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Delta Open-Loop Variable-Torque Standard Drive VP3000 Series Parameter Manual

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READ PRIOR TO INSTALLATION FOR SAFETY.

DANGER

☑ Disconnect AC input power before connecting any wiring to the AC motor drive.
☑ Even if the power has been turned off, a charge may still remain in the DC-link capacitors with hazardous voltages before the POWER LED is OFF. Do NOT touch the internal circuits and components.
☑ There are highly sensitive MOS components on the printed circuit boards. These components are especially sensitive to static electricity. Take anti-static measure before touching these components or the circuit boards.
☑ Never modify the internal components or wiring.
☑ Ground the AC motor drive by using the ground terminal. The grounding method must comply with the laws of the country where the AC motor drive is to be installed.
☑ Do NOT install the AC motor drive in a location with high temperature, direct sunlight or inflammable materials or gases.

CAUTION

☑ Never connect the AC motor drive output terminals U/T1, V/T2 and W/T3 directly to the AC mains circuit power supply.
☑ After finishing the wiring of the AC motor drive, check if U/T1, V/T2, and W/T3 are short-circuited to ground with a multimeter. Do NOT power the drive if short circuits occur. Eliminate the short circuits before the drive is powered.
☑ The rated voltage of power system to install motor drives is listed below. Ensure that the installation voltage is in the correct range when installing a motor drive.
1. For 230V models, the range is between 170–264V.
2. For 460V models, the range is between 323–528V.

☑ Refer to the table below for short circuit rating:

460V Model (Power)	0.75–37 kW	45–132 kW	160–280 kW	315–400 kW	450–630 kW
Short Circuit Rating	5 kA	10 kA	18 kA	30 kA	42 kA

☑ Only qualified persons are allowed to install, wire and maintain the AC motor drives.
☑ Even if the three-phase AC motor is stopped, a charge with hazardous voltages may still remain in the main circuit terminals of the AC motor drive.
☑ The performance of electrolytic capacitor will degrade if it is not charged for a long time. It is recommended to charge the drive that is stored in no charge condition every 2 years for 3–4 hours to restore the performance of electrolytic capacitor in the motor drive. **NOTE:** When power up the motor drive, use adjustable AC power source (ex. AC autotransformer) to charge the drive at 70–80% of rated voltage for 30 minutes (do not run the motor drive). Then charge the drive at 100% of rated voltage for an hour (do not run the motor drive). By doing these, restore the performance of electrolytic capacitor before starting to run the motor drive. Do NOT run the motor drive at 100% rated voltage right away.
☑ Pay attention to the following precautions when transporting and installing this package (including wooden crate and wood stave)
1. If you need to deworm the wooden crate, do NOT use fumigation or you will damage the drive. Any damage to the drive caused by using fumigation voids the warranty.
2. Use other methods, such as heat treatment or any other non-fumigation treatment, to deworm the wood packaging material.
3. If you use heat treatment to deworm, leave the packaging materials in an environment of over 56°C for a minimum of thirty minutes.

☑ Connect the drive to a three-phase three-wire or three-phase four-wire Wye system to comply with UL standards.

	☑ If the motor drive generates leakage current over AC 3.5 mA or over DC 10 mA on a grounding conductor, compliance with local grounding regulations or IEC61800-5-1 standard is the minimum requirement for grounding. ☑ The VP3000 series drives are designed for Industrial application. The non-linear load generates harmonic current, when you use a VP3000 series drive in a public low-voltage distribution network (such as power supply in a residential building), install suppression devices (for example, one-to-one transformer or input AC reactor) to suppress the possible interferences caused by the harmonic current. Contact Delta for more information.

NOTE: The content of this manual may be revised without prior notice. Consult our distributors or download the latest version at http://www.deltaww.com/iadownload_acmotordrive

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This chapter provides summary of parameter settings for user to gather the parameter setting ranges, factory settings and set parameters. The parameters can be set, changed and reset by the digital keypad.

NOTE:

1. ⌿: the parameter can be set during operation
2. ✻: Advanced parameters, set Pr.b0-00 to unlock this parameter.
3. For more detail on parameters, refer to Ch13 Description of Parameter Settings.
4. Refer to the Abbreviation Table in Appendix A for full names of abbreviations in the parameter name.

A. Fundamental Setting

A0. Drive Information

Pr.	Parameter Name	Setting Range	Default
A0-00 (0x00)	Drive Identity Code	3–165	Read only
A0-01 (0x01)	Drive Cont. Rated Current	0–6000.0 A	Read only
A0-02 (0x02)	Drive Max. Output Current	0–6000.0 A	Read only
A0-03 (0x03)	Control Board FW Version	0.00–655.35	Read only
A0-05 (0x05)	Control Board FW Date Code	0–65535	Read only
A0-06 (0x06)	Power Board FW Version	0.00–655.35	Read only
A0-08 (0x08)	Power Board FW Date Code	0–65535	Read only

A1. Control Handle

Pr.	Parameter Name	Setting Range	Default
A1-00 (0x40)	EX1/EX2 Switch Src	0: External 1 1: External 2 2–7: MI1–MI6 8–10: Reserve 10–15: MI10–MI15	0

Pr.	Parameter Name	Setting Range	Default
A1-01 (0x41)	EX1 OPER Cmd Src	0: Disable 1: S1 Start 2: S1 Start, S2 Dir 3: S1 FWD, S2 REV 4: S1 Start, S2 Stop 5: S1 Start, S2 Stop, S3 Dir 6: S1 FWD, S2 REV, S3 Stop 7: Keypad 8: RS-485 9: USB 10: EX. COM	0
A1-02 (0x42)	EX1 S1 Src	0: Disable 1: Reserve 2–7: MI1–MI6 8–9: Reserve 10–15: MI10–MI15	0
A1-03 (0x43)	EX1 S2 Src	0: Disable 1: Reserve 2–7: MI1–MI6 8–9: Reserve 10–15: MI10–MI15	0
A1-04 (0x44)	EX1 S3 Src	0: Disable 1: Reserve 2–7: MI1–MI6 8–9: Reserve 10–15: MI10–MI15	0
A1-05 (0x45)	EX1 S1 Trigger Method	0: Edge Triggered 1: Level Triggered	0
A1-06 (0x46)	EX1 S2 Trigger Method	0: Edge Triggered 1: Level Triggered	0
A1-07 (0x47)	EX1 S3 Trigger Method	0: Edge Triggered 1: Level Triggered	0
A1-08 (0x48)	EX2 OPER Cmd Src	0: Disable 1: S1 Start 2: S1 Start, S2 Dir 3: S1 FWD, S2 REV 4: S1 Start, S2 Stop 5: S1 Start, S2 Stop, S3 Dir 6: S1 FWD, S2 REV, S3 Stop 7: Keypad	0

	Pr.	Parameter Name	Setting Range	Default
			8: RS-485 9: USB 10: EX. COM	
	A1-09 (0x49)	EX2 S1 Src	0: Disable 1: Reserve 2–7: MI1–MI6 8–9: Reserve 10–15: MI10–MI15	0
	A1-10 (0x4A)	EX2 S2 Src	0: Disable 1: Reserve 2–7: MI1–MI6 8–9: Reserve 10–15: MI10–MI15	0
	A1-11 (0x4B)	EX2 S3 Src	0: Disable 1: Reserve 2–7: MI1–MI6 8–9: Reserve 10–15: MI10–MI15	0
✔	A1-12 (0x4C)	EX2 S1 Trigger Method	0: Edge Triggered 1: Level Triggered	0
✔	A1-13 (0x4D)	EX2 S2 Trigger Method	0: Edge Triggered 1: Level Triggered	0
✔	A1-14 (0x4E)	EX2 S3 Trigger Method	0: Edge Triggered 1: Level Triggered	0
✔	A1-15 (0x4F)	Halt Decel Method	0: Ramp to stop 1: By Quick Stop Time 2: Auto-Decel	0
	A1-16 (0x50)	Halt MI Src	0: Disable 1: Reserve 2–7: MI1–MI6 8–9: Reserve 10–15: MI10–MI15	0
	A1-17 (0x51)	Lock MI Src	0: Disable 1: Reserve 2–7: MI1–MI6 8–9: Reserve 10–15: MI10–MI15	0

Pr.	Parameter Name	Setting Range	Default
A1-21 (0x55)	Run Enable MI Src	0: Disable 1: Reserve 2–7: MI1–MI6 8–9: Reserve 10–15: MI10–MI15	0
A1-22 (0x56)	Run Disable Stop Method	0: Coast to stop 1: Ramp to stop 2: By Quick Stop Time 3: Auto-Decel	0
A1-23 (0x57)	Run Enable Indn	0: Disable 1–2: Relay1–2 3–4: MO1–MO2 5–9: Reserve 10–15: MO/Relay10–15	0
A1-24 (0x58)	OPER Cmd by Kpd Indn	0: Disable 1–2: Relay1–2 3–4: MO1–MO2 5–9: Reserve 10–15: MO/Relay10–15	0
A1-25 (0x59)	Forward Cmd Indn	0: Disable 1–2: Relay1–2 3–4: MO1–MO2 5–9: Reserve 10–15: MO/Relay10–15	0
A1-26 (0x5A)	Reverse Cmd Indn	0: Disable 1–2: Relay1–2 3–4: MO1–MO2 5–9: Reserve 10–15: MO/Relay10–15	0
A1-27 (0x5B)	FWD / REV Direction Setting	0: Enable FWD/ REV 1: FWD only 2: REV only	0
A1-28 (0x5C)	Forward Phase Sel	0: UVW 1: UWV	0
A1-29 (0x5D)	Base Block MI Src	0: Disable 1: Reserve 2–7: MI1–MI6 8–9: Reserve 10–15: MI10–MI15	0

Pr.	Parameter Name	Setting Range	Default
A1-30 (0x5E)	Base Block Time	Demagnitization time setting–5.0 sec.	Demagni- tization time set
A1-31 (0x5F)	Base Block Indn	0: Disable 1–2: Relay1–2 3–4: MO1–MO2 5–9: Reserve 10–15: MO/Relay10–15	0
A1-32 (0x60)	External Fault MI Src	0: Disable 1: Reserve 2–7: MI1–MI6 8–9: Reserve 10–15: MI10–MI15	0
A1-33 (0x61)	External Fault Stop Method	0: Coast to stop 1: Ramp to stop 2: By EF decel Time 3: Auto-Decel	0
A1-34 (0x62)	External Fault Decel Time	0.0–6000.0 sec. 0.00–600.00 sec.	10.00 or 60.00

A2. Stop Method

Pr.	Parameter Name	Setting Range	Default
A2-00 (0x80)	Stop Method	0: Ramp to stop 1: Coast to stop 2: Auto-Decel	0
A2-01 (0x81)	Quick Stop MI Src	0: Disable 1: Reserve 2–7: MI1–MI6 8–9: Reserve 10–15: MI10–MI15	0
A2-02 (0x82)	Quick Stop Method	0: By Quick Stop Time 1: Coast to stop 2: Auto-Decel 3: Ramp to stop	0
A2-03 (0x83)	Emergency Stop MI Src	0: Disable 1: Reserve 2–7: MI1–MI6 8–9: Reserve 10–15: MI10–MI15	0
A2-05 (0x85)	Decel Voltage Limit	Depending on the models	Depending on the models

Pr.	Parameter Name	Setting Range	Default
A2-06 (0x86)	Zero Speed Delay Level	0.00–599.00 Hz	1.00
A2-07 (0x87)	Zero Speed Delay Time	0.0–6553.5 sec.	0.0
A2-08 (0x88)	Zero Speed Delay Timeout	0.0–6553.5 sec.	0.0

A3. Start & Stop Function

Pr.	Parameter Name	Setting Range	Default
A3-00 (0xC0)	Start Speed Tracking	0: Disable 1: Max. output FREQ 2: FREQ Cmd at Start 3: Min. output FREQ 4: Rotor FREQ	0
A3-01 (0xC1)	Speed Tracking Current Limit	20–200%	100
A3-02 (0xC2)	Speed Tracking Voltage Gain	1–200%	100
A3-03 (0xC3)	Speed Tracking Time	0.100–10.000 sec.	1.000
A3-04 (0xC4)	Speed Tracking FREQ Filter	0.001–10.000 sec.	0.050
A3-05 (0xC5)	Speed Tracking Transient Time	0.100–10.000 sec.	0.500
A3-06 (0xC6)	DC Brake Current Level	0–150%	100
A3-07 (0xC7)	DC Brake Time at Start	0.0–60.0 sec.	0.0
A3-08 (0xC8)	DC Brake Time at Stop	0.0–60.0 sec.	0.0
A3-09 (0xC9)	DC Brake Frequency at Stop	0.00–599.00 Hz	0.00
A3-10 (0xCA)	DC Brake Kp Gain	0.000–60.000 pu	0.020
A3-11 (0xCB)	DC Brake Ki Gain	0.000–60.000 pu	0.500
A3-12 (0xCC)	PM Zero Voltage Time at Start	0.0–60.0 sec.	0.0
A3-13 (0xCD)	PM Zero Voltage Time at Stop	0.0–60.0 sec.	0.0
A3-14 (0xCE)	IM Magnetize Time at Start	0.0–60.0 sec.	0.0
A3-15 (0xCF)	IM Magnetize Current at Start	0–100%	0
A3-16 (0xD0)	IM Demagnetize Time	0.0–5.0 sec.	Depending on the models

Pr.	Parameter Name	Setting Range	Default
A3-17 (0xD1)	SM Rotor Initial Detection	0: Disable 1: Force Alignment 2: Pulse inject 3: HFI	0
A3-18 (0xD2)	Force Alignment Current Value	0–150%	50
A3-19 (0xD3)	Force Alignment Time	0.0–10.0 sec.	2.0
A3-20 (0xD4)	Pulse Inject Curr Threshold	0–300%	100
A3-21 (0xD5)	HFI Frequency	200–2400 Hz	1000
A3-22 (0xD6)	HFI Amplitude	0–100%	30

A4. HOA / LoRe Setting

Pr.	Parameter Name	Setting Range	Default
A4-00 (0x100)	HOA/ LoRe Sel.	0: HOA 1: LoRe	0
A4-01 (0x101)	AUTO Lock MI Src	0: Disable 1: Enable 2–7: MI1–MI6 8–9: Reserve 10–15: MI10–MI15	0
A4-02 (0x102)	AUTO Lock Mode	0: AUTO to OFF Disable 1: AUTO to HAND Disable 2: AUTO to HAND & OFF Disable	0
A4-03 (0x103)	AUTO Initial FREQ Cmd	0: FREQ before switch 1: AUTO mode FREQ	0
A4-04 (0x104)	HAND Initial FREQ Cmd	0: FREQ before switch 1: HAND mode FREQ	0
A4-05 (0x105)	LoRe Switch Src	0: Remote 1: Local 2–7: MI1–MI6 8–9: Reserve 10–15: MI10–MI15 16–19: Reserve 20: Keypad	20

Pr.	Parameter Name	Setting Range	Default
A4-06 (0x106)	Remote Lock MI Src	0: Disable 1: Enable 2–7: MI1–MI6 8–9: Reserve 10–15: MI10–MI15	0
A4-07 (0x107)	Remote Keypad STOP Enable	0: Disable 1: Enable	0
A4-08 (0x108)	Remote Initial FREQ Cmd	0: FREQ before switch 1: Remote mode FREQ	0
A4-09 (0x109)	Local Initial FREQ Cmd	0: FREQ before switch 1: Local mode FREQ	0
A4-10 (0x10A)	LoRe Switch Action	0: Always stop 1: Remote Start Cmd 2: Local Start Cmd 3: Start Cmd before Switch	2

A5. Carrier FREQ Adjustment

Pr.	Parameter Name	Setting Range	Default
A5-00 (0x140)	CF Setting	Depending on the models–15.0 kHz	Depending on the models
A5-01 (0x141)	Over-Modulation Gain	80–110%	100
A5-12 (0x14C)	RPWM Sel	0: Disable 1: RPWM Mode 1 2: RPWM Mode 2 3: RPWM Mode 3	0
A5-13 (0x14D)	RPWM Range	0.0–Carrier frequency setting kHz	0.0
A5-14 (0x14E)	AVR Function	0: Enable 1: Disable during decel 2: Disable	0
A5-15 (0x14F)	AVR DC bus Filter Time	0.000–10.000 sec.	0.010
A5-16 (0x150)	DC bus Filter Time	0.000–10.000 sec.	0.010
A5-17 (0x151)	DC bus Ripple Suppression	0: Disable 1: Manual COMP	Depending on the models
A5-18 (0x152)	DC bus Ripple Suppress Gain	0.00–50.00	0
A5-19 (0x153)	DC bus Ripple Suppress Limit	5–30%	10

b. Pr Management & Macro

b0. Pr Management

Pr.	Parameter Name	Setting Range	Default
b0-00 (0x200)	Access Permission	0: Normal 1: Advanced	0
b0-01 (0x201)	Parameter Reset	0: Reserve 5: Reset kWh 6: Reset PLC 7: Reset CANopen Slave index 9: Reset 50 Hz default 10: Reset 60 Hz default	0
b0-02 (0x202)	Password Setting	0–65535	0
b0-03 (0x203)	Password	0–65535	0
b0-04 (0x204)	Read-Only Password Setting	0–65535	0
b0-05 (0x205)	Read-Only Password	0–65535	0
b0-06 (0x206)	Failed password attempts	0–3	Read only
b0-07 (0x207)	Parameter Lock Status	bit0: Parameter hidden bit1: Parameter read-only bit2: Reserve bit3: Over PW attempts limit bit4: FireMode parameter lock	Read only

b1. Application Macro

Pr.	Parameter Name	Setting Range	Default
b1-00 (0x240)	MACRO Sel	0: Reserve 1: User Defined 2: Compressor 3: Fan 4: Pump 10: AHU	0
b1-01 (0x241)	MACRO Parameter 1	0–65535	0
b1-02 (0x242)	MACRO Parameter 2	0–65535	0
b1-03 (0x243)	MACRO Parameter 3	0–65535	0
b1-04 (0x244)	MACRO Parameter 4	0–65535	0
b1-05 (0x245)	MACRO Parameter 5	0–65535	0

Pr.	Parameter Name	Setting Range	Default
b1-06 (0x246)	MACRO Parameter 6	0–65535	0
b1-07 (0x247)	MACRO Parameter 7	0–65535	0
b1-08 (0x248)	MACRO Parameter 8	0–65535	0
b1-09 (0x249)	MACRO Parameter 9	0–65535	0
b1-10 (0x24A)	MACRO Parameter 10	0–65535	0
b1-11 (0x24B)	MACRO Parameter 11	0–65535	0
b1-12 (0x24C)	MACRO Parameter 12	0–65535	0
b1-13 (0x24D)	MACRO Parameter 13	0–65535	0
b1-14 (0x24E)	MACRO Parameter 14	0–65535	0
b1-15 (0x24F)	MACRO Parameter 15	0–65535	0
b1-16 (0x250)	MACRO Parameter 16	0–65535	0
b1-17 (0x251)	MACRO Parameter 17	0–65535	0
b1-18 (0x252)	MACRO Parameter 18	0–65535	0
b1-19 (0x253)	MACRO Parameter 19	0–65535	0
b1-20 (0x254)	MACRO Parameter 20	0–65535	0
b1-21 (0x255)	MACRO Parameter 21	0–65535	0
b1-22 (0x256)	MACRO Parameter 22	0–65535	0
b1-23 (0x257)	MACRO Parameter 23	0–65535	0
b1-24 (0x258)	MACRO Parameter 24	0–65535	0
b1-25 (0x259)	MACRO Parameter 25	0–65535	0
b1-26 (0x25A)	MACRO Parameter 26	0–65535	0
b1-27 (0x25B)	MACRO Parameter 27	0–65535	0
b1-28 (0x25C)	MACRO Parameter 28	0–65535	0
b1-29 (0x25D)	MACRO Parameter 29	0–65535	0
b1-30 (0x25E)	MACRO Parameter 30	0–65535	0

Pr.	Parameter Name	Setting Range	Default
b1-31 (0x25F)	MACRO Parameter 31	0–65535	0
b1-32 (0x260)	MACRO Parameter 32	0–65535	0
b1-33 (0x261)	MACRO Parameter 33	0–65535	0
b1-34 (0x262)	MACRO Parameter 34	0–65535	0
b1-35 (0x263)	MACRO Parameter 35	0–65535	0
b1-36 (0x264)	MACRO Parameter 36	0–65535	0
b1-37 (0x265)	MACRO Parameter 37	0–65535	0
b1-38 (0x266)	MACRO Parameter 38	0–65535	0
b1-39 (0x267)	MACRO Parameter 39	0–65535	0
b1-40 (0x268)	MACRO Parameter 40	0–65535	0
b1-41 (0x269)	MACRO Parameter 41	0–65535	0
b1-42 (0x26A)	MACRO Parameter 42	0–65535	0
b1-43 (0x26B)	MACRO Parameter 43	0–65535	0
b1-44 (0x26C)	MACRO Parameter 44	0–65535	0
b1-45 (0x26D)	MACRO Parameter 45	0–65535	0
b1-46 (0x26E)	MACRO Parameter 46	0–65535	0
b1-47 (0x26F)	MACRO Parameter 47	0–65535	0
b1-48 (0x270)	MACRO Parameter 48	0–65535	0
b1-49 (0x271)	MACRO Parameter 49	0–65535	0
b1-50 (0x272)	MACRO Parameter 50	0–65535	0
b1-51 (0x273)	MACRO Parameter 51	0–65535	0
b1-52 (0x274)	MACRO Parameter 52	0–65535	0
b1-53 (0x275)	MACRO Parameter 53	0–65535	0
b1-54 (0x276)	MACRO Parameter 54	0–65535	0
b1-55 (0x277)	MACRO Parameter 55	0–65535	0

	Pr.	Parameter Name	Setting Range	Default
𝑁	b1-56 (0x278)	MACRO Parameter 56	0–65535	0
𝑁	b1-57 (0x279)	MACRO Parameter 57	0–65535	0
𝑁	b1-58 (0x27A)	MACRO Parameter 58	0–65535	0
𝑁	b1-59 (0x27B)	MACRO Parameter 59	0–65535	0
𝑁	b1-60 (0x27C)	MACRO Parameter 60	0–65535	0

b2. Pr Modified REC 1–20

Pr.	Parameter Name	Setting Range	Default
b2-00 (0x280)	REC 1 Pr Address	0–65535	Read only
b2-01 (0x281)	REC 1 Original Setting	0–65535	Read only
b2-02 (0x282)	REC 1 New Setting	0–65535	Read only
b2-03 (0x283)	REC 1 Year	0–65535	Read only
b2-04 (0x284)	REC 1 Date	0–1231	Read only
b2-05 (0x285)	REC 1 Time	0–2359	Read only
b2-06 (0x286)	REC 2 Pr Address	0–65535	Read only
b2-07 (0x287)	REC 2 Original Setting	0–65535	Read only
b2-08 (0x288)	REC 2 New Setting	0–65535	Read only
b2-09 (0x289)	REC 2 Year	0–65535	Read only
b2-10 (0x28A)	REC 2 Date	0–1231	Read only
b2-11 (0x28B)	REC 2 Time	0–2359	Read only
b2-12 (0x28C)	REC 3 Pr Address	0–65535	Read only
b2-13 (0x28D)	REC 3 Original Setting	0–65535	Read only
b2-14 (0x28E)	REC 3 New Setting	0–65535	Read only
b2-15 (0x28F)	REC 3 Year	0–65535	Read only
b2-16 (0x290)	REC 3 Date	0–1231	Read only
b2-17 (0x291)	REC 3 Time	0–2359	Read only

Pr.	Parameter Name	Setting Range	Default
b2-18 (0x292)	REC 4 Pr Address	0–65535	Read only
b2-19 (0x293)	REC 4 Original Setting	0–65535	Read only
b2-20 (0x294)	REC 4 New Setting	0–65535	Read only
b2-21 (0x295)	REC 4 Year	0–65535	Read only
b2-22 (0x296)	REC 4 Date	0–1231	Read only
b2-23 (0x297)	REC 4 Time	0–2359	Read only
b2-24 (0x298)	REC 5 Pr Address	0–65535	Read only
b2-25 (0x299)	REC 5 Original Setting	0–65535	Read only
b2-26 (0x29A)	REC 5 New Setting	0–65535	Read only
b2-27 (0x29B)	REC 5 Year	0–65535	Read only
b2-28 (0x29C)	REC 5 Date	0–1231	Read only
b2-29 (0x29D)	REC 5 Time	0–2359	Read only
b2-30 (0x29E)	REC 6 Pr Address	0–65535	Read only
b2-31 (0x29F)	REC 6 Original Setting	0–65535	Read only
b2-32 (0x2A0)	REC 6 New Setting	0–65535	Read only
b2-33 (0x2A1)	REC 6 Year	0–65535	Read only
b2-34 (0x2A2)	REC 6 Date	0–1231	Read only
b2-35 (0x2A3)	REC 6 Time	0–2359	Read only
b2-36 (0x2A4)	REC 7 Pr Address	0–65535	Read only
b2-37 (0x2A5)	REC 7 Original Setting	0–65535	Read only
b2-38 (0x2A6)	REC 7 New Setting	0–65535	Read only
b2-39 (0x2A7)	REC 7 Year	0–65535	Read only
b2-40 (0x2A8)	REC 7 Date	0–1231	Read only
b2-41 (0x2A9)	REC 7 Time	0–2359	Read only
b2-42 (0x2AA)	REC 8 Pr Address	0–65535	Read only

Pr.	Parameter Name	Setting Range	Default
b2-43 (0x2AB)	REC 8 Original Setting	0–65535	Read only
b2-44 (0x2AC)	REC 8 New Setting	0–65535	Read only
b2-45 (0x2AD)	REC 8 Year	0–65535	Read only
b2-46 (0x2AE)	REC 8 Date	0–1231	Read only
b2-47 (0x2AF)	REC 8 Time	0–2359	Read only
b2-48 (0x2B0)	REC 9 Pr Address	0–65535	Read only
b2-49 (0x2B1)	REC 9 Original Setting	0–65535	Read only
b2-50 (0x2B2)	REC 9 New Setting	0–65535	Read only
b2-51 (0x2B3)	REC 9 Year	0–65535	Read only
b2-52 (0x2B4)	REC 9 Date	0–1231	Read only
b2-53 (0x2B5)	REC 9 Time	0–2359	Read only
b2-54 (0x2B6)	REC 10 Pr Address	0–65535	Read only
b2-55 (0x2B7)	REC 10 Original Setting	0–65535	Read only
b2-56 (0x2B8)	REC 10 New Setting	0–65535	Read only
b2-57 (0x2B9)	REC 10 Year	0–65535	Read only
b2-58 (0x2BA)	REC 10 Date	0–1231	Read only
b2-59 (0x2BB)	REC 10 Time	0–2359	Read only

b3. Pr Modified REC 11–20

Pr.	Parameter Name	Setting Range	Default
b3-00 (0x2C0)	REC 11 Pr Address	0–65535	Read only
b3-01 (0x2C1)	REC 11 Original Setting	0–65535	Read only
b3-02 (0x2C2)	REC 11 New Setting	0–65535	Read only
b3-03 (0x2C3)	REC 11 Year	0–65535	Read only
b3-04 (0x2C4)	REC 11 Date	0–1231	Read only
b3-05 (0x2C5)	REC 11 Time	0–2359	Read only

Pr.	Parameter Name	Setting Range	Default
b3-06 (0x2C6)	REC 12 Pr Address	0–65535	Read only
b3-07 (0x2C7)	REC 12 Original Setting	0–65535	Read only
b3-08 (0x2C8)	REC 12 New Setting	0–65535	Read only
b3-09 (0x2C9)	REC 12 Year	0–65535	Read only
b3-10 (0x2CA)	REC 12 Date	0–1231	Read only
b3-11 (0x2CB)	REC 12 Time	0–2359	Read only
b3-12 (0x2CC)	REC 13 Pr Address	0–65535	Read only
b3-13 (0x2CD)	REC 13 Original Setting	0–65535	Read only
b3-14 (0x2CE)	REC 13 New Setting	0–65535	Read only
b3-15 (0x2CF)	REC 13 Year	0–65535	Read only
b3-16 (0x2D0)	REC 13 Date	0–1231	Read only
b3-17 (0x2D1)	REC 13 Time	0–2359	Read only
b3-18 (0x2D2)	REC 14 Pr Address	0–65535	Read only
b3-19 (0x2D3)	REC 14 Original Setting	0–65535	Read only
b3-20 (0x2D4)	REC 14 New Setting	0–65535	Read only
b3-21 (0x2D5)	REC 14 Year	0–65535	Read only
b3-22 (0x2D6)	REC 14 Date	0–1231	Read only
b3-23 (0x2D7)	REC 14 Time	0–2359	Read only
b3-24 (0x2D8)	REC 15 Pr Address	0–65535	Read only
b3-25 (0x2D9)	REC 15 Original Setting	0–65535	Read only
b3-26 (0x2DA)	REC 15 New Setting	0–65535	Read only
b3-27 (0x2DB)	REC 15 Year	0–65535	Read only
b3-28 (0x2DC)	REC 15 Date	0–1231	Read only
b3-29 (0x2DD)	REC 15 Time	0–2359	Read only
b3-30 (0x2DE)	REC 16 Pr Address	0–65535	Read only

Pr.	Parameter Name	Setting Range	Default
b3-31 (0x2DF)	REC 16 Original Setting	0–65535	Read only
b3-32 (0x2E0)	REC 16 New Setting	0–65535	Read only
b3-33 (0x2E1)	REC 16 Year	0–65535	Read only
b3-34 (0x2E2)	REC 16 Date	0–1231	Read only
b3-35 (0x2E3)	REC 16 Time	0–2359	Read only
b3-36 (0x2E4)	REC 17 Pr Address	0–65535	Read only
b3-37 (0x2E5)	REC 17 Original Setting	0–65535	Read only
b3-38 (0x2E6)	REC 17 New Setting	0–65535	Read only
b3-39 (0x2E7)	REC 17 Year	0–65535	Read only
b3-40 (0x2E8)	REC 17 Date	0–1231	Read only
b3-41 (0x2E9)	REC 17 Time	0–2359	Read only
b3-42 (0x2EA)	REC 18 Pr Address	0–65535	Read only
b3-43 (0x2EB)	REC 18 Original Setting	0–65535	Read only
b3-44 (0x2EC)	REC 18 New Setting	0–65535	Read only
b3-45 (0x2ED)	REC 18 Year	0–65535	Read only
b3-46 (0x2EE)	REC 18 Date	0–1231	Read only
b3-47 (0x2EF)	REC 18 Time	0–2359	Read only
b3-48 (0x2F0)	REC 19 Pr Address	0–65535	Read only
b3-49 (0x2F1)	REC 19 Original Setting	0–65535	Read only
b3-50 (0x2F2)	REC 19 New Setting	0–65535	Read only
b3-51 (0x2F3)	REC 19 Year	0–65535	Read only
b3-52 (0x2F4)	REC 19 Date	0–1231	Read only
b3-53 (0x2F5)	REC 19 Time	0–2359	Read only
b3-54 (0x2F6)	REC 20 Pr Address	0–65535	Read only
b3-55 (0x2F7)	REC 20 Original Setting	0–65535	Read only

Pr.	Parameter Name	Setting Range	Default
b3-56 (0x2F8)	REC 20 New Setting	0–65535	Read only
b3-57 (0x2F9)	REC 20 Year	0–65535	Read only
b3-58 (0x2FA)	REC 20 Date	0–1231	Read only
b3-59 (0x2FB)	REC 20 Time	0–2359	Read only

C. Control Mode & Cmd Scheme

C0. Motor Control Mode

Pr.	Parameter Name	Setting Range	Default
C0-00 (0x400)	Motor Type	0: IM 1: PM 2: SynRM	0
C0-02 (0x402)	Motor Control Method	0: VF 1: SVC 2: FOC	0

C1. FREQ Cmd Handle

Pr.	Parameter Name	Setting Range	Default
C1-00 (0x440)	EX1 Main and Aux FREQ Math	0: Main FREQ 1: Aux FREQ 2: ADD 3: SUB 4: MULTI 5: DIV 6: MAX 7: MIN	0
C1-01 (0x441)	EX1 Main FREQ Src	0: Disable 1: Keypad 2: RS-485 3: USB 4: COM Card 5–6: Reserve 7–9: AI1–AI3 10–11: Reserve 12–13: AI10–AI11 14–15: Reserve 16: Up/down keys 17: Pulse Train 18: PID	1
C1-02 (0x442)	EX1 Aux FREQ Src	0: Ddisable 1: Keypad 2: RS-485 3: USB 4: COM Card 5–6: Reserve 7–9: AI1–AI3	0

Pr.	Parameter Name	Setting Range	Default
		10–11: Reserve 12–13: AI10–AI11 14–15: Reserve 16: Up/down keys 17: Pulse Train 18: PID	
C1-03 (0x443)	EX1 Aux FREQ Gain	-200.0–200.0%	100.0
C1-04 (0x444)	EX2 Main & Aux FREQ Math	0: Main FREQ 1: Aux FREQ 2: ADD 3: SUB 4: MULTI 5: DIV 6: MAX 7: MIN	0
C1-05 (0x445)	EX2 Main FREQ Src	0: Disable 1: Keypad 2: RS-485 3: USB 4: COM Card 5–6: Reserve 7–9: AI1–AI3 10–11: Reserve 12–13: AI10–AI11 14–15: Reserve 16: Up/down keys 17: Pulse Train 18: PID	1
C1-06 (0x446)	EX2 Aux FREQ Src	0: Disable 1: Keypad 2: RS-485 3: USB 4: COM Card 5–6: Reserve 7–9: AI1–AI3 10–11: Reserve 12–13: AI10–AI11 14–15: Reserve 16: Up/down keys	0

	Pr.	Parameter Name	Setting Range	Default
			17: Pulse Train 18: PID	
✔	C1-07 (0x447)	EX2 Aux FREQ Gain	-200.0–200.0%	100.0
✔	C1-08 (0x448)	Keypad FREQ Cmd	0.00–599.00 Hz	60.00
	C1-09 (0x449)	FREQ Cmd REC	0.00–599.00 Hz	60.00
✔	C1-10 (0x44A)	Zero-speed Behavior	0: Output ready 1: Zero-speed run 2: Min output FREQ	0
✔	C1-11 (0x44B)	Pulse Train MI Src	0: Disable 1–5: Reserve 6: MI5	0
✔	C1-12 (0x44C)	Pulse Train Filter Time	0.000–65.535 sec.	0.100
✔	C1-13 (0x44D)	FREQ Cmd Up Key MI Src	0: Disable 1: Enable 2–7: MI1–MI6 8–9: Reserve 10–15: MI10–MI15	0
✔	C1-14 (0x44E)	FREQ Cmd Down Key MI Src	0: Disable 1: Enable 2–7: MI1–MI6 8–9: Reserve 10–15: MI10–MI15	0
	C1-15 (0x44F)	Up/Down Accel/ Decel Method	0: Accel/ Decel time 1: Up/Down Accel/Decel rate	0
✔	C1-16 (0x450)	Up/Down Accel/ Decel Rate	0.001–1.000 Hz / ms	0.001
✔	C1-17 (0x451)	Up/Down Accel/ Decel Rate Unit	0: Hz/ms 1: Hz/100ms	0
	C1-18 (0x452)	Multi Speed Mode	0: 16 Speed 1: 4 Speed	0
	C1-19 (0x453)	Multi Speed MI Src 1	0: Disable 1: Reserve 2–7: MI1–MI6 8–9: Reserve 10–15: MI10–MI15	0

	Pr.	Parameter Name	Setting Range	Default
	C1-20 (0x454)	Multi Speed MI Src 2	0: Disable 1: Reserve 2–7: MI1–MI6 8–9: Reserve 10–15: MI10–MI15	0
	C1-21 (0x455)	Multi Speed MI Src 3	0: Disable 1: Reserve 2–7: MI1–MI6 8–9: Reserve 10–15: MI10–MI15	0
	C1-22 (0x456)	Multi Speed MI Src 4	0: Disable 1: Reserve 2–7: MI1–MI6 8–9: Reserve 10–15: MI10–MI15	0
✓	C1-23 (0x457)	Multi Speed 1	0.00–599.00 Hz	0.00
✓	C1-24 (0x458)	Multi Speed 2	0.00–599.00 Hz	0.00
✓	C1-25 (0x459)	Multp Speed 3	0.00–599.00 Hz	0.00
✓	C1-26 (0x45A)	Multi Speed 4	0.00–599.00 Hz	0.00
✓	C1-27 (0x45B)	Multi Speed 5	0.00–599.00 Hz	0.00
✓	C1-28 (0x45C)	Multi Speed 6	0.00–599.00 Hz	0.00
✓	C1-29 (0x45D)	Multi Speed 7	0.00–599.00 Hz	0.00
✓	C1-30 (0x45E)	Multi Speed 8	0.00–599.00 Hz	0.00
✓	C1-31 (0x45F)	Multi Speed 9	0.00–599.00 Hz	0.00
✓	C1-32 (0x460)	Multi Speed 10	0.00–599.00 Hz	0.00
✓	C1-33 (0x461)	Multi Speed 11	0.00–599.00 Hz	0.00
✓	C1-34 (0x462)	Multi Speed 12	0.00–599.00 Hz	0.00
✓	C1-35 (0x463)	Multi Speed 13	0.00–599.00 Hz	0.00
✓	C1-36 (0x464)	Multi Speed 14	0.00–599.00 Hz	0.00
✓	C1-37 (0x465)	Multi Speed 15	0.00–599.00 Hz	0.00
✓	C1-38 (0x466)	Negative FREQ Cmd Define	0: Always 0 Hz 1: Negative is reverse	0

Pr.	Parameter Name	Setting Range	Default
C1-39 (0x467)	AI Res Switch MI Src	0: Disable 1: Enable 2–7: MI1–MI6 8–9: Reserve 10–15: MI10–MI15	0
C1-40 (0x468)	AI Res Switch Max FREQ	0.00–599.00 Hz	60.00
C1-41 (0x469)	AI Res Switch Delay	0.000–65.000 sec.	0.000

C2. Accel / Decel & Speed Limit

Pr.	Parameter Name	Setting Range	Default
C2-00 (0x480)	Accel Time 1	0.0–6000.0 sec./ 0.00–600.00 sec.	10.00 or 60.00 (30 HP above models)
C2-01 (0x481)	Decel Time 1	0.0–6000.0 sec./ 0.00–600.00 sec.	10.00 or 60.00 (30 HP above models)
C2-02 (0x482)	Accel Time 2	0.0–6000.0 sec./ 0.00–600.00 sec.	10.00 or 60.00 (30 HP above models)
C2-03 (0x483)	Decel Time 2	0.0–6000.0 sec./ 0.00–600.00 sec.	10.00 or 60.00 (30 HP above models)
C2-04 (0x484)	Accel Time 3	0.0–6000.0 sec./ 0.00–600.00 sec.	10.00 or 60.00 (30 HP above models)
C2-05 (0x485)	Decel Time 3	0.0–6000.0 sec./ 0.00–600.00 sec.	10.00 or 60.00 (30 HP above models)
C2-06 (0x486)	Accel Time 4	0.0–6000.0 sec./ 0.00–600.00 sec.	10.00 or 60.00 (30 HP above models)
C2-07 (0x487)	Decel Time 4	0.0–6000.0 sec./ 0.00–600.00 sec.	10.00 or 60.00 (30 HP above models)
C2-08 (0x488)	Start of Accel S-curve Time	0.00–25.00 sec./ 0.0–250.0 sec.	0.20/ 0.2
C2-09 (0x489)	End of Accel S-curve Time	0.00–25.00 sec./ 0.0–250.0 sec.	0.20/ 0.2
C2-10 (0x48A)	Start of Decel S-curve Time	0.00–25.00 sec./ 0.0–250.0 sec.	0.20/ 0.2

	Pr.	Parameter Name	Setting Range	Default
ϟ	C2-11 (0x48B)	End of Decel S-curve Time	0.00–25.00 sec./ 0.0–250.0 sec.	0.20/ 0.2
ϟ	C2-12 (0x48C)	Accel/ Decel 1/4 Switch FREQ	0.00–599.00 Hz	0.00
	C2-13 (0x48D)	Accel/ Decel Time unit	0: 0.01 second 1: 0.1 second	0
ϟ	C2-14 (0x48E)	Quick Stop Time	0.0–6000.0 sec./ 0.00–600.00 sec.	10.00 or 60.00 (30 HP above models)
	C2-15 (0x48F)	Accel/ Decel Switch MI Src 1	0: OFF 1: ON 2–7: MI1–MI6 8–9: Reserve 10–15: MI10–MI15	0
	C2-16 (0x490)	Accel/ Decel Swtich MI Src 2	0: OFF 1: ON 2–7: MI1–MI6 8–9: Reserve 10–15: MI10–MI15	0
ϟ	C2-17 (0x491)	Max. OPER FREQ	0.00–599.00 Hz	60.00
ϟ	C2-18 (0x492)	FREQ Upper Limit	Lower limit frequency–599.00 (Hz)	599.00
ϟ	C2-19 (0x493)	FREQ Lower Limit	0.00–Upper limit frequency (Hz)	0.00
	C2-20 (0x494)	Start FREQ	0.00–motor's max. operation frequency (Hz)	0.50
ϟ	C2-21 (0x495)	Skip FREQ 1 Upper Limit	Skip frequency 1 lower limit–motor's max. operation frequency (Hz)	0
ϟ	C2-22 (0x496)	Skip FREQ 1 Lower Limit	0–Skip frequency 1 upper limit (Hz)	0
ϟ	C2-23 (0x497)	Skip FREQ 2 Upper Limit	Skip frequency 2 lower limit–motor's max. operation frequency (Hz)	0
ϟ	C2-24 (0x498)	Skip FREQ 2 Lower Limit	0–Skip frequency 2 upper limit (Hz)	0
ϟ	C2-25 (0x499)	Skip FREQ 3 Upper Limit	Skip frequency 3 lower limit–motor's max. operation frequency (Hz)	0
ϟ	C2-26 (0x49A)	Skip FREQ 3 Lower Limit	0–Skip frequency 3 upper limit (Hz)	0
	C2-27 (0x49B)	Min Output FREQ	0.00–motor's max. operation frequency (Hz)	0.50

C3. JOG Setting

	Pr.	Parameter Name	Setting Range	Default
✎	C3-00 (0x4C0)	JOG FREQ	0.00–Max. OPER FREQ (Hz)	6.00
✎	C3-01 (0x4C1)	JOG Accel Time	0.0–6000.0 sec./ 0.00–600.00 sec.	10.0/ 10.00
✎	C3-02 (0x4C2)	JOG Decel Time	0.0–6000.0 sec./ 0.00–600.00 sec.	10.0/ 10.00
	C3-03 (0x4C3)	JOG MI Src	0: Disable 1: Reserve 2–7: MI1–MI6 5–9: Reserve 10–15: MI10–MI15	0
✎	C3-04 (0x4C4)	JOG Indn	0: Disable 1–2: Relay1–2 3–4: MO1–MO2 5–9: Reserve 10–15: MO/Relay10–15	0

d. Motor Parameter

d0. IM Switching

Pr.	Parameter Name	Setting Range	Default
d0-00 (0x640)	IM 1–4 Sel	1: IM1 2: IM2 3: IM3 4: IM4 5: IM1/ IM2 switch 6: IM1–IM4 switch 7: IM Y-D switch enable	1
d0-01 (0x641)	IM Switch MI Src 1	0: OFF 1: ON 2–7: MI1–MI6 8–9: Reserve 10–15: MI10–MI15	0
d0-02 (0x642)	IM Switch MI Src 2	0: OFF 1: ON 2–7: MI1–MI6 8–9: Reserve 10–15: MI10–MI15	0
d0-03 (0x643)	Y-D Switch FREQ	0.00–599.00 Hz	60.00
d0-04 (0x644)	Y-D Switch Delay Time	0.000–60.000 sec.	0.200
d0-05 (0x645)	Y-con Confirm MI Src	0: Disable 1: Enable 2–7: MI1–MI6 8–9: Reserve 10–15: MI10–MI15	0
d0-06 (0x646)	D-con Confirm MI Src	0: Disable 1: Dnable 2–7: MI1–MI6 8–9: Reserve 10–15: MI10–MI15	0
d0-07 (0x647)	Y-con Cmd Output	0: Disable 1–2: Relay1–Relay2 3–4: MO1–MO2 5–9: Reserve 10–15: MO/Relay10–15	0

Pr.	Parameter Name	Setting Range	Default
✓ d0-08 (0x648)	D-con Cmd Output	0: Disable 1–2: Relay1–Relay2 3–4: MO1–MO2 5–9: Reserve 10–15: MO/Relay10–15	0

d1. IM1 Parameter & Autotune

Pr.	Parameter Name	Setting Range	Default
d1-00 (0x680)	IM Autotune	0: Disable 1: IM static autotune 2: IM simple active autotune 3: IM advanced active autotune 4: Reserve	0
d1-01 (0x681)	IM1 Rated Power	0.0–6553.5 kW	Depending on the models
d1-02 (0x682)	IM1 Rated Current	Depending on the models (A)	Depending on the models
d1-03 (0x683)	IM1 Rated Voltage	Depending on the models (V)	Depending on the models
d1-04 (0x684)	IM1 Rated Speed	Depending on the number of poles (rpm)	Depending on the number of poles
d1-05 (0x685)	IM1 Rated FREQ	0.00–599.00 Hz	60.00
d1-06 (0x686)	IM1 Pole Number	2–64 Pole	4
d1-07 (0x687)	IM1 No-Load Current	0.0–6553.5 A	Depending on the models
d1-08 (0x688)	IM1 Rs	0.000–65.535 Ω	Depending on the models
d1-09 (0x689)	IM1 Rr	0.000–65.535 Ω	Depending on the models
d1-10 (0x68A)	IM1 Lm	0.0–6553.5 mH	Depending on the models
d1-11 (0x68B)	IM1 Lx	0.0–6553.5 mH	Depending on the models

d2. IM2 Parameter & Autotune

Pr.	Parameter Name	Setting Range	Default
d2-00 (0x6C0)	IM2 Rated Power	0.0–6553.5 kW	Depending on the models
d2-01 (0x6C1)	IM2 Rated Current	Depending on the models (A)	Depending on the models
d2-02 (0x6C2)	IM2 Rated Voltage	Depending on the models (V)	Depending on the models
d2-03 (0x6C3)	IM2 Rated Speed	Depending on the number of poles (rpm)	Depending on the number of poles
d2-04 (0x6C4)	IM2 Rated FREQ	0.00–599.00 Hz	60.00
d2-05 (0x6C5)	IM2 Pole Number	2–64 Pole	4
d2-06 (0x6C6)	IM2 No-Load Current	0–Rated current (A)	Depending on the models
d2-07 (0x6C7)	IM2 Rs	0.000–65.535 Ω	Depending on the models
d2-08 (0x6C8)	IM2 Rr	0.000–65.535 Ω	Depending on the models
d2-09 (0x6C9)	IM2 Lm	0.0–6553.5 mH	0.0
d2-10 (0x6CA)	IM2 Lx	0.0–6553.5 mH	0.0

d3. IM3 Parameter & Autotune

Pr.	Parameter Name	Setting Range	Default
d3-00 (0x700)	IM3 Rated Power	0.0–6553.5 kW	Depending on the models
d3-01 (0x701)	IM3 Rated Current	Depending on the models (A)	Depending on the models
d3-02 (0x702)	IM3 Rated Voltage	Depending on the models (V)	Depending on the models
d3-03 (0x703)	IM3 Rated Speed	Depending on the number of poles (rpm)	Depending on the number of poles
d3-04 (0x704)	IM3 Rated FREQ	0.00–599.00 Hz	60.00
d3-05 (0x705)	IM3 Pole Number	2–64 Pole	4

Pr.	Parameter Name	Setting Range	Default
d3-06 (0x706)	IM3 No-Load Current	0–Rated current (A)	Depending on the models
d3-07 (0x707)	IM3 Rs	0.000–65.535 Ω	Depending on the models
d3-08 (0x708)	IM3 Rr	0.000–65.535 Ω	Depending on the models
d3-09 (0x709)	IM3 Lm	0.0–6553.5 mH	0.0
d3-10 (0x70A)	IM3 Lx	0.0–6553.5 mH	0.0

d4. IM4 Parameter & Autotune

Pr.	Parameter Name	Setting Range	Default
d4-00 (0x740)	IM4 Rated power	0.0–6553.5 kW	Depending on the models
d4-01 (0x741)	IM4 Rated Current	Depending on the models (A)	Depending on the models
d4-02 (0x742)	IM4 Rated Voltage	Depending on the models (V)	Depending on the models
d4-03 (0x743)	IM4 Rated Speed	Depending on the number of poles (rpm)	Depending on the number of poles
d4-04 (0x744)	IM4 Rated Frequency	0.00–599.00 Hz	60.00
d4-05 (0x745)	IM4 Pole Number	2–64 Pole	4
d4-06 (0x746)	IM4 No-Load Current	0–Rated current (A)	Depending on the models
d4-07 (0x747)	IM4 Rs	0.000–65.535 Ω	Depending on the models
d4-08 (0x748)	IM4 Rr	0.000–65.535 Ω	Depending on the models
d4-09 (0x749)	IM4 Lm	0.0–6553.5 mH	0.0
d4-10 (0x74A)	IM4 Lx	0.0–6553.5 mH	0.0

d5. SM Parameter & Autotune

Pr.	Parameter Name	Setting Range	Default
d5-00 (0x780)	SM Autotune	0: Disable 1: SM static autotune 2: SM blocked rotor autotune 3: SM active autotune 4: Reserve	0
d5-01 (0x781)	SM Rated power	0.1–6553.5 kW	Depending on the models
d5-02 (0x782)	SM Rated Current	Depending on the models (A)	Depending on the models
d5-03 (0x783)	SM Rated Voltage	Depending on the models (V)	Depending on the models
d5-04 (0x784)	SM Rated Speed	PM: 0–65535 rpm SynRM: 0–65535 rpm	1800 1500
d5-05 (0x785)	SM Pole Number	PM: 2–65535 Pole SynRM: 2–65535 Pole	8 4
d5-06 (0x786)	SM Rs	0–65.535 Ω (Digit of the decimal points varies with the motor's power)	1.000
d5-07 (0x787)	SM Ld	0.00–655.35 mH	10.00
d5-08 (0x788)	SM Lq	0.00–655.35 mH	10.00
d5-10 (0x78A)	SM BEMF Constant	0–6553.5 V/krpm	0

E. VF Control & SVC

E0. IM1 VF Control & SVC

Pr.	Parameter Name	Setting Range	Default
E0-00 (0x840)	IM1 VF Curve Sel	0: Manual VF curve 1: 1.5th power V/F curve 2: 2nd power V/F curve 3: 60 Hz with rated 50 Hz 4: 72 Hz with rated 60 Hz 5: 50 Hz, 3rd power decreasing 6: 50 Hz, 2nd power decreasing 7: 60 Hz, 3rd power decreasing 8: 60 Hz, 2nd power decreasing 9: 50 Hz, Mid starting torque 10: 50 Hz, Large starting torque 11: 60 Hz, Mid starting torque 12: 60 Hz, Large starting torque 13: 90 Hz with rated 60 Hz 14: 120 Hz with rated 60 Hz 15: 180 Hz with rated 60 Hz	0
E0-01 (0x841)	IM1 VF Max FREQ	3.00–599.00 Hz	60.00
E0-02 (0x842)	IM1 VF Max Voltage	Depending on the models (V)	Depending on the models
E0-03 (0x843)	IM1 VF Mid FREQ 5	0.00–599.00 Hz	3.00
E0-04 (0x844)	IM1 VF Mid Voltage 5	Depending on the models (V)	Depending on the models
E0-05 (0x845)	IM1 VF Mid FREQ 4	0.00–599.00 Hz	3.00
E0-06 (0x846)	IM1 VF Mid Voltage 4	Depending on the models (V)	Depending on the models
E0-07 (0x847)	IM1 VF Mid FREQ 3	0.00–599.00 Hz	3.00
E0-08 (0x848)	IM1 VF Mid Voltage 3	Depending on the models (V)	Depending on the models
E0-09 (0x849)	IM1 VF Mid FREQ 2	0.00–599.00 Hz	3.00
E0-10 (0x84A)	IM1 VF Mid Voltage 2	Depending on the models (V)	Depending on the models
E0-11 (0x84B)	IM1 VF Mid FREQ 1	0.00–599.00 Hz	1.50

Pr.	Parameter Name	Setting Range	Default
E0-12 (0x84C)	IM1 VF Mid Voltage 1	Depending on the models (V)	Depending on the models
E0-13 (0x84D)	IM1 VF Min FREQ	0.00–599.00 Hz	0.50
E0-14 (0x84E)	IM1 VF Min Voltage	Depending on the models (V)	Depending on the models
E0-16 (0x850)	IM1 VF Torque COMP Gain	0.000–60.000 pu	0.000
E0-17 (0x851)	IM1 VF Torque COMP Filter	0.000–60.000 sec.	0.300
E0-19 (0x853)	IM1 VF Slip COMP Gain	0.000–60.000 pu	0.000
E0-20 (0x854)	IM1 VF Slip COMP Filter	0.000–60.000 sec.	0.100
E0-21 (0x855)	IM1 VF Hunt COMP Gain	0.000–60.000 pu	1.000
E0-22 (0x856)	IM1 VF Hunt COMP Filter	0.0–6000.0 sec.	1.0
E0-25 (0x859)	IM1 SVC Flux Boost Decay FREQ	0–100%	5
E0-26 (0x85A)	IM1 SVC Flux Boost End FREQ	0–100%	10
E0-27 (0x85B)	IM1 SVC Flux Boost Gain	0–100%	20
E0-28 (0x85C)	IM1 SVC Slip COMP Gain	0.000–2.000	1.000
E0-29 (0x85D)	IM1 SVC Slip COMP Filter	0.000–60.000 sec.	0.500
E0-30 (0x85E)	IM1 SVC Torque COMP P Gain	0.000–60.000	0.050
E0-31 (0x85F)	IM1 SVC Torque COMP I Gain	0.000–60.000	0.010
E0-32 (0x860)	IM1 SVC Torque COMP Filter	0.000–60.000 sec.	0.500
E0-33 (0x861)	IM1 SVC Hunt COMP Gain	0.000–60.000	0.500
E0-34 (0x862)	IM1 SVC Hunt COMP Filter	0.0–6000.0 sec.	1.0

E1. IM2 VF Control & SVC

	Pr.	Parameter Name	Setting Range	Default
	E1-00 (0x880)	IM2 VF Curve Sel	0: Manual VF curve 1: 1.5th power V/F curve 2: 2nd power V/F curve 3: 60 Hz with rated 50 Hz 4: 72 Hz with rated 60 Hz 5: 50 Hz, 3rd power decreasing 6: 50 Hz, 2nd power decreasing 7: 60 Hz, 3rd power decreasing 8: 60 Hz, 2nd power decreasing 9: 50 Hz, Mid starting torque 10: 50 Hz, Large starting torque 11: 60 Hz, Mid starting torque 12: 60 Hz, Large starting torque 13: 90 Hz with rated 60 Hz 14: 120 Hz with rated 60 Hz 15: 180 Hz with rated 60 Hz	0
✓	E1-01 (0x881)	IM2 VF Max FREQ	3.00–599.00 Hz	60.00
✓	E1-02 (0x882)	IM2 VF Max Voltage	Depending on the models (V)	Depending on the models
✓	E1-03 (0x883)	IM2 VF Mid FREQ 5	0.00–599.00 Hz	3.00
✓	E1-04 (0x884)	IM2 VF Mid Voltage 5	Depending on the models (V)	Depending on the models
✓	E1-05 (0x885)	IM2 VF Mid FREQ 4	0.00–599.00 Hz	3.00
✓	E1-06 (0x886)	IM2 VF Mid Voltage 4	Depending on the models (V)	Depending on the models
✓	E1-07 (0x887)	IM2 VF Mid FREQ 3	0.00–599.00 Hz	3.00
✓	E1-08 (0x888)	IM2 VF Mid Voltage 3	Depending on the models (V)	Depending on the models
✓	E1-09 (0x889)	IM2 VF Mid FREQ 2	0.00–599.00 Hz	3.00
✓	E1-10 (0x88A)	IM2 VF Mid Voltage 2	Depending on the models (V)	Depending on the models
✓	E1-11 (0x88B)	IM2 VF Mid FREQ 1	0.00–599.00 Hz	1.50
✓	E1-12 (0x88C)	IM2 VF Mid Voltage 1	Depending on the models (V)	Depending on the models

Pr.	Parameter Name	Setting Range	Default
E1-13 (0x88D)	IM2 VF Min FREQ	0.00–599.00 Hz	0.50
E1-14 (0x88E)	IM2 VF Min Voltage	Depending on the models (V)	Depending on the models
E1-16 (0x890)	IM2 VF Torque COMP Gain	0.000–60.000 pu	0.000
E1-17 (0x891)	IM2 VF Torque COMP Filter	0.000–60.000 sec.	0.300
E1-19 (0x893)	IM2 VF Slip COMP Gain	0.000–60.000 pu	0.000
E1-20 (0x894)	IM2 VF Slip COMP Filter	0.000–60.000 sec.	0.100
E1-21 (0x895)	IM2 VF Hunt COMP Gain	0.000–60.000 pu	1.000
E1-22 (0x896)	IM2 VF Hunt COMP Filter	0.0–6000.0 sec.	1.0
E1-25 (0x899)	IM2 SVC Flux Boost Decay FREQ	0–100%	5
E1-26 (0x89A)	IM2 SVC Flux Boost End FREQ	0–100%	10
E1-27 (0x89B)	IM2 SVC Flux Boost Gain	0–100%	20
E1-28 (0x89C)	IM2 SVC Slip COMP Gain	0.000–2.000	1.000
E1-29 (0x89D)	IM2 SVC Slip COMP Filter	0.000–60.000 sec.	0.500
E1-30 (0x89E)	IM2 SVC Torque COMP P Gain	0.000–60.000	0.050
E1-31 (0x89F)	IM2 SVC Torque COMP I Gain	0.000–60.000	0.010
E1-32 (0x8A0)	IM2 SVC Torque COMP Filter	0.000–60.000 sec.	0.500
E1-33 (0x8A1)	IM2 SVC Hunt COMP Gain	0.000–60.000	0.500
E1-34 (0x8A2)	IM2 SVC Hunt COMP Filter	0.0–6000.0 sec.	1.0

E2. IM3 VF Control & SVC

Pr.	Parameter Name	Setting Range	Default
E2-00 (0x8C0)	IM3 VF Curve Sel	0: Manual VF curve 1: 1.5th power V/F curve 2: 2nd power V/F curve 3: 60 Hz with rated 50 Hz 4: 72 Hz with rated 60 Hz 5: 50 Hz, 3rd power decreasing	0

	Pr.	Parameter Name	Setting Range	Default
			6: 50 Hz, 2nd power decreasing 7: 60 Hz, 3rd power decreasing 8: 60 Hz, 2nd power decreasing 9: 50 Hz, Mid starting torque 10: 50 Hz, Large starting torque 11: 60 Hz, Mid starting torque 12: 60 Hz, Large starting torque 13: 90 Hz with rated 60 Hz 14: 120 Hz with rated 60 Hz 15: 180 Hz with rated 60 Hz	
〃	E2-01 (0x8C1)	IM3 VF Max FREQ	3.00–599.00 Hz	60.00
〃	E2-02 (0x8C2)	IM3 VF Max Voltage	Depending on the models (V)	Depending on the models
〃	E2-03 (0x8C3)	IM3 VF Mid FREQ 5	0.00–599.00 Hz	3.00
〃	E2-04 (0x8C4)	IM3 VF Mid Voltage 5	Depending on the models (V)	Depending on the models
〃	E2-05 (0x8C5)	IM3 VF Mid FREQ 4	0.00–599.00 Hz	3.00
〃	E2-06 (0x8C6)	IM3 VF Mid Voltage 4	Depending on the models (V)	Depending on the models
〃	E2-07 (0x8C7)	IM3 VF Mid FREQ 3	0.00–599.00 Hz	3.00
〃	E2-08 (0x8C8)	IM3 VF Mid Voltage 3	Depending on the models (V)	Depending on the models
〃	E2-09 (0x8C9)	IM3 VF Mid FREQ 2	0.00–599.00 Hz	3.00
〃	E2-10 (0x8CA)	IM3 VF Mid Voltage 2	Depending on the models (V)	Depending on the models
〃	E2-11 (0x8CB)	IM3 VF Mid FREQ 1	0.00–599.00 Hz	1.50
〃	E2-12 (0x8CC)	IM3 VF Mid Voltage 1	Depending on the models (V)	Depending on the models
〃	E2-13 (0x8CD)	IM3 VF Min FREQ	0.00–599.00 Hz	0.50
〃	E2-14 (0x8CE)	IM3 VF Min Voltage	Depending on the models (V)	Depending on the models
〃	E2-16 (0x8D0)	IM3 VF Torque COMP Gain	0.000–60.000 pu	0.000
〃	E2-17 (0x8D1)	IM3 VF Torque COMP Filter	0.000–60.000 sec.	0.300

Pr.	Parameter Name	Setting Range	Default
E2-19 (0x8D3)	IM3 VF Slip COMP Gain	0.000–60.000 pu	0.000
E2-20 (0x8D4)	IM3 VF Slip COMP Filter	0.000–60.000 sec.	0.100
E2-21 (0x8D5)	IM3 VF Hunt COMP Gain	0.000–60.000 pu	1.000
E2-22 (0x8D6)	IM3 VF Hunt COMP Filter	0.0–6000.0 sec.	1.0
E2-25 (0x8D9)	IM3 SVC Flux Boost Decay FREQ	0–100%	5
E2-26 (0x8DA)	IM3 SVC Flux Boost End FREQ	0–100%	10
E2-27 (0x8DB)	IM3 SVC Flux Boost Gain	0–100%	20
E2-28 (0x8DC)	IM3 SVC Slip COMP Gain	0.000–2.000	1.000
E2-29 (0x8DD)	IM3 SVC Slip COMP Filter	0.000–60.000 sec.	0.500
E2-30 (0x8DE)	IM3 SVC Torque COMP P Gain	0.000–60.000	0.050
E2-31 (0x8DF)	IM3 SVC Torque COMP I Gain	0.000–60.000	0.010
E2-32 (0x8E0)	IM3 SVC Torque COMP Filter	0.000–60.000 sec.	0.500
E2-33 (0x8E1)	IM3 SVC Hunt COMP Gain	0.000–60.000	0.500
E2-34 (0x8E2)	IM3 SVC Hunt COMP Filter	0.0–6000.0 sec.	1.0

E3. IM4 VF Control & SVC

Pr.	Parameter Name	Setting Range	Default
E3-00 (0x900)	IM4 VF Curve Sel	0: Manual VF curve 1: 1.5th power V/F curve 2: 2nd power V/F curve 3: 60 Hz with rated 50 Hz 4: 72 Hz with rated 60 Hz 5: 50 Hz, 3rd power decreasing 6: 50 Hz, 2nd power decreasing 7: 60 Hz, 3rd power decreasing 8: 60 Hz, 2nd power decreasing 9: 50 Hz, Mid starting torque 10: 50 Hz, Large starting torque 11: 60 Hz, Mid starting torque 12: 60 Hz, Large starting torque	0

Pr.	Parameter Name	Setting Range	Default
		13: 90 Hz with rated 60 Hz 14: 120 Hz with rated 60 Hz 15: 180 Hz with rated 60 Hz	
E3-01 (0x901)	IM4 VF Max FREQ	3.00–599.00 Hz	60.00
E3-02 (0x902)	IM4 VF Max Voltage	Depending on the models (V)	Depending on the models
E3-03 (0x903)	IM4 VF Mid FREQ 5	0.00–599.00 Hz	3.00
E3-04 (0x904)	IM4 VF Mid Voltage 5	Depending on the models (V)	Depending on the models
E3-05 (0x905)	IM4 VF Mid FREQ 4	0.00–599.00 Hz	3.00
E3-06 (0x906)	IM4 VF Mid Voltage 4	Depending on the models (V)	Depending on the models
E3-07 (0x907)	IM4 VF Mid FREQ 3	0.00–599.00 Hz	3.00
E3-08 (0x908)	IM4 VF Mid Voltage 3	Depending on the models (V)	Depending on the models
E3-09 (0x909)	IM4 VF Mid FREQ 2	0.00–599.00 Hz	3.00
E3-10 (0x90A)	IM4 VF Mid Voltage 2	Depending on the models (V)	Depending on the models
E3-11 (0x90B)	IM4 VF Mid FREQ 1	0.00–599.00 Hz	1.50
E3-12 (0x90C)	IM4 VF Mid Voltage 1	Depending on the models (V)	Depending on the models
E3-13 (0x90D)	IM4 VF Min FREQ	0.00–599.00 Hz	0.50
E3-14 (0x90E)	IM4 VF Min Voltage	Depending on the models (V)	Depending on the models
E3-16 (0x910)	IM4 VF Torque COMP Gain	0.000–60.000 pu	0.000
E3-17 (0x911)	IM4 VF Torque COMP Filter	0.000–60.000 sec.	0.300
E3-19 (0x913)	IM4 VF Slip COMP Gain	0.000–60.000 pu	0.000
E3-20 (0x914)	IM4 VF Slip COMP Filter	0.000–60.000 sec.	0.100
E3-21 (0x915)	IM4 VF Hunt COMP Gain	0.000–60.000 pu	1.000
E3-22 (0x916)	IM4 VF Hunt COMP Filter	0.0–6000.0 sec.	1.0

	Pr.	Parameter Name	Setting Range	Default
⚡	E3-25 (0x919)	IM4 SVC Flux Boost Decay FREQ	0–100%	5
⚡	E3-26 (0x91A)	IM4 SVC Flux Boost End FREQ	0–100%	10
⚡	E3-27 (0x91B)	IM4 SVC Flux Boost Gain	0–100%	20
⚡	E3-28 (0x91C)	IM4 SVC Slip COMP Gain	0.000–2.000	1.000
⚡	E3-29 (0x91D)	IM4 SVC Slip COMP Filter	0.000–60.000 sec.	0.500
⚡	E3-30 (0x91E)	IM4 SVC Torque COMP P Gain	0.000–60.000	0.050
⚡	E3-31 (0x91F)	IM4 SVC Torque COMP I Gain	0.000–60.000	0.010
⚡	E3-32 (0x920)	IM4 SVC Torque COMP Filter	0.000–60.000 sec.	0.500
⚡	E3-33 (0x921)	IM4 SVC Hunt COMP Gain	0.000–60.000	0.500
⚡	E3-34 (0x922)	IM4 SVC Hunt COMP Filter	0.0–6000.0 sec.	1.0

E4. SM SVC

	Pr.	Parameter Name	Setting Range	Default
⚡	E4-00 (0x940)	SM LowFREQ Voltage COMP Level	0–150%	40
⚡	E4-01 (0x941)	SM LowFREQ COMP Stop FREQ	0.00–599.00 Hz	20.00
⚡	E4-02 (0x942)	SM Feed Forward Voltage Gain	0.00–2.00	1.00
⚡	E4-03 (0x943)	SM FREQ Hunting Gain	0.000–60.000	0.100
⚡	E4-04 (0x944)	SM FREQ Hunting Filter	0.000–60.000 sec.	0.100
⚡	E4-05 (0x945)	SM Torque COMP Gain	0.000–60.000	0.010
⚡	E4-06 (0x946)	SM Torque COMP Filter	0.000–60.000 sec.	0.100
⚡	E4-07 (0x947)	SM Angle Hunting Gain	0.0–6000.0	8.0
⚡	E4-08 (0x948)	SM Angle Hunting Decay FREQ	0.0–6000.0	0.4

F. FOC

F0. IM FOC

Pr.	Parameter Name	Setting Range	Default
F0-00 (0xAC0)	IMFOC Speed Observer BW	1–1000 Hz	40
F0-01 (0xAC1)	IMFOC Speed Observer Filter	0.000–3.000 sec.	0.005
F0-02 (0xAC2)	IMFOC Min Stator FREQ Level	0.0–10.0%	2.0
F0-06 (0xAC6)	IMFOC Flux Boost Gain	0–100%	50
F0-07 (0xAC7)	IMFOC Flux Boost Decay FREQ	0–6%	4
F0-08 (0xAC8)	IMFOC Flux Boost End FREQ	0–30%	20

F1. SM FOC

Pr.	Parameter Name	Setting Range	Default
F1-00 (0xB00)	IF/HFI Sel	0: HFI 1: IF	1
F1-01 (0xB01)	IF Cmd	0–150%	40
F1-02 (0xB02)	HFI PLL BW Gain	10–500%	100
F1-03 (0xB03)	Speed Observer Filter BW	0–100 Hz	10
F1-04 (0xB04)	IF/HFI to SM Switch FREQ	0.00–599.00 Hz	20.00
F1-05 (0xB05)	SM to IF/HFI Switch FREQ	0.00–599.00 Hz	20.00
F1-06 (0xB06)	HFI Injection FREQ	200–1200 Hz	500
F1-07 (0xB07)	HFI Injection Amplitude	0–100%	15
F1-08 (0xB08)	Observer Low Speed Gain	10–1000%	100
F1-09 (0xB09)	Observer High Speed Gain	10–1000%	100
F1-10 (0xB0A)	PLL P Gain	10–1000%	100
F1-11 (0xB0B)	PLL I Gain	10–1000%	100

F2. ASR Setting

	Pr.	Parameter Name	Setting Range	Default
	F2-00 (0xB40)	Motor Inertia	0.1–1000000.0 kg-cm^2	330.0 (Depending on the models)
	F2-01 (0xB42)	System Inertia	0.01–600.00	1.00
	F2-02 (0xB43)	ASR Calculation Sel	0: Gain 1: Bandwidth	1
	F2-03 (0xB44)	ASR High/ Low BW Switch FREQ	0.00–Max. operation frequency (Hz)	7.00
	F2-04 (0xB45)	ASR Zero-Speed BW	0.1–750.0 Hz	3.0
	F2-05 (0xB46)	ASR Low-Speed BW	0.1–750.0 Hz	3.0
	F2-06 (0xB47)	ASR High-Speed BW	0.1–750.0 Hz	3.0
	F2-07 (0xB48)	ASR Zero-Speed Gain	0.1–750.0 Hz	3.0
	F2-08 (0xB49)	ASR Zero-Speed Integral Time	0.001–10.000 sec.	0.100
	F2-09 (0xB4A)	ASR Low-Speed Gain	0.1–750.0 Hz	3.0
	F2-10 (0xB4B)	ASR Low-Speed Integral Time	0.001–10.000 sec.	0.100
	F2-11 (0xB4C)	ASR High-Speed Gain	0.1–750.0 Hz	3.0
	F2-12 (0xB4D)	ASR High-Speed Integral Time	0.001–10.000 sec.	0.100
	F2-13 (0xB4E)	PDFF Gain	0.00–1.00 pu	0.30
	F2-14 (0xB4F)	ASR Speed Feedforward Gain	0.00–100.00 pu	0.00
	F2-15 (0xB50)	Torque Cmd Filter Time	0.0–6000.0 ms	5.0
	F2-16 (0xB51)	FWD Motoring Torque Limit	0.00–300.00%	250.00
	F2-17 (0xB52)	FWD Regenerating Torque Limit	0.00–300.00%	250.00
	F2-18 (0xB53)	REV Motoring Torque Limit	0.00–300.00%	250.00
	F2-19 (0xB54)	REV Regenerating Torque Limit	0.00–300.00%	250.00
*	F2-20 (0xB55)	IMFOC AMR BW	0.1–750.0 Hz	10.0

	Pr.	Parameter Name	Setting Range	Default
✻ 〆	F2-21 (0xB56)	IMFOC AMR Voltage Limit	0–100%	95
✻ 〆	F2-22 (0xB57)	SMFOC AMR Kp Gain	0.00–3.00	1.00
✻ 〆	F2-23 (0xB58)	SMFOC AMR Ki Gain	0.00–3.00	0.20
✻ 〆	F2-24 (0xB59)	SMFOC AMR Id Filter Coefficient	0–1000	10

F3. ACR Setting

	Pr.	Parameter Name	Setting Range	Default
〆	F3-00 (0xB80)	ACR Gain Calculation Sel	0: ACR BW 1: BW Calculated by CF	1
〆	F3-01 (0xB81)	ACR BW	10–3000 Hz	300
〆	F3-02 (0xB82)	ACR d-Axis Kp Gain	0.01–100.00 pu	1.00
〆	F3-03 (0xB83)	ACR d-Axis Ki Gain	0.01–100.00 pu	1.00
〆	F3-04 (0xB84)	ACR q-Axis Kp Gain	0.01–100.00 pu	1.00
〆	F3-05 (0xB85)	ACR q-Axis Ki Gain	0.01–100.00 pu	1.00

G. IO Setting

G0. MI Setting

<table>
<tr><th>Pr.</th><th>Parameter Name</th><th>Setting Range</th><th>Default</th></tr>
<tr><td>G0-00
(0xCC0)</td><td>MI Mode Sel</td><td>0: Low Active
1: High Active</td><td>0</td></tr>
<tr><td>G0-01
(0xCC1)</td><td>MI Status</td><td>0: Inactive
1: Active</td><td>Read only</td></tr>
<tr><td>G0-02
(0xCC2)</td><td>Virtual MI Function</td><td>0: Disable
1: Enable</td><td>0</td></tr>
<tr><td>G0-03
(0xCC3)</td><td>Virtual MI Level Setting</td><td>0: Low
1: High</td><td>0</td></tr>
<tr><td>G0-05
(0xCC5)</td><td>MI1 Function Sel</td><td rowspan="7">0040h: EX1/ EX2 Switch Src
0042h: EX1 S1 Src
0043h: EX1 S2 Src
0044h: EX1 S3 Src
0049h: EX2 S1 Src
004Ah: EX2 S2 Src
004Bh: EX2 S3 Src
0050h: Halt MI Src
0051h: Lock MI Src
0055h: Run Enable MI Src
005Dh: Base Block MI Src
0060h: External Fault MI Src
0081h: Quick Stop MI Src
0083h: Emergency Stop MI Src
0101h: AUTO Lock MI Src
0105h: LoRe Switch Src
0106h: Remote Lock MI Src
044Bh: Pulse Train MI Src
044Dh: FREQ Cmd Up Key MI Src
044Eh: FREQ Cmd Down Key MI Src
0453h: Multi Speed MI Src 1
0454h: Multi Speed MI Src 2
0455h: Multi Speed MI Src 3
0456h: Multi Speed MI Src 4
0467h: AI Res Switch MI Src
048Fh: Accel/Decel Switch MI Src 1
0490h: Accel/Decel Switch MI Src 2
04C3h: JOG MI Src
0641h: IM Switch MI Src 1
0642h: IM Switch MI Src 2</td><td>0</td></tr>
<tr><td>G0-07
(0xCC7)</td><td>MI2 Function Sel</td><td>0</td></tr>
<tr><td>G0-09
(0xCC9)</td><td>MI3 Function Sel</td><td>0</td></tr>
<tr><td>G0-11
(0xCCB)</td><td>MI4 Function Sel</td><td>0</td></tr>
<tr><td>G0-13
(0xCCD)</td><td>MI5 Function Sel</td><td>0</td></tr>
<tr><td>G0-15
(0xCCF)</td><td>MI6 Function Sel</td><td>0</td></tr>
<tr><td></td><td></td><td></td></tr>
</table>

Pr.	Parameter Name	Setting Range	Default
		0645h: Y-con Confirm MI Src 0646h: D-con Confirm MI Src 0CD1h: MI Count Src 0CD2h: MI Count Clear Src 0F40h: Fault Reset MI Src 0F44h: Fault Restart MI Src 12C0h: Preheat MI Src 1302h: FireMode MI Src 1304h: FireMode Direction MI Src 1344h: Time Function 1 MI Src 1345h: Time Function 2 MI Src 1346h: Time Function 3 MI Src 1407h: InnerPLC Mode Switch Scr 1 1408h: InnerPLC Mode Switch Src 2 1880h: P-PID1/ P-PID2 Switch Src 1892h: P-PID1 Setpoint Freeze Src 1894h: P-PID1 Multi Setpoint Src 1 1895h: P-PID1 Multi Setpoint Src 2 18A1h: P-PID1 Output Freeze Src 18ACh: P-PID1 Track Enable Src 18D1h: P-PID2 Setpoint Freeze Src 18D3h: P-PID2 Multi Setpoint Src 1 18D4h: P-PID2 Multi Setpoint Src 2 18E0h: P-PID2 Output Freeze Src 18EBh: P-PID2 Track Enable Src 1908h: B-PID1 Multi Setpoint Src 1 1909h: B-PID1 Multi Setpoint Src 2 1914h: B-PID1 Output Freeze Src 1948h: B-PID2 Multi Setpoint Src 1 1949h: B-PID2 Multi Setpoint Src 2 1954h: B-PID2 Output Freeze Src 1988h: B-PID3 Multi Setpoint Src 1 1989h: B-PID3 Multi Setpoint Src 2 1994h: B-PID3 Output Freeze Src 19C8h: B-PID4 Multi Setpoint Src 1 19C9h: B-PID4 Multi Setpoint Src 2 19D4h: B-PID4 Output Freeze Src 1B17h: Pump 1 Stop MI Src 1B18h: Pump 2 Stop MI Src 1B19h: Pump 3 Stop MI Src	

Pr.	Parameter Name	Setting Range	Default
		1B1Ah: Pump 4 Stop MI Src 1B1Bh: Pump 5 Stop MI Src 1B1Ch: Pump 6 Stop MI Src 1B1Dh: Pump 7 Stop MI Src 1B1Eh: Pump 8 Stop MI Scr 1B1Fh: Multi Pump Stop MI Src 1BD5h: Pump Clean Function MI Src	
G0-06 (0xCC6)	MI1 Response Time	0.000–30.000 sec.	0.001
G0-08 (0xCC8)	MI2 Response Time	0.000–30.000 sec.	0.001
G0-10 (0xCCA)	MI3 Response Time	0.000–30.000 sec.	0.001
G0-12 (0xCCC)	MI4 Response Time	0.000–30.000 sec.	0.001
G0-14 (0xCCE)	MI5 Response Time	0.000–30.000 sec.	0.001
G0-16 (0xCD0)	MI6 Response Time	0.000–30.000 sec.	0.001
G0-17 (0xCD1)	MI Count Src	0: Disable 1–5: Reserve 6: MI5	0
G0-18 (0xCD2)	MI Count Clear Src	0: Disable 1: Enable 2–7: MI1–MI6 8–9: Reserve 10–15: MI10–MI15	0
G0-19 (0xCD3)	MI Count Reached Level	0–60000 0: Disable	0
G0-20 (0xCD4)	MI Count Reset Level	0–60000 0: Disable	0
G0-21 (0xCD5)	MI Count Reached MO Indn	0: Disable 1–2: Relay1–2 3–4: MO1–MO2 5–9: Reserve 10–15: MO/Relay 10–15	0
G0-22 (0xCD6)	MI Count Reset MO Indn	0: Disable 1–2: Relay1–2 3–4: MO1–MO2 5–9: Reserve 10–15: MO/Relay 10–15	0

G1. MO Setting

<table>
<tr><th>Pr.</th><th>Parameter Name</th><th>Setting Range</th><th>Default</th></tr>
<tr><td>G1-00
(0xD00)</td><td>MO Mode Sel</td><td>0: MO-MCM or RA-RC Close at Active
1: MO-MCM or RA-RC Open at Active</td><td>0</td></tr>
<tr><td>G1-01
(0xD01)</td><td>Virtual MO Function</td><td>0: Disable
1: Enable</td><td>0</td></tr>
<tr><td>G1-02
(0xD02)</td><td>Virtual MO Level Setting</td><td>0: Inactive
1: Active</td><td>0</td></tr>
<tr><td>G1-03
(0xD03)</td><td>MO Status</td><td>0: Inactive
1: Active</td><td>Read only</td></tr>
<tr><td>G1-04
(0xD04)</td><td>RY1 Function Sel</td><td rowspan="5">0057h: Run Enable Indn
0058h: OPER Cmd by Kpd Indn
0059h: Forward Cmd Indn
005Ah: Reverse Cmd Indn
005Fh: Base Block Indn
04C4h: JOG indn
0647h: Y-con Cmd Output
0648h: D-con Cmd Output
0CD5h: MI Count Reached MO Indn
0CD6h: MI Count Reset MO Indn
0D01h: Virtual MO Function
0D7Eh: AI Level in Range Indn
0F41h: Fault Indn
0F42h: Warning Indn
0F4Fh: STO Output logic A
0F50h: STO Output logic B
0F51h: Fault Output Indn 1
0F52h: Fault Output Indn 2
0F53h: Fault Output Indn 3
0F54h: Fault Output Indn 4
0F81h: ov Warning Indn
0F85h: Lv Fault Indn
0F8Ah: ov Stall Prev Indn
0FC9h: oc Stall Prev Indn
0FCFh: Low Current Indn
1001h: OrP Indn
1006h: U Phase Loss Indn
1007h: V Phase Loss Indn
1008h: W Phase Loss Indn
1042h: Drive oH warning Indn
1081h: ot Indn</td><td>0</td></tr>
<tr><td>G1-06
(0xD06)</td><td>RY2 Function Sel</td><td>0</td></tr>
<tr><td>G1-08
(0xD08)</td><td>MO1 Function Sel</td><td>0</td></tr>
<tr><td>G1-10
(0xD0A)</td><td>MO2 Function Sel</td><td>0</td></tr>
<tr><td></td><td></td><td></td></tr>
</table>

Pr.	Parameter Name	Setting Range	Default
		1083h: Normal Speed ot Indn 10B5h: Over Slip Indn 10CAh: Motor Temp 1 OH Indn 10D5h: Motor Temp 2 OH Indn 1103h: L/F Overload Indn 1111h: L/F Underload Indn 11C0h: UVW MC Action Indn 1249h: dEb Output Indn 12C7: Preheat Indn 132Bh: FireMode Indn 1587h: Modubs MO Mask 1596h: CANopen MO Mask 15A7h: BACnet MO Mask 15B4h: DeviceNET MO Mask 15B8h: Profitibus MO Mask 15D2h: EtherNet MO Mask 1646h: Drive Ready Indn 1647h: Run Indn 1649h: Output Amp Exceed Indn 164Ah: Output Amp under Indn 164Ch: At Target Speed Indn 164Eh: Output FREQ Exceed Indn 164Fh: Output FREQ under Indn 1652h: At Output FREQ 1 Indn 1655h: At Output FREQ 2 Indn 1656h: 0 Hz Cmd Indn at Run 1657h: 0 Hz Cmd Indn 1659h: 0 Hz Output Indn at Run 165Ah: 0 Hz Output Indn 16C4h: Monitor 1 Trigger Indn 16CEh: Monitor 2 Trigger Indn 16D8h: Monitor 3 Trigger Indn 16E2h: Monitor 4 Trigger Indn 16ECh: Monitor 5 Trigger Indn 16F6h: Monitor 6 Trigger Indn 1700h: Monitor 7 Trigger Indn 170Ah: Monitor 8 Trigger Indn 18AFh: P-PID1 Fdk Error Indn 18EEh: P-PID2 Fdk Error Indn 1B0Fh: Pump 1 Output Enable Sel	

Pr.	Parameter Name	Setting Range	Default
		1B10h: Pump 2 Output Enable Sel 1B11h: Pump 3 Output Enable Sel 1B12h: Pump 4 Output Enable Sel 1B13h: Pump 5 Output Enable Sel 1B14h: Pump 6 Output Enable Sel 1B15h: Pump 7 Output Enable Sel 1B16h: Pump 8 Output Enable Sel	
G1-05 (0xD05)	RY1 Response Time	0.000–30.000 sec.	0.001
G1-07 (0xD07)	RY2 Response Time	0.000–30.000 sec.	0.001
G1-09 (0xD09)	MO1 Response Time	0.000–30.000 sec.	0.001
G1-11 (0xD0B)	MO2 Response Time	0.000–30.000 sec.	0.001
G1-12 (0xD0C)	DFM MO Indn	0: Disable 1–3: Reserve 4: MO2	0
G1-13 (0xD0D)	DFM Function Sel	0: Disable 1: FREQ Cmd 2: FREQ Profile 3: Output FREQ	0
G1-14 (0xD0E)	DFM Output Gain	1–100	1

G2. AI Setting

Pr.	Parameter Name	Setting Range	Default
G2-00 (0xD40)	Virtual AI Function	0: Disable 1: Enable	0
G2-02 (0xD42)	AI1 Function Sel	0441h: EX1 Main FREQ Src 0442h: EX1 Aux FREQ Src 0445h: EX2 Main FREQ Src 0446h: EX2 Aux FREQ Src 0D7Bh: AI Comparator Src 10C1h: Motor Temp Fdk 1 AI Src 10CCh: Motor Temp Fdk 2 AI Src 1303h: FireMode FREQ Src 1882h: P-PID1 Ref 1 Src 1883h: P-PID1 Ref 2 Src 1884h: P-PID1 Fdk 1 Src 1885h: P-PID1 Fdk 2 Src 18ADh: P-PID1 Track Enable Src	0
G2-21 (0xD55)	AI2 Function Sel		0
G2-40 (0xD68)	AI3 Function Sel		0

	Pr.	Parameter Name	Setting Range	Default
			18C1h: P-PID2 Ref 1 Src 18C2h: P-PID2 Ref 2 Src 18C3h: P-PID2 Fdk 1 Src 18C4h: P-PID2 Fdk 2 Src 18ECh: P-PID2 Track Enable Src 1901h: B-PID1 Ref Src 1902h: B-PID1 Fdk Src 1941h: B-PID2 Ref Src 1942h: B-PID2 Fdk Src 1981h: B-PID3 Ref Src 1982h: B-PID3 Fdk Src 19C1h: B-PID4 Ref Src 19C2h: B-PID4 Fdk Src 1B83h: Inlet Pressure AI Src 1B87h: Outlet Pressure AI Src 1B8Bh: Flow Meter AI Src	
✎	G2-03 (0xD43)	AI1 Signal Type	0: 0–10 V 1: 0–20 mA 2: 4–20 mA	2
✎	G2-04 (0xD44)	AI1 Filter Time	0.00–20.00 sec.	0.02
✎	G2-05 (0xD45)	AI1 Low Value	0–10 V: 0.00–10.00 V 0–20 mA: 0.00–20.00 mA 4–20 mA: 4.00–20.00 mA	0.00 0.00 4.00
✎	G2-06 (0xD46)	AI1 Low %	-100.00–100.00%	0.00
✎	G2-07 (0xD47)	AI1 Mid Value	0–10 V: 0.00–10.00 V 0–20 mA: 0.00–20.00 mA 4–20 mA: 4.00–20.00 mA	5.00 10.00 12.00
✎	G2-08 (0xD48)	AI1 Mid %	-100.00–100.00%	50.00
✎	G2-09 (0xD49)	AI1 High Value	0–10 V: 0.00–10.00 V 0–20 mA: 0.00–20.00 mA 4–20 mA: 4.00–20.00 mA	10.00 20.00 20.00
✎	G2-10 (0xD4A)	AI1 High %	-100.00–100.00%	100.00
	G2-11 (0xD4B)	AI1 Signal Loss Action	0–6 0: Disable 1: Warn & Continue OPER 2: Fault & Ramp to Stop 3: Fault & Auto-Decel 4: Fault & Coast to Stop	0

Pr.	Parameter Name	Setting Range	Default
		5: Fault & by Quick Stop Time 6: Warning & FREQ Lower Limit OPER	
G2-12 (0xD4C)	Virtual AI1 Input	0.00–100.00%	0.00
G2-13 (0xD4D)	AI1 Display	0.00–100.00%	Read only
G2-22 (0xD56)	AI2 Signal Type	0: 0–10 V 1: 0–20 mA 2: 4–20 mA	2
G2-23 (0xD57)	AI2 Filter Time	0.00–20.00 sec.	0.02
G2-24 (0xD58)	AI2 Low Value	0–10 V: 0.00–10.00 V 0–20 mA: 0.00–20.00 mA 4–20 mA: 4.00–20.00 mA	0.00 0.00 4.00
G2-25 (0xD59)	AI2 Low %	-100.00–100.00%	0.00
G2-26 (0xD5A)	AI2 Mid Value	0–10 V: 0.00–10.00 V 0–20 mA: 0.00–20.00 mA 4–20 mA: 4.00–20.00 mA	5.00 10.00 12.00
G2-27 (0xD5B)	AI2 Mid %	-100.00–100.00%	50.00
G2-28 (0xD5C)	AI2 High Value	0–10 V: 0.00–10.00 V 0–20 mA: 0.00–20.00 mA 4–20 mA: 4.00–20.00 mA	10.00 20.00 20.00
G2-29 (0xD5D)	AI2 High %	-100.00–100.00%	100.00
G2-30 (0xD5E)	AI2 Signal Loss Action	0: Disable 1: Warn & Continue OPER 2: Fault & Ramp to Stop 3: Fault & Auto-Decel 4: Fault & Coast to Stop 5: Fault & by Quick Stop Time 6: Warning & FREQ Lower Limit OPER	0
G2-31 (0xD5F)	Virtual AI2 Input	0.00–100.00%	0.00
G2-32 (0xD60)	AI2 Display	0.00–100.00%	Read only
G2-41 (0xD69)	AI3 Signal Type	0: 0–10 V 1: 0–20 mA 2: 4–20 mA	0
G2-42 (0xD6A)	AI3 Filter Time	0.00–20.00 sec.	0.02

	Pr.	Parameter Name	Setting Range	Default
〆	G2-43 (0xD6B)	AI3 Low Value	0–10 V: 0.00–10.00 V 0–20 mA: 0.00–20.00 mA 4–20 mA: 4.00–20.00 mA	0.00 0.00 4.00
〆	G2-44 (0xD6C)	AI3 Low %	-100.00–100.00%	0.00
〆	G2-45 (0xD6D)	AI3 Mid Value	0–10 V: 0.00–10.00 V 0–20 mA: 0.00–20.00 mA 4–20 mA: 4.00–20.00 mA	5.00 10.00 12.00
〆	G2-46 (0xD6E)	AI3 Mid %	-100.00–100.00%	50.00
〆	G2-47 (0xD6F)	AI3 High Value	0–10 V: 0.00–10.00 V 0–20 mA: 0.00–20.00 mA 4–20 mA: 4.00–20.00 mA	10.00 20.00 20.00
〆	G2-48 (0xD70)	AI3 High %	-100.00–100.00%	100.00
	G2-49 (0xD71)	AI3 Signal Loss Action	0: Disable 1: Warn & Continue OPER 2: Fault & Ramp to Stop 3: Fault & Auto-Decel 4: Fault & Coast to Stop 5: Fault & by Quick Stop Time 6: Warning & FREQ Lower Limit OPER	0
〆	G2-50 (0xD72)	Virtual AI3 Input	0.00–100.00%	0.00
	G2-51 (0xD73)	AI3 Display	0.00–100.00%	Read only
〆	G2-59 (0xD7B)	AI Comparator Src	0: Disable 1–6: Reserve 7–9: AI1–AI3 10–11: Reserve 12–13: AI10–AI11	0
〆	G2-60 (0xD7C)	AI Comparator High Level	-100.0–100.0%	50.0
〆	G2-61 (0xD7D)	AI Comparator Low Level	-100.0–100.0%	10.0
〆	G2-62 (0xD7E)	AI Level in Range Indn	0: Disable 1–2: Relay 1–2 3–4: MO1–MO2 5–9: Reserve 10–15: MO/Relay 10–15	0

G3. AO Setting

<table>
<tr><th>Pr.</th><th>Parameter Name</th><th>Setting Range</th><th>Default</th></tr>
<tr><td>G3-00
(0xD80)</td><td>Virtual AO Function</td><td>0: Disable
1: Enable</td><td>0</td></tr>
<tr><td>G3-01
(0xD81)</td><td>AO1 Function Sel</td><td rowspan="3">0000h: Disable
0D80h: Virtual AO Function
10C2h: Motor Temp 1 AO Sel
10CDh: Motor Temp 2 AO Sel
1588h: Modbus AO Mask
1597h: CANopen AO Mask
15A8h: BACnet AO Mask
15B5h: DeviceNET AO Mask
15B9h: Profibus AO Mask
15D3h: EtherNet AO Mask
165Bh: FREQ Cmd AO Sel
165Ch: FREQ Profile AO Sel
165Dh: Motor RPM AO Sel
165Eh: Output FREQ AO Sel
165Fh: Output Current AO Sel
1660h: Output Voltage AO Sel
1661h: Torque Cmd AO Sel
1662h: Output Torque AO Sel
1663h: Output Power AO Sel
1664h: Power Factor AO Sel
167Bh: DC bus Voltage AO Sel
1917h: B-PID1 Output AO Sel
1957h: B-PID2 Output AO Sel
1997h: B-PID3 Output AO Sel
19D7h: B-PID4 Output AO Sel</td><td>0</td></tr>
<tr><td>G3-15
(0xD8F)</td><td>AO2 Function Sel</td><td>0</td></tr>
<tr><td></td><td></td><td></td></tr>
<tr><td>G3-02
(0xD82)</td><td>AO1 Signal Type</td><td>0: 0–10 V
1: 0–20 mA
2: 4–20 mA</td><td>2</td></tr>
<tr><td>G3-03
(0xD83)</td><td>AO1 Filter Time</td><td>0.00–20.00 sec.</td><td>0.02</td></tr>
<tr><td>G3-04
(0xD84)</td><td>AO1 Bias</td><td>-100.00–100.00%</td><td>0.00</td></tr>
<tr><td>G3-05
(0xD85)</td><td>AO1 Gain</td><td>-500.0–500.0%</td><td>100.0</td></tr>
<tr><td>G3-06
(0xD86)</td><td>AO1 Output Method</td><td>0: Absolute Value
1: 0% Negative; 0–100% Positive
2: 0–50% Negative; 50–100% Positive</td><td>0</td></tr>
<tr><td>G3-07
(0xD87)</td><td>Virtual AO1 Output</td><td>0.00–100.00 PCT</td><td>0.00</td></tr>
</table>

Pr.	Parameter Name	Setting Range	Default
G3-16 (0xD90)	AO2 Signal Type	0: 0–10 V 1: 0–20 mA 2: 4–20 mA	2
G3-17 (0xD91)	AO2 Filter Time	0.00–20.00 sec.	0.02
G3-18 (0xD92)	AO2 Bias	-100.00–100.00%	0.00
G3-19 (0xD93)	AO2 Gain	-500.0–500.0%	100.0
G3-20 (0xD94)	AO2 Output Method	0: Absolute Value 1: 0% Negative; 0–100% Positive 2: 0–50% Negative; 50–100% Positive	0
G3-21 (0xD95)	Virtual AO2 Output	0.00–100.00 PCT	0.00

G4. Extension MI Setting

Pr.	Parameter Name	Setting Range	Default
G4-00 (0xDC0)	Extension Card ID	0: None 1: EMV-A22A 5: EMV-D42A 6: EMV-R6AA	Read only
G4-01 (0xDC1)	MI10 Function Sel	0–65535	0
G4-02 (0xDC2)	MI10 Response Time	0.000–30.000 sec.	0.001
G4-03 (0xDC3)	MI11 Function Sel	0–65535	0
G4-04 (0xDC4)	MI11 Response Time	0.000–30.000 sec.	0.001
G4-05 (0xDC5)	MI12 Function Sel	0–65535	0
G4-06 (0xDC6)	MI12 Response Time	0.000–30.000 sec.	0.001
G4-07 (0xDC7)	MI13 Function Sel	0–65535	0
G4-08 (0xDC8)	MI13 Response Time	0.000–30.000 sec.	0.001
G4-09 (0xDC9)	MI14 Function Sel	0–65535	0
G4-10 (0xDCA)	MI14 Response Time	0.000–30.000 sec.	0.001
G4-11 (0xDCB)	MI15 Function Sel	0–65535	0
G4-12 (0xDCC)	MI15 Response Time	0.000–30.000 sec.	0.001

G5. Extension MO Setting

	Pr.	Parameter Name	Setting Range	Default
	G5-00 (0xE00)	Extension Card ID	0: None 1: EMV-A22A 5: EMV-D42A 6: EMV-R6AA	Read only
✓	G5-01 (0xE01)	MO10(RY10) Function Sel	0–65535	0
✓	G5-02 (0xE02)	MO10(RY10) Response Time	0.000–30.000 sec.	0.001
✓	G5-03 (0xE03)	MO11(RY11) Function Sel	0–65535	0
✓	G5-04 (0xE04)	MO11(RY11) Response Time	0.000–30.000 sec.	0.001
✓	G5-05 (0xE05)	RY12 Function Sel	0–65535	0
✓	G5-06 (0xE06)	RY12 Response Time	0.000–30.000 sec.	0.001
✓	G5-07 (0xE07)	RY13 Function Sel	0–65535	0
✓	G5-08 (0xE08)	RY13 Response Time	0.000–30.000 sec.	0.001
✓	G5-09 (0xE09)	RY14 Function Sel	0–65535	0
✓	G5-10 (0xE0A)	RY14 Response Time	0.000–30.000 sec.	0.001
✓	G5-11 (0xE0B)	RY15 Function Sel	0–65535	0
✓	G5-12 (0xE0C)	RY15 Response Time	0.000–30.000 sec.	0.001

G6. Extension AI Setting

	Pr.	Parameter Name	Setting Range	Default
	G6-00 (0xE40)	Extension Card ID	0: None 1: EMV-A22A 5: EMV-D42A 6: EMV-R6AA	Read only
✓	G6-01 (0xE41)	AI10 Function Sel	0–65535	0
✓	G6-02 (0xE42)	AI10 Signal Type	0: 0–10 V 1: 0–20 mA 2: 4–20 mA	0
✓	G6-03 (0xE43)	AI10 Filter Time	0.00–20.00 sec.	0.02
✓	G6-04 (0xE44)	AI10 Low Value	0–10 V: 0.00–10.00 V 0–20 mA: 0.00–20.00 mA 4–20 mA: 4.00–20.00 mA	0.00 0.00 4.00

	Pr.	Parameter Name	Setting Range	Default
〆	G6-05 (0xE45)	AI10 Low %	-100.00–100.00%	0.00
〆	G6-06 (0xE46)	AI10 Mid Value	0–10 V: 0.00–10.00 V 0–20 mA: 0.00–20.00 mA 4–20 mA: 4.00–20.00 mA	5.00 10.00 12.00
〆	G6-07 (0xE47)	AI10 Mid %	-100.00–100.00%	50.00
〆	G6-08 (0xE48)	AI10 High Value	0–10 V: 0.00–10.00 V 0–20 mA: 0.00–20.00 mA 4–20 mA: 4.00–20.00 mA	10.00 20.00 20.00
〆	G6-09 (0xE49)	AI10 High %	-100.00–100.00%	100.00
	G6-10 (0xE4A)	AI10 Signal Loss Action	0: Disable 1: Warn & Continue OPER 2: Fault & Ramp to Stop 3: Fault & Auto-Decel 4: Fault & Coast to Stop 5: Fault & by Quick Stop Time 6: Warning & FREQ Lower Limit OPER	0
〆	G6-11 (0xE4B)	Virtual AI10 Input	0.00–100.00%	0.00
	G6-12 (0xE4C)	AI10 Display	0.00–100.00%	Read only
〆	G6-13 (0xE4D)	AI11 Function Sel	0–65535	0
〆	G6-14 (0xE4E)	AI11 Signal Type	0: 0–10 V 1: 0–20 mA 2: 4–20 mA	0
〆	G6-15 (0xE4F)	AI11 Filter Time	0.00–20.00 sec	0.02
〆	G6-16 (0xE50)	AI11 Low Value	0–10 V: 0.00–10.00 V 0–20 mA: 0.00–20.00 mA 4–20 mA: 4.00–20.00 mA	0.00 0.00 4.00
〆	G6-17 (0xE51)	AI11 Low %	-100.00–100.00%	0.00
〆	G6-18 (0xE52)	AI11 Mid Value	0–10 V: 0.00–10.00 V 0–20 mA: 0.00–20.00 mA 4–20 mA: 4.00–20.00 mA	5.00 10.00 12.00
〆	G6-19 (0xE53)	AI11 Mid %	-100.00–100.00%	50.00
〆	G6-20 (0xE54)	AI11 High Value	0–10 V: 0.00–10.00 V 0–20 mA: 0.00–20.00 mA 4–20 mA: 4.00–20.00 mA	10.00 20.00 20.00

Pr.	Parameter Name	Setting Range	Default
G6-21 (0xE55)	AI11 High %	-100.00–100.00%	100.00
G6-22 (0xE56)	AI11 Signal Loss Action	0: Disable 1: Warn & Continue OPER 2: Fault & Ramp to Stop 3: Fault & Auto-Decel 4: Fault & Coast to Stop 5: Fault & by Quick Stop Time 6: Warning & FREQ Lower Limit OPER	0
G6-23 (0xE57)	Virtual AI11 Input	0.0–100.0%	0.0
G6-24 (0xE58)	AI11 Display	0.0–100.0%	Read only

G7. Extension AO Setting

Pr.	Parameter Name	Setting Range	Default
G7-00 (0xE80)	Extension Card ID	0: None 1: EMV-A22A 5: EMV-D42A 6: EMV-R6AA	Read only
G7-01 (0xE81)	AO10 Function Sel	0–65535	0
G7-02 (0xE82)	AO10 Signal Type	0: 0–10 V 1: 0–20 mA 2: 4–20 mA	0
G7-03 (0xE83)	AO10 Filter Time	0.00–20.00 sec.	0.02
G7-04 (0xE84)	AO10 Bias	-100.00–100.00%	0.00
G7-05 (0xE85)	AO10 Gain	-500.0–500.0%	100.0
G7-06 (0xE86)	AO10 Output Method	0: Absolute Value 1: 0% Negative; 0–100% Positive 2: 0–50% Negative; 50–100% Positive	0
G7-07 (0xE87)	Virtual AO10 Output	0.00–100.00 PCT	0.00
G7-08 (0xE88)	AO11 Function Sel	0–65535	0
G7-09 (0xE89)	AO11 Signal Type	0: 0–10 V 1: 0–20 mA 2: 4–20 mA	0

	Pr.	Parameter Name	Setting Range	Default
✓	G7-10 (0xE8A)	AO11 Filter Time	0.00–20.00 sec.	0.02
✓	G7-11 (0xE8B)	AO11 Bias	-100.00–100.00%	0.00
✓	G7-12 (0xE8C)	AO11 Gain	-500.0–500.0%	100.0
✓	G7-13 (0xE8D)	AO11 Output Method	0: Absolute Value 1: 0% Negative; 0–100% Positive 2: 0–50% Negative; 50–100% Positive	0
✓	G7-14 (0xE8E)	Virtual AO11 Output	0.00–100.00 PCT	0.00

H. Fault & Protection

H0. Fault Handle

Pr.	Parameter Name	Setting Range	Default
H0-00 (0xF40)	Fault Reset MI Src	0: Disable 1: Enable 2–7: MI1–MI6 8–9: Reserve 10–15: MI10–MI15	0
H0-01 (0xF41)	Fault Indn	0: Disable 1–2: Relay1–2 3–4: MO1–MO2 5–9: Reserve 10–15: MO/Relay10–15	0
H0-02 (0xF42)	Warning Indn	0: Disable 1–2: Relay1–2 3–4: MO1–MO2 5–9: Reserve 10–15: MO/Relay10–15	0
H0-03 (0xF43)	Fault Auto Reset Allowed Sel	bit 0: ocA/ocd/ocn bit 1: ovA/ovd/ovn/ovs bit 2: LvA/Lvd/Lvn bit 3: Orp bit 4: oH1/oH2 bit 5: EF bit 6: EF1 bit 7: oL bit 8: Eol1/Eol2 bit 9: oH3 bit 10: ot1/ot2 bit 11: uC bit 12: AFE/ACE bit 13: GFF bit 14: Reserve bit 15: Reserve	0
H0-04 (0xF44)	Fault Restart MI Src	0: Disable 1: Enable 2–7: MI1–MI6 8–9: Reserve 10–15: MI10–MI15	0

Pr.	Parameter Name	Setting Range	Default
H0-05 (0xF45)	Restart Speed Tracking	0: Max output FREQ 1: FREQ before stop 2: Min output FREQ 3: Auto Estimation	0
H0-06 (0xF46)	Fault Restart No.	0–10 times	0
H0-07 (0xF47)	Fault Restart No. Remain	0–10	Read only
H0-08 (0xF48)	Fault Restart No. Reset Time	0.0–600.0 sec.	60.0
H0-09 (0xF49)	Fault Auto Reset Delay Time	1.0–600.0 sec.	1.0
H0-10 (0xF4A)	Fault Restart Delay Time	1.0–600.0 sec.	1.0
H0-11 (0xF4B)	STO Definition Sel	0: STO Fault 1: Fault at Run; Warning at Stop 2: STO Warning 3: No STO Display at Stop	0
H0-12 (0xF4C)	STO1/2 Allowable Duration	1–200 ms	10
H0-13 (0xF4D)	STO Indn Delay Time	STO setting difference–1000 ms	10
H0-14 (0xF4E)	STO Auto Reset	0: Disable 1: Enable	0
H0-15 (0xF4F)	STO Output logic A	0: Disable 1–2: Relay1–2 3–4: MO1–MO2 5–9: Reserve 10–15: MO/Relay10–15	0
H0-16 (0xF50)	STO Output logic B	0: Disable 1–2: Relay1–2 3–4: MO1–MO2 5–9: Reserve 10–15: MO/Relay10–15	0
H0-17 (0xF51)	Fault Output Indn 1	0: Disable 1–2: Relay1–2 3–4: MO1–MO2 5–9: Reserve 10–15: MO/Relay10–15	0

	Pr.	Parameter Name	Setting Range	Default
〆	H0-18 (0xF52)	Fault Output Indn 2	0: Disable 1–2: Relay1–2 3–4: MO1–MO2 5–9: Reserve 10–15: MO/Relay10–15	0
〆	H0-19 (0xF53)	Fault Output Indn 3	0: Disable 1–2: Relay1–2 3–4: MO1–MO2 5–9: Reserve 10–15: MO/Relay10–15	0
〆	H0-20 (0xF54)	Fault Output Indn 4	0: Disable 1–2: Relay1–2 3–4: MO1–MO2 5–9: Reserve 10–15: MO/Relay10–15	0
〆	H0-21 (0xF55)	Fault Output Option 1	0–65535	0
〆	H0-22 (0xF56)	Fault Output Option 2	0–65535	0
〆	H0-23 (0xF57)	Fault Output Option 3	0–65535	0
〆	H0-24 (0xF58)	Fault Output Option 4	0–65535	0

H1. Voltage Protection

Pr.	Parameter Name	Setting Range	Default
H1-00 (0xF80)	ov Warning Level	0.0–820.0 V_{DC}	740.0
H1-01 (0xF81)	ov Warning Indn	0: Disable 1–2: Relay1–2 3–4: MO1–MO2 5–9: Reserve 10–15: MO/Relay10–15	0
H1-02 (0xF82)	Lv Fault Level	Non Lower harmonic models: 300.0–440.0 V_{DC} / 150.0–220.0 V_{DC}	360.0/ 180.0
		Lower harmonic models: 200.0–400.0 V_{DC} / 100.0–200.0 V_{DC}	200.0/ 100.0
H1-04 (0xF84)	ECAP Lv Fault Level	300.0–440.0 V_{DC} 150.0–220.0 V_{DC}	360.0 180.0

Pr.	Parameter Name	Setting Range	Default
H1-05 (0xF85)	Lv Fault Indn	0: Disable 1–2: Relay1–2 3–4: MO1–MO2 5–9: Reserve 10–15: MO/Relay10–15	0
H1-06 (0xF86)	Restart after Power Loss	0: Disable 1: FREQ before power loss 2: Max Output FREQ 3: Min Output FREQ 4: Auto Estimation	0
H1-07 (0xF87)	Power Loss Time Allowed	0.0–20.0 sec.	2.0
H1-08 (0xF88)	ov Stall Prev Level	460V models: 0.0–900.0 V_{DC}	760.0
H1-09 (0xF89)	Stall Prev Function Sel	0: Basic OC+Basic OV 1: Basic OC+Smart OV 2: Smart OC+Basic OV 3: Smart OC+ Smart OV	3
H1-10 (0xF8A)	OV Stall Prev Indn	0: Disable 1–2: Relay1–2 3–4: MO1–MO2 5–9: Reserve 10–15: MO/Relay10–15 16–19: Reserve	0
H1-11 (0xF8B)	Smart ov P Gain	0–65535	Depending on the model power
H1-12 (0xF8C)	Smart ov I Gain	0.000–65.535	Depending on the model power
H1-13 (0xF8D)	Smart ov D Gain	0–65535	Depending on the model power

H2. Current Protection

Pr.	Parameter Name	Setting Range	Default
H2-00 (0xFC0)	GFF Detect Level	0–200%	60
H2-04 (0xFC4)	Output Current Limit	Depending on the models (100% corresponds to the drive's continuous current)	100
H2-05 (0xFC5)	ocA Stall Prev Level	0–100%	90

Pr.	Parameter Name	Setting Range	Default
H2-06 (0xFC6)	Weak Flux oc Stall Prev Level	0–100%	100
H2-07 (0xFC7)	ocn Stall Prev Level	0–100%	90
H2-08 (0xFC8)	ocn Stall Prev Decel Sel	0: Current Decel Time 1: Decel Time 1 2: Decel Time 2 3: Decel Time 3 4: Decel Time 4 5: By Quick Stop Time	0
H2-09 (0xFC9)	oc Stall Prev Indn	0: Disable 1–2: Relay1–2 3–4: MO1–MO2 5–9: Reserve 10–15: MO/Relay10–15 16–19: Reserve	0
H2-10 (0xFCA)	Smart oc P Gain	0–65535	Depending on the model power
H2-11 (0xFCB)	Smart oc I Gain	0.000–65.535	Depending on the model power
H2-12 (0xFCC)	Low Current Detect Level	0.0–100.0%	0.0
H2-13 (0xFCD)	Low Current Detect Time	0.00–360.00 sec.	0.00
H2-14 (0xFCE)	Low Current Action	0: Warning & Continue OPER 1: Fault & Ramp to Stop 2: Fault & Auto-Decel 3: Fault & Coast to Stop 4: Fault & by Quick Stop Time	0
H2-15 (0xFCF)	Low Current Indn	0: Disable 1–2: Relay1–2 3–4: MO1–MO2 5–9: Reserve 10–15: MO/Relay10–15	0

H3. Phase Loss Protection

Pr.	Parameter Name	Setting Range	Default
H3-00 (0x1000)	OrP Action	1: Fault & Ramp to Stop 2: Fault & Auto-Decel 3: Fault & Coast to Stop 4: Fault & by Quick Stop Time	1
H3-01 (0x1001)	OrP Indn	0: Disable 1–2: Relay1–2 3–4: MO1–MO2 5–9: Reserve 10–15: MO/Relay10–15	0
H3-02 (0x1002)	OPL Detect Level	0.00–100.00%	1.00
H3-03 (0x1003)	OPL Detect Time	0.000–65.535 sec.	3.000
H3-04 (0x1004)	OPL DC Brake Time	0.000–65.535 sec.	0.000
H3-05 (0x1005)	OPL Action	0: Warning & Continue OPER 1: Fault & Ramp to Stop 2: Fault & Auto-Decel 3: Fault & Coast to Stop 4: Fault & by Quick Stop Time	0
⚡ H3-06 (0x1006)	U Phase Loss Indn	0: Disable 1–2: Relay1–2 3–4: MO1–MO2 5–9: Reserve 10–15: MO/Relay10–15	0
⚡ H3-07 (0x1007)	V Phase Loss Indn	0: Disable 1–2: Relay1–2 3–4: MO1–MO2 5–9: Reserve 10–15: MO/Relay10–15	0
⚡ H3-08 (0x1008)	W Phase Loss Indn	0: Disable 1–2: Relay1–2 3–4: MO1–MO2 5–9: Reserve 10–15: MO/Relay10–15	0

H4. Drive Heat Protection

	Pr.	Parameter Name	Setting Range	Default
〆	H4-00 (0x1040)	IGBT oH Warning Level	0–95%	95
〆	H4-01 (0x1041)	Cap oH Warning Level	0–95%	95
	H4-02 (0x1042)	Drive oH Warning Indn	0: Disable 1–2: Relay1–2 3–4: MO1–MO2 5–9: Reserve 10–15: MO/Relay10–15	0
〆	H4-03 (0x1043)	Fan Control Sel	0: Always OFF 1: Always ON 2: Fan ON after Drive Start 3: By IGBT Temp	1
	H4-04 (0x1044)	Fan Speed Setting	0–100	0
	H4-05 (0x1045)	CF Derating Protection	0: Reduce CF & Current Limit 1: Fix CF & Reduce Current Limit 2: Reduce CF & Fix Current Limit	0

H5. Motor Overload Protection

	Pr.	Parameter Name	Setting Range	Default
〆	H5-00 (0x1080)	ot Action	0: Warning & Continue OPER 1: Fault & Ramp to Stop 2: Fault & Auto-Decel 3: Fault & Coast to Stop 4: Fault & by Quick Stop Time	0
〆	H5-01 (0x1081)	ot Indn	0: Disable 1–2: Relay1–2 3–4: MO1–MO2 5–9: Reserve 10–15: MO/Relay10–15	0
〆	H5-02 (0x1082)	Normal Speed ot Action	0: Warning & Continue OPER 1: Fault & Ramp to Stop 2: Fault & Auto-Decel 3: Fault & Coast to Stop 4: Fault & by Quick Stop Time	0

Pr.	Parameter Name	Setting Range	Default
H5-03 (0x1083)	Normal Speed ot Indn	0: Disable 1–2: Relay1–2 3–4: MO1–MO2 5–9: Reserve 10–15: MO/Relay10–15	0
H5-04 (0x1084)	IM1/SM ot Level	0–250% (100% = motor rated current)	120
H5-05 (0x1085)	IM1/SM ot Detect Time	0.0–10.0 sec.	0.1
H5-06 (0x1086)	IM1/SM N-Speed ot Level	0–250% (100% = motor rated current)	120
H5-07 (0x1087)	IM1/SM N-Speed ot Detect Time	0.0–10.0 sec.	0.1
H5-08 (0x1088)	IM1/SM EoL1 Mode	0: Disable 1: Variable Torque mode 2: Constant Torque mode 3: High Precision mode	0
H5-09 (0x1089)	IM1/SM EoL1 Detect Time	30.0–600.0 sec.	60.0
H5-10 (0x108A)	IM1/SM EoL1 Action	0: Warning & Continue OPER 1: Fault & Ramp to Stop 2: Fault & Auto-Decel 3: Fault & Coast to Stop 4: Fault & by Quick Stop Time	0
H5-11 (0x108B)	IM1/SM HP Mode Max Torque	0–250% 100% = motor rated torque (vector) or rated current (scalar)	100
H5-12 (0x108C)	IM1/SM HP Mode 0 RPM Torque	0–250% 100% = motor rated torque (vector) or rated current (scalar)	40
H5-13 (0x108D)	IM1/SM HP Mode Switch FREQ	0.00–599.00 Hz	Refer to Desc. of Parameters
H5-15 (0x1090)	IM2 ot Level	0–250% 100% = motor rated current	120
H5-16 (0x1091)	IM2 ot Detect Time	0.0–10.0 sec.	0.1
H5-17 (0x1092)	IM2 N-Speed ot Level	0–250% 100% = motor rated current	120
H5-18 (0x1093)	IM2 N-Speed ot Detect Time	0.0–10.0 sec.	0.1

Pr.	Parameter Name	Setting Range	Default
H5-19 (0x1094)	IM2 EoL1 Mode	0: Disable 1: Variable Torque mode 2: Constant Torque mode 3: High Precision mode	0
H5-20 (0x1095)	IM2 EoL1 Detect Time	30.0–600.0 sec.	60.0
H5-21 (0x1096)	IM2 EoL1 Action	0: Warning & Continue OPER 1: Fault & Ramp to Stop 2: Fault & Auto-Decel 3: Fault & Coast to Stop 4: Fault & by Quick Stop Time	0
H5-22 (0x1097)	IM2 HP Mode Max Torque	0–250% 100% = motor rated torque (vector) or rated current (scalar)	100
H5-23 (0x1098)	IM2 HP Mode 0 RPM Torque	0–250% 100% = motor rated torque (vector) or rated current (scalar)	40
H5-24 (0x1099)	IM2 HP Mode Switch FREQ	0.00–599.00 Hz	Refer to Desc. of Parameters
H5-26 (0x109C)	IM3 ot Level	0–250% 100% = motor rated current	120
H5-27 (0x109D)	IM3 ot Detect Time	0.0–10.0 sec.	0.1
H5-28 (0x109E)	IM3 N-Speed ot Level	0–250% 100% = motor rated current	120
H5-29 (0x109F)	IM3 N-Speed ot Detect Time	0.0–10.0 sec.	0.1
H5-30 (0x10A0)	IM3 EoL1 Mode	0: Disable 1: Variable Torque mode 2: Constant Torque mode 3: High Precision mode	0
H5-31 (0x10A1)	IM3 EoL1 Detect Time	30.0–600.0 sec.	60.0
H5-32 (0x10A2)	IM3 EoL1 Action	0: Warning & Continue OPER 1: Fault & Ramp to Stop 2: Fault & Auto-Decel 3: Fault & Coast to Stop 4: Fault & by Quick Stop Time	0
H5-33 (0x10A3)	IM3 HP Mode Max Torque	0–250% 100% = motor rated torque (vector) or rated current (scalar)	100

	Pr.	Parameter Name	Setting Range	Default
✓	H5-34 (0x10A4)	IM3 HP Mode 0 RPM Torque	0–250% 100% = motor rated torque (vector) or rated current (scalar)	40
✓	H5-35 (0x10A5)	IM3 HP Mode Switch FREQ	0.00–599.00 Hz	Refer to Desc. of Parameters
✓	H5-37 (0x10A8)	IM4 ot Level	0–250% 100% = motor rated current	120
✓	H5-38 (0x10A9)	IM4 ot Detect Time	0.0–10.0 sec.	0.1
✓	H5-39 (0x10AA)	IM4 N-Speed ot Level	0–250% 100% = motor rated current	120
✓	H5-40 (0x10AB)	IM4 N-Speed ot Detect Time	0.0–10.0 sec.	0.1
	H5-41 (0x10AC)	IM4 EoL1 Mode	0: Disable 1: Variable Torque mode 2: Constant Torque mode 3: High Precision mode	0
✓	H5-42 (0x10AD)	IM4 EoL1 Detect Time	30.0–600.0 sec.	60.0
✓	H5-43 (0x10AE)	IM4 EoL1 Action	0: Warning & Continue OPER 1: Fault & Ramp to Stop 2: Fault & Auto-Decel 3: Fault & Coast to Stop 4: Fault & by Quick Stop Time	0
✓	H5-44 (0x10AF)	IM4 HP Mode Max Torque	0–250% 100% = motor rated torque (vector) or rated current (scalar)	100
✓	H5-45 (0x10B0)	IM4 HP Mode 0 RPM Torque	0–250% 100% = motor rated torque (vector) or rated current (scalar)	40
✓	H5-46 (0x10B1)	IM4 HP Mode Switch FREQ	0.00–599.00 Hz	Refer to Desc. of Parameters
✓	H5-48 (0x10B4)	Over Slip Action	0: Warning & Continue OPER 1: Fault & Ramp to Stop 2: Fault & Auto-Decel 3: Fault & Coast to Stop 4: Fault & by Quick Stop Time	0

Pr.	Parameter Name	Setting Range	Default
H5-49 (0x10B5)	Over Slip Indn	0: Disable 1–2: Relay1–2 3–4: MO1–MO2 5–9: Reserve 10–15: MO/Relay10–15	0
H5-50 (0x10B6)	IM1 Max Slip FREQ	0.00–200.00 Hz	20.00
H5-51 (0x10B7)	IM2 Max Slip FREQ	0.00–200.00 Hz	20.00
H5-52 (0x10B8)	IM3 Max Slip FREQ	0.00–200.00 Hz	20.00
H5-53 (0x10B9)	IM4 Max Slip FREQ	0.00–200.00 Hz	20.00
H5-54 (0x10BA)	Over Slip Level	0.0–100.0%	0.0
H5-55 (0x10BB)	Over Slip Detect Time	0.0–10.0 sec.	1.0

H6. Motor Heat Protection

Pr.	Parameter Name	Setting Range	Default
H6-00 (0x10C0)	Motor Temp 1	-20–200°C	Read only
H6-01 (0x10C1)	Motor Temp Fdk 1 AI Src	0: Disable 1–6: Reserve 7–9: AI1–AI3 10–11: Reserve 12–13: AI10–AI11	0
H6-02 (0x10C2)	Motor Temp 1 AO Sel	0: Disable 1–2: AO1–AO2 3–4: Reserve 5–6: AO10–AO11	0
H6-03 (0x10C3)	Motor Temp 1 Sensor Type	0: Disable 1: PTC 2: KTY84 3: PT100 4: PT1000	0
H6-04 (0x10C4)	Motor Temp 1 Derating Level	0.0–100.0% 0.0–150.0°C (Motor Temp.1 overheating detection level)	40.0 100.0
H6-05 (0x10C5)	Motor Temp 1 Derating Delay	0.0–600.0 sec.	60.0
H6-06 (0x10C6)	Motor Temp 1 Derating FREQ	0.00–599.00 Hz (c2-19 lower limit freq.)–(c2-18 upper limit freq.)	0.00

	Pr.	Parameter Name	Setting Range	Default
〆	H6-07 (0x10C7)	Motor Temp 1 OH Detect Level	0.0–100.0% 0.0–150.0°C	50.0 125.0
〆	H6-08 (0x10C8)	Motor Temp 1 OH Detect Time	0.0–600.0 sec.	60.0
	H6-09 (0x10C9)	Motor Temp 1 OH Action	0: Warning & Continue OPER 1: Fault & Ramp to Stop 2: Fault & Auto-Decel 3: Fault & Coast to Stop 4: Fault & by Quick Stop Time	0
〆	H6-10 (0x10CA)	Motor Temp 1 OH Indn	0: Disable 1–2: Relay1–2 3–4: MO1–MO2 5–9: Reserve 10–15: MO/Relay10–15	0
〆	H6-11 (0x10CB)	Motor Temp 2	-40–150°C	Read only
	H6-12 (0x10CC)	Motor Temp Fdk 2 AI Src	0: Disable 1–6: Reserve 7–9: AI1–AI3 10–11: Reserve 12–13: AI10–AI11	0
	H6-13 (0x10CD)	Motor Temp 2 AO Sel	0: Disable 1–2: AO1–AO2 3–4: Reserve 5–6: AO10–AO11	0
	H6-14 (0x10CE)	Motor Temp 2 Sensor Type	0: Disable 1: PTC 2: KTY84 3: PT100 4: PT1000	0
〆	H6-15 (0x10CF)	Motor Temp 2 Derating Level	0.0–100.0% 0.0–150.0°C (Motor Temp.2 overheating detection level)	40.0 100.0
〆	H6-16 (0x10D0)	Motor Temp 2 Derating Delay	0.0–600.0 sec.	60.0
〆	H6-17 (0x10D1)	Motor Temp 2 Derating FREQ	0.00–599.00 Hz (c2-19 lower limit freq.)–(c2-18 upper limit freq.)	0.00
〆	H6-18 (0x10D2)	Motor Temp 2 OH Detect Level	0.0–100.0% 0.0–150.0°C	50.0 125.0
〆	H6-19 (0x10D3)	Motor Temp 2 OH Detect Time	0.0–600.0 sec.	60.0

Pr.	Parameter Name	Setting Range	Default
H6-20 (0x10D4)	Motor Temp 2 OH Action	0: Warning & Continue OPER 1: Fault & Ramp to Stop 2: Fault & Auto-Decel 3: Fault & Coast to Stop 4: Fault & by Quick Stop Time	0
✗ H6-21 (0x10D5)	Motor Temp 2 OH Indn	0: Disable 1–2: Relay1–2 3–4: MO1–MO2 5–9: Reserve 10–15: MO/Relay10–15	0

H7. Overload / Underload Handle

Pr.	Parameter Name	Setting Range	Default
H7-00 (0x1100)	Load Compare Src	0: Output Amp/ motor rated Amp 1: Output torque/ motor rated torque 2: Output power/ motor rated power 3: Output power/ driver rated power	0
H7-01 (0x1101)	L/F Overload Curve Sel	0: Disable 1: User Defined 2: 1.5th power curve 3: 2nd power curve 4: 3rd power curve	0
H7-02 (0x1102)	L/F Overload Action	0: Warning & Continue OPER 1: Fault & Ramp to Stop 2: Fault & Auto-Decel 3: Fault & Coast to Stop 4: Fault & by Quick Stop Time	0
H7-03 (0x1103)	L/F Overload Indn	0: Disable 1–2: Relay1–2 3–4: MO1–MO2 5–9: Reserve 10–15: MO/Relay10–15	0
✗ H7-04 (0x1104)	L/F Overload Detect Time	0.0–600.0 sec.	10.0
✗ H7-05 (0x1105)	Overload L/F FREQ Set 1	0.00–H7-06 (Hz)	5.00
✗ H7-06 (0x1106)	Overload L/F FREQ Set 2	H7-05–H7-07 (Hz)	5.00
✗ H7-07 (0x1107)	Overload L/F FREQ Set 3	H7-06–H7-08 (Hz)	5.00
✗ H7-08 (0x1108)	Overload L/F FREQ Set 4	H7-07–H7-09 (Hz)	5.00

Pr.	Parameter Name	Setting Range	Default
H7-09 (0x1109)	Overload L/F FREQ Set 5	H7-08–599.00 (Hz)	5.00
H7-10 (0x110A)	Overload L/F Load Set 1	0.0–200.0%	150.0
H7-11 (0x110B)	Overload L/F Load Set 2	0.0–200.0%	150.0
H7-12 (0x110C)	Overload L/F Load Set 3	0.0–200.0%	150.0
H7-13 (0x110D)	Overload L/F Load Set 4	0.0–200.0%	150.0
H7-14 (0x110E)	Overload L/F Load Set 5	0.0–200.0%	150.0
H7-15 (0x110F)	L/F Underload Curve Sel	0: Disable 1: User Defined 2: 1.5th power curve 3: 2nd power curve 4: 3rd power curve	0
H7-16 (0x1110)	L/F Underload Action	0: Warning & Continue OPER 1: Fault & Ramp to Stop 2: Fault & Auto-Decel 3: Fault & Coast to Stop 4: Fault & by Quick Stop Time	0
H7-17 (0x1111)	L/F Underload Indn	0: Disable 1–2: Relay1–2 3–4: MO1–MO2 5–9: Reserve 10–15: MO/Relay10–15	0
H7-18 (0x1112)	L/F Underload Detect Time	0.0–600.0 sec.	10.0
H7-19 (0x1113)	Underload L/F FREQ Set 1	0.00–H7-20 (Hz)	5.00
H7-20 (0x1114)	Underload L/F FREQ Set 2	H7-19–H7-21 (Hz)	5.00
H7-21 (0x1115)	Underload L/F FREQ Set 3	H7-20–H7-22 (Hz)	5.00
H7-22 (0x1116)	Underload L/F FREQ Set 4	H7-21–H7-23 (Hz)	5.00
H7-23 (0x1117)	Underload L/F FREQ Set 5	H7-22–599.00 (Hz)	5.00
H7-24 (0x1118)	Underload L/F Load Set 1	0.0–200.0%	10.0
H7-25 (0x1119)	Underload L/F Load Set 2	0.0–200.0%	15.0
H7-26 (0x111A)	Underload L/F Load Set 3	0.0–200.0%	25.0
H7-27 (0x111B)	Underload L/F Load Set 4	0.0–200.0%	30.0

	Pr.	Parameter Name	Setting Range	Default
⚡	H7-28 (0x111C)	Underload L/F Load Set 5	0.0–200.0%	30.0

H8. Speed Fdk Protection

	Pr.	Parameter Name	Setting Range	Default
⚡	H8-00 (0x1140)	Speed Deviation Detect Level	0–50%	50
⚡	H8-01 (0x1141)	Speed Deviation Detect Time	0.0–10.0 sec.	0.5
⚡	H8-02 (0x1142)	Speed Deviation Action	0: Warning & Continue OPER 1: Fault & Ramp to Stop 2: Fault & Auto-Decel 3: Fault & Coast to Stop 4: Fault & by Quick Stop Time	0
⚡	H8-03 (0x1143)	Over Speed Detect Level	0–120%	115
⚡	H8-04 (0x1144)	Over Speed Detect Time	0.0–10.0 sec.	0.5
⚡	H8-05 (0x1145)	Over Speed Action	0: Warning & Continue OPER 1: Fault & Ramp to Stop 2: Fault & Auto-Decel 3: Fault & Coast to Stop 4: Fault & by Quick Stop Time	0
⚡	H8-06 (0x1146)	Direction Error Detect Time	0.0–10.0 sec.	1.0
⚡	H8-07 (0x1147)	Direction Error Action	0: Warning & Continue OPER 1: Fault & Ramp to Stop 2: Fault & Auto-Decel 3: Fault & Coast to Stop 4: Fault & by Quick Stop Time	0

J. Application Function

J0. Additional Function

Pr.	Parameter Name	Setting Range	Default
J0-00 (0x11C0)	UVW MC Action Indn	0: Disable 1–2: Relay1–2 3–4: MO1–MO2 5–9: Reserve 10–15: MO/Relay10–15	0

J1. AES Function

Pr.	Parameter Name	Setting Range	Default
J1-00 (0x1200)	AES Auto Energy Saving Mode	0: Disable 1: PFO Power Factor Optimization 2: PLO Power Loss Optimization	0
J1-01 (0x1201)	AES Min FREQ	0.00–40.00 Hz	10.00
J1-02 (0x1202)	AES Delay Time	0.0–600.0 sec.	5.0
J1-03 (0x1203)	AES Max Voltage Drop	0–70%	60
J1-04 (0x1204)	PFO Target Power Factor Angle	35.00–65.00 deg	40.00
J1-05 (0x1205)	PFO Voltage Regulation Rate	1–100%	10
J1-06 (0x1206)	PLO Loss Coefficient	0–100%	1
J1-07 (0x1207)	PLO Kp Gain	0.001–60.000 pu	0.050
J1-08 (0x1208)	PLO Ki Gain	0.001–60.000 pu	0.020

J2. dEb Function

Pr.	Parameter Name	Setting Range	Default
J2-00 (0x1240)	dEb Function Sel	0: Disable 1: Auto-decel, stop after restore 2: Auto-decel, run after restore 3: Low speed high voltage control 4: All high voltage control 5: dEb Decel, stop after restore 6: FOC Decel, stop after restore 7: FOC Decel, run after restore	0
J2-01 (0x1241)	dEb Action Level	0.0–200.0 V_{DC}	40.0
J2-02 (0x1242)	dEb Reset Bias Level	0.0–200.0 V_{DC}	40.0

	Pr.	Parameter Name	Setting Range	Default
✎	J2-03 (0x1243)	dEb Function Reset Time	0.0–25.0 sec.	3.0
✎	J2-04 (0x1244)	dEb P Gain	0.00–655.35	1.00
✎	J2-05 (0x1245)	dEb I Gain	0.000–65.535	0.100
✎	J2-06 (0x1246)	dEb Decel Time	0.00–600.00 sec.	60.00
	J2-09 (0x1249)	dEb Output Indn	0: Disable 1–2: Relay1–2 3–4: MO1–MO2 5–9: Reserve 10–15: MO/Relay10–15 16–19: Reserve	0
✎	J2-07 (0x1247)	FOC dEb Torque Feedforward	0–100%	80
✎	J2-08 (0x1248)	FOC dEb Coat Stop FREQ	0.00–599.00 Hz	0.00

J3. TEC Function

	Pr.	Parameter Name	Setting Range	Default
	J3-00 (0x1280)	TEC Function Sel	0: Disable 1: Enable	0
✎	J3-01 (0x1281)	TEC Voltage Regulation Gain	0.00–500.00%	0.50
✎	J3-02 (0x1282)	TEC Voltage Regulation LPF	0.000–65.535 sec.	0.050

J4. Preheat Function

	Pr.	Parameter Name	Setting Range	Default
✎	J4-00 (0x12C0)	Preheat MI Src	0: Disable 1: Enable 2–7: MI1–MI6 8–9: Reserve 10–15: MI10–MI15	0
	J4-01 (0x12C1)	Preheat Delay Time	5–3000 sec.	5
✎	J4-03 (0x12C3)	Preheat Current Cmd	0–100%	0
✎	J4-06 (0x12C6)	Preheat Time	0–100%	0

Pr.	Parameter Name	Setting Range	Default
J4-07 (0x12C7)	Preheat Indn	0: Disable 1–2: Relay1–2 3–4: MO1–MO2 5–9: Reserve 10–15: MO/Relay10–15	0

J5. Fire Mode

Pr.	Parameter Name	Setting Range	Default
J5-00 (0x1300)	FireMode Status	bit 0: FireMode enabled 0 = FireMode is disabled 1 = FireMode is enabled bit 1: FireMode active 0 = FireMode is inactive 1 = FireMode is active bit 2: FireMode direction is forward 0 = FireMode direction is not forward 1 = FireMode direction is forward bit 3: FireMode direction is reverse 0 = FireMode direction is not reverse 1 = FireMode direction is reverse bit 4: FireMode stop mode is active 0 = FireMode stop mode is not active 1 = FireMode stop mode is active bit 5: FireMode Pr lock status 0 = FireMode Pr unlock 1 = FireMode Pr locked bit 6: Run enable 0 = Not allow to Run 1 = Allow to Run bit 7: Start Enable 0 = Not allow to Start 1 = Allow to Start bit 8–15: Reserve	Read only
J5-01 (0x1301)	FireMode	0: Ddisable 1: Enable, Limited OPER 2: Enable, Unlimited OPER	0

Pr.	Parameter Name	Setting Range	Default
J5-02 (0x1302)	FireMode MI Src	0: Disable 1: Reserve 2–7: MI1–MI6 8–9: Reserve 10–15: MI10–MI15	0
J5-03 (0x1303)	FireMode FREQ Src	0: Disable 1–6: Reserve 7–9: AI1–AI3 10–11: Reserve 12–13: AI10–AI11 14–15: Reserve 16: Multi-step speed 17: FireMode FREQ Cmd 18: Up/Down terminal 19: STOP 20: PID	0
J5-04 (0x1304)	FireMode Direction MI Src	0: FWD 1: REV 2–7: MI1–MI6 8–9: Reserve 10–15: MI10–MI15	0
J5-05 (0x1305)	FireMode FREQ Cmd	0.00–599.00 Hz	60.00
J5-06 (0x1306)	FireMode Control bits	bit 0: RUN Enable bit 1: Start Enable bit 2: FireMode PR Lock bit 3–bit15: Reserve	0
J5-07 (0x1307)	FireMode Fault Handle	0: Manual reset 1: Automatic reset	0
J5-08 (0x1308)	FireMode Auto Reset Times	1–5	1
J5-09 (0x1309)	FireMode Auto Reset Delay	5.0–120.0 sec.	5.0
J5-10 (0x130A)	FireMode Log 1 Start Date	0–12319999	Read only
J5-11 (0x130C)	FireMode Log 1 Start Time	0–245959	Read only
J5-12 (0x130E)	FireMode Log 1 End Date	0–12319999	Read only
J5-13 (0x1310)	FireMode Log 1 End Time	0–245959	Read only

Pr.	Parameter Name	Setting Range	Default
J5-14 (0x1312)	FireMode Log 1 Fault Code	0–65535	Read only
J5-15 (0x1313)	FireMode Log 1 Warning Code	0–65535	Read only
J5-16 (0x1314)	FireMode Log 1 Warranty Fault	0–65535	Read only
J5-17 (0x1315)	FireMode Log 2 Start Date	0–12319999	Read only
J5-18 (0x1317)	FireMode Log 2 Start Time	0–245959	Read only
J5-19 (0x1319)	FireMode Log 2 End Date	0–12319999	Read only
J5-20 (0x131B)	FireMode Log 2 End Time	0–245959	Read only
J5-21 (0x131D)	FireMode Log 2 Fault Code	0–65535	Read only
J5-22 (0x131E)	FireMode Log 2 Warning Code	0–65535	Read only
J5-23 (0x131F)	FireMode Log 2 Warranty Fault	0–65535	Read only
J5-24 (0x1320)	FireMode Log 3 Start Date	0–12319999	Read only
J5-25 (0x1322)	FireMode Log 3 Start Time	0–245959	Read only
J5-26 (0x1324)	FireMode Log 3 End Date	0–12319999	Read only
J5-27 (0x1326)	FireMode Log 3 End Time	0–245959	Read only
J5-28 (0x1328)	FireMode Log 3 Fault Code	0–65535	Read only
J5-29 (0x1329)	FireMode Log 3 Warning Code	0–65535	Read only
J5-30 (0x132A)	FireMode Log 3 Warranty Fault	0–65535	Read only
J5-31 (0x132B)	FireMode Indn	0: Disable 1–2: Relay1–2 3–4: MO1–MO2 5–9: Reserve 10–15: MO/Relay10–15	0

J6. Time Function

<table>
<tr><th>Pr.</th><th>Parameter Name</th><th>Setting Range</th><th>Default</th></tr>
<tr><td>J6-00
(0x1340)</td><td>Low Battery Action</td><td>0: No warning
1: Warning after power on
2: Warning each hour
3: Warning each day</td><td>0</td></tr>
<tr><td>J6-01
(0x1341)</td><td>Time Function1</td><td rowspan="4">bit0: Timer 1
bit1: Timer 2
bit2: Timer 3
bit3: Timer 4
bit4: Timer 5
bit5: Timer 6
bit6: Timer 7
bit7: Timer 8
bit8: Timer 9
bit9: Timer 10</td><td>0</td></tr>
<tr><td>J6-02
(0x1342)</td><td>Time Function2</td><td>0</td></tr>
<tr><td>J6-03
(0x1343)</td><td>Time Function3</td><td>0</td></tr>
<tr><td></td><td></td><td></td></tr>
<tr><td>J6-04
(0x1344)</td><td>Time Function 1 MI Src</td><td>0: Disable
1: Enable
2–7: MI1–MI6
8–9: Reserve
10–15: MI10–MI15</td><td>0</td></tr>
<tr><td>J6-05
(0x1345)</td><td>Time Function 2 MI Src</td><td>0: Disable
1: Enable
2–7: MI1–MI6
8–9: Reserve
10–15: MI10–MI15</td><td>0</td></tr>
<tr><td>J6-06
(0x1346)</td><td>Time Function 3 MI Src</td><td>0: Disable
1: Enable
2–7: MI1–MI6
8–9: Reserve
10–15: MI10–MI15</td><td>0</td></tr>
<tr><td>J6-07
(0x1347)</td><td>Timer 1 Configuration</td><td rowspan="7">bit0: Monday
bit1: Tuesday
bit2: Wednesday
bit3: Thursday
bit4: Friday
bit5: Saturday
bit6: Sunday</td><td>0</td></tr>
<tr><td>J6-10
(0x134B)</td><td>Timer 2 Configuration</td><td>0</td></tr>
<tr><td>J6-13
(0x134F)</td><td>Timer 3 Configuration</td><td>0</td></tr>
<tr><td>J6-16
(0x1353)</td><td>Timer 4 Configuration</td><td>0</td></tr>
<tr><td>J6-19
(0x1357)</td><td>Timer 5 Configuration</td><td>0</td></tr>
<tr><td>J6-22
(0x135B)</td><td>Timer 6 Configuration</td><td>0</td></tr>
<tr><td>J6-25
(0x135F)</td><td>Timer 7 Configuration</td><td>0</td></tr>
</table>

	Pr.	Parameter Name	Setting Range	Default
✓	J6-28 (0x1363)	Timer 8 Configuration	bit7: Activation 1	0
✓	J6-31 (0x1367)	Timer 9 Configuration	bit8: Activation 2	0
✓	J6-34 (0x136B)	Timer 10 Configuration	bit9: Activation 3	0
			bit10: Activation 4 bit11: Exception bit12: Holiday bit13: Workday	
✓	J6-08 (0x1348)	Timer 1 Start Time	00:00–23:59	00:00
✓	J6-09 (0x1349)	Timer 1 Duration	00:00:00–07:00:00	00:00:00
✓	J6-11 (0x134C)	Timer 2 Start Time	00:00–23:59	00:00
✓	J6-12 (0x134D)	Timer 2 Duration	00:00:00–07:00:00	00:00:00
✓	J6-14 (0x1350)	Timer 3 Start Time	00:00–23:59	00:00
✓	J6-15 (0x1351)	Timer 3 Duration	00:00:00–07:00:00	00:00:00
✓	J6-17 (0x1354)	Timer 4 Start Time	00:00–23:59	00:00
✓	J6-18 (0x1355)	Timer 4 Duration	00:00:00–07:00:00	00:00:00
✓	J6-20 (0x1358)	Timer 5 Start Time	00:00–23:59	00:00
✓	J6-21 (0x1359)	Timer 5 Duration	00:00:00–07:00:00	00:00:00
✓	J6-23 (0x135C)	Timer 6 Start Time	00:00–23:59	00:00
✓	J6-24 (0x135D)	Timer 6 Duration	00:00:00–07:00:00	00:00:00
✓	J6-26 (0x1360)	Timer 7 Start Time	00:00–23:59	00:00
✓	J6-27 (0x1361)	Timer 7 Duration	00:00:00–07:00:00	00:00:00
✓	J6-29 (0x1364)	Timer 8 Start Time	00:00–23:59	00:00
✓	J6-30 (0x1365)	Timer 8 Duration	00:00:00–07:00:00	00:00:00
✓	J6-32 (0x1368)	Timer 9 Start Time	00:00–23:59	00:00
✓	J6-33 (0x1369)	Timer 9 Duration	00:00:00–07:00:00	00:00:00
✓	J6-35 (0x136C)	Timer 10 Start Time	00:00–23:59	00:00
✓	J6-36 (0x136D)	Timer 10 Duration	00:00:00–07:00:00	00:00:00

Pr.	Parameter Name	Setting Range	Default
J6-37 (0x136F)	Activation 1 Start Date	01:01–31:12	01:01
J6-38 (0x1370)	Activation 1 End Date	01:01–31:12	01:01
J6-39 (0x1371)	Activation 2 Start Date	01:01–31:12	01:01
J6-40 (0x1372)	Activation 2 End Date	01:01–31:12	01:01
J6-41 (0x1373)	Activation 3 Start Date	01:01–31:12	01:01
J6-42 (0x1374)	Activation 3 End Date	01:01–31:12	01:01
J6-43 (0x1375)	Activation 4 Start Date	01:01–31:12	01:01
J6-44 (0x1376)	Activation 4 End Date	01:01–31:12	01:01
J6-45 (0x1377)	Exception Enable Number	0–12	3
J6-46 (0x1378)	Exception Type	bit0: Exception 1 bit1: Exception 2 bit2: Exception 3 bit3: Exception 4 bit4: Exception 5 bit5: Exception 6 bit6: Exception 7 bit7: Exception 8 bit8: Exception 9 bit9: Exception 10 bit10: Exception 11 bit11: Exception 12	0
J6-47 (0x1379)	Exception 1 Start Date	01:01–31:12	01:01
J6-48 (0x137A)	Exception 1 Duration Days	0–60 day	0
J6-49 (0x137B)	Exception 2 Start Date	01:01–31:12	01:01
J6-50 (0x137C)	Exception 2 Duration Days	0–60 day	0
J6-51 (0x137D)	Exception 3 Start Date	01:01–31:12	01:01
J6-52 (0x137E)	Exception 3 Duration Days	0–60 day	0
J6-53 (0x137F)	Exception 4 Start Date	01:01–31:12	01:01
J6-54 (0x1380)	Exception 5 Start Date	01:01–31:12	01:01
J6-55 (0x1381)	Exception 6 Start Date	01:01–31:12	01:01

Pr.	Parameter Name	Setting Range	Default
J6-56 (0x1382)	Exception 7 Start Date	01:01–31:12	01:01
J6-57 (0x1383)	Exception 8 Start Date	01:01–31:12	01:01
J6-58 (0x1384)	Exception 9 Start Date	01:01–31:12	01:01
J6-59 (0x1385)	Exception 10 Start Date	01:01–31:12	01:01
J6-60 (0x1386)	Exception 11 Start Date	01:01–31:12	01:01
J6-61 (0x1387)	Exception 12 Start Date	01:01–31:12	01:01

L. PLC Function

L0. InnerPLC Handle

Pr.	Parameter Name	Setting Range	Default
L0-00 (0x1400)	InnerPLC Address	0–254	2
L0-01 (0x1401)	InnerPLC Control Word	0–65535 bit0: 0: Maintain FREQ 1: Reset FREQ bit1–15: Reserve	0
L0-02 (0x1402)	InnerPLC Cmd Control Mask	0–65535 bit0: OPER Cmd bit1: FREQ Cmd bit2–15: Reserve	11
L0-03 (0x1403)	InnerPLC MI Mask	0–65535 bit0: MI1 bit1: MI2 bit2: MI3 bit3: MI4 bit4: MI5 bit5: MI6 bit6–7: Reserve bit8–13: MI10–MI15 (IO extension card) bit14–15: Reserve	65535
L0-04 (0x1404)	InnerPLC MO Mask	0–65535 bit0: Relay1 bit1: Relay2 bit2: MO1 bit3: MO2 bit4–8: Reserve bit9–14: MO10–MO15 (IO extension card) bit15: Reserve	65535
L0-05 (0x1405)	InnerPLC AI Mask	0–65535 bit0: AI1 bit1: AI2 bit2: AI3 bit3–4: Reserve bit5–6: AI10–AI11 (AIO extension card) bit7–15: Reserve	65535

	Pr.	Parameter Name	Setting Range	Default
〆	L0-06 (0x1406)	InnerPLC AO Mask	0–65535 bit0: AO1 bit1: AO2 bit2–3: Reserve bit4–5: AO10–AO11 (AIO extension card) bit6–15: Reserve	65535
〆	L0-07 (0x1407)	InnerPLC Mode Switch Src 1	0: OFF 1: ON 2–7: MI1–MI6 8–9: Reserve 10–15: M10–M15 (IO extension card)	0
〆	L0-08 (0x1408)	InnerPLC Mode Switch Src 2	0: OFF 1: ON 2–7: MI1–MI6 8–9: Reserve 10–15: M10–M15 (IO extension card)	0

L1. InnerPLC App Pr 0–49

	Pr.	Parameter Name	Setting Range	Default
〆	L1-00 (0x1440)	InnerPLC App Parameter 0	0–0xFFFF	0
〆	L1-01 (0x1441)	InnerPLC App Parameter 1	0–0xFFFF	0
〆	L1-02 (0x1442)	InnerPLC App Parameter 2	0–0xFFFF	0
〆	L1-03 (0x1443)	InnerPLC App Parameter 3	0–0xFFFF	0
〆	L1-04 (0x1444)	InnerPLC App Parameter 4	0–0xFFFF	0
〆	L1-05 (0x1445)	InnerPLC App Parameter 5	0–0xFFFF	0
〆	L1-06 (0x1446)	InnerPLC App Parameter 6	0–0xFFFF	0
〆	L1-07 (0x1447)	InnerPLC App Parameter 7	0–0xFFFF	0
〆	L1-08 (0x1448)	InnerPLC App Parameter 8	0–0xFFFF	0
〆	L1-09 (0x1449)	InnerPLC App Parameter 9	0–0xFFFF	0
〆	L1-10 (0x144A)	InnerPLC App Parameter 10	0–0xFFFF	0
〆	L1-11 (0x144B)	InnerPLC App Parameter 11	0–0xFFFF	0
〆	L1-12 (0x144C)	InnerPLC App Parameter 12	0–0xFFFF	0

Pr.	Parameter Name	Setting Range	Default
L1-13 (0x144D)	InnerPLC App Parameter 13	0–0xFFFF	0
L1-14 (0x144E)	InnerPLC App Parameter 14	0–0xFFFF	0
L1-15 (0x144F)	InnerPLC App Parameter 15	0–0xFFFF	0
L1-16 (0x1450)	InnerPLC App Parameter 16	0–0xFFFF	0
L1-17 (0x1451)	InnerPLC App Parameter 17	0–0xFFFF	0
L1-18 (0x1452)	InnerPLC App Parameter 18	0–0xFFFF	0
L1-19 (0x1453)	InnerPLC App Parameter 19	0–0xFFFF	0
L1-20 (0x1454)	InnerPLC App Parameter 20	0–0xFFFF	0
L1-21 (0x1455)	InnerPLC App Parameter 21	0–0xFFFF	0
L1-22 (0x1456)	InnerPLC App Parameter 22	0–0xFFFF	0
L1-23 (0x1457)	InnerPLC App Parameter 23	0–0xFFFF	0
L1-24 (0x1458)	InnerPLC App Parameter 24	0–0xFFFF	0
L1-25 (0x1459)	InnerPLC App Parameter 25	0–0xFFFF	0
L1-26 (0x145A)	InnerPLC App Parameter 26	0–0xFFFF	0
L1-27 (0x145B)	InnerPLC App Parameter 27	0–0xFFFF	0
L1-28 (0x145C)	InnerPLC App Parameter 28	0–0xFFFF	0
L1-29 (0x145D)	InnerPLC App Parameter 29	0–0xFFFF	0
L1-30 (0x145E)	InnerPLC App Parameter 30	0–0xFFFF	0
L1-31 (0x145F)	InnerPLC App Parameter 31	0–0xFFFF	0
L1-32 (0x1460)	InnerPLC App Parameter 32	0–0xFFFF	0
L1-33 (0x1461)	InnerPLC App Parameter 33	0–0xFFFF	0
L1-34 (0x1462)	InnerPLC App Parameter 34	0–0xFFFF	0
L1-35 (0x1463)	InnerPLC App Parameter 35	0–0xFFFF	0
L1-36 (0x1464)	InnerPLC App Parameter 36	0–0xFFFF	0
L1-37 (0x1465)	InnerPLC App Parameter 37	0–0xFFFF	0

	Pr.	Parameter Name	Setting Range	Default
✔	L1-38 (0x1466)	InnerPLC App Parameter 38	0–0xFFFF	0
✔	L1-39 (0x1467)	InnerPLC App Parameter 39	0–0xFFFF	0
✔	L1-40 (0x1468)	InnerPLC App Parameter 40	0–0xFFFF	0
✔	L1-41 (0x1469)	InnerPLC App Parameter 41	0–0xFFFF	0
✔	L1-42 (0x146A)	InnerPLC App Parameter 42	0–0xFFFF	0
✔	L1-43 (0x146B)	InnerPLC App Parameter 43	0–0xFFFF	0
✔	L1-44 (0x146C)	InnerPLC App Parameter 44	0–0xFFFF	0
✔	L1-45 (0x146D)	InnerPLC App Parameter 45	0–0xFFFF	0
✔	L1-46 (0x146E)	InnerPLC App Parameter 46	0–0xFFFF	0
✔	L1-47 (0x146F)	InnerPLC App Parameter 47	0–0xFFFF	0
✔	L1-48 (0x1470)	InnerPLC App Parameter 48	0–0xFFFF	0
✔	L1-49 (0x1471)	InnerPLC App Parameter 49	0–0xFFFF	0

L2. InnerPLC APP Pr 50–99

	Pr.	Parameter Name	Setting Range	Default
✔	L2-00 (0x1480)	InnerPLC App Parameter 50	0–0xFFFF	0
✔	L2-01 (0x1481)	InnerPLC App Parameter 51	0–0xFFFF	0
✔	L2-02 (0x1482)	InnerPLC App Parameter 52	0–0xFFFF	0
✔	L2-03 (0x1483)	InnerPLC App Parameter 53	0–0xFFFF	0
✔	L2-04 (0x1484)	InnerPLC App Parameter 54	0–0xFFFF	0
✔	L2-05 (0x1485)	InnerPLC App Parameter 55	0–0xFFFF	0
✔	L2-06 (0x1486)	InnerPLC App Parameter 56	0–0xFFFF	0
✔	L2-07 (0x1487)	InnerPLC App Parameter 57	0–0xFFFF	0
✔	L2-08 (0x1488)	InnerPLC App Parameter 58	0–0xFFFF	0
✔	L2-09 (0x1489)	InnerPLC App Parameter 59	0–0xFFFF	0
✔	L2-10 (0x148A)	InnerPLC App Parameter 60	0–0xFFFF	0

Pr.	Parameter Name	Setting Range	Default
L2-11 (0x148B)	InnerPLC App Parameter 61	0–0xFFFF	0
L2-12 (0x148C)	InnerPLC App Parameter 62	0–0xFFFF	0
L2-13 (0x148D)	InnerPLC App Parameter 63	0–0xFFFF	0
L2-14 (0x148E)	InnerPLC App Parameter 64	0–0xFFFF	0
L2-15 (0x148F)	InnerPLC App Parameter 65	0–0xFFFF	0
L2-16 (0x1490)	InnerPLC App Parameter 66	0–0xFFFF	0
L2-17 (0x1491)	InnerPLC App Parameter 67	0–0xFFFF	0
L2-18 (0x1492)	InnerPLC App Parameter 68	0–0xFFFF	0
L2-19 (0x1493)	InnerPLC App Parameter 69	0–0xFFFF	0
L2-20 (0x1494)	InnerPLC App Parameter 70	0–0xFFFF	0
L2-21 (0x1495)	InnerPLC App Parameter 71	0–0xFFFF	0
L2-22 (0x1496)	InnerPLC App Parameter 72	0–0xFFFF	0
L2-23 (0x1497)	InnerPLC App Parameter 73	0–0xFFFF	0
L2-24 (0x1498)	InnerPLC App Parameter 74	0–0xFFFF	0
L2-25 (0x1499)	InnerPLC App Parameter 75	0–0xFFFF	0
L2-26 (0x149A)	InnerPLC App Parameter 76	0–0xFFFF	0
L2-27 (0x149B)	InnerPLC App Parameter 77	0–0xFFFF	0
L2-28 (0x149C)	InnerPLC App Parameter 78	0–0xFFFF	0
L2-29 (0x149D)	InnerPLC App Parameter 79	0–0xFFFF	0
L2-30 (0x149E)	InnerPLC App Parameter 80	0–0xFFFF	0
L2-31 (0x149F)	InnerPLC App Parameter 81	0–0xFFFF	0
L2-32 (0x14A0)	InnerPLC App Parameter 82	0–0xFFFF	0
L2-33 (0x14A1)	InnerPLC App Parameter 83	0–0xFFFF	0
L2-34 (0x14A2)	InnerPLC App Parameter 84	0–0xFFFF	0
L2-35 (0x14A3)	InnerPLC App Parameter 85	0–0xFFFF	0

	Pr.	Parameter Name	Setting Range	Default
✓	L2-36 (0x14A4)	InnerPLC App Parameter 86	0–0xFFFF	0
✓	L2-37 (0x14A5)	InnerPLC App Parameter 87	0–0xFFFF	0
✓	L2-38 (0x14A6)	InnerPLC App Parameter 88	0–0xFFFF	0
✓	L2-39 (0x14A7)	InnerPLC App Parameter 89	0–0xFFFF	0
✓	L2-40 (0x14A8)	InnerPLC App Parameter 90	0–0xFFFF	0
✓	L2-41 (0x14A9)	InnerPLC App Parameter 91	0–0xFFFF	0
✓	L2-42 (0x14AA)	InnerPLC App Parameter 92	0–0xFFFF	0
✓	L2-43 (0x14AB)	InnerPLC App Parameter 93	0–0xFFFF	0
✓	L2-44 (0x14AC)	InnerPLC App Parameter 94	0–0xFFFF	0
✓	L2-45 (0x14AD)	InnerPLC App Parameter 95	0–0xFFFF	0
✓	L2-46 (0x14AE)	InnerPLC App Parameter 96	0–0xFFFF	0
✓	L2-47 (0x14AF)	InnerPLC App Parameter 97	0–0xFFFF	0
✓	L2-48 (0x14B0)	InnerPLC App Parameter 98	0–0xFFFF	0
✓	L2-49 (0x14B1)	InnerPLC App Parameter 99	0–0xFFFF	0

n. Communication

n0. COM Card Information

Pr.	Parameter Name	Setting Range	Default
n0-00 (0x1540)	RS-485 COM Port Protocol Sel	0: Modbus Slave 1: Modbus Master 2: BACnet MS/TP	0
n0-01 (0x1541)	COM Card Timeout Disposal	0: By COM Stop Method and display Warning 1: By OPER FREQ after COM Timeout and display Warning 2: By Drive Stop Method and display Warning 3: By Drive Stop Method and display Fault 4: By Drive Stop Method and display Warning after stop 5: By Drive Stop Method and display Fault after stop	0
n0-02 (0x1542)	OPER FREQ after COM Timeout	0.00–599.00 Hz	0.00
n0-03 (0x1543)	COM Card ID	0: N/A 1: DeviceNet 2: Profibus-DP 3: CANopen 5: EtherNet 8: BACnet IP 12: Profinet	Read only
n0-04 (0x1544)	COM Card Version	0–65535	Read only
n0-05 (0x1545)	COM Card Date Code	0–65535	Read only

n1. Modbus

Pr.	Parameter Name	Setting Range	Default
n1-00 (0x1580)	Modbus Decoding Method	0: Delta Defined 2000 1: Delta Defined 6000	0
n1-01 (0x1581)	Modbus Address	1–254	1
n1-02 (0x1582)	Modbus COM Baud Rate	0: 4.8 Kbps 1: 9.6 Kbps 2: 19.2 Kbps 3: 38.4 Kbps 4: 57.6 Kbps 5: 76.8 Kbps 6: 115.2 Kbps	1

	Pr.	Parameter Name	Setting Range	Default
↯	n1-03 (0x1583)	Modbus Package Format	0: 7, N, 2 (ASCII) 1: 7, E, 1 (ASCII) 2: 7, O, 1 (ASCII) 3: 7, E, 2 (ASCII) 4: 7, O, 2 (ASCII) 5: 8, N, 1 (ASCII) 6: 8, N, 2 (ASCII) 7: 8, E, 1 (ASCII) 8: 8, O, 1 (ASCII) 9: 8, E, 2 (ASCII) 10: 8, O, 2 (ASCII) 11: 8, N, 1 (RTU) 12: 8, N, 2 (RTU) 13: 8, E, 1 (RTU) 14: 8, O, 1 (RTU) 15: 8, E, 2 (RTU) 16: 8, O, 2 (RTU)	0
↯	n1-04 (0x1584)	Modbus Timeout Check Time	0.0–100.0 sec.	0.0
↯	n1-05 (0x1585)	Modbus Timeout Disposal	0: Continue OPER 1: Warning & continue OPER 2: Fault & ramp to stop 3: Fault & coast to stop	0
↯	n1-06 (0x1586)	Modbus Response Delay Time	0.0–200.0 ms	2.0
↯	n1-07 (0x1587)	Modbus MO Mask	0: Disable 1: Enable bit0–1: Relay1–2 bit2–3: MO1–MO2 bit4–8: Reserve bit9–14: MO10–MO15	0
↯	n1-08 (0x1588)	Modbus AO Mask	0: Disable 1: Enable bit0–1: AO1–2 bit2–3: Reserve bit4–5: AO10–AO11	0
	n1-09 (0x1589)	Modbus Master Target Selection	0: None 1: InnerPLC 2: D2D	0

n2. CANopen

Pr.	Parameter Name	Setting Range	Default
n2-00 (0x1590)	CANopen Decoding Method	0: Delta Defined 2000 1: Delta Defined 6000 2: DS402	0
n2-01 (0x1591)	CANopen Slave Address	0–127	0
n2-02 (0x1592)	CANopen COM Baud Rate	0: 1 Mbps 1: 500 Kbps 2: 250 Kbps 3: 125 Kbps 4: 100 Kbps 5: 50 Kbps	1
n2-03 (0x1593)	CANopen Master Function	0: Disable 1: Enable	0
n2-04 (0x1594)	CANopen Master Address	0–127	100
n2-05 (0x1595)	CANopen Control Word	0–0xFFFF	0
n2-06 (0x1596)	CANopen MO Mask	0: Disable 1: Enable bit0–1: Relay1–2 bit2–3: MO1–MO2 bit4–8: Reserve bit9–14: MO10–MO15	0
n2-07 (0x1597)	CANopen AO Mask	0: Disable 1: Enable bit0–1: AO1–2 bit2–3: Reserve bit4–5: AO10–AO11	0
n2-08 (0x1598)	CANopen CiA 301 Status	0: Initialising 1: Reset Application 2: Reset COM 3: Pre-Operational 4: Operational 5: Stopped	Read only

Pr.	Parameter Name	Setting Range	Default
n2-09 (0x1599)	CANopen CiA 402 Status	0: Not ready to switch on 1: Switch on Disabled 2: Ready to switch on 3: Switched on 4: Operation Enabled 5: Quick stop active 6: Fault reaction active 7: Fault	Read only
n2-10 (0x159A)	CANopen Fault REC	bit0: CANopen Guarding Timeout bit1: CANopen Heartbeat Timeout bit2: CANopen Bus-off bit3: CANopen SYNC Timeout bit4: CANopen Format Error	Read only

n3. BACnet

Pr.	Parameter Name	Setting Range	Default
n3-00 (0x15A0)	BACnet MS/TP Decoding Method	0: Delta defined 2000	0
n3-01 (0x15A1)	BACnet MAC ID	0–127	10
n3-02 (0x15A2)	Max BACnet MAC ID Setting	0–127	127
n3-03 (0x15A3)	BACnet COM Baud Rate	0: 9.6 Kbps 1: 19.2 Kbps 2: 38.4 Kbps 3: 76.8 Kbps	2
n3-04 (0x15A4)	BACnet Device ID	0–4194303	10
n3-05 (0x15A6)	BACnet Password	0–65535	0
n3-06 (0x15A7)	BACnet MO Mask	0: Disable 1: Enable bit0–1: Relay1–2 bit2–3: MO1–MO2 bit4–8: Reserve bit9–14: MO10–MO15	0
n3-07 (0x15A8)	BACnet AO Mask	0: Disable 1: Enable bit0–1: AO1–2 bit2–3: Reserve bit4–5: AO10–AO11	0

n4. DeviceNET & Profibus

	Pr.	Parameter Name	Setting Range	Default
	n4-00 (0x15B0)	DeviceNET Decoding Method	0: Delta Defined 2000 1: Delta Defined 6000	0
✎	n4-01 (0x15B1)	DeviceNET Address	0–63	1
✎	n4-02 (0x15B2)	DeviceNET COM Baud Rate	0: 10 Kbps 1: 20 Kbps 2: 50 Kbps 3: 100 Kbps 4: 125 Kbps 5: 250 Kbps 6: 500 Kbps 7: 800 Kbps 8: 1 Mbps	3
✎	n4-03 (0x15B3)	DeviceNet Control Word	0–0xFFFF bit0 = 0: standard bit0 = 1: Delta Defined	0
✎	n4-04 (0x15B4)	DeviceNET MO Mask	0: Disable 1: Enable bit0–1: Relay1–2 bit2–3: MO1–MO2 bit4–8: Reserve bit9–14: MO10–MO15	0
✎	n4-05 (0x15B5)	DeviceNET AO Mask	0: Disable 1: Enable bit0–1: AO1–2 bit2–3: Reserve bit4–5: AO10–AO11	0
	n4-06 (0x15B6)	Profibus Decoding Method	0: Delta Defined 2000 1: Delta Defined 6000	0
	n4-07 (0x15B7)	Profibus Address	1–125	1
✎	n4-08 (0x15B8)	Profibus MO Mask	0: Disable 1: Enable bit0–1: Relay1–2 bit2–3: MO1–MO2 bit4–8: Reserve bit9–14: MO10–MO15	0
✎	n4-09 (0x15B9)	Profibus AO Mask	0: Disable 1: Enable bit0–1: AO1–2	0

Pr.	Parameter Name	Setting Range	Default
		bit2–3: Reserve bit4–5: AO10–AO11	

n5. EtherNET

Pr.	Parameter Name	Setting Range	Default
n5-00 (0x15C0)	EtherNET Decoding Method	0: Delta Defined 2000 1: Delta Defined 6000	0
n5-01 (0x15C1)	EtherNET IP Configuration	0: Static IP 1: DHCP 2: BOOTP	0
n5-02 (0x15C2)	EtherNET IP Address 1	0–223	0
n5-03 (0x15C3)	EtherNET IP Address 2	0–255	0
n5-04 (0x15C4)	EtherNET IP Address 3	0–255	0
n5-05 (0x15C5)	EtherNET IP Address 4	0–255	0
n5-06 (0x15C6)	EtherNET Mask Address 1	0–255	0
n5-07 (0x15C7)	EtherNET Mask Address 2	0–255	0
n5-08 (0x15C8)	EtherNET Mask Address 3	0–255	0
n5-09 (0x15C9)	EtherNET Mask Address 4	0–255	0
n5-10 (0x15CA)	EtherNET Gateway Address 1	0–223	0
n5-11 (0x15CB)	EtherNET Gateway Address 2	0–255	0
n5-12 (0x15CC)	EtherNET Gateway Address 3	0–255	0
n5-13 (0x15CD)	EtherNET Gateway Address 4	0–255	0
n5-14 (0x15CE)	EtherNET Password	0–4294967295	0
n5-15 (0x15D0)	EtherNET Reset	0: Disable 1: Reset	0
n5-16 (0x15D1)	EtherNET Control Word	bit0: Enable IP filter bit1: Enable Internet parameters bit2: Enable Login Password	0
n5-17 (0x15D2)	EtherNET MO Mask	0: Disable 1: Enable bit0–1: Relay1–2 bit2–3: MO1–MO2 bit4–8: Reserve	0

	Pr.	Parameter Name	Setting Range	Default
			bit9–14: MO10–MO15	
✓	n5-18 (0x15D3)	EtherNET AO Mask	0: Disable 1: Enable bit0–1: AO1–2 bit2–3: Reserve bit4–5: AO10–AO11	0
	n5-19 (0x15D4)	EtherNET Status	bit0: Enable login password	Read only
✓	n5-20 (0x15D5)	EIP COM Card Identify Method	0: by the device's family 1: by the device's series	1

o. Monitor & Recorder

o0. Status Monitor

Pr.	Parameter Name	Setting Range	Default
o0-00 (0x1640)	Status Display 1	0: Display output current (A) (unit: Amp) 1: Display counter value (c) (Unit: CNT) 2: Display the motor's actual output frequency (H.) (Unit: Hz) 3: Display the drive's DC bus voltage (v) (Unit: V_{DC}) 4: Display the drive's output voltage (E) (Unit: V_{AC}) 5: Display the drive's output power angle (n) (Unit: deg) 6: Display the drive's output power (P) (Unit: kW) 7: Display the motor speed rpm (r) (Unit: rpm) 8: Display the drive's estimated output torque, motor's rated torque is 100% (t) (Unit: %) 11: Display AI1 analog input terminal signal (1.) (Unit: %) 12: Display AI2 analog input terminal signal (2.) (Unit: %) 13: Display AI3 analog input terminal signal (3.) (Unit: %) 14: Display the drive's IGBT temperature (i.) (Unit: °C) 15: Display the drive's capacitance temperature (c.) (Unit: °C) 16: The digital input status (ON / OFF) (i) 17: The digital output status (ON / OFF) (o) 18: Display multi-step speed (S) 19: The corresponding CPU digital input pin status (d) 20: The corresponding CPU digital output pin status (0.) 21: Display the drive's IGBT temperature (i.) (Unit: %) 22: Display the drive's capacitance temperature (c.) (Unit: %) 25: Overload count (0.00–100.00%) (o.) (Unit: %) 26: Ground fault GFF (G.) (Unit: %) 27: DC bus voltage ripple (r.) (Unit: V_{DC}) 28: Display PLC register D1043 data (C) 29: Display PM pole SECT (4.) 34: Operation speed of fan (F.) (Unit: %)	0
o0-01 (0x1641)	Status Display 2		0
o0-02 (0x1642)	Status Display 3		0

Pr.	Parameter Name	Setting Range	Default
		36: Present operating carrier frequency of the drive (Unit: Hz) (J.) 38: Display the drive status (6.) 39: Display the drive’s estimated output torque, positive and negative, using Nt-m as unit (t 0.0: positive torque; -0.0: negative torque (C.) 41: kWh display (J) (Unit: kWh) 42: P-PID1 reference (h.) (Unit: %) 43: P-PID2 reference (y) (Unit: %) 44: P-PID1 feedback (b) (Unit: %) 45: P-PID2 feedback (y.) (Unit: %) 46: P-PID1 output frequency (b.) (Unit: Hz) 47: P-PID2 output frequency (u.) (Unit: Hz) 48: Hardware ID 49: Motor temperature (KTY84-130 only) 51: PMSVC torque offset 52: AI10% 53: AI11% 54: Hardware ID 2 55: Hardware ID 3 68: STO version (d) 69: STO checksum high word (d) 70: STO checksum low word (d)	
o0-03 (0x1643)	Current Display Filter Time	0.001–65.535 sec.	0.100
o0-04 (0x1644)	DC bus Display Filter Time	0.001–65.535 sec.	0.100
o0-05 (0x1645)	Status Display Filter Time	0.001–65.535 sec.	0.100
o0-06 (0x1646)	Drive Ready Indn	0: Disable 1–2: Relay1–2 3–4: MO1–MO2 5–9: Reserve 10–15: MO/Relay10–15	0
o0-07 (0x1647)	Run Indn	0: Disable 1–2: Relay1–2 3–4: MO1–MO2 5–9: Reserve 10–15: MO/Relay10–15	0
o0-08 (0x1648)	Output Amp Detection Level	0.0–200.0%	0.0

Pr.	Parameter Name	Setting Range	Default
o0-09 (0x1649)	Output Amp Exceed Indn	0: Disable 1–2: Relay1–2 3–4: MO1–MO2 5–9: Reserve 10–15: MO/Relay10–15	0
o0-10 (0x164A)	Output Amp under Indn	0: Disable 1–2: Relay1–2 3–4: MO1–MO2 5–9: Reserve 10–15: MO/Relay10–15	0
o0-11 (0x164B)	Target Speed Width	0.1–5.0%	0.1
o0-12 (0x164C)	At Target Speed Indn	0: Disable 1–2: Relay1–2 3–4: MO1–MO2 5–9: Reserve 10–15: MO/Relay10–15	0
o0-13 (0x164D)	Output FREQ Detection Level	0.00–599.00 Hz	30.00
o0-14 (0x164E)	Output FREQ Exceed Indn	0: Disable 1–2: Relay1–2 3–4: MO1–MO2 5–9: Reserve 10–15: MO/Relay10–15	0
o0-15 (0x164F)	Output FREQ under Indn	0: Disable 1–2: Relay1–2 3–4: MO1–MO2 5–9: Reserve 10–15: MO/Relay10–15	0
o0-16 (0x1650)	Output FREQ1 Level	0.00–599.00 Hz	60.00
o0-17 (0x1651)	Output FREQ1 Width	0.00–599.00 Hz	2.00
o0-18 (0x1652)	At Output FREQ1 Indn	0: Disable 1–2: Relay1–2 3–4: MO1–MO2 5–9: Reserve 10–15: MO/Relay10–15	0
o0-19 (0x1653)	Output FREQ2 Level	0.00–599.00 Hz	60.00
o0-20 (0x1654)	Output FREQ2 Width	0.00–599.00 Hz	2.00

Pr.	Parameter Name	Setting Range	Default
o0-21 (0x1655)	At Output FREQ2 Indn	0: Disable 1–2: Relay1–2 3–4: MO1–MO2 5–9: Reserve 10–15: MO/Relay10–15	0
o0-22 (0x1656)	0 Hz Cmd Indn at Run	0: Disable 1–2: Relay1–2 3–4: MO1–MO2 5–9: Reserve 10–15: MO/Relay10–15	0
o0-23 (0x1657)	0 Hz Cmd Indn	0: Disable 1–2: Relay1–2 3–4: MO1–MO2 5–9: Reserve 10–15: MO/Relay10–15	0
o0-24 (0x1658)	0 Hz Width	0.1–5.0%	0.1
o0-25 (0x1659)	0 Hz Output Indn at Run	0: Disable 1–2: Relay1–2 3–4: MO1–MO2 5–9: Reserve 10–15: MO/Relay10–15	0
o0-26 (0x165A)	0 Hz Output Indn	0: Disable 1–2: Relay1–2 3–4: MO1–MO2 5–9: Reserve 10–15: MO/Relay10~15	0
o0-27 (0x165B)	FREQ Cmd AO Sel	0: Disable 1–2: AO1–AO2 3–4: Reserve 5–6: AO10–AO11	0
o0-28 (0x165C)	FREQ Profile AO Sel	0: Disable 1–2: AO1–AO2 3–4: Reserve 5–6: AO10–AO11	0
o0-29 (0x165D)	Motor RPM AO Sel	0: Disable 1–2: AO1–AO2 3–4: Reserve 5–6: AO10–AO11	0

	Pr.	Parameter Name	Setting Range	Default
〆	o0-30 (0x165E)	Output FREQ AO Sel	0: Disable 1–2: AO1–AO2 3–4: Reserve 5–6: AO10–AO11	0
〆	o0-31 (0x165F)	Output Current AO Sel	0: Disable 1–2: AO1–AO2 3–4: Reserve 5–6: AO10–AO11	0
〆	o0-32 (0x1660)	Output Voltage AO Sel	0: Disable 1–2: AO1–AO2 3–4: Reserve 5–6: AO10–AO11	0
〆	o0-34 (0x1662)	Output Torque AO Sel	0: Disable 1–2: AO1–AO2 3–4: Reserve 5–6: AO10–AO11	0
〆	o0-35 (0x1663)	Output Power AO Sel	0: Disable 1–2: AO1–AO2 3–4: Reserve 5–6: AO10–AO11	0
〆	o0-36 (0x1664)	Power Factor AO Sel	0: Disable 1–2: AO1–AO2 3–4: Reserve 5–6: AO10–AO11	0
	o0-37 (0x1665)	Recent 1Hr OPER KW-hour	0.0–6553.5 kW-hour	Read only
	o0-38 (0x1666)	Cumulative OPER KW-hour	0.0–999.9 kW-hour	Read only
	o0-39 (0x1667)	Cumulative OPER MW-hour	0–999 MW-hour	Read only
	o0-40 (0x1668)	Cumulative OPER GW-hour	0–999 GW-hour	Read only
	o0-41 (0x1669)	Cumulative OPER Minutes	0–60 min	Read only
	o0-42 (0x166A)	Cumulative OPER Hours	0–24 hr	Read only
	o0-43 (0x166B)	Cumulative OPER Days	0–65535 day	Read only
	o0-44 (0x166C)	Drive Output Efficiency	0.0–99.9%	Read only

Pr.	Parameter Name	Setting Range	Default
o0-45 (0x166D)	Drive Output PF Angle	-90.0–90.0 deg	Read only
o0-46 (0x166E)	Drive Output Apparent Power	0.0–6553.5 kVA	Read only
o0-47 (0x166F)	Drive Output Active Power	0.0–6553.5 kW	Read only
o0-48 (0x1670)	Drive Output Reactive Power	0.0–6553.5 kVar	Read only
o0-49 (0x1671)	Motor Rated Power Consumed	0.00–100.00%	100.00
o0-50 (0x1672)	kW-hour Power Saved	0.0–999.9 kW-hour	Read only
o0-51 (0x1673)	MW-hour Power Saved	0–999 MW-hour	Read only
o0-52 (0x1674)	GW-hour Power Saved	0–999 GW-hour	Read only
o0-53 (0x1675)	Carbon Emission Reduction	0.0–6553.5 tn	Read only
o0-54 (0x1676)	Carbon Emission Factor	0.000–65.535 tn/MWh	0.500
o0-55 (0x1677)	Power Saved Record Reset	0–1	0
o0-59 (0x167B)	DC bus Voltage AO Sel	0: Disable 1–2: AO1–AO2 3–4: Reserve 5–6: AO10–AO11	0

o1. Signal & Recorder Function

Pr.	Parameter Name	Setting Range	Default
o1-00 (0x1680)	Signal Sampling Rate	0: 1 kHz 1: 2 kHz 2: 5 kHz 3: 10 kHz	0
o1-01 (0x1681)	Channel 1 Signal Sel	0: Signal Address 1–150 (Number of Signal List)	18
o1-02 (0x1682)	Channel 1 Signal Address	0–0xFFFFFFFF	0

Pr.	Parameter Name	Setting Range	Default
o1-03 (0x1683)	Channel 1 Data Type	0: UBYTE 1: SBYTE 2: UWORD 3: SWORD 4: ULONG 5: SLONG 6: FLOAT	2
o1-04 (0x1684)	Channel 1 Filter Time	0.0–6553.5 ms	0.0
o1-05 (0x1685)	Channel 2 Signal Sel	0–150	6
o1-06 (0x1686)	Channel 2 Signal Address	0–0xFFFFFFFF	0
o1-07 (0x1687)	Channel 2 Data Type	0–6	2
o1-08 (0x1688)	Channel 2 Filter Time	0.0–6553.5 ms	0.0
o1-09 (0x1689)	Channel 3 Signal Sel	0–150	31
o1-10 (0x168A)	Channel 3 Signal Address	0–0xFFFFFFFF	0
o1-11 (0x168B)	Channel 3 Data Type	0–6	5
o1-12 (0x168C)	Channel 3 Filter Time	0.0–6553.5 ms	0.0
o1-13 (0x168D)	Channel 4 Signal Sel	0–150	34
o1-14 (0x168E)	Channel 4 Signal Address	0–0xFFFFFFFF	0
o1-15 (0x168F)	Channel 4 Data Type	0–6	3
o1-16 (0x1691)	Channel 4 Filter Time	0.0–6553.5 ms	0.0
o1-17 (0x1692)	Channel 5 Signal Sel	0–150	11
o1-18 (0x1693)	Channel 5 Signal Address	0–0xFFFFFFFF	0
o1-19 (0x1694)	Channel 5 Data Type	0–6	2
o1-20 (0x1696)	Channel 5 Filter Time	0.0–6553.5 ms	0.0
o1-21 (0x1697)	Channel 6 Signal Sel	0–150	24
o1-22 (0x1698)	Channel 6 Signal Address	0–0xFFFFFFFF	0
o1-23 (0x1699)	Channel 6 Data Type	0–6	3
o1-24 (0x169B)	Channel 6 Filter Time	0.0–6553.5 ms	0.0

	Pr.	Parameter Name	Setting Range	Default
	o1-25 (0x169C)	Channel 7 Signal Sel	0–150	3
	o1-26 (0x169D)	Channel 7 Signal Address	0–0xFFFFFFFF	0
	o1-27 (0x169E)	Channel 7 Data Type	0–6	3
	o1-28 (0x16A0)	Channel 7 Filter Time	0.0–6553.5 ms	0.0
	o1-29 (0x16A1)	Channel 8 Signal Sel	0–150	4
	o1-30 (0x16A2)	Channel 8 Signal Address	0–0xFFFFFFFF	0
	o1-31 (0x16A3)	Channel 8 Data Type	0–6	3
	o1-32 (0x16A5)	Channel 8 Filter Time	0.0–6553.5 ms	0.0
✎	o1-33 (0x16A6)	Recorder Function	0: Disable 1: One-Time Record 2: Continuously Record	0
	o1-34 (0x16A7)	Recorder Trigger Method	0: Src A 1: Src A Reverse 2: Src A and Src B 3: Src A or Src B 4: Src A xor Src B	0
	o1-35 (0x16A8)	Recorder Trigger Src A	1–8 Monitor No.	1
	o1-36 (0x16AA)	Recorder Trigger Src B	1–8 Monitor No.	1
✎	o1-37 (0x16AB)	Recorder Time Setting	20–600 sec.	20
	o1-38 (0x16AC)	Recorder 1 Channel Src	0–8 Channel No.	1
	o1-39 (0x16AD)	Recorder 2 Channel Src	0–8 Channel No.	2
	o1-40 (0x16AF)	Recorder 3 Channel Src	0–8 Channel No.	3
	o1-41 (0x16B0)	Recorder 4 Channel Src	0–8 Channel No.	4
	o1-42 (0x16B1)	Recorder 5 Channel Src	0–8 Channel No.	5
	o1-43 (0x16B2)	Recorder 6 Channel Src	0–8 Channel No.	6
	o1-44 (0x16B4)	Recorder 7 Channel Src	0–8 Channel No.	7
	o1-45 (0x16B5)	Recorder 8 Channel Src	0–8 Channel No.	8

o2. Monitor Function

Pr.	Parameter Name	Setting Range	Default
o2-00 (0x16C0)	Monitor Trigger Status	0–0x00FF	Read only
o2-01 (0x16C1)	Monitor 1 Channel Src	1–8 Channel No.	1
o2-02 (0x16C2)	Monitor 1 Trigger Method	0: Disable 1: Low 2: High 3: Abs Low 4: Abs High 5: Low & High 6: Abs Low & Abs High 7: Hysteresis	2
o2-03 (0x16C3)	Monitor 1 Trigger Action	0: Disable 1: Warning 2: Error and Ramp Stop 3: Error and Coast Stop	0
o2-04 (0x16C4)	Monitor 1 Trigger Indn	0: Disable 1–2: Relay1–2 3–4: MO1–MO2 5–9: Reserve 10–15: MO/Relay10–15 16–19: Reserve	0
o2-05 (0x16C5)	Monitor 1 Upper Limit	-21474836.00–21474836.00	0.00
o2-06 (0x16C7)	Monitor 1 Lower Limit	-21474836.00–21474836.00	0.00
o2-07 (0x16C9)	Monitor 1 Hysteresis	0.00–100000.00	0.00
o2-08 (0x16CB)	Monitor 2 Channel Src	1–8 Channel No.	2
o2-09 (0x16CC)	Monitor 2 Trigger Method	0–7	0
o2-10 (0x16CD)	Monitor 2 Trigger Action	0–3	0
o2-11 (0x16CE)	Monitor 2 Trigger Indn	0: Disable 1–2: Relay1–2 3–4: MO1–MO2 5–9: Reserve 10–15: MO/Relay10–15 16–19: Reserve	0
o2-12 (0x16CF)	Monitor 2 Upper Limit	-21474836.00–21474836.00	0.00

Pr.	Parameter Name	Setting Range	Default
o2-13 (0x16D1)	Monitor 2 Lower Limit	-21474836.00–21474836.00	0.00
o2-14 (0x16D3)	Monitor 2 Hysteris	0.00–100000.00	0.00
o2-15 (0x16D5)	Monitor 3 Channel Src	1–8 Channel No.	3
o2-16 (0x16D6)	Monitor 3 Trigger Method	0–7	0
o2-17 (0x16D7)	Monitor 3 Trigger Action	0–3	0
o2-18 (0x16D8)	Monitor 3 Trigger Indn	0: Disable 1–2: Relay1–2 3–4: MO1–MO2 5–9: Reserve 10–15: MO/Relay10–15 16–19: Reserve	0
o2-19 (0x16D9)	Monitor 3 Upper Limit	-21474836.00–21474836.00	0.00
o2-20 (0x16DB)	Monitor 3 Lower Limit	-21474836.00–21474836.00	0.00
o2-21 (0x16DD)	Monitor 3 Hysteris	0.00–100000.00	0.00
o2-22 (0x16DF)	Monitor 4 Channel Src	1–8 Channel No.	4
o2-23 (0x16E0)	Monitor 4 Trigger Method	0–7	0
o2-24 (0x16E1)	Monitor 4 Trigger Action	0–3	0
o2-25 (0x16E2)	Monitor 4 Trigger Indn	0: Disable 1–2: Relay1–2 3–4: MO1–MO2 5–9: Reserve 10–15: MO/Relay10–15 16–19: Reserve	0
o2-26 (0x16E3)	Monitor 4 Upper Limit	-21474836.00–21474836.00	0.00
o2-27 (0x16E5)	Monitor 4 Lower Limit	-21474836.00–21474836.00	0.00
o2-28 (0x16E7)	Monitor 4 Hysteris	0.00–100000.00	0.00
o2-29 (0x16E9)	Monitor 5 Channel Src	1–8 Channel No.	5
o2-30 (0x16EA)	Monitor 5 Trigger Method	0–7	0
o2-31 (0x16EB)	Monitor 5 Trigger Action	0–3	0

Pr.	Parameter Name	Setting Range	Default
o2-32 (0x16EC)	Monitor 5 Trigger Indn	0: Disable 1–2: Relay1–2 3–4: MO1–MO2 5–9: Reserve 10–15: MO/Relay10–15 16–19: Reserve	0
o2-33 (0x16ED)	Monitor 5 Upper Limit	-21474836.00–21474836.00	0.00
o2-34 (0x16EF)	Monitor 5 Lower Limit	-21474836.00–21474836.00	0.00
o2-35 (0x16F1)	Monitor 5 Hystersis	0.00–100000.00	0.00
o2-36 (0x16F3)	Monitor 6 Channel Src	1–8 Channel No.	6
o2-37 (0x16F4)	Monitor 6 Trigger Method	0–7	0
o2-38 (0x16F5)	Monitor 6 Trigger Action	0–3	0
o2-39 (0x16F6)	Monitor 6 Trigger Indn	0: Disable 1–2: Relay1–2 3–4: MO1–MO2 5–9: Reserve 10–15: MO/Relay10–15 16–19: Reserve	0
o2-40 (0x16F7)	Monitor 6 Upper Limit	-21474836.00–21474836.00	0.00
o2-41 (0x16F9)	Monitor 6 Lower Limit	-21474836.00–21474836.00	0.00
o2-42 (0x16FB)	Monitor 6 Hystersis	0.00–100000.00	0.00
o2-43 (0x16FD)	Monitor 7 Channel Src	1–8 Channel No.	7
o2-44 (0x16FE)	Monitor 7 Trigger Method	0–7	0
o2-45 (0x16FF)	Monitor 7 Trigger Action	0–3	0
o2-46 (0x1700)	Monitor 7 Trigger Indn	0: Disable 1–2: Relay1–2 3–4: MO1~MO2 5–9: Reserve 10–15: MO/Relay10–15 16–19: Reserve	0
o2-47 (0x1701)	Monitor 7 Upper Limit	-21474836.00–21474836.00	0.00
o2-48 (0x1703)	Monitor 7 Lower Limit	-21474836.00–21474836.00	0.00

Pr.	Parameter Name	Setting Range	Default
o2-49 (0x1705)	Monitor 7 Hystersis	0.00–100000.00	0.00
o2-50 (0x1707)	Monitor 8 Channel Src	1–8 Channel No.	8
o2-51 (0x1708)	Monitor 8 Trigger Method	0–7	0
o2-52 (0x1709)	Monitor 8 Trigger Action	0–3	0
o2-53 (0x170A)	Monitor 8 Trigger Indn	0: Disable 1–2: Relay1–2 3–4: MO1–MO2 5–9: Reserve 10–15: MO/Relay10–15 16–19: Reserve	0
o2-54 (0x170B)	Monitor 8 Upper Limit	-21474836.00–21474836.00	0.00
o2-55 (0x170D)	Monitor 8 Lower Limit	-21474836.00–21474836.00	0.00
o2-56 (0x170F)	Monitor 8 Hystersis	0.00–100000.00	0.00

o3. PDM Function

Pr.	Parameter Name	Setting Range	Default
o3-00 (0x1740)	Component Life Status	bit0: IGBT Life bit1: DC bus Cap Life bit2: PB Cap Life bit3: Fan Life bit4: PB Relay Life bit5: IO Relay 1 Life bit6: IO Relay 2 Life bit7: Fan Spd Fdb 1 bit8: Fan Spd Fdb 2 bit9: Fan Spd Fdb 3	0000h
✍ o3-01 (0x1741)	Component Lift Lower than Level Indn	0: Disable 1–2: Relay 1–2 3–4: MO1–2 5–9: Reserve 10–15: MO/Relay 10–15	0
o3-02 (0x1742)	IGBT Life	0.00–100.00%	100.00
o3-03 (0x1743)	DC bus Cap Life	0.00–100.00%	100.00
o3-04 (0x1744)	PB Cap Life	0.00–100.00%	100.00

	Pr.	Parameter Name	Setting Range	Default
	o3-05 (0x1745)	Fan Life	0.00–100.00%	100.00
	o3-06 (0x1746)	PB Relay Life	0.00–100.00%	100.00
	o3-07 (0x1747)	IO Relay1 Life	0.00–100.00%	100.00
	o3-08 (0x1748)	IO Relay2 Life	0.00–100.00%	100.00
	o3-09 (0x1749)	IGBT Life Warring Level	0.00–100.00%	10.00
	o3-10 (0x174A)	DC bus Cap Life Warring Level	0.00–100.00%	10.00
	o3-11 (0x174B)	PB Cap Life Warring Level	0.00–100.00%	10.00
	o3-12 (0x174C)	Fan Life Warring Level	0.00–100.00%	10.00
	o3-13 (0x174D)	PB Relay Life Warring Level	0.00–100.00%	10.00
	o3-14 (0x174E)	IO Relay1 Life Warring Level	0.00–100.00%	10.00
	o3-15 (0x174F)	IO Relay2 Life Warring Level	0.00–100.00%	10.00
	o3-16 (0x1750)	System Life	0.00–100.00%	100.00
*	o3-18 (0x1572)	Estimated Life Remains	0.0–6553.5 day	0.0

o4. Fault Record 1–2

Pr.	Parameter Name	Setting Range	Default
o4-00 (0x1780)	Fault Code REC 1	0–65535	Read only
o4-01 (0x1781)	OPER Time at Fault REC 1	0–2359 hr/min	Read only
o4-02 (0x1782)	OPER Days at Fault REC 1	0–65535 day	Read only
o4-03 (0x1783)	Date of Fault REC 1	0–1231 month/day	Read only
o4-04 (0x1784)	Time of Fault REC 1	0–2359 hr/min	Read only
o4-05 (0x1785)	FREQ Cmd at Fault REC 1	0.00–599.00	Read only
o4-06 (0x1786)	Output FREQ at Fault REC 1	0.00–599.00	Read only
o4-07 (0x1787)	Output Current at Fault REC 1	0.0–6553.5 A	Read only

Pr.	Parameter Name	Setting Range	Default
o4-08 (0x1788)	Output Voltage at Fault REC 1	0.0–6553.5 V_{DC}	Read only
o4-09 (0x1789)	DC bus at Fault REC 1	0.0–6553.5 V_{DC}	Read only
o4-10 (0x178A)	IGBT Temp at Fault REC 1	-3276.8–3276.7°C	Read only
o4-11 (0x178B)	Cap Temp at Fault REC 1	-3276.8–3276.7°C	Read only
o4-12 (0x178C)	Fan Speed at Fault REC 1	0–65535 rpm	Read only
o4-13 (0x178D)	Motor Speed at Fault REC 1	0–65535 rpm	Read only
o4-15 (0x178F)	Output Torque at Fault REC 1	0.0–6553.5%	Read only
o4-16 (0x1790)	MI Status at Fault REC 1	0000h–FFFFh	Read only
o4-17 (0x1791)	MO/Rly Status at Fault REC 1	0000h–FFFFh	Read only
o4-18 (0x1792)	Drive Status at Fault REC 1	0000h–FFFFh	Read only
o4-19 (0x1793)	Fault Code REC 2	0–65535	Read only
o4-20 (0x1794)	OPER Time at Fault REC 2	0–2359 hr/min	Read only
o4-21 (0x1795)	OPER Days at Fault REC 2	0–65535 day	Read only
o4-22 (0x1796)	Date of Fault REC 2	0–1231 month/day	Read only
o4-23 (0x1797)	Time of Fault REC 2	0–2359 hr/min	Read only
o4-24 (0x1798)	FREQ Cmd at Fault REC 2	0.00–599.00 Hz	Read only
o4-25 (0x1799)	Output FREQ at Fault REC 2	0.00–599.00 Hz	Read only
o4-26 (0x179A)	Output Current at Fault REC 2	0.0–6553.5 A	Read only
o4-27 (0x179B)	Output Voltage at Fault REC 2	0.0–6553.5 V_{DC}	Read only
o4-28 (0x179C)	DC bus at Fault REC 2	0.0–6553.5 V_{DC}	Read only

Pr.	Parameter Name	Setting Range	Default
o4-29 (0x179D)	IGBT Temp at Fault REC 2	-3276.8–3276.7°C	Read only
o4-30 (0x179E)	Cap Temp at Fault REC 2	-3276.8–3276.7°C	Read only
o4-31 (0x179F)	Fan Speed at Fault REC 2	0–65535 rpm	Read only
o4-32 (0x17A0)	Motor Speed at Fault REC 2	0–65535 rpm	Read only
o4-34 (0x17A2)	Output Torque at Fault REC 2	0.0–6553.5%	Read only
o4-35 (0x17A3)	MI Status at Fault REC 2	0000h–FFFFh	Read only
o4-36 (0x17A4)	MO/Rly Status at Fault REC 2	0000h–FFFFh	Read only
o4-37 (0x17A5)	Drive Status at Fault REC 2	0000h–FFFFh	Read only

o5. Fault Record 3–4

Pr.	Parameter Name	Setting Range	Default
o5-00 (0x17C0)	Fault Code REC 3	0–65535	Read only
o5-01 (0x17C1)	OPER Time at Fault REC 3	0–2359 hr/min	Read only
o5-02 (0x17C2)	OPER Days at Fault REC 3	0–65535 day	Read only
o5-03 (0x17C3)	Date of Fault REC 3	0–1231 month/day	Read only
o5-04 (0x17C4)	Time of Fault REC 3	0–2359 hr/min	Read only
o5-05 (0x17C5)	FREQ Cmd at Fault REC 3	0.00–599.00 Hz	Read only
o5-06 (0x17C6)	Output FREQ at Fault REC 3	0.00–599.00 Hz	Read only
o5-07 (0x17C7)	Output Current at Fault REC 3	0.0–6553.5 A	Read only
o5-08 (0x17C8)	Output Voltage at Fault REC 3	0.0–6553.5 V_{DC}	Read only
o5-09 (0x17C9)	DC bus at Fault REC 3	0.0–6553.5 V_{DC}	Read only

Pr.	Parameter Name	Setting Range	Default
o5-10 (0x17CA)	IGBT Temp at Fault REC 3	-3276.8–3276.7°C	Read only
o5-11 (0x17CB)	Cap Temp at Fault REC 3	-3276.8–3276.7°C	Read only
o5-12 (0x17CC)	Fan Speed at Fault REC 3	0–65535 rpm	Read only
o5-13 (0x17CD)	Motor Speed at Fault REC 3	0–65535 rpm	Read only
o5-15 (0x17CF)	Output Torque at Fault REC 3	0.0–6553.5%	Read only
o5-16 (0x17D0)	MI Status at Fault REC 3	0000h–FFFFh	Read only
o5-17 (0x17D1)	MO/Rly Status at Fault REC 3	0000h–FFFFh	Read only
o5-18 (0x17D2)	Drive Status at Fault REC 3	0000h–FFFFh	Read only
o5-19 (0x17D3)	Fault Code REC 4	0–65535	Read only
o5-20 (0x17D4)	OPER Time at Fault REC 4	0–2359 hr/min	Read only
o5-21 (0x17D5)	OPER Days at Fault REC 4	0–65535 day	Read only
o5-22 (0x17D6)	Date of Fault REC 4	0–1231 month/day	Read only
o5-23 (0x17D7)	Time of Fault REC 4	0–2359 hr/min	Read only
o5-24 (0x17D8)	FREQ Cmd at Fault REC 4	0.00–599.00 Hz	Read only
o5-25 (0x17D9)	Output FREQ at Fault REC 4	0.00–599.00 Hz	Read only
o5-26 (0x17DA)	Output Current at Fault REC 4	0.0–6553.5 A	Read only
o5-27 (0x17DB)	Output Voltage at Fault REC 4	0.0–6553.5 V_{DC}	Read only
o5-28 (0x17DC)	DC bus at Fault REC 4	0.0–6553.5 V_{DC}	Read only
o5-29 (0x17DD)	IGBT Temp at Fault REC 4	-3276.8–3276.7°C	Read only
o5-30 (0x17DE)	Cap Temp at Fault REC 4	-3276.8–3276.7°C	Read only

Pr.	Parameter Name	Setting Range	Default
o5-31 (0x17DF)	Fan Speed at Fault REC 4	0–65535 rpm	Read only
o5-32 (0x17E0)	Motor Speed at Fault REC 4	0–65535 rpm	Read only
o5-34 (0x17E2)	Output Torque at Fault REC 4	0.0–6553.5%	Read only
o5-35 (0x17E3)	MI Status at Fault REC 4	0000h–FFFFh	Read only
o5-36 (0x17E4)	MO/Rly Status at Fault REC 4	0000h–FFFFh	Read only
o5-37 (0x17E5)	Drive Status at Fault REC 4	0000h–FFFFh	Read only

o6. Fault Record 5–6

Pr.	Parameter Name	Setting Range	Default
o6-00 (0x1800)	Fault Code REC 5	0–65535	Read only
o6-01 (0x1801)	OPER Time at Fault REC 5	0–2359 hr/min	Read only
o6-02 (0x1802)	OPER Days at Fault REC 5	0–65535 day	Read only
o6-03 (0x1803)	Date of Fault REC 5	0–1231 month/day	Read only
o6-04 (0x1804)	Time of Fault REC 5	0–2359 hr/min	Read only
o6-05 (0x1805)	FREQ Cmd at Fault REC 5	0.00–599.00 Hz	Read only
o6-06 (0x1806)	Output FREQ at Fault REC 5	0.00–599.00 Hz	Read only
o6-07 (0x1807)	Output Current at Fault REC 5	0.0–6553.5 A	Read only
o6-08 (0x1808)	Output Voltage at Fault REC 5	0.0–6553.5 V_{DC}	Read only
o6-09 (0x1809)	DC bus at Fault REC 5	0.0–6553.5 V_{DC}	Read only
o6-10 (0x180A)	IGBT Temp at Fault REC 5	-3276.8–3276.7°C	Read only
o6-11 (0x180B)	Cap Temp at Fault REC 5	-3276.8–3276.7°C	Read only

Pr.	Parameter Name	Setting Range	Default
o6-12 (0x180C)	Fan Speed at Fault REC 5	0–65535 rpm	Read only
o6-13 (0x180D)	Motor Speed at Fault REC 5	0–65535 rpm	Read only
o6-15 (0x180F)	Output Torque at Fault REC 5	0.0–6553.5%	Read only
o6-16 (0x1810)	MI Status at Fault REC 5	0000h–FFFFh	Read only
o6-17 (0x1811)	MO/Rly Status at Fault REC 5	0000h–FFFFh	Read only
o6-18 (0x1812)	Drive Status at Fault REC 5	0000h–FFFFh	Read only
o6-19 (0x1813)	Fault Code REC 6	0–65535	Read only
o6-20 (0x1814)	OPER Time at Fault REC 6	0–2359 hr/min	Read only
o6-21 (0x1815)	OPER Days at Fault REC 6	0–65535 day	Read only
o6-22 (0x1816)	Date of Fault REC 6	0–1231 month/day	Read only
o6-23 (0x1817)	Time of Fault REC 6	0–2359 hr/min	Read only
o6-24 (0x1818)	FREQ Cmd at Fault REC 6	0.00–599.00 Hz	Read only
o6-25 (0x1819)	Output FREQ at Fault REC 6	0.00–599.00 Hz	Read only
o6-26 (0x181A)	Output Current at Fault REC 6	0.0–6553.5 A	Read only
o6-27 (0x181B)	Output Voltage at Fault REC 6	0.0–6553.5 V_{DC}	Read only
o6-28 (0x181C)	DC bus at Fault REC 6	0.0–6553.5 V_{DC}	Read only
o6-29 (0x181D)	IGBT Temp at Fault REC 6	-3276.8–3276.7°C	Read only
o6-30 (0x181E)	Cap Temp at Fault REC 6	-3276.8–3276.7°C	Read only
o6-31 (0x181F)	Fan Speed at Fault REC 6	0–65535 rpm	Read only
o6-32 (0x1820)	Motor Speed at Fault REC 6	0–65535 rpm	Read only

Pr.	Parameter Name	Setting Range	Default
o6-34 (0x1822)	Output Torque at Fault REC 6	0.0–6553.5%	Read only
o6-35 (0x1823)	MI Status at Fault REC 6	0000h–FFFFh	Read only
o6-36 (0x1824)	MO/Rly Status at Fault REC 6	0000h–FFFFh	Read only
o6-37 (0x1825)	Drive Status at Fault REC 6	0000h–FFFFh	Read only

P. PID Function

P0. Process PID1

Pr.	Parameter Name	Setting Range	Default
P0-00 (0x1880)	P-PID1/P-PID2 Switch Src	0: P-PID1 1: P-PID2 2–7: MI1–MI6 8–9: Reserve 10–15: MI10–MI15 16–25: Reserve 26–28: Time Function 1–3 29–30: Reserve 31–38: Monitor 1–8	0
P0-01 (0x1881)	P-PID1 Function	0: Disable 1: Enable	0
P0-02 (0x1882)	P-PID1 Ref1 Src	0: Disable 1: Keypad 2: RS-485 3: USB 4: COM Card 5–6: Reserve 7–9: AI1–AI3 10–11: Reserve 12–13: AI10–AI11 14–15: Reserve 16: Multi Setpoint 17: B-PID1 Output 18: Pulse Train 19: Current Pressure Cmd	0
P0-03 (0x1883)	P-PID1 Ref2 Src	0–19	0
P0-04 (0x1884)	P-PID1 Fdk1 Src	0: Disable 1: Reserve 2: RS-485 3: USB 4: COM Card 5–6: Reserve 7–9: AI1–AI3 10–11: Reserve 12–13: AI10–AI11 14–15: Reserve 16: B-PID1 Fdk	0

	Pr.	Parameter Name	Setting Range	Default
			17: B-PID1 Output 18: Pulse Train	
✎	P0-05 (0x1885)	P-PID1 Fdk2 Src	0–18	0
✎	P0-06 (0x1886)	P-PID1 Ref Math	0: Ref1 1: Ref1 + K*Ref2 2: Ref1 – K*Ref2 3: Ref1*K*Ref2 4: Ref1/K*Ref2 5: MIN(Ref1, Ref2) 6: MAX(Ref1, Ref2) 7: AVE(Ref1, Ref2) 8: K*sqrt(Ref1) 9: K*sqrt(Ref1-Ref2) 10: K*sqrt(Ref1+Ref2) 11: sqrt(Ref1)+K*sqrt(Ref2) 12: $(Ref1 – K*Ref2)^2$ 13: $(Ref1)^2 +K* (Ref2)^2$	0
✎	P0-07 (0x1887)	P-PID1 Ref K Gain	-300.00–300.00	1.00
✎	P0-08 (0x1888)	P-PID1 Fdk Math	0: Fdk1 1: Fdk1 + K*Fdk2 2: Fdk1 – K*Fdk2 3: Fdk1*K*Fdk2 4: Fdk1/K*Fdk2 5: MIN(Fdk1, Fdk2) 6: MAX(Fdk1, Fdk2) 7: AVE(Fdk1, Fdk2) 8: K*sqrt(Fdk1) 9: K*sqrt(Fdk1-Fdk2) 10: K*sqrt(Fdk1+Fdk2) 11: sqrt(Fdk1)+K*sqrt(Fdk2) 12: $(Fdk1 – K*Fdk2)^2$ 13: $(Fdk1)^2 +K* (Fdk2)^2$	0
✎	P0-09 (0x1889)	P-PID1 Fdk K Gain	-300.00–300.00	1.00
✎	P0-10 (0x188A)	P-PID1 Decimal Point	0: No Decimal Point 1: One Decimal Point 2: Two Decimal Point 3: Three Decimal Point	2

	Pr.	Parameter Name	Setting Range	Default
〆	P0-11 (0x188B)	P-PID1 Unit	0: Hz 1: rpm 2: % 3: m/s 4: kW 5: HP 6: ppm 7: 1/m 8: kg/s 9: kg/m 10: kg/h 11: lb/s 12: lb/m 13: lb/h 14: ft/s 15: ft/m 16: m 17: ft 18: degC 19: degF 20: mbar 21: bar 22: Pa 23: kPa 24: mWG 25: inWG 26: ftWG 27: psi 28: atm 29: L/s 30: L/m 31: L/h 32: m3/s 33: m3/h 34: GPM 35: CFM	0
〆	P0-12 (0x188C)	P-PID1 Setpoint	P0-14–P0-13 (PID1 unit)	0
〆	P0-13 (0x188D)	P-PID1 Setpoint Upper Limit	-30000–30000 PID unit	10000

	Pr.	Parameter Name	Setting Range	Default
✎	P0-14 (0x188E)	P-PID1 Setpoint Lower Limit	-30000–P0-13 setting value (PID unit)	0
✎	P0-15 (0x188F)	P-PID1 Setpoint Accel Time	0.0–1800.0 sec.	0.0
✎	P0-16 (0x1890)	P-PID1 Setpoint Decel Time	0.0–1800.0 sec.	0.0
✎	P0-17 (0x1891)	P-PID1 Fdk Filter Time	0.000–30.000 sec.	0.000
✎	P0-18 (0x1892)	P-PID1 Setpoint Freeze Src	0: Disable 1: Enable 2–7: MI1–MI6 8–9: Reserve 10–15: MI10–MI15 16–25: Reserve 26–28: Time Function 1–3 29–30: Reserve 31–38: Monitor 1–8	0
✎	P0-19 (0x1893)	P-PID1 Error OPER	0: PID1 err = PID1 Ref – PID1 Fdk 1: PID1 err = PID1 Fdk – PID1 Ref	0
✎	P0-20 (0x1894)	P-PID1 Multi Setpoint Src1	0: OFF 1: ON 2–7: MI1–MI6 8–9: Reserve 10–15: MI10–MI15 16–25: Reserve 26–28: Time Function 1–3 29–30: Reserve 31–38: Monitor 1–8	0
✎	P0-21 (0x1895)	P-PID1 Multi Setpoint Src2	0–38	0
✎	P0-22 (0x1896)	P-PID1 Multi Setpoint1	P0-14–P0-13 (PID1 unit)	0
✎	P0-23 (0x1897)	P-PID1 Multi Setpoint2	-30000–30000 PID1 unit	0
✎	P0-24 (0x1898)	P-PID1 Multi Setpoint3	-30000–30000 PID1 unit	0
✎	P0-25 (0x1899)	P-PID1 Multi Setpoint4	-30000–30000 PID1 unit	0
✎	P0-26 (0x189A)	P-PID1 Output Upper Limit Src	0: P-PID1 Output Upper Limit 1: P-PID2 Output 2: B-PID1 Output 3: B-PID2 Output 4: B-PID3 Output 5: B-PID4 Output	0

Pr.	Parameter Name	Setting Range	Default
P0-27 (0x189B)	P-PID1 Output Upper Limit	0.00–600.00 Hz	60.00
P0-28 (0x189C)	P-PID1 Output Lower Limit	0.00–P0-27 setting value (Hz)	0.00
P0-29 (0x189D)	P-PID1 P Gain	0.01–100.00	1.00
P0-30 (0x189E)	P-PID1 I Time	0.0–6000.0 sec.	60.0
P0-31 (0x189F)	P-PID1 D Time	0.000–10.000 sec.	0.000
P0-32 (0x18A0)	P-PID1 Derivative Filter	0.0–10.0 sec.	0.0
P0-33 (0x18A1)	P-PID1 Output Freeze Src	0: Disable 1: Enable 2–7: MI1–MI6 8–9: Reserve 10–15: MI10–MI15 16–25: Reserve 26–28: Time Function 1–3 29–30: Reserve 31–38: Monitor 1–8	0
P0-34 (0x18A2)	P-PID1 Setpoint Deadband	0–10000	0
P0-35 (0x18A3)	P-PID1 Deadband Delay	0.0–3600.0 sec.	0.0
P0-36 (0x18A4)	P-PID1 Sleep Ref Src	0: Disable 1: Motor FREQ 2: Fdk value	0
P0-37 (0x18A5)	P-PID1 Sleep FREQ Level	0.00–60.00 Hz	0.00
P0-38 (0x18A6)	P-PID1 Sleep Fdk Range	0.00–100.00%	0.00
P0-39 (0x18A7)	P-PID1 Sleep Delay Time	0.0–3600.0 sec.	60.0
P0-40 (0x18A8)	P-PID1 Sleep Boost Time	0.0–3600.0 sec.	0.0
P0-41 (0x18A9)	P-PID1 Sleep Boost Value	0–30000 PID1 unit	0
P0-42 (0x18AA)	P-PID1 Wake Error Level	0–10000 PID1 unit	0
P0-43 (0x18AB)	P-PID1 Wake Delay Time	0.00–60.00 PID1 unit	0.50
P0-44 (0x18AC)	P-PID1 Track Enable Src	0: Disable 1: Enable 2–7: MI1–MI6 8–9: Reserve 10–15: MI10–MI15	0

Pr.	Parameter Name	Setting Range	Default
		16–25: Reserve 26–28: Time Function 1–3 29–30: Reserve 31–38: Monitor 1–8	
P0-45 (0x18AD)	P-PID1 Track Ref Src	0: Disable 1: Reserve 2: RS-485 3: USB 4: COM Card 5–6: Reserve 7–9: AI1–AI3 10–11: Reserve 12–13: AI10–AI11 14–15: Reserve	0
P0-46 (0x18AE)	P-PID1 Output Delay Time	0.000–30.000 sec.	0.000
P0-47 (0x18AF)	P-PID1 Fdk Error Indn	0: Disable 1–2: Relay1–2 3–4: MO1–MO2 5–9: Reserve 10–15: MO/Relay10–15 16–19: Reserve	0

P1. Process PID2

Pr.	Parameter Name	Setting Range	Default
P1-00 (0x18C0)	P-PID2 Function	0: Disable 1: Enable	0
P1-01 (0x18C1)	P-PID2 Ref1 Src	0: Disable 1: Keypad 2: RS-485 3: USB 4: COM Card 5–6: Reserve 7–9: AI1–AI3 10–11: Reserve 12–13: AI10–AI11 14–15: Reserve 16: Multi Setpoint 17: B-PID1 Output 18: Pulse Train 19: Current pressure cmd	0

Pr.	Parameter Name	Setting Range	Default
P1-02 (0x18C2)	P-PID2 Ref2 Src	0–19	0
P1-03 (0x18C3)	P-PID2 Fdk1 Src	0: Disable 1: Reserve 2: RS-485 3: USB 4: COM Card 5–6: Reserve 7–9: AI1–AI3 10–11: Reserve 12–13: AI10–AI11 14–15: Reserve 16: B-PID1 Fdk 17: B-PID1 Output 18: Pulse Train	0
P1-04 (0x18C4)	P-PID2 Fdk2 Src	0–18	0
P1-05 (0x18C5)	P-PID2 Ref Math	0: Ref1 1: Ref1 + K*Ref2 2: Ref1 – K*Ref2 3: Ref1*K*Ref2 4: Ref1/K*Ref2 5: MIN(Ref1, Ref2) 6: MAX(Ref1, Ref2) 7: AVE(Ref1, Ref2) 8: K*sqrt(Ref1) 9: K*sqrt(Ref1-Ref2) 10: K*sqrt(Ref1+Ref2) 11: sqrt(Ref1)+K*sqrt(Ref2) 12: (Ref1 – K*Ref2)^2 13: (Ref1)^2 +K* (Ref2)^2	0
P1-06 (0x18C6)	P-PID2 Ref K Gain	-300.00–300.00	1.00
P1-07 (0x18C7)	P-PID2 Fdk Math	0: Fdk1 1: Fdk1 + K*Fdk2 2: Fdk1 – K*Fdk2 3: Fdk1*K*Fdk2 4: Fdk1/K*Fdk2 5: MIN(Fdk1, Fdk2) 6: MAX(Fdk1, Fdk2) 7: AVE(Fdk1, Fdk2)	0

	Pr.	Parameter Name	Setting Range	Default
			8: K*sqrt(Fdk1) 9: K*sqrt(Fdk1-Fdk2) 10: K*sqrt(Fdk1+Fdk2) 11: sqrt(Fdk1)+K*sqrt(Fdk2) 12: (Fdk1 – K*Fdk2)^2 13: (Fdk1)^2 +K* (Fdk2)^2	
〆	P1-08 (0x18C8)	P-PID2 Fdk K Gain	-300.00–300.00	1.00
〆	P1-09 (0x18C9)	P-PID2 Decimal Point	0: No Decimal Point 1: One Decimal Point 2: Two Decimal Point 3: Three Decimal Point	2
〆	P1-10 (0x18CA)	P-PID2 Unit	Refer to Pr.P0-11	0
〆	P1-11 (0x18CB)	P-PID2 Setpoint	-30000–30000 PID2 unit	0
〆	P1-12 (0x18CC)	P-PID2 Setpoint Upper Limit	-30000–30000 PID unit	10000
〆	P1-13 (0x18CD)	P-PID2 Setpoint Lower Limit	-30000–P1-12 setting value (PID unit)	0
〆	P1-14 (0x18CE)	P-PID2 Setpoint Accel Time	0.0–1800.0 sec.	0.0
〆	P1-15 (0x18CF)	P-PID2 Setpoint Decel Time	0.0–1800.0 sec.	0.0
〆	P1-16 (0x18D0)	P-PID2 Fdk Filter Time	0.000–30.000 sec.	0.000
〆	P1-17 (0x18D1)	P-PID2 Setpoint Freeze Src	0: Disable 1: Enable 2–7: MI1–MI6 8–9: Reserve 10–15: MI10–MI15 16–25: Reserve 26–28: Time Function 1–3 29–30: Reserve 31–38: Monitor 1–8	0
〆	P1-18 (0x18D2)	P-PID2 Error OPER	0: PID2 err = PID2 Ref – PID2 Fdk 1: PID2 err = PID2 Fdk – PID2 Ref	0
〆	P1-19 (0x18D3)	P-PID2 Multi Setpoint Src1	0: OFF 1: ON 2–7: MI1–MI6 8–9: Reserve 10–15: MI10–MI15 16–25: Reserve	0

	Pr.	Parameter Name	Setting Range	Default
			26–28: Time Function 1–3 29–30: Reserve 31–38: Monitor 1–8	
✓	P1-20 (0x18D4)	P-PID2 Multi Setpoint Src2	0–38	0
✓	P1-21 (0x18D5)	P-PID2 Multi Setpoint1	-30000–30000 PID2unit	0
✓	P1-22 (0x18D6)	P-PID2 Multi Setpoint2	-30000–30000 PID2 unit	0
✓	P1-23 (0x18D7)	P-PID2 Multi Setpoint3	-30000–30000 PID2 unit	0
✓	P1-24 (0x18D8)	P-PID2 Multi Setpoint4	-30000–30000 PID2 unit	0
✓	P1-25 (0x18D9)	P-PID2 Output Upper Limit Src	0: P-PID1 Output Upper Limit 1: P-PID2 Output 2: B-PID1 Output 3: B-PID2 Output 4: B-PID3 Output 5: B-PID4 Output	0
✓	P1-26 (0x18DA)	P-PID2 Output Upper Limit	0.00–600.00 Hz	60.00
✓	P1-27 (0x18DB)	P-PID2 Output Lower Limit	0.00–P1-26 setting value (Hz)	0.00
✓	P1-28 (0x18DC)	P-PID2 P Gain	0.01–100.00	1.00
✓	P1-29 (0x18DD)	P-PID2 I Time	0.0–6000.0 sec.	60.0
✓	P1-30 (0x18DE)	P-PID2 D Time	0.000–10.000 sec.	0.000
✓	P1-31 (0x18DF)	P-PID2 Derivative Filter	0.0–10.0 sec.	0.0
✓	P1-32 (0x18E0)	P-PID2 Output Freeze Src	0: Disable 1: Enable 2–7: MI1–MI6 8–9: Reserve 10–15: MI10–MI15 16–25: Reserve 26–28: Time Function 1–3 29–30: Reserve 31–38: Monitor 1–8	0
✓	P1-33 (0x18E1)	P-PID2 Deadband Zone	0–10000	0
✓	P1-34 (0x18E2)	P-PID2 Deadband Delay	0.0–3600.0 sec.	0.0

Pr.	Parameter Name	Setting Range	Default
P1-35 (0x18E3)	P-PID2 Sleep Ref Src	0: Disable 1: Motor FREQ 2: Fdk value	0
P1-36 (0x18E4)	P-PID2 Sleep FREQ Level	Low limit Freq–High limit Freq Hz 0.00–60.00 Hz	0.00
P1-37 (0x18E5)	P-PID2 Sleep Fdk Range	0.00–100.00%	0.00
P1-38 (0x18E6)	P-PID2 Sleep Delay Time	0.0–3600.0 sec.	60.0
P1-39 (0x18E7)	P-PID2 Sleep Boost Time	0.0–3600.0 sec.	0.0
P1-40 (0x18E8)	P-PID2 Sleep Boost Value	0–30000 PID2 unit	0
P1-41 (0x18E9)	P-PID2 Wake Error Level	0–10000 PID2 unit	0
P1-42 (0x18EA)	P-PID2 Wake Delay Time	0.00–60.00 PID2 unit	0.50
P1-43 (0x18EB)	P-PID2 Track Enable Src	0: Disable 1: Enable 2–7: MI1–MI6 8–9: Reserve 10–15: MI10–MI15 16–25: Reserve 26–28: Time Function 1–3 29–30: Reserve 31–38: Monitor 1–8	0
P1-44 (0x18EC)	P-PID2 Track Ref Src	0: Disable 1: Reserve 2: RS-485 3: USB 4: COM Card 5–6: Reserve 7–9: AI1–AI3 10–11: Reserve 12–13: AI10–AI11 14–15: Reserve	0
P1-45 (0x18ED)	P-PID2 Output Delay Time	0.000–30.000 sec..	0.000

Pr.	Parameter Name	Setting Range	Default
P1-46 (0x18EE)	P-PID2 Fdk Error Indn	0: Disable 1–2: Relay1–2 3–4: MO1–MO2 5–9: Reserve 10–15: MO/Relay10–15 16–19: Reserve	0

P2. Basic PID1

Pr.	Parameter Name	Setting Range	Default
P2-00 (0x1900)	B-PID1 Function	0: Disable 1: Enable 2: Enable after Run	0
P2-01 (0x1901)	B-PID1 Ref Src	0: Disable 1: Keypad 2: RS-485 3: USB 4: COM Card 5–6: Reserve 7–9: AI1–AI3 10–11: Reserve 12–13: AI10–AI11 14–15: Reserve 16: Multi Setpoint 17: Pulse Train	0
P2-02 (0x1902)	B-PID1 Fdk Src	0: Disable 1: Reserve 2: RS-485 3: USB 4: COM Card 5–6: Reserve 7–9: AI1–AI3 10–11: Reserve 12–13: AI10–AI11 14–15: Reserve 16: Pulse Train	0
P2-03 (0x1903)	B-PID1 Setpoint	-30000–30000 PID unit	0
P2-04 (0x1904)	B-PID1 Setpoint Upper Limit	-30000–30000 PID unit	10000
P2-05 (0x1905)	B-PID1 Setpoint Lower Limit	-30000–30000 PID unit	0

Pr.	Parameter Name	Setting Range	Default
P2-06 (0x1906)	B-PID1 Fdk Filter Time	0.000–30.000 sec.	0.000
P2-07 (0x1907)	B-PID1 Error OPER	0: PID1 err = PID1 Ref – PID1 Fdk 1: PID1 err = PID1 Fdk – PID1 Ref	0
P2-08 (0x1908)	B-PID1 Multi Setpoint Src1	0: OFF 1: ON 2–7: MI1–MI6 8–9: Reserve 10–15: MI10–MI15 16–25: Reserve 26–28: Time Function 1–3 29–30: Reserve 31–38: Monitor 1–8	0
P2-09 (0x1909)	B-PID1 Multi Setpoint Src2	0: Disable 1: Enable 2–7: MI1–MI6 8–9: Reserve 10–15: MI10–MI15 16–25: Reserve 26–28: Time Function 1–3 29–30: Reserve 31–38: Monitor 1–8	0
P2-10 (0x190A)	B-PID1 Multi Setpoint1	-30000–30000 PID1 unit	0
P2-11 (0x190B)	B-PID1 Multi Setpoint2	-30000–30000 PID1 unit	0
P2-12 (0x190C)	B-PID1 Multi Setpoint3	-30000–30000 PID1 unit	0
P2-13 (0x190D)	B-PID1 Multi Setpoint4	-30000–30000 PID1 unit	0
P2-14 (0x190E)	B-PID1 Output Upper Limit	-30000–30000	10000
P2-15 (0x190F)	B-PID1 Output Lower Limit	-30000–30000	0
P2-16 (0x1910)	B-PID1 P Gain	0.01–100.00	1.00
P2-17 (0x1911)	B-PID1 I Time	0.0–6000.0 sec.	60.0
P2-18 (0x1912)	B-PID1 D Time	0.000–10.000 sec.	0.000
P2-19 (0x1913)	B-PID1 Derivative Filter	0.0–10.0 sec.	0.0

Pr.	Parameter Name	Setting Range	Default
P2-20 (0x1914)	B-PID1 Output Freeze Src	0: Disable 1: Enable 2–7: MI1–MI6 8–9: Reserve 10–15: MI10–MI15 16–25: Reserve 26–28: Time Function 1–3 29–30: Reserve 31–38: Monitor 1–8	0
P2-21 (0x1915)	B-PID1 Deadband Zone	0–10000	0
P2-22 (0x1916)	B-PID1 Deadband Delay	0.0–3600.0 sec.	0.0
P2-23 (0x1917)	B-PID1 Output AO Sel	0: Disable 1–2: AO1–AO2 3–4: Reserve 5–6: AO10–AO11	0

P3. Basic PID2

Pr.	Parameter Name	Setting Range	Default
P3-00 (0x1940)	B-PID2 Function	0: Disable 1: Enable 2: Enable after Run	0
P3-01 (0x1941)	B-PID2 Ref Src	0: Disable 1: Keypad 2: RS-485 3: USB 4: COM Card 5–6: Reserve 7–9: AI1–AI3 10–11: Reserve 12–13: AI10–AI11 14–15: Reserve 16: Multi Setpoint 17: Pulse Train	0
P3-02 (0x1942)	B-PID2 Fdk Src	0: Disable 1: Reserve 2: RS-485 3: USB 4: COM Card 5–6: Reserve	0

Pr.	Parameter Name	Setting Range	Default
		7–9: AI1–AI3 10–11: Reserve 12–13: AI10–AI11 14–15: Reserve 16: Pulse Train	
P3-03 (0x1943)	B-PID2 Setpoint	-30000–30000 PID unit	0
P3-04 (0x1944)	B-PID2 Setpoint Upper Limit	-30000–30000 PID unit	10000
P3-05 (0x1945)	B-PID2 Setpoint Lower Limit	-30000–30000 PID unit	0
P3-06 (0x1946)	B-PID2 Fdk Filter Time	0.000–30.000 sec.	0.000
P3-07 (0x1947)	B-PID2 Error OPER	0: PID1 err = PID1 Ref – PID1 Fdk 1: PID1 err = PID1 Fdk – PID1 Ref	0
P3-08 (0x1948)	B-PID2 Multi Setpoint Src1	0: OFF 1: ON 2–7: MI1–MI6 8–9: Reserve 10–15: MI10–MI15 16–25: Reserve 26–28: Time Function 1–3 29–30: Reserve 31–38: Monitor 1–8	0
P3-09 (0x1949)	B-PID2 Multi Setpoint Src2	0: OFF 1: ON 2–7: MI1–MI6 8–9: Reserve 10–15: MI10–MI15 16–25: Reserve 26–28: Time Function 1–3 29–30: Reserve 31–38: Monitor 1–8	0
P3-10 (0x194A)	B-PID2 Multi Setpoint1	-30000–30000 PID unit	0
P3-11 (0x194B)	B-PID2 Multi Setpoint2	-30000–30000 PID unit	0
P3-12 (0x194C)	B-PID2 Multi Setpoint3	-30000–30000 PID unit	0
P3-13 (0x194D)	B-PID2 Multi Setpoint4	-30000–30000 PID unit	0
P3-14 (0x194E)	B-PID2 Output Upper Limit	-30000–30000 Hz	10000

Pr.	Parameter Name	Setting Range	Default
P3-15 (0x194F)	B-PID2 Output Lower Limit	-30000–30000 Hz	0
P3-16 (0x1950)	B-PID2 P Gain	0.01–100.00	1.00
P3-17 (0x1951)	B-PID2 I Time	0.0–6000.0 sec.	60.0
P3-18 (0x1952)	B-PID2 D Time	0.000–10.000 sec.	0.000
P3-19 (0x1953)	B-PID2 Derivative Filter	0.0–10.0 sec.	0.0
P3-20 (0x1954)	B-PID2 Output Freeze Src	0: Disable 1: Enable 2–7: MI1–MI6 8–9: Reserve 10–15: MI10–MI15 16–25: Reserve 26–28: Time Function 1–3 29–30: Reserve 31–38: Monitor 1–8	0
P3-21 (0x1955)	B-PID2 Deadband Zone	0–10000	0
P3-22 (0x1956)	B-PID2 Deadband Delay	0.0–3600.0 sec.	0.0
P3-23 (0x1957)	B-PID2 Output AO Sel	0: Disable 1–2: AO1–AO2 3–4: Reserve 5–6: AO10–AO11	0

P4. Basic PID3

Pr.	Parameter Name	Setting Range	Default
P4-00 (0x1980)	B-PID3 Function	0: Disable 1: Enable 2: Enable after Run	0
P4-01 (0x1981)	B-PID3 Ref Src	0: Disable 1: Keypad 2: RS-485 3: USB 4: COM Card 5–6: Reserve 7–9: AI1–AI3 10–11: Reserve 12–13: AI10–AI11 14–15: Reserve	0

	Pr.	Parameter Name	Setting Range	Default
			16: Multi Setpoint 17: Pulse Train	
〃	P4-02 (0x1982)	B-PID3 Fdk Src	0: Disable 1: Reserve 2: RS-485 3: USB 4: COM Card 5–6: Reserve 7–9: AI1–AI3 10–11: Reserve 12–13: AI10–AI11 14–15: Reserve 16: Pulse Train	0
〃	P4-03 (0x1983)	B-PID3 Setpoint	-30000–30000 PID unit	0
〃	P4-04 (0x1984)	B-PID3 Setpoint Upper Limit	-30000–30000 PID unit	10000
〃	P4-05 (0x1985)	B-PID3 Setpoint Lower Limit	-30000–30000 PID unit	0
〃	P4-06 (0x1986)	B-PID3 Fdk Filter Time	0.000–30.000 sec.	0.000
〃	P4-07 (0x1987)	B-PID3 Error OPER	0: PID1 err = PID1 Ref – PID1 Fdk 1: PID1 err = PID1 Fdk – PID1 Ref	0
〃	P4-08 (0x1988)	B-PID3 Multi Setpoint Src1	0: OFF 1: ON 2–7: MI1–MI6 8–9: Reserve 10–15: MI10–MI15 16–25: Reserve 26–28: Time Function 1–3 29–30: Reserve 31–38: Monitor 1–8	0
〃	P4-09 (0x1989)	B-PID3 Multi Setpoint Src2	0: OFF 1: ON 2–7: MI1–MI6 8–9: Reserve 10–15: MI10–MI15 16–25: Reserve 26–28: Time Function 1–3 29–30: Reserve 31–38: Monitor 1–8	0

Pr.	Parameter Name	Setting Range	Default
P4-10 (0x198A)	B-PID3 Multi Setpoint1	-30000–30000 PID3 unit	0
P4-11 (0x198B)	B-PID3 Multi Setpoint2	-30000–30000 PID3 unit	0
P4-12 (0x198C)	B-PID3 Multi Setpoint3	-30000–30000 PID3 unit	0
P4-13 (0x198D)	B-PID3 Multi Setpoint4	-30000–30000 PID3 unit	0
P4-14 (0x198E)	B-PID3 Output Upper Limit	-30000–30000	10000
P4-15 (0x198F)	B-PID3 Output Lower Limit	-30000–30000	0
P4-16 (0x1990)	B-PID3 P Gain	0.01–100.00	1.00
P4-17 (0x1991)	B-PID3 I Time	0.0–6000.0 sec.	60.0
P4-18 (0x1992)	B-PID3 D Time	0.000–10.000 sec.	0.000
P4-19 (0x1993)	B-PID3 Derivative Filter	0.0–10.0 sec.	0.0
P4-20 (0x1994)	B-PID3 Output Freeze Src	0: Disable 1: Enable 2–7: MI1–MI6 8–9: Reserve 10–15: MI10–MI15 16–25: Reserve 26–28: Time Function 1–3 29–30: Reserve 31–38: Monitor 1–8	0
P4-21 (0x1995)	B-PID3 Deadband Zone	0–10000	0
P4-22 (0x1996)	B-PID3 Deadband Delay	0.0–3600.0 sec.	0.0
P4-23 (0x1997)	B-PID3 Output AO Sel	0: Disable 1–2: AO1–AO2 3–4: Reserve 5–6: AO10–AO11	0

P5. Basic PID4

Pr.	Parameter Name	Setting Range	Default
P5-00 (0x19C0)	B-PID4 Function	0: Disable 1: Enable 2: Enable after Run	0

	Pr.	Parameter Name	Setting Range	Default
〃	P5-01 (0x19C1)	B-PID4 Ref Src	0: Disable 1: Keypad 2: RS-485 3: USB 4: COM Card 5–6: Reserve 7–9: AI1–AI3 10–11: Reserve 12–13: AI10–AI11 14–15: Reserve 16: Multi Setpoint 17: Pulse Train	0
〃	P5-02 (0x19C2)	B-PID4 Fdk Src	0: Disable 1: Reserve 2: RS-485 3: USB 4: COM Card 5–6: Reserve 7–9: AI1–AI3 10–11: Reserve 12–13: AI10–AI11 14–15: Reserve 16: Pulse Train	0
〃	P5-03 (0x19C3)	B-PID4 Setpoint	-30000–30000 PID unit	0
〃	P5-04 (0x19C4)	B-PID4 Setpoint Upper Limit	-30000–30000 PID unit	10000
〃	P5-05 (0x19C5)	B-PID4 Setpoint Lower Limit	-30000–30000 PID unit	0
〃	P5-06 (0x19C6)	B-PID4 Fdk Filter Time	0.000–30.000 sec.	0.000
〃	P5-07 (0x19C7)	B-PID4 Error OPER	0: PID1 err = PID1 Ref – PID1 Fdk 1: PID1 err = PID1 Fdk – PID1 Ref	0
〃	P5-08 (0x19C8)	B-PID4 Multi Setpoint Src1	0: OFF 1: ON 2–7: MI1–MI6 8–9: Reserve 10–15: MI10–MI15 16–25: Reserve 26–28: Time Function 1–3 29–30: Reserve 31–38: Monitor 1–8	0

Pr.	Parameter Name	Setting Range	Default
P5-09 (0x19C9)	B-PID4 Multi Setpoint Src2	0: OFF 1: ON 2–7: MI1–MI6 8–9: Reserve 10–15: MI10–MI15 16–25: Reserve 26–28: Time Function 1–3 29–30: Reserve 31–38: Monitor 1–8	0
P5-10 (0x19CA)	B-PID4 Multi Setpoint1	-30000–30000 PID4 unit	0
P5-11 (0x19CB)	B-PID4 Multi Setpoint2	-30000–30000 PID4 unit	0
P5-12 (0x19CC)	B-PID4 Multi Setpoint3	-30000–30000 PID4 unit	0
P5-13 (0x19CD)	B-PID4 Multi Setpoint4	-30000–30000 PID4 unit	0
P5-14 (0x19CE)	B-PID4 Output Upper Limit	-30000–30000	10000
P5-15 (0x19CF)	B-PID4 Output Lower Limit	-30000–30000	0
P5-16 (0x19D0)	B-PID4 P Gain	0.01–100.00	1.00
P5-17 (0x19D1)	B-PID4 I Time	0.0–6000.0 sec.	60.0
P5-18 (0x19D2)	B-PID4 D Time	0.000–10.000 sec.	0.000
P5-19 (0x19D3)	B-PID4 Derivative Filter	0.0–10.0 sec.	0.0
P5-20 (0x19D4)	B-PID4 Output Freeze Src	0: Disable 1: Enable 2–7: MI1–MI6 8–9: Reserve 10–15: MI10–MI15 16–25: Reserve 26–28: Time Function 1–3 29–30: Reserve 31–38: Monitor 1–8	0
P5-21 (0x19D5)	B-PID4 Deadband Zone	0–10000	0
P5-22 (0x19D6)	B-PID4 Deadband Delay	0.0–3600.0 sec.	0.0
P5-23 (0x19D7)	B-PID4 Output AO Sel	0: Disable 1–2: AO1–AO2 3–4: Reserve 5–6: AO10–AO11	0

U. Industry

U0. Pump Function

Pr.	Parameter Name	Setting Range	Default
U0-00 (0x1B00)	Circulation Control	0: Disable 1: Time Circulation 2: QTY Circulation 3: QTY Control 4: QTY + Time Circulation 5: QTY Control + Time Circulation	0
U0-01 (0x1B01)	Number of Pump	1–8	1
U0-02 (0x1B02)	Pump Status Word	0–0xFFFF	Read only
U0-03 (0x1B03)	Pump Switch Type	0: by the sequence 1: by the least running time	0
U0-04 (0x1B04)	Circulation Time	0–65000 min.	0
U0-05 (0x1B05)	Time Circulation Switch Delay	0.1–3600.0 sec.	0.1
U0-06 (0x1B06)	Time Circulation Output Delay	1.0–100.0 sec.	1.0
U0-07 (0x1B07)	AUX Pump Active FREQ Level	0.00–599.00 Hz	60.00
U0-08 (0x1B08)	AUX Pump Active Check Time	1.0–3600.0 sec.	10.0
U0-09 (0x1B09)	AUX Pump Active Delay Time	1.0–3600.0 sec.	1.0
U0-10 (0x1B0A)	QTY Circulation Output Delay	1.0–100.0 sec.	1.0
U0-11 (0x1B0B)	AUX Pump Deactive FREQ Level	0.00–599.00 Hz	0.00
U0-12 (0x1B0C)	AUX Pump Deactive Check Time	1.0–3600.0 sec.	1.0
U0-13 (0x1B0D)	QTY Circulation Fault Action	0: Stop All Pumps 1: Stop MAS Pump	0
U0-14 (0x1B0E)	Output FREQ Reached Range	0.00–100.00%	1.00

Pr.	Parameter Name	Setting Range	Default
U0-15 (0x1B0F)	Pump 1 Output Enable Sel	0: Disable 1–2: Relay1–2 3–4: MO1–MO2 5–9: Reserve 10–15: MO/Relay 10–15 16–19: Reserve	0
U0-16 (0x1B10)	Pump 2 Output Enable Sel	0: Disable 1–2: Relay1–2 3–4: MO1–MO2 5–9: Reserve 10–15: MO/Relay 10–15 16–19: Reserve	0
U0-17 (0x1B11)	Pump 3 Output Enable Sel	0: Disable 1–2: Relay1–2 3–4: MO1–MO2 5–9: Reserve 10–15: MO/Relay 10–15 16–19: Reserve	0
U0-18 (0x1B12)	Pump 4 Output Enable Sel	0: Disable 1–2: Relay1–2 3–4: MO1–MO2 5–9: Reserve 10–15: MO/Relay 10–15 16–19: Reserve	0
U0-19 (0x1B13)	Pump 5 Output Enable Sel	0: Disable 1–2: Relay1–2 3–4: MO1–MO2 5–9: Reserve 10–15: MO/Relay 10–15 16–19: Reserve	0
U0-20 (0x1B14)	Pump 6 Output Enable Sel	0: Disable 1–2: Relay1–2 3–4: MO1–MO2 5–9: Reserve 10–15: MO/Relay 10–15 16–19: Reserve	0

Pr.	Parameter Name	Setting Range	Default
U0-21 (0x1B15)	Pump 7 Output Enable Sel	0: Disable 1–2: Relay1–2 3–4: MO1–MO2 5–9: Reserve 10–15: MO/Relay 10–15 16–19: Reserve	0
U0-22 (0x1B16)	Pump 8 Output Enable Sel	0: Disable 1–2: Relay1–2 3–4: MO1–MO2 5–9: Reserve 10–15: MO/Relay 10–15 16–19: Reserve	0
U0-23 (0x1B17)	Pump 1 Stop MI Src	0: Disable 1: Enable 2–7: MI1–MI6 8–9: Reserve 10–15: MI10–MI15	0
U0-24 (0x1B18)	Pump 2 Stop MI Src	0: Disable 1: Enable 2–7: MI1–MI6 8–9: Reserve 10–15: MI10–MI15	0
U0-25 (0x1B19)	Pump 3 Stop MI Src	0: Disable 1: Enable 2–7: MI1–MI6 8–9: Reserve 10–15: MI10–MI15	0
U0-26 (0x1B1A)	Pump 4 Stop MI Src	0: Disable 1: Enable 2–7: MI1–MI6 8–9: Reserve 10–15: MI10–MI15	0
U0-27 (0x1B1B)	Pump 5 Stop MI Src	0: Disable 1: Enable 2–7: MI1–MI6 8–9: Reserve 10–15: MI10–MI15	0

Pr.	Parameter Name	Setting Range	Default
U0-28 (0x1B1C)	Pump 6 Stop MI Src	0: Disable 1: Enable 2–7: MI1–MI6 8–9: Reserve 10–15: MI10–MI15	0
U0-29 (0x1B1D)	Pump 7 Stop MI Src	0: Disable 1: Enable 2–7: MI1–MI6 8–9: Reserve 10–15: MI10–MI15	0
U0-30 (0x1B1E)	Pump 8 Stop MI Src	0: Disable 1: Enable 2–7: MI1–MI6 8–9: Reserve 10–15: MI10–MI15	0
U0-31 (0x1B1F)	Multi Pump Stop MI Src	0: Disable 1: Enable 2–7: MI1–MI6 8–9: Reserve 10–15: MI10–MI15	0
U0-32 (0x1B20)	Pump 1 Operating Time	H-word: 65535 → 65535 hours L-word: 05959 → 59 mimutes/ 59 seconds	Read only
U0-33 (0x1B22)	Pump 2 Operating Time	H-word: 65535 → 65535 hours L-word: 05959 → 59 mimutes/ 59 seconds	Read only
U0-34 (0x1B24)	Pump 3 Operating Time	H-word: 65535 → 65535 hours L-word: 05959 → 59 mimutes/ 59 seconds	Read only
U0-35 (0x1B26)	Pump 4 Operating Time	H-word: 65535 → 65535 hours L-word: 05959 → 59 mimutes/ 59 seconds	Read only
U0-36 (0x1B28)	Pump 5 Operating Time	H-word: 65535 → 65535 hours L-word: 05959 → 59 mimutes/ 59 seconds	Read only
U0-37 (0x1B2A)	Pump 6 Operating Time	H-word: 65535 → 65535 hours L-word: 05959 → 59 mimutes/ 59 seconds	Read only
U0-38 (0x1B2C)	Pump 7 Operating Time	H-word: 65535 → 65535 hours L-word: 05959 → 59 mimutes/ 59 seconds	Read only
U0-39 (0x1B2E)	Pump 8 Operating Time	H-word: 65535 → 65535 hours L-word: 05959 → 59 mimutes/ 59 seconds	Read only

Pr.	Parameter Name	Setting Range	Default
U0-40 (0x1B30)	Pump Operating Time Erase	0: Disable 1: Erase Pump1 Operating Time 2: Erase Pump2 Operating Time 3: Erase Pump3 Operating Time 4: Erase Pump4 Operating Time 5: Erase Pump5 Operating Time 6: Erase Pump6 Operating Time 7: Erase Pump7 Operating Time 8: Erase Pump8 Operating Time 10: Erase all Pumps Operating Time	0

U1. Pump Schedule

Pr.	Parameter Name	Setting Range	Default
U1-00 (0x1B40)	Pump Schedule Setting	bit0: Weekday bit1: Weekend bit2: Appt bti3–bit15: Reserve	0
U1-01 (0x1B41)	Weekend Definition	0: Saturday and Sunday 1: Sunday 2: No Weekend	0
U1-02 (0x1B42)	Pressure Cmd Output	-30000–30000	0
U1-03 (0x1B43)	Weekday Start Time 1	00:00–23:59	0
U1-04 (0x1B44)	Weekday Pressure Setpoint 1	-30000–30000	0
U1-05 (0x1B45)	Weekday Start Time 2	00:00–23:59	0
U1-06 (0x1B46)	Weekday Presssure Setpoint 2	-30000–30000	0
U1-07 (0x1B47)	Weekday Start Time 3	00:00–23:59	0
U1-08 (0x1B48)	Weekday Pressure Setpoint 3	-30000–30000	0
U1-09 (0x1B49)	Weekday Start Time 4	00:00–23:59	0
U1-10 (0x1B4A)	Weekday Pressure Setpoint 4	-30000–30000	0
U1-11 (0x1B4B)	Weekday Start Time 5	00:00–23:59	0
U1-12 (0x1B4C)	Weekday Pressure Setpoint 5	-30000–30000	0
U1-13 (0x1B4D)	Weekend Start Time 1	00:00–23:59	0

	Pr.	Parameter Name	Setting Range	Default
✓	U1-14 (0x1B4E)	Weekend Pressure Setpoint 1	-30000–30000	0
✓	U1-15 (0x1B4F)	Weekend Start Time 2	00:00–23:59	0
✓	U1-16 (0x1B50)	Weekend Pressure Setpoint 2	-30000–30000	0
✓	U1-17 (0x1B51)	Weekend Start Time 3	00:00–23:59	0
✓	U1-18 (0x1B52)	Weekend Pressure Setpoint 3	-30000–30000	0
✓	U1-19 (0x1B53)	Weekend Start Time 4	00:00–23:59	0
✓	U1-20 (0x1B54)	Weekend Pressure Setpoint 4	-30000–30000	0
✓	U1-21 (0x1B55)	Weekend Start Time 5	00:00–23:59	0
✓	U1-22 (0x1B56)	Weekend Pressure Setpoint 5	-30000–30000	0
✓	U1-23 (0x1B57)	Appt Start Date 1	01:01–12:31 00:00 No function	0
✓	U1-24 (0x1B58)	Appt End Date 1	01:01–12:31 00:00 No function	0
✓	U1-25 (0x1B59)	Appt Start Date 2	01:01–12:31 00:00 No function	0
✓	U1-26 (0x1B5A)	Appt End Date 2	01:01–12:31 00:00 No function	0
✓	U1-27 (0x1B5B)	Appt Start Date 3	01:01–12:31 00:00 No function	0
✓	U1-28 (0x1B5C)	Appt End Date 3	01:01–12:31 00:00 No function	0
✓	U1-29 (0x1B5D)	Appt Start Date 4	01:01–12:31 00:00 No function	0
✓	U1-30 (0x1B5E)	Appt End Date 4	01:01–12:31 00:00 No function	0
✓	U1-31 (0x1B5F)	Appt Start Date 5	01:01–12:31 00:00 No function	0
✓	U1-32 (0x1B60)	Appt End Date 5	01:01–12:31 00:00 No function	0
✓	U1-33 (0x1B61)	Appt Start Time 1	00:00–23:59	0
✓	U1-34 (0x1B62)	Appt Pressure Setpoint 1	-30000–30000	0

Pr.	Parameter Name	Setting Range	Default
U1-35 (0x1B63)	Appt Start Time 2	00:00–23:59	0
U1-36 (0x1B64)	Appt Pressure Setpoint 2	-30000–30000	0
U1-37 (0x1B65)	Appt Start Time 3	00:00–23:59	0
U1-38 (0x1B66)	Appt Pressure Setpoint 3	-30000–30000	0
U1-39 (0x1B67)	Appt Start Time 4	00:00–23:59	0
U1-40 (0x1B68)	Appt Pressure Setpoint 4	-30000–30000	0
U1-41 (0x1B69)	Appt Start Time 5	00:00–23:59	0
U1-42 (0x1B6A)	Appt Pressure Setpoint 5	-30000–30000	0

U2. Fluid Estimator

Pr.	Parameter Name	Setting Range	Default
U2-00 (0x1B80)	Flow Estimation Method	0: Disable 1: Q-H Estimation 2: Q-P Estimation	0
U2-01 (0x1B81)	Cavitation Detect Control Bit	bit 0: Cavitaion Enable bit 1: Flow Input Sel bit 2: Cavitation Warning bit3–bit15: Reserve	0
U2-02 (0x1B82)	Flow Estimation Status Bit	bit 0: Q-H Estimation bit 1: Q-P Estimation bit 2: Cavitation Detecting bit 3: Q-H Setting Incomplete bit 4: Fluid Density Setting Incorrect bit 5: Pump Rated RPM Setting Incorrect bit 6: Inlet Diameter too Small bit 7: Outlet Diameter too Small bit 8: RPM under Flow Esitmation Limit bit 9: Incomplete Setting of Cavitation bit 10: RPM under Cavitation Limit	Read only
U2-03 (0x1B83)	Inlet Pressure AI Src	0: Disable 1–6: Reserve 7–9: AI1–AI3 10–11: Reserve 12–13: AI10–AI11	0
U2-04 (0x1B84)	Inlet Pressure AI Max Value	AVI: 0–10 V ACI: 0–20 mA / 4–20 mA	0

	Pr.	Parameter Name	Setting Range	Default
〆	U2-05 (0x1B85)	Inlet Pressure Decimal Point	0: No Decimal Point 1: One Decimal Point 2: Two Decimal Point 3: Three Decimal Point	0
〆	U2-06 (0x1B86)	Inlet Pressure Unit	0: mbar 1: bar 2: Pa 3: kPa 4: mWG 5: inWG 6: ftWG 7: psi 8: atm	0
〆	U2-07 (0x1B87)	Outlet Pressure AI Src	0: Disable 1–6: Reserve 7–9: AI1–AI3 10–11: Reserve 12–13: AI10–AI11	0
〆	U2-08 (0x1B88)	Outlet Pressure AI Max Value	AVI: 0–10 V ACI: 0–20 mA / 4–20 mA	10
〆	U2-09 (0x1B89)	Outlet Pressure Decimal Point	0: No Decimal Point 1: One Decimal Point 2: Two Decimal Point 3: Three Decimal Point	0
〆	U2-10 (0x1B8A)	Outlet Pressure Unit	0: mbar 1: bar 2: Pa 3: kPa 4: mWG 5: inWG 6: ftWG 7: psi 8: atm	0
〆	U2-11 (0x1B8B)	Flow Meter AI Src	0: Disable 1–6: Reserve 7–9: AI1–AI3 10–11: Reserve 12–13: AI10–AI11	0
〆	U2-12 (0x1B8C)	Flow Meter AI Max Value	AVI: 0–10 V ACI: 0–20 mA / 4–20 mA	10

	Pr.	Parameter Name	Setting Range	Default
𝜘	U2-13 (0x1B8D)	Flow Decimal Point	0: No Decimal Point 1: One Decimal Point 2: Two Decimal Point 3: Three Decimal Point	0
𝜘	U2-14 (0x1B8E)	Flow Unit	0: L/s 1: L/m 2: L/h 3: m3/s 4: m3/h 5: GPM 6: CFM	0
	U2-15 (0x1B8F)	Inlet Pressure Display	-30000–30000 (Unit: refer to Pr.U2-06)	Read only
	U2-16 (0x1B9A)	Outlet Pressure Display	-30000–30000 (Unit: refer to Pr.U2-10)	Read only
	U2-17 (0x1B9B)	Flow Meter Output	0–4294967295 (Unit: refer to Pr.U2-14)	Read only
	U2-18 (0x1B9D)	Flow Estimation Output	0–4294967295 (Unit: refer to Pr.U2-14)	Read only
𝜘	U2-19 (0x1B9E)	Flow Accumulated Src	0: Flow Estimation 1: Flow Meter	0
	U2-20 (0x1B9F)	Flow Accumulated m^3	0.0–999.9 m^3	Read only
	U2-21 (0x1BA1)	Flow Accumulated km^3	0–65535 km^3	Read only
𝜘	U2-22 (0x1BA3)	Flow Accumulated Reset	0: Disable 1: Reset after Power On 2: Reset Immediately	0
𝜘	U2-23 (0x1BA4)	Pump Inlet Diameter	0.0–6500.0 mm	0.0
𝜘	U2-24 (0x1BA5)	Pump Outlet Diameter	0.0–6500.0 mm	0.0
𝜘	U2-25 (0x1BA6)	Pump Rated Speed	0–65535 rpm	3000
𝜘	U2-26 (0x1BA7)	Fluid Density	0.0–6550.0 kg/m^3	995.7
𝜘	U2-27 (0x1BA8)	Fluid Oper Temp	0.00–600.00°C	30.00
𝜘	U2-28 (0x1BA9)	Pressure Sensor Height Diff	-30.00–30.00 m	0.00
𝜘	U2-29 (0x1BAA)	Cavitation Detect Tolerance	0.00–600.00 m	0.00
𝜘	U2-30 (0x1BAB)	Pump Curve Head 1	0.00–655.00 m	0.00

Pr.	Parameter Name	Setting Range	Default
U2-31 (0x1BAC)	Pump Curve Head 2	0.00–655.00 m	0.00
U2-32 (0x1BAD)	Pump Curve Head 3	0.00–655.00 m	0.00
U2-33 (0x1BAE)	Pump Curve Head 4	0.00–655.00 m	0.00
U2-34 (0x1BAF)	Pump Curve Head 5	0.00–655.00 m	0.00
U2-35 (0x1BB0)	Pump Curve Flow 1	0.00–655.00 m³/hr	0.00
U2-36 (0x1BB1)	Pump Curve Flow 2	0.00–655.00 m³/hr	0.00
U2-37 (0x1BB2)	Pump Curve Flow 3	0.00–655.00 m³/hr	0.00
U2-38 (0x1BB3)	Pump Curve Flow 4	0.00–655.00 m³/hr	0.00
U2-39 (0x1BA8)	Pump Curve Flow 5	0.00–655.00 m³/hr	0.00
U2-40 (0x1BB4)	Pump Curve Power 1	0.00–655.00 kW	0.00
U2-41 (0x1BB5)	Pump Curve Power 2	0.00–655.00 kW	0.00
U2-42 (0x1BB6)	Pump Curve Power 3	0.00–655.00 kW	0.00
U2-43 (0x1BB7)	Pump Curve Power 4	0.00–655.00 kW	0.00
U2-44 (0x1BB8)	Pump Curve Power 5	0.00–655.00 kW	0.00
U2-45 (0x1BB9)	Pump Curve NPSHr 1	0.00–655.00 m	0.00
U2-46 (0x1BBA)	Pump Curve NPSHr 2	0.00–655.00 m	0.00
U2-47 (0x1BBB)	Pump Curve NPSHr 3	0.00–655.00 m	0.00
U2-48 (0x1BBB)	Pump Curve NPSHr 4	0.00–655.00 m	0.00
U2-49 (0x1BBC)	Pump Curve NPSHr 5	0.00–655.00 m	0.00

U3. Pump Protection

Pr.	Parameter Name	Setting Range	Default
U3-00 (0x1BC0)	Pressure Protection Src	0: Disable 1: P-PID1 Fdk 2: P-PID2 Fdk	0
U3-01 (0x1BC1)	Heavy Leakage Detect Level	0–85%	85
U3-02 (0x1BC2)	Heavy Leakage Detect time	0.1–300.0 sec.	15.0

Pr.	Parameter Name	Setting Range	Default
U3-03 (0x1BC3)	Heavy Leakage Current Level	0–100%	20
U3-04 (0x1BC4)	Heavy Leakage Treatment	0: Warning & Continue OPER 1: Fault & Coast to Stop 2: Fault & Ramp to Stop	0
U3-05 (0x1BC5)	Hi-Pressure Alarm Level	0–50%	25
U3-06 (0x1BC6)	Hi-Pressure Alarm Detect Time	0.1–300.0 sec.	5.0
U3-07 (0x1BC7)	Hi-Pressure Alarm Treatment	1: Fault & Coast to Stop 2: Fault & Ramp to Stop	1
U3-08 (0x1BC8)	Lo-Pressure Alarm Level	0–50%	25
U3-09 (0x1BC9)	Lo-Pressure Alarm Detect Time	0.1–300.0 sec.	5.0
U3-10 (0x1BCA)	Lo-Pressure Alarm Treatment	0: Warning & Continue OPER 1: Fault & Coast to Stop 2: Fault & Ramp to Stop	0
U3-11 (0x1BCB)	Dry Pump Curve Autotune	0: Disable 1: Enable	0
U3-12 (0x1BCC)	50% Rated FREQ Output Power	0–120%	0
U3-13 (0x1BCD)	100% Rated FREQ Output Power	0–120%	0
U3-14 (0x1BCE)	Dry Pump Detect Level	0–50%	10
U3-15 (0x1BCF)	Dry Pump Detect Function	0: Disable 1: Enable	0
U3-16 (0x1BD0)	Dry Pump Detect Time	0.0–300.0 sec.	15.0
U3-17 (0x1BD1)	Dry Pump Restart Delay Time	1–1000 min	30
U3-18 (0x1BD2)	Dry Pump Restart Times Limit	0–20	5
U3-19 (0x1BD3)	Dry Pump Alarm Treatment	1: Warning & Coast to Stop 2: Warning & Ramp to Stop	1
U3-20 (0x1BD4)	Pump Clean Function	0: Disable 1: Enable by MI Src 2: Enable by Jam Current Limit 3: Enable by Scheduled Time	0

Pr.	Parameter Name	Setting Range	Default
U3-21 (0x1BD5)	Pump Clean Function MI Src	0: Disable 1: Reserve 2–7: MI1–MI6 5–9: Reserve 10–15: MI10–MI15	0
U3-22 (0x1BD6)	Jam Current Detect Level	0–Max. setting value for H2-05	Default for H2-05
U3-23 (0x1BD7)	Jam Current Detect Time	0.0–300.0 sec.	60.0
U3-24 (0x1BD8)	Pump Clean Weekday Sel	bit 0: Sunday bit 1: Monday bit 2: Tuesday bit 3: Wednesday bit 4: Thursday bit 5: Friday bit 6: Saturday bit 7–bit15: Reserve	0
U3-25 (0x1BD9)	Pump Clean Start Time	00:00–23:59	0
U3-26 (0x1BDA)	Pump Clean Cycle Times	1–30	5
U3-27 (0x1BDB)	Pump Clean FWD FREQ	0.00–Fmax Hz	40.00
U3-28 (0x1BDC)	Pump Clean FWD Time	0.0–300.0 sec.	2.0
U3-29 (0x1BDD)	Pump Clean REV FREQ	0.00–Fmax Hz	40.00
U3-30 (0x1BDE)	Pump Clean REV Time	0.0–300.0 sec.	2.0
U3-31 (0x1BEF)	Pump Clean Accel Time	0.0–300.0 sec.	1.0
U3-32 (0x1BF0)	Pump Clean Decel Time	0.0–300.0 sec.	1.0

U4. Master-Slave Multi-Pump Control

Pr.	Parameter Name	Setting Range	Default
✓ U4-00 (0x1C00)	Master-Slave Pump Control	bit 0: Enable bit 1: Backup Master bit2–15: Reserve	0
U4-01 (0x1C01)	Master-Slave Pump Status	0: No Master-Slave Control 1: Master 2: Slave	Read only

Pr.	Parameter Name	Setting Range	Default
U4-02 (0x1C02)	Pump AI Fdk Loss Treatment	0: No Warning 1: ANL Warning & Continue OPER 2: ACE Fault & Stop OPER	0
U4-03 (0x1C03)	Pump FREQ at Fdk Loss	0–FMAX Hz	0
U4-04 (0x1C04)	Setpoint Deviation Level	0–50%	0
U4-05 (0x1C05)	Setpoint Deviation Detect T	1–600 sec.	10
U4-06 (0x1C06)	Low Consump Restart Offset	0–50%	10
U4-07 (0x1C07)	High Consump Restart Offset	0–100%	0
U4-08 (0x1C08)	High Consump Detect Time	0.1–10.0 sec.	0.5
U4-09 (0x1C09)	FREQ to Start Aux Pump	0.00–Fmax Hz	Fmax
U4-10 (0x1C0A)	Delay to Start Aux Pump	0.0–120.0 sec.	1.0
U4-11 (0x1C0B)	Pump Start-up Sequence Sel	0: by Sequence of Pump 1: by OPER Time	1
U4-12 (0x1C0C)	Cycle Time Sel	0: Disable 1: by Absolute Time of Circulation 2: by Constant Time of Circulation	2
U4-13 (0x1C0D)	Absolute Time of Circulation	00:00–23:59	00:00
U4-14 (0x1C0E)	Constant Time of Circulation	0.0–200.0 hr	5.0
U4-15 (0x1C0F)	FREQ Drop% of Water Consump	0.0–50.0%	5.0
U4-16 (0x1C10)	Sleep Pressure Boost Delay	0.0–120.0 sec.	10.0
U4-17 (0x1C11)	Sleep Pressure Boost Setting	0.0–50.0%	0.0

Chapter 2 Descriptions of Parameter Settings

A. Fundamental Setting

b. Pr Management & Macro

C. Control Mode & Cmd Scheme

d. Motor Parameter

E. VF Control & SVC

F. FOC

G. IO Setting

H. Fault & Protection

J. Application Function

L. PLC Function

n. Communication

o. Monitor & Recorder

P. PID Function

U. Industry

A. Fundamental Setting

A0. Drive Information

A0-00 Drive Identity Code

(0x00) Default: Read only

Settings Read only

A0-01 Drive Cont. Rated Current

(0x01) Default: Read only

Settings Read only

A0-02 Drive Max. Output Current

(0x02) Default: Read only

Settings Read only

- Pr. A-00 displays the AC motor drive identity code. You can also identify the model by reading the current value from Pr. A0-01 or the barcode on the drive.
- The AC motor drive protection level is mainly based on Pr. A0-01, supplemented by Pr. A0-02.

Model	Identity Code	Voltage	Power (kW)	Power (HP)	Cont. Current
VFD3A0VP43ANTAA	54	460V	0.75	1	3
VFD4A2VP43ANTAA	55	460V	1.5	2	4.2
VFD5A6VP43ANTAA	56	460V	2.2	3	5.6
VFD7A2VP43ANTAA	57	460V	3	4	7.2
VFD011VP43ANTAA	58	460V	4	5	11
VFD013VP43ANTAA	59	460V	5.5	7.5	13
VFD018VP43ANTAA	60	460V	7.5	10	18
VFD025VP43ANTAA	61	460V	11	15	25
VFD032VP43ANTAA	62	460V	15	20	32
VFD038VP43ANTAA	63	460V	18.5	25	38
VFD045VP43ANTCA	64	460V	22	30	45
VFD062VP43ANTCA	65	460V	30	40	62
VFD073VP43ANTCA	66	460V	37	50	73
VFD090VP43ANTCA	67	460V	45	60	90
VFD110VP43AFTCA	68	460V	55	75	110
VFD150VP43AFTCA	69	460V	75	100	150
VFD180VP43AFTCA	70	460V	90	125	180
VFD220VP43AFTCA	71	460V	110	150	220
VFD260VP43AFTCA	72	460V	132	175	260
VFD310VP43AFTCA	73	460V	160	215	310
VFD370VP43AFTCA	74	460V	185	250	370
VFD395VP43AFTCA	75	460V	200	270	395
VFD460VP43AFTCA	76	460V	220	300	460
VFD485VP43AFTCA	77	460V	250	340	485
VFD3A0VP43BFTAA	78	460V	0.75	1	3

Model	Identity Code	Voltage	Power (kW)	Power (HP)	Cont. Current
VFD4A2VP43BFTAA	79	460V	1.5	2	4.2
VFD5A6VP43BFTAA	80	460V	2.2	3	5.6
VFD7A2VP43BFTAA	81	460V	3	4	7.2
VFD011VP43BFTAA	82	460V	4	5	11
VFD013VP43BFTAA	83	460V	5.5	7.5	13
VFD018VP43BFTAA	84	460V	7.5	10	18
VFD025VP43BFTAA	85	460V	11	15	25
VFD032VP43BFTAA	86	460V	15	20	32
VFD038VP43BFTAA	87	460V	18.5	25	38
VFD045VP43BFTCA	88	460V	22	30	45
VFD062VP43BFTCA	89	460V	30	40	62
VFD073VP43BFTCA	90	460V	37	50	73
VFD090VP43BFTCA	91	460V	45	60	90
VFD110VP43BFTCA	92	460V	55	75	110
VFD150VP43BFTCA	93	460V	75	100	150
VFD180VP43BFTCA	94	460V	90	125	180
VFD220VP43BFTCA	95	460V	110	150	220
VFD260VP43BFTCA	96	460V	132	175	260
VFD310VP43BFTCA	97	460V	160	215	310
VFD370VP43BFTCA	98	460V	185	250	370
VFD395VP43BFTCA	99	460V	200	270	395
VFD460VP43BFTCA	100	460V	220	300	460
VFD485VP43BFTCA	101	460V	250	340	485
VFD045VP43BSTCA	112	460V	22	30	45
VFD062VP43BSTCA	113	460V	30	40	62
VFD073VP43BSTCA	114	460V	37	50	73
VFD090VP43BSTCA	115	460V	45	60	90
VFD110VP43BSTCA	116	460V	55	75	110
VFD150VP43BSTCA	117	460V	75	100	150
VFD180VP43BSTCA	118	460V	90	125	180
VFD220VP43BSTCA	119	460V	110	150	220
VFD260VP43BSTCA	120	460V	132	175	260
VFD310VP43BSTCA	121	460V	160	215	310
VFD370VP43BSTCA	122	460V	185	250	370
VFD395VP43BSTCA	123	460V	200	270	395
VFD460VP43BSTCA	124	460V	220	300	460
VFD485VP43BSTCA	125	460V	250	340	485
VFD530VP43SHTCA	158	460V	280	375	530
VFD616VP43SHTCA	159	460V	315	425	616
VFD683VP43SHTCA	160	460V	355	475	683
VFD770VP43SHTCA	161	460V	400	530	770
VFD866VP43SHTCA	162	460V	450	600	866

Model	Identity Code	Voltage	Power (kW)	Power (HP)	Cont. Current
VFD930VP43SHTCA	163	460V	500	665	930
VFD1K1VP43SHTCA	164	460V	560	745	1100
VFD1K2VP43SHTCA	165	460V	630	840	1212

A0-03 Control Board FW Version

(0x03) Default: Read only

Settings 0.00–655.35

A0-05 Control Board FW Date Code

(0x05) Default: Read only

Settings 0–65535

📖 Pr. A0-03 and A0-05 display the current drive firmware version and its date code.

A0-06 Power Board FW Version

(0x06) Default: Read only

Settings 0.00–655.35

A0-08 Power Board FW Date Code

(0x08) Default: Read only

Settings 0–65535

📖 Pr. A0-06 and A0-08 display the current drive power board version and its date code.

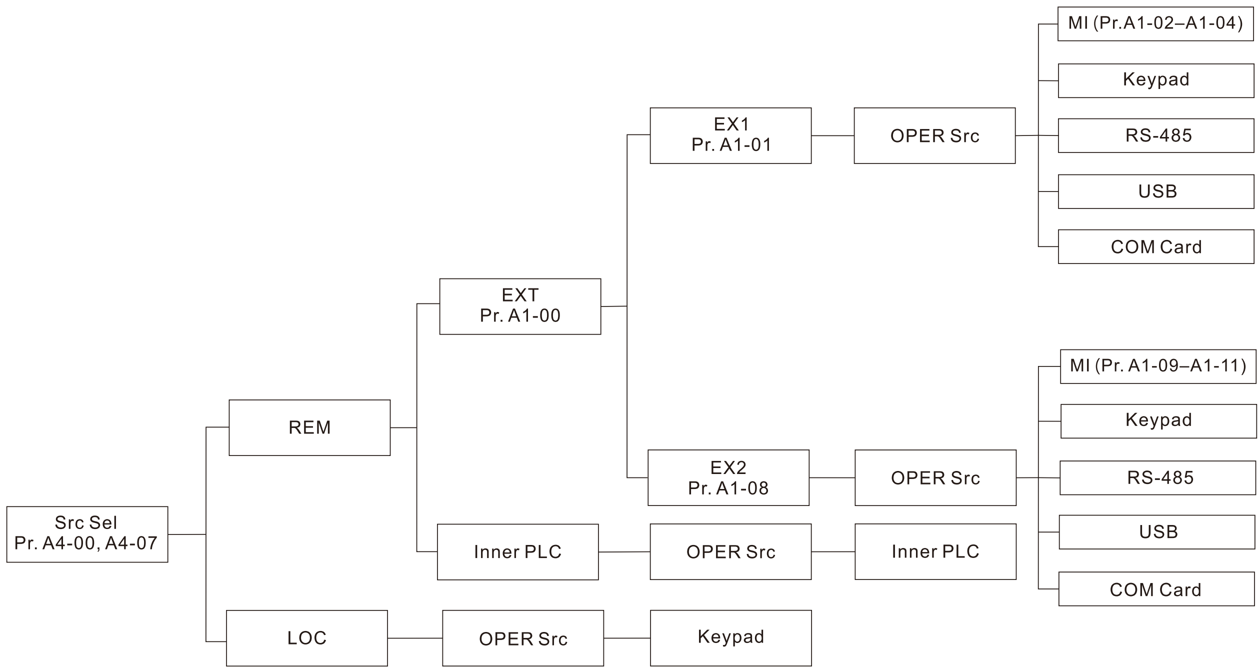
A1. Control Handle

A1-00 EX1/EX2 Switch Src

(0x40) Default: 0

Settings 0: External 1
1: External 2
2–7: MI1–MI6
8–10: Reserve
10–15: MI10–MI15

- As shown in the operation command source in the figure below, there are two sources of EX1/ EX2 for external control of the drive, which can be switched through parameter setting or MI terminal.
- The relevant parameters for EX1 channel are Pr. A1-01–A1-07, and that for EX2 channel are Pr. A1-08–A1-14.
- When the switching source is set to 0, the EX1 channel will be used; if it is set to 1, the EX2 channel will be used.
- When the switching source is set as MI terminal, for example: MI1, the EX1 channel will be used for MI1 OFF and the EX2 channel will be used for MI1 ON.
- This parameter is set to select the switching source of EX1/ EX2, NOT the source selection of EX1/ EX2 operation command.



A1-01 EX1 OPER Cmd Src

(0x41)

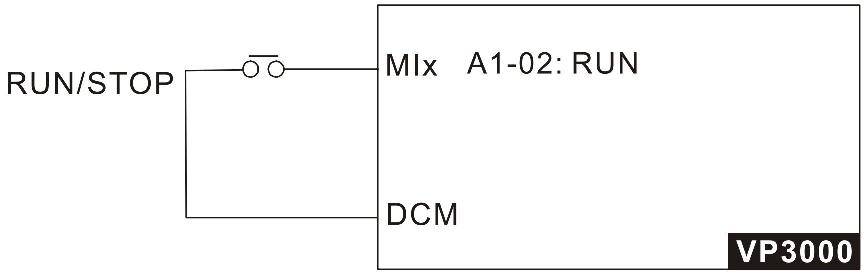
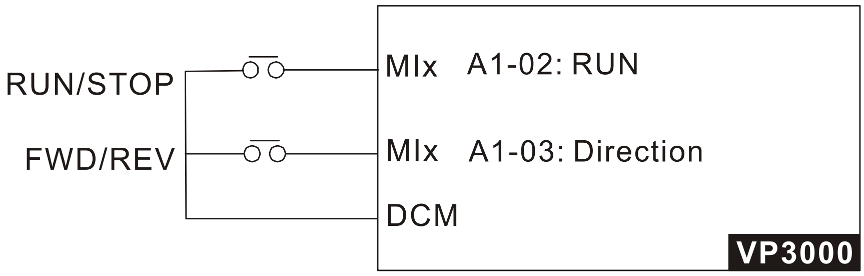
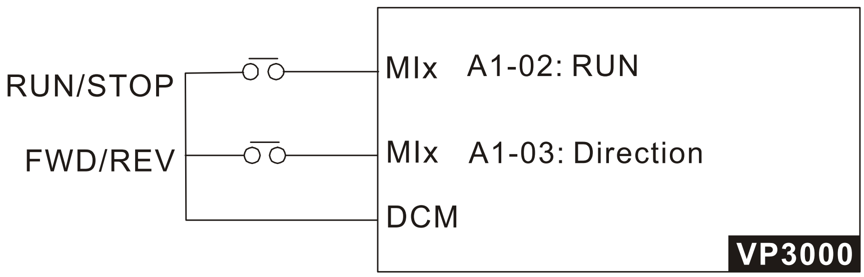
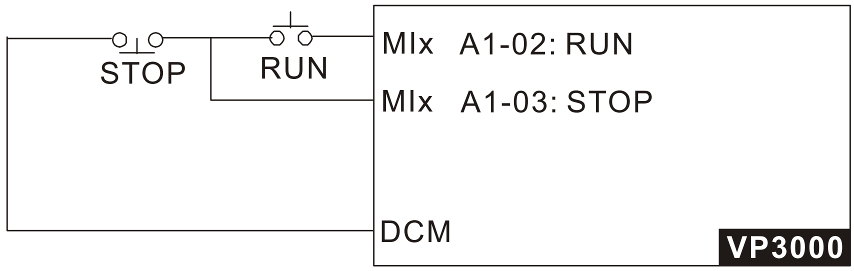
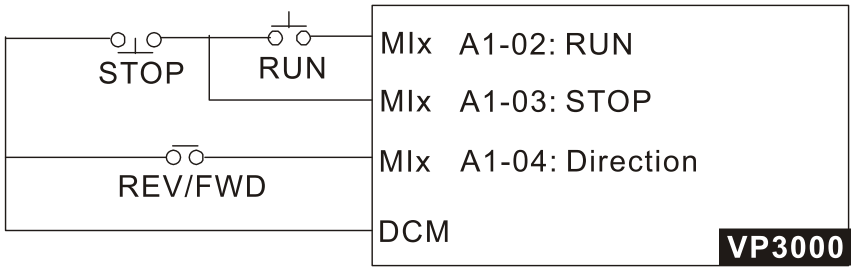
A1-08 EX2 OPER Cmd Src

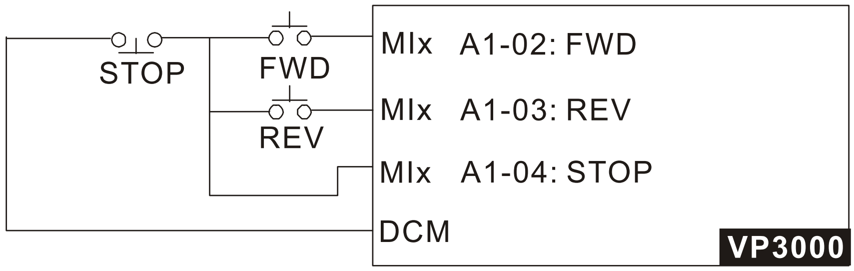
(0x48) Default: 0

Settings 0: Disable
1: S1 Start
2: S1 Start, S2 Dir
3: S1 FWD, S2 REV

4: S1 Start, S2 Stop
5: S1 Start, S2 Stop, S3 Dir
6: S1 FWD, S2 REV, S3 Stop
7: Keypad
8: RS-485
9: USB
10: EX. COM

This parameter sets the configuration of the terminals which control the operation, there are six different control modes, including single-wire, two-wire, and three-wire control modes.

A1-01/ A1-08	External Terminal Control Circuits
Setting value: 1 Single-wire operation control RUN	
Setting value: 2 Two-wire operation control RUN Direction	
Setting value: 3 Two-wire operation control FWD REV	
Setting value: 4 Two-wire operation control RUN STOP	
Setting value: 5 Three-wire operation control RUN STOP Direction	

A1-01/ A1-08	External Terminal Control Circuits
Setting value: 6 Three-wire operation control FWD REV STOP	

📖 Refer to Pr. A4-00 HOA/ LoRe selection, when it is set as AUTO or REM mode, Pr. A1-01 and A1-08 set the AC motor drive operation command source. Refer to the drive operation roadmap shown in the figure 1 and figure 2 below.

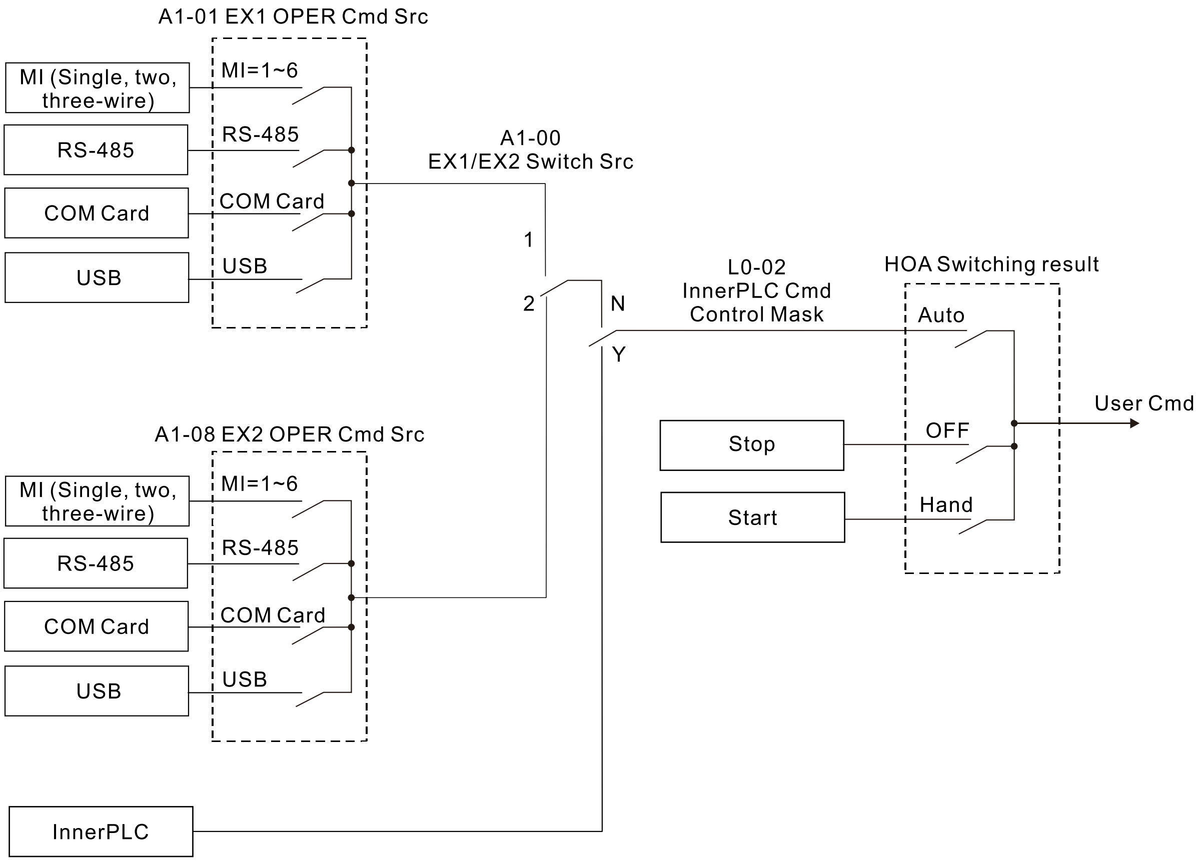


Figure 1 Drive Operation Roadmap (HOA)

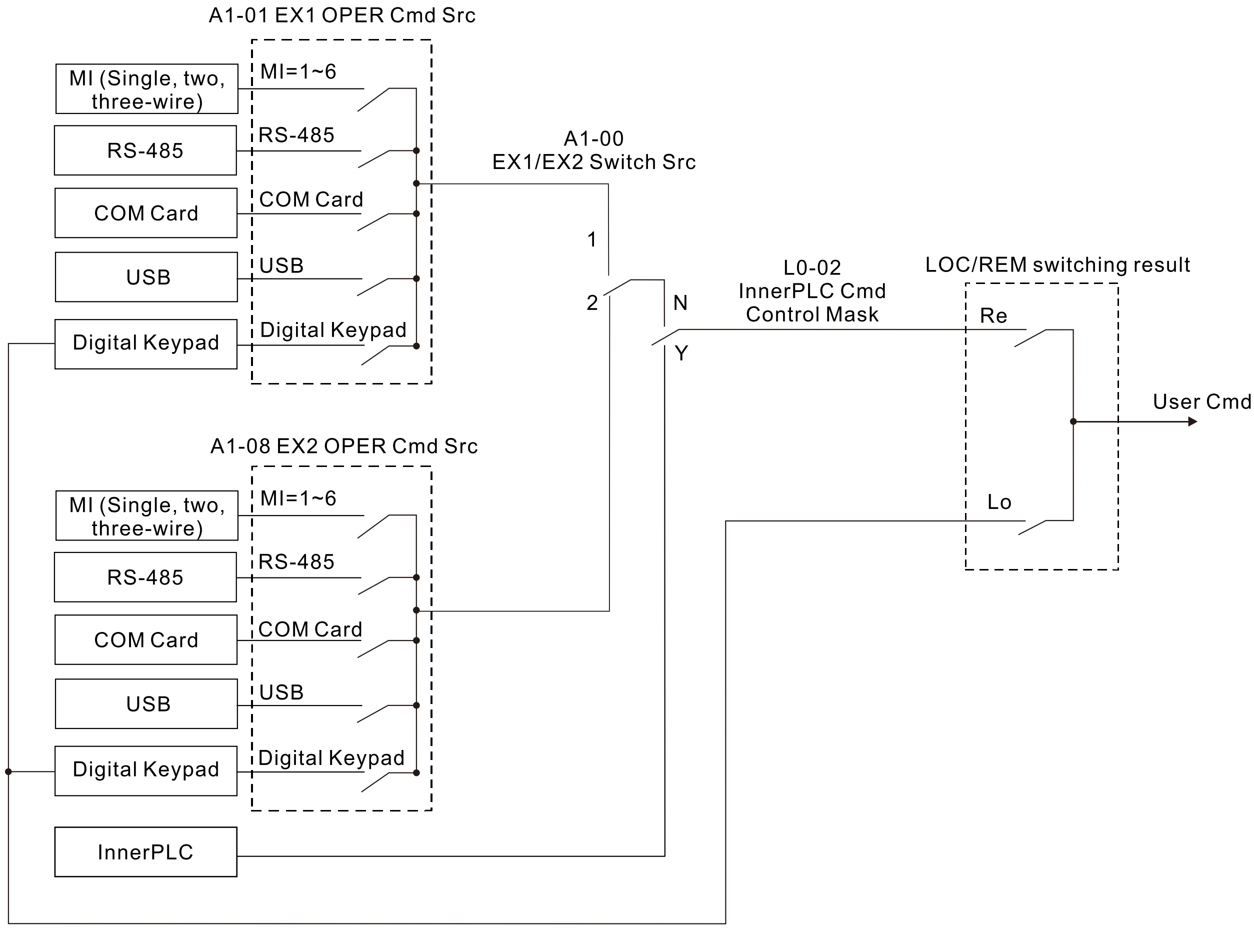


Figure 2 Drive operation diagram (LoRe)

📖 Continuing from the above, when the operation command source is set as communication, for example, the set value is 8: 2000H, the position writes in 2 for the drive to run; 1 for the drive to stop.

A1-01	Communication Control
Setting value: 7–10	**2000H** bit0–1: Run/ Stop/ JOG bit4–5: FWD/ REV **2002H** bit1: Reset
Setting value: 7–10	**6000H** bit1: DIR bit3: HALT bit4: LOCK bit5: JOG bit7: Servo ON bit15: Reset

A1-02 EX1 S1 Src
(0x42)
A1-09 EX2 S1 Src
(0x49) Default: 0

Settings 0: Disable
1: Reserve
2–7: MI1–MI6
8–9: Reserve
10–15: MI10–MI15

- Selects terminal for external control source 1.
- MI1–MI6 are control board multi-function input terminals; MI10–MI15 are IO extension card multi-function input terminals.

A1-03 EX1 S2 Src
(0x43)
A1-10 EX2 S2 Src
(0x4A) Default: 0

Settings 0: Disable
1: Reserve
2–7: MI1–MI6
8–9: Reserve
10–15: MI10–MI15

- Selects terminal for external control source 2.
- Refer to description of Pr. A1-02 and A1-09.

A1-04 EX1 S3 Src
(0x44)
A1-11 EX2 S3 Src
(0x4B) Default: 0

Settings 0: Disable
1: Reserve
2–7: MI1–MI6
8–9: Reserve
10–15: MI10–MI15

- Selects terminal for external control source 3.
- Refer to description of Pr. A1-02 and A1-09.

A1-05 EX1 S1 Trigger Method
(0x45)

A1-12 EX2 S1 Trigger Method
(0x4C) Default: 0

Settings 0: Edge Triggered
1: Level Triggered

- Selects starting signal for external control source 1.
- The edge trigger means that the switch starts when detecting the rising edge process from OFF to ON; the level trigger means that the switch starts when detecting the process from OFF to ON and it must stay in the ON position.
- The trigger method is only valid at RUN command, and the STOP command is always level triggered. Take option 1 of Pr. A1-01/ A1-08 as an example, when you choose edge triggered, the status of MI changes from OFF to ON as a RUN command; when you choose level triggered, the MI status is ON as a RUN command. No matter which trigger method is selected, when the MI status is OFF, it is regarded as a STOP command.
- Option 4–6 of Pr. A1-01/ A1-08 do not support level triggered.

A1-06 EX1 S2 Trigger Method
(0x46)

A1-13 EX2 S2 Trigger Method
(0x4D) Default: 0

Settings 0: Edge Triggered
1: Level Triggered

- Selects starting signal for external control source 2.
- Refer to description of Pr. A1-05 and A1-12.

A1-07 EX1 S3 Trigger Method
(0x47)

A1-14 EX2 S3 Trigger Method
(0x4E) Default: 0

Settings 0: Edge Triggered
1: Level Triggered

- Selects starting signal for external control source 3.
- Refer to description of Pr. A1-05 and A1-12.

A1-15 Halt Decel Method
(0x4F) Default: 0

Settings 0: Ramp to stop
1: By Quick Stop Time
2: Auto-Decel

- When the Halt enables, it decelerates to 0 and enters zero-speed control; when the Halt disables, it returns to the target speed set by the user.
- 0: It decelerates based on the setting for Pr. C2-00–C2-07 (Accel / Decel time 1–4).

- 1: the Halt decelerates based on the setting for Pr. C2-14 (Quick stop time).

A1-16 Halt MI Src

(0x50) Default: 0

Settings 0: Disable
1: Reserve
2–7: MI1–MI6
8–9: Reserve
10–15: MI10–MI15

- Selects the Halt MI source.

A1-17 Lock MI Src

(0x51) Default: 0

Settings 0: Disable
1: Reserve
2–7: MI1–MI6
8–9: Reserve
10–15: MI10–MI15

- Selects the Lock MI source.
- When the Lock enables, it locks the current output frequency and stops following the frequency command; when the Lock disables, it unlocks the current output frequency and continues following the target frequency command.
- When Halt and Lock are enabled at the same time, the Halt has higher priority than Lock.

A1-21 Run Enable MI Src

(0x56) Default: 0

Settings 0: Disable
1: Reserve
2–7: MI1–MI6
8–9: Reserve
10–15: MI10–MI15

- Selects the run enable MI source.
- The default of the Run Enable MI Source is OFF, that is, the drive is not limited to the on-off state of this function.
- When the Run Enable MI Source is specified, this function is enabled.
- Run Enable determines whether the actual operation is valid or not. When the drive is stopped and the Run Enable function is ON but not enabled (MI OFF), the keypad displays Run Disabled warning message; when the Run Enable function is ON and enabled (MI ON), the keypad clears the warning and gives the run command, and then the drive can run.
- Continuing from the above, after the drive starts to run after issuing the run command, if the Run Enable function is switched off (MI OFF), the drive stops according to the stop method set in Pr. A1-22, and only resumes to run when the Run Enable function is enabled again.

✎ A1-22 Run Disable Stop Method

(0x57) Default: 0

Settings 0: Coast to stop

1: Ramp to stop

2: By Quick Stop Time

3: Auto-Decel

📖 0: The AC motor drive stops output immediately, and the motor coasts to stop according to the load inertia.

- Use "ramp to stop" for the safety of personnel or to prevent material from being wasted in applications where the motor must stop immediately after the drive stops. You must set the deceleration time accordingly.
- If idling is allowed or the load inertia is large, use "coast to stop". For example: blowers, punching machines and pumps.

📖 1: it decelerates based on the setting for Pr. C2-00–C2-07 (Accel / Decel time 1–4).

📖 2: it decelerates based on the setting for Pr. C2-14 (Quick stop time).

✎ A1-23 Run Enable Indn

(0x58) Default: 0

Settings 0: Disable

1–2: Relay1–Relay2

3–4: MO1–MO2

5–9: Reserve

10–15: MO/Relay10–15

📖 Relay 1–2 and MO1–MO2 are control board multi-function (contact, photo coupler) output terminals; MO/ Relay 10–15 are extension card multi-function output terminals (contact, photo coupler).

📖 When the drive is in Run Enable status, the specified MO contact activates.

✎ A1-24 OPER Cmd by Kpd Indn

(0x59) Default: 0

Settings 0: Disable

1–2: Relay1–Relay2

3–4: MO1–MO2

5–9: Reserve

10–15: MO/Relay10–15

📖 When the drive operation command source is digital keypad, the specified MO contact activates.

A1-25 Forward Cmd Indn

(0x5A) Default: 0

Settings 0: Disable

1–2: Relay1–Relay2

3–4: MO1–MO2

5–9: Reserve

10–15: MO/Relay10–15

When the drive is not in STOP status and operates in FWD direction, the specified MO contact activates.

A1-26 Reverse Cmd Indn

(0x5B) Default: 0

Settings 0: Disable

1–2: Relay1–Relay2

3–4: MO1–MO2

5–9: Reserve

10–15: MO/Relay10–15

When the drive is not in STOP status and operates in REV direction, the specified MO contact activates.

A1-27 FWD / REV Direction Setting

(0x5C) Default: 0

Settings 0: Enable FWD/ REV

1: FWD only

2: REV only

This parameter avoids damage to the equipment caused by the motor forward and reverse operation due to mis-operation. Use this parameter to limit the motor operation direction to forward or reverse. When the load of the motor only allows one running direction, this parameter limits the running direction of the motor to avoid equipment caused by user mis-operation.

A1-28 Forward Phase Sel

(0x5D) Default: 0

Settings 0: UVW

1: UWV

Switches the motor operation direction. If the phase sequence of the motor wiring is wrong, which makes the motor rotate in the wrong direction and cannot be re-wired, use this parameter to change the motor operation direction.

A1-29 Base Block MI Src

(0x5E) Default: 0

Settings 0: Disable

1: Reserve

2–7: MI1–MI6

8–9: Reserve

10–15: MI10–MI15

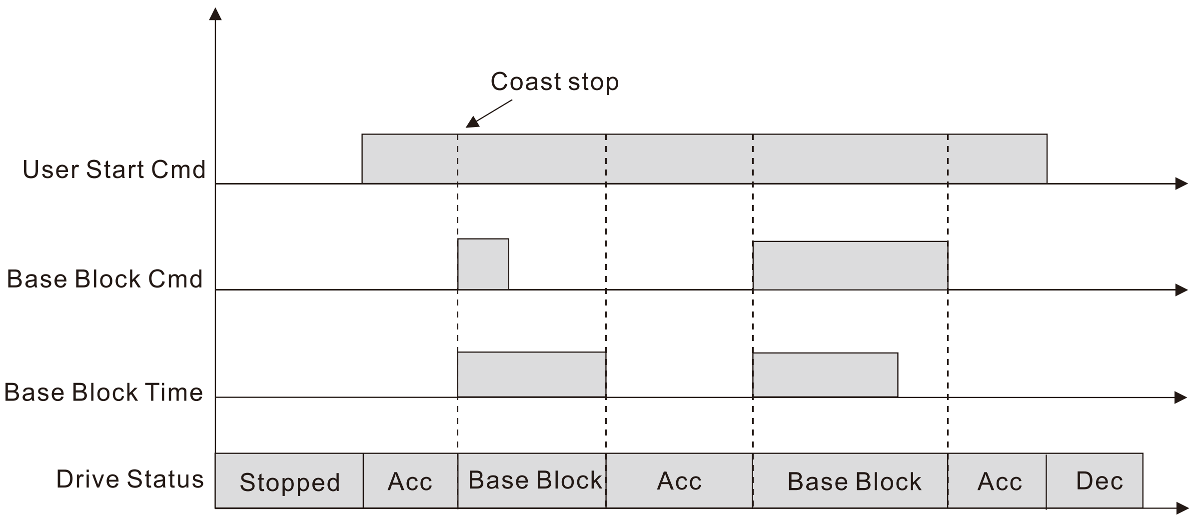
- Selects the Base Block MI source.

A1-30 Base Block Time

(0x5F) Default: Demagnetization time set

Settings Demagnetization time setting–5.0 sec.

- The setting range of Pr. A1-30 is affected by the IM demagnetization time setting. Pr. A3-16 sets the IM Demagnetize Time.
- Pr. A1-30 sets the delay time for the motor to coast to stop and restart after the Base Block occurs.
- When the MI ON specified by the Base Block stops the output of the drive, and keeps stopping output within the Base Block time, after the Base Block command disappears and the Base Block time ends, or after the Base Bock time ends and the Base Block command disappears, if the operation command exists, the drive can be restarted. Refer to the sequential diagram below:



- The operation command given in the delay time for the motor to coast to stop and restart will be memorized, after the delay time, the motor operates or stops according to the last operation command.

A1-31 Base Block Indn

(0x60) Default: 0

Settings 0: Disable
1–2: Relay1–Relay2
3–4: MO1–MO2
5–9: Reserve
10–15: MO/Relay10–15

- When the AC motor drive is in Base Block status, the specified MO contact activates.

A1-32 External Fault MI Src

(0x61) Default: 0

Settings 0: Disable
1: Reserve
2–7: MI1–MI6
8–9: Reserve
10–15: MI10–MI15

- Selects the External Fault MI source.

A1-33 External Fault Stop Method

(0x62) Default: 0

Settings 0: Coast to stop
1: Ramp to stop
2: By EF decel Time
3: Auto-Decel

- 0: The motor coasts to stop according to the load inertia.
- 1: It decelerates based on the setting for Pr. C2-00–C2-07 (Accel / Decel time 1–4).
- 2: The drive stops according to the External Fault Deceleration Time set int Pr. A1-34.

A1-34 External Fault Decel Time

(0x63) Default: 10.0 / 60.00

Settings 0.0–6000.0 sec.
0.00–600.00 sec.

- Sets the deceleration time after the external fault occurs.

A2. Stop Method

A2-00 Stop Method

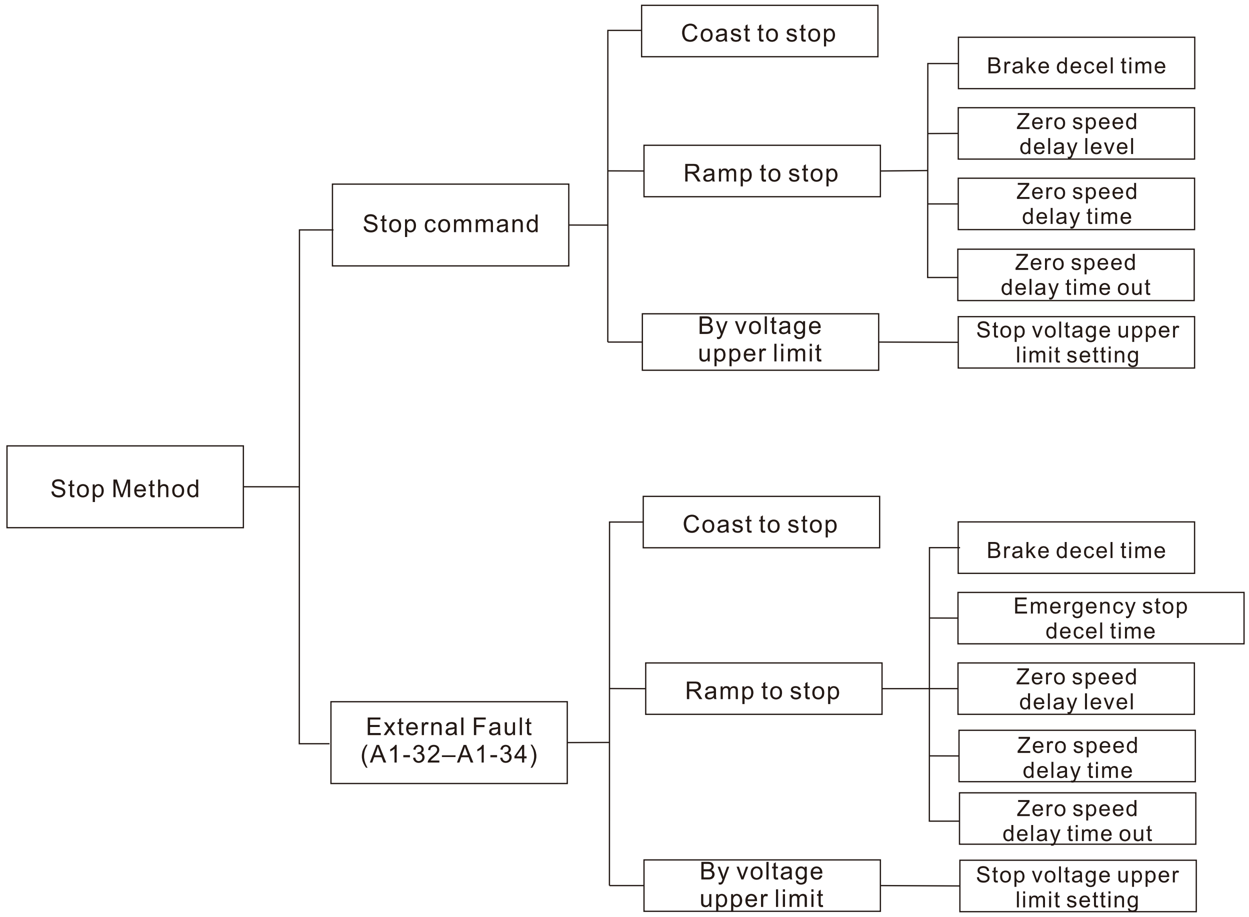
(0x80) Default: 0

Settings 0: Ramp to stop

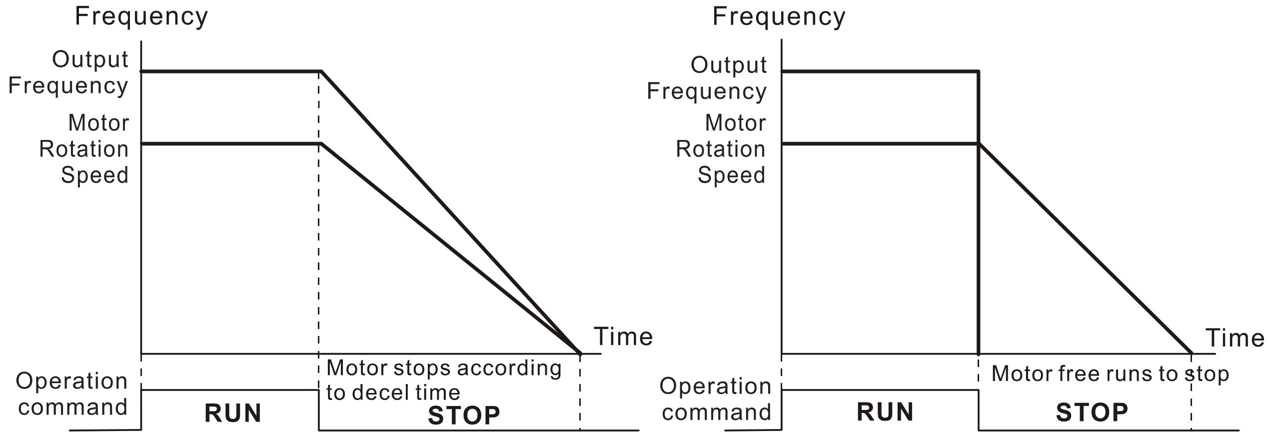
1: Coast to stop

2: Auto-Decel

📖 Refer to the figure below for the AC motor drive stop method:



📖 Determines how the motor is stopped when the AC motor drive receives the Stop command.



Ramp to stop and Coast to stop

📖 Setting 0: The AC motor drive decelerates to 0 Hz or the minimum output frequency (Pr. C2-27) according to the set deceleration time (for example, Pr. C2-01 Decel Time 1), and then to stop.

- Setting 1: The AC motor drive stops output immediately, and the motor coasts to stop according to the load inertia.
  - ☑ Use "ramp to stop" for the safety of personnel or to prevent material from being wasted in applications where the motor must stop immediately after the drive stops. You must set the deceleration time accordingly.
  - ☑ If idling is allowed or the load inertia is large, use "coast to stop".
    For example: blowers, punching machines and pumps.
- Setting 2:
  1. The AC motor drive ramps to stop according to the voltage upper limit. After the stop command is issued, the drive ramps to stop with the maximum voltage upper limit that can be set until the motor stops, and then the drive stops output after the deceleration is completed.
  2. The auto-deceleration voltage limit adopts closed-loop control. During deceleration, Pr. A2-05 Decel Voltage Limit will be referred to as the control target command. When the DC bus voltage exceeds the deceleration voltage upper limit, the controller adjusts the output frequency increasing according to the closed-loop response until the DC bus voltage equals to the deceleration voltage upper limit. If the DC bus voltage is still higher than the deceleration voltage upper limit during the adjustment, the output frequency increases to Pr. C2-17 Maximum Operation Frequency.
  3. It is suitable for occasions where the motor load changes frequently, and the fixed stop time is not required when the machine stops.
     Because the stop time varies with the load, if it is set properly, there will be no oc problem caused by deceleration and braking.
  4. The actual deceleration time depends on different working conditions, and the goal is to stop with the fastest deceleration time. If you need time planning to stop, set this parameter to 0 (ramp to stop).

A2-01 Quick Stop MI Src

(0x81) Default: 0

Settings 0: Disable
1: Reserve
2–7: MI1–MI6
8–9: Reserve
10–15: MI10–MI15

- Selects the quick stop MI source.
- MI1–MI6 are control board multi-function input terminals; MI10–MI15 are IO extension card multi-function input terminals.

✎ A2-02 Quick Stop Method

(0x82) Default: 0

Settings 0: By Quick Stop Time
1: Coast to stop
2: Auto-Decel
3: Ramp to stop

- 0: The drive decelerates the motor to 0 Hz according to Pr. C2-14 Quick Stop Time.
- Refer to Pr. A2-00 for the rest of descriptions.

A2-03 Emergency Stop MI Src

(0x83) Default: 0

Settings 0: Disable
1: Reserve
2–7: MI1–MI6
8–9: Reserve
10–15: MI10–MI15

- Selects the emergency stop MI source.
- Refer to Pr. A2-00 for the rest of descriptions.

✎ A2-05 Decel Voltage Limit

(0x85) Default: Depending on the models

Settings Depending on the models (V)

- The AC motor drive ramps to stop according to the voltage upper limit. After the stop command is issued, the drive ramps to stop with the maximum voltage upper limit that can be set until the motor stops, and then the drive stops output after the deceleration is completed.

✎ A2-06 Zero Speed Delay Level

(0x86) Default: 1.00

Settings 0.00–599.00 Hz
0: Disable zero speed delay function

✎ A2-07 Zero Speed Delay Time

(0x87) Default: 0

Settings 0.0–6553.5 sec.

- This function Applies to IMFOCPG and IMFOC control modes.
- When setting Pr. A2-06 Zero Speed Delay Level to 0, the zero speed delay function is disabled.
- In application for large inertia or rapid deceleration, it often occurs that the frequency command programs decelerating to the minimum frequency, the drive stops outputting at that moment, but the motor's actual speed has not reached zero-speed yet, therefore, the motor goes to free-run status.
- The zero-speed delay function refers to the actual (or estimated) rotor frequency, it counts the setting time of Pr. A2-07 after the actual (or estimated) rotor frequency reaches the setting level of Pr. A2-06, then the drive stops outputting.

📖 The counting starts when the actual (or estimated) rotor frequency reaches the setting level of Pr. A2-06 for the first time, it the frequency jumps out of the level during the process, it will not restart the counting.

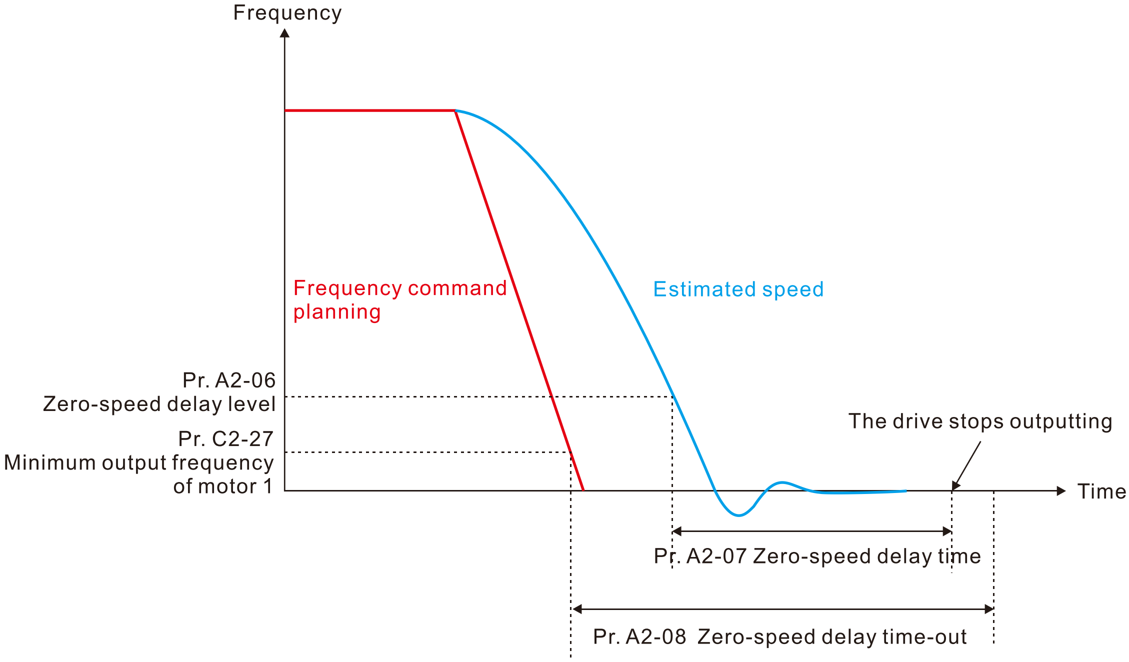
A2-08 Zero Speed Delay Timeout

(0x88) Default: 0

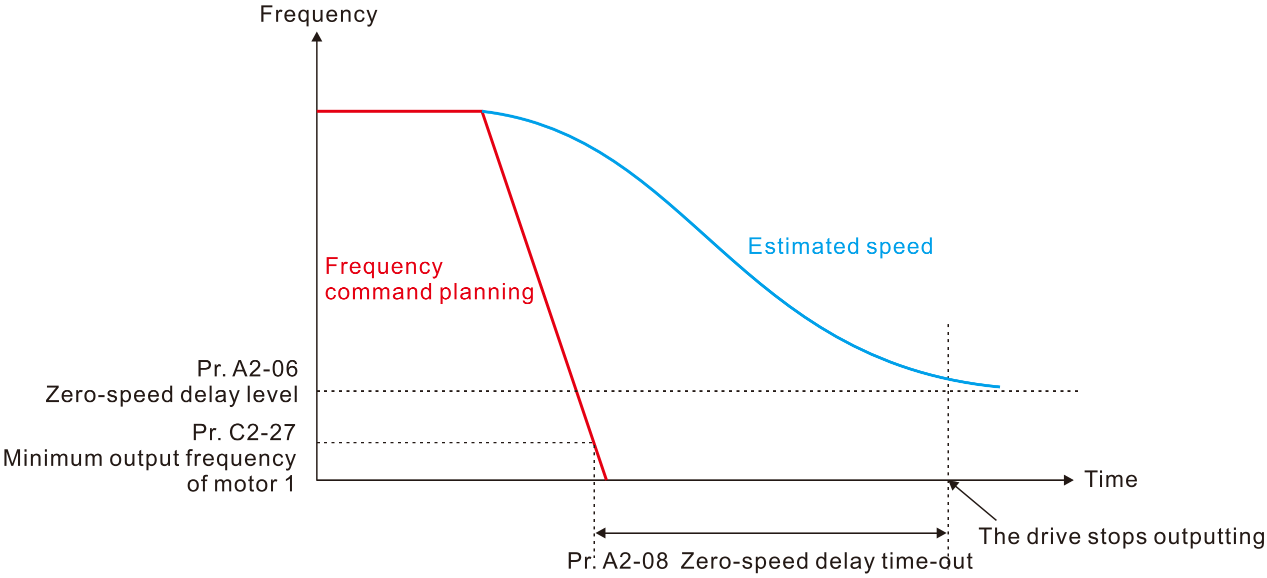
Settings 0.0–6553.5 sec.

📖 If the actual (or estimated) rotor frequency fails to restrain under Pr. A2-06 frequency level, and the difference error is not triggered, the drive may be unable to stop outputting. Set this parameter for this condition. When the frequency command decelerates to the minimum frequency and starts to count, this function forces the drive to stop outputting when it reaches the Pr. A2-08 setting time.

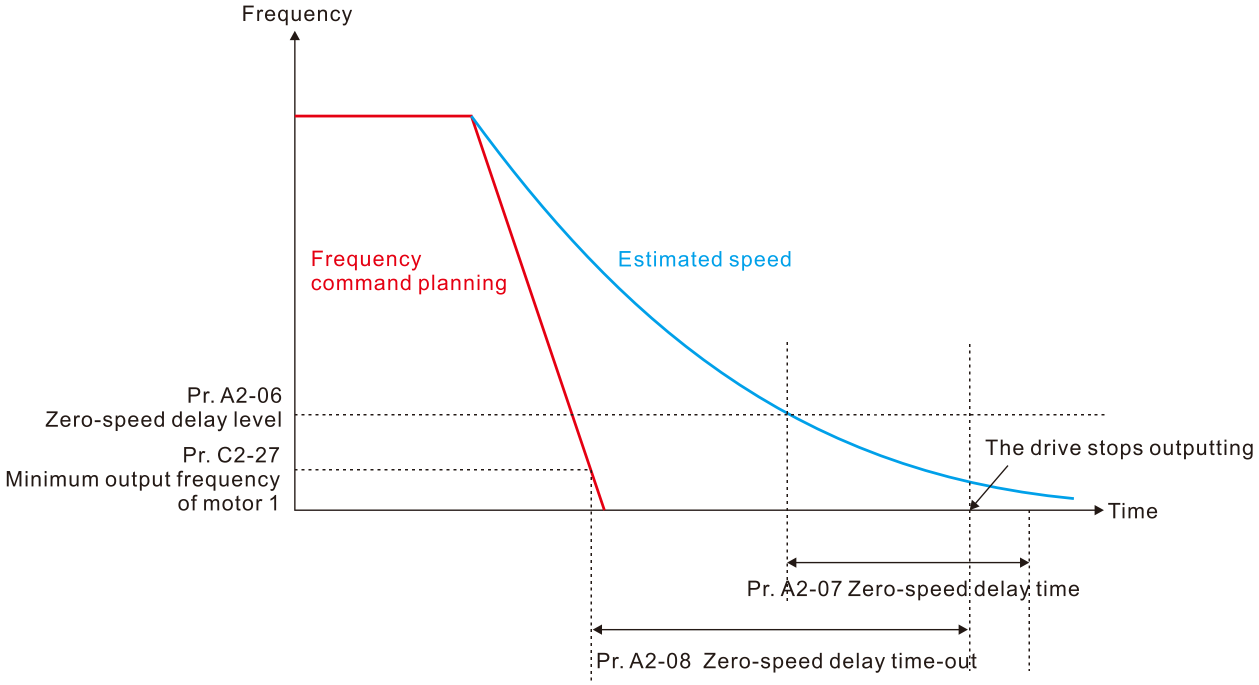
📖 The actual motor speed reaches the Pr. A2-06 level in Pr. A2-08 setting time, and the drive stops outputting when the counting reaches Pr. A2-07 setting time (Pr. A2-08 setting time is still counting):



📖 The motor actual speed does not reach the Pr. A2-06 level in Pr. A2-08 setting time:



📖 The motor actual speed reaches the Pr. A2-06 level in Pr. A2-08 setting time, but does not reach to 0 Hz in Pr. A2-08 setting time:



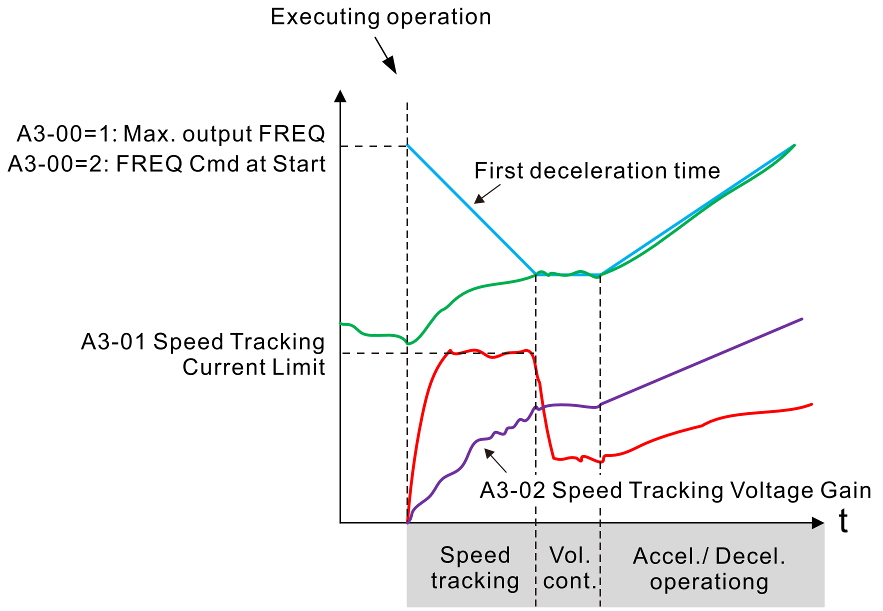
A3. Start & Stop Function

A3-00 Start Speed Tracking

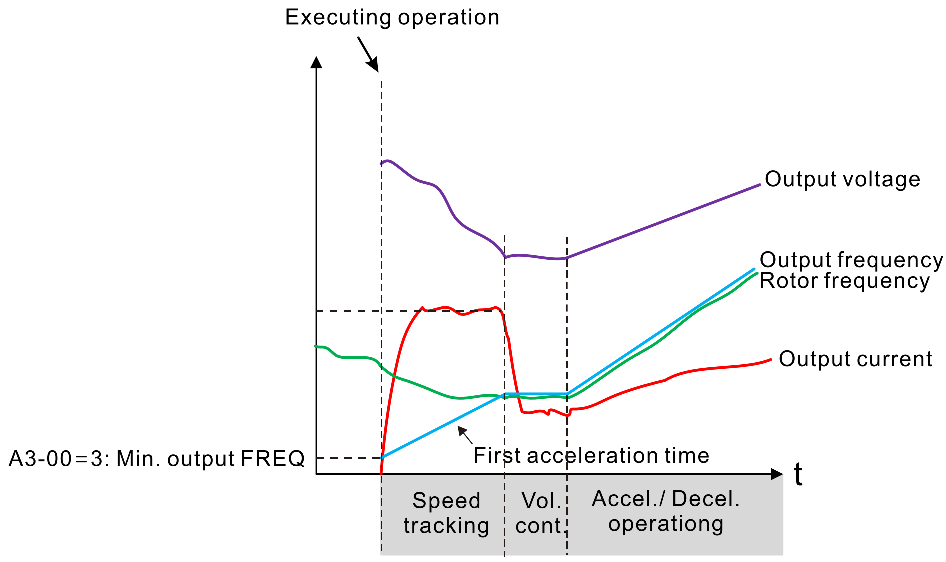
(0xC0) Default: 0

Settings 0: Disable
1: Max. output FREQ
2: FREQ Cmd at Start
3: Min Output FREQ
4: Rotor FREQ

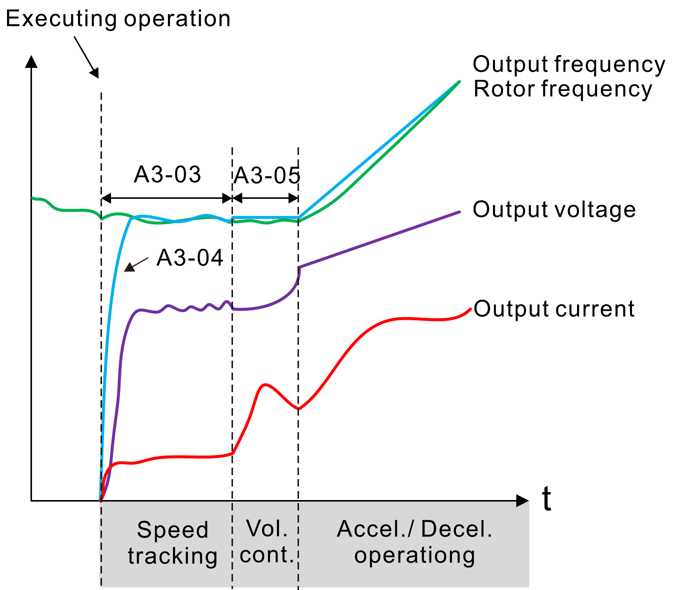
- The speed tracking function is most applicable for large inertia loading system, such as punch, pumps, and fans. If the motor is rotating with a large inertia load without control and the speed tracking function is not enabled, it will take a long time for the load to stop rotating before the motor runs; after enabling this function, the motor can run immediately without waiting for the load to stop. After tracking to the load speed, it can be used as the initial speed for further acceleration and deceleration.
- When using IM and Pr. A3-00 = 1–3, it is a scalar speed tracking. Option 1 and 2 is suitable for occasions where the normal rotation is at a relatively high speed. The command and command direction at this time will be used as the initial frequency, and the drive uses the first deceleration time to perform deceleration sweeping frequency to zero speed for speed tracking. Option 3 is suitable for tracking occasions where the normal rotation is with relatively low speed, which uses zero speed as the initial frequency and accelerates sweeping frequency with the first acceleration time for speed tracking. While sweeping frequency, the current will reach to the Pr. A3-01 level, and controls the current according to Pr. A3-02 voltage gain. When the rotor speed reaches the sweeping frequency, the current drops suddenly, and the speed tracking is completed, the drive continues the acceleration or deceleration operation.
- When using IM and Pr. A3-00 = 4, it is a vector speed tracking. When starting, it instantly searches the rotor frequency automatically, controls the current at no-load current and perform speed tracking for the setting time of Pr. A3-03. The frequency filters for the time setting of Pr. A3-04, and perform voltage transient for the time of Pr. A3-05 when the filter time is up. When the voltage transient is completed, the speed tracking completes, and the drive continues the acceleration and deceleration operation. Compared to option 1 to 3, option 4 can complete speed tracking with smaller output current and smoother rotor speed changes.



A3-00=1, 2 action



A3-00=3 action



A3-00=4 action

- In the IMVF and IMSVC modes, when Pr. A3-00 = 1–3, it can be used without performing parameter auto-tuning in advance, when Pr. A3-00 = 4, it is recommended to perform parameter auto-tuning first. If the tracking speed is lower than the motor rated frequency, static auto-tuning can be used; if the tracking speed is higher than the motor rated frequency, then it is recommended to use dynamic auto-tuning.
- The auto-tuning before speed tracking is necessary in IMFOC mode; therefore, the more advanced mode 4 is used as the speed tracking method when Pr. A3-00 is set as 1–4.
- When using PM or SynRM, set Pr. A3-00 > 0 to enable the speed tracking function.

A3-01 Speed Tracking Current Limit

(0xC1) Default: 100

Settings 20–200%

- 100% corresponds to the motor rated current, internal limits the maximum to 120% of drive rated current.
- Applies to Pr. A3-00 = 1–3.
- The AC motor drive executes speed tracking only when the drive output current reaches to this level.
- The maximum current for speed tracking affects the synchronous time. The larger the parameter setting is, the faster the synchronization occurs. However, if the parameter setting is too large, the overload protection function may be activated.

A3-02 Speed Tracking Voltage Gain

(0xC2) Default: 100

Settings 1–200%

- Applies to Pr. A3-00 = 1–3.
- If oL and oc occurs during speed tracking, adjust Pr. A3-02 to adjust the speed tracking voltage gain for a better current control.

A3-03 Speed Tracking Time

(0xC3) Default: 1.000

Settings 0.100–10.000 sec.

A3-04 Speed Tracking FREQ Filter

(0xC4) Default: 0.050

Settings 0.001–10.000 sec.

A3-05 Speed Tracking Transient Time

(0xC5) Default: 0.500

Settings 0.100–10.000 sec.

- Applies to Pr. A3-00 = 4.
- Pr. A3-03 and A3-04 automatically bring out suggested value after parameter auto-tuning, which can be adjusted according to your needs.

✎ A3-06 DC Brake Current Level

(0xC6) Default: 100

Settings 0–150%

- Sets the level of the DC brake current output to the motor at start-up and stop. This parameter is based on the motor rated current as 100%, if it exceeds 150% of the drive rated current, it outputs based on 150% of the drive rated current. When you set this parameter, increase the level slowly to reach the desired holding torque. DO NOT use the DC brake for mechanical retention, otherwise injury or accident may occur.
- It is recommended to use IM or SynRM for this parameter, the PM has the magnetic field itself, using the DC brake may possibly cause the motor run in a reverse direction, therefore, it is not recommended to use it for PM.

✎ A3-07 DC Brake Time at Start

(0xC7) Default: 0.0

Settings 0.0–60.0 sec.

- The motor may continue rotating after the drive stops output due to external forces or the inertia of the motor itself. If you use the drive with the motor rotating, it may cause motor damage or trigger drive protection due to over-current. This parameter outputs DC current, generating torque to force the motor stop to get a stable start before motor operation. This parameter determines the duration of the DC brake current output to the motor when the drive starts up. Setting this parameter to 0.0 disables the DC brake at start-up.
- The PM has the magnetic field itself, using the DC brake may possibly cause the motor run in a reverse direction, therefore, it is not recommended to use DC brake for PM.
  Use Pr. A3-12 (PM Zero Voltage Time at Start) to force the motor decelerate or to stop.

✎ A3-08 DC Brake Time at Stop

(0xC8) Default: 0.0

Settings 0.0–60.0 sec.

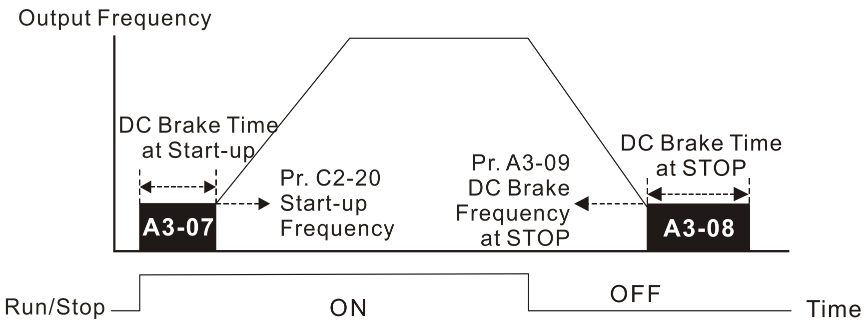
- The motor may continue rotating after the drive stops output due to external forces or the inertia of the motor itself. This parameter outputs DC current, generating torque to force the motor stop after the drive stops output to make sure that the motor stops.
- This parameter determines the duration of the DC Brake current output to the motor when braking. To enable the DC brake at STOP, you must set Pr. A2-00 (Stop Method) to 0 (ramp to stop). Set Pr. A3-08 to 0.0 to disable the DC brake at stop.

✎ A3-09 DC Brake Frequency at Stop

(0xC9) Default: 0.00

Settings 0.00–599.00 Hz

- Determines the start frequency of the DC brake before the drive ramps to stop. When this setting is less than Pr. C2-20 (Start Frequency), the start frequency for the DC brake begins at the minimum frequency.



DC Brake Output Timing Diagram

- Use the DC brake before running the motor when the load is movable at stop, such as with fans and pumps. The motor is in free running status and in unknown rotation direction before the drive starts up. Execute the DC brake before you start the motor.
- Use the DC Brake at STOP when you need to brake the motor quickly or to control the positioning. Such as cranes or cutting machines.

A3-10 DC Brake Kp Gain

(0xCA) Default: 0.020

Settings 0.000–60.000 pu

A3-11 DC Brake Ki Gain

(0xCB) Default: 0.500

Settings 0.000–60.000 pu

- This parameter sets the controller PI gain when the DC brake function activates.
- Kp gain adjusts the current transient response, Ki gain adjusts the current steady-state response.

A3-12 PM Zero Voltage Time at Start

(0xCC) Default: 0.0

Settings 0.0–60.0 sec.

A3-13 PM Zero Voltage Time at Stop

(0xCD) Default: 0.0

Settings 0.0–60.0 sec.

- When the motor needs to be kept still during start-up, adjust Pr. A3-12; when the motor needs to be quickly stopped within a short deceleration time, adjust Pr. A3-13.
- When enabling speed tracking function (Pr. A3-00 ≠ 0) and the PM rotor speed is too low or closed to zero, the drive executes zero voltage according to the setting for Pr. A3-12.
- When the motor is in static status at start-up, this increases the accuracy when estimating angles. In order to put the motor in static state, set the three-phase drive output to 0 V to the motor. The Pr. A3-12 and A3-13 setting time is the length of time when three-phase output at 0 V.
- It is possible that even when you apply this parameter, the motor cannot go into the static state because of inertia or external force. If the motor does not go into the static state in the setting time, increase the setting value of Pr. A3-12 and A3-13 appropriately.
- If Pr. A3-12 and A3-13 are too high, the start-up time is longer. If it is too low, then the braking performance is weak.

✎ A3-14 IM Magnetize Time at Start

(0xCE) Default: 0.0

Settings 0.0–60.0 sec.

✎ A3-15 IM Magnetize Current at Start

(0xCF) Default: 0

Settings 0–100%

- This function is only valid in IMFOC mode, the 100% magnetize current corresponds to the motor rated current.
- Because the stator and rotor of an IM need to establish their own magnetic field, a large torque is required when the motor is started. The magnetize function pre-establishes a magnetic field before the motor runs can shorten the torque output time.
- After the drive goes from stationary to RUN, it executes the magnetizing function according to the set time and magnetize current.
- In the following conditions, the magnetize function does not work:
  - Operates from Stand by
  - When speed tracking is enabled
  - In JOG mode

✎ A3-16 IM Demagnetize Time

(0xD0) Default: Depending on the models

Settings 0.0–5.0 sec.

- Sets the delay time for the motor to coast to stop and restart.
- When momentary power loss is detected, the AC motor drive blocks its output and then waits for a specified period of time before resuming operation. Set this parameter to the time that allows the residual voltage at the output side to decrease to 0 V before activating the drive again.
- Following table is the recommended setting for re-start delay time of each model power. You must set Pr. A3-16 according to this table (the default of each model power is based on this table as well).

kW	0.75	1.5	2.2	3.7	4.0	5.5	7.5	11.0	15.0	18.5	22.0
HP	1	2	3	5	5.5	7.5	10	15	20	25	30
Delay Time (sec.)	0.3	0.4	0.5	0.6	0.7	0.7	0.8	0.9	1	1.1	1.2

kW	30.0	37.0	45.0	55.0	75.0	90.0	110.0	132.0	160.0	185.0	200.0
HP	40	50	60	75	100	125	150	175	215	250	270
Delay Time (sec.)	1.3	1.4	1.5	1.6	1.7	1.8	1.9	2.0	2.1	2.2	2.3

kW	220.0	250.0	280.0	315.0	355.0	400.0	500.0	560.0	630.0
HP	300	340	375	425	475	530	675	750	850
Delay Time (sec.)	2.3	2.4	2.5	2.6	2.7	2.8	2.9	3.2	3.4

A3-17 SM Rotor Initial Detection

(0xD1) Default: 1

Settings 0: Disable

1: Force Alignment

2: Pulse inject

3: HFI

- In order to stably start the SM, the SM needs to obtain the angle information of the rotor through the initial angle detection when starting.
- When setting the speed mode as PMSVC (Pr. C0-02 = 1) or PM FOC (Pr. C0-02 = 2):
  - For IPM, the setting value is suggested to be 3.
  - For SPM, the setting value is suggested to be 2.
  - You can choose the setting 1 if the result is not good of setting as 2 or 3.

A3-18 Force Alignment Current Value

(0xD2) Default: 50

Settings 0–150%

A3-19 Force Alignment Time

(0xD3) Default: 2.0

Settings 0.0–10.0 sec.

- Applies to Pr. A3-17 = 1.
- Based on the motor rated current, Pr. A3-18 and A3-19 set the force alignment current and time of the rotor initial angle, and the rotor rotates during the detection process.

A3-20 Pulse Inject Curr Threshold

(0xD4) Default: 100

Settings 0–300%

- Applies to Pr. A3-17 = 2 or 3.
- Based on the motor rated current, the angle range is estimated when the pulse current reaches this level, and the rotor does not rotate during the detection process.
- The parameter affects the value of the pulse during the angle detection. The larger the pulse, the higher the accuracy of rotator's position. But a larger pulse might cause oc.
- Increase the parameter when the running direction and the command are opposite during start-up. If oc occurs at start-up, then decrease the parameter.
- Refer to Chapter 5 Initial Operation and Adjustment for detailed motor adjustment procedure.

A3-21 HFI Frequency

(0xD5) Default: 1000

Settings 200–2400 Hz

- Applies to Pr. A3-17 = 3 or IPM sensorless control mode, sets the frequency command of high-frequency injection signal.
- If the motor rated frequency (for example: 400 Hz) is too close to the set frequency of this parameter (for example: default 500 Hz), it might affect the accuracy of the angle detection. Therefore, it is recommended to adjust this parameter with setting value of Pr. E0-01 (IM1 VF

Max Frequency).

📖 If the carrier setting value of Pr. A5-00 is lower than Pr. A3-21 × 10, then increase the carrier frequency.

A3-22 HFI Amplitude

(0xD6) Default: 30

Settings 0–100%

📖 Applies to Pr. A3-17 = 3 or IPM sensorless control mode, sets the magnitude command for the high-frequency injection signal.

📖 Increasing the parameter can increase the accuracy of the angle estimation, but the electromagnetic noise might be louder if the setting value is too high.

📖 The system uses this parameter when the motor's parameter is "Auto". This parameter influences the angle estimation accuracy.

📖 When the ratio of the salient pole (Lq/Ld) is lower, increase Pr. A3-22 to make the angle detection more accurate

A4. HOA / LoRe Setting

A4-00 HOA/ LoRe Sel.

(0x100) Default: 0

Settings 0: HOA

1: LoRe

0: Standard HOA (Hand-Off-Auto) function, refer to Figure 1 below.

1: LoRd (Local/ Remote) function, refer to Figure 2 below.

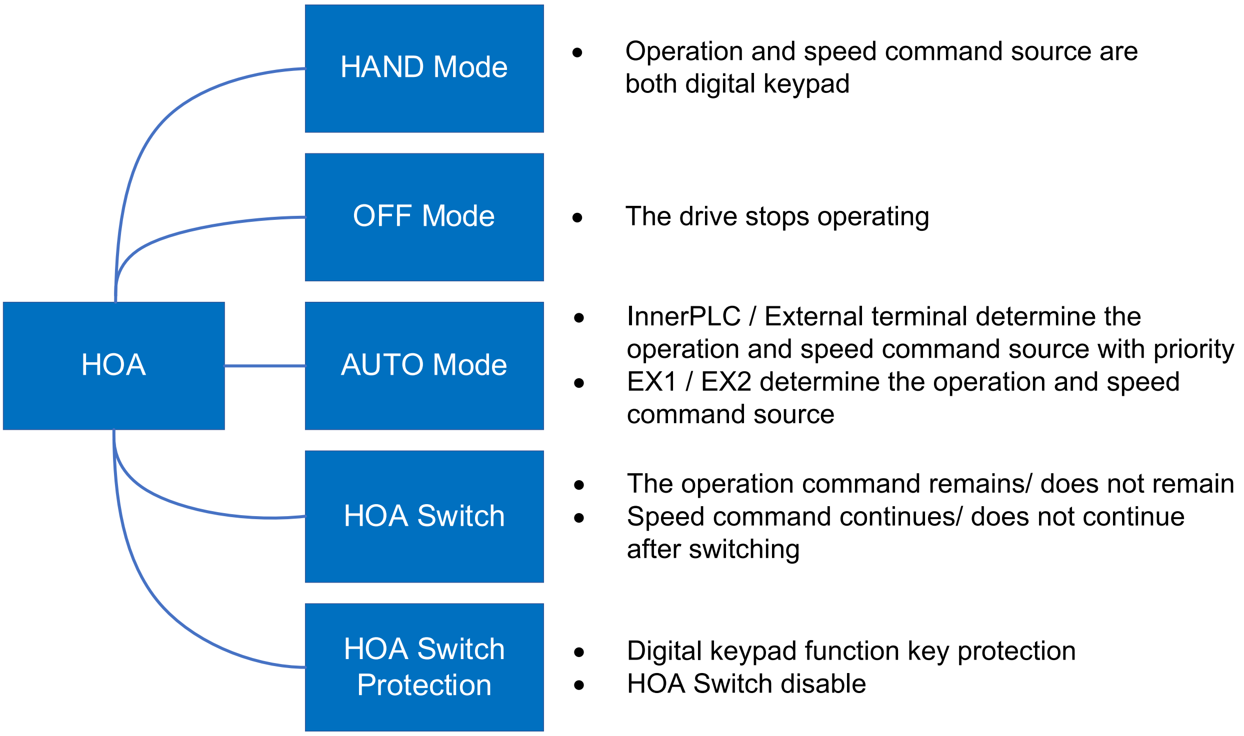


Figure 1: HOA function

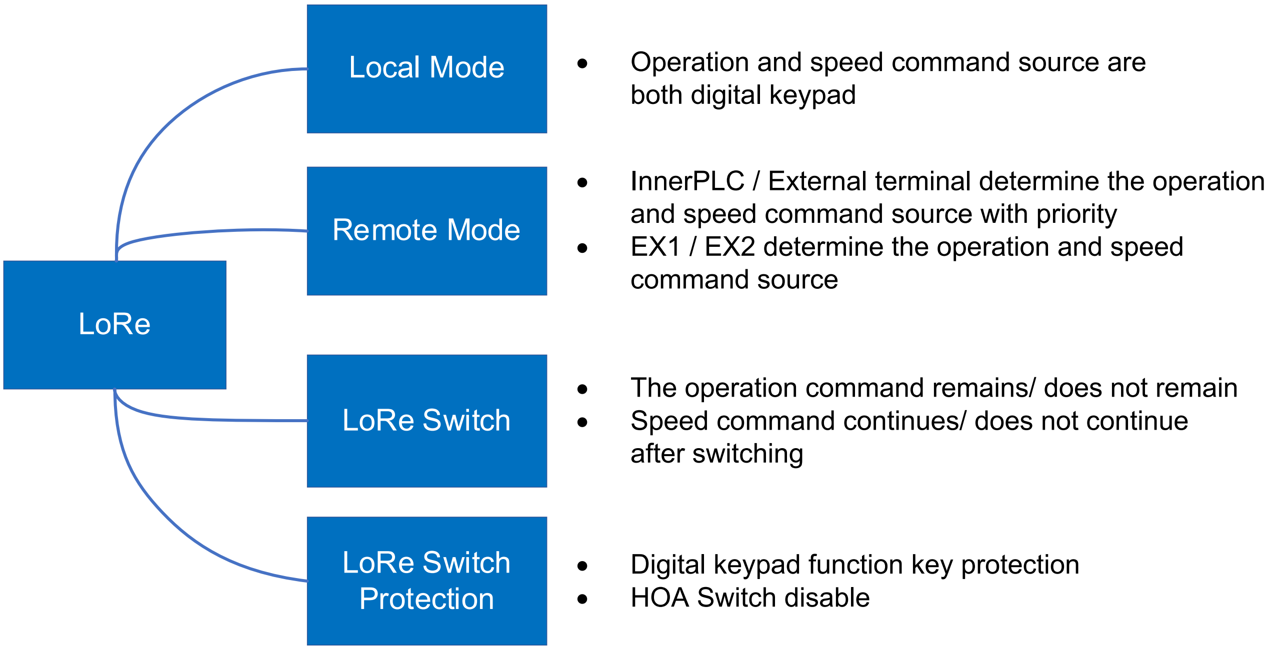


Figure 2: LoRe function

📖 Setting 0:

1. HAND mode: The frequency command and operation command sources are fixed to keypad. When executing key function (or) and the operation LED is ON, it means that the drive is operating. Refer to Section 4-1-3 for detailed keypad function.
2. OFF mode:
   - The drive executes STOP command. When executing key function (or) and the STOP LED is ON, it means that the drive is STOP or is stopping.
   - In OFF mode, the LCD keypad KPV-CC01 can give the JOG command; but it cannot give JOG command in AUTO and HAND modes.
   - During JOG operation, you cannot switch to AUTO or OFF modes, nor can it perform general operation in HAND mode. It will return to OFF mode when the JOG deceleration is completed.
3. In AUTO mode: When the InnerPLC mask and MI multi-speed function are not enabled, the frequency command and operation source operate according to the setting of Pr. A1-00 (EX1/ EX2 Switch Source), such as Pr. C1-01 (EX1 Main Frequency Source) and Pr. A1-01 (EX1 Operation Command Source). When executing key function (or) and the operation LED is ON (the Lo/Re AUTO key for KPV-CC01 on the left has no indication light), it means that the drive has switched to AUTO mode (you can check from the KPV-CC01 screen), and it can only operate after setting the above parameters.
4. In AUTO mode, when the drive is powered off and on again or the drive has an error, it is remained at AUTO mode; when the above situations occur in HAND and OFF modes, it is OFF mode.
5. When setting as 0, the HOA function can only be switched by the keypad; when setting as 1, you can switch the LoRe function through Pr. A4-05.

📖 Setting 1:

1. Local mode: (The status is displayed on KPV-CC01 synchronously), the frequency command and operation command sources are fixed to keypad. When executing key function ( ) and the operation LED is ON, it means that the drive is operating.
2. Remote mode:
   - When the InnerPLC mask and MI multi-speed function are not enabled, the frequency command and operation source operate according to the setting of Pr. A1-00 (EX1/ EX2 Switch Source), such as Pr. C1-01 (EX1 Main Frequency Source) and Pr. A1-01 (EX1 Operation Command Source). When executing key , you can check the current LoRe mode through KPV-CC01, and it can only operate after setting the above parameters.
   - When the drive is powered off and on again or the drive has an error, it is remained at Remote mode. Refer to description of Pr. A4-05.
3. The keypad can issue JOG commands under Local mode; in the Remote mode, if the operation source is the keypad, it can also issue the JOG command.

📖 LCD digital keypad KPV-CC01 supports HOA and LoRe functions; LED digital keypad KPV-CE02 only supports HOA function. When the former is connected to the drive, it can use and switch HOA and LoRd functions; when the latter is connected to the drive, it automatically switches to HOA.

- When the drive is not connected to any keypad, you can switch the HOA and LoRe functions by setting communication parameters.
- Use KPV-CC01 to set Pr. A4-00 = 1 (LoRe), when switching the keypad to KPV-CE02, Pr. A4-00 automatically switches to 0 (HOA). If you set Pr. A1-01 = 7 (digital keypad), Pr. A1-01 returns to the default (0).

Pr. Function/ Keypad Set Pr. Range	KPV-CC01 LCD Keypad	KPV-CE02 LED Keypad
Pr. A4-00 HOA/ LoRe Sel.	0–1	0 (1 Disable)
A1-01 EX1 OPER Cmd Src	0–10	0–10 (7 Disable)
HOA and LoRe function	HOA and LoRe function	HOA

- In HAND (Local) mode, the frequency command and operation sources are fixed to keypad; the operation source cannot set to keypad under AUTO mode, but it can be set to keypad under Remote mode.
- When you set the operation source to digital keypad in Remote mode, after you switch back to AUTO mode, the operation source will change to disable.

A4-01 AUTO Lock MI Src

(0x101) Default: 0

Settings
0: Disable
1: Enable
2–7: MI1–MI6
8–9: Reserve
10–15: MI10–MI15

- Prevents accidental switching to MI sources out of the AUTO mode. You can enable this function by setting parameters or by the MI terminal.
- MI1–MI6 are control board multi-function input terminals; MI10–MI15 are IO extension card multi-function input terminals.

A4-02 AUTO Lock Mode

(0x102) Default: 0

Settings
0: AUTO to OFF Disable
1: AUTO to HAND Disable
2: AUTO to HAND & OFF Disable

- 0: When switching from AUTO to OFF mode, the drive remains at AUTO status and does not switch. The drive is able to switch from AUTO to OFF mode if you switch from AUTO to HAND mode first, and then switch to OFF mode.
- 1: When switching from AUTO to HAND mode, the drive remains at AUTO status and does not switch. To switch from AUTO to HAND mode, you can switch from AUTO to OFF mode first, and then switch to HAND mode.
- 2: When switching from AUTO to HAND or OFF mode, the drive remains at AUTO status and does not switch. Disable the function (Pr. A4-01 AUTO Lock MI Source) first before switching the mode.

- 1 or 2: When the lock mode is triggered under HAND mode, the drive stops according to the set stop method, and will be in OFF mode after stop.

✓ A4-03 AUTO Initial FREQ Cmd

(0x103) Default: 0

Settings 0: FREQ before switch

1: AUTO mode FREQ

- 0: The frequency command maintains the frequency command before switching and runs with the changed frequency command after it is changed. It should be noted that this method is only applicable to occasions that the frequency command source is the keypad or a non-periodic update communication command, it is not applicable to analog input or periodic update communication commands.
- 1: The frequency command is set according to the frequency command source in AUTO mode, if the switched source is set as the keypad, it runs according to the frequency command from the keypad.

✓ A4-04 HAND Initial FREQ Cmd

(0x104) Default: 0

Settings 0: FREQ before switch

1: HAND mode FREQ

- 0: The frequency command maintains the frequency command before switching and runs with the changed frequency command after it is changed. It should be noted that this method is only applicable to occasions that the frequency command source is the keypad or a non-periodic update communication command, it is not applicable to analog input or periodic update communication commands.
- 1: The frequency command source is fixed to keypad in HAND mode.
- The drive issues operation command simultaneously in HAND mode. If the drive is in operation status before switch, it will not stop after switch; if it is in stop status before switch, it will start operation after switch.

A4-05 LoRe Switch Src

(0x105) Default: 20

Settings 0: Remote

1: Local

2–7: MI1–MI6

8–9: Reserve

10–15: MI10–MI15

16–19: Reserve

20: Keypad

- Local/ Remote can be switched through parameter setting, MI terminals or keypad.
- In LoRe mode, the default of LoRe switching source is Keypad, you can directly switch Local/ Remote mode when connecting to KPV-CC01.
- MI1–MI6 are control board multi-function input terminals; MI10–MI15 are IO extension card

multi-function input terminals.

- 🕮 When setting MI terminals, MI ON is local and MI OFF is remote.
- 🕮 20: If the drive is in Local mode before rebooting the power, then it automatically switches to Remote mode after power is ON. Other settings are not limited to this.

〆 A4-06 Remote Lock MI Src

(0x106) Default: 0

Settings	0: Disable
	1: Enable
	2–7: MI1–MI6
	8–9: Reserve
	10–15: MI10–MI15

- 🕮 Prevents accidental switching to MI sources out of the Remote mode. You can enable this function by setting parameters or by the MI ON.
- 🕮 If it is in Local mode before the Remote Lock function is enabled, it will force to switch to Remote mode after enabling this function and will return to the previous mode when the function is disabled.

〆 A4-07 Remote Keypad STOP Enable

(0x107) Default: 0

Settings	0: Disable
	1: Enable

- 🕮 This parameter is only available in LoRe mode.
- 🕮 When the drive operation source is the Keypad, it performs OFF command and is not affected by this parameter.
- 🕮 When the drive operation source is not the Keypad, it performs OFF command and will be affected by this parameter; when setting this parameter to 1, the drive stops.

〆 A4-08 Remote Initial FREQ Cmd

(0x108) Default: 0

Settings	0: FREQ before switch
	1: Remote mode FREQ

- 🕮 0: The frequency command maintains the frequency command before switching and runs with the changed frequency command after it is changed. It should be noted that this method is only applicable to occasions that the frequency command source is the keypad or a non-periodic update communication command, it is not applicable to analog input or periodic update communication commands.
- 🕮 1: The frequency command is set according to the frequency command source in Remote mode, if the switched source is set as the Keypad, it runs according to the frequency command from the keypad.

✔ A4-09 Local Initial FREQ Cmd

(0x109) Default: 0

Settings 0: FREQ before switch
1: Local mode FREQ

- 0: The frequency command maintains the frequency command before switching and runs with the changed frequency command after it is changed. It should be noted that this method is only applicable to occasions that the frequency command source is the keypad or a non-periodic update communication command, it is not applicable to analog input or periodic update communication commands.
- 1: The frequency command source is fixed to Keypad in Local mode.

A4-10 LoRe Switch Action

(0x10E) Default: 2

Settings 0: Always stop
1: Remote Start Cmd
2: Local Start Cmd
3: Start Cmd before Switch

- Selects the switch action for LoRe operation command. 0: LoRe switch will force to stop
- 1: When switching to Local, the operation command continues to operate from the Remote source setting.
- 2: When switching to Remote, the operation command continues to operate from the Local source setting. If the source of the Remote operation command is MI ON after switching, the Local operation command continues to the Remote mode.
- If the operation command is communication or keypad after LoRe switch, it operates according to the parameter setting after switching.

A5. Carrier FREQ Adjustment

A5-00 CF Setting

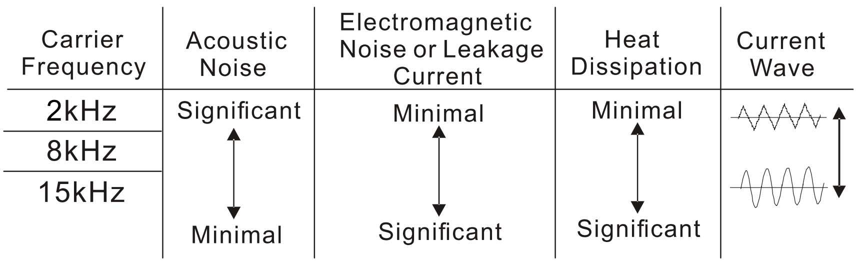
(0x140) Default: Depending on the models

Settings Depending on the modes–15.0 kHz

- Sets the PWM output carrier frequency.

Control Mode / Model VFDxxxVP43xxxXx	VF, SVC		PMFOC		SRMFOC	
	Settings	Default (40°C)	Settings	Default (40°C)	Settings	Default (40°C)
VFD3A0–018VP43xxxxx	3–15 kHz	9 kHz	3–8 kHz	8 kHz	3–8 kHz	8 kHz
VFD025–032VP43xxxAx VFD025–032VP43xxxCx	3–15 kHz 3–12 kHz	8 kHz 6 kHz	3–8 kHz	8 kHz	3–8 kHz	8 kHz
VFD038VP43xxxAx VFD038VP43xxxCx	3–15 kHz 3–12 kHz	6 kHz 6 kHz	3–8 kHz	6 kHz	3–8 kHz	6 kHz
VFD045–220VP43xxxxx	3–12 kHz	6 kHz	3–8 kHz	6 kHz	3–8 kHz	6 kHz
VFD260–310VP43xxxxx	3–12 kHz	3 kHz	3–8 kHz	3 kHz	3–8 kHz	3 kHz
VFD370–485VP43xxxxx	2–12 kHz	3 kHz	2–8 kHz	3 kHz	2–8 kHz	3 kHz
VFD530–1k2VP43xxxxx	2–9 kHz	3 kHz	2–8 kHz	3 kHz	2–8 kHz	3 kHz

- The PWM output carrier frequency has an absolute influence on the electromagnetic noise of the motor. It also influences the AC motor drive heat dissipation, and the surrounding interference. Therefore, if the surrounding noise is greater than the motor noise, lower the carrier frequency to reduce the temperature rise. Although the motor has quiet operation in the higher carrier frequency, the entire wiring and interference prevention should still be taken into consideration.



- When the carrier frequency is higher than the default value, it must be protected by load reduction. Refer to Pr. H4-05 for further setting and description.

A5-01 Over-Modulation Gain

(0x141) Default: 100

Settings 80–100%

- When the output voltage is saturated, you can increase the over-modulation gain to increase the output voltage, so as to reduce output current and improve motor efficiency. However, if the gain is too large, it may produce a low frequency harmonic driven by a six-step square wave.

- Increase the parameter value gradually and monitor whether the output current is improved (the output current decreases), or whether the operation performance is improved, so as to obtain the best over-modulation gain value.

A5-12 RPWM Sel

(0x14C) Default: 0

Settings 0: Disable
1: RPWM Mode 1
2: RPWM Mode 2
3: RPWM Mode 3

- The RPWM function is enabled when this parameter is not set to 0, and the carrier of the drive is randomly distributed based on the center of current setting of Pr. A5-00.
- After RPWM function is enabled, it can reduce the harsh noise concentrated at a specific high frequency, and the audio frequency of the motor operation will change accordingly (usually from a sharper audio frequency to a low rustling sound).
- This function provides three RPWM modes (RPWM Mode 1 to Mode 3). Each mode corresponds to different carrier frequency distribution method, the corresponded electromagnetic noise distribution and sound are different as well.
- When enabling RPWM function and Pr. A5-13 RPWM Range setting is valid, the setting upper limit of Pr. A5-00 Carrier Frequency changes to 8 kHz, and its lower limit remains as the lower limit of each model. In this case, the actual output upper limit of random carrier frequency is 9 kHz, and the lower limit is automatically limited according to the conditions of each model.

✎ A5-13 RPWM Range

(0x14D) Default: 0.0

Settings 0.0–Carrier frequency setting kHz

- When Pr. A5-00 Carrier Frequency is set as 4 kHz and the RPWM function is enabled, Pr. A5-13 RPWM Range is set as 2.0 kHz, the output carrier is based on 4 kHz and the random frequency distribution range is +/- 1 kHz, that is, it changes randomly within 3–5 kHz.

✎ A5-14 AVR Function

(0x14E) Default: 0

Settings 0: Enable
1: Disable during decel
2: Disable

- The AC motor drive uses DC bus voltage as a voltage source to calculate how the current output voltage command is converted into the switching opening of the power element, so as to complete the line-to-line voltage output to the motor and ensure the accuracy of the output voltage and the voltage command. When the parameter is set as 0 to enable the AVR function, the DC bus information will be filtered according to the filter time of Pr. A5-16, and the switching opening of the power element will be adjusted in real time based on this. When the parameter is set as 1 to disable the AVR function during deceleration, the drive decelerates to trigger the instant DC bus as a fixed voltage source to control the switching opening base of the power element. When the parameter is set as 2 to disable the AVR function, it uses the instant DC bus triggered by the operation as a fixed voltage source to control the switching opening base of the power element.

- When the parameter is set as 0 to enable the AVR function, if the drive input power is unstable, or the load condition is unstable and the DC bus voltage fluctuates sharply, then the line-to-line voltage output by the motor regulated by the AVR will easily oscillate, which will easily cause the load fluctuates and affect the DC bus, resulting in a negative cycle that leads to OV, OC, etc. When the above problem occurs, increase the filter time of Pr. A5-16 to reduce the vibration of power element opening to stable the system. In the contrary, if there is an extremely fast output voltage response time requirement, and the specification is smaller than the filter time of Pr. A5-16, decrease the filter time to meet the demand.
- When a system with a large inertia has a faster deceleration requirement, and the DC bus oscillates violently during deceleration and causes OV and OC, set this parameter to 1 to stabilize the power element opening during deceleration, and further stabilize DC bus during deceleration and obtain a better deceleration efficiency.
- When the drive input power is extreme unstable, the input power is lack of phase, or the impedance of the drive and the mains are extremely mismatched, causing the DC bus to oscillate violently during normal operation and resulting OV and OC, set this parameter as 2 to disable the AVR function, and to stabilize the power element opening in normal operation, so the DC bus is stabilized and a better control efficiency is obtained.

✎ A5-15 AVR DC bus Filter Time

(0x14F) Default: 0.01

Settings 0.001–1.000 sec.

- Usually, you do not need to set the AVR DC bus filter time.
- If the time constant is set small, the response will be fast; otherwise, the response will be slow.

A5-16 DC bus Filter Time

(0x150) Default: 0.010

Settings 0.000–10.000 sec.

- The smaller the time setting, the faster the output voltage response; otherwise, the slower the response.

A5-17 DC bus Ripple Suppression

(0x151) Default: Depending on the models

Settings 0: Disable
1: Manual COMP

- When the drive loads the motor, the DC bus ripple voltage may cause DC bus voltage oscillations due to the rapid load extraction of the motor. The ripple suppression function can affectively suppress it to achieve the DC bus ripple voltage stabilization effect.
- Related parameters of DC bus ripple suppression are Pr. A5-17–A5-19, and it is applicable to models with the second last digit C (VFDxxxVP43xxxCx).

📖 Setting 0: DC bus Ripple Suppression is disabled. For the models with the second last digit A (VFDxxxVP43xxxAx), Pr. A5-17–A5-19 has no function, it is recommended to set Pr. A5-17 to 0.

📖 Setting 1, the suppression operates according to Pr. A5-18 and A5-19.

Pr.	A5-17	A5-18	A5-19	Applicable models
Settings	0	x	x	Frame C and below, model name with the second last digit A VFDxxxVP43xxx**A**x
	1	v	v	Frame C and below, model name with the second last digit C VFDxxxVP43xxx**C**x Frame D and above

✎ A5-18 DC bus Ripple Suppress Gain

(0x152) Default: 0.00

Settings 0.00–50.00

📖 Sets the DC bus suppression manual compensation gain.

📖 When there is a high DC link voltage fluctuation during the drive operation, the drive detects the DC voltage signal and compensates the voltage through the controller and performs manual compensation according to the parameter setting to achieve the DC link voltage shock suppression effect.

A5-19 DC bus Ripple Suppress Limit

(0x153) Default: 10

Settings 5–30%

📖 Sets the upper limit of DC bus suppression manual compensation voltage. Avoids the risk of OC or OV failure when the compensation gain is set too large.

b. Pr Management & Macro

b0. Pr Management

✓ b0-00 Access Permission

(0x200) Default: 0

Settings 0: Normal

1: Advanced

- The drive parameter definition is divided into normal and advanced parameters according to the access permission, the differences are shown in the following table.
- The default of the parameter access permission for new machines is normal parameter, you can set this parameter according to your need.
- The access permission of the parameter is marked on the upper left of the parameter number in the user manual. When the star symbol ∗ appears, it means that the parameter is an advanced parameter, otherwise it is a normal parameter.

Access Permission	Display Pr. Inf.	Set Pr.	Functions	Pr. Qty
0: Normal	Normal	Normal	For example, F2-20–F2-24 are advanced parameters, they will now show when the access permission is set as normal.	General
1: Advanced	Normal and advanced parameters	Normal and advanced parameters	For example, F2-20–F2-24 are advanced parameters, they will show when the access permission is set as advanced.	More

b0-01 Parameter Reset

(0x201) Default: 0

Settings 0: Reserve

5: Reset kWh

6: Reset PLC

7: Reset CANopen Slave index

9: Reset 50 Hz default

10: Reset 60 Hz default

- 9 or 10: Reset to default. If the password function is enabled (Pr.b0-02 and b0-04), it must be decoded first (Pr.b0-03 and b0-05). You can only reset to default after clearing the previous set password.
- 5: You can return the kWh displayed value to 0 even during drive operation.
- 6: Clear the internal PLC program (includes the related settings of PLC internal CANopen master).
- 7: Reset the related settings of CANopen Slave index.

✔ b0-02 Password Setting

(0x202)

✔ b0-04 Read-Only Password Setting

(0x204) Default: 0

Settings 0–65535

0: No password protection or password is entered correctly (b0-03/ b0-05)

- The first-level password of the parameter is b0-02 (Password Setting), and the second-level password is b0-04 (Read-only Password Setting).
- This parameter is for setting the password protection. Password can be set directly the first time. After setting, the password protection is activated. At this time, if you want to change any of the parameter settings, you must enter the correct password in Pr.b0-03/ b0-05 to deactivate the password temporarily, this parameter becomes 0 and you can set any parameter. The password protection function is automatically established after rebooting the drive.
- When you enter the correct password in Pr.b0-03/ b0-05, the drive temporarily unlocks the password, and then set this parameter to 0 to cancel the password protection. Otherwise, password protection is always reactivated after you reboot the motor drive.

✔ b0-03 Password

(0x203)

✔ b0-05 Read-Only Password

(0x205) Default: 0

Settings 0–65535

- The first-level password of the parameter is b0-02 (Password Setting), and the second-level password is b0-04 (Read-only Password Setting).
- The parameter locking function allows the project developer using the drive to manage the personnel who operate the equipment hierarchically.
- The parameter locking function distinguishes between the first and second levels. After setting the first level (Pr.b0-02 Password setting), the parameter value is read as 0, and you cannot read the actual parameter value. The parameters can only be read after setting the second level (Pr.b0-04 Read-only password setting).

Pr Lock Level	Pr Lock Method	Pr Status	Decode Method	Access Permission
1st level locked	Set Pr.b0-02 Password Setting	The Pr attribute becomes read-only and displays 0, the parameter name is not displayed. (Only Pr.b0-03 and b0-05 can be set)	Enter password in Pr.b0-03	Low (e.g. end-user)
2nd level locked	Set Pr.b0-04 Read-Only Password Setting	The parameter attribute is read-only, other functions are normal (Only Pr.b0-02, b0-03 and b0-05 can be set)	Enter read-only password in b0-05	Medium (e.g. distributors)

Pr Lock Level	Pr Lock Method	Pr Status	Decode Method	Access Permission
Unlock	N/A	The drive operates and displays normally.	N/A	Normal (for example: equipment manufacturer)

📖 The unlock method for the first level locking is entering the same password as Pr.b0-02 into Pr.b0-03; and to unlock the second level, enter the same password as Pr.b0-04 into Pr.b0-05.

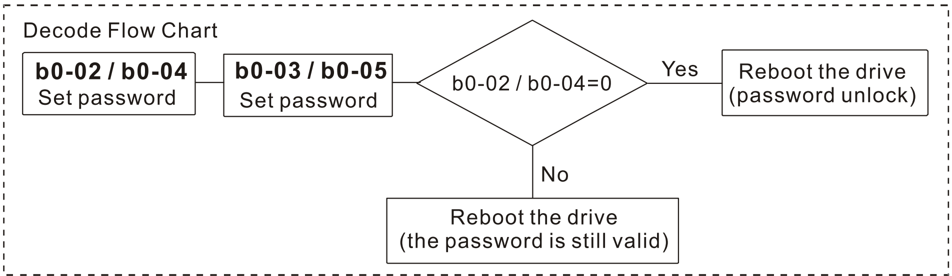
📖 When the parameters are not locked, you can set the first or second level parameter locking function according to your needs. If you need to use both the parameters' functions of the first and the second level, the second level should be locked first (the access permission is medium), and then lock the first level (the access permission is low); otherwise, the second level cannot be locked if you lock the first level firs.

📖 Under parameter locked status, the unlock principle is the same as above. When the first and second level parameters need to be used at the same time, you can unlock the second level directly; if only the first level parameters are unlocked, then the second level needs to be unlocked again.

📖 The first and second level parameter lock functions can be used together, when the functions are enabled:

- You can unlock the first or second level parameters respectively according to the above methods.
- Directly enter the password of the second level to unlock the first and the second level parameters.
- Regardless of unlocking the first or the second level parameters, if you enter the wrong password three times during the process, the drive pops up a parameter unlock failure message, indicating that the fault cannot be reset manually. You must power off and reboot the drive and enter the correct password again to complete the unlock.
- Refer to the table above for the access permission and parameter status corresponding to each level after unlocking.

📖 Password Decode Flow Chart

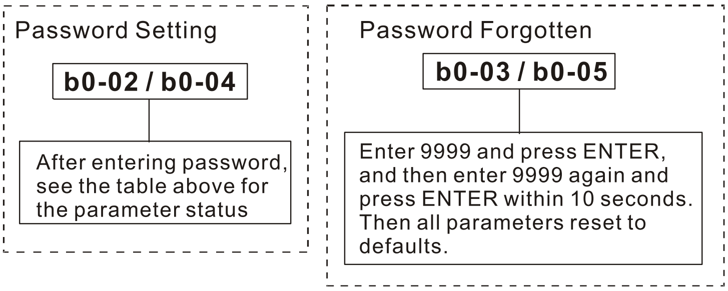


📖 After the parameter lock function is enabled, be sure to write down the password to avoid problems in the future.

📖 The parameter lock function is used to prevent personnel from setting other parameters by accident.

📖 The keypad copy function works normally only when the password protection is deactivated (temporarily or permanently) Password set in Pr.b0-02 and b0-04 cannot be copied to the keypad. When copying parameters from the keypad to the motor drive, set the password in b0-02 and b0-04 manually again in the motor drive to activate password protection.

- If you forget the password, clear the password setting by input 9999 in Pr.b0-03 / b0-05 and press the ENTER key, then enter 9999 again and press ENTER within 10 seconds (if the above action takes more than 10 seconds, repeat the process again). After decoding, all the settings return to default.
- Password Function Flow Chart



b0-06 Failed password attempts

(0x206) Default: Read only

Settings 0–3

- When the b0-03/ b0-05 input password is different from the b0-02/ b0-04 password, and the number of errors reaches the set value of this parameter, the drive shows the parameter unlock failure fault code, and this fault cannot be reset manually (even after you enter the correct password again). You must power off and reboot the drive to clear this fault, and then enter the correct password to unlock the parameter locked/ read-only status.

b0-07 Parameter Lock Status

(0x207) Default: Read only

Settings bit0: Parameter hidden
bit1: Parameter read-only
bit2: Reserve
bit3: Over PW attempts limit
bit4: FireMode parameter lock

- Use the password function (Pr.b0-02–b0-05) to protect the parameter information. When the password is set in Pr.b0-02 or b0-04, the corresponding bit0 or bit1 will be ON. When Pr.b0-03 or b0-05 unlocks parameter more than 3 times (not included), bit3 will be ON.
- When using the fire mode password function, Pr.J5-06 bit2 is ON, the corresponding bit4 for b0-07 will be ON.

bit	4	3	2	1	0
Parameter Lock Status	FireMode parameter lock	Over PW attempts limit	Reserved	Parameters read-only	Parameter hidden
Description	When Pr.J5-06 is enabled, the bit is ON.	When the password fails to unlock for over 3 times, this bit is ON.	N/A	When Pr.b0-04 is enabled, this bit is ON.	When Pr.b0-02 is enabled, this bit is ON.

b1. Application MACRO

b1-00 MACRO Sel

(0x240) Default: 0

Settings 0: Reserve
1: User Defined
2: Compressor
3: Fan
4: Pump
10: AHU

- The AC motor drive integrates the commonly used parameters for fans and pumps into application macros for facilitate user operations.
- The MACRO selections are compressor, fan, pump, and AHU (Air Handling Unit). After you select the application, Pr. Group b1 brings out the corresponding parameter index, and you can read or edit the parameter settings for the application in the App Macros and Quick Setting page of the digital keypad. For example: when you select b1-00 = 2 (Compressor), the corresponding parameters and setting values will be displayed in Pr.b1-01–b1-28. To view or to edit the parameter setting values, refer to the above description or Chapter 4 Operation Interface for detailed information.
- Refer to the following tables for the corresponded parameters and set values of each application macro according to the MACRO selection.
- When the drive does not provide application macros, or the provided macro is not suitable for use, user-defined methods are provided to create application macros.
- 01: User Defined

  Check the parameters that are going to add into the macro first. For example, the firmware version that is going to add into the drive has two parameters: A0-03 Control Board FW Version and A0-06 Power Board FW Version. Check the corresponding address of the parameters in Chapter 12 Summary of Parameter Settings or Chapter 13 Description of Parameter Settings (A0-03 corresponds to 0003h, A0-06 corresponds to 0006h), and input 0003h and 0006h to Pr. b1-01 and b1-02 respectively. This completes the creation of user defined application macros.

Pr.	Parameter Name
A0-00 (0x00)	Drive Identity Code
A0-01 (0x01)	Drive Cont. Rated Current
A0-02 (0x02)	Drive Max. Output Current
A0-03 (0x03)	Control Board FW Version
A0-05 (0x05)	Control Board FW Date Code
A0-06 (0x06)	Power Board FW Version
A0-08 (0x08)	Power Board FW Date Code

02: Compressor

The following table lists the relevant compressor application parameters.

Pr. Correspondence		Parameter Name	Setting value
b1-01	C0-02	Motor Control Method	0: VF
b1-02	A1-01	EX1 OPER Cmd Src	0: Disable
b1-03	C1-01	EX1 Main FREQ Src	1: Keypad
b1-04	A2-00	Stop Method	0: Ramp to stop
b1-05	A1-27	FWD / REV Direction Setting	1: FWD only
b1-06	C2-17	Max. OPER FREQ	Same as Default
b1-07	E0-01	IM1 VF Max FREQ	Same as Default
b1-08	E0-02	IM1 VF Max Voltage	Same as Default
b1-09	E0-11	IM1 VF Mid FREQ 1	Same as Default
b1-10	E0-12	IM1 VF Mid FREQ 1	Same as Default
b1-11	C2-18	FREQ Upper Limit	599
b1-12	C2-19	FREQ Lower Limit	0
b1-13	C2-00	Accel Time 1	5s
b1-14	C2-01	Decel Time 1	5s
b1-15	E0-00	IM1 VF Curve Sel	0: Manual VF curve
b1-16	d1-02	IM1 Rated current	Same as Default
b1-17	H1-08	Over-voltage Stall Prevention	760.0
b1-18	H1-09	Stall Prev Function Sel	3: Smart OC + Smart OV
b1-19	H1-06	Restart after Power Loss	0: Disable
b1-20	H1-07	Power Loss Time Allowed	2

Setting value 03: Fan

The following table lists the relevant fan application parameters.

Pr. Correspondence		Parameter Name	Setting value
b1-01	C0-02	Motor Control Method	0: VF
b1-02	A1-01	EX1 OPER Cmd Src	0: Disable
b1-03	C1-01	EX1 Main FREQ Src	1: Keypad
b1-04	A2-00	Stop Method	0: Ramp to stop
b1-05	A1-27	FWD / REV Direction Setting	1: FWD only
b1-06	C2-17	Max. OPER FREQ	Same as Default
b1-07	E0-01	IM1 VF Max FREQ	Same as Default
b1-08	E0-02	IM1 VF Max Voltage	Same as Default
b1-09	E0-11	IM1 VF Mid FREQ 1	Same as Default
b1-10	E0-12	IM1 VF Mid FREQ 1	Same as Default
b1-11	C2-00	Accel Time 1	Same as Default
b1-12	C2-02	Accel Time 2	Same as Default
b1-13	E0-00	IM1 VF Curve Sel	0: Manual VF curve

Pr. Correspondence		Parameter Name	Setting value
b1-14	d1-02	IM1 Rated current	Same as Default
b1-15	H1-08	Ov Stall Prev Level	760.0
b1-16	H1-09	Stall Prev Function Sel	3: Smart OC + Smart OV
b1-17	H1-06	Restart after Power Loss	0: Disable
b1-18	H1-07	Power Loss Time Allowed	2
b1-19	A3-01	Speed Tracking Current Limit	100%
b1-20	A3-00	Start Speed Tracking	0: Disable

📖 Setting value 04: Pump

The following table lists the relevant pump application parameters.

Pr. Correspondence		Parameter Name	Setting value
b1-01	C0-02	Motor Control Method	0: VF
b1-02	A1-01	EX1 OPER Cmd Src	0: Disable
b1-03	C1-01	EX1 Main FREQ Src	1: Keypad
b1-04	A1-27	FWD / REV Direction Setting	1: FWD only
b1-05	C2-17	Max. OPER FREQ	Same as Default
b1-06	E0-01	IM1 VF Max FREQ	Same as Default
b1-07	E0-02	IM1 VF Max Voltage	Same as Default
b1-08	E0-11	IM1 VF Mid FREQ 1	Same as Default
b1-09	E0-12	IM1 VF Mid FREQ 1	Same as Default
b1-10	C2-19	FREQ Lower Limit	0
b1-11	C2-00	Accel Time 1	1.0s
b1-12	C2-01	Decel Time 1	1.0s
b1-13	E0-00	IM1 VF Curve Sel	0: Manual VF curve
b1-14	H1-08	Ov Stall Prev Level	760.0
b1-15	H1-09	Stall Prev Function Sel	3: Smart OC + Smart OV
b1-16	H1-06	Restart after Power Loss	0: Disable
b1-17	H1-07	Power Loss Time Allowed	2

📖 Group setting 10: Air Handling Unit (AHU)

The following table lists the relevant AHU application parameters.

Pr. Correspondence		Parameter Name	Setting value
b1-01	o0-00	Status Display 1	2: Display the motor's actual output frequency (H.)
b1-02	C0-02	Motor Control Method	0: VF
b1-03	A1-01	EX1 OPER Cmd Src	2: S1 Start, S2 Dir
b1-04	A1-02	EX1 S1 Src	2: MI1
b1-05	A1-03	EX1 S2 Src	3: MI2
b1-06	C1-01	EX1 Main FREQ Src	7: AI1

Pr. Correspondence		Parameter Name	Setting value
b1-07	A2-00	Stop Method	1: Coast to stop
b1-08	A1-27	FWD / REV Direction Setting	1: FWD only
b1-09	C2-17	Max. OPER FREQ	50
b1-10	E0-01	IM1 VF Max FREQ	50
b1-11	E0-02	IM1 VF Max Voltage	380
b1-12	E0-13	IM1 VF Min FREQ	0.1
b1-13	C2-18	FREQ Upper Limit	50
b1-14	C2-19	FREQ Lower Limit	35
b1-15	C1-10	Zero-speed Behavior	2: Min output FREQ
b1-16	E0-00	IM1 VF Curve Sel	2: 2nd power V/F curve
b1-17	A4-00	HOA / LoRe Sel	1: LoRe
b1-18	A4-05	LoRe Switch Src	4: MI3
b1-19	A4-10	LoRe Switch Action	3: Start Cmd before Switch
b1-20	H0-01	Fault Indn	1: Relay 1
b1-21	A1-23	Run Enable Indn	2: Relay 2
b1-22	G2-03	AI1 Signal Type	0: 0–10 V
b1-23	G3-01	AO1 Function Sel	165Eh: Output FREQ AO Sel
b1-24	G3-02	AO1 Signal Type	2: 4–20 mA
b1-25	H1-06	Restart after Power Loss	2: Max output FREQ
b1-26	H0-06	Fault Restart No.	0
b1-27	H0-10	Fault Restart Delay Time	60

b1-01 MACRO Parameter 1

(0x241)

b1-02 MACRO Parameter 2

(0x242)

b1-03 MACRO Parameter 3

(0x243)

b1-04 MACRO Parameter 4

(0x244)

b1-05 MACRO Parameter 5

(0x245)

b1-06 MACRO Parameter 6

(0x246)

b1-07 MACRO Parameter 7

(0x247)

b1-08 MACRO Parameter 8

(0x248)

⌿ **b1-09** MACRO Parameter 9
(0x249)

⌿ **b1-10** MACRO Parameter 10
(0x24A)

⌿ **b1-11** MACRO Parameter 11
(0x24B)

⌿ **b1-12** MACRO Parameter 12
(0x24C)

⌿ **b1-13** MACRO Parameter 13
(0x24D)

⌿ **b1-14** MACRO Parameter 14
(0x24E)

⌿ **b1-15** MACRO Parameter 15
(0x24F)

⌿ **b1-16** MACRO Parameter 16
(0x250)

⌿ **b1-17** MACRO Parameter 17
(0x251)

⌿ **b1-18** MACRO Parameter 18
(0x252)

⌿ **b1-19** MACRO Parameter 19
(0x253)

⌿ **b1-20** MACRO Parameter 20
(0x254)

⌿ **b1-21** MACRO Parameter 21
(0x255)

⌿ **b1-22** MACRO Parameter 22
(0x256)

⌿ **b1-23** MACRO Parameter 23
(0x257)

⌿ **b1-24** MACRO Parameter 24
(0x258)

⌿ **b1-25** MACRO Parameter 25
(0x259)

⌿ **b1-26** MACRO Parameter 26
(0x25A)

⌿ **b1-27** MACRO Parameter 27
(0x25B)

⌿ **b1-28** MACRO Parameter 28
(0x25C)

⌿ **b1-29** MACRO Parameter 29
(0x25D)

b1-30 MACRO Parameter 30
(0x25E)

b1-31 MACRO Parameter 31
(0x25F)

b1-32 MACRO Parameter 32
(0x260)

b1-33 MACRO Parameter 33
(0x261)

b1-34 MACRO Parameter 34
(0x262)

b1-35 MACRO Parameter 35
(0x263)

b1-36 MACRO Parameter 36
(0x264)

b1-37 MACRO Parameter 37
(0x265)

b1-38 MACRO Parameter 38
(0x266)

b1-39 MACRO Parameter 39
(0x267)

b1-40 MACRO Parameter 40
(0x268)

b1-41 MACRO Parameter 41
(0x269)

b1-42 MACRO Parameter 42
(0x26A)

b1-43 MACRO Parameter 43
(0x26B)

b1-44 MACRO Parameter 44
(0x26C)

b1-45 MACRO Parameter 45
(0x26D)

b1-46 MACRO Parameter 46
(0x26E)

b1-47 MACRO Parameter 47
(0x26F)

b1-48 MACRO Parameter 48
(0x270)

b1-49 MACRO Parameter 49
(0x271)

b1-50 MACRO Parameter 50
(0x272)

✓ **b1-51** (0x273)	MACRO Parameter 51	
✓ **b1-52** (0x274)	MACRO Parameter 52	
✓ **b1-53** (0x275)	MACRO Parameter 53	
✓ **b1-54** (0x276)	MACRO Parameter 54	
✓ **b1-55** (0x277)	MACRO Parameter 55	
✓ **b1-56** (0x278)	MACRO Parameter 56	
✓ **b1-57** (0x279)	MACRO Parameter 57	
✓ **b1-58** (0x27A)	MACRO Parameter 58	
✓ **b1-59** (0x27B)	MACRO Parameter 59	
✓ **b1-60** (0x27C)	MACRO Parameter 60	Default: 0
	Settings 0–65535	

Pr.b1-01–b1-60: Macro parameter 1–60.

b2. Pr Modified REC 1–10

b2-00 REC 1 Pr Address

(0x280) Default: Read only

b2-01 REC 1 Original Setting

(0x281) Default: Read only

b2-02 REC 1 New Setting

(0x282) Default: Read only

b2-03 REC 1 Year

(0x283) Default: Read only

b2-04 REC 1 Date

(0x284) Default: Read only

b2-05 REC 1 Time

(0x285) Default: Read only

Setting Range	0–2359

- The parameter modified record provides 20 groups, each group corresponds to 6 parameters (b2-00–b2-59, b3-00–b3-59). It records the parameter address, original setting, new setting, and time.
- When the parameter is changed, the first record is stored in b2-00–b2-05; when another parameter is changed, the latest record is retained in b2-00–b2-05, the previous record is pushed backwards to b2-06–b2-11 and so on.
- When the parameters reset to the default (Pr.b0-01), all the parameter modified records (b2-00–b2-59, b3-00–b3-59) return to 0.

b2-06 REC 2 Pr Address

(0x286) Default: Read only

b2-07 REC 2 Original Setting

(0x287) Default: Read only

b2-08 REC 2 New Setting

(0x288) Default: Read only

b2-09 REC 2 Year

(0x289) Default: Read only

b2-10 REC 2 Date

(0x28A) Default: Read only

b2-11 REC 2 Time

(0x28B) Default: Read only

b2-12 REC 3 Pr Address

(0x28C) Default: Read only

b2-13 REC 3 Original Setting

(0x28D) Default: Read only

b2-14 REC 3 New Setting

(0x28E) Default: Read only

b2-15 REC 3 Year
(0x28F) Default: Read only

b2-16 REC 3 Date
(0x290) Default: Read only

b2-17 REC 3 Time
(0x291) Default: Read only

b2-18 REC 4 Pr Address
(0x292) Default: Read only

b2-19 REC 4 Original Setting
(0x293) Default: Read only

b2-20 REC 4 New Setting
(0x294) Default: Read only

b2-21 REC 4 Year
(0x295) Default: Read only

b2-22 REC 4 Date
(0x296) Default: Read only

b2-23 REC 4 Time
(0x297) Default: Read only

b2-24 REC 5 Pr Address
(0x298) Default: Read only

b2-25 REC 5 Original Setting
(0x299) Default: Read only

b2-26 REC 5 New Setting
(0x29A) Default: Read only

b2-27 REC 5 Year
(0x29B) Default: Read only

b2-28 REC 5 Date
(0x29C) Default: Read only

b2-29 REC 5 Time
(0x29D) Default: Read only

b2-30 REC 6 Pr Address
(0x29E) Default: Read only

b2-31 REC 6 Original Setting
(0x29F) Default: Read only

b2-32 REC 6 New Setting
(0x2A0) Default: Read only

b2-33 REC 6 Year
(0x2A1) Default: Read only

b2-34 REC 6 Date
(0x2A2) Default: Read only

b2-35 REC 6 Time
(0x2A3) Default: Read only

b2-36 (0x2A4)	REC 7 Pr Address	Default: Read only
b2-37 (0x2A5)	REC 7 Original Setting	Default: Read only
b2-38 (0x2A6)	REC 7 New Setting	Default: Read only
b2-39 (0x2A7)	REC 7 Year	Default: Read only
b2-40 (0x2A8)	REC 7 Date	Default: Read only
b2-41 (0x2A9)	REC 7 Time	Default: Read only
b2-42 (0x2AA)	REC 8 Pr Address	Default: Read only
b2-43 (0x2AB)	REC 8 Original Setting	Default: Read only
b2-44 (0x2AC)	REC 8 New Setting	Default: Read only
b2-45 (0x2AD)	REC 8 Year	Default: Read only
b2-46 (0x2AE)	REC 8 Date	Default: Read only
b2-47 (0x2AF)	REC 8 Time	Default: Read only
b2-48 (0x2B0)	REC 9 Pr Address	Default: Read only
b2-49 (0x2B1)	REC 9 Original Setting	Default: Read only
b2-50 (0x2B2)	REC 9 New Setting	Default: Read only
b2-51 (0x2B3)	REC 9 Year	Default: Read only
b2-52 (0x2B4)	REC 9 Date	Default: Read only
b2-53 (0x2B5)	REC 9 Time	Default: Read only
b2-54 (0x2B6)	REC 10 Pr Address	Default: Read only
b2-55 (0x2B7)	REC 10 Original Setting	Default: Read only
b2-56 (0x2B8)	REC 10 New Setting	Default: Read only

b2-57 REC 10 Year

(0x2B9) Default: Read only

b2-58 REC 10 Date

(0x2BA) Default: Read only

b2-59 REC 10 Time

(0x2BB) Default: Read only

Settings 0–2359

📖 Refer to description of b2-00–b2-05.

b3. Pr Modified REC 11–20

b3-00 REC 11 Pr Address
(0x2C0) Default: Read only

b3-01 REC 11 Original Setting
(0x2C1) Default: Read only

b3-02 REC 11 New Setting
(0x2C2) Default: Read only

b3-03 REC 11 Year
(0x2C3) Default: Read only

b3-04 REC 11 Date
(0x2C4) Default: Read only

b3-05 REC 11 Time
(0x2C5) Default: Read only

b3-06 REC 12 Pr Address
(0x2C6) Default: Read only

b3-07 REC 12 Original Setting
(0x2C7) Default: Read only

b3-08 REC 12 New Setting
(0x2C8) Default: Read only

b3-09 REC 12 Year
(0x2C9) Default: Read only

b3-10 REC 12 Date
(0x2CA) Default: Read only

b3-11 REC 12 Time
(0x2CB) Default: Read only

b3-12 REC 13 Pr Address
(0x2CC) Default: Read only

b3-13 REC 13 Original Setting
(0x2CD) Default: Read only

b3-14 REC 13 New Setting
(0x2CE) Default: Read only

b3-15 REC 13 Year
(0x2CF) Default: Read only

b3-16 REC 13 Date
(0x2D0) Default: Read only

b3-17 REC 13 Time
(0x2D1) Default: Read only

b3-18 REC 14 Pr Address
(0x2D2) Default: Read only

b3-19 REC 14 Original Setting
(0x2D3) Default: Read only

b3-20	REC 14 New Setting	
(0x2D4)		Default: Read only
b3-21	REC 14 Year	
(0x2D5)		Default: Read only
b3-22	REC 14 Date	
(0x2D6)		Default: Read only
b3-23	REC 14 Time	
(0x2D7)		Default: Read only
b3-24	REC 15 Pr Address	
(0x2D8)		Default: Read only
b3-25	REC 15 Original Setting	
(0x2D9)		Default: Read only
b3-26	REC 15 New Setting	
(0x2DA)		Default: Read only
b3-27	REC 15 Year	
(0x2DB)		Default: Read only
b3-28	REC 15 Date	
(0x2DC)		Default: Read only
b3-29	REC 15 Time	
(0x2DD)		Default: Read only
b3-30	REC 16 Pr Address	
(0x2DE)		Default: Read only
b3-31	REC 16 Original Setting	
(0x2DF)		Default: Read only
b3-32	REC 16 New Setting	
(0x2E0)		Default: Read only
b3-33	REC 16 Year	
(0x2E1)		Default: Read only
b3-34	REC 16 Date	
(0x2E2)		Default: Read only
b3-35	REC 16 Time	
(0x2E3)		Default: Read only
b3-36	REC 17 Pr Address	
(0x2E4)		Default: Read only
b3-37	REC 17 Original Setting	
(0x2E5)		Default: Read only
b3-38	REC 17 New Setting	
(0x2E6)		Default: Read only
b3-39	REC 17 Year	
(0x2E7)		Default: Read only
b3-40	REC 17 Date	
(0x2E8)		Default: Read only

b3-41 REC 17 Time
(0x2E9) Default: Read only

b3-42 REC 18 Pr Address
(0x2EA) Default: Read only

b3-43 REC 18 Original Setting
(0x2EB) Default: Read only

b3-44 REC 18 New Setting
(0x2EC) Default: Read only

b3-45 REC 18 Year
(0x2ED) Default: Read only

b3-46 REC 18 Date
(0x2EE) Default: Read only

b3-47 REC 18 Time
(0x2EF) Default: Read only

b3-48 REC 19 Pr Address
(0x2F0) Default: Read only

b3-50 REC 19 New Setting
(0x2F2) Default: Read only

b3-51 REC 19 Year
(0x2F3) Default: Read only

b3-52 REC 19 Date
(0x2F4) Default: Read only

b3-53 REC 19 Time
(0x2F5) Default: Read only

b3-54 REC 20 Pr Address
(0x2F6) Default: Read only

b3-55 REC 20 Original Setting
(0x2F7) Default: Read only

b3-56 REC 20 New Setting
(0x2F8) Default: Read only

b3-57 REC 20 Year
(0x2F9) Default: Read only

b3-58 REC 20 Date
(0x2FA) Default: Read only

b3-59 REC 20 Time
(0x2FB) Default: Read only

Settings 0–2359

📖 Refer to description of b2-00–b2-05.

C. Control Mode & Cmd Scheme

C0. Motor Control Mode

C0-00 Motor Type

(0x400) Default: 0

Settings 0: IM

1: PM

2: SynRM

Use this parameter to select motor type.

C0-02 Motor Control Method

(0x402) Default: 0

Settings 0: VF

1: SVC

2: FOC

Use this parameter to select motor control method.

Determine the motor control method through Pr.C0-00 and C0-02, as shown in the table below:

	IM	PM	SynRM
VF	IMVF	-	-
SVC	IMSVC	SMSVC	SMSVC
FOC	IMFOC	SMFOC	SMFOC

C1. FREQ Cmd Handle

C1-00 EX1 Main and Aux FREQ Math

(0x440) Default: 0

C1-04 EX2 Main & Aux FREQ Math

(0x444) Default: 0

Settings
0: Main FREQ
1: Aux FREQ
2: ADD
3: SUB
4: MULTI
5: DIV
6: MAX
7: MIN

- Selects the mathematical operation method of the main and auxiliary frequency.
- Pr.C1-00 = 0 Main frequency: It means EX1 has only main frequency and no auxiliary frequency. Similarly, if Pr.C1-00 = 1, it means that EX1 has only auxiliary frequency but no main frequency.
- Use Pr.C1-01 and C1-02 to select EX1 main and auxiliary frequency source; use Pr.C1-05 and C1-06 for EX2 main and auxiliary frequency source selection.

C1-01 EX1 Main FREQ Src

(0x441) Default: 1

C1-05 EX2 Main FREQ Src

(0x445) Default: 1

Settings
0: Disable
1: Keypad
2: RS-485
3: USB
4: COM Card
5–6: Reserve
7–9: AI1–AI3
10–11: Reserve
12–13: AI10–AI11
14–15: Reserve
16: Up/down keys
17: Pulse Train
18: PID

- This parameter selects EX1/ EX2 main frequency source.
- For example, when selection AI source (AI1–AI3):
  Set Pr.C1-01 = 7 (AI1) as the main frequency source; Pr.G2-03 = 1, AI1 signal type is 0–10 V; Pr.C2-17 maximum operation frequency = 60.00 Hz, AI input 0–100% corresponds to 0.00 Hz in Pr.C2-17. When the AI1 input 5V (50%), the main frequency command is 60 Hz × 50% = 30 Hz.
- 17: When setting pulse input as the main frequency source, Frequency command (Hz) = Input

pulse frequency.

📖 16: When setting the Up/Down terminal as the main frequency source, you can set the MI source for speed up and down. When you set MI1 as the speed up command source and MI1 is ON, the speed command increases according to the parameter setting in Up/ Down mode; when you set MI2 as the speed down command source and MI2 is ON, the speed command decreases according to the parameter setting in Up/ Down mode. If both MI sources of speed up and down are the same (MI1 = MI2 = ON or OFF), the speed command remains.

📖 18: When selecting PID as the main frequency source, the frequency command source is the output of the PID function.

C1-02 EX1 Aux FREQ Src

(0x442) Default: 0

C1-06 EX2 Aux FREQ Src

(0x446) Default: 0

Settings 0: Disable
1: Keypad
2: RS-485
3: USB
4: COM Card
5–6: Reserve
7–9: AI1–AI3
10–11: Reserve
12–13: AI10–AI11
14–15: Reserve
16: Up/down keys
17: Pulse Train
18: PID

📖 This parameter selects EX1/ EX2 auxiliary frequency source.

✓ **C1-03** EX1 Aux FREQ Gain

(0x443) Default: 100.0

✓ **C1-07** EX2 Aux FREQ Gain

(0x447) Default: 100.0

Settings -200.0–200.00%

📖 This parameter sets the EX1/ EX2 auxiliary frequency gain.

📖 For example: Pr.C1-00 = 2 (ADD), Pr.C1-01 = 1 (Keypad), Pr.C1-02 = 7 (AI1), Pr.C1-03 = 10% and Pr.C2-17 = 50 Hz

Main frequency: Keypad frequency F = 30 Hz

Auxiliary frequency: AI1 = 5V, 30 Hz × 10% = 3 Hz

EX1 frequency command = main frequency + auxiliary frequency = 30 + 3 = 33 Hz

C1-08 Keypad FREQ Cmd

(0x448) Default: 60.00

Settings 0.00–599.00 Hz

- This parameter displays the frequency command setting value of the main page when the frequency command source is Digital Keypad. Meanwhile, you can enter this parameter setting page to set the frequency command on the main page as well.

C1-09 FREQ Cmd REC

(0x449) Default: 60.00

Settings 0.00–599.00 Hz

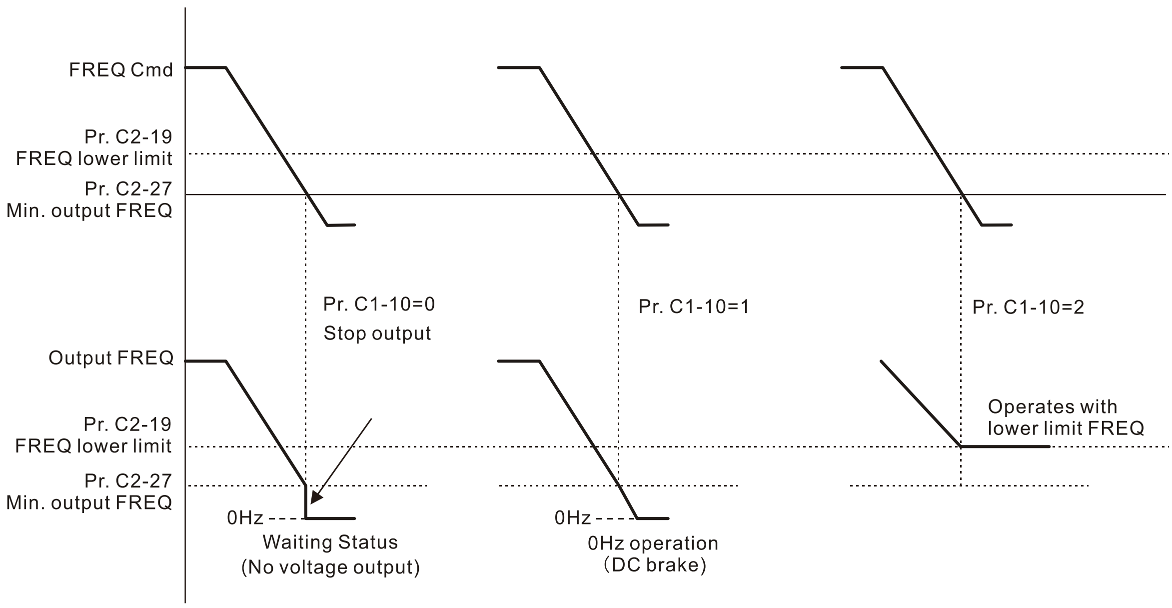
- This parameter displays the last frequency command setting value before power-off when the frequency command source is RS-485.
- To run directly with the set value before the last power-off after the drive reboots, the drive needs to record the frequency command set before the power-off and use this recorded frequency command as the initial value of the frequency command after power-on.

C1-10 Zero-speed Behavior

(0x44A) Default: 0

Settings 0: Output ready
1: Zero-speed run
2: Min output FREQ

- When the drive frequency command is < Fmin (Pr.C2-27), the drive activates according to the setting for this parameter.
- 0: the drive is in standby status (there is no voltage output from U, V and W)
- 1: in V/F, SVC and FOC Sensorless modes, the drive executes DC brake with VF minimum voltage (Pr.E0-14, E1-14, E2-14, and E3-14).
- 2: in V/F, SVC and FOC Sensorless modes, the drive operates according to Fmin (Pr.E0-13, E1-13, E2-13, and E3-13) and Vmin (Pr.E0-14, E1-14, E2-14 and E3-14).
- Frequency command < Pr.C2-27 Min. output frequency:



⚡ C1-11 Pulse Train MI Src

(0x44B) Default: 0

Settings 0: Disable

1–5: Reserve

6: MI5

- This parameter enables the pulse train function.
- Use only MI5 terminal for pulse train input.

⚡ C1-12 Pulse Train Filter Time

(0x44C) Default: 0.100

Settings 0.000–65.535 sec.

- This parameter sets the filter time for pulse command.

⚡ C1-13 FREQ Cmd Up Key MI Src

(0x44D) Default: 0

⚡ C1-14 FREQ Cmd Down Key MI Src

(0x44E) Default: 0

Settings 0: Disable

1: Enable

2–7: MI1–MI6

8–9: Reserved

10–15: MI10–MI15

- You can choose up key or down key as the main frequency source.
- Use this parameter to select the MI source for frequency up and down command. For example:
  Pr.C1-13 = 2 (MI1): when the MI1 terminal is ON, sets the frequency up command with Up/Down mode.
  Pr.C1-14 = 3 (MI2): when the MI2 terminal is ON, sets the frequency down command with Up/Down mode.

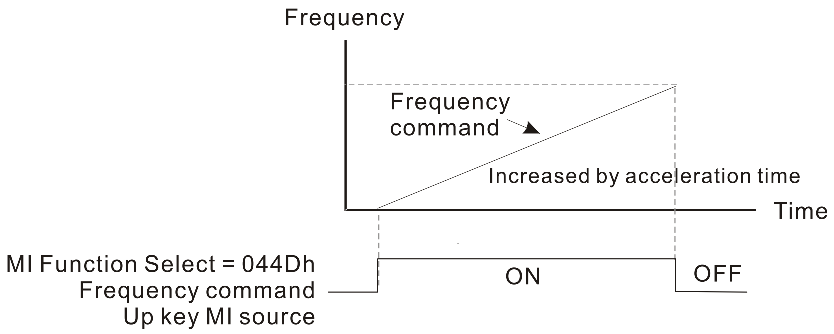
C1-15 Up/Down Accel/ Decel Method

(0x44F) Default: 0

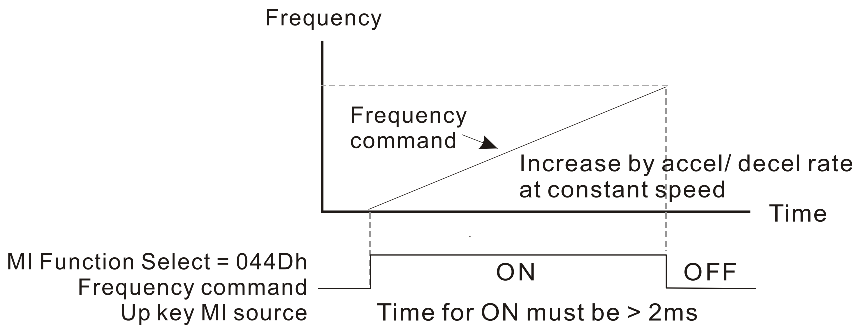
Settings 0: Accel/ Decel time

1: Up/Down Accel/Decel rate

- This parameter determines the up and down mode of the frequency command of the up/ down terminal.
- Pr.C1-15 = 0 (Accel/ Decel time): The up/ down terminal increases / decreases the frequency command (F) according to the setting for acceleration or deceleration time (refer to Pr.C2-00–C2-07).



📖 Pr.C1-15 = 1 (Up/ Down Accel/ Decel Rate): The up/ down terminal increases/ decreases the frequency command (F) according to the setting of Pr.C1-16 and Pr.C1-17.



✎ C1-16 Up/Down Accel/ Decel Rate

(0x450) Default: 0.001

Settings 0.001–1.000 Hz/ms

✎ C1-17 Up/Down Accel/ Decel Rate Unit

(0x451) Default: 0

Settings 0: Hz/ms

1: Hz/100ms

📖 When selecting up/down accel/ decel rate for the up/down mode, the frequency up/ down command is determined by the up/ down acceleration and deceleration rate and its units.

C1-18 Multi Speed Mode

(0x452) Default: 0

Settings 0: 16 Speed

1: 4 Speed

📖 Use this parameter to select 16 speed or 4 speed for the multi-speed mode.

C1-19 Multi Speed MI Src 1
(0x453) Default: 0

C1-20 Multi Speed MI Src 2
(0x454) Default: 0

C1-21 Multi Speed MI Src 3
(0x455) Default: 0

C1-22 Multi Speed MI Src 4
(0x456) Default: 0

Settings 0: Disable
1: Reserved
2–7: MI1–MI6
8–9: Reserved
10–15: MI10–MI15

📖 Use Pr.C1-19–C1-22 to select the multi-speed MI source. Sets the operated speed through the MI terminal (use Pr.C1-18 to select 4 speed or 16 speed).

C1-23 Multi Speed 1
(0x457) Default: 0.00

C1-24 Multi Speed 2
(0x458) Default: 0.00

C1-25 Multi Speed 3
(0x459) Default: 0.00

C1-26 Multi Speed 4
(0x45A) Default: 0.00

C1-27 Multi Speed 5
(0x45B) Default: 0.00

C1-28 Multi Speed 6
(0x45C) Default: 0.00

C1-29 Multi Speed 7
(0x45D) Default: 0.00

C1-30 Multi Speed 8
(0x45E) Default: 0.00

C1-31 Multi Speed 9
(0x45F) Default: 0.00

C1-32 Multi Speed 10
(0x460) Default: 0.00

C1-33 Multi Speed 11
(0x461) Default: 0.00

C1-34 Multi Speed 12
(0x462) Default: 0.00

C1-35 Multi Speed 13
(0x463) Default: 0.00

C1-36 Multi Speed 14

(0x464) Default: 0.00

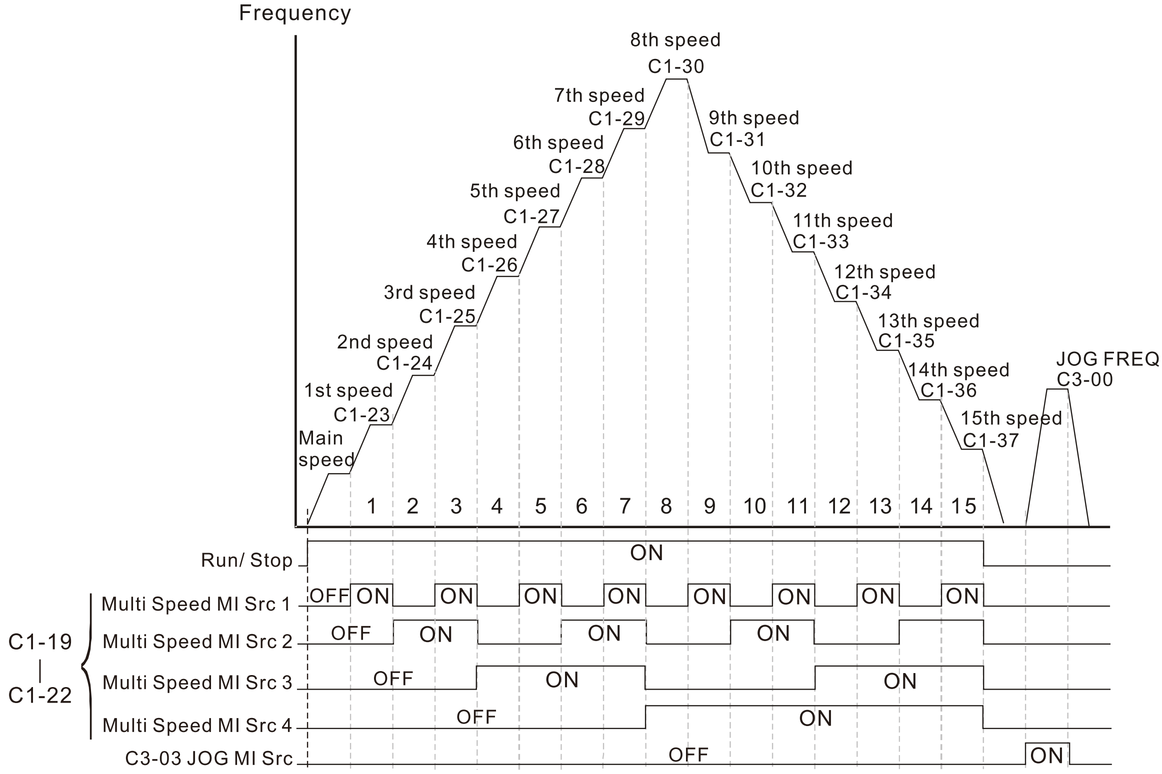
C1-37 Multi Speed 15

(0x465) Default: 0.00

Settings 0.00–599.00 Hz

- Sets Multi speed 1–15 separately with Pr.C1-23–C1-37.
- Explanation for the timing diagram of the multi-step speed and multi speed MI source:
  Related parameters:

  - Pr.C1-23–C1-37: Multi speed 1–15
  - Pr.C1-19–C1-22: Multi Speed MI Src 1–4
  - The figure below shows the multi-speed via external terminals sequence and the multi-speed switching combination.



Multi-speed and Multi Speed MI Source Action Sequence

C1-38 Negative FREQ Cmd Define

(0x466) Default: 0

Settings 0: Always 0 Hz
1: Negative is reverse

- This parameter defines the action when AI is set as negative frequency command.
- For the analog input (AI) frequency source that has positive/ negative frequency commands and accepts forward/ reverse command, it operates according to Pr.C1-38 setting.
  When Pr.C1-38 = 0, the negative frequency command is not accepted and will be regarded as 0 Hz command. The drive operation direction is determined by the forward/ reverse command.
  When Pr.C1-38 = 1, the negative frequency command is accepted. The positive and negative signals of the frequency command determine the drive operating in forward/ reverse direction and the forward/ reverse command is invalid at this moment.

📖 For example: when the analog input frequency command is -30 Hz:

Pr.C1-38 = 0: the drive operates according to the setting for Pr.C1-10 Zero-speed Behavior.

Pr.C1-38 = 1: the drive operates in reverse for 30 Hz.

C1-39 AI Res Switch MI Src

(0x467) Default: 0

Settings 0: Disable

1: Enable

2–7: MI1–MI6

8–9: Reserved

10–15: MI10–MI15

📖 Use Pr.C1-39 to enable or disable the AI resolution switch function, or to select the MI terminal that is going to enable.

✓ C1-40 AI Res Switch Max FREQ

(0x468) Default: 60.00

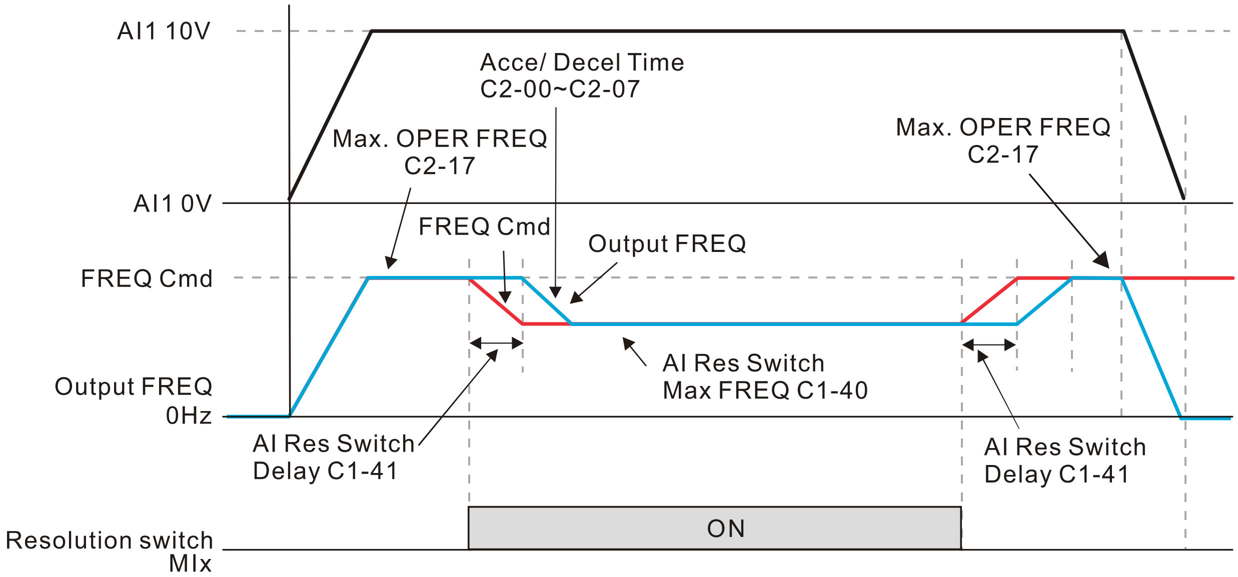
Settings 0.00–599.00 Hz

✓ C1-41 AI Res Switch Delay

(0x469) Default: 0.000

Settings 0.000–65.000 sec.

📖 Complements the unstable speed or positioning caused by insufficient analog input resolution, use it with Pr.C1-39 enabling the AI resolution switch function.



C2. Accel / Decel & Speed Limit

C2-00 (0x480)	Accel Time 1
C2-01 (0x481)	Decel Time 1
C2-02 (0x482)	Accel Time 2
C2-03 (0x483)	Decel Time 2
C2-04 (0x484)	Accel Time 3
C2-05 (0x485)	Decel Time 3
C2-06 (0x486)	Accel Time 4
C2-07 (0x487)	Decel Time 4

Default: 10.00

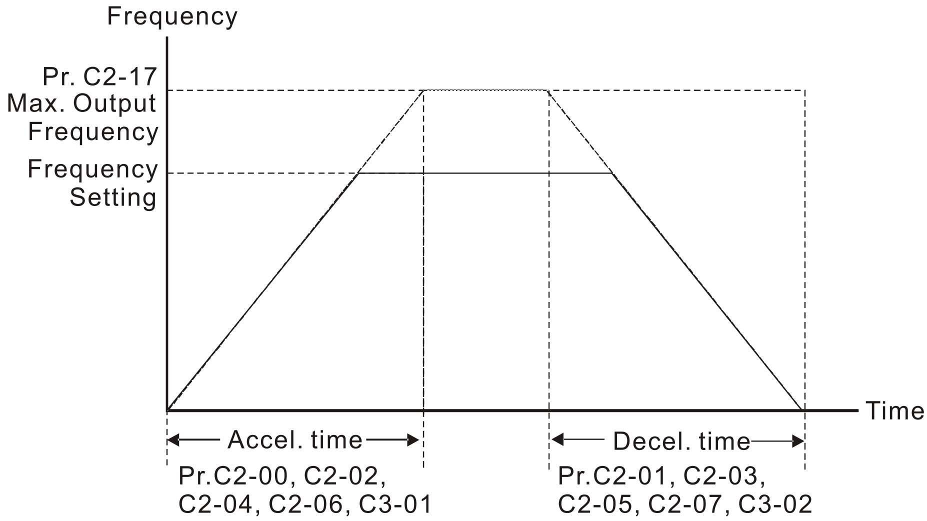
Default: 60.00

(30HP and above models)

Settings Pr.C2-13 = 0: 0.00–600.00 sec.

Pr.C2-13 = 1: 0.0–6000.0 sec.

- The acceleration time determines the time required for the AC motor drive to ramp from 0.00 Hz to the maximum operation frequency (Pr.C2-17). The deceleration time determines the time required for the AC motor drive to decelerate from the maximum operation frequency (Pr.C2-17) down to 0.00 Hz.



Acceleration / Deceleration Time

- The deceleration time is invalid when using auto-deceleration setting.
- With the enabled torque limits and stall prevention functions, the actual acceleration and deceleration time are longer than the set acceleration/ deceleration time.
- Setting the acceleration and deceleration time too short may trigger the drive protection function (Pr.H2-05 Over-current Stall Prevention during Acceleration or Pr.H1-08 Over-voltage Stall

Prevention); therefore, the actual acceleration/ deceleration time will be longer than the set acceleration/ deceleration time.

- Setting the acceleration time too short may cause motor damage or trigger drive protection due to over-current during the drive acceleration.
- Setting the deceleration time too short may cause motor damage or trigger drive protection due to over-current during the drive deceleration or over-voltage of DC bus.
- The default is Accel/ Decel Time 1 (Pr.C2-00, C2-01). You can select the other Accel/ Decel Time 2–4 (Pr. C2-02–C2-07) of the drive by setting the multi-function terminal and its digital status. There are four acceleration and deceleration selections in total.
- When you use this function with the S-curve acceleration/ deceleration (Pr. C2-08–Pr. C2-11), the actual acceleration and deceleration time are longer than the setting.

C2-08 Start of Accel S-curve Time

(0x488) Default: 0.20 / 0.2

C2-09 End of Accel S-curve Time

(0x489) Default: 0.20 / 0.2

C2-10 Start of Decel S-curve Time

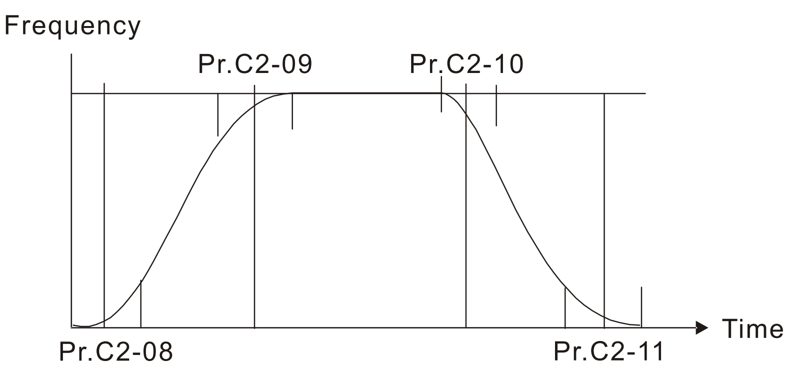
(0x48A) Default: 0.20 / 0.2

C2-11 End of Decel S-curve Time

(0x48B) Default: 0.20 / 0.2

Settings Pr.C2-13 = 0: 0.00–25.00 sec.
Pr.C2-13 = 1: 0.0–250.0 sec.

- Using the S-curve acceleration/ deceleration time can reduce the impact of the drive when it starts to accelerate or stops.
- The acceleration and deceleration curve adjusts the acceleration and deceleration S-curve. When enabled, the drive produces a different acceleration and deceleration curve according to the acceleration and deceleration time.
- The S-curve function is invalid when you set the acceleration and deceleration time to 0.
- When Pr.C2-00, C2-02, C2-06 and C2-06 ≥ Pr.C2-08 and C2-09, the actual acceleration time is as follows:
  The actual acceleration time = Pr.C2-00, C2-02, C2-04, C2-06 + (Pr.C2-08 + C2-09) ÷ 2
- When Pr.C2-01, C2-03, C2-07 and C2-06 ≥ Pr.C2-10 and C2-11, the actual deceleration time is as follows:
  The actual deceleration time = Pr.C2-01, C2-03, C2-05, C2-07 + (Pr.C2-10 + C2-11) ÷ 2



✎ C2-12 Accel/ Decel 1/4 Switch FREQ

(0x48C) Default: 0.00

Settings 0.00–599.00 Hz

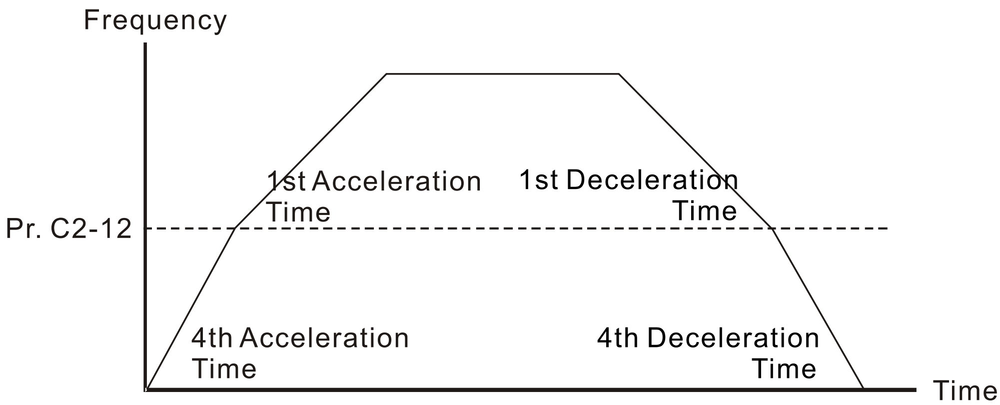
- This function does not require the external terminal switching function; it switches the acceleration and deceleration time automatically according to the Pr.C2-12 setting. If you set the external terminal, the external terminal has priority over Pr.C2-12.
- Use this parameter to set the switch frequency between acceleration and deceleration slope. The First / Fourth Accel. / Decel. slope is calculated by the Max. Operation Frequency (Pr.C2-17) ÷ acceleration / deceleration time.

  Example:

  When the Max. Operation Frequency (Pr.C2-17) = 80 Hz, and Accel/ Decel 1/4 Switch Frequency (Pr.C2-12) = 40 Hz:

  a. If Acceleration Time 1 (Pr.C2-00) = 10 sec., Acceleration Time 4 (Pr.C2-06) = 6 sec., then the acceleration time is 3 sec. for 0–40 Hz and 5 sec. for 40–80 Hz.

  b. If Deceleration Time 1 (Pr.C2-01) = 8 sec., Deceleration Time 4 (Pr.C2-07) = 2 sec., then the deceleration time is 4 sec. for 80–40 Hz and 1 sec. for 40–0 Hz.



1st/4th Acceleration/Deceleration Frequency Switching

C2-13 Accel/ Decel Time unit

(0x48D) Default: 0

Settings 0: 0.01 sec.

1: 0.1 sec.

- Selects the numerical unit of the acceleration/ deceleration time.

✎ C2-14 Quick Stop Time

(0x48E) Default: 10

Default: 60.00

(30HP and above models)

Settings Pr.C2-13 = 0: 0.00–600.00 sec.

Pr.C2-13 = 1: 0.0–6000.0 sec.

- When using quick stop, Pr.C2-14 determines the time required for the AC motor drive to decelerate from the maximum operation frequency (Pr.C2-17) down to 0.00 Hz.

C2-15 Accel/ Decel Switch MI Src 1

(0x48F) Default: 0

C2-16 Accel/ Decel Switch MI Src 2

(0x490) Default: 0

Settings 0: OFF

1: ON

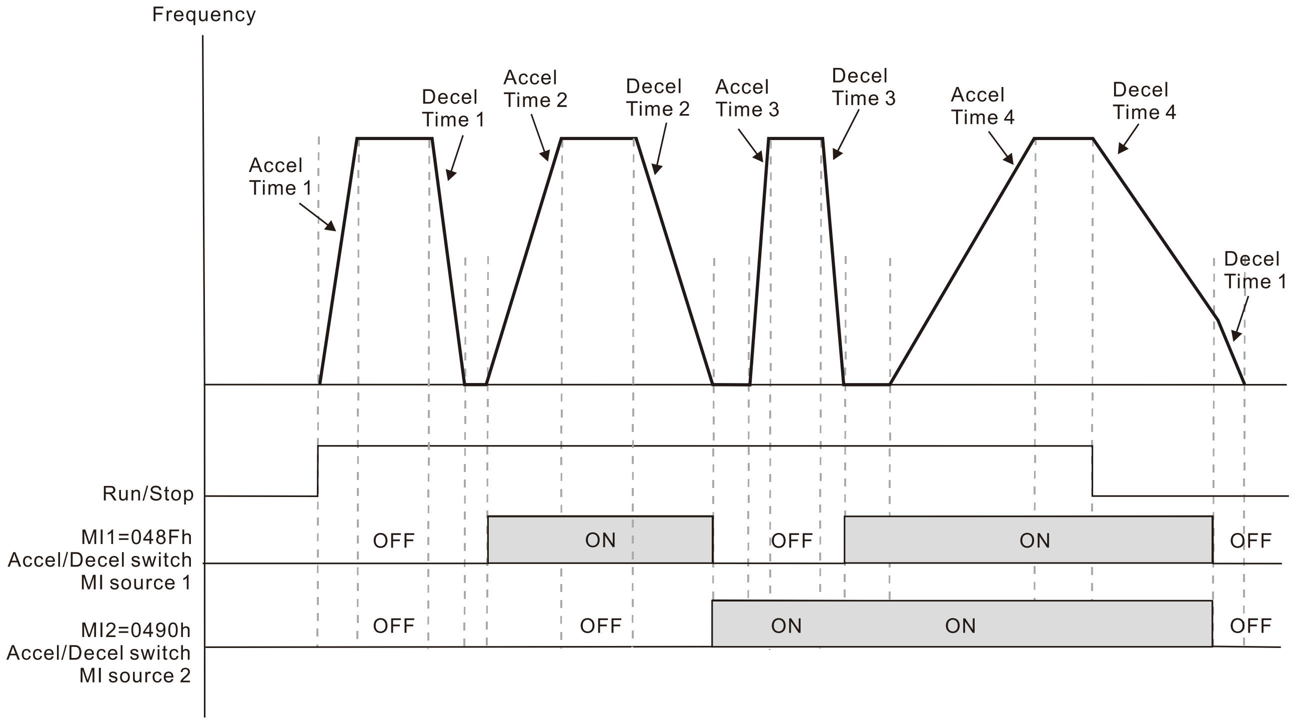
2–7: MI1–MI6

8–9: Reserved

10–15: MI10–MI15

📖 Use Pr.C2-15–C2-16 to select the acceleration/ deceleration switch MI source. You can select the acceleration and deceleration time (Pr.C2-00–C2-07) of the drive from the digital status of the MI terminals.

MI Source 1 Status	MI Source 2 Status	Accel/ Decel Time Selection
OFF	OFF	Accel/ Decel Time 1 (Pr.C2-00–C2-01)
ON	OFF	Accel/ Decel Time 2 (Pr.C2-02–C2-03)
OFF	ON	Accel/ Decel Time 3 (Pr.C2-04–C2-05)
ON	ON	Accel/ Decel Time 4 (Pr.C2-06–C2-07)



C2-17 Max. OPER FREQ

(0x491) Default: 60.00

Settings 0.00–599.00 Hz

📖 Sets the maximum operation frequency of the drive. All the AC motor drive frequency command sources (analog inputs 0–10 V, 4–20 mA, 0–20 mA, ±10 V) are scaled to correspond to the output frequency range.

📖 Maximum operation frequency vs. Carrier:

Carrier Setting	Max. Output Frequency
2k	200 Hz
3k	300 Hz
4k	400 Hz
5k	500 Hz
6k	599 Hz

There is no limit to Pr.C2-17 Max. Operation Frequency setting. However, when the relation between the set carrier and the maximum operation frequency does not match, the actual output frequency will be limited to the max. operation frequency corresponding to the carrier.

For example:

Pr.C2-17 = 400.00 Hz, when the carrier is set as 2 kHz, the maximum output frequency = 200.00 Hz.

If the drive can only operate at 200.00 Hz and F = 400.00 Hz, the actual output frequency is displayed as H = 200.00 Hz.

C2-18 FREQ Upper Limit

(0x492) Default: 599.00

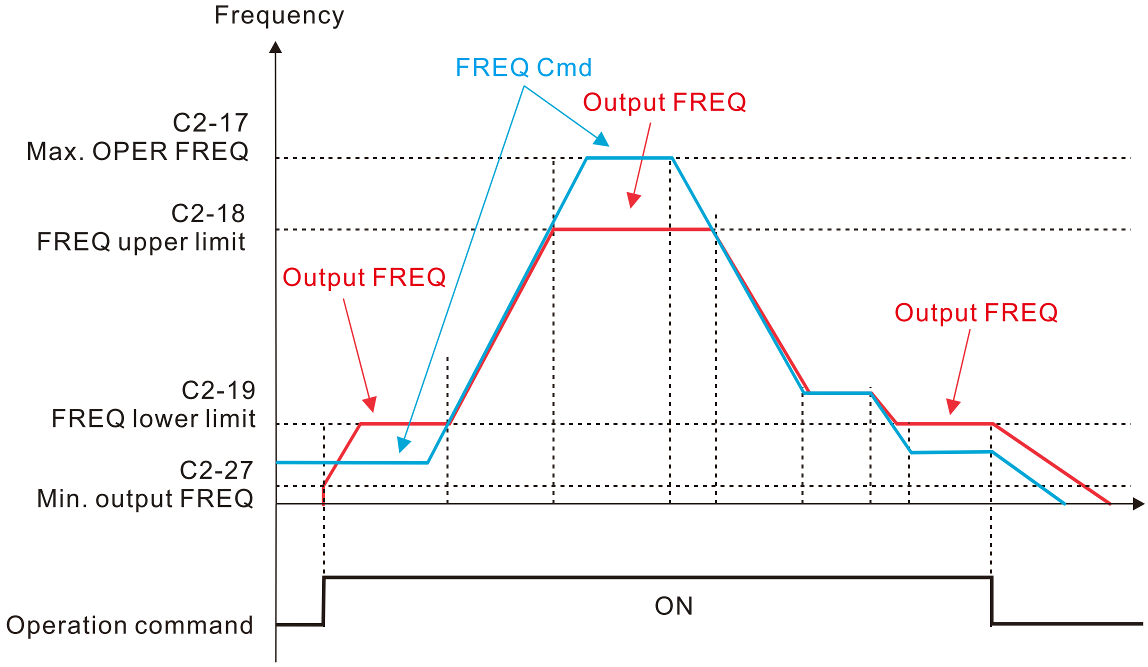
Settings Frequency lower limit–599.00 (Hz)

C2-19 FREQ Lower Limit

(0x493) Default: 0.00

Settings 0.00–Frequency upper limit (Hz)

📖 If the output frequency setting is higher than the upper limit (Pr.C2-18), the drive runs with the frequency upper limit. If the output frequency setting is lower than the lower limit (Pr.C2-19) but higher than the minimum output frequency (Pr.C2-27), the drive runs with the frequency lower limit. (Pr.C2-18 setting value must be > Pr.C2-19 setting value).



- Use the output frequency upper and lower limit settings to prevent operator misuse, overheating caused by the motor's operating at a too low frequency, or mechanical wear due to a too high speed.
- If the frequency upper limit setting is 50 Hz and the frequency setting is 60 Hz, the maximum operation frequency is 50 Hz.
- If the frequency lower limit setting is 10 Hz and the minimum output frequency setting (Pr.C2-27) is 1.5 Hz, then the drive operates at 10 Hz when the Frequency command is higher than Pr.C2-27 but lower than 10 Hz. If the Frequency command is lower than Pr.C2-27 (Min. Output Frequency), the drive selects the action according to Pr.C1-10 (Zero-speed Behavior).

C2-20 Start FREQ

(0x494) Default: 0.50

Settings 0.00–motor's max. operation frequency (Hz)

- When the starting frequency is larger than the minimum output frequency, the drive frequency output starts when the starting frequency reaches the F command.
- Refer to Pr.C2-27 for the relation between the minimum output frequency, frequency lower limit, start frequency, frequency command and the actual output frequency.

✔ C2-21 Skip FREQ 1 Upper Limit

(0x495) Default: 0

Settings Skip frequency 1 lower limit–motor's max. operation frequency (Hz)

✔ C2-22 Skip FREQ 1 Lower Limit

(0x496) Default: 0

Settings 0–Skip frequency 1 upper limit (Hz)

✔ C2-23 Skip FREQ 2 Upper Limit

(0x497) Default: 0

Settings Skip frequency 2 lower limit–motor's max. operation frequency (Hz)

✔ C2-24 Skip FREQ 2 Lower Limit

(0x498) Default: 0

Settings 0–Skip frequency 2 upper limit (Hz)

✔ C2-25 Skip FREQ 3 Upper Limit

(0x499) Default: 0

Settings Skip frequency 3 lower limit–motor's max. operation frequency (Hz)

✔ C2-26 Skip FREQ 3 Lower Limit

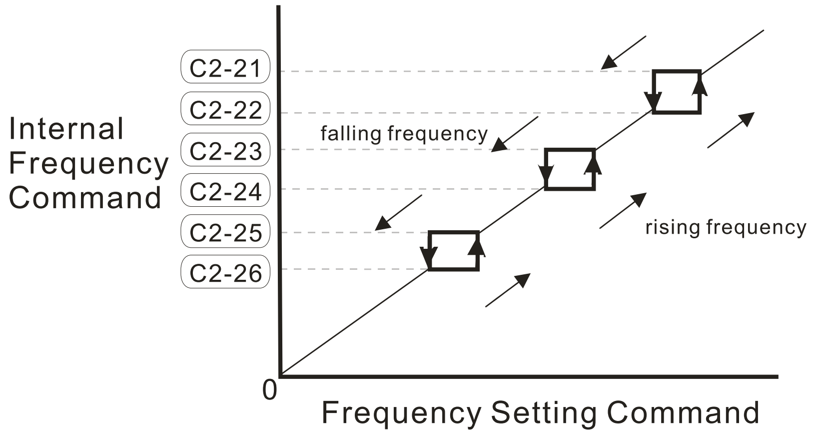
(0x49A) Default: 0

Settings 0–Skip frequency 3 upper limit (Hz)

- Sets the skip frequency ranges for the AC motor drive. Provides three sets of skip frequency parameters for setting, and the range of the three sets of kip frequency setting ranges are allowed to overlap. However, between the same set of skip frequency, the lower limit value must be smaller than the upper limit value.
- The skip frequencies are useful when a motor has resonance vibration at a specific frequency bandwidth. Skipping this frequency avoids the vibration. There are three frequency skip zones

available.

- You can set the Frequency command (F) within the range of skip frequencies. Then the output frequency (H) is limited to the lower limit of skip frequency ranges.
- During acceleration and deceleration, the output frequency still passes through the skip frequency ranges.



C2-27 Min Output FREQ

(0x49B) Default: 0.50

Settings 0.00–motor's max. operation frequency (Hz)

- When the drive executes the stop action and the speed planning command is lower than the minimum output frequency, it is regarded as the completion of the stop, and the drive is in the stop output control status. When the speed command is set as 0 for zero-speed control and the speed planning command is lower than the minimum output frequency, it is regarded as entering zero-speed operation. Refer to Pr.C1-10 for zero-speed operation description.
- Relation between speed command upper and lower limits/ start speed and minimum output frequency:

a. If the frequency command is < min. output frequency when starting up, the drive directly enters zero-speed operation at start, if it is during the operation, the drive enters zero-speed operation after decelerating to the min. output frequency. For zero-speed operation behavior, refer to Pr.C1-10 Zero-speed Behavior.

b. When starting up the drive, if the frequency command is > the min. output frequency and the start frequency is > the min. output frequency, the drive operates with the start speed; if the frequency command is > the min. output frequency and the start frequency is < the min. output frequency, the drive operates with the minimum frequency.

c. If the frequency lower limit is > min. output frequency, when the frequency command < min. output frequency, the drive operates according to the frequency lower limit.

d. Refer to the diagram below for the relation between frequency upper and lower limits/ start frequency and minimum output frequency.

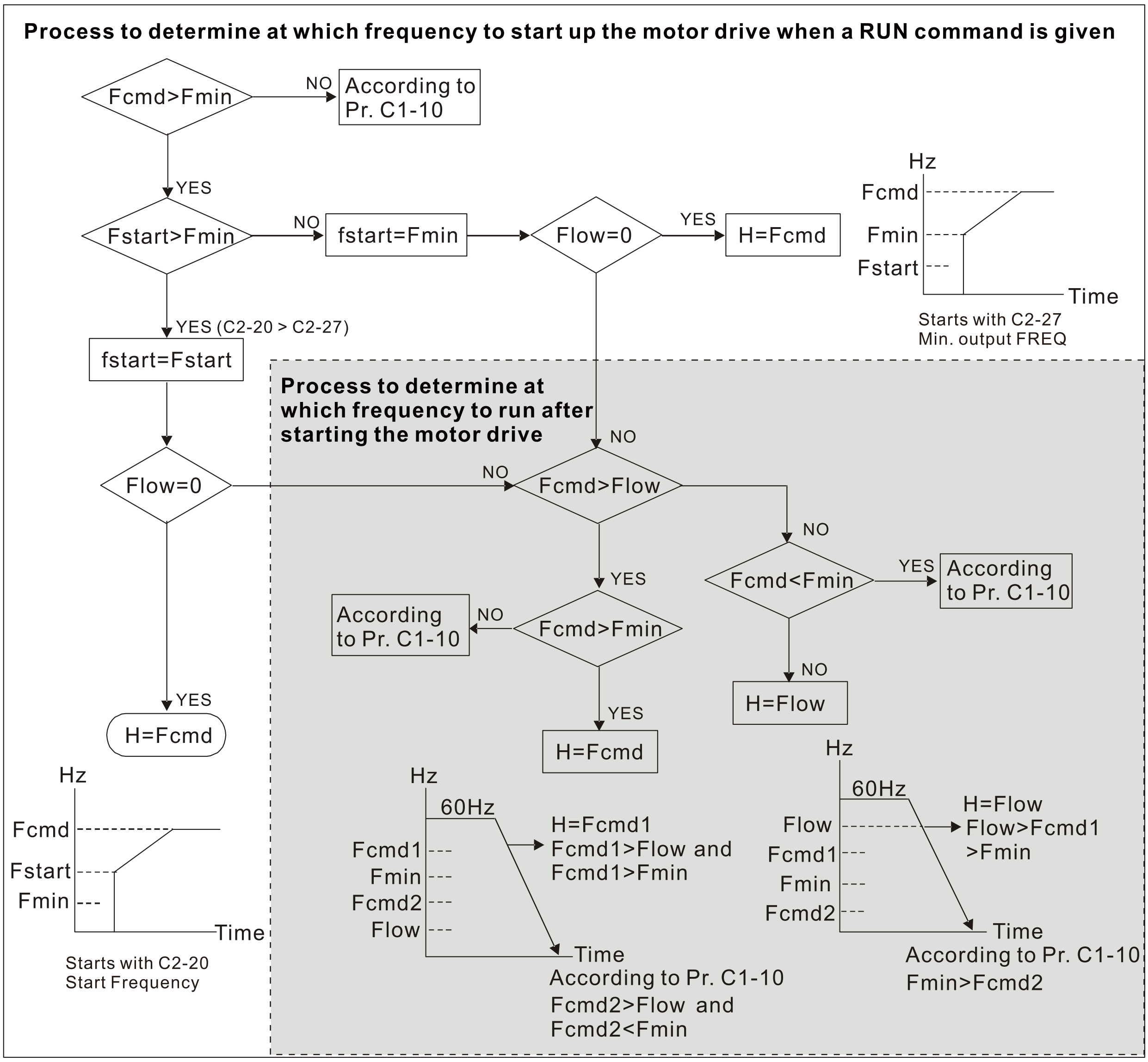
Fcmd: frequency command

Fstart: start-up frequency (Pr.C2-20)

fstart: actual start-up frequency of the drive

Fmin: min. output frequency (Pr.C2-27)

Flow: output frequency lower limit (Pr.C2-19)



- When Fcmd > Fmind and Fcmd < Fstart:
  If Fcmd > Flow, the drive runs directly by Fcmd. If Flow ≥ Fcmd, the drive runs with Fcmd, and then rises to Flow according to acceleration time.
- The drive’s output frequency goes directly to 0 when decelerating to Fmin.

C3. JOG Setting

✎ C3-00 JOG FREQ

(0x4C0) Default: 6.00

Settings 0.00–Max. operation frequency (Hz)

✎ C3-01 JOG Accel Time

(0x4C1) Default: 10.00 / 10.0

✎ C3-02 JOG Decel Time

(0x4C2) Default: 10.00 / 10.0

Settings Pr.C2-13 = 0: 0.00–600.00 sec.

Pr.C2-13 = 1: 0.0–6000.0 sec.

C3-03 JOG MI Src

(0x4C3) Default: 0

Settings 0: Disable

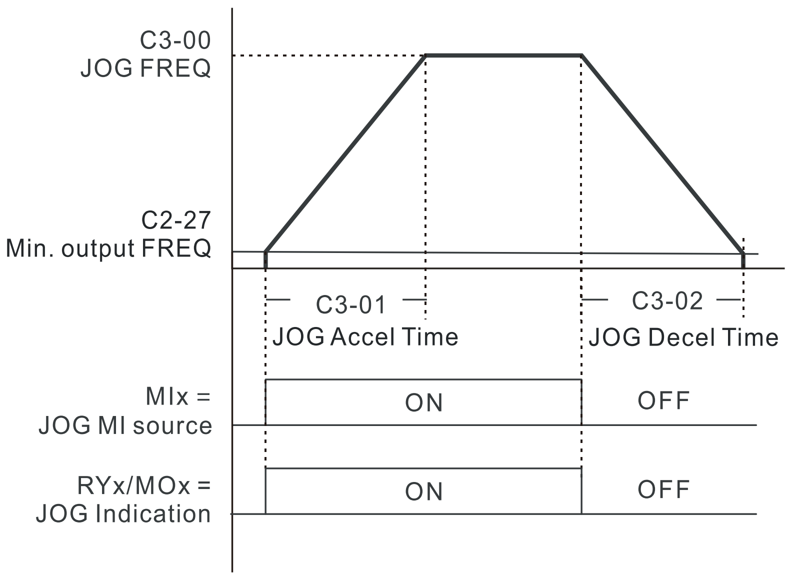
1: Reserved

2–7: MI1–MI6

5–9: Reserved

10–15: MI10–MI15

- When using JOG function, you can select the MI source by setting MI terminal to 04C3h (JOG MI source), Pr.C3-03 (JOG MI Source) or using the F2 key on the KPV-CC01.
- When the switch of JOG MI terminal is ON, the AC motor drive accelerates from 0 Hz to the JOG frequency (Pr.C3-00). When the switch of JOG MI terminal is OFF, the AC motor drive decelerates from the JOG frequency to stop.
- The drive does not execute JOG command during normal operation. If the drive receives a normal operation command as the operation source during the JOG operation, the drive executes normal operation.
- The JOG acceleration/ deceleration time (Pr.C3-01, C3-02) is the time for the drive accelerates from 0.0 Hz to Pr.C3-00 JOG frequency.
- The JOG MI terminal is valid when the source of the operation command is the external terminal.
- The JOG operation can only be executed when the drive stops.



✎ C3-04 JOG Indn

(0x4C4) Default: 0

Settings 0: Disable

1–2: Relay1–Relay2

3–4: MO1–MO2

5–9: Reserved

10–15: MO/Relay10–15

- This parameter selects the JOG indication source.
- When the drive executes JOG command, the selected contact is ON.

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d. Motor Parameter

d0. IM Switching

d0-00 IM 1–4 Sel

(0x640) Default: 1

Settings
1: IM1
2: IM2
3: IM3
4: IM4
5: IM1/ IM2 switch
6: IM1–IM4 switch
7: IM Y-D switch enable

📖 5: Use a set of MI to switch IM1 and IM2 according to the IM Switch Src 1 (Pr.d0-01) as follows:

Induction Motor	IM Switch MI Src 1 (Pr.d0-01)
IM1	OFF
IM2	ON

📖 6: Use two sets of MI to switch IM1–4 according to the IM Switch Src 1/ 2 (Pr.d0-01 and d0-02) as follows:

Induction Motor	IM Switch MI Src 1 (Pr.d0-01)	IM Switch MI Src 2 (Pr.d0-02)
IM1	OFF	OFF
IM2	ON	OFF
IM3	OFF	ON
IM4	ON	ON

📖 7: Enable IM Y-D switch according to Pr.d0-03 (Y-D Switch FREQ).

d0-01 IM Switch MI Src 1

(0x641) Default: 0

Settings
0: OFF
1: ON
2–7: MI1–MI6
8–9: Reserve
10–15: MI10–MI15

d0-02 IM Switch MI Src 2

(0x642) Default: 0

Settings
0: OFF
1: ON
2–7: MI1–MI6
8–9: Reserve
10–15: MI10–MI15

✓ d0-03 Y-D Switch FREQ

(0x643) Default: 60.00

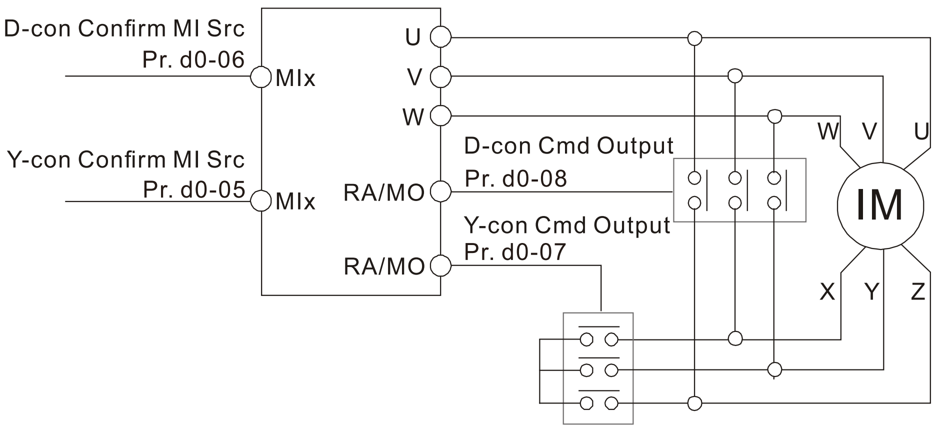
Settings 0.00–599.00 Hz

✓ d0-04 Y-D Switch Delay Time

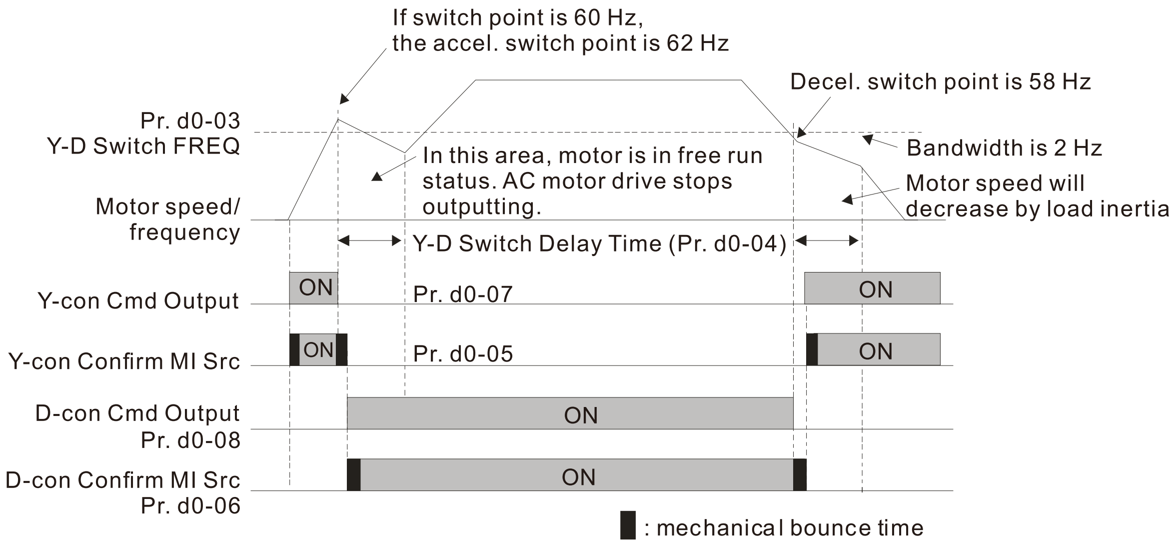
(0x644) Default: 0.200

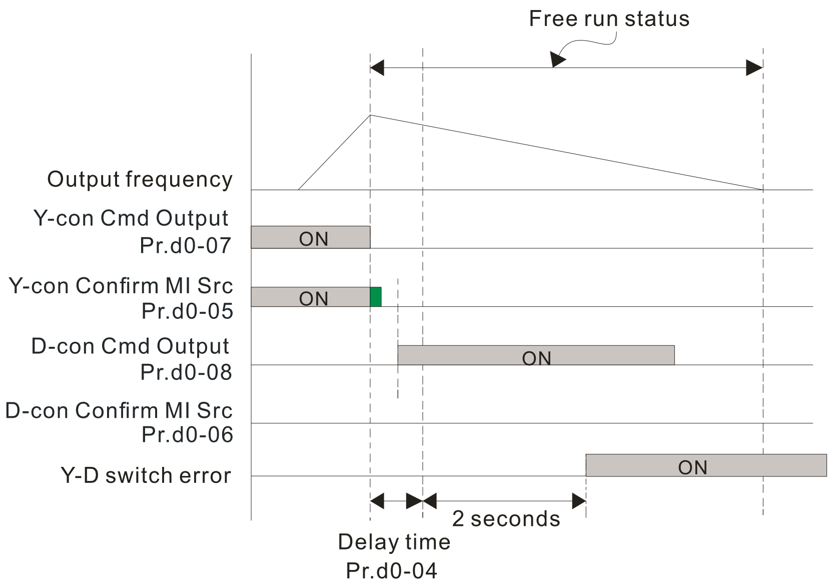
Settings 0.000–60.000 sec.

- You can apply Pr.d0-00 = 7, d0-03 and d0-04 in a wide range of motors, and the motor coil executes the Y-connection/ D-connection switch as required. (The wide range motors are related to the motor design. In general, the motor has higher torque with low-speed Y-connection and has higher speed with high-speed D-connection.)
- Set Pr.d0-00 as 7 to enable and disable the switch of Y-connection/ D-connection.
- When you set Pr.d0-00 as 7, the drive uses Pr.d0-03 setting and current motor frequency to switch the current motor to Y-connection or D-connection. You can switch the relevant motor parameter settings simultaneously.
- Pr.d0-04 sets the switch delay time of Y-connection and D-connection.
- When the output frequency reaches Y-connection/ D-connection switch frequency, the drive delays according to Pr.d0-04 before activating the multi-function output terminals.



Y-D connection switch: can be used for wide range motor
Y-connection for low speed: higher torque can be used for rigid tapping
D-connection for high speed: higher torque can be used for high-speed drilling





d0-05 Y-con Confirm MI Src

(0x645) Default: 0

Settings 0: Disable
1: Enable
2–7: MI1–MI6
8–9: Reserve
10–15: MI10–MI15

d0-06 D-con Confirm MI Src

(0x646) Default: 0

Settings 0: Disable
1: Enable
2–7: MI1–MI6
8–9: Reserve
10–15: MI10–MI15

d0-07 Y-con Cmd Output

(0x647) Default: 0

Settings 0: Disable
1–2: Relay1–Relay2
3–4: MO1–MO2
5–9: Reserve
10–15: MO/Relay10–15

d0-08 D-con Cmd Output

(0x648) Default: 0

Settings 0: Disable
1–2: Relay1–Relay2
3–4: MO1–MO2
5–9: Reserve
10–15: MO/Relay10–15

d1. IM1 Parameter & Autotune

d1-00 IM Autotune

(0x680) Default: 0

Settings
- 0: Disable
- 1: IM static autotune
- 2: IM simple active autotune
- 3: IM advanced active autotune
- 4: Reserve

📖 Refer to Chapter 5 "Initial Operation and Adjustment" for details of motor adjustment process.

d1-01 IM1 Rated Power

(0x681) Default: Depending on the models

Settings 0.0–6553.5 kW

📖 Sets the IM rated power. The default is the power value of the drive.

d1-02 IM1 Rated Current

(0x682) Default: Depending on the models

Settings Depending on the modes–6553.5 A

📖 Set this value according to the rated current of the motor as indicated on the motor nameplate. Default of the motor rated current is 90%, the maximum value is 120% and the minimum value is 40%.

d1-03 IM1 Rated Voltage

(0x683) Default: Depending on the models

Settings Depending on the modes (V)

📖 Sets the rated voltage for the motor as indicated on the motor nameplate. The default is the rated voltage of the drive.

d1-04 IM1 Rated Speed

(0x684) Default: Depending on the number of poles

Settings 0–Depending on the number of poles (rpm)

📖 Sets the IM rated operation speed.

d1-05 IM1 Rated FREQ

(0x685) Default: 60.00

Setting Range 0.00–599.00 Hz

📖 Sets the IM rated operation frequency.

d1-06 IM1 Pole Number

(0x686) Default: 4

Settings 2–64 poles

Sets the pole number for the IM rotor. It cannot be an odd number.

d1-07 IM1 No-Load Current

(0x687) Default: Depending on the models

Settings 0.0–6553.5 A

Sets the no-load Current for the IM. For models with 110 kW and above, the default is 20% of the motor rated current.

d1-08 IM1 Rs

(0x688) Default: Depending on the models

Settings 0.000–65.535 Ω

Sets the stator resistance of the motor with parameter auto-tuning, and it can be detected automatically.

d1-09 IM1 Rr

(0x689) Default: Depending on the models

Settings 0.000–65.535 Ω

Sets the rotor resistance of the motor with parameter auto-tuning, and it can be detected automatically.

d1-10 IM1 Lm

(0x68A) Default: Depending on the models

Settings 0.0–6553.5 mH

Sets the magnetizing inductance of the motor with parameter auto-tuning, and it can be detected automatically.

d1-11 IM1 Lx

(0x68B) Default: Depending on the models

Settings 0.0–6553.5 mH

Sets the stator inductance of the motor with parameter auto-tuning, and it can be detected automatically.

d2. IM2 Parameter & Autotune

d2-00 IM2 Rated Power

(0x6C0) Default: Depending on the models

Settings 0.0–6553.5 kW

📖 Sets the IM rated power. The default is the power value of the drive.

d2-01 IM2 Rated Current

(0x6C1) Default: Depending on the models

Settings Depending on the modes (V)

📖 Set this value according to the rated current of the motor as indicated on the motor nameplate. Default of the motor rated current is 90%, the maximum value is 120% and the minimum value is 40%.

d2-02 IM2 Rated Voltage

(0x6C2) Default: Depending on the models

Settings Depending on the modes (V)

📖 Sets the rated voltage for the motor as indicated on the motor nameplate. The default is the rated voltage of the drive.

d2-03 IM2 Rated Speed

(0x6C3) Default: Depending on the number of poles

Settings 0–Depending on the number of poles (rpm)

📖 Sets the IM rated operation speed.

d2-04 IM2 Rated FREQ

(0x6C4) Default: 60.00

Settings 0.00–599.00 Hz

📖 Sets the IM rated operation frequency.

d2-05 IM2 Pole Number

(0x6C5) Default: 4

Settings 2–64 poles

📖 Sets the pole number for the IM rotor. It cannot be an odd number.

d2-06 IM2 No-Load Current

(0x6C6) Default: Depending on the models

Settings 0–Depending on the rated current (A)

📖 Sets the no-load Current for the IM. For models with 110 kW and above, the default is 20% of the motor rated current.

d2-07 IM2 Rs

(0x6C7) Default: Depending on the models

Settings 0.000–65.535 Ω

📖 Sets the stator resistance of the motor with parameter auto-tuning, and it can be detected automatically.

d2-08 IM2 Rr

(0x6C8) Default: Depending on the models

Settings 0.000–65.535 Ω

📖 Sets the rotor resistance of the motor with parameter auto-tuning, and it can be detected automatically.

d2-09 IM2 Lm

(0x6C9) Default: 0

Settings 0.0–6553.5 mH

📖 Sets the magnetizing inductance of the motor with parameter auto-tuning, and it can be detected automatically.

d2-10 IM2 Lx

(0x6CA) Default: 0

Settings 0.0–6553.5 mH

📖 Sets the stator inductance of the motor with parameter auto-tuning, and it can be detected automatically.

d3. IM3 Parameter & Autotune

d3-00 IM3 Rated Power

(0x700) Default: Depending on the models

Settings 0.0–6553.5 kW

d3-01 IM3 Rated Current

(0x701) Default: Depending on the models

Settings Depending on the modes (V)

d3-02 IM3 Rated Voltage

(0x702) Default: Depending on the models

Settings Depending on the modes (V)

d3-03 IM3 Rated Speed

(0x703) Default: Depending on the number of poles

Settings 0–Depending on the number of poles (rpm)

d3-04 IM3 Rated FREQ

(0x704) Default: 60.00

Settings 0.00–599.00 Hz

d3-05 IM3 Pole Number

(0x705) Default: 4

Settings 2–64 poles

d3-06 IM3 No-Load Current

(0x706) Default: Depending on the models

Settings 0–Depending on the rated current (A)

d3-07 IM3 Rs

(0x707) Default: Depending on the models

Settings 0.000–65.535 Ω

d3-08 IM3 Rr

(0x708) Default: Depending on the models

Settings 0.000–65.535 mH

d3-09 IM3 Lm

(0x709) Default: 0.0

Settings 0.0–6553.5 mH

d3-10 IM3 Lx

(0x70A) Default: 0.0

Settings 0.0–6553.5 mH

📖 Refer to descriptions of Parameter Group d2 (IM2 Parameter & Autotune).

d4. IM4 Parameter & Autotune

d4-00 IM4 Rated Power

(0x740) Default: Depending on the models

Settings 0.0–6553.5 kW

d4-01 IM4 Rated Current

(0x741) Default: Depending on the models

Settings Depending on the modes (V)

d4-02 IM4 Rated Voltage

(0x742) Default: Depending on the models

Settings Depending on the modes (V)

d4-03 IM4 Rated Speed

(0x743) Default: Depending on the number of poles

Settings 0–Depending on the number of poles (rpm)

d4-04 IM4 Rated FREQ

(0x744) Default: 60.00

Settings 0.00–599.00 Hz

d4-05 IM4 Pole Number

(0x745) Default: 4

Settings 2–64 poles

d4-06 IM4 No-Load Current

(0x746) Default: Depending on the models

Settings 0–Depending on the rated current (A)

d4-07 IM4 Rs

(0x747) Default: Depending on the models

Settings 0.000–65.535 Ω

d4-08 IM4 Rr

(0x748) Default: Depending on the models

Settings 0.000–65.535 Ω

d4-09 IM4 Lm

(0x749) Default: 0

Settings 0.0–6553.5 mH

d4-10 IM4 Lx

(0x74A) Default: 0

Settings 0.0–6553.5 mH

📖 Refer to descriptions of Parameter Group d2 (IM2 Parameter & Autotune).

d5. SM Parameter & Autotune

d5-00 SM Autotune

(0x780) Default: 0

Settings 0: Disable
1: SM static autotune
2: SM blocked rotor autotune
3: SM active autotune
4: Reserve

📖 Refer to Chapter 5 “Initial Operation and Adjustment” for details of motor adjustment process.

d5-01 SM Rated power

(0x781) Default: Depending on the models

Settings 0.1–6553.5 kW

📖 Sets the SM rated power. The default is the power value of the drive.

d5-02 SM Rated Current

(0x782) Default: Depending on the models

Settings Depending on the modes (V)

📖 Set this value according to the rated current of the motor as indicated on the motor nameplate. Default of the motor rated current is 90%, the maximum value is 120% and the minimum value is 40%.

d5-03 SM Rated Voltage

(0x783) Default: Depending on the models

Settings Depending on the modes (V)

📖 Sets the rated voltage for the motor as indicated on the motor nameplate.

d5-04 SM Rated Speed

(0x784) Default:
PM: 1800/ SynRM: 1500

Settings 0–65535 rpm

📖 Sets the rated speed for the SM.

d5-05 SM Pole Number

(0x785) Default:
PM: 8/ SynRM: 4

Settings 2–65535 poles

📖 Sets the pole number for the SM rotor. It cannot be an odd number.

d5-06 SM Rs

(0x786) Default: 1.000

Settings	0–65.535 Ω (Digit of the decimal points varies with the motor's power)

- Sets the stator resistance of the motor with parameter auto-tuning, and it can be detected automatically.

d5-07 SM Ld

(0x787) Default: 10.00

Settings	0.00–655.35 mH

- Sets the d-axis inductance of the motor with parameter auto-tuning, and it can be detected automatically.

d5-08 SM Lq

(0x788) Default: 10.00

Settings	0.00–655.35 mH

- Sets the q-axis inductance of the motor with parameter auto-tuning, and it can be detected automatically.

d5-10 SM BEMF Constant

(0x78A) Default: 0

Settings	0–6553.5 V/krpm

- Permanent magnet motor parameter Ke ($V_{phase, rms}$/ krpm).
- When Pr.d5-00 = 3, parameter Ke is calculated according to the motor's actual operation and can be detected automatically.
- When Pr.d5-00 = 1 or 2, parameter Ke is automatically calculated according to the motor power, rated current and rotor speed.

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E. VF Control & SVC

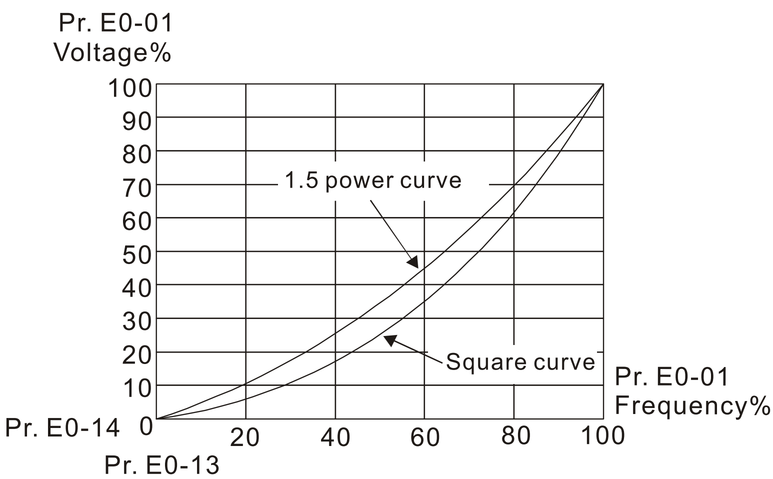
E0. IM1 VF Control & SVC

E0-00 IM1 VF Curve Sel

(0x840) Default: 0

Settings 0: Manual VF curve
1: 1.5th power V/F curve
2: 2nd power V/F curve
3: 60 Hz with rated 50 Hz
4: 72 Hz with rated 60 Hz
5: 50 Hz, 3rd power decreasing
6: 50 Hz, 2nd power decreasing
7: 60 Hz, 3rd power decreasing
8: 60 Hz, 2nd power decreasing
9: 50 Hz, Mid starting torque
10: 50 Hz, Large starting torque
11: 60 Hz, Mid starting torque
12: 60 Hz, Large starting torque
13: 90 Hz with rated 60 Hz
14: 120 Hz with rated 60 Hz
5: 180 Hz with rated 60 Hz

- When setting to 0, refer to Pr.E0-01–E0-08 for IM1 V/F curve.
- When setting to 1 or 2, use only VF maximum frequency and voltage setting as the highest reference, and use the VF minimum frequency and voltage setting as the lowest reference.
- If the load of the motor is a variable torque load (torque is in direct proportion to the rotating speed, such as the load of a fan or a pump), the load torque is low at low rotating speed. You can decrease the input voltage appropriately to make the magnetic field of the input current smaller and reduce flux loss and iron loss for the motor to increase efficiency.
- When you set the V/F curve to high power, it has lower torque at low frequency, and the drive is not suitable for rapid acceleration and deceleration. Do NOT use this parameter for rapid acceleration and deceleration.



E0-01 IM1 VF Max FREQ

(0x841) Default: 60.00

Settings 3.00–599.00 Hz

Set this parameter according to the motor's rated frequency on the motor nameplate. If the motor's rated frequency is 60 Hz, set this parameter to 60. If the motor's rated frequency is 50 Hz, set this parameter to 50.

E0-02 IM1 VF Max Voltage

(0x842) Default: Depending on the models

Settings Depending on the models

Set this parameter according to the rated voltage on the motor nameplate. If the motor's rated voltage is 440 V, set this parameter to 440.0 V. If the motor's rated voltage is 400 V, set this parameter to 400.0 V.

There are many motor types in the market and the power system for each country is different. The economical and convenient solution is to install an AC motor drive. Then there is no problem using the motor with different voltage and frequency inputs, and the motor drive can improve the original motor characteristics and useful life.

E0-03 IM1 VF Mid FREQ 5

(0x843) Default: 3.00

Settings 0.00–599.00 Hz

E0-04 IM1 VF Mid Voltage 5

(0x844) Default: Depending on the models

Settings Depending on the models

E0-05 IM1 VF Mid FREQ 4

(0x845) Default: 3.00

Settings 0.00–599.00 Hz

E0-06 IM1 VF Mid Voltage 4

(0x846) Default: Depending on the models

Settings Depending on the models

E0-07 IM1 VF Mid FREQ 3

(0x847) Default: 3.00

Settings 0.00–599.00 Hz

E0-08 IM1 VF Mid Voltage 3

(0x848) Default: Depending on the models

Settings Depending on the models

E0-09 IM1 VF Mid FREQ 2

(0x849) Default: 3.00

Settings 0.00–599.00 Hz

E0-10 IM1 VF Mid Voltage 2

(0x84A) Default: Depending on the models

Settings Depending on the models

E0-11 IM1 VF Mid FREQ 1

(0x84B) Default: 1.50

Settings 0.00–599.00 Hz

E0-12 IM1 VF Mid Voltage 1

(0x84C) Default: Depending on the models

Settings Depending on the models

E0-13 IM1 VF Min FREQ

(0x84D) Default: 0.50

Settings 0.00–599.00 Hz

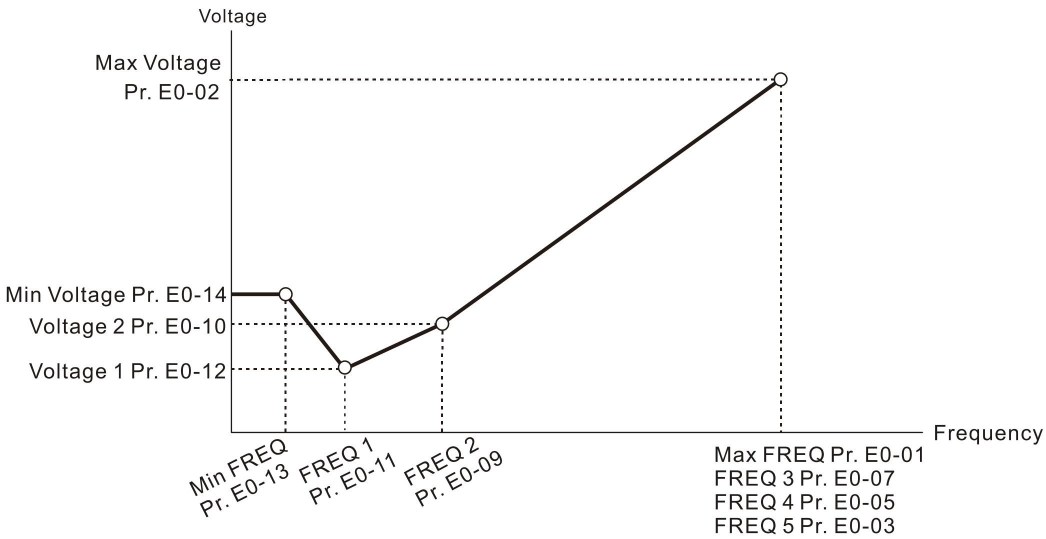
E0-14 IM1 VF Min Voltage

(0x84E) Default: Depending on the models

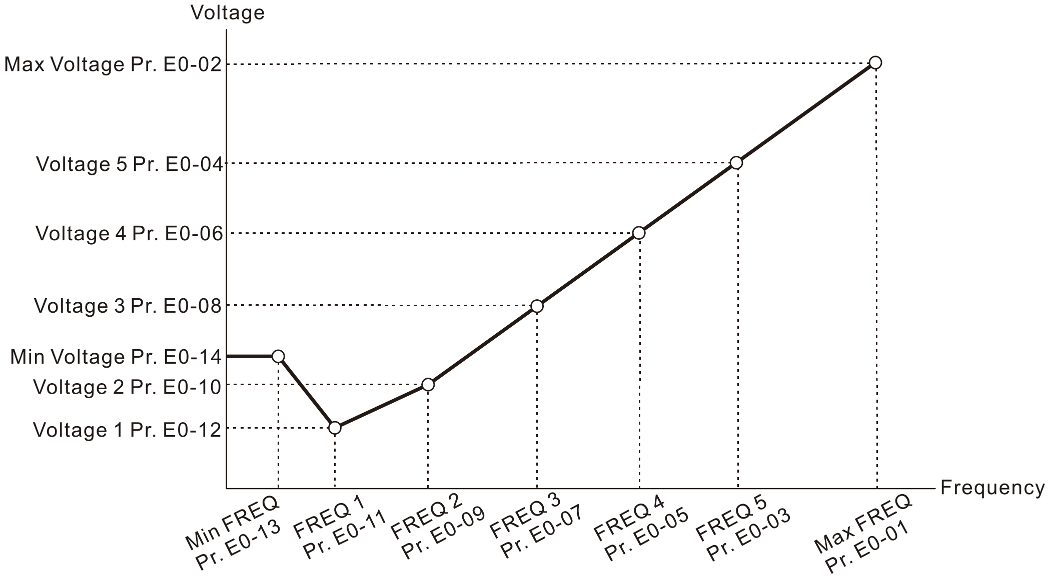
Settings Depending on the models

- You usually set the V/F curve according to the motor's allowable loading characteristics. Pay special attention to the motor's heat dissipation, dynamic balance, and bearing lubrication when the loading characteristics exceed the loading limit of the motor.
- There is no limit for the voltage setting, but a high voltage at a low frequency may cause motor damage, overheating, and trigger the stall prevention or the over-current protection; therefore, use low voltage at low frequency to prevent motor damage or drive error.
- The diagram below shows the V/F curve for motor 1. You can use the same V/F curve for motor 2–4.

Default



User Setting



✎ E0-16 IM1 VF Torque COMP Gain

(0x850) Default: 0.000

Settings 0.000–60.000 pu

- Setting 0 to disable this function.
- With a large motor load, a part of the drive output voltage is absorbed by the stator-winding resistor; therefore, the air gap magnetic field is insufficient. This causes insufficient voltage at motor induction and results in excessive output current but insufficient output torque. Auto-torque compensation can automatically adjust the output voltage according to the load and keep the air gap magnetic fields stable to get the optimal operation.
- In the V/F control, the voltage decreases in direct proportion with decreasing frequency. The torque decreases at low speed because of a decreasing AC impedance and an unchanged DC resistance. The auto-torque compensation function increases the output voltage at low frequency to get a higher starting torque.
- When the compensation gain is set too large, it may cause motor over-flux and result in a too large output current of the drive, motor overheating or trigger the drive's protection function.
- This parameter affects the output current when the drive runs. But the effect is smaller at the low-speed area.
- Set this parameter higher when the no-load current is too large, but the motor may vibrate if the setting is too high. If the motor vibrates when operating, reduce the setting.

✎ E0-17 IM1 VF Torque COMP Filter

(0x851) Default: 0.300

Settings 0.000–60.000 sec.

- When the time constant setting is too large, the control is stable, but the control response is slow. When the time constant setting is too small, the control response is faster, but the control may be unstable. For optimal setting, adjust the setting based on the control stability or the control response.

E0-19 IM1 VF Slip COMP Gain

(0x853) Default: 0.000

Settings 0.000–60.000 pu

- The induction motor needs constant slip to produce electromagnetic torque. It can be ignored at higher motor speeds, such as rated speed or 2–3% of slip.
- However, during the drive operation, the slip and the synchronous frequency are in reverse proportion to produce the same electromagnetic torque. The slip is larger with the reduction of synchronous frequency. Moreover, the motor may stop when the synchronous frequency decreases to a specific value. Therefore, the slip seriously affects the motor speed accuracy at low speed.
- In another situation, when you use an induction motor with the drive, the slip increases when the load increases. It also affects the motor speed accuracy.
- Use this parameter to set the compensation frequency and reduce the slip to maintain the synchronous speed when the motor runs at the rated current in order to improve the accuracy of the drive.
- Apply the slip compensation after load and acceleration. Increase the compensation value from small to large gradually. When operates in the motor rated load, if the actual speed ratio is slower than expected, increase the parameter setting value; otherwise, decrease the setting value.
- Setting 1 means the rated current corresponds to one times the rated slip; setting 0 to disable this function.
- After compensation, the motor has rated torque, and the steady-state speed error can be limited within 20% of the rated slip.

E0-20 IM1 VF Slip COMP Filter

(0x854) Default: 0.100

Settings 0.000–60.000 sec.

- If you set this parameter to 60.00 sec., the compensation response time is the slowest; set this parameter to 0, then there is no filter; however, the system may be unstable if you set the time too short.

E0-21 IM1 VF Hunt COMP Gain

(0x855) Default: 1.000

Settings 0.000–60.000 pu

- By adjusting the oscillation compensation gain, you can eliminate or improve the oscillation of the motor at certain frequencies.
- Setting 1 means the torque oscillating quantity per pu compensates 1 pu of frequency; setting 0 to disable this function.

E0-22 IM1 VF Hunt COMP Filter

(0x856) Default: 1.0

Settings 0.0–6000.0 sec.

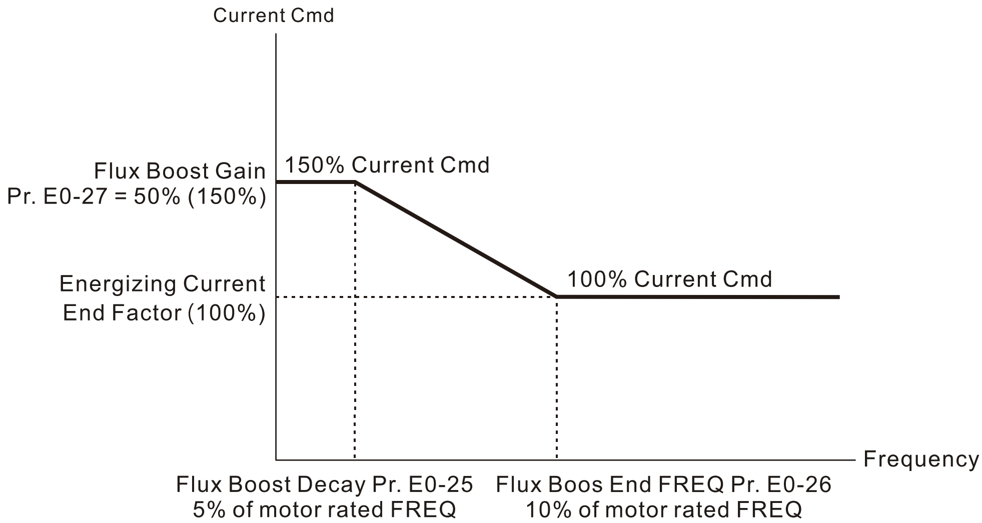
- The filter time constant of compensation frequency, set 0 for no filter.

E0-25 IM1 SVC Flux Boost Decay FREQ

(0x859) Default: 5

Settings 0–100%

- The SVC flux boost function can strengthen the excitation current command controlled by the low-frequency SVC to enhance the load capacity.
- When the frequency is higher than the setting of this parameter, the excitation current command decays.
- The set value corresponds to 100% of the motor rated frequency.



E0-26 IM1 SVC Flux Boost End FREQ

(0x85A) Default: 10

Settings 0–100%

- When the frequency reaches the set value of this parameter, the excitation current stops.
- The set value corresponds to 100% of the motor rated frequency.

E0-27 IM1 SVC Flux Boost Gain

(0x85B) Default: 20

Settings 0–100%

- The flux boost gain corresponds to 100% of the motor rated current, for example, when the parameter is set to 50, the output current is 150% of the motor rated current, which increases 50% of the excitation current.

E0-28 IM1 SVC Slip COMP Gain

(0x85C) Default: 1.000

Settings 0.000–2.000

- The induction motor needs constant slip to produce electromagnetic torque. It can be ignored at higher motor speeds, such as rated speed or 2–3% of slip.
- However, during the drive operation, the slip and the synchronous frequency are in reverse proportion to produce the same electromagnetic torque. The slip is larger with the reduction of synchronous frequency. Moreover, the motor may stop when the synchronous frequency decreases to a specific value. Therefore, the slip seriously affects the motor speed accuracy at low speed.

- In another situation, when you use an induction motor with the drive, the slip increases when the load increases. It also affects the motor speed accuracy.
- Use this parameter to set the compensation frequency and reduce the slip to maintain the synchronous speed when the motor runs at the rated current, in order to improve the accuracy of the drive.
- Apply the slip compensation after load and acceleration. Increase the compensation value from small to large gradually. When operates in the motor rated load, if the actual speed ratio is slower than expected, increase the parameter setting value; otherwise, decrease the setting value.

E0-29 IM1 SVC Slip COMP Filter

(0x85D) Default: 0.500

Settings 0.000–60.000 sec.

- If you set this parameter to 60 seconds, the compensation response time is the slowest; set the parameter to 0, then there is no filter; however, the system may be unstable if you set the time too short.

E0-30 IM1 SVC Torque COMP P Gain

(0x85E) Default: 0.050

Settings 0.000–60.000

E0-31 IM1 SVC Torque COMP I Gain

(0x85F) Default: 0.010

Settings 0.000–60.000

E0-32 IM1 SVC Torque COMP Filter

(0x860) Default: 0.500

Settings 0.000–60.000 sec.

- When the time constant setting is too large, the control is stable, but the control response is slow. When the time constant setting is too small, the control response is faster, but the control may be unstable. For optimal setting, adjust the setting based on the control stability or the control response.

E0-33 IM1 SVC Hunt COMP Gain

(0x861) Default: 0.500

Settings 0.000–60.000

- By adjusting the oscillation compensation gain, you can eliminate or improve the oscillation of the motor at certain frequencies.

E0-34 IM1 SVC Hunt COMP Filter

(0x862) Default: 1.0

Settings 0.0–6000.0 sec.

- The filter time constant of compensation frequency, set 0 for no filter.

E1. IM2 VF Control & SVC

E1-00 IM2 VF Curve Sel

(0x880) Default: 0

Settings
- 0: Manual VF curve
- 1: 1.5th power V/F curve
- 2: 2nd power V/F curve
- 3: 60Hz with rated 50Hz
- 4: 72Hz with rated 60Hz
- 5: 50 Hz, 3rd power decreasing
- 6: 50 Hz, 2nd power decreasing
- 7: 60 Hz, 3rd power decreasing
- 8: 60 Hz, 2nd power decreasing
- 9: 50Hz, Mid starting torque
- 10: 50Hz, Large starting torque
- 11: 60 Hz, Mid starting torque
- 12: 60 Hz, Large starting torque
- 13: 90 Hz with rated 60 Hz
- 14: 120 Hz with rated 60 Hz
- 15: 180 Hz with rated 60 Hz

✓ E1-01 IM2 VF Max FREQ

(0x881) Default: 60.00

Settings 3.00–599.00 Hz

✓ E1-02 IM2 VF Max Voltage

(0x882) Default: Depending on the models

Settings Depending on the models

✓ E1-03 IM2 VF Mid FREQ 5

(0x883) Default: 3.00

Settings 0.00–599.00 Hz

✓ E1-04 IM2 VF Mid Voltage 5

(0x884) Default: Depending on the models

Settings Depending on the models

✓ E1-05 IM2 VF Mid FREQ 4

(0x885) Default: 3.00

Settings 0.00–599.00 Hz

✓ E1-06 IM2 VF Mid Voltage 4

(0x886) Default: Depending on the models

Settings Depending on the models

✓	**E1-07**	IM2 VF Mid FREQ 3	
	(0x887)		Default: 3.00
		Settings 0.00–599.00 Hz	
✓	**E1-08**	IM2 VF Mid Voltage 3	
	(0x888)		Default: Depending on the models
		Settings Depending on the models	
✓	**E1-09**	IM2 VF Mid FREQ 2	
	(0x889)		Default: 3.00
		Settings 0.00–599.00 Hz	
✓	**E1-10**	IM2 VF Mid Voltage 2	
	(0x88A)		Default: Depending on the models
		Settings Depending on the models	
✓	**E1-11**	IM2 VF Mid FREQ 1	
	(0x88B)		Default: 1.50
		Settings 0.00–599.00 Hz	
✓	**E1-12**	IM2 VF Mid Voltage 1	
	(0x88C)		Default: Depending on the models
		Settings Depending on the models	
✓	**E1-13**	IM2 VF Min FREQ	
	(0x88D)		Default: 0.50
		Settings 0.00–599.00 Hz	
✓	**E1-14**	IM2 VF Min Voltage	
	(0x88E)		Default: Depending on the models
		Settings Depending on the models	
✓	**E1-16**	IM2 VF Torque COMP Gain	
	(0x890)		Default: 0.000
		Settings 0.000–60.000 pu	
✓	**E1-17**	IM2 VF Torque COMP Filter	
	(0x891)		Default: 0.300
		Settings 0.000–60.000 sec.	
✓	**E1-19**	IM2 VF Slip COMP Gain	
	(0x893)		Default: 0.000
		Settings 0.000–60.000 pu	
✓	**E1-20**	IM2 VF Slip COMP Filter	
	(0x894)		Default: 0.100
		Settings 0.000–60.000 sec.	

✐ **E1-21** IM2 VF Hunt COMP Gain

(0x895) Default: 1.000

Settings 0.000–60.000 pu

✐ **E1-22** IM2 VF Hunt COMP Filter

(0x896) Default: 1.0

Settings 0.0–6000.0 sec.

✐ **E1-25** IM2 SVC Flux Boost Decay FREQ

(0x899) Default: 5

Settings 0–100%

✐ **E1-26** IM2 SVC Flux Boost End FREQ

(0x89A) Default: 10

Settings 0–100%

✐ **E1-27** IM2 SVC Flux Boost Gain

(0x89B) Default: 20

Settings 0–100%

✐ **E1-28** IM2 SVC Slip COMP Gain

(0x89C) Default: 1.000

Settings 0.000–2.000

✐ **E1-29** IM2 SVC Slip COMP Filter

(0x89D) Default: 0.500

Settings 0.000–60.000 sec.

✐ **E1-30** IM2 SVC Torque COMP P Gain

(0x89E) Default: 0.050

Settings 0.000–60.000

✐ **E1-31** IM2 SVC Torque COMP I Gain

(0x89F) Default: 0.010

Settings 0.000–60.000

✐ **E1-32** IM2 SVC Torque COMP Filter

(0x8A0) Default: 0.500

Settings 0.000–60.000 sec.

✐ **E1-33** IM2 SVC Hunt COMP Gain

(0x8A1) Default: 0.500

Settings 0.000–60.000

✐ **E1-34** IM2 SVC Hunt COMP Filter

(0x862) Default: 1.0

Settings 0.0–6000.0 sec.

📖 Refer to descriptions of Parameter Group E0 (IM1 VF Control & SVC).

E2. IM3 VF Control & SVC

E2-00 IM3 VF Curve Sel

(0x8C0) Default: 0

Settings
0: Manual VF curve
1: 1.5th power V/F curve
2: 2nd power V/F curve
3: 60Hz with rated 50Hz
4: 72Hz with rated 60Hz
5: 50 Hz, 3rd power decreasing
6: 50 Hz, 2nd power decreasing
7: 60 Hz, 3rd power decreasing
8: 60 Hz, 2nd power decreasing
9: 50Hz, Mid starting torque
10: 50Hz, Large starting torque
11: 60Hz, Mid starting torque
12: 60Hz, Large starting torque
13: 90Hz with rated 60Hz
14: 120Hz with rated 60Hz
15: 180Hz with rated 60Hz

E2-01 IM3 VF Max FREQ

(0x8C1) Default: 60.00

Settings 3.00–599.00 Hz

E2-02 IM3 VF Max Voltage

(0x8C2) Default: Depending on the models

Settings Depending on the models

E2-03 IM3 VF Mid FREQ 5

(0x8C3) Default: 3.00

Settings 0.00–599.00 Hz

E2-04 IM3 VF Mid Voltage 5

(0x8C4) Default: Depending on the models

Settings Depending on the models

E2-05 IM3 VF Mid FREQ 4

(0x8C5) Default: 3.00

Settings 0.00–599.00 Hz

E2-06 IM3 VF Mid Voltage 4

(0x8C6) Default: Depending on the models

Settings Depending on the models

E2-07 IM3 VF Mid FREQ 3
(0x8C7) Default: 3.00

Settings 0.00–599.00 Hz

E2-08 IM3 VF Mid Voltage 3
(0x8C8) Default: Depending on the models

Settings Depending on the models

E2-09 IM3 VF Mid FREQ 2
(0x8C9) Default: 3.00

Settings 0.00–599.00 Hz

E2-10 IM3 VF Mid Voltage 2
(0x8CA) Default: Depending on the models

Settings Depending on the models

E2-11 IM3 VF Mid FREQ 1
(0x8CB) Default: 1.50

Settings 0.00–599.00 Hz

E2-12 IM3 VF Mid Voltage 1
(0x8CC) Default: Depending on the models

Settings Depending on the models

E2-13 IM3 VF Min FREQ
(0x8CD) Default: 0.50

Settings 0.00–599.00 Hz

E2-14 IM3 VF Min Voltage
(0x8CE) Default: Depending on the models

Settings Depending on the models

E2-16 IM3 VF Torque COMP Gain
(0x8D0) Default: 0.000

Settings 0.000–60.000 pu

E2-17 IM3 VF Torque COMP Filter
(0x8D1) Default: 0.300

Settings 0.000–60.000 sec.

E2-19 IM3 VF Slip COMP Gain
(0x8D3) Default: 0.000

Settings 0.000–60.000 pu

E2-20 IM3 VF Slip COMP Filter
(0x8D4) Default: 0.100

Settings 0.000–60.000 sec.

✓	**E2-21**	IM3 VF Hunt COMP Gain	
	(0x8D5)		Default: 1.000
		Settings 0.000–60.000 pu	
✓	**E2-22**	IM3 VF Hunt COMP Filter	
	(0x8D6)		Default: 1.0
		Settings 0.0–6000.0 sec.	
✓	**E2-25**	IM3 SVC Flux Boost Decay FREQ	
	(0x8D9)		Default: 5
		Settings 0–100%	
✓	**E2-26**	IM3 SVC Flux Boost End FREQ	
	(0x8DA)		Default: 10
		Settings 0–100%	
✓	**E2-27**	IM3 SVC Flux Boost Gain	
	(0x8DB)		Default: 20
		Settings 0–100%	
✓	**E2-28**	IM3 SVC Slip COMP Gain	
	(0x8DC)		Default: 1.000
		Settings 0.000–2.000	
✓	**E2-29**	IM3 SVC Slip COMP Filter	
	(0x8DD)		Default: 0.500
		Settings 0.000–60.000 sec.	
✓	**E2-30**	IM3 SVC Torque COMP P Gain	
	(0x8DE)		Default: 0.050
		Settings 0.000–60.000	
✓	**E2-31**	IM3 SVC Torque COMP I Gain	
	(0x8DF)		Default: 0.010
		Settings 0.000–60.000	
✓	**E2-32**	IM3 SVC Torque COMP Filter	
	(0x8E0)		Default: 0.500
		Settings 0.000–60.000 sec.	
✓	**E2-33**	IM3 SVC Hunt COMP Gain	
	(0x8E1)		Default: 0.500
		Settings 0.000–60.000	
✓	**E2-34**	IM3 SVC Hunt COMP Filter	
	(0x8E2)		Default: 1.0
		Settings 0.0–6000.0 sec.	

📖 Refer to descriptions of Parameter Group E0 (IM1 VF Control & SVC).

E3. IM4 VF Control & SVC

E3-00 IM4 VF Curve Sel

(0x900) Default: 0

Settings
- 0: Manual VF curve
- 1: 1.5th power V/F curve
- 2: 2nd power V/F curve
- 3: 60Hz with rated 50Hz
- 4: 72Hz with rated 60Hz
- 5: 50 Hz, 3rd power decreasing
- 6: 50 Hz, 2nd power decreasing
- 7: 60 Hz, 3rd power decreasing
- 8: 60 Hz, 2nd power decreasing
- 9: 50Hz, Mid starting torque
- 10: 50Hz, Large starting torque
- 11: 60Hz, Mid starting torque
- 12: 60Hz, Large starting torque
- 13: 90Hz with rated 60Hz
- 14: 120Hz with rated 60Hz
- 15: 180Hz with rated 60Hz

E3-01 IM4 VF Max FREQ

(0x901) Default: 60.00

Settings 3.00–599.00 Hz

E3-02 IM4 VF Max Voltage

(0x902) Default: Depending on the models

Settings Depending on the models

E3-03 IM4 VF Mid FREQ 5

(0x903) Default: 3.00

Settings 0.00–599.00 Hz

E3-04 IM4 VF Mid Voltage 5

(0x904) Default: Depending on the models

Settings Depending on the models

E3-05 IM4 VF Mid FREQ 4

(0x905) Default: 3.00

Settings 0.00–599.00 Hz

E3-06 IM4 VF Mid Voltage 4

(0x906) Default: Depending on the models

Settings Depending on the models

✔ E3-07 IM4 VF Mid FREQ 3
(0x907) Default: 3.00

Settings 0.00–599.00 Hz

✔ E3-08 IM4 VF Mid Voltage 3
(0x908) Default: Depending on the models

Settings Depending on the models

✔ E3-09 IM4 VF Mid FREQ 2
(0x909) Default: 3.00

Settings 0.00–599.00 Hz

✔ E3-10 IM4 VF Mid Voltage 2
(0x90A) Default: Depending on the models

Settings Depending on the models

✔ E3-11 IM4 VF Mid FREQ 1
(0x90B) Default: 1.50

Settings 0.00–599.00 Hz

✔ E3-12 IM4 VF Mid Voltage 1
(0x90C) Default: Depending on the models

Settings Depending on the models

✔ E3-13 IM4 VF Min FREQ
(0x90D) Default: 0.50

Settings 0.00–599.00 Hz

✔ E3-14 IM4 VF Min Voltage
(0x90E) Default: Depending on the models

Settings Depending on the models

✔ E3-16 IM4 VF Torque COMP Gain
(0x910) Default: 0.000

Settings 0.000–60.000 pu

✔ E3-17 IM4 VF Torque COMP Filter
(0x911) Default: 0.300

Settings 0.000–60.000 sec.

✔ E3-19 IM4 VF Slip COMP Gain
(0x913) Default: 0.000

Settings 0.000–60.000 pu

✔ E3-20 IM4 VF Slip COMP Filter
(0x914) Default: 0.100

Settings 0.000–60.000 sec.

E3-21 IM4 VF Hunt COMP Gain
(0x915) Default: 1.000

Settings 0.000–60.000 pu

E3-22 IM4 VF Hunt COMP Filter
(0x916) Default: 1.0

Settings 0.0–6000.0 sec.

E3-25 IM4 SVC Flux Boost Decay FREQ
(0x919) Default: 5

Settings 0–100%

E3-26 IM4 SVC Flux Boost End FREQ
(0x91A) Default: 10

Settings 0–100%

E3-27 IM4 SVC Flux Boost Gain
(0x91B) Default: 20

Settings 0–100%

E3-28 IM4 SVC Slip COMP Gain
(0x91C) Default: 1.000

Settings 0.000–2.000

E3-29 IM4 SVC Slip COMP Filter
(0x91D) Default: 0.500

Settings 0.000–60.000 sec.

E3-30 IM4 SVC Torque COMP P Gain
(0x91E) Default: 0.050

Settings 0.000–60.000

E3-31 IM4 SVC Torque COMP I Gain
(0x91F) Default: 0.010

Settings 0.000–60.000

E3-32 IM4 SVC Torque COMP Filter
(0x920) Default: 0.500

Settings 0.000–60.000 sec.

E3-33 IM4 SVC Hunt COMP Gain
(0x921) Default: 0.500

Settings 0.000–60.000

E3-34 IM4 SVC Hunt COMP Filter
(0x922) Default: 1.0

Settings 0.0–6000.0 sec.

Refer to descriptions of Parameter Group E0 (IM1 VF Control & SVC).

E4. SM SVC

E4-00 SM LowFREQ Voltage COMP Level

(0x940) Default: 40

Settings 0–150%

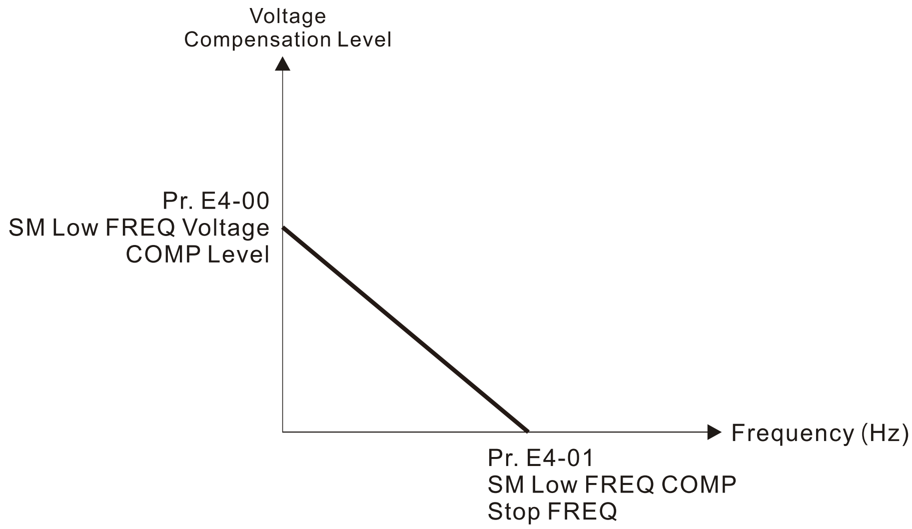
- Provide the output voltage at low frequency. Increase this parameter to enhance the loading performance at low frequency, and to avoid failure to start under load starting conditions.

E4-01 SM LowFREQ COMP Stop FREQ

(0x941) Default: 20.00

Settings 0.00–599.00 Hz

- Sets the stop frequency for low-frequency compensation voltage.
- When controlling at low frequency, the motor may vibrate due to insufficient load capacity. Increase this parameter if the motor vibrates at frequency that close to the SM low frequency compensation stop frequency.



E4-02 SM Feed Forward Voltage Gain

(0x942) Default: 1.00

Settings 0.00–2.00

- Adjusts the SMSVC voltage feedback forward gain, and to meet the demand of rapid feedback application.
- Pr.E4-02 = 1.00 means forward feedback = Ke × motor rotor speed

E4-03 SM FREQ Hunting Gain

(0x943) Default: 0.100

Settings 0.000–60.000

- Suppress frequency oscillation at start-up, increase the gain if low-frequency vibration occurs at the output frequency, and decrease the gain if high-frequency vibration occurs.
- If the adjustment is too large or too small, the system control may be unstable. Adjust the gain according to the motor parameters and load applications.
- 0: no compensation.

✎ E4-04 SM FREQ Hunting Filter

(0x944) Default: 0.100

Settings 0.000–60.000 sec.

📖 The filter time constant of compensation oscillation, set 0 for no filter.

✎ E4-05 SM Torque COMP Gain

(0x945) Default: 0.010

Settings 0.000–60.000

📖 The torque compensation function increases the output voltage at low frequency to get a higher starting torque.

📖 When the compensation gain is set too large, it may cause motor over-flux and result in a too large output current of the drive, motor overheating or trigger the drive's protection function.

📖 Set this parameter higher when the no-load current is too large, but the motor may vibrate if the setting is too high. If the motor vibrates when operating, reduce the setting.

📖 This parameter improves the output current during operation. The impact in the low speed is smaller.

✎ E4-06 SM Torque COMP Filter

(0x946) Default: 0.100

Settings 0.000–60.000 sec.

📖 When the time constant setting is too large, the control is stable, but the control response is slow. When the time constant setting is too small, the control response is faster, but the control may be unstable. For optimal setting, adjust the setting based on the control stability or the control response.

✎ E4-07 SM Angle Hunting Gain

(0x947) Default: 8.0

Settings 0.0–6000.0

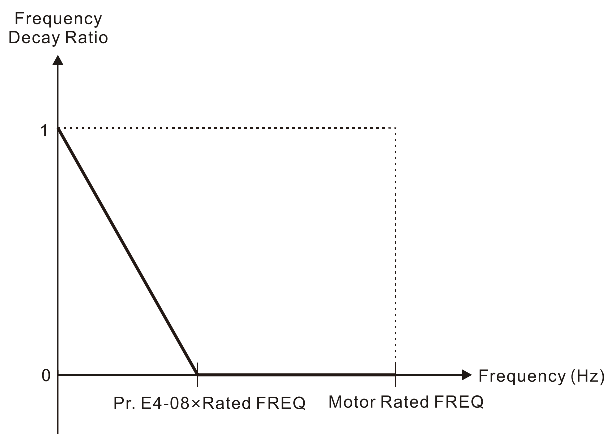
✎ E4-08 SM Angle Hunting Decay FREQ

(0x948) Default: 0.4

Settings 0.0–6000.0

📖 When the output frequency is > Pr.E4-08 × rated frequency, there is no angle compensation.

📖 Increase this frequency parameter if there is oscillation with this frequency point during adjustment.



F. FOC

F0. IM FOC

✎ **F0-00** IMFOC Speed Observer BW

(0xAC0) Default: 40

Settings	1–1000 Hz

📖 Sets the speed observer bandwidth, a higher setting value makes the response of speed observer faster, but the noise will also increase.

✎ **F0-01** IMFOC Speed Observer Filter

(0xAC1) Default: 0.005

Settings	0.000–3.000 sec.

📖 The filter time of speed observer, set this parameter to 0 for no filter.

F0-02 IMFOC Min Stator FREQ Level

(0xAC2) Default: 2.0

Settings	0.0–10.0%

📖 Sets the stator frequency lower limit in operation status. This setting ensures the stability and accuracy of observer and avoids interferences from voltage, current and motor parameters.

✎ **F0-06** IMFOC Flux Boost Gain

(0xAC6) Default: 50

Settings	0–100%

📖 When the frequency command is between the IMFOC flux boost decay frequency and the IMFOC flux boost end frequency, set this parameter to increase the flux boost gain. Take the no-load current as 100%.

✎ **F0-07** IMFOC Flux Boost Decay FREQ

(0xAC7) Default: 4

Settings	0–6%

📖 The start frequency of low-speed flux boost decay. Take the rated frequency as 100%.

✎ **F0-08** IMFOC Flux Boost End FREQ

(0xAC8) Default: 20

Settings	0–30%

📖 The end frequency of low-speed flux boost decay. Take the rated frequency as 100%.

F1. SM FOC

F1-00 IF/HFI Sel

(0xB00) Default: 1

Settings 0: HFI
1: IF

- If the motor is IPM, PMA or SynRM, we suggest choosing HFI as low-frequency operation method, and adjust with Pr.F1-02, F1-06 and F1-07.
- If the motor is SPM, choose IF as low-frequency operation method, and adjust with Pr.F1-01.

F1-01 IF Cmd

(0xB01) Default: 40

Settings 0–150%

- Sets the current command when the drive operates in the low-speed area (the area whose frequency command is less than Pr.F1-04 is the low-speed area). When starting with heavy load or the forward and reverse operation stalls with load, increase setting for Pr.F1-01; if the starting current is too large or causes oc stall, decrease this parameter.

F1-02 HFI PLL BW Gain

(0xB02) Default: 100

Settings 10–500%

- This parameter affects the speed response when HFI starts. If you need fast response or rapid acceleration, increase this parameter; if there is speed wave or current oscillation, decrease this parameter.

F1-03 Speed Observer Filter BW

(0xB03) Default: 10

Settings 0–100 Hz

- Sets the speed observer bandwidth, a higher setting value makes the response of speed observer faster, but the noise will also increase.

F1-04 IF/HFI to SM Switch FREQ

(0xB04) Default: 20.00

Settings 0.00–599.00 Hz

F1-05 SM to IF/HFI Switch FREQ

(0xB05) Default: 20.00

Settings 0.00–599.00 Hz

- Sets the frequency for switching from low frequency to high frequency and sets the switch point for high and low frequencies of the speed observer.
- Sets the frequency for switching from high frequency to low frequency and sets the switch point for high and low frequencies of the speed observer.
- If the switch frequency is too low, the motor does not generate enough back-EMF to let the speed observer measure the right position and speed of the rotor when running at the switch frequency.

- If the switch frequency is too high, the active range of I/F is too wide, which generates a larger current without energy saving. (If the current value for Pr.F1-01 is too high, the high switch frequency makes the drive continue to output with Pr.F1-01 setting value.)

✓ F1-06 HFI Injection FREQ

(0xB06) Default: 500

Settings 200–1200 Hz

- If the motor has high-frequency excitation noise, decrease setting for this parameter, but not less than 1/10 of the carrier frequency.

✓ F1-07 HFI Injection Amplitude

(0xB07) Default: 15

Settings 0–100%

- This parameter affects the starting performance of HFI. if the HFI cannot be started or has low-frequency speed oscillation, increase setting for this parameter; however, this will make the high-frequency excitation noise more obvious.

✓ F1-08 Observer Low Speed Gain

(0xB08) Default: 100

Settings 10–1000%

- Sets the observer gain when the observer speed is less than 1/5 of the motor rated speed.
- Increase setting for this parameter to enhance the loading capacity at start.

✓ F1-09 Observer High Speed Gain

(0xB09) Default: 100

Settings 10–1000%

- Sets the observer gain when the observer speed is larger than or equal to 1/5 of the motor rated speed.
- Increase setting for this parameter to enhance the loading capacity at high-speed area and the observer response.
- When there is speed oscillation at high-speed area, decrease setting for this parameter.

✓ F1-10 PLL P Gain

(0xB0A) Default: 100

Settings 10–1000%

- Increase setting for this parameter to enhance the loading capacity at high-speed area and the observer response.
- When the speed output frequency has high-frequency fluctuations, decrease setting for this parameter.

✓ F1-11 PLL I Gain

(0xB0B) Default: 100

Settings 10–1000%

- Decrease setting for this parameter to enhance the speed response during acceleration and deceleration.

F2. ASR Setting

F2-00 Motor Inertia

(0xB40) Default: Depending on the models

Settings 0.1–1000000.0 kg-cm^2

📖 The rotor inertia corresponded to the motor.

📖 IM system inertia value (unit: kg-cm^2):

HP	kW	Setting	HP	kW	Setting	HP	kW	Setting
1	0.75	2.3	40	30	202.5	300	220	5139.0
2	1.5	4.3	50	37	355.5	340	250	5981.0
3	2.2	8.3	60	45	410.8	375	280	5981.0
5	3.7	14.8	75	55	494.8	425	315	5981.0
5	4.0	26.0	100	75	1056.5	475	355	5981.0
7	5.5	26.0	125	90	1275.3	530	400	5981.0
10	7.5	35.8	150	110	1900.0	600	450	5981.0
15	11	74.3	175	132	2150.0	675	500	5981.0
20	15	95.3	215	160	2800.0	750	560	5981.0
25	18.5	142.8	250	185	3550.0			
30	22	176.5	270	200	5139.0			

F2-01 System Inertia

(0xB42) Default: 1.00

Settings 0.01–600.00

📖 The rotor inertia corresponded to the system.

📖 Perform the operation test with load, run the motor in acceleration, deceleration and steady speed and observe the values. If values between speed feedback and speed command are close, steady-state error is small and overshoot is less, then this inertia is a better one.

📖 If the Iq current command from ASR has high-frequency glitch, then decrease the setting. If the response time of sudden loading is too slow, then increase the setting.

F2-02 ASR Calculation Sel

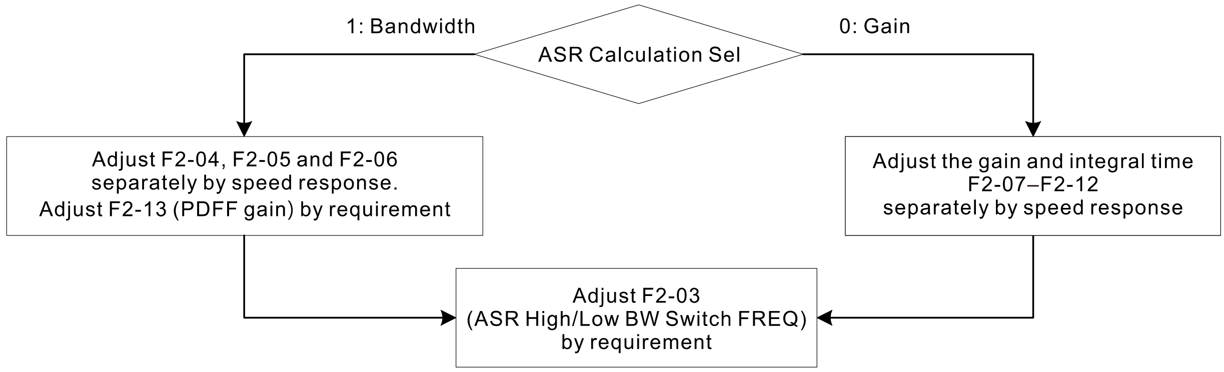
(0xB43) Default: 1

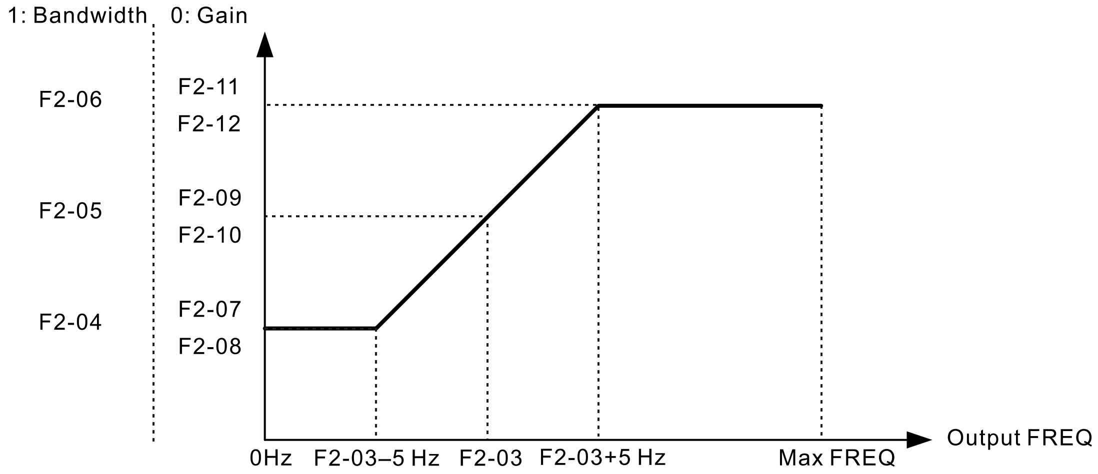
Settings 0: Gain

1: Bandwidth

📖 1: Bandwidth, use Pr.F2-04–F2-06 for adjustment.

📖 0: Gain, use Pr.F2-07–F2-12 for adjustment.





F2-03 ASR High/ Low BW Switch FREQ

(0xB44) Default: 7.00

Settings 0.00–Max. operation frequency (Hz)

- Sets the low-speed and high-speed ASR switching point in the FOC area. Provides flexibility to meet two needs: in the high-speed region of the estimator switch point it has a high response, and in the low-speed region of the estimator switch point it has a lower response. The recommended switching point is higher than Pr.F1-04.
- A low setting does not cover Pr.F1-04. If the setting is too high, the high-speed range is too narrow.

✓ F2-04 ASR Zero-Speed BW

(0xB45) Default: 3.0

Settings 0.1–750.0 Hz

✓ F2-05 ASR Low-Speed BW

(0xB46) Default: 3.0

Settings 0.1–750.0 Hz

✓ F2-06 ASR High-Speed BW

(0xB47) Default: 3.0

Settings 0.1–750.0 Hz

- When setting F2-02 as 1: Bandwidth, you can adjust Pr.F2-04–F2-06 separately by speed response. The larger the setting value, the faster the response.
- When the holding torque is required to zero speed or stable frequency output is required at extremely low speed, properly increase setting for ASR zero speed bandwidth.

- When the output frequency oscillates at low-speed or the response is slow, increase setting for ASR low speed bandwidth.
- When the output current fluctuates severely at high speed and causes the machine to vibrate, decrease setting for ASR high speed bandwidth.

✐ F2-07 ASR Zero-Speed Gain

(0xB48) Default: 3.0

Settings 0.1–750.0 Hz

✐ F2-08 ASR Zero-Speed Integral Time

(0xB49) Default: 0.100

Settings 0.001–10.000 sec.

✐ F2-09 ASR Low-Speed Gain

(0xB4A) Default: 3.0

Settings 0.1–750.0 Hz

✐ F2-10 ASR Low-Speed Integral Time

(0xB4B) Default: 0.100

Settings 0.001–10.000 sec.

✐ F2-11 ASR High-Speed Gain

(0xB4C) Default: 3.0

Settings 0.1–750.0 Hz

✐ F2-12 ASR High-Speed Integral Time

(0xB4D) Default: 0.100

Settings 0.001–10.000 sec.

- When setting F2-02 as 0: Gain, you can adjust Pr.F2-07–F2-12 separately by speed response.
- The larger the setting value of gain, the faster the response, but fluctuation and oscillation may easily occur.
- The smaller the setting value of time, the faster the response, but fluctuation and oscillation may easily occur.

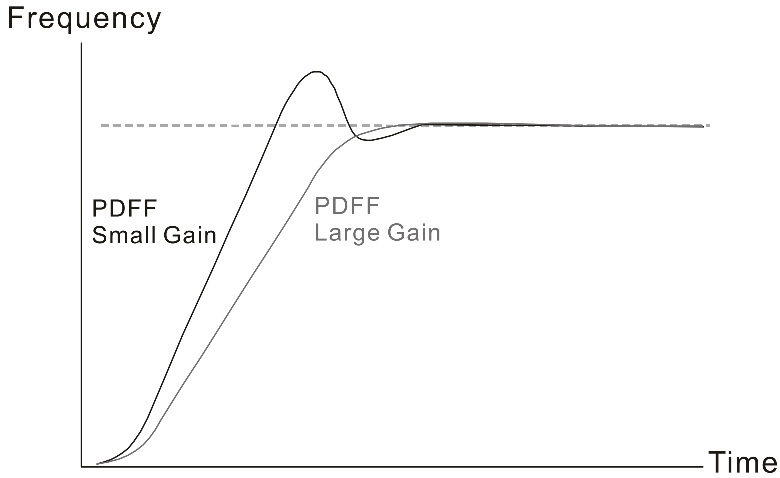
✐ F2-13 PDFF Gain

(0xB4E) Default: 0.30

Settings 0.00–1.00 pu

- When Pr.d0-00 is set to 7, this parameter is invalid.
- When Pr.F2-02 is set to 1, this parameter is valid.
- If it is set to 0 pu, the control structure is pure IP control, which has the characteristics of a second-order system. Under the same bandwidth design, it has the advantages of fast response and anti-noise, but it will overshoot easily. If it is set to 1 pu, the control structure is pure PI control, which has the characteristics of a first-order system. The response is slower under the same bandwidth design, but it will not overshoot easily.
- To suppress speed overshoot, you can set the parameter to 0 first, and then increase the setting value to “a condition with best acceleration and without overshoot” when the acceleration time meets your application but overshoot occurs.

- Increase the setting improves the overshoot of speed tracking, but an excessive value may reduce the transient response.
- Increase the setting enhances the system stiffness in high-speed steady state and reduce the speed transient fluctuation at a sudden loading.
- Ensure that you set Pr.F2-01 system inertia correctly to get excellent improvement of the speed response.



✔ F2-14 ASR Speed Feedforward Gain

(0xB4F) Default: 0.00

Settings 0.00–100.00 pu

- The function enables when Pr.F2-02 = 0: Gain.
- Increase the setting for this parameter to reduce command tracking difference and improve the speed response. Use this function for speed tracking applications.
- Ensure that you set Pr.F2-01 system inertia correctly to get excellent improvement of the speed response.

✔ F2-15 Torque Cmd Filter Time

(0xB50) Default: 5.0

Settings 0.0–6000.0 ms

- When the time constant setting is too large, the control is stable, but the control response is slow. When the time constant setting is too small, the control response is faster, but the control may be unstable. For optimal setting, adjust the setting based on the control stability or the control response.

F2-16 FWD Motoring Torque Limit

(0xB51) Default: 250.00

F2-17 FWD Regenerating Torque Limit

(0xB52) Default: 250.00

F2-18 REV Motoring Torque Limit

(0xB53) Default: 250.00

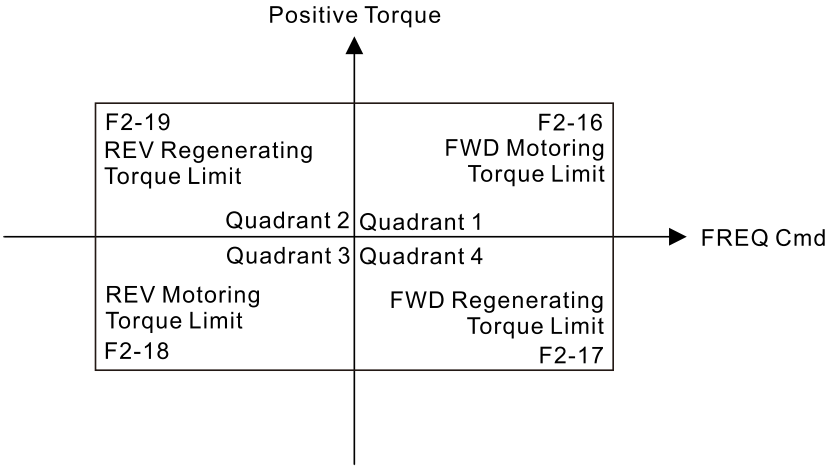
F2-19 REV Regenerating Torque Limit

(0xB54) Default: 250.00

Settings 0.00–300.00%

📖 Pr.F2-16–F2-19 limit the output torque and only apply to IMFOC and SMFOC control modes, the percentage base value is the motor rated torque.

📖 The calculation equation for the motor rated torque: $T(N-M)=\frac{P(Watt)}{\omega(rad/s)}$, P(W) value = Pr.d1-01; ω (rad/s) = Pr.d1-04, $\frac{RPM\times 2\pi}{60}=rad/s$.



F2-20 IMFOC AMR BW

(0xB55) Default: 10.0

Settings 0.1–750.0 Hz

📖 Sets the response speed of excitation axis (d-axis) control command, the time constant of control command is $1/[(F2-20)\times 2\pi]$ sec.

F2-21 IMFOC AMR Voltage Limit

(0xB56) Default: 95

Settings 0–100%

📖 Sets the voltage limit of excitation axis (d-axis) control command, 100% corresponds to the current DC bus voltage.

📖 When the back EMF reaches this voltage limit, it enters the flux weakening control.

F2-22 SMFOC AMR Kp Gain

(0xB57) Default: 1.00

Settings 0.00–3.00

F2-23 SMFOC AMR Ki Gain

(0xB58) Default: 0.20

Settings 0.00–3.00

📖 Active Magnetic Regulator Kp / Ki. Affects the response of magnetic regulation in the low magnetic area.

📖 If entering the low magnetic area and the input voltage (or DC bus) plummets (e.g., an unstable power net causes instant insufficient voltage, or a sudden load that makes DC bus drop), which causes the ACR diverge and oc, then increase the gain. If the Id value of a spur creates large noise in high-frequency output current, decrease the gain to reduce the noise, but it will also slow down the response.

F2-24 SMFOC AMR Id Filter Coefficient

(0xB59) Default: 10

Settings 0–1000

📖 Sets the filter coefficient of Active Magnetic Regulator Id current in the flux weakening area.

F3. ACR Setting

F3-00 ACR Gain Calculation Sel

(0xB80) Default: 1

Settings 0: ACR BW
1: BW Calculated by CF

📖 0: ACR bandwidth calculation gain, use Pr.F3-01 as a fixed bandwidth value.

📖 1: Bandwidth calculated by carrier frequency, keep the set value 1 for general user that does not need high torque response.

F3-01 ACR BW

(0xB81) Default: 300

Settings 10–3000 Hz

📖 When setting F3-00 as 0: ACR BW, you can adjust Pr.F3-01 separately by current response. The larger the setting value, the faster the response. The converged time constant for current control is $1/([(F3-01)\times 2\pi]$ sec.

F3-02 ACR d-Axis Kp Gain

(0xB82) Default: 1.00

Settings 0.01–100.00 pu

📖 For adjusting the transient response of excitation axis (d-axis), the larger the setting value, the faster the response. If you set the value too large, it may cause current oscillation.

F3-03 ACR d-Axis Ki Gain

(0xB83) Default: 1.00

Settings 0.01–100.00 pu

📖 For adjusting the response of excitation axis (d-axis) in steady state, the larger the setting value, the faster the response. If you set the value too large, it may cause current oscillation.

F3-04 ACR q-Axis Kp Gain

(0xB84) Default: 1.00

Settings 0.01–100.00 pu

📖 For adjusting the transient response of torque axis (q-axis), the larger the setting value, the faster the response. If you set the value too large, it may cause current oscillation.

F3-05 ACR q-Axis Ki Gain

(0xB85) Default: 1.00

Settings 0.01–100.00 pu

📖 For adjusting the response of torque axis (q-axis) in steady-state, the larger the setting value, the faster the response. If you set the value too large, it may cause current oscillation.

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G. IO Setting

G0. MI Setting

G0-00 MI Mode Sel

(0xCC0) Default: 0

Settings 0: Low Active

1: High Active

G0-01 MI Status

(0xCC1) Default: Read only

Settings 0: Inactive

1: Active

- The displayed parameter format of MI mode selection and MI status is 000000b–111111b. The bits from right (bit0) to left (bit5) correspond to MI1–MI6 respectively, and bit8–13 correspond to MI10–MI15.
- MI mode selection defines the corresponding input meaning of MI signal as action (1) / no action (0).
- Take low active as an example, when MIx status is OFF, Pr.G0-01 MIx displays 0; when MIx status is ON, Pr.G0-01 MIx displays 1.

MI status	G0-00 MI Mode Sel	
	Low Active	High Active
ON	Action	No action
OFF	No action	Action

- The entity and virtual MI signals determine the MI enable status through the response time and mode selection (level setting). Refer to Figure 1 - MI signal processing diagram for the MI action logic.

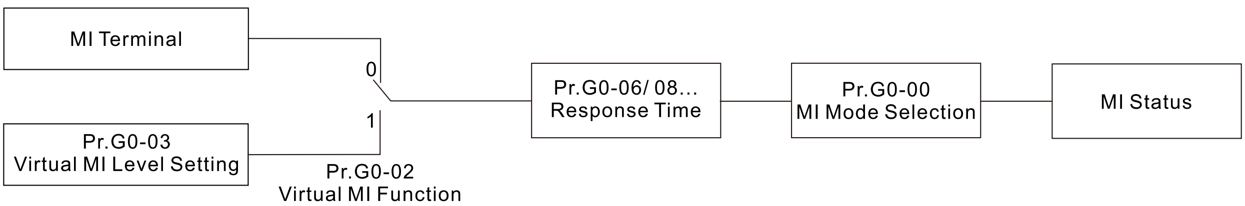


Figure 1 - MI signal processing diagram

G0-02 Virtual MI Function

(0xCC2) Default: 0

Settings 0: Disable

1: Enable

G0-03 Virtual MI Level Setting

(0xCC3) Default: 0

Settings 0: Low

1: High

- The function of virtual MI is the same as that of the entity MI terminals, the difference is that the former can set the action of the virtual MI through parameters. Refer to description of Pr.G0-00/ G0-01 for the action logic.

📖 The displayed parameter format of virtual MI function and level setting is 000000b–111111b. The bits from right (bit0) to left (bit5) correspond to MI1–MI6 respectively, and bit8–13 correspond to MI10–MI15.

⌁ **G0-05**	MI1 Function Sel	
(0xCC5)		Default: 0
⌁ **G0-07**	MI2 Function Sel	
(0xCC7)		Default: 0
⌁ **G0-09**	MI3 Function Sel	
(0xCC9)		Default: 0
⌁ **G0-11**	MI4 Function Sel	
(0xCCB)		Default: 0
⌁ **G0-13**	MI5 Function Sel	
(0xCCD)		Default: 0
⌁ **G0-15**	MI6 Function Sel	
(0xCCF)		Default: 0

Settings 0000h: Disable
0040h: A1-00 EX1/ EX2 Switch Src
0042h: A1-02 EX1 S1 Src
0043h: A1-03 EX1 S2 Src
0044h: A1-04 EX1 S3 Src
0049h: A1-09 EX2 S1 Src
004Ah: A1-10 EX2 S2 Src
004Bh: A1-11 EX2 S3 Src
0050h: A1-16 Halt MI Src
0051h: A1-17 Lock MI Src
0055h: A1-21 Run Enable MI Src
005Dh: A1-29 Base Block MI Src
0060h: A1-32 External Fault MI Src
0081h: A2-01 Quick Stop MI Src
0083h: A2-03 Emergency Stop MI Src
0101h: A4-01 AUTO Lock MI Src
0105h: A4-05 LoRe Switch Src
0106h: A4-06 Remote Lock MI Src
044Bh: C1-11 Pulse Train MI Src
044Dh: C1-13 FREQ Cmd Up Key MI Src
044Eh: C1-14 FREQ Cmd Down Key MI Src
0453h: C1-19 Multi Speed MI Src 1
0454h: C1-20 Multi Speed MI Src 2
0455h: C1-21 Multi Speed MI Src 3
0456h: C1-22 Multi Speed MI Src 4
0467h: C1-39 AI Res Switch MI Src

048Fh: C2-15 Accel/Decel Switch MI Src 1
0490h: C2-16 Accel/Decel Switch MI Src 2
04C3h: C3-03 JOG MI Src
0641h: d0-01 IM Switch MI Src 1
0642h: d0-02 IM Switch MI Src 2
0645h: d0-05 Y-con Confirm MI Src
0646h: d0-06 D-con Confirm MI Src
0CD1h: G0-17 MI Count Src
0CD2h: G0-18 MI Count Clear Src
0F40h: H0-00 Fault Reset MI Src
0F44h: H0-04 Fault Restart MI Src
12C0h: J4-00 Preheat MI Src
1302h: J5-02 FireMode MI Src
1304h: J5-04 FireMode Direction MI Src
1344h: J6-04 Time Function 1 MI Src
1345h: J6-05 Time Function 2 MI Src
1346h: J6-06 Time Function 3 MI Src
1407h: L0-07 InnerPLC Mode Switch Src 1
1408h: L0-08 InnerPLC Mode Switch Src 2
1880h: P0-00 P-PID1/ P-PID2 Switch Src
1892h: P0-18 P-PID1 Setpoint Freeze Src
1894h: P0-20 P-PID1 Multi Setpoint Src 1
1895h: P0-21 P-PID1 Multi Setpoint Src 2
18A1h: P0-33 P-PID1 Output Freeze Src
18ACh: P0-44 P-PID1 Track Enable Src
18D1h: P1-17 P-PID2 Setpoint Freeze Src
18D3h: P1-19 P-PID2 Multi Setpoint Src 1
18D4h: P1-20 P-PID2 Multi Setpoint Src 2
18E0h: P1-32 P-PID2 Output Freeze Src
18EBh: P1-43 P-PID2 Track Enable Src
1908h: P2-08 B-PID1 Multi Setpoint Src 1
1909h: P2-09 B-PID1 Multi Setpoint Src 2
1914h: P2-20 B-PID1 Output Freeze Src
1948h: P3-08 B-PID2 Multi Setpoint Src 1
1949h: P3-09 B-PID2 Multi Setpoint Src 2
1954h: P3-20 B-PID2 Output Freeze Src
1988h: P4-08 B-PID3 Multi Setpoint Src 1
1989h: P4-09 B-PID3 Multi Setpoint Src 2
1994h: P4-20 B-PID3 Output Freeze Src
19C8h: P5-08 B-PID4 Multi Setpoint Src 1
19C9h: P5-09 B-PID4 Multi Setpoint Src 2
19D4h: P5-20 B-PID4 Output Freeze Src

1B17h: U0-23 Pump 1 Stop MI Src
1B18h: U0-24 Pump 2 Stop MI Src
1B19h: U0-25 Pump 3 Stop MI Src
1B1Ah: U0-26 Pump 4 Stop MI Src
1B1Bh: U0-27 Pump 5 Stop MI Src
1B1Ch: U0-28 Pump 6 Stop MI Src
1B1Dh: U0-29 Pump 7 Stop MI Src
1B1Eh: U0-30 Pump 8 Stop MI Scr
1B1Fh: U0-31 Multi Pump Stop MI Src
1BD5h: U3-21 Pump Clean Function MI Src

- There are two methods for MI function selection, one is to specify the function through MI, and the other is to specify the MI by functions, no matter which method is used, the two sides are synchronous. For example, Pr.G0-05 MI1 function selection is set to A1-00 EX1/EX2 switch source (MI assigned function), the setting of the corresponding Pr.A1-00 will also be changed and assigned to MI1 (the function is assigned to MI).
- The same MIx function can only be defined and selected as one single function. If the same MIx function is set repeatedly, the last setting will prevail, and the same MIx function previously set repeatedly returns to the default value. For example, A1-00 EX1/EX2 switch source indicates that MI1 is specified first, and then A1-02 EX1 S1 source indicates that MI1 is also specified, then the latter setting replaces the former, and the former will restore to the default value.
- Refer to the list for MI function selection. For example, setting 0040h means MI function selection A1-00 EX1/EX2 switch source. For its function description, refer to the detailed description of each parameter group.

G0-06 MI1 Response Time
(0xCC6) Default: 0.001

G0-08 MI2 Response Time
(0xCC8) Default: 0.001

G0-10 MI3 Response Time
(0xCCA) Default: 0.001

G0-12 MI4 Response Time
(0xCCC) Default: 0.001

G0-14 MI5 Response Time
(0xCCE) Default: 0.001

G0-16 MI6 Response Time
(0xCD0) Default: 0.001

Settings 0.000–30.000 sec.

- The MI response time setting can effectively avoid the bouncing phenomenon of the MI terminal.
- This function is to delay and confirm the digital input terminal signal. The time for delay is also the time for confirmation. The confirmation prevents interference that could cause error in the input to the digital terminals. But in the meanwhile, it delays the response time though confirmation improves accuracy.

📖 When MI signal changes (for example from low to high), it is regarded as transitioning to High only when the High status remains for the time longer than the MI response time. Refer to Figure 1 - MI signal processing diagram in Pr.G0-00 for the MI action logic.

✍ G0-17 MI Count Src

(0xCD1) Default: 0

Settings 0: Disable
1–5: Reserve
6: MI5

✍ G0-18 MI Count Clear Src

(0xCD2) Default: 0

Settings 0: Disable
1: Enable
2–7: MI1–MI6
8–9: Reserve
10–15: MI10–MI15

✍ G0-19 MI Count Reached Level

(0xCD3) Default: 0

Settings 0–60000
0: Disable

✍ G0-20 MI Count Reset Level

(0xCD4) Default: 0

Settings 0–60000
0: Disable

✍ G0-21 MI Count Reached MO Indn

(0xCD5) Default: 0

Settings 0: Disable
1–2: Relay1–Relay2
3–4: MO1–MO2
5–9: Reserve
10–15: MO/Relay10–15

✍ G0-22 MI Count Reset MO Indn

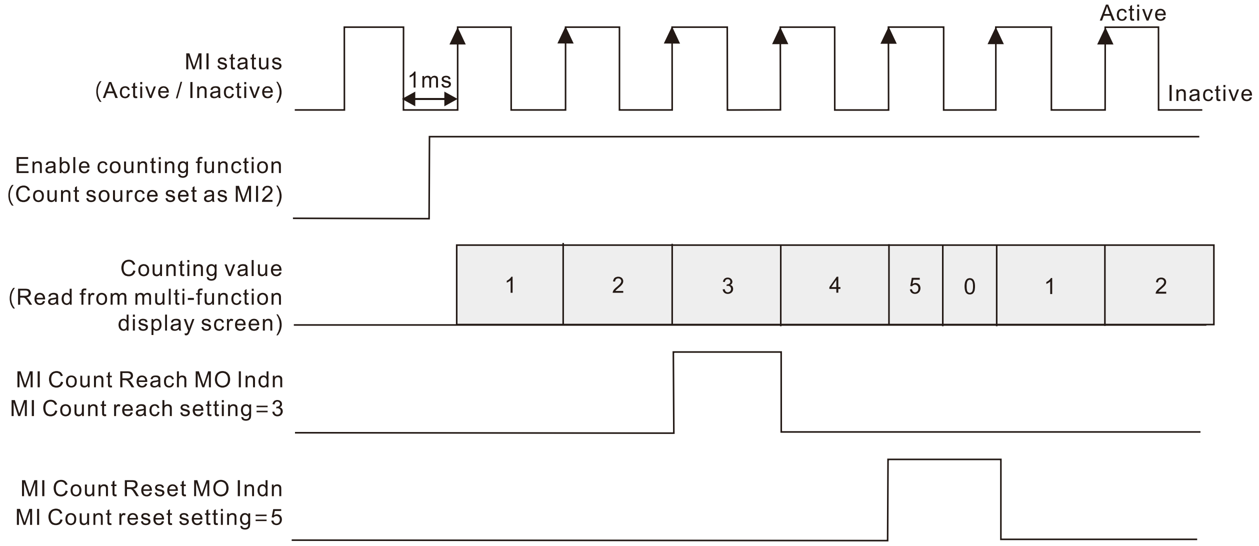
(0xCD6) Default: 0

Settings 0: Disable
1–2: Relay1–Relay2
3–4: MO1–MO2
5–9: Reserve
10–15: MO/Relay10–15

📖 MI1–MI6 are control board multi-function input terminals; MI10–MI15 are IO extension card multi-function input terminals.

📖 Relay 1–2 and MO1–MO2 are control board multi-function (contact, photo coupler) output terminals; MO/ Relay 10–15 are extension card multi-function output terminals (contact, photo coupler).

- 🕮 MI count source only supports MI5, set Pr.G0-17 = 6 to enable this function.
- 🕮 MI counting input: When MI5 is ON once, the count value displayed on the digital keypad will be incremented by "1" (when any of the status display parameter o0-00, o0-01 and o0-01 is set as 1, the digital keypad displays the count value).
- 🕮 MI count clear source: Select MI1–MI6/ MI10–MI15, when specify the MIx as ON once, the counting value displayed on the digital keypad will be reset to "0". Only when this signal disappears, the drive can accept the triggered signal at start to count.
- 🕮 MI count reached MO indication: When the count value counts from 1 to reach the set value in this parameter, the corresponding MO terminal of "MI count reached MO indication" is activated. You can use this parameter as the end of counting to make the drive run from the low speed to stop.
- 🕮 MI count reset MO indication: When the count value counts from 1 to reach the set value in this parameter, the corresponding MO terminal of "MI count reset MO indication" is activated, and the count value displayed on the digital keypad returns to 0.



G1. MO Setting

✎ G1-00 MO Mode Sel

(0xD00) Default: 0

Settings 0: MO-MCM or RA-RC Close at Active
1: MO-MCM or RA-RC Open at Active

✎ G1-01 Virtual MO Function

(0xD01) Default: 0

Settings 0: Disable
1: Enable

✎ G1-02 Virtual MO Level Setting

(0xD02) Default: 0

Settings 0: Inactive
1: Active

G1-03 MO Status

(0xD03) Default: Read only

Settings 0: Inactive
1: Active

- MO mode selection refers to the behavior of the MO switch. You can choose MO-MCM or RA-RC to be closed when Pr.G1-03 is set as 0: Inactive, or that to be opened when Pr.G1-03 is set as 1: Active. For example: When RY1 function is selected as forward command indication and the drive frequency command is forward, RY1 activates. If the MO mode is set as 0, then MO-MCM or RA-RC will be closed when it activates.
- The parameter format of MO mode selection is 0000 0000 0000 0000b–1111 1111 1111 1111b. The bits from the right to the left (bit0–bit3) correspond to RY1–RY2, MO1–MO2 respectively, and the bits from right (bit9) to left (bit14) correspond to MO10–MO15 respectively.
  MO status displays the action status of the MO source. For example: RY1 is set as Forward command indication, it activates when the drive frequency command is forward and Pr.G1-03 bit0 displays as 1; bit0 is inactive when the drive operates with reverse command and Pr.G1-03 bit0 displays as 0.
- The MO status refers to the active status of MO source. For example, set RY1 as forward command indication, it activates when the drive frequency command is forward and Pr.G1-03 bit0 displays 1; the MO inactivates when the drive frequency command is reverse and Pr.G1-03 bit0 displays 0.
- The function of virtual MI is the same as that of the entity MI terminals, the difference is that the former can be turned on and off by setting parameters.
- When the virtual MO function is enabled (for example, Pr.G1-01 = 11b) and the virtual MO level is set as active (for example, Pr.G1-02 = 11b), then the status of RY1 and RY2 is ON.
- Pay extra attention that when the MOx function is defined before enabling the virtual MO function, after the virtual MO is enabled, the corresponding MO parameters settings (RY1 G1-04, RY2 G1-06, MO1 G1-08 and MO2 G1-10) will be automatically replaced by the changed 0D01h virtual MO function.

G1-04 RY1 Function Sel
(0xD04) Default: 0

G1-06 RY2 Function Sel
(0xD06) Default: 0

G1-08 MO1 Function Sel
(0xD08) Default: 0

G1-10 MO2 Function Sel
(0xD0A) Default: 0

Settings
0000h: Disable
0057h: A1-23 Run Enable Indn
0058h: A1-24 OPER Cmd by Kpd Indn
0059h: A1-25 Forward Cmd Indn
005Ah: A1-26 Reverse Cmd Indn
005Fh: A1-31 Base Block Indn
04C4h: C3-04 JOG indn
0647h: d0-07 Y-con Cmd Output
0648h: d0-08 D-con Cmd Output
0CD5h: G0-21 MI Count Reached MO Indn
0CD6h: G0-22 MI Count Reset MO Indn
0D01h: G1-01 Virtual MO Function
0D7Eh: G2-62 AI Level in Range Indn
0F41h: H0-01 Fault Indn
0F42h: H0-02 Warning Indn
0F4Fh: H0-15 STO Output logic A
0F50h: H0-16 STO Output logic B
0F51h: H0-17 Fault Output Indn 1
0F52h: H0-18 Fault Output Indn 2
0F53h: H0-19 Fault Output Indn 3
0F54h: H0-20 Fault Output Indn 4
0F81h: H1-01 ov Warning Indn
0F85h: H1-05 Lv Fault Indn
0F8Ah: H1-10 ov Stall Prev Indn
0FC9h: H2-09 oc Stall Prev Indn
0FCFh: H2-15 Low Current Indn
1001h: H3-01 OrP Indn
1006h: H3-06 U Phase Loss Indn
1007h: H3-07 V Phase Loss Indn
1008h: H3-08 W Phase Loss Indn
1042h: H4-02 Drive oH warning Indn
1081h: H5-01 ot Indn
1083h: H5-03 Normal Speed ot Indn
10B5h: H5-49 Over Slip Indn

10CAh: H6-10 Motor Temp 1 OH Indn
10D5h: H6-21 Motor Temp 2 OH Indn
1103h: H7-03 L/F Overload Indn
1111h: H7-17 L/F Underload Indn
11C0h: J0-00 UVW MC Action Indn
1249h: J2-09 dEb Output Indn
12C7h: J4-07 Preheat Indn
132Bh: J5-31 FireMode Indn
1587h: n1-07 Modbus MO Mask
1596h: n2-06 CANopen MO Mask
15A7h: n3-06 BACnet MO Mask
15B4h: n4-04 DeviceNET MO Mask
15B8h: n4-08 Profibus MO Mask
15D2h: n5-17 EtherNet MO Mask
1646h: o0-06 Drive Ready Indn
1647h: o0-07 Run Indn
1649h: o0-09 Output Amp Exceed Indn
164Ah: o0-10 Output Amp under Indn
164Ch: o0-12 At Target Speed Indn
164Eh: o0-14 Output FREQ Exceed Indn
164Fh: o0-15 Output FREQ under Indn
1652h: o0-18 At Output FREQ 1 Indn
1655h: o0-21 At Output FREQ 2 Indn
1656h: o0-22 0 Hz Cmd Indn at Run
1657h: o0-23 0 Hz Cmd Indn
1659h: o0-25 0 Hz Output Indn at Run
165Ah: o0-26 0 Hz Output Indn
16C4h: o2-04 Monitor 1 Trigger Indn
16CEh: o2-11 Monitor 2 Trigger Indn
16D8h: o2-18 Monitor 3 Trigger Indn
16E2h: o2-25 Monitor 4 Trigger Indn
16ECh: o2-32 Monitor 5 Trigger Indn
16F6h: o2-39 Monitor 6 Trigger Indn
1700h: o2-46 Monitor 7 Trigger Indn
170Ah: o2-53 Monitor 8 Trigger Indn
18AFh: P0-47 P-PID1 Fdk Error Indn
18EEh: P1-46 P-PID2 Fdk Error Indn
1B0Fh: U0-15 Pump 1 Output Enable Sel
1B10h: U0-16 Pump 2 Output Enable Sel
1B11h: U0-17 Pump 3 Output Enable Sel
1B12h: U0-18 Pump 4 Output Enable Sel
1B13h: U0-19 Pump 5 Output Enable Sel

1B14h: U0-20 Pump 6 Output Enable Sel
1B15h: U0-21 Pump 7 Output Enable Sel
1B16h: U0-22 Pump 8 Output Enable Sel

- There are two methods for MO function selection, one is to specify the function through MO, and the other is to specify the MO by functions, no matter which method is used, the two sides are synchronous. For example, Pr.G1-04 RY1 function selection is set to A1-23 Run enable indication (MO assigned function), the setting of the corresponding Pr.A1-23 will also be changed and assigned to MO1 (the function is assigned to MO).
- The same MOx function can only be defined and selected as one single function. If the same MOx function is set repeatedly, the last setting will prevail, and the same MOx function previously set repeatedly returns to the default value. For example, A1-25 Forward command indication indicates that RY1 is specified first, and then A1-26 Reverse command indication indicates that RY1 is also specified, then the latter setting replaces the former, and the former will restore to the default value.
- Refer to the list for MO function selection. For example, setting 0057h means MO function selection A1-23 Run enable indication. For its function description, refer to the detailed description of each parameter group.

G1-05 RY1 Response Time
(0xD05) Default: 0.001

G1-07 RY2 Response Time
(0xD07) Default: 0.001

G1-09 MO1 Response Time
(0xD09) Default: 0.001

G1-11 MO2 Response Time
(0xD0B) Default: 0.001

Settings 0.000–30.000 sec.

- This function is to delay and confirm the digital output terminal signal. The time for delay is also the time for confirmation. It prevents high frequency changes of the digital terminal output; however, the response time will also be delayed. For example, MOx function is set as reverse command indication, when the drive frequency command changes from forward command to reverse command, the MOx output status will change from OFF to ON after the MOx response time.

G1-12 DFM MO Indn
(0xD0C) Default: 0

Settings 0: Disable
1–3: Reserve
4: MO2

✓ G1-13 DFM Function Sel

(0xD0D) Default: 0

Settings 0: Disable

1: FREQ Cmd

2: FREQ Profile

3: Output FREQ

✓ G1-14 DFM Output Gain

(0xD0E) Default: 1

Settings 1–100

- DMF MO indication only supports MO2. Note that when MO2 is used for DFM function, the terminal wiring uses the same MO2-MCM as the MO function.
- DFM digital frequency can be output as pulse wave at MO2 terminal according to Pr.G1-13 DFM function selection.
- Pr.G1-14 sets the digital frequency output signal (pulse, working cycle = 50%) of the drive digital output terminal (MO2-MCM). Output pulse per second = output frequency × Pr.G1-14.

G2. AI Setting

G2-00 Virtual AI Function

(0xD40) Default: 0

Settings 0: Disable
1: Enable

- When the virtual AI function is enabled, the AI input value is replaced by the virtual AI level (Pr.G2-12, G2-31, and G2-50) setting.
- The parameter format of virtual AI function is 000000b–111111b. The bits from right (bit0) to left (bit2) correspond to AI1–AI3 respectively, and bit5–6 correspond to AI10–AI11.

G2-02 AI1 Function Sel

(0xD42) Default: 0

G2-21 AI2 Function Sel

(0xD55) Default: 0

G2-40 AI3 Function Sel

(0xD68) Default: 0

Settings 0000h: Disable
0441h: C1-01 EX1 Main FREQ Src
0442h: C1-02 EX1 Aux FREQ Src
0445h: C1-05 EX2 Main FREQ Src
0446h: C1-06 EX2 Aux FREQ Src
0D7Bh: G2-59 AI Comparator Src
10C1h: H6-01 Motor Temp Fdk 1 AI Src
10CCh: H6-12 Motor Temp Fdk 2 AI Src
1303h: J5-03 FireMode FREQ Src
1882h: P0-02 P-PID1 Ref 1 Src
1883h: P0-03 P-PID1 Ref 2 Src
1884h: P0-04 P-PID1 Fdk 1 Src
1885h: P0-05 P-PID1 Fdk 2 Src
18ADh: P0-44 P-PID1 Track Enable Src
18C1h: P1-01 P-PID2 Ref 1 Src
18C2h: P1-02 P-PID2 Ref 2 Src
18C3h: P1-03 P-PID2 Fdk 1 Src
18C4h: P1-04 P-PID2 Fdk 2 Src
18ECh: P1-43 P-PID2 Track Enable Src
1901h: P2-01 B-PID1 Ref Src
1902h: P2-02 B-PID1 Fdk Src
1941h: P3-01 B-PID2 Ref Src
1942h: P3-02 B-PID2 Fdk Src
1981h: P4-01 B-PID3 Ref Src
1982h: P4-02 B-PID3 Fdk Src
19C1h: P5-01 B-PID4 Ref Src

19C2h: P5-02 B-PID4 Fdk Src
1B83h: U2-03 Inlet Pressure AI Src
1B87h: U2-07 Outlet Pressure AI Src
1B8Bh: U2-11 Flow Meter AI Src

📖 Sets the analog output corresponding drive function setting source.

📖 There are two methods for AI function selection, one is to specify the function through AI, and the other is to specify the AI by functions, no matter which method is used, the two sides are synchronous. For example, Pr.G2-02 AI1 function selection is set to C1-01 EX1 main frequency source (AI assigned function), the setting of the corresponding Pr.C1-01 will also be changed and assigned to AI1 (the function is assigned to AI).

📖 The same AIx function can only be defined and selected as one single function. If the same AIx function is set repeatedly, the last setting will prevail, and the same AIx function previously set repeatedly returns to the default value. For example, C1-01 EX1 main frequency source indicates that AI1 is specified first, and then C1-02 EX1 auxiliary frequency source indicates that AI1 is also specified, then the latter setting replaces the former, and the former will restore to the default value.

📖 Refer to the list for AI function selection. For example, setting 0441h means AI function selection C1-01 EX1 main frequency source. For its function description, refer to the detailed description of each parameter group.

✓ G2-03 AI1 Signal Type

(0xD43) Default: 2

✓ G2-22 AI2 Signal Type

(0xD56) Default: 2

✓ G2-41 AI3 Signal Type

(0xD69) Default: 0

Settings 0: 0–10 V
1: 0–20 mA
2: 4–20 mA

📖 Sets the analog input signal type and range.

✓ G2-04 AI1 Filter Time

(0xD44) Default: 0.02

✓ G2-23 AI2 Filter Time

(0xD57) Default: 0.02

✓ G2-42 AI3 Filter Time

(0xD6A) Default: 0.02

Settings 0.00–20.00 sec.

📖 The analog signal input by the control terminal often contains noise, which affects the stability of the control. Use an input filter to eliminate this noise.

📖 When the time constant setting is too large, the control is stable, but the control response is slow. When the time constant setting is too small, the control responses faster but it may be unstable. For optimal setting, adjust the setting based on the control stability or the control response.

G2-05 AI1 Low Value
(0xD45)

G2-24 AI2 Low Value
(0xD58)

G2-43 AI3 Low Value
(0xD6B)

Settings		Default:
	0–10 V: 0.00–10.00 V	0.00
	0–20 mA: 0.00–20.00 mA	0.00
	4–20 mA: 4.00–20.00 mA	4.00

G2-06 AI1 Low %
(0xD46)

G2-25 AI2 Low %
(0xD59)

G2-44 AI3 Low %
(0xD6C) Default: 0.00

Settings -100.00–100.00%

G2-07 AI1 Mid Value
(0xD47)

G2-26 AI2 Mid Value
(0xD5A)

G2-45 AI3 Mid Value
(0xD6D)

Settings		Default:
	0–10 V: 0.00–10.00 V	5.00
	0–20 mA: 0.00–20.00 mA	10.00
	4–20 mA: 4.00–20.00 mA	12.00

G2-08 AI1 Mid %
(0xD48)

G2-27 AI2 Mid %
(0xD5B)

G2-46 AI3 Mid %
(0xD6E) Default: 50.00

Settings -100.00–100.00%

G2-09 AI1 High Value
(0xD49)

G2-28 AI2 High Value
(0xD5C)

G2-47 AI3 High Value
(0xD6F)

Settings		Default:
	0–10 V: 0.00–10.00 V	10.00
	0–20 mA: 0.00–20.00 mA	20.00
	4–20 mA: 4.00–20.00 mA	20.00

G2-10 AI1 High %
(0xD4A)

G2-29 AI2 High %
(0xD5D)

G2-48 AI3 High %
(0xD70) Default: 100.00

Settings -100.00–100.00%

- When the parameter AI signal type is the voltage type 0–10V analog input, the setting unit is voltage (V); when the signal type is current 0–20 mA or 4–20 mA input, the setting unit is current (mA).
- If the analog input is set as frequency command, 100% corresponds to Fmax (Pr.C2-17 maximum operation frequency).
- The voltage can only be input from low voltage to high voltage between AI1–AI3, which is low value ≤ mid value ≤ high value. There is no limit for the corresponding percentage, you can set it freely, and the calculation is linear between two points.
- When the voltage input is lower than the low value, the output percentage equals to the low percentage. For example, when Pr.G2-05 = 1 V and Pr.G2-06 = 10%, all of the output below 1V (including) is 10%.

G2-11 AI1 Signal Loss Action
(0xD4B)

G2-30 AI2 Signal Loss Action
(0xD5E)

G2-49 AI3 Signal Loss Action
(0xD71) Default: 0

Settings 0: Disable
1: Warn & Continue OPER
2: Fault & Ramp to Stop
3: Fault & Auto-Decel
4: Fault & Coast to Stop
5: Fault & by Quick Stop Time
6: Warning & FREQ Lower Limit OPER

- The signal loss function is only valid when the AI signal type is selected as 4–20 mA. When the AI signal type is set as 4–20 mA loss, the AI signal is regarded as loss when it is lower than 3.6 mA, and regarded as not loss when it returns to 4 mA.

G2-12 Virtual AI1 Input
(0xD4C)

G2-31 Virtual AI2 Input
(0xD5F)

✓ G2-50 Virtual AI3 Input

(0xD72) Default: 0.00

Settings 0.00–100.00%

When the virtual AI function is enabled, the virtual AI input takes place of the actual input value.

G2-13 AI1 Display

(0xD4D)

G2-32 AI2 Display

(0xD60)

G2-51 AI3 Display

(0xD73) Default: Read only

Settings -100.00–100.00%

Displays the current AI signal percentage.

✓ G2-59 AI Comparator Src

(0xD7B) Default: 0

Settings 0: Disable
1: Reserve
7–9: AI1–AI3
10–11: Reserve
12–13: AI10–AI11

Sets the analog input source.

✓ G2-60 AI Comparator High Level

(0xD7C) Default: 50.0

Settings -100.0–100.0%

Sets the high level of analog input.

✓ G2-61 AI Comparator Low Level

(0xD7D) Default: 10.0

Settings -100.0–100.0%

Sets the low level of analog input.

✓ G2-62 AI Level in Range Indn

(0xD7E) Default: 0

Settings 0: Disable
1–2: Relay 1–2
3–4: MO1–MO2
5–9: Reserve
10–15: MO/Relay 10–15

When the analog signal is higher than the high level, Pr.G2-62 starts the corresponding output; when the analog signal is lower than the low level, it stops the corresponding output.

G3. AO Setting

✎ G3-00 Virtual AO Function

(0xD80) Default: 0

Settings 0: Disable

1: Enable

📖 The parameter format of virtual AO function is 000000b–111111b. The bits from right (bit0) to left (bit1) correspond to AO1–AO2 respectively, and bit4–5 correspond to AO10–AIO11.

G3-07 Virtual AO1 Output

(0xD87) Default: 0.00

✎ G3-21 Virtual AO2 Output

(0xD95) Default: 0.00

Settings 0.00–100.00 PCT

📖 When the virtual AO function is enabled, the AO output value is replaced by the virtual AO level (Pr.G3-07, G3-21) setting.

✎ G3-01 AO1 Function Sel

(0xD81) Default: 0

✎ G3-15 AO2 Function Sel

(0xD8F) Default: 0

Settings 0000h: Disable

0D80h: G3-00 Virtual AO Function

10C2h: H6-02 Motor Temp 1 AO Sel

10CDh: H6-13 Motor Temp 2 AO Sel

1588h: n1-08 Modubs AO Mask

1597h: n2-07 CANopen AO Mask

15A8h: n3-07 BACnet AO Mask

15B5h: n4-05 DeviceNET AO Mask

15B9h: n4-09 Profibus AO Mask

15D3h: n5-18 EtherNet AO Mask

165Bh: o0-27 FREQ Cmd AO Sel

165Ch: o0-28 FREQ Profile AO Sel

165Dh: o0-29 Motor RPM AO Sel

165Eh: o0-30 Output FREQ AO Sel

165Fh: o0-31 Output Current AO Sel

1660h: o0-32 Output Voltage AO Sel

1662h: o0-34 Output Torque AO Sel

1663h: o0-35 Output Power AO Sel

1664h: o0-36 Power Factor AO Sel

167Bh: o0-59 DC bus Voltage AO Sel

1917h: P2-23 B-PID1 Output AO Sel

1957h: P3-23 B-PID2 Output AO Sel

1997h: P4-23 B-PID3 Output AO Sel

19D7h: P5-23 B-PID4 Output AO Sel

G3-02 AO1 Signal Type

(0xD82) Default: 2

G3-16 AO2 Signal Type

(0xD90) Default: 2

Settings 0: 0–10 V

1: 0–20 mA

2: 4–20 mA

- Sets the analog output signal type and range.

G3-03 AO1 Filter Time

(0xD83) Default: 0.02

G3-17 AO2 Filter Time

(0xD91) Default: 0.02

Settings 0.00–20.00 sec.

- When the control signal is unstable, set the filter time to reduce the output signal fluctuation.

G3-04 AO1 Bias

(0xD84) Default: 0.00

G3-18 AO2 Bias

(0xD92) Default: 0.00

Settings -100.00–100.00%

- Signal type is 0–10V, take the output frequency as an example:
  10V × (output frequency ÷ Pr.C2-17) × Pr.G3-05 + 10V × Pr.G3-04
- Signal type is 0–20 mA, take the output frequency as an example:
  20 mA × (output frequency ÷ Pr.C2-17) × Pr.G3-05 + 20 mA × Pr.G3-04
- Signal type is 4–20 mA, take the output frequency as an example:
  4 mA + 16 mA × (output frequency ÷ Pr.C2-17) × Pr.G3-05 + 16 mA × Pr.G3-04
- Sets the corresponding value when analog output 0%.

G3-05 AO1 Gain

(0xD85) Default: 100.0

G3-19 AO2 Gain

(0xD93) Default: 100.0

Settings -500.0–500.0%

- Adjusts the signal level of the analog signal outputs from the drive to the analog meter.

✓ G3-06 AO1 Output Method

(0xD86) Default: 0

✓ G3-20 AO2 Output Method

(0xD94) Default: 0

Settings 0: Absolute Value
1: 0% Negative; 0–100% Positive
2: 0–50% Negative; 50–100% Positive

📖 Sets the positive and negative range of the control signal indicated by the output signal range.

G4. Extension MI Setting

G4-00 Extension Card ID

(0xDC0) Default: Read only

Settings 0: None
1: EMV-A22A
5: EMV-D42A
6: EMV-R6AA

- When an extension IO card has been inserted into the drive before powering on, this parameter displays after powering on to identify the type of extension IO card.
- It means no extension card when this parameter displays 0.

G4-01 MI10 Function Sel

(0xDC1)

G4-03 MI11 Function Sel

(0xDC3)

G4-05 MI12 Function Sel

(0xDC5)

G4-07 MI13 Function Sel

(0xDC7)

G4-09 MI14 Function Sel

(0xDC9)

G4-11 MI15 Function Sel

(0xDCB) Default: 0

Settings 0–65535

- Refer to description of Pr.G0-05.

G4-02 MI10 Response Time

(0xDC2)

G4-04 MI11 Response Time

(0xDC4)

G4-06 MI12 Response Time

(0xDC6)

G4-08 MI13 Response Time

(0xDC8)

G4-10 MI14 Response Time

(0xDCA)

G4-12 MI15 Response Time

(0xDCC) Default: 0.001

Settings 0.000–30.000 sec.

- Refer to description of Pr.G0-06.

G5. Extension MO Setting

G5-00 Extension Card ID

(0xE00) Default: Read only

Settings 0: None
1: EMV-A22A
5: EMV-D42A
6: EMV-R6AA

- When an extension IO card has been inserted into the drive before powering on, this parameter displays after powering on to identify the type of extension IO card.
- It means no extension card when this parameter displays 0.

✎ G5-01 MO10 (RY10) Function Sel

(0xE01)

✎ G5-03 MO11 (RY11) Function Sel

(0xE03)

✎ G5-05 RY12 Function Sel

(0xE05)

✎ G5-07 RY13 Function Sel

(0xE07)

✎ G5-09 RY14 Function Sel

(0xE09)

✎ G5-11 RY15 Function Sel

(0xE0B) Default: 0

Settings 0–65535

- Refer to description of Pr.G1-04.

✎ G5-02 MO10 (RY10) Response Time

(0xE02)

✎ G5-04 MO11 (RY11) Response Time

(0xE04)

✎ G5-06 RY12 Response Time

(0xE06)

✎ G5-08 RY13 Response Time

(0xE08)

✎ G5-10 RY14 Response Time

(0xE0A)

✎ G5-12 RY15 Response Time

(0xE0C)

Settings 0.000–30.000 sec.

- Refer to description of Pr.G1-05.

G6. Extension AI Setting

G6-00 Extension Card ID

(0xE40) Default: Read only

Settings 0: None
1: EMV-A22A
5: EMV-D42A
6: EMV-R6AA

- When an extension IO card has been inserted into the drive before powering on, this parameter displays after powering on to identify the type of extension IO card.
- It means no extension card when this parameter displays 0.

G6-01 AI10 Function Sel

(0xE41)

G6-13 AI11 Function Sel

(0xE4D) Default: 0

Settings 0–65535

- Refer to description in Pr.G2-02.

G6-02 AI10 Signal Type

(0xE42)

G6-14 AI11 Signal Type

(0xE4E) Default: 0

Settings 0: 0–10 V
1: 0–20 mA
2: 4–20 mA

- Refer to description in Pr.G2-03.

G6-03 AI10 Filter Time

(0xE43)

G6-15 AI11 Filter Time

(0xE4F) Default: 0.02

Settings 0.00–20.00 sec.

- Refer to description in Pr.G2-04.

G6-04 AI10 Low Value

(0xE44)

G6-16 AI11 Low Value

(0xE50) Default:

Settings	0–10 V: 0.00–10.00 V	0.00
	0–20 mA: 0.00–20.00 mA	0.00
	4–20 mA: 4.00–20.00 mA	4.00

- Refer to description in Pr.G2-05.

⚡ G6-05 AI10 Low %
(0xE45)
⚡ G6-17 AI11 Low %
(0xE51) Default: 0.00

Settings -100.00–100.00%

📖 Refer to description in Pr.G2-06.

⚡ G6-06 AI10 Mid Value
(0xE46)
⚡ G6-18 AI11 Mid Value
(0xE52) Default:

Settings	0–10 V: 0.00–10.00 V	5.00
	0–20 mA: 0.00–20.00 mA	10.00
	4–20 mA: 4.00–20.00 mA	12.00

📖 Refer to description in Pr.G2-07.

⚡ G6-07 AI10 Mid %
(0xE47)
⚡ G6-19 AI11 Mid %
(0xE53) Default: 50.00

Settings -100.00–100.00%

📖 Refer to description in Pr.G2-08.

⚡ G6-08 AI10 High Value
(0xE48)
⚡ G6-20 AI11 High Value
(0xE54) Default:

Settings	0–10 V: 0.00–10.00 V	10.00
	0–20 mA: 0.00–20.00 mA	20.00
	4–20 mA: 4.00–20.00 mA	20.00

📖 Refer to description in Pr.G2-09.

⚡ G6-09 AI10 High %
(0xE49)
⚡ G6-21 AI11 High %
(0xE55) Default: 100.00

Settings -100.00–100.00%

📖 Refer to description in Pr.G2-10.

G6-10 AI10 Signal Loss Action
(0xE4A)
G6-22 AI11 Signal Loss Action
(0xE56) Default: 0

Settings 0: Disable

1: Warn & Continue OPER
2: Fault & Ramp to Stop
3: Fault & Auto-Decel
4: Fault & Coast to Stop
5: Fault & by Quick Stop Time
6: Warning & FREQ Lower Limit OPER

📖 Refer to description in Pr.G2-11.

✗ G6-11 Virtual AI10 Input
(0xE4B)

✗ G6-23 Virtual AI11 Input
(0xE57) Default: 0.00

Settings 0.00–100.00%

📖 Refer to description in Pr.G2-12.

G6-12 AI10 Display
(0xE4C)

G6-24 AI11 Display
(0xE58) Default: Read only

Settings 0.00–100.00%

📖 Refer to description in Pr.G2-13.

G7. Extension AO Setting

G7-00 Extension Card ID

(0xE80) Default: Read only

Settings 0: None
1: EMV-A22A
5: EMV-D42A
6: EMV-R6AA

- When an extension IO card has been inserted into the drive before powering on, this parameter displays after powering on to identify the type of extension IO card.
- It means no extension card when this parameter displays 0.

✓ G7-01 AO10 Function Sel

(0xE81)

✓ G7-08 AO11 Function Sel

(0xE88) Default: 0

Settings 0–65535

- Refer to description in Pr.G3-01.

✓ G7-02 AO10 Signal Type

(0xE82)

✓ G7-09 AO11 Signal Type

(0xE89) Default: 0

Settings 0: 0–10 V
1: 0–20 mA
2: 4–20 mA

- Refer to description in Pr.G3-02.

✓ G7-03 AO10 Filter Time

(0xE83)

✓ G7-10 AO11 Filter Time

(0xE8A) Default: 0.02

Settings 0.00–20.00 sec.

- Refer to description in Pr.G3-03.

✓ G7-04 AO10 Bias

(0xE84)

✓ G7-11 AO11 Bias

(0xE8B) Default: 0.00

Settings -100.00–100.00%

- Refer to description in Pr.G3-04.

✎ **G7-05** (0xE85)	AO10 Gain
✎ **G7-12** (0xE8C)	AO11 Gain

Default: 100.0

Settings -500.0–500.0%

📖 Refer to description in Pr.G3-05.

✎ **G7-06** (0xE86)	AO10 Output Method
✎ **G7-13** (0xE8D)	AO11 Output Method

Default: 0

Settings
0: Absolute Value
1: 0% Negative; 0–100% Positive
2: 0–50% Negative; 50–100% Positive

📖 Refer to description in Pr.G3-06.

✎ **G7-07** (0xE87)	Virtual AO10 Output
✎ **G7-14** (0xE8E)	Virtual AO11 Output

Default: 0.00

Settings 0.00–100.00 PCT

📖 Refer to description in Pr.G3-07.

H. Fault & Protection

H0. Fault Handle

✎ H0-00 Fault Reset MI Src

(0xF40) Default: 0

Settings 0: Disable
1: Enable
2–7: MI1–MI6
8–9: Reserve
10–15: MI10–MI15

📖 Sets the corresponded fault handle function of multi-function terminals.

✎ H0-01 Fault Indn

(0xF41) Default: 0

Settings 0: Disable
1–2: Relay1–Relay2
3–4: MO1–MO2
5–9: Reserve
10–15: MO/Relay10–15

📖 Sets the corresponded fault indication of multi-function terminals.

✎ H0-02 Warning Indn

(0xF42) Default: 0

Settings 0: Disable
1–2: Relay1–Relay2
3–4: MO1–MO2
5–9: Reserve
10–15: MO/Relay10–15

📖 Sets the corresponded warning indication of multi-function terminals.

H0-03 Fault Auto Reset Allowed Sel

(0xF43) Default: 0

Settings bit 0: ocA/ ocd/ ocn
bit 1: ovA/ ovd/ ovn/ ovs
bit 2: LvA/ Lvd/ Lvn
bit 3: Orp
bit 4: oH1/ oH2
bit 5: EF
bit 6: EF1
bit 7: oL
bit 8: EoI1/ EoI2
bit 9: oH3
bit 10: ot1/ ot2
bit 11: uC

bit 12: AFE/ ACE
bit 13: GFF
bit 14: Reserve
bit 15: Reserve

📖 Sets the selection of fault restart type. To restart after fault, you cannot set Pr.H0-04 to 0.

H0-04 Fault Restart MI Src

(0xF44) Default: 0

Settings 0: Disable
1: Enable
2–7: MI1–MI6
8–9: Reserve
10–15: MI10–MI15

📖 Sets the fault restart function and enable it through external terminals.

H0-05 Restart Speed Tracking

(0xF45) Default: 0

Settings 0: Max output FREQ
1: FREQ before stop
2: Min output FREQ
3: Auto Estimation

📖 Speed tracking is suitable for punch, fans, and other large inertia loads. For example, a mechanical punch usually has a large inertia flywheel, and the general stop method is coast to stop. If it needs to be restarted again, the flywheel may take 2–5 minutes or longer to stop. This parameter setting allows you to start the flywheel operating again without waiting until the flywheel stops completely.

📖 When using PM, the output frequency converts to the actual rotor speed from zero-speed.

📖 When using SynRM, Pr.H0-05 only supports setting 2 (speed tracking from the minimum output frequency).

H0-06 Fault Restart No.

(0xF46) Default: 0

Settings 0–10 times

📖 After a fault occurs, the AC motor drive can reset and restart automatically up to 10 times. If Pr.H0-06 is set to 0, there is no upper limit for auto restart time. The drive starts according to the Pr.H0-05 setting after restarting after fault.

📖 If the number of faults exceeds the Pr.H0-06 setting, the drive does not reset and restart until you press “RESET” manually and execute the operation command again.

H0-07 Fault Restart No. Remain

(0xF47) Default: Read only

Settings 0–10

📖 Displays the remaining fault auto reset times of the drive.

H0-08 Fault Restart No. Reset Time

(0xF48) Default: 60.0

Settings 0.0–600.0 sec.

📖 Sets the longest reset time of the fault auto restart time.

✎ H0-09 Fault Auto Reset Delay Time

(0xF49) Default: 1.0

Settings 1.0–600.0 sec.

📖 Sets the delay time before fault auto reset.

✎ H0-10 Fault Restart Delay Time

(0xF4A) Default: 1.0

Settings 1.0–600.0 sec.

📖 Sets the delay time before fault auto restart.

✎ H0-11 STO Definition Sel

(0xF4B) Default: 0

Settings 0: STO Fault

1: Fault at Run; Warning at Stop

2: STO Warning

3: No STO Display at Stop

📖 Defines the STO as fault or warning when the STO occurs.

✎ H0-12 STO1/2 Allowable Duration

(0xF4C) Default: 10

Settings 1–200 ms

📖 Sets the time difference between the STO channel detection.

✎ H0-13 STO Indn Delay Time

(0xF4D) Default: 10

Settings STO setting difference–1000 ms

📖 Sets the delay time when the indication is triggered.

✎ H0-14 STO Auto Reset

(0xF4E) Default: 0

Settings 0: Disable

1: Enable

📖 Determines whether the STO fault can be auto reset.

✎ H0-15 STO Output logic A

(0xF4F) Default: 0

Settings 0: Disable

1–2: Relay1–Relay2

3–4: MO1–MO2

5–9: Reserve
10–15: MO/Relay10–15

📖 Sets the corresponded STO output logic A of multi-function terminals.

✎ H0-16 STO Output logic B

(0xF50) Default: 0

Settings 0: Disable
1–2: Relay1–Relay2
3–4: MO1–MO2
5–9: Reserve
10–15: MO/Relay10–15

📖 Sets the corresponded STO output logic B of multi-function terminals.

✎ H0-17 Fault Output Indn 1

(0xF51) Default: 0

✎ H0-18 Fault Output Indn 2

(0xF52) Default: 0

✎ H0-19 Fault Output Indn 3

(0xF53) Default: 0

✎ H0-20 Fault Output Indn 4

(0xF54) Default: 0

Settings 0: Disable
1–2: Relay1–Relay2
3–4: MO1–MO2
5–9: Reserve
10–15: MO/Relay10–15

📖 Set the corresponded fault output indication 1–4 of multi-function terminals, use these parameters with Pr.H0-21–H0-24.

H0-21	Fault Output Option 1	
(0xF55)		Default: 0
H0-22	Fault Output Option 2	
(0xF56)		Default: 0
H0-23	Fault Output Option 3	
(0xF57)		Default: 0
H0-24	Fault Output Option 4	
(0xF58)		Default: 0
	Settings 0–65535	

Set the fault output code Pr.H0-21–H0-24, when the corresponded fault code occurs, it outputs the corresponded fault indication Pr.H0-17–H0-20.

H1. Voltage Protection

H1-00 ov Warning Level

(0xF80) Default: 740.0

Settings	0.0–820.0 V_{DC}
	0: No warning

📖 Sets the judging level of over voltage. When the drive DC bus voltage is higher than the voltage level, the ov fault is triggered to stop output and coast to stop.

H1-01 ov Warning Indn

(0xF81) Default: 0

Settings	0: Disable
	1–2: Relay1–Relay2
	3–4: MO1–MO2
	5–9: Reserve
	10–15: MO/Relay 10–15

📖 Sets the over-voltage warning indication of multi-function terminals.

H1-02 Lv Fault Indn

(0xF82) Default:

Settings	Non Lower harmonic models:	
	300.0–440.0 V_{DC} / 150.0–220.0 V_{DC}	360.0/ 180.0
	Lower harmonic models:	
	200.0–400.0 V_{DC} / 100.0–200.0 V_{DC}	200.0/ 100.0

📖 Sets the judging level of low voltage. When the drive DC bus voltage is lower than the low voltage level, the Lv fault is triggered to stop output and coast to stop.

H1-04 ECAP Lv Fault Level

(0xF84) Default:

Settings	300.0–440.0 V_{DC}	360.0
	150.0–200.0 V_{DC}	180.0

📖 Sets the judging level of low voltage for lower harmonic models. When the drive DC bus voltage is lower than the low voltage level, the Lv fault is triggered to stop output and coast to stop.

H1-05 Lv Fault Indn

(0xF85) Default: 0

Settings	0: Disable
	1–2: Relay1–Relay2
	3–4: MO1–MO2
	5–9: Reserve
	10–15: MO/Relay10–15

📖 Sets the corresponded low voltage fault indication of multi-function terminals.

✎ H1-06 Restart after Power Loss

(0xF86) Default: 0

Settings 0: Disable
1: FREQ before power loss
2: Max output FREQ
3: Min output FREQ
4: Auto Estimation

- Determines the operation mode when the drive restarts from a momentary power loss.
- The power system connected to the drive may power off momentarily due to various reasons. This function allows the drive to keep outputting voltages after repowered and does not cause the drive to stop.
- This function is only valid when the RUN command is enabled.

✎ H1-07 Power Loss Time Allowed

(0xF87) Default: 2.0

Settings 0.0–20.0 sec.

- Determines the maximum time of allowable power loss. If the duration of a power loss exceeds this parameter setting, the AC motor drive stops output after the power recovers.
- The function of restart after loss is valid when the AC motor drive displays “Lv” during the maximum allowable power loss time. If the AC motor drive powers off due to overload which even does not exceed the allowed power loss duration, Pr.H1-06 is invalid after the power recovers

✎ H1-08 ov Stall Prev Level

(0xF88) Default: 760.0

Settings 0.0–900.0 V_{DC}

- When Pr.H1-08 is set to 0.0, the over-voltage stall prevention function is disabled.
- Setting Pr.H1-08 to a value > 0.0 enables the over-voltage stall prevention. This setting refers to the power supply system and loading. If the setting is too low, then over-voltage stall prevention is easily activated, which may increase the deceleration time.
- When Pr.H1-09 (Stall Prev Function Sel) is set as 0–3, and the used drive is general model (VFDxxxVP43xxxAx), the default of Pr.H1-08 (ov Stall Prev Level) is set as parameter setting.
- When Pr.H1-09 (Stall Prev Function Sel) is set as 1 or 3, and the used drive is the lower harmonic model (VFDxxxVP43xxxCx), the default of Pr.H1-08 (ov Stall Prev Level) is dynamically adjusted by the system.

✎ H1-09 Stall Prev Function Sel

(0xF89) Default: 3

Settings 0: Basic OC+Basic OV
1: Basic OC+Smart OV
2: Smart OC+Basic OV
3: Smart OC+Smart OV

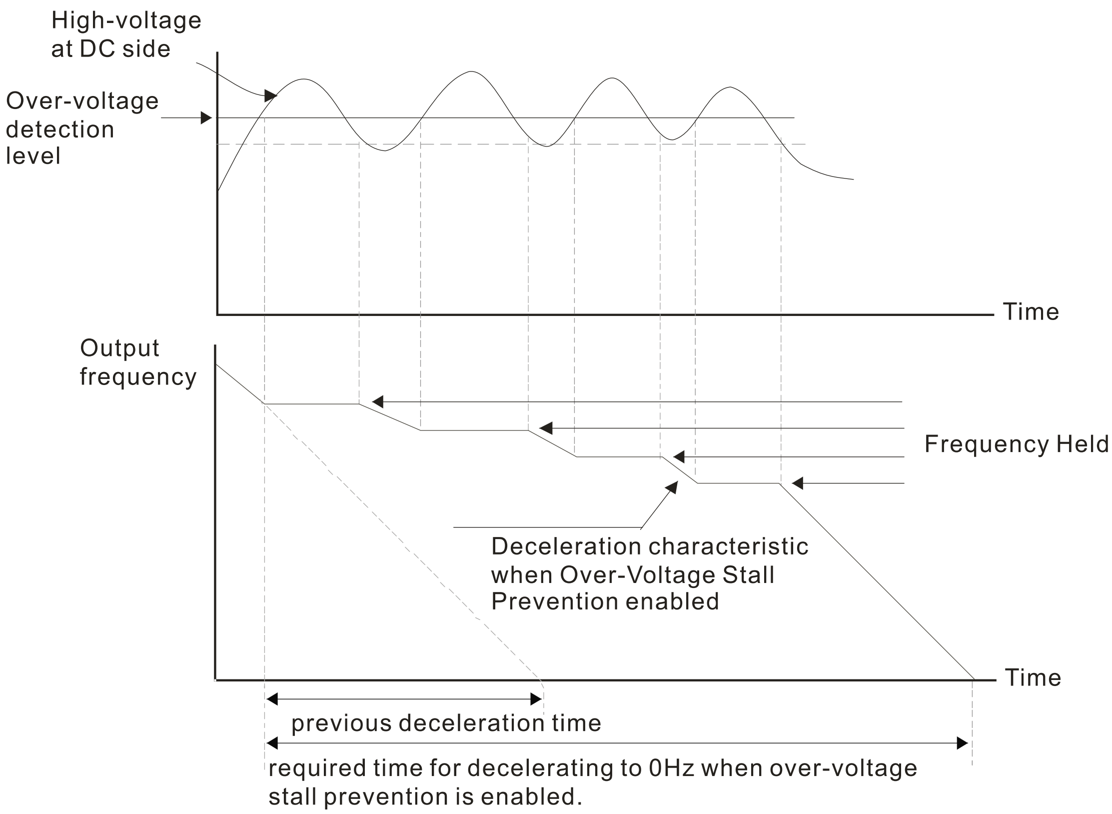
- A comparison between basic stall prevention and smart stall prevention:

Type	Over-voltage			Over-current (oc)		
	Descriptions	Action	Pr.	Descriptions	Action	Pr.
Basic	Frequency maintains during deceleration	Deceleration stops	H1-08	Frequency maintains during acceleration	Acceleration stops	H2-05
				Frequency decreases at constant speed	Frequency gradually decreases	H2-07
Smart	Frequency increases during accel./ decel./ constant speed	Full PID control	H1-08	Frequency decreases during accel./ decel.	Full PID control	H2-05
				Frequency decreases at constant speed	Full PID control	H2-07

- Pr.H1-09 (stall prevention function selection) and Pr.J3-00 (TEC function) can be used together.
- If you use smart over-voltage or smart over-current stall prevention for industries that require fast response, you can adjust the value of Smart OV PID controller (Pr.H1-11–H1-13).
- When using smart over-voltage function, the drive decelerates to stop with the fastest deceleration time according to different working condition, rather than the first to fourth deceleration time (Pr.C2-01–C2-09).
- When you choose the smart over-voltage stall prevention and the drive is a lower harmonic model, Pr.H1-08 ov Stall Prev Level will be adjusted dynamically.

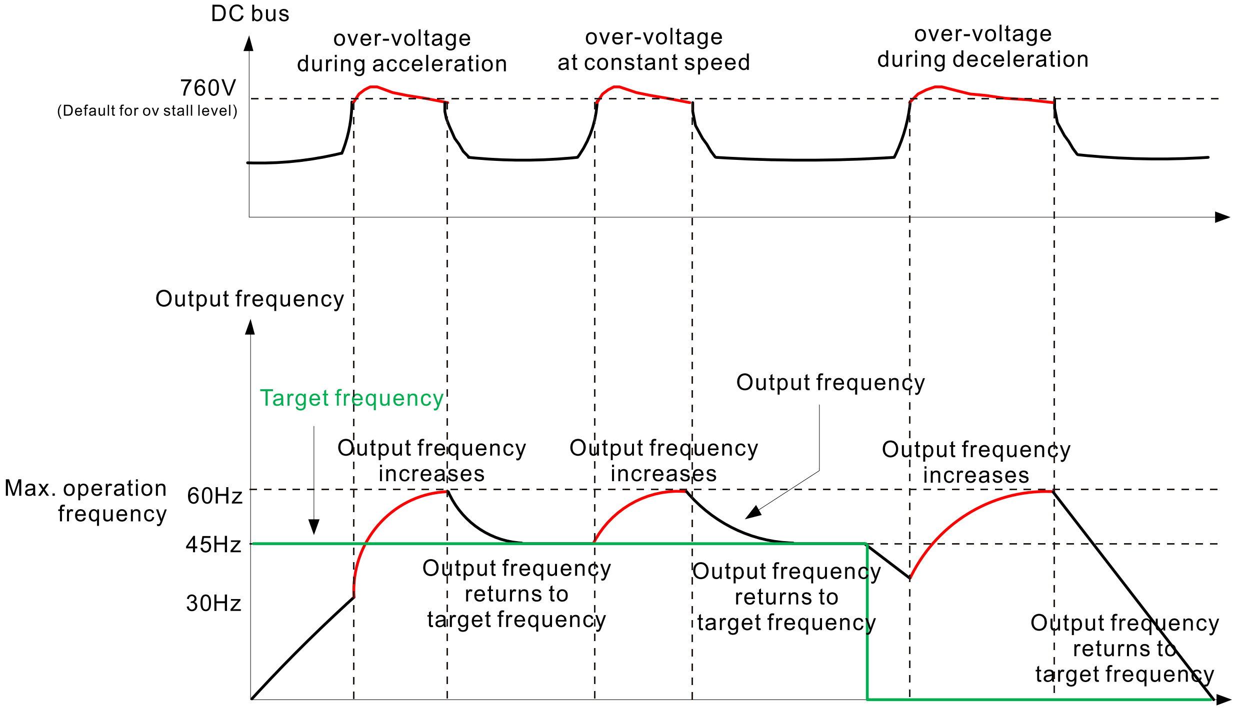
Basic Over-voltage Stall Prevention

- This parameter is suitable for uncertain load inertia. When stopping under normal load, the over-voltage does not occur during deceleration and meet the deceleration time setting. Sometimes it may not stop due to over-voltage during decelerating to STOP when the load regenerative inertia increases. In this case, the AC motor drive extends the deceleration time automatically until the drive stops.
- Due to the motor load inertia, the motor may exceed the synchronous speed when the drive decelerates; in this case, the motor becomes generator. If the motor load inertia is larger or the setting for drive derating time is too small, the motor regenerates energy to the drive, and makes the DC bus voltage increase to the maximum allowable value. When you enable basic over-voltage stall prevention and the DC bus voltage detected is too high, the drive stops decelerating (output frequency remains unchanged) until the DC bus voltage drops below the setting value.
- When the over-voltage stall prevention is enabled, the drive deceleration time is larger than the setting time.
- If the deceleration time affects your application, it is not recommended to use this function. You can increase the deceleration time properly.



Smart Over-voltage Stall Prevention

📖 The smart over-voltage stall prevention adopts closed-loop control. During acceleration, constant speed and deceleration, Pr.H1-08 Over-voltage Stall Prevention will be referred to as the control target command. When the DC bus voltage exceeds the stall prevention level, the controller adjusts the output frequency increasing according to the closed-loop response until the DC bus voltage is lower than the stall prevention level, and then returns to the target frequency based on the originally set deceleration time after the situation is relieved. If the DC bus is still higher than the stall prevention level during the adjustment, the output frequency increases to Pr.C2-17 Maximum Operation Frequency.

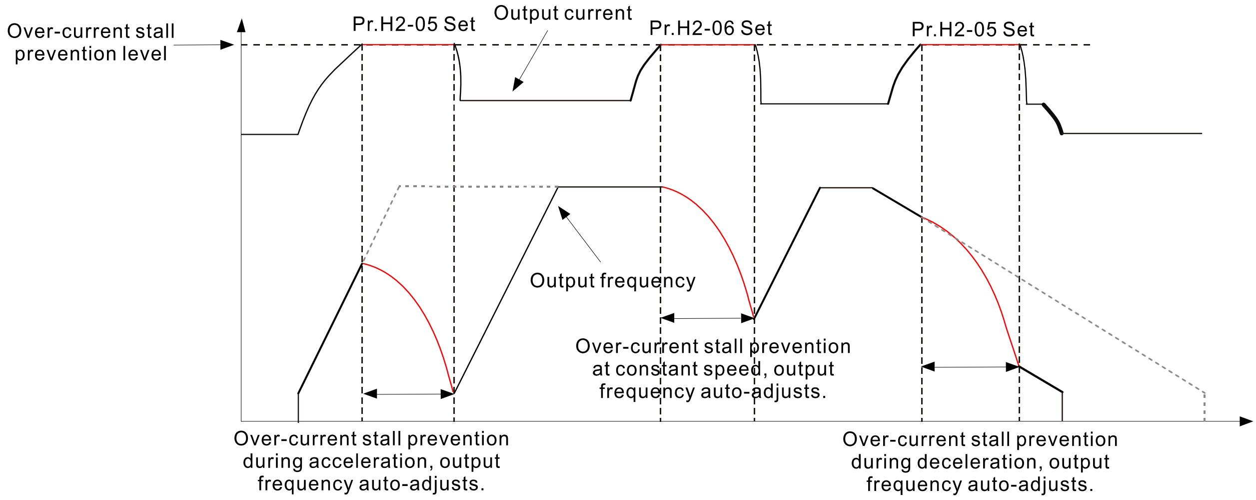


Basic Over-current Stall Prevention

- When the output current exceeds the over-current stall prevention level (Pr.H2-05) during acceleration, the output frequency stops accelerating. The output frequency continues to accelerate when the output current drops below the stall prevention level to protect the drive.
- When the output current exceeds the over-current stall prevention level during operation (Pr.H2-07), the output frequency decreases according to the setting for acceleration/ deceleration time selection for over-current stall prevention at constant speed (Pr.H2-07). When the output current drops below the stall prevention level, the output frequency accelerates to the target frequency according to its previous set acceleration time to protect the drive.

Smart Over-current Stall Prevention

- The smart over-current stall prevention adopts closed-loop control. It takes the setting for Pr.H2-05 (over-current stall prevention during acceleration) as target command during acceleration / deceleration and takes setting for Pr.H2-07 (over-current stall prevention during operation) as target command at constant speed. When the output current exceeds the stall prevention level, the Smart OC PI controller (Pr.H2-10, H2-11) decreases the output frequency gradually according to the closed-loop response until the current drops below the stall prevention level and returns to target frequency based on the previous setting when the current is lower than the stall prevention level. If the output current is still higher than the stall prevention level during the adjustment, the output frequency decreases to the minimum output frequency.



H1-10	OV Stall Prev Indn

(0xF8A) Default: 0

Settings
0: Disable
1–2: Relay1–Relay2
3–4: MO1–MO2
5–9: Reserve
10–15: MO/Relay10–15

- Sets the corresponded over-voltage stall prevention indication of multi-function terminals.

H1-11 Smart ov P Gain

(0xF8B)

Default: Depending on the models

Settings 0–65535

Sets the proportional gain of smart over-voltage stall prevention.

H1-12 Smart ov I Gain

(0xF8C)

Default: Depending on the models

Settings 0–65535

Sets the integral gain of smart over-voltage stall prevention.

H1-13 Smart ov D Gain

(0xF8D)

Default: Depending on the models

Settings 0–65535

Sets the differential gain of smart over-voltage stall prevention.

H2. Current Protection

H2-00 GFF Detect Level

(0xFC0) Default: 60

Settings 0–200%

- 100% corresponds to the drive light load rated current.

✓ H2-04 Output Current Limit

(0xFC4) Default: 100

Settings 0– Depending on the models (unit: %)
(100% corresponds to the drive continuous current)

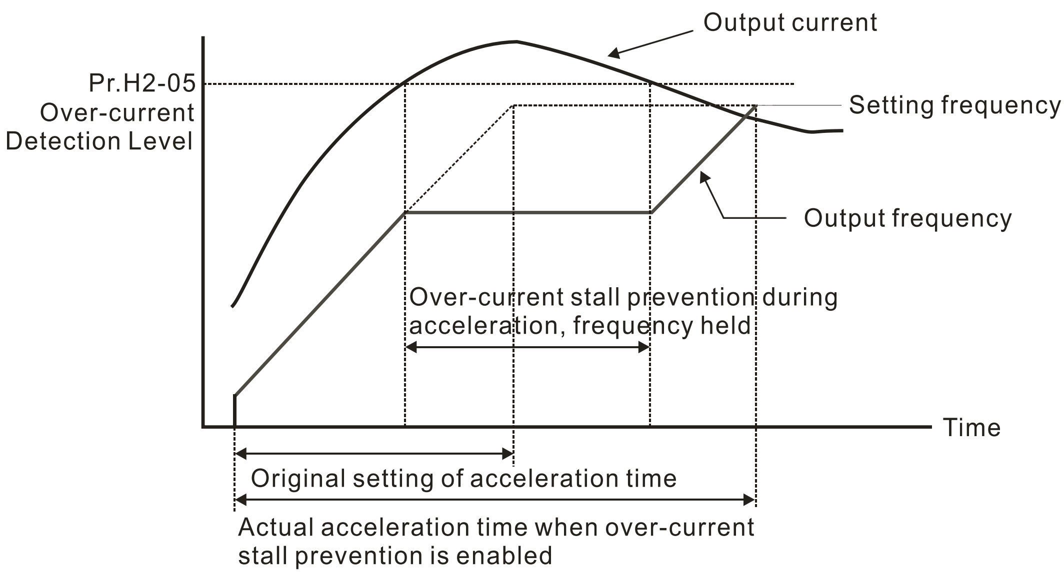
- Sets the maximum output current of the drive, determines the drive output current limit with Pr.F2-16–F2-19. When the control mode is PMFOC and SynRM FOC, and the drive output current reaches the set current limit, the output frequency automatically decreases as the over-current stall prevention action.
- This parameter is NOT applicable for VF and SVC control modes.

✓ H2-05 ocA Stall Prev Level

(0xFC5) Default: 90

Settings 0–100%

- If the motor load is too large or the drive acceleration time is too short, the output current of the drive may be too high during acceleration, and it may cause motor damage or trigger the drive protection functions (oL, oc, etc.). Use this parameter to prevent these situations.
- As the following figure shown, the drive output current may increase abruptly and exceed the setting of Pr.H2-05 during acceleration. In this case, the drive stops accelerating and keeps the output frequency constant, and then continues to accelerate until the output current decreases.
- When the over-voltage stall prevention is enabled, the drive acceleration time is larger than the setting time.
- When the over-current stall prevention occurs because the motor capacity is too small or operates in the default, decrease Pr.H2-05 setting value.

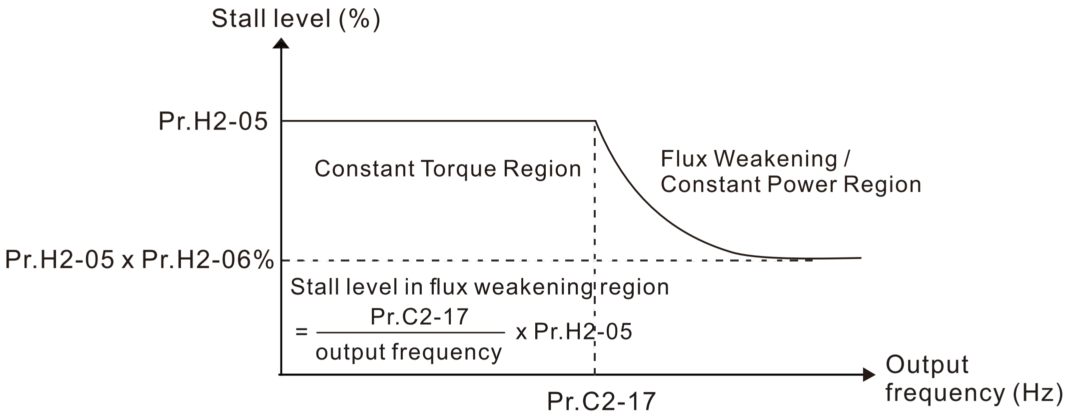


H2-06 Weak Flux oc Stall Prev Level

(0xFC6) Default: 100

Settings 0–100%

- Sets the over-current stall prevention level when the motor operation frequency is larger than Pr.d1-05 (IM1 Rated Frequency). This parameter only works during acceleration and for IM applications.
- Example: Pr.H2-05 = 150%, Pr.H2-06 = 80%.
  When the motor operation frequency is larger than Pr.d1-05 (IM1 Rated Frequency), the lowest over-current stall prevention level during acceleration is:
  Pr.H2-05 × Pr.H2-06 = 150 × 80% = 120%
- Pr.H2-06 is invalid when the over-current stall prevention activates according to Pr.H2-07 at constant speed.

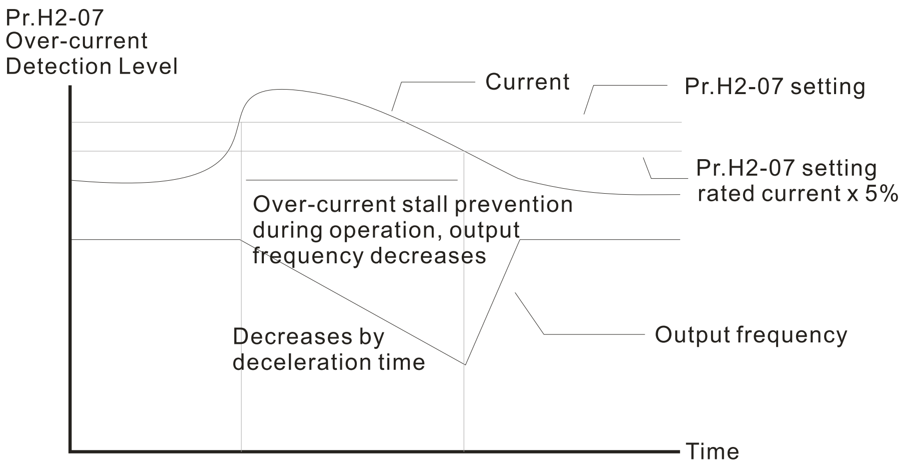


H2-07 ocn Stall Prev Level

(0xFC7) Default: 90

Settings 0–100%

- This is a protection for the drive to decrease output frequency automatically when the motor over-loads abruptly during constant motor operation.
- If the output current exceeds the setting value for Pr.H2-07 when the drive is operating, the drive decelerates according to the Pr.H2-08 setting to prevent the motor from stalling. The lower limit for the over-current stall prevention is determined by Pr.C2-19.



Over-current stall prevention during operation

✎ H2-08 ocn Stall Prev Decel Sel

(0xFC8) Default: 0

Settings 0: Current Decel Time
1: Decel Time 1
2: Decel Time 2
3: Decel Time 3
4: Decel Time 4
5: By Quick Stop Time

📖 Selects the deceleration time when over-current stall prevention occurs at constant speed.

H2-09 oc Stall Prev Indn

(0xFC9) Default: 0

Settings 0: Disable
1–2: Relay1–Relay2
3–4: MO1–MO2
5–9: Reserve
10–15: MO/Relay10–15
16–19: Reserve

📖 Sets the corresponded over-current stall prevention indication of multi-function terminals.

✎ H2-10 Smart oc P Gain

(0xFCA) Default: Depending on the models

Settings 0–65535

📖 Sets the proportional gain of smart over-current stall prevention.

✎ H2-11 Smart oc I Gain

(0xFCB) Default: Depending on the models

Settings 0.000–65.535

📖 Sets the integral gain of smart over-current stall prevention.

✎ H2-12 Low Current Detect Level

(0xFCC) Default: 0.0

Settings 0.0– 100.0%

📖 100% corresponds to the drive light load rated current.

✎ H2-13 Low Current Detect Time

(0xFCD) Default: 0.00

Settings 0.00–360.00 sec.

H2-14 Low Current Action

(0xFCE) Default: 0

Settings
0: Warning & continue OPER
1: Fault and ramp to stop
2: Fault & Auto-Decel
3: Fault & coast to stop
4: Fault & by Quick Stop Time

- When the drive output current is lower that the set level in Pr.H2-12, and the low current output time exceeds the detect time of Pr.H2-13, the drive activates according to Pr.H2-14. It can be used with MO terminal 0FCFh (low current output).
- The low current detection does not activate when the drive is in sleep mode or standby mode.
- Pr.H2-12 low current detect level is based on the drive rated current, the equation is: Pr.A0-01 (drive rated current) × Pr.H2-12 (Low current detect level) % = Low current detection level (A).

H2-15 Low Current Indn

(0xFCF) Default: 0

Settings
0: Disable
1–2: Relay1–Relay2
3–4: MO1–MO2
5–9: Reserve
10–15: MO/Relay10–15

- Sets the corresponded low current indication of multi-function terminals.

H3. Phase Loss Protection

H3-00 OrP Action

(0x1000) Default: 1

Settings
1: Fault and ramp to stop
2: Fault & Auto-Decel
3: Fault & coast to stop
4: Fault & by Quick Stop Time

📖 The drive activates according to Pr.H3-00 when the DC bus ripple voltage meets the following conditions:

- DC bus ripple frequency ≤ 166 Hz
- Starts counting time when the vibration amplitude is larger than 60V (440V models) for 20 times continuously.

H3-01 OrP Indn

(0x1001) Default: 0

Settings
0: Disable
1–2: Relay1–Relay2
3–4: MO1–MO2
5–9: Reserve
10–15: MO/Relay10–15

📖 Sets the corresponded DC bus over-voltage protection indication of multi-function terminals.

H3-02 OPL Detect Level

(0x1002) Default: 1.00

Settings
0.00–100.00 sec. (100% corresponds to the drive rated current)
0: Disable

H3-03 OPL Detect Time

(0x1003) Default: 3.000

Settings 0.000–65.535 sec.

H3-04 OPL DC Brake Time

(0x1004) Default: 0.000

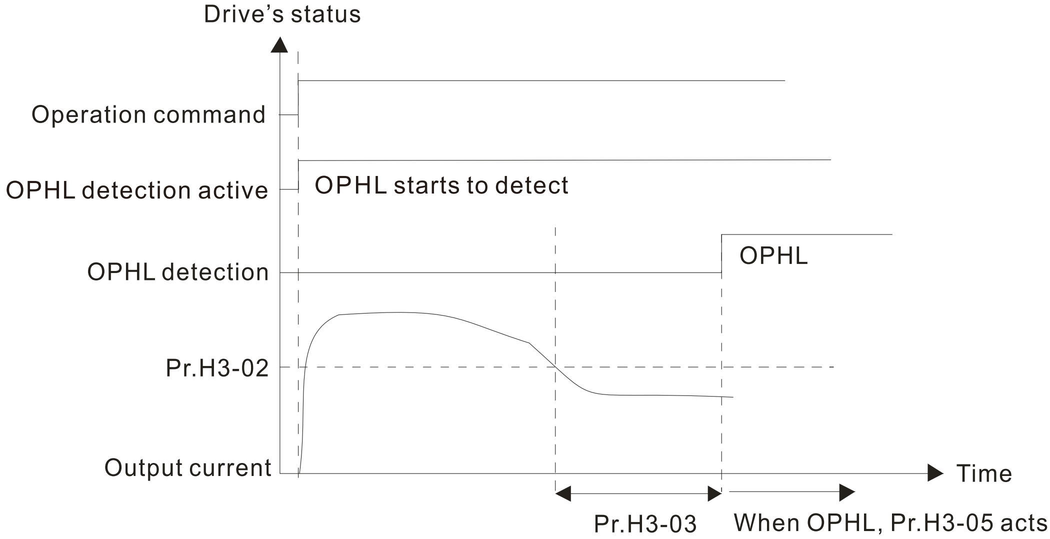
Settings 0.000–65.535 sec.

📖 There are two situations for the output phase loss detection: “detect when the drive is in operation” and “detect before operation”. Setting Pr.H3-04 to 0 disables the OPHL detection function before operation.

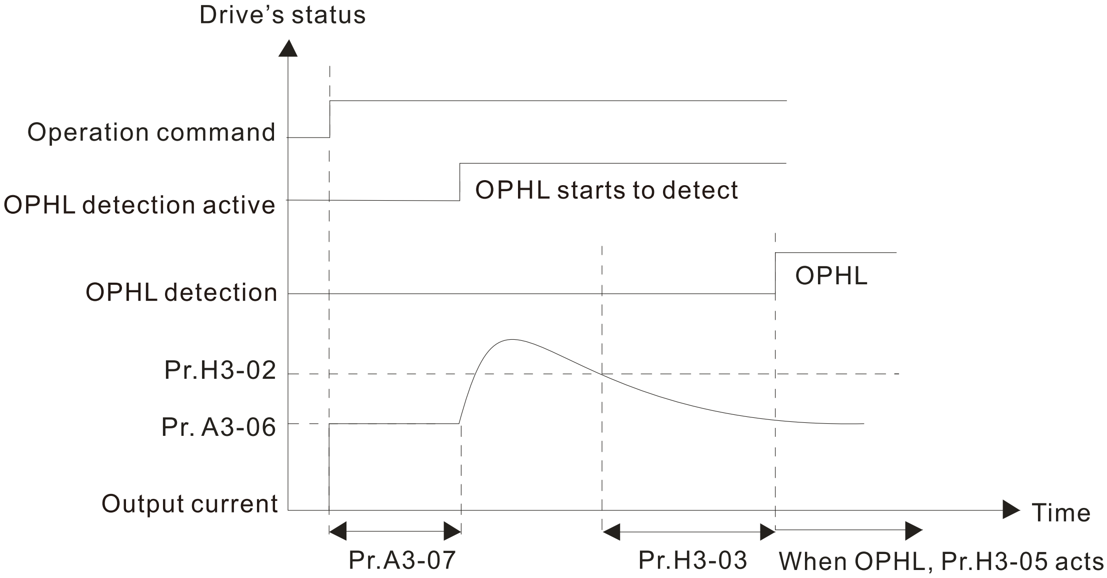
📖 The OPHL detection during operation is only valid for IM applications, and the OPHL detection before operation is available for all types of motors.

📖 The status of output phase loss detection is as following:

- Status 1: The drive is in operation
  When any phase is less than Pr.H3-02 level and exceeds the Pr.H3-03 setting time, the drive executes according to Pr.H3-05 setting.

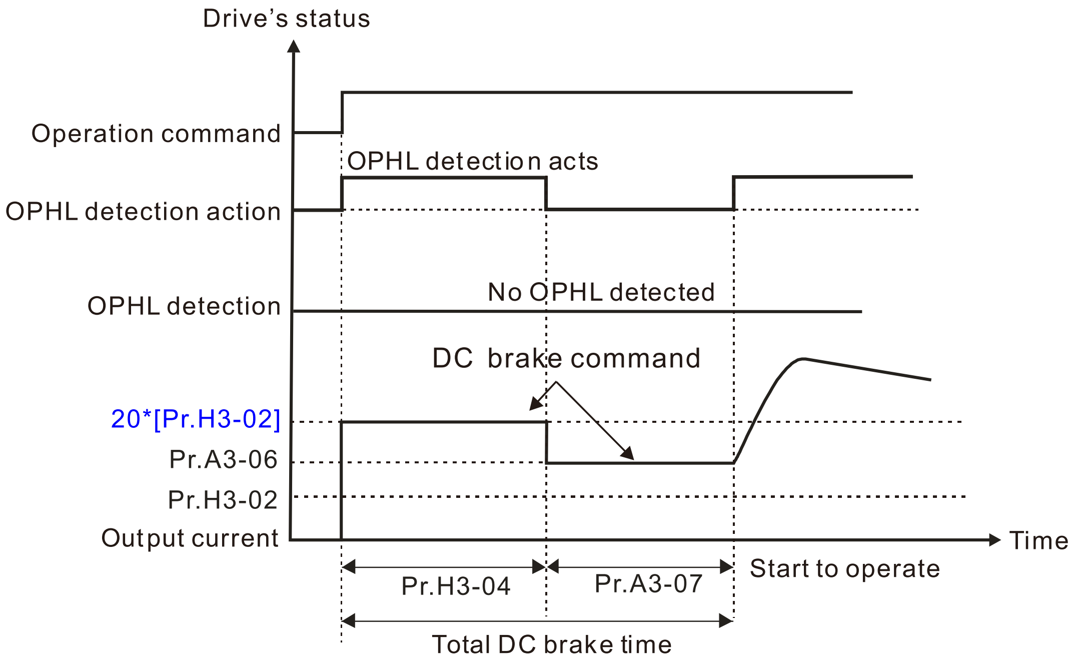


- Status 2: The drive is in STOP, Pr.H3-03 ≠ 0; Pr.H3-04 ≠ 0; Pr.A3-06 and A3-07 ≠ 0
  After the drive starts, the DC brake operates according to Pr.A3-06 and A3-07. During this period, OPHL detection is not active. After the DC brake action is completed, the drive starts to run and enables the OPHL protection as mentioned above in status 1.



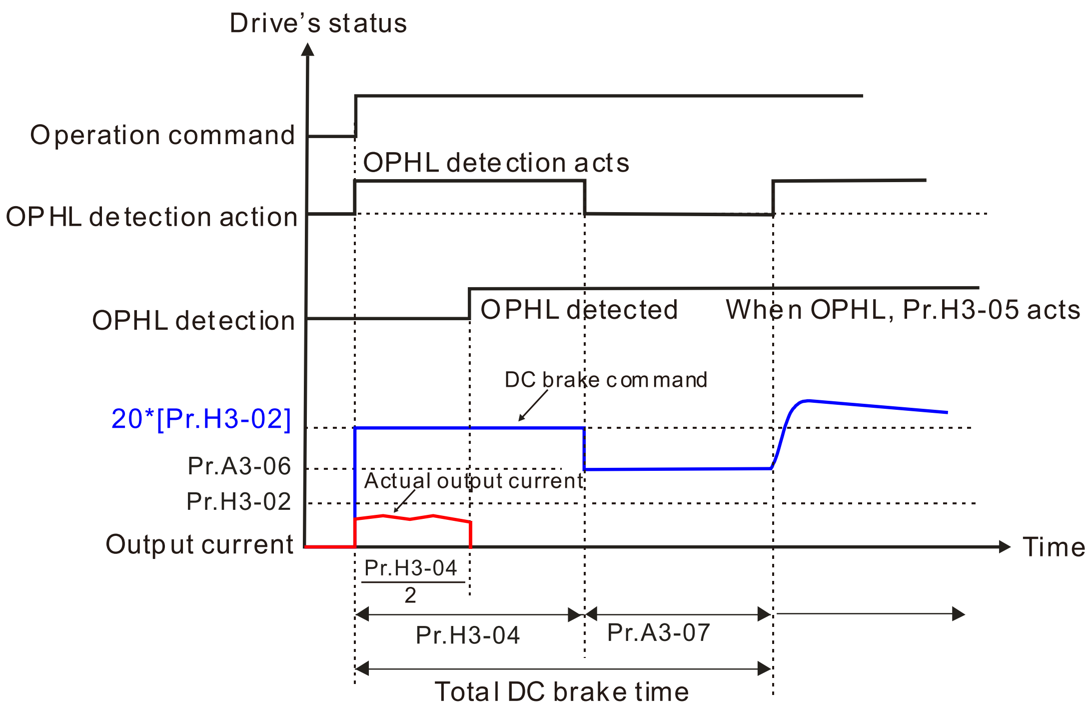
- Status 3: The drive is in STOP, Pr.H3-03 ≠ 0; Pr.H3-04 ≠ 0
  When the drive starts, it executes Pr.H3-04 first, and then executes Pr.A3-07 (DC brake). The DC brake current level in this state includes two parts: one is 20 times the Pr.H3-02 setting value in Pr. H3-04 setting time (if the value is larger than Pr.A3-06, then takes Pr.A3-06 as the level); the other is the Pr.A3-07 setting value if Pr.A3-06 setting time. The total DC brake time T = Pr.H3-04 + Pr.A3-07.

Status 3-1: Pr.H3-04 ≠ 0, Pr.A3-07 ≠ 0 (No OPHL detection before operation)



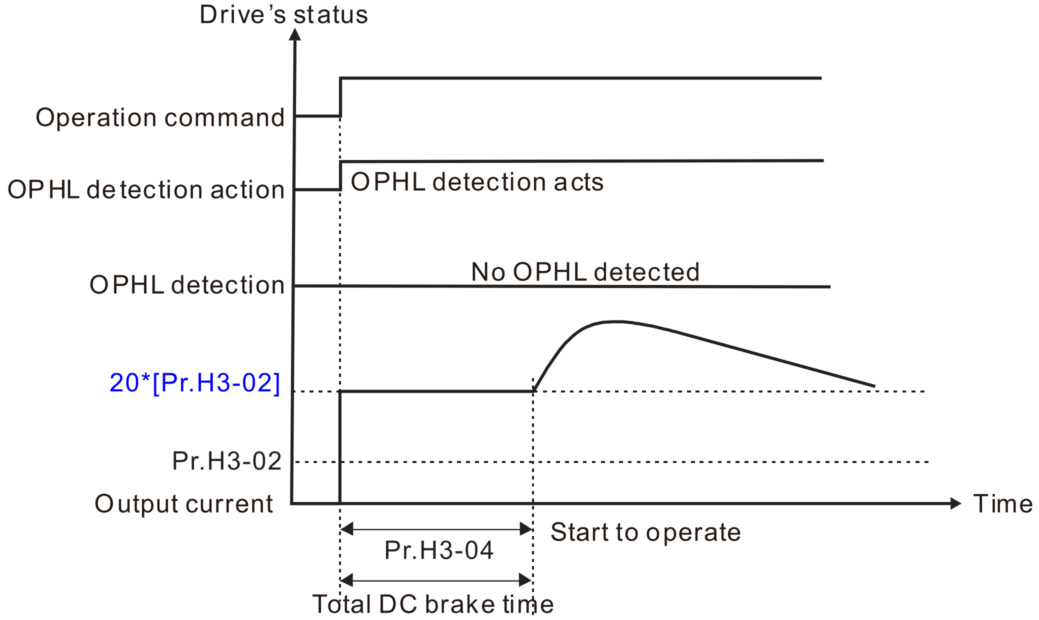
Status 3-2: Pr.H3-04 ≠ 0, Pr.A3-07 ≠ 0 (OPHL detected before operation)

In this period, if an OPHL occurs within the time for Pr.H3-04, the drive executes Pr.H3-05 setting after the drive starts counting for half the time of Pr.H3-04.

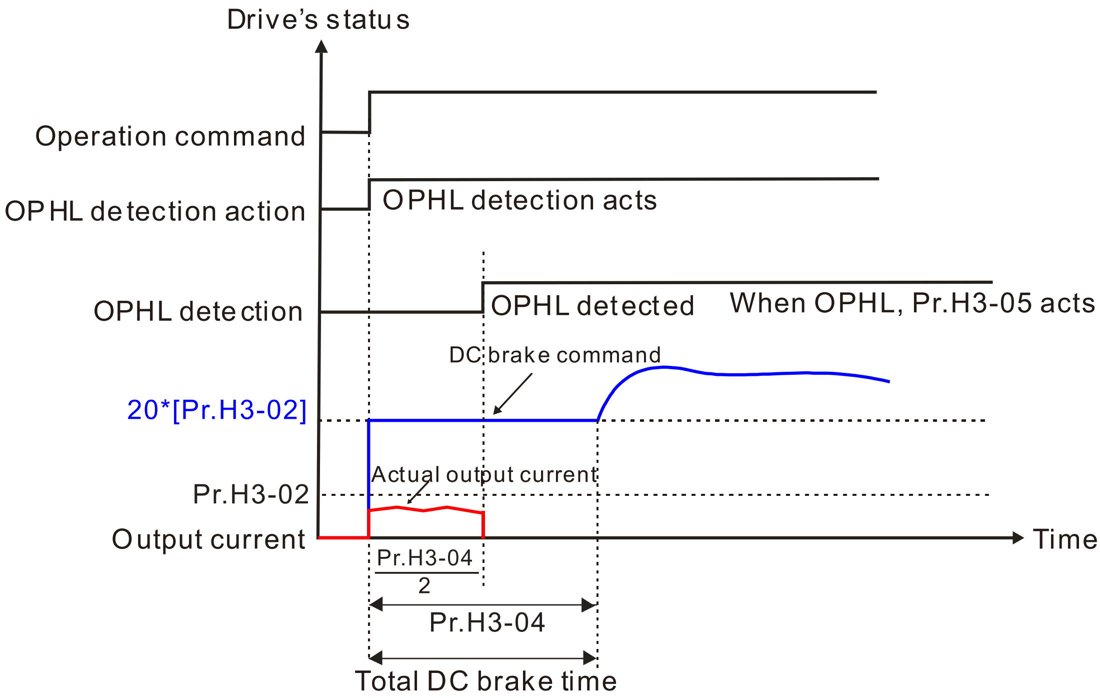


- Status 4: The drive is in STOP, Pr.H3-04 ≠ 0; Pr.A3-07 = 0
  When the drive starts, it executes Pr.H3-04 as the DC brake. The DC brake current level is 20 times the Pr.H3-02 setting value.

Status 4-1: Pr.H3-04 ≠ 0, Pr.A3-07 = 0 (No OPHL detection before operation)



Status 4-2: Pr.H3-04 ≠ 0, Pr.A3-07 = 0 (OPHL detected before operation)
In this period, if an OPHL occurs within the time for Pr.H3-04, the drive executes Pr.H3-05 setting after the drive starts counting for half the time of Pr.H3-04.



H3-05 OPL Action

(0x1005) Default: 0

Settings 0: Warning & continue OPER

1: Fault and ramp to stop

2: Fault & Auto-Decel

3: Fault & coast to stop

4: Fault & by Quick Stop Time

- The phase loss protection is activated when Pr.H3-05 is not set to 0.

H3-06 U Phase Loss Indn

(0x1006) Default: 0

H3-07 V Phase Loss Indn

(0x1007) Default: 0

H3-08 W Phase Loss Indn

(0x1008) Default: 0

Settings 0: Disable

1–2: Relay1–Relay2

3–4: MO1–MO2

5–9: Reserve

10–15: MO/Relay10–15

- Sets the corresponded U, V and W phase loss indication of multi-function terminals.

H4. Drive Heat Protection

✎ H4-00 IGBT oH Warning Level

(0x1040) Default: 95

Settings	0–95%

📖 When the IGBT temperature is higher than Pr.H4-00 setting value, the drive gives the overheat warning.

✎ H4-01 Cap oH Warning Level

(0x1041) Default: 95

Settings	0–95%

📖 When the capacitance temperature is higher than Pr.H4-01 setting value, the drive gives the overheat warning.

H4-02 Drive oH Warning Indn

(0x1042) Default: 0

Settings	0: Disable
	1–2: Relay1–Relay2
	3–4: MO1–MO2
	5–9: Reserve
	10–15: MO/Relay10–15

📖 Sets the corresponded drive overheat warning indication of multi-function terminals.

H4-03 Fan Control Sel

(0x1043) Default: 1

Settings	0: Always OFF
	1: Always ON
	2: Fan ON after Drive Start
	3: By IGBT Temp

📖 Sets the fan running conditions.

H4-04 Fan Speed Setting

(0x1044) Default: 10

Settings	0–100%

📖 Sets the fan speed of the drive.

H4-05 CF Derating Protection

(0x1045) Default: 0

Settings	0: Reduce CF & Current Limit
	1: Fix CF & Reduce Current Limit
	2: Reduce CF & Fix Current Limit

📖 The maximum allowable output frequency and the corresponded carrier frequency lower limit under each control mode:

- VF, SVC: 599 Hz, 6K
- FOC sensorless (IM): 300 Hz, 6K

- FOC sensorless (PM): 500 Hz, 10K

📖 Setting 0:

- Actual over-current stall prevention level = derating ratio × over-current stall prevention level (Pr.H2-05, H2-07).
- Rated current derating level = derating ratio × drive rated current (A0-01).
- When the operating point is greater than the derating curve, the carrier frequency (Fc) output by the drive decreases automatically according to the ambient temperature, overload output current and time.
- Applicable conditions: If overload frequencies are not frequent, and the only concern is the carrier frequency when the output current is lower than the rated current most of the time, and the carrier change caused by short-term overload is acceptable, set to 0.

📖 Setting 1:

- When the operating point is greater than the derating curve, the carrier frequency (Fc) output by the drive is fixed to the default value.
- Applicable conditions: Select this mode if the change of carrier frequency and motor noise caused by ambient temperature and frequent overload are not acceptable.

📖 Setting 2:

- The protection method and action are set to 0, but this disables the current limit when output current is the derating ratio × 160% of output current in normal load, and derating ratio × 130% of output current in light load.
- The advantage is that it can provide a higher starting output current when carrier frequency setting is higher than the default value. The disadvantage is that the carrier frequency derates easily when it overloads. For example: when Pr.H4-05 = 0 or 1, the over-current stall prevention level = Ratio × Pr.H2-05. When Pr.H4-05 = 2, the over-current stall prevention level = Pr.H2-05.

H5. Motor Overload Protection

⚡ H5-00 ot Action

(0x1080) Default: 0

Settings 0: Warning & continue OPER

1: Fault and ramp to stop

2: Fault & Auto-Decel

3: Fault & coast to stop

4: Fault & by Quick Stop Time

📖 The over-torque protection is activated when Pr.H5-00 is not set to 0.

⚡ H5-01 ot Indn

(0x1081) Default: 0

Settings 0: Disable

1–2: Relay1–Relay2

3–4: MO1–MO2

5–9: Reserve

10–15: MO/Relay10–15

📖 Sets the corresponded over torque indication of multi-function terminals.

⚡ H5-02 Normal Speed ot Action

(0x1082) Default: 0

Settings 0: Warning & continue OPER

1: Fault and ramp to stop

2: Fault & Auto-Decel

3: Fault & coast to stop

4: Fault & by Quick Stop Time

📖 The over-torque protection at constant speed is activated when Pr.H5-02 is not set to 0.

⚡ H5-03 Normal Speed ot Indn

(0x1083) Default: 0

Settings 0: Disable

1–2: Relay1–Relay2

3–4: MO1–MO2

5–9: Reserve

10–15: MO/Relay10–15

📖 Sets the corresponded over-torque indication at constant speed multi-function terminals.

✓ H5-04	IM1/ SM ot Level
(0x1084)	
✓ H5-15	IM2 ot Level
(0x1090)	
✓ H5-26	IM3 ot Level
(0x109C)	
✓ H5-37	IM4 ot Level
(0x10A8)	Default: 120
Settings	0–250%

📖 100% corresponds to the motor rated current.

✓ H5-05	IM1/ SM ot Detect Time
(0x1085)	
✓ H5-16	IM2 ot Detect Time
(0x1091)	
✓ H5-27	IM3 ot Detect Time
(0x109D)	
✓ H5-38	IM4 ot Detect Time
(0x10A9)	Default: 0.1
Settings	0.0–10.0 sec.

✓ H5-06	IM1/ SM N-Speed ot Level
(0x1086)	
✓ H5-17	IM2 N-Speed ot Level
(0x1092)	
✓ H5-28	IM3 N-Speed ot Level
(0x109E)	
✓ H5-39	IM4 N-Speed ot Level
(0x10AA)	Default: 120
Settings	0–250%

📖 100% corresponds to the motor rated current.

H5-07 IM1/ SM N-Speed ot Detect Time
(0x1087)

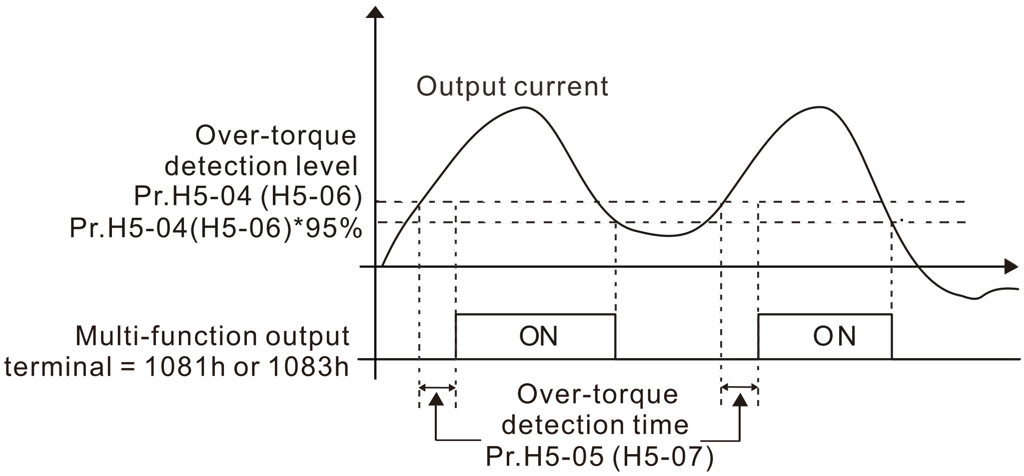
H5-18 IM2 N-Speed ot Detect Time
(0x1093)

H5-29 IM3 N-Speed ot Detect Time
(0x109F)

H5-40 IM4 N-Speed ot Detect Time
(0x10AB) Default: 0.1

Settings 0.0–10.0 sec.

- When the output current exceeds the over torque detect level (Pr.H5-04, H5-06) and the over torque detect time (Pr.H5-05, H5-07), the over-torque detection activates according to the setting for Pr.H5-00 or H5-02.
- When Pr.H5-00 or H5-02 is set to 0, after the over-torque is detected, the drive displays ot1/ ot2 warning and continues operating until the output current is smaller than 5% of the over-torque detect level, then the warning is released.
- When Pr.H5-00 or H5-02 is set to 1–4, after the over-torque is detected, the drive shows ot1/ ot2 fault and stops running according to the set stop method until the fault is reset manually.



H5-08 IM1/ SM EoL1 Mode
(0x1088)

H5-19 IM2 EoL1 Mode
(0x1094)

H5-30 IM3 EoL1 Mode
(0x10A0)

H5-41 IM4 EoL1 Mode
(0x10AC) Default: 0

Settings 0: Disable
1: Variable Torque mode
2: Constant Torque mode
3: High Precision mode

- Prevents self-cooled motor from overheating under low speed. Use an electronic thermal relay to limit the drive's output power.

- When the power is cycled frequently, if the power is switched OFF, the electronic thermal relay protection is reset; therefore, even setting the parameter to 0 or 1 may not protect the motor well. If there are several motors connected to one drive, install an electronic thermal relay in each motor.

H5-09 IM1/ SM EoL1 Detect Time
(0x1089)

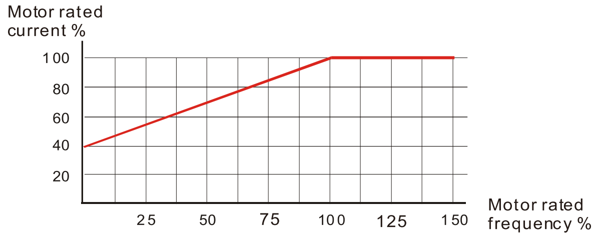
H5-20 IM2 EoL1 Detect Time
(0x1095)

H5-31 IM3 EoL1 Detect Time
(0x10A1)

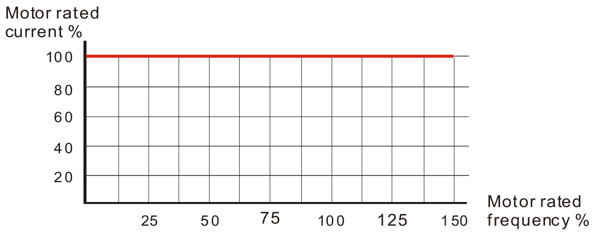
H5-42 IM4 EoL1 Detect Time
(0x10AD) Default: 60.0

Settings 30.0–600.0 sec.

- Set the parameter to 150% of motor rated current and use with the setting of Pr.H5-09 to prevent motor damage due to overheating. When it reaches the setting, the drive displays EoL1–4 and the motor coasts to stop.
- Use this parameter to set the action time of electronic thermal relay. It works based on the I^2t characteristic curve of electronic thermal relay, the output frequency and current of the drive, and the operation time to protect motor from overheating.



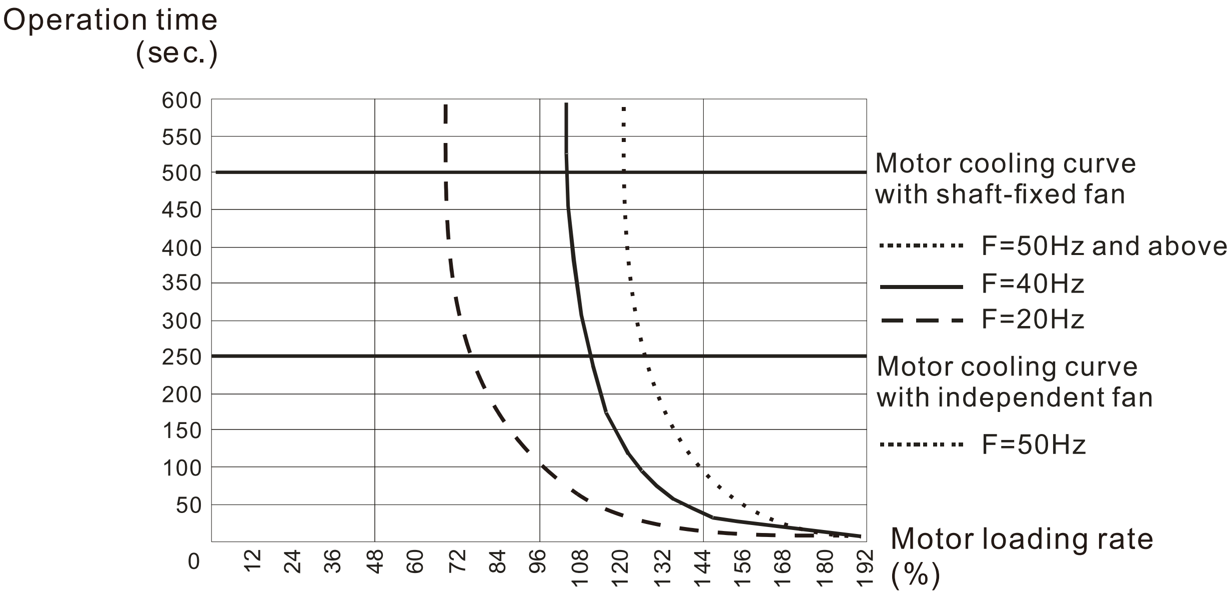
Motor cooling curve with shaft-fixed fan



Motor cooling curve with independent fan

- The action of electronic thermal relay depends on the setting for Pr.H5-08/ H5-19.
  1. Pr.H5-08/ H5-19 is set to 1 (using variable torque mode):
     When the output current of motor drive is higher than 150% of the motor rated current (refer to the motor rated current % corresponded to the motor rated frequency in the motor cooling curve with independent fan), motor drive starts to count the time. The electronic thermal relay acts when the accumulated time exceeds Pr.H5-09 or Pr.H5-20.
  2. Pr.H5-08/ H5-19 is set to 2 (using constant torque mode):
     When the output current of the drive is higher than 150% of the motor rated current (refer to the motor rated current % corresponded to the motor rated frequency in the motor cooling curve with shaft-fixed fan), the drive starts to count the time. The electronic thermal relay acts when the accumulated time exceeds Pr.H5-09 or Pr.H5-20.
  3. If the motor's rated current (Pr.d1-02) is not set, then set 90% of the drive rated current (Pr.A0-01) as the default of this parameter.
- The actual electronic thermal relay action time adjusts according to the drive output current (shown as the motor loading rate %). The action time is short when the current is high, and the action time is long when the current is low. Refer to the following diagram: (The motor cooling

curve with shaft-fixed fan and motor cooling curve with independent fan F = 50 Hz are the same one.)



H5-10 (0x108A)	IM1/ SM EoL1 Action
H5-21 (0x1096)	IM2 EoL1 Action
H5-32 (0x10A2)	IM3 EoL1 Action
H5-43 (0x10AE)	IM4 EoL1 Action

Default: 0

Settings
0: Warning & continue OPER
1: Fault and ramp to stop
2: Fault & Auto-Decel
3: Fault & coast to stop
4: Fault & by Quick Stop Time

The EoL action is activated when this parameter is not set to 0.

H5-11 (0x108B)	IM1/ SM HP Mode Max Torque
H5-22 (0x1097)	IM2 HP Mode Max Torque
H5-33 (0x10A3)	IM3 HP Mode Max Torque
H5-44 (0x10AF)	IM4 HP Mode Max Torque

Default: 100

Settings
0–250%
100% = motor rated torque (vector) or rated current (scalar)

100% corresponds to the motor rated torque.

✎ H5-12 IM1/ SM HP Mode 0 RPM Torque
(0x108C)
✎ H5-23 IM2 HP Mode 0 RPM Torque
(0x1098)
✎ H5-34 IM3 HP Mode 0 RPM Torque
(0x10A4)
✎ H5-45 IM4 HP Mode 0 RPM Torque
(0x10B0) Default: 40

Settings 0–250%

100% = motor rated torque (vector) or rated current (scalar)

📖 100% corresponds to the motor rated torque.

✎ H5-13 IM1/ SM HP Mode Switch FREQ
(0x108D)
✎ H5-24 IM2 HP Mode Switch FREQ
(0x1099)
✎ H5-35 IM3 HP Mode Switch FREQ
(0x10A5)
✎ H5-46 IM4 HP Mode Switch FREQ
(0x10B1) Default: See descriptions

Settings 0.00–599.00 Hz

📖 For high precision application, the electronic thermal relay can set the corresponding relation between the motor load level and the motor speed as a protection mechanism.

📖 When the motor speed is ≥ high precision mode switch frequency (Pr.H5-13), the equation of motor load level is:

Motor torque × [reciprocal of Pr.H5-13]

When the motor speed is < high precision mode switch frequency (Pr.H5-13), the equation of motor load level is:

Motor torque × reciprocal of [(Pr.H5-11 – H5-12) ÷ (Pr.H5-13 × motor speed + H5-12)]

✎ H5-48 Over Slip Action
(0x10B4) Default: 0

Settings 0: Warning & continue OPER

1: Fault and ramp to stop

2: Fault & Auto-Decel

3: Fault & coast to stop

4: Fault & by Quick Stop Time

📖 The over slip protection is activated when Pr.H5-48 is not set to 0.

✓ H5-49 Over Slip Indn

(0x10B5) Default: 0

Settings 0: Disable

1–2: Relay1–Relay2

3–4: MO1–MO2

5–9: Reserve

10–15: MO/Relay10–15

Sets the over slip indication of multi-function terminals.

✓ H5-50 IM1 Max Slip FREQ

(0x10B6)

✓ H5-51 IM2 Max Slip FREQ

(0x10B7)

✓ H5-52 IM3 Max Slip FREQ

(0x10B8)

✓ H5-53 IM4 Max Slip FREQ

(0x10B9) Default: 20.00

Settings 0.00–200.00 Hz

✓ H5-54 Over Slip Level

(0x10BA) Default: 0.0

Settings 0.0–100.0%

✓ H5-55 Over Slip Detect Time

(0x10BB) Default: 1.0

Settings 0.0–10.0 sec.

Pr.H5-50–H5-55 define the allowable slip value during the drive operation and the treatment when the slip exceeds the setting value.

H6. Motor Heat Protection

H6-00 Motor Temp 1
(0x10C0)

H6-11 Motor Temp 2
(0x10CB) Default: Read only

Settings -20–200°C

Display the temperature of the motor that currently connected to the AC motor drive. When using PTC, the displayed unit is %; when using KTY84, PT100 and PT1000, the displayed unit is °C.

H6-01 Motor Temp Fdk 1 AI Src
(0x10C1)

H6-12 Motor Temp Fdk 2 AI Src
(0x10CC) Default: 0

Settings
0: Disable
1–6: Reserve
7–9: AI1–AI3
10–11: Reserve
12–13: AI10–AI11

Sets the current source of motor temperature sensor.

H6-02 Motor Temp 1 AO Sel
(0x10C2)

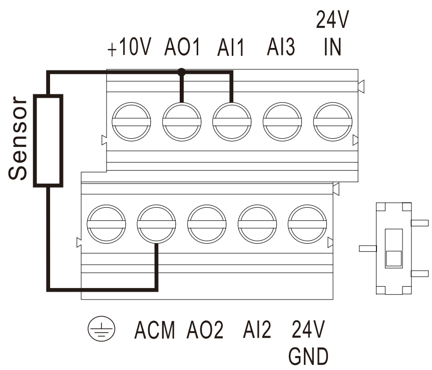
H6-13 Motor Temp 2 AO Sel
(0x10CD) Default: 0

Settings
0: Disable
1–2: AO1–AO2
3–4: Reserve
5–6: AO10–AO11

Set the AO according to distinct types of temperature sensor listed in the table below.

Sensor Type	AO Format	AO Output Percentage (%)	Equivalent Output Current (mA)
PTC	0–20 mA	Virtual AO outputs percentage	
KTY84	0–20 mA	5.00	1
PT100	0–20 mA	25.00	5
PT1000	0–20 mA	2.50	0.5

The wiring of the temperature wiring refers to the following figure.



📖 Set the AO according to different types of temperature sensors as listed in the table below.

Sensor Type	AO Format	AO Output Percentage Setting (%)	Equivalent Output Current (mA)
PTC	0~20 mA	Virtual AO outputs percentage	
KTY84	0~20 mA	5.00	1
PT100	0~20 mA	25.00	5
PT1000	0~20 mA	2.50	0.5

H6-03 Motor Temp 1 Sensor Type
(0x10C3)

H6-14 Motor Temp 2 Sensor Type
(0x10CE) Default: 0

Settings 0: Disable
1: PTC
2: KTY84
3: PT100
4: PT1000

📖 Sets the motor temperature sensor type.

📖 When setting the sensor type as PTC, the displayed unit of Pr.H6-00 and H6-01 is %.
When setting the sensor type as KTY84, PT100 and PT1000, the displayed unit of Pr.H6-00 and H6-01 is °C.

✎ H6-04 Motor Temp 1 Derating Level
(0x10C4)

✎ H6-15 Motor Temp 2 Derating Level
(0x10CF) Default:

Settings		Default
	0.0–100.0%	40.0
	0.0–150.0°C (Motor Temp.1 / 2 overheating detection level)	100.0

📖 Sets the motor temperature detection level of derating protection.

✎ H6-05 Motor Temp 1 Derating Delay
(0x10C5)

✎ H6-16 Motor Temp 2 Derating Delay
(0x10D0) Default: 60.0

Settings 0.0–600.0 sec.

📖 Sets the derating delay time of the motor temperature level.

✎ H6-06 Motor Temp 1 Derating FREQ
(0x10C6)

✎ H6-17 Motor Temp 2 Derating FREQ
(0x10D1) Default: 0.00

Settings 0.00–599.00 Hz

📖 Sets the drive output frequency limit of derating protection.

H6-07 Motor Temp 1 OH Detect Level
(0x10C7)
H6-18 Motor Temp 2 OH Detect Level
(0x10D2) Default:

Settings	0.0–100.0%	50.0
	0.0–150.0°C	125.0

📖 Setting 0 to disable the function, but the motor temperature feedback is still displayed.

📖 The unit is % when using PTC, and that of other occasions is °C.

H6-08 Motor Temp 1 OH Detect Time
(0x10C8)
H6-19 Motor Temp 2 OH Detect Time
(0x10D3) Default: 60.0

Settings 0.0–600.0 sec.

📖 Sets the motor temperature level detect time when the temperature reaches the overheat protection.

H6-09 Motor Temp 1 OH Action
(0x10C9)
H6-20 Motor Temp 2 OH Action
(0x10D4) Default: 0

Settings
0: Warning & continue OPER
1: Fault and ramp to stop
2: Fault & Auto-Decel
3: Fault & coast to stop
4: Fault & by Quick Stop Time

📖 The overheat protection is activated when this parameter is not set to 0.

H6-10 Motor Temp 1 OH Indn
(0x10CA)
H6-21 Motor Temp 2 OH Indn
(0x10D5) Default: 0

Settings
0: Disable
1–2: Relay 1–2
3–4: MO1–MO2
5–9: Reserve
10–15: MO/Relay 10–15

📖 Sets the overheat indication of multi-function terminals.

H7. Overload/ Underload Handle

H7-00 Load Compare Src

(0x1100) Default: 0

Settings 0: Output Amp/ motor rated Amp
1: Output torque/ motor rated torque
2: Output power/ motor rated power
3: Output power/ driver rated power

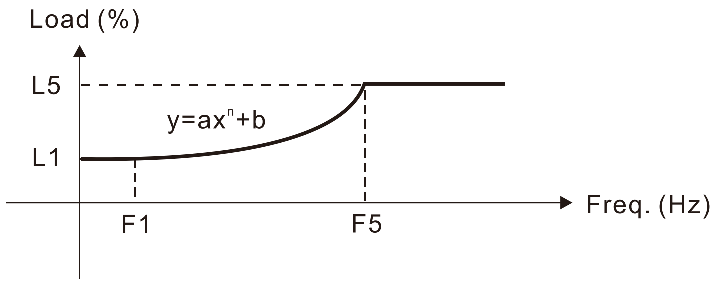
- Through different load compare sources, it provides user-defined derating conditions to prevent and reduce drive stopping due to overload.

H7-01 L/F Overload Curve Sel

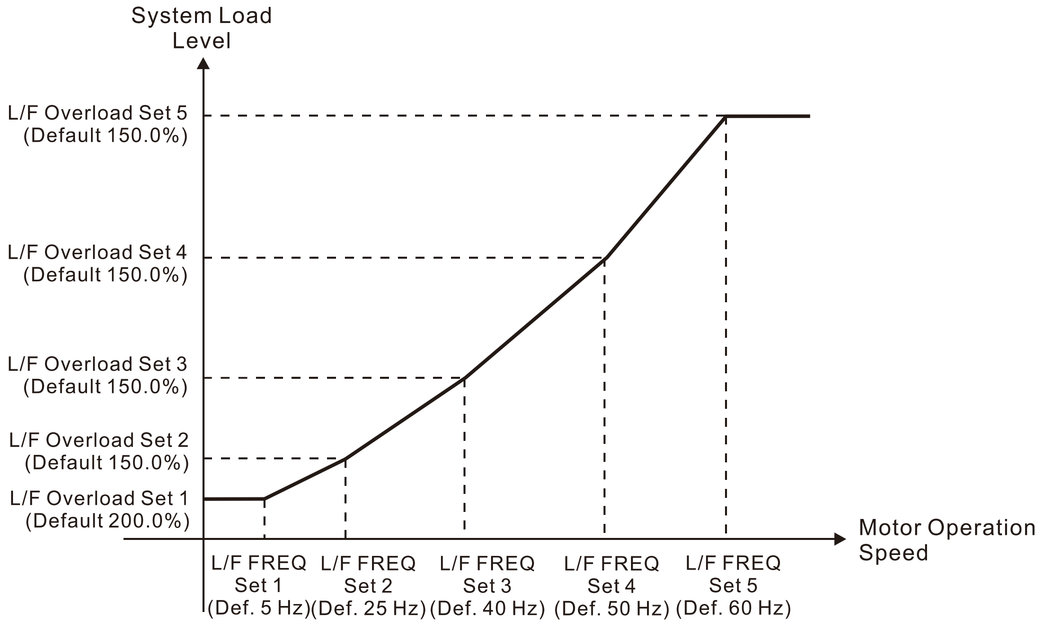
(0x1101) Default: 0

Settings 0: Disable
1: User Defined
2: 1.5th power curve
3: 2nd power curve
4: 3rd power curve

- Pr.H7-01 selects user-defined or built-in curves.
- When selecting a power type curve, the final curve is determined with reference to the setpoint 1 and setpoint 5 set by the user (that affects the coefficients a and b in the figure below), as shown in the following figure.



- When selecting user defined curve, the overload level is set using the overload parameters. The proportional relation is as shown in the following figure.



H7-02 L/F Overload Action

(0x1102) Default: 0

Settings 0: Warning & continue OPER
1: Fault and ramp to stop
2: Fault & Auto-Decel
3: Fault & coast to stop
4: Fault & by Quick Stop Time

- The L/F overload protection is activated when this parameter is not set to 0.
- Setting 0: The drive decelerates according to the current deceleration time until the overload condition is cleared.

H7-03 L/F Overload Indn

(0x1103) Default: 0

Settings 0: Disable
1–2: Relay 1–2
3–4: MO1–MO2
5–9: Reserve
10–15: MO/Relay 10–15

- Sets the overload indication of multi-function terminals.

✓ H7-04 L/F Overload Detect Time

(0x1104) Default: 10.0

Settings 0.0–600.0 sec.

- When the system load is > Pr.H7-10–H7-14 and remains in the frequency range of Pr.H7-05–H7-09 for the detect time more than Pr.H7-04, the drive executes the overload condition according to Pr.H7-03.

✓ H7-05 Overload L/F FREQ Set 1

(0x1105)

✓ H7-06 Overload L/F FREQ Set 2

(0x1106)

✓ H7-07 Overload L/F FREQ Set 3

(0x1107)

✓ H7-08 Overload L/F FREQ Set 4

(0x1108)

✓ H7-09 Overload L/F FREQ Set 5

(0x1109) Default: 5.00

Settings 0.00–599.00 Hz

- Setpoints are related in order of magnitude (the drive performs interpolation processing on the speed value internally), the relation between the speed parameter settings should be Setpoint 5 ≥ Setpoint 4 ≥ Setpoint 3 ≥ Setpoint 2 ≥ Setpoint 1.

✓ H7-10 Overload L/F Load Set 1
(0x110A)

✓ H7-11 Overload L/F Load Set 2
(0x110B)

✓ H7-12 Overload L/F Load Set 3
(0x110C)

✓ H7-13 Overload L/F Load Set 4
(0x110D)

✓ H7-14 Overload L/F Load Set 5
(0x110E) Default: 150.0

Settings 0.0–200.0%

- Set the load according to the frequency of Pr.H7-05–H7-09.

H7-15 L/F Underload Curve Sel
(0x110F) Default: 0

Settings
0: Disable
1: User Defined
2: 1.5th power curve
3: 2nd power curve
4: 3rd power curve

- Pr.H7-15 selects user-defined or built-in curves.

H7-16 L/F Underload Action
(0x1110) Default: 0

Settings
0: Warning & continue OPER
1: Fault and ramp to stop
2: Fault & Auto-Decel
3: Fault & coast to stop
4: Fault & by Quick Stop Time

- The L/F underload protection is activated when this parameter is not set to 0.

H7-17 L/F Underload Indn
(0x1111) Default: 0

Settings
0: Disable
1–2: Relay 1–2
3–4: MO1–MO2
5–9: Reserve
10–15: MO/Relay 10–15

- Sets the underload indication of multi-function terminals.

H7-18 L/F Underload Detect Time

(0x1112) Default: 10.0

Settings 0.0–600.0 sec.

📖 When the system load is < Pr.H7-24–H7-28 and within the frequency range of Pr.H7-17–H7-23 for the detect time that exceeds Pr.H7-18, the drive executes the underload conditions according to Pr.H7-17.

H7-19 Underload L/F FREQ Set 1

(0x1113)

H7-20 Underload L/F FREQ Set 2

(0x1114)

H7-21 Underload L/F FREQ Set 3

(0x1115)

H7-22 Underload L/F FREQ Set 4

(0x1116)

H7-23 Underload L/F FREQ Set 5

(0x1117) Default: 5.00

Settings 0.00–599.00 Hz

📖 Setpoints are related in order of magnitude (the drive performs interpolation processing on the speed value internally), the relation between the speed parameter settings should be Setpoint 5 ≥ Setpoint 4 ≥ Setpoint 3 ≥ Setpoint 2 ≥ Setpoint 1.

H7-24 Underload L/F Load Set 1

(0x1118) Default: 10.0

H7-25 Underload L/F Load Set 2

(0x1119) Default: 15.0

H7-26 Underload L/F Load Set 3

(0x111A) Default: 25.0

H7-27 Underload L/F Load Set 4

(0x111B) Default: 30.0

H7-28 Underload L/F Load Set 5

(0x111C) Default: 30.0

Settings 0.0–200.0%

📖 Set the load according to the frequency of Pr.H7-24–H7-28.

H8. Speed Feedback Protection

H8-00 Speed Deviation Detect Level

(0x1140) Default: 50

Settings 0–50%

This parameter is valid only in FOC mode.

H8-01 Speed Deviation Detect Time

(0x1141) Default: 0.5

Settings 0.0–10.0 sec.

H8-02 Speed Deviation Action

(0x1142) Default: 0

Settings
0: Warning & continue OPER
1: Fault and ramp to stop
2: Fault & Auto-Decel
3: Fault & coast to stop
4: Fault & by Quick Stop Time

The speed deviation protection is activated when this parameter is not set to 0.

H8-03 Over Speed Detect Level

(0x1143) Default: 115

Settings 0–120%
0: Disable

This parameter is valid only in FOC mode.

H8-04 Over Speed Detect Time

(0x1144) Default: 0.5

Settings 0.0–10.0 sec.

H8-05 Over Speed Action

(0x1145) Default: 0

Settings
0: Warning & continue OPER
1: Fault and ramp to stop
2: Fault & Auto-Decel
3: Fault & coast to stop
4: Fault & by Quick Stop Time

The over speed protection is activated when this parameter is not set to 0.

H8-06 Direction Error Detect Time

(0x1146) Default: 1.0

Settings 0.0–10.0 sec.
0: Disable

⌿ H8-07 Direction Error Action

(0x1147) Default: 0

Settings 0: Warning & continue OPER

1: Fault and ramp to stop

2: Fault & Auto-Decel

3: Fault & coast to stop

4: Fault & by Quick Stop Time

📖 The direction error protection is activated when this parameter is not set to 0.

J. Application Function

J0. Additional Function

⌁ You can set this parameter during operation.

⌁ J0-00 UVW MC Action Indn

(0x11C0) Default: 0

Settings
- 0: Disable
- 1–2: Relay1–Relay2
- 3–4: MO1–MO2
- 5–9: Reserved
- 10–15: MO/Relay10–15

📖 Selects terminals that control the action of the UVW electromagnetic contactor, and it needs to be used with MI function = 0055h Run Enable.

📖 When the MI terminal = Run Enable activates, the selected terminal contact in Pr.J0-00 activates.

J1. AES Function

⌁ You can set this parameter during operation.

⌁ J1-00 AES Auto Energy Saving Mode

(0x1200) Default: 0

Settings
- 0: Disable
- 1: PFO Power Factor Optimization
- 2: PLO Power Loss Optimization

📖 Applicable control modes for Pr.J1-00:

Settings/ Control Mode	Induction Motor (IM)			Permanent Magnet Synchronous AC Motor (PM)		Synchronous Reluctance Motor (SynRM)	
	VF	SVC	FOC	PMSVC	PMFOC	SVC	FOC
1: PFO Power Factor Optimization	✓						
2: PLO Power Loss Optimization	✓						

📖 Pr.J1-00 = 1 Power Factor Optimization (PFO):

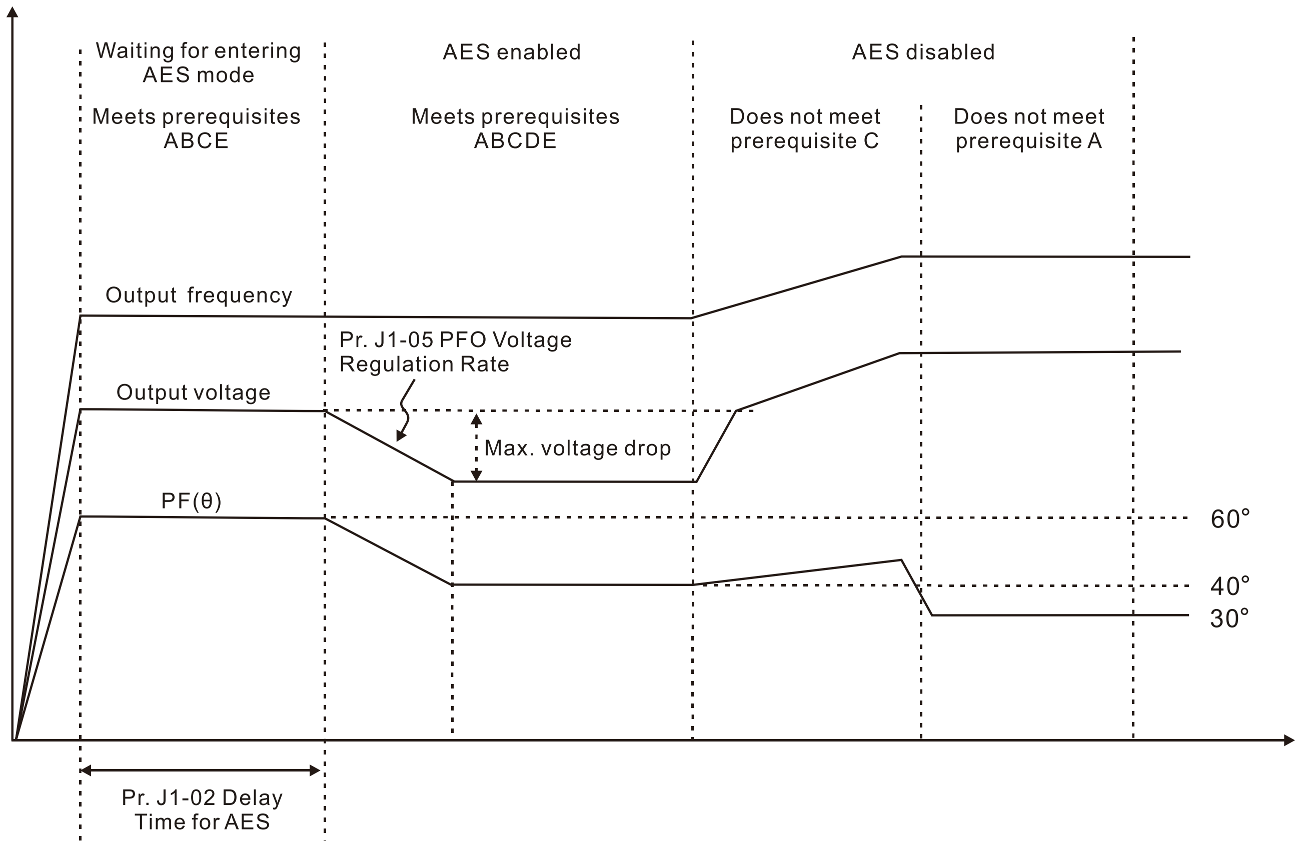
- When energy-saving is enabled, the motor acceleration/ deceleration operates with full voltage. During constant speed operation, it automatically calculates the best voltage value according to the load power. This function is not suitable for fluctuating loads or loads that are nearly full during operation.
- The prerequisites for power factor optimization are:
  - A. Power factor angle is > Pr.J1-04 (PFO Target Power Factor Angle)
  - B. Output frequency is > Pr.J1-01 (AES Min FREQ)
  - C. The drive is in a steady-state output frequency status (speed fluctuation < ±1% of rated frequency)
  - D. Time for steady-state output frequency is > Pr.J1-02 (AES Delay Time)
  - E. Output current is ≤ 90% of the drive rated current

- The prerequisites for invalid power factor optimization are:
  1. A change output frequency
  2. Output current is > 90% of the drive rated current

📖 If the prerequisites A, B, C, D and E are met at the same time, the drive enters the energy-saving mode and starts to adjust the energy-saving voltage according to the upper limit of Pr.J1-03 (AES Max Voltage Drop).

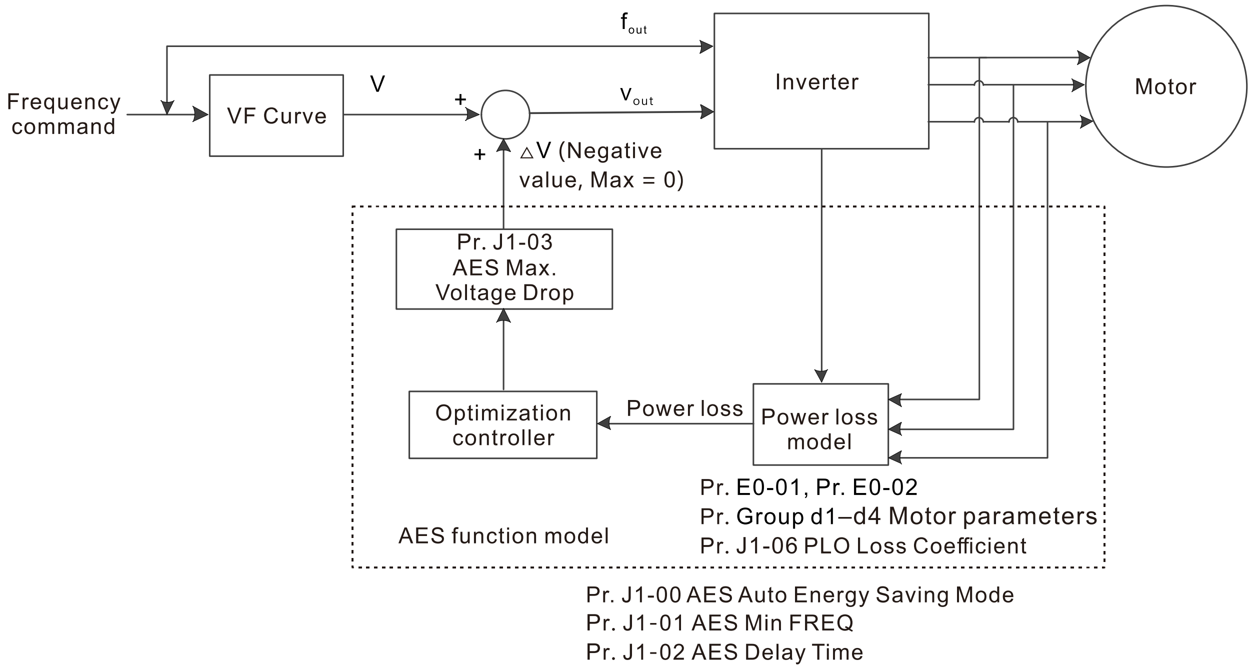
📖 If condition A reaches the target value first, the voltage reduction will be stopped.

📖 If the energy-saving mode is skipped, the voltage returns to the original VF voltage output value, as shown in the figure below.

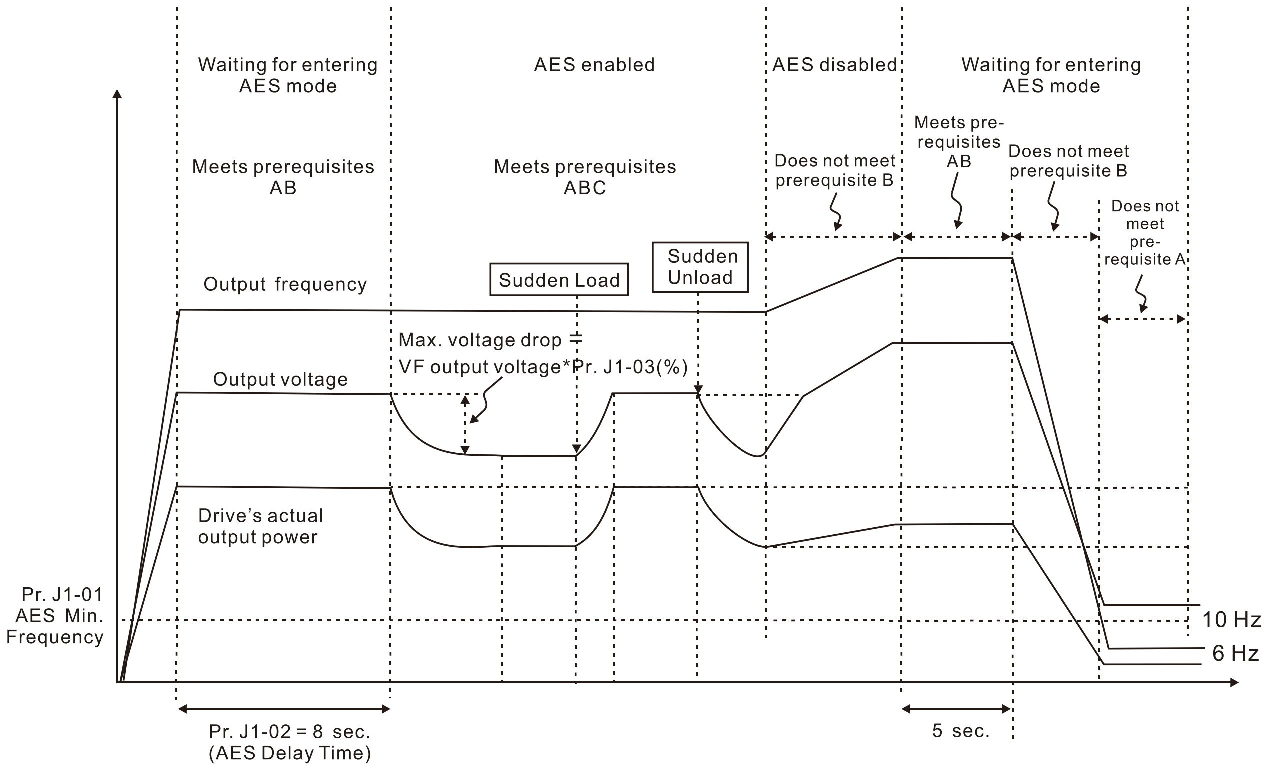


📖 Pr.J1-00 = 2 Power Loss Optimization (PLO):

- The current operating loss of the motor is calculated through the motor parameters auto-tune and the energy-saving coefficient, and the power loss is minimized by controlling the output voltage to achieve the optimization of energy saving.
- Control diagram of power loss optimization:



- The prerequisites for power loss optimization are:
  A. Output frequency is > Pr.J1-01 (AES Min FREQ)
  B. The drive is in a steady-state output frequency status (speed fluctuation < ±1% of rated frequency)
  C. Time for steady-state output frequency is > Pr.J1-02 (AES Delay Time)
- The prerequisites for invalid power loss optimization are:
  1. Skip steady-state output frequency
  2. The consumption model will automatically judge the voltage drop and may judge as no voltage drop under medium and no load situation.



📖 The energy-saving function is invalid during the drive acceleration and deceleration. To make it valid, the prerequisites need to be verified again.

✎ J1-01 AES Min FREQ

(0x1201) Default: 10.00

Settings 0.00–40.00 Hz

- The drive output frequency must be higher than Pr.J1-01 to make the drive determine whether to run in a steady-state output frequency.
- In general, larger power and voltage can give more energy-savings; lower power and voltage produce less energy-savings. However, too low power and voltage are not suitable for low-speed operation because it needs a larger starting current. Pr.J1-01 is the parameter that limits the minimum frequency when AES is enabled (Pr.J1-01 to Pr.E0-01 is the frequency range – from minimum to maximum – that you can use for the AES function).

J1-02 AES Delay Time

(0x1202) Default: 5.0

Settings 0.0–600.0 sec.

- When the drive runs in a steady-state output frequency, and exceeds Pr.J1-02 setting time, the drive enters the energy-saving mode.

✎ J1-03 AES Max Voltage Drop

(0x1203) Default: 60

Settings 0–70%

- Defines the maximum allowed voltage drop when the drive is in energy-saving mode.
- The drive has bigger energy-saving efficiency when running in no-load or light-load. To ensure the basic excitation voltage of the motor operation, you can use this parameter as the upper limit ratio (%) of the maximum voltage drop of the output voltage.
- Maximum voltage drop = voltage command corresponding to the frequency command in the VF table (take Motor 1 VF curve as an example, Pr.E0-01–E1-14) × Pr.J1-03 (%)

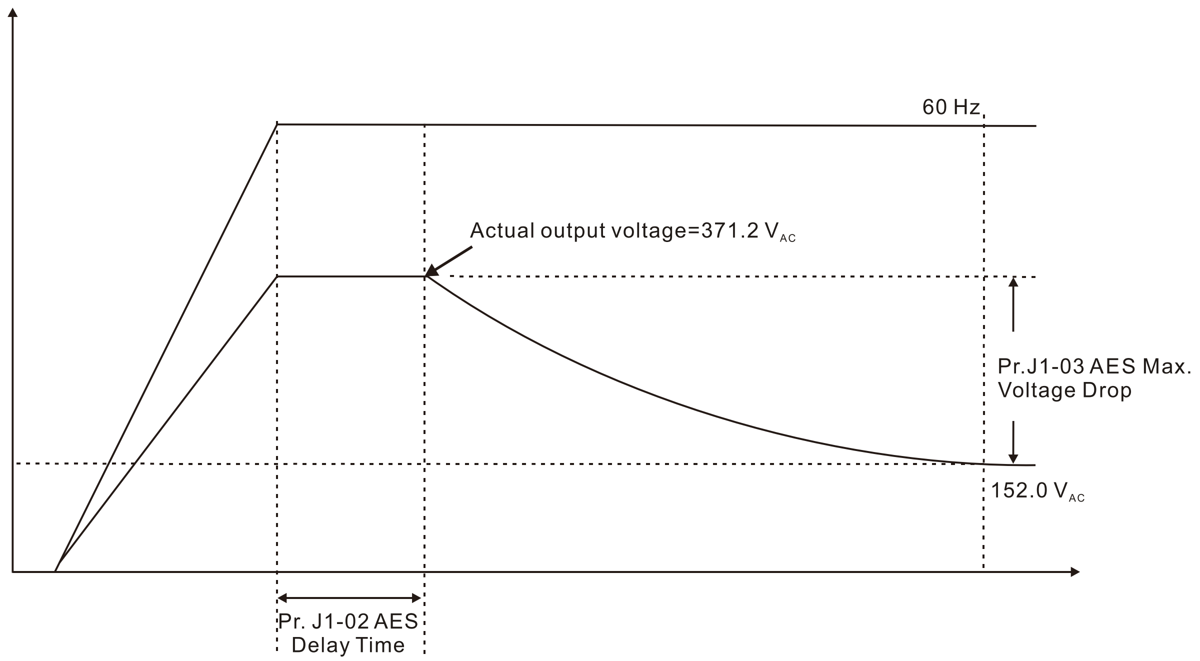
  For example:

  (1) Pr.E0-01 = 60 Hz, Pr.E0-02 = 380 V_{AC}, current frequency command is 60 Hz, the actual motor output is 371.2 V_{AC}, and Pr.J1-03 = 60%, then

  The maximum voltage drop = 380 V (voltage command corresponding to the frequency command in the VF table: 60 Hz corresponds to 380V) × 60% = 228 V_{AC}

  (2) If the current frequency command is 30 Hz, the corresponded voltage in the VF table is 200 V_{AC}, and Pr.J1-03 = 60%, then

  The maximum voltage drop = 200V × 60% = 120 V_{AC}



J1-04 PFO Target Power Factor Angle

(0x1204) Default: 40.00

Settings 35.00–65.00°

- Use this function when Pr.J1-00 = 1. If the current power factor angle is larger than Pr.J1-04 target power factor angle, the drive continuously adjusts the energy-saving until it is smaller than Pr.J1-04.
- This parameter is the angle θ between active power and reactive power. The smaller Cos θ, the lower the reactive power, and the lower the consumption.

J1-05 PFO Voltage Regulation Rate

(0x1205) Default: 10

Settings 1–100%

- When entering the energy-saving mode, the drive starts to adjust the energy-saving voltage according to Pr.J1-05 (PFO Voltage Regulation Rate).

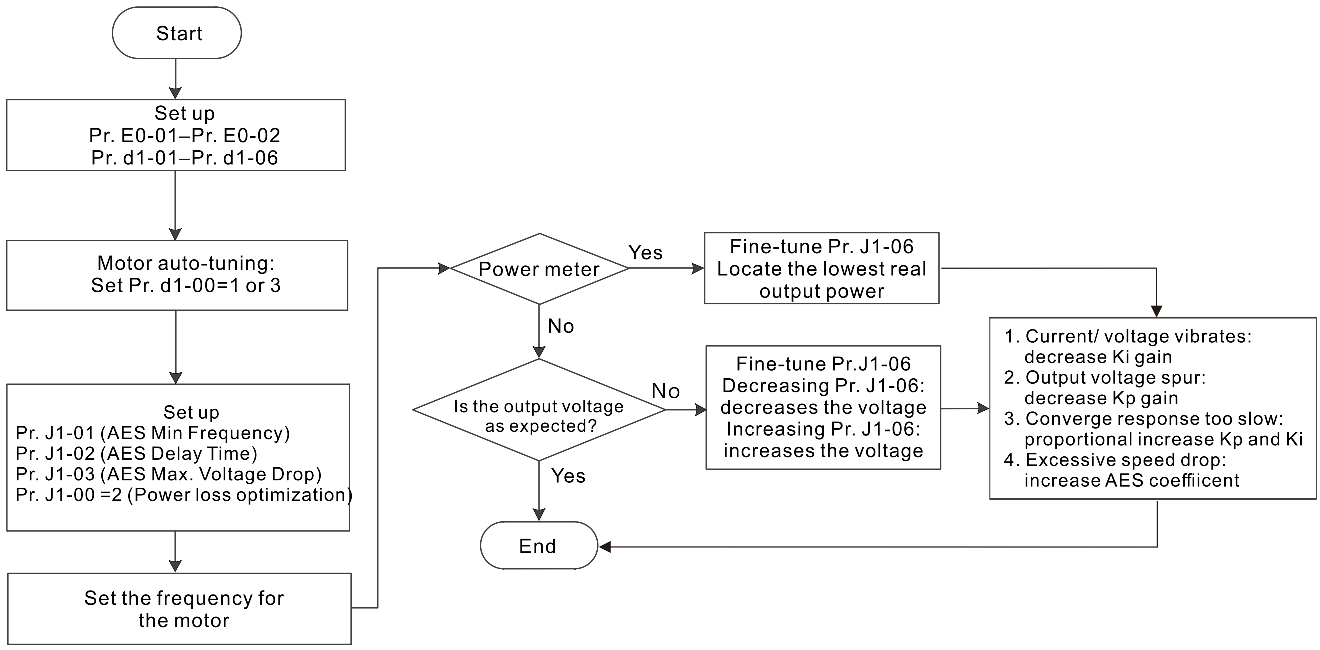
J1-06 PLO Loss Coefficient

(0x1206) Default: 1

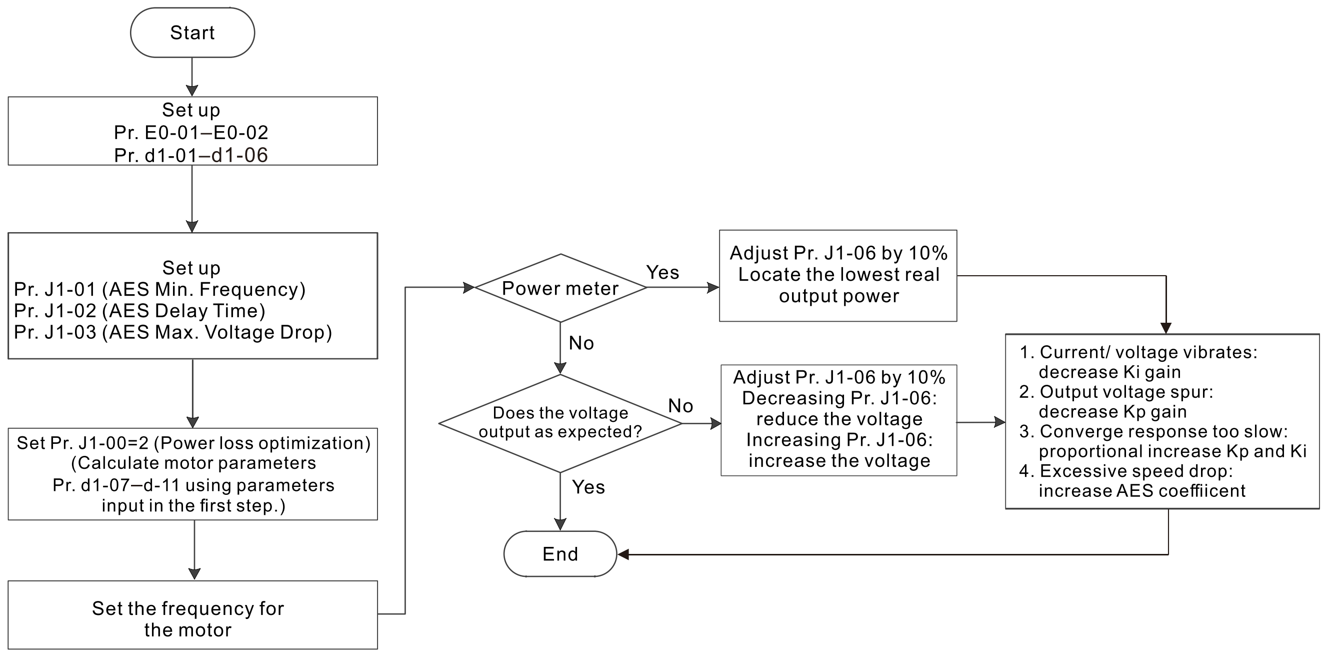
Settings 0–100%

- Defines the motor power loss constant. Default 100% corresponds to the drive iron loss constant that is calculated by motor parameter auto-tuning or motor nameplate information.
- Pr.J1-06 affects the final steady-state output voltage value for the energy-saving control. The larger the Pr.J1-06 setting value, the higher the steady-state output voltage (the smaller the voltage drop). The smaller the setting value, the lower the steady-state output voltage (the larger the voltage drop).
- Refer to Parameter group d1–d4 for PLO loss optimization with motor parameter auto-tuning (recommended).

📖 See below for the flowchart of PLO loss optimization with motor parameter auto-tuning (recommended):



📖 See below for the flowchart of PLO loss optimization without motor parameter auto-tuning (recommended):



✐ J1-07 PLO Kp Gain

(0x1207) Default: 0.050

Settings 0.001–60.000%

✐ J1-08 PLO Ki Gain

(0x1208) Default: 0.020

Settings 0.001–60.000%

- Pr.J1-07 and J1-08 are the Kp gain and Ki gain for the automatic energy optimization controller. Adjusting Kp and Ki gain can affect the response speed from energy saving to steady-state voltage and the stability of the steady-state voltage, but it does not affect the final steady-state voltage value.
- If the output current and voltage vibrates, decrease the Ki gain; If the output current and voltage spurs, decrease the Kp gain. If the convergence to steady-state response is too slow, then proportionally increase Kp and Ki gains.

J2. dEb Function

✓ You can set this parameter during operation.

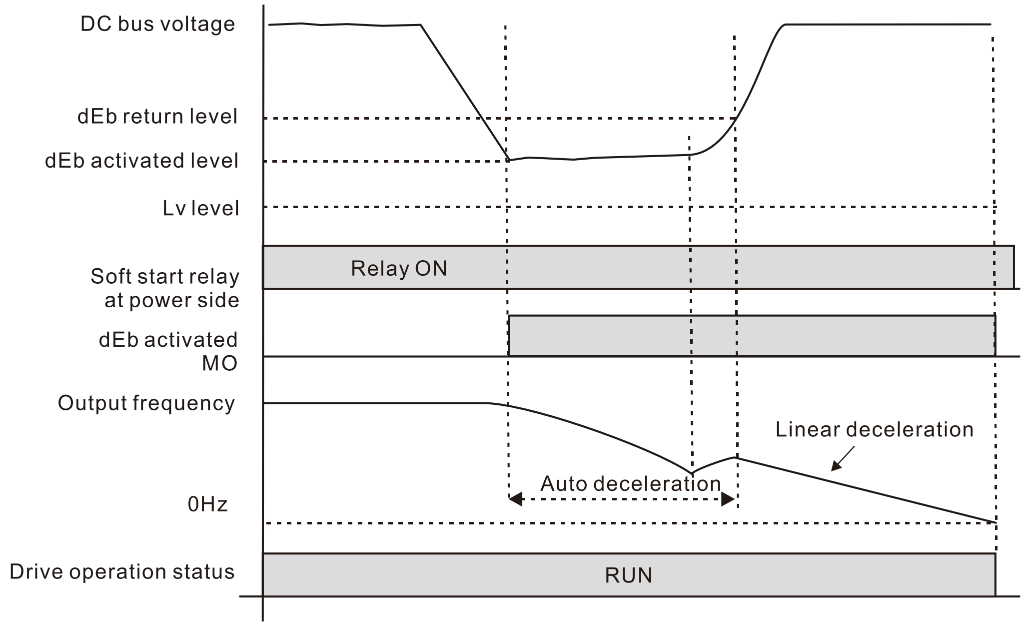
✓ J2-00 dEb Function Sel

(0x1240) Default: 0

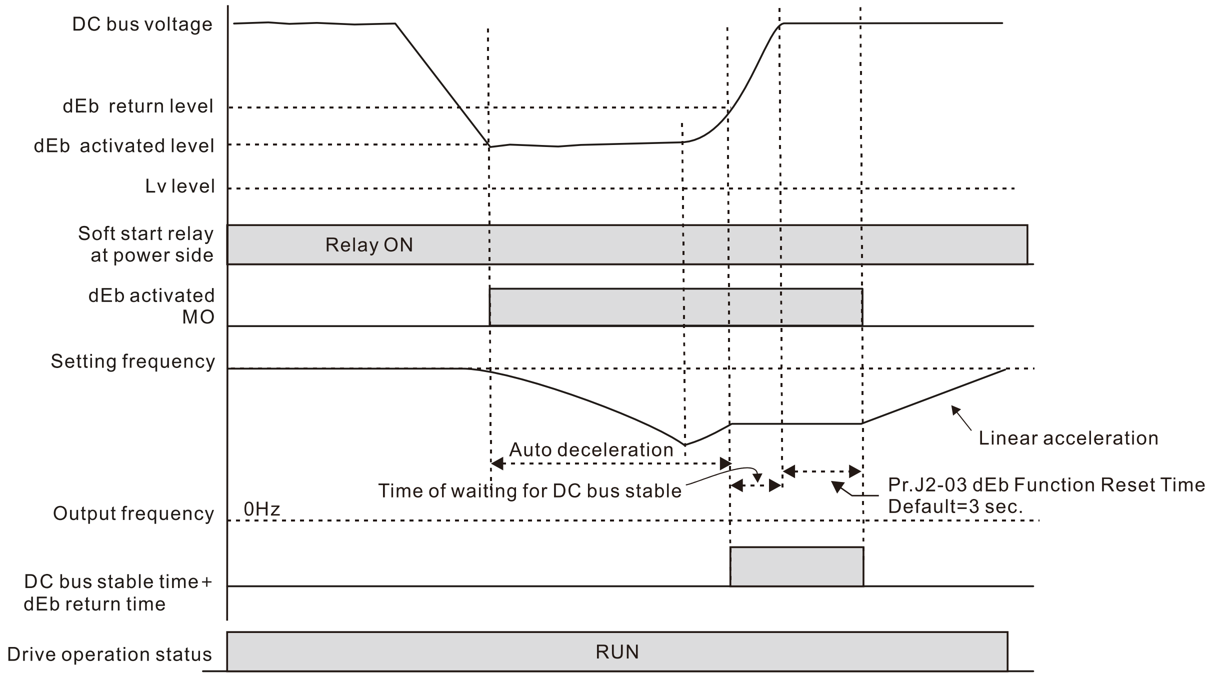
Settings
- 0: Disable
- 1: Auto-decel, stop after restore
- 2: Auto-decel, run after restore
- 3: Low speed high voltage control
- 4: All high voltage control
- 5: dEb Decel, stop after restore
- 6: FOC Decel, stop after restore
- 7: FOC Decel, run after restore

- dEb (Deceleration Energy Backup) makes the motor decelerate to stop when momentary power loss occurs. When the power loss is instantaneous, use this function to make the motor decelerate to zero speed. If the power recovers at this time, the drive restarts the motor after the dEb return time.
- Lv return level: Default value depends on the drive power model.
- Lv return level = Pr.H1-02 + H1-03.
- Lv level: Default = Pr.H1-02 (Lv Fault Level)
- During dEb operation, other protection such as ryF, ov, oc, occ and EF may interrupt it, and these error codes are recorded.
- The B.B. function does not work when executing dEb. The B.B. function is enabled after the dEb function finishes.
- The following explains the dEb action:
  When the DC voltage drops below the dEb setting level, the dEb function starts to work (soft start relay remains closed), and the drive executes auto-deceleration.

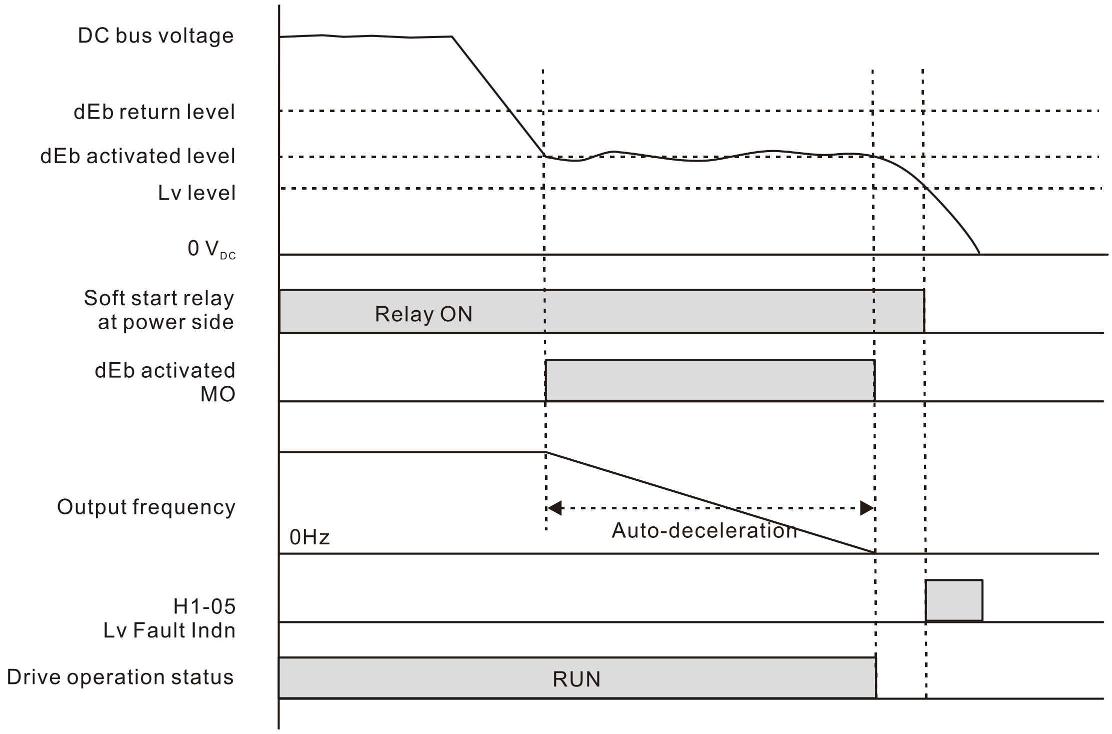
- Situation 1: Momentary power loss, or too low and unstable power voltage, or power supply sliding down because of sudden heavy load.
  Pr.J2-00 = 1 "dEb active, DC bus voltage returns, output frequency does not return"
  When the power recovers and DC bus voltage exceeds the dEb return level, the drive automatically decelerates and switches to ramp stop mode until 0 Hz and stops. The keypad displays the" dEb" warning until you manually reset it, so you can see the reason for the stop.



- Situation 2: Momentary power loss, or too low and unstable power voltage, or power supply sliding down because of sudden heavy load.
  Pr.J2-00 = 2 "dEb active, DC bus voltage returns, output frequency returns"
  During the dEb deceleration (includes 0 Hz run), if the power recovers to a voltage higher than dEb return level, the drive maintains the frequency for the set time of Pr.J2-03 (default = 3 sec.) and then accelerates again. The "dEb" warning on the keypad is automatically cleared.



- Situation 3: Unexpected power shut down or power loss
  Pr.J2-00 = 1 “dEb active, DC bus voltage returns, the output frequency does not return”
  The keypad displays the “dEb” warning, and the drive stops after decelerating to the lowest operating frequency. When the DC bus voltage is lower than the Lv level, the drive disconnects the soft start relay until the power completely runs out.



- Situation 4:
  Pr.J2-00 = 2 “dEb active, DC bus voltage returns, the output frequency returns”
  Same as Situation 3. The drive decelerates to 0 Hz. The DC bus voltage continues to decrease until the voltage is lower than the Lv level, and then the drive disconnects the soft start relay. The keypad displays “dEb” warning until the drive completely runs out of power.

- Situation 5:
  Pr.J2-00 = 3 “dEb low voltage control, when the speed is lower than 1/4 rated motor speed, DC bus voltage rises to 350 V_{DC} / 700 V_{DC}, the drive ramps to stop.
  The drive decelerates to 0 Hz. The DC bus voltage continues to decrease until the voltage is lower than the Lv level, and then the drive disconnects the soft start relay. The soft start relay closes again after the power recovers and the DC bus voltage is higher than the Lv return level. When the DC bus voltage is higher than the dEb return level, the drive maintains the frequency for the set time of Pr.J2-03 (default = 3 sec.) and starts to accelerate linearly, and the dEb warning on the keypad is automatically cleared.

- Situation 6:
  Pr.J2-00 = 4, dEb high-voltage control. When dEb occurs, the DC bus voltage control level rises to 350 V_{DC} / 700 V_{DC} to ramp to stop. Even though the power recovers and the frequency does not return, dEb activates until the motor decelerates to 0 Hz.
  (1) When dEb activates, it sends dEb warning. When the output frequency reaches 0Hz, the operation status is STOP and disables the dEb function, the dEb warning continues.

(2) If power does not recover, the DC bus voltage drops until reaches the Lv level, the drive LvS error occurs (keypad displays LvS error that covers the dEb display), the Soft Start Relay will be OFF.

✎ J2-01 dEb Action Level

(0x1241) Default: 40.0

Settings 0.0–200.0 V_{DC}

- When Pr.J2-00 = 1–5, dEb action level = Lv return level + Pr.J2-01 dEb action (Bias) level
- When Pr.J2-00 = 6–7, dEb action level = DC bus – 200V + Pr.J2-01 dEb action (Bias) level

✎ J2-02 dEb Reset Bias Level

(0x1242) Default: 40.0

Settings 0.0–200.0 V_{DC}

- Prevents action vibration caused by dEb action level = reset level.
- When Pr.J2-00 = 1–5, dEb reset level = dEb action level + Pr.J2-02 dEb Reset Bias Level.
- When Pr.J2-00 = 6–7, dEb reset level = DC bus – Pr.J2-02 dEb Reset Bias Level.

✎ J2-03 dEb Function Reset Time

(0x1243) Default: 3.0

Settings 0.0–25.0 sec.

- When the voltage returns to above the dEb reset level, the drive remains operating at constant speed, and then accelerates/ decelerates to the target frequency after the counting. The time of this process is still the dEb action time.

✎ J2-04 dEb P Gain

(0x1244) Default: 1.00

Settings 0.00–655.35

- Sets the PI gain of the DC bus voltage controller when the dEb function activates.
- If the DC bus voltage drops too fast, or the speed oscillation occurs during deceleration after the dEb function activates, adjusts the proportional gain and integral gain.
- When the external inertia is large or the friction force is large, the corresponding energy change is more severe. Adjust the gain value to avoid Lv fault occurs at the beginning.
- When the DC bus voltage fluctuates violently during the control process, decrease the gain value to avoid oc or ov fault occur during the process.
- Proportional gain: Increase the P gain to quicken the control response, but the oscillation may occur if the setting is too large.

✎ J2-05 dEb I Gain

(0x1245) Default: 0.100

Settings 0.000–65.535

- Integral gain: Use the I gain to decrease the steady-state error to zero and increase the setting to quicken the response speed.
- If the DC bus voltage fluctuates greatly and violently, the adjustment process will trigger the protection, and the integral value can be decreased.

✔ J2-06 dEb Decel Time

(0x1246) Default: 60.00

Settings 0.00–600.00 sec.

📖 The deceleration time when Pr.J2-00 = 5 (dEb Decel, stop after restore).

✔ J2-07 FOC dEb Torque Feedforward

(0x1247) Default: 80

Settings 0–100%

📖 The feedforward control parameter that improves the PI controller response speed in the FOC dEb function.

📖 This function is only valid when Pr.J2-00 = 6 or 7.

✔ J2-08 FOC dEb Coat Stop FREQ

(0x1248) Default: 0.00

Settings 0.00–599.00 Hz

📖 This parameter is valid only when Pr.J2-00 = 6 or 7.

📖 When the motor output frequency is lower than the frequency set in Pr.J2-08 during dEb actuation, the motor coasts to stop.

📖 When Pr.J2-08 = 0, this function is disabled.

J2-09 dEb Output Indn

(0x1249) Default: 0

Settings 0: Disable
1–2: Relay1–Relay2
3–4: MO1–MO2
5–9: Reserved
16–19: Reserved

📖 The output indication when dEb activates.

J3. TEC Function

⚡ You can set this parameter during operation.

J3-00 TEC Function Sel

(0x1280) Default: 0

Settings 0: Disable

1: Enable

- 📖 When the drive DC bus voltage rises, the motor regenerative energy can be consumed to the motor through the drive control, so as to avoid triggering an over-voltage fault that causes the drive to stop without adding the brake resistors.
- 📖 During the drive operation (acceleration, constant speed, and deceleration), the output voltage can be adjusted according to the current regenerative energy. Consume the regenerative energy in a timely manner to reduce the risk of over-voltage and set the intensity of output voltage adjustment through Pr.J3-01 (TEC Voltage Regulation Gain).
- 📖 The TEC function is valid in the operating conditions of acceleration, constant speed, and deceleration. It can achieve the best deceleration effect when combined with the smart over-voltage stall prevention function during the deceleration.
- 📖 This function only applies to induction motor.

⚡ J3-01 TEC Voltage Regulation Gain

(0x1281) Default: 0.50

Settings 0.00–500.00%

- 📖 During acceleration, constant speed, and deceleration, output appropriate voltage value according to the DC bus regenerating trend to suppress the over-voltage. And adjust the magnetization voltage intensity through Pr.J3-01 (TEC Voltage Regulation Gain).
- 📖 When the parameter increases, the drive output current and the efficiency of consuming regenerative energy will be increased, and vice versa.
- 📖 When adjusting parameters, the drive output current should be controlled below 80% of the motor rated current to avoid overheating of the motor.

⚡ J3-02 TEC Voltage Regulation LPF

(0x1282) Default: 0.050

Settings 0.000–65.535 sec.

- 📖 Sets the filter constant.

J4. Preheat Function

✔ You can set this parameter during operation.

✔ **J4-00** Preheat MI Src

(0x12C0) Default: 0

Settings 0: Disable
1: Enable
2–7: MI1–MI6
8–9: Reserved
10–15: MI10–MI15

- Selects the preheat MI source. You can enable this function by setting parameters or by the MI terminal.
- When the preheat function is enabled (Pr.J4-00 ≠ 0 or 8–9), and the enabling method is set as MI terminal and MI = ON), the function activates according to Pr.J4-03 and J4-06.
- MI1–MI6 are control board multi-function input terminals; MI10–MI15 are IO extension card multi-function input terminals.

J4-01 Preheat Delay Time

(0x12C1) Default: 5

Settings 5–3000 sec.

- The delay time after the motor stops and before the preheating function executes.

✔ **J4-03** Preheat Current Cmd

(0x12C3) Default: 0

Settings 0–100%

- When a motor drive is not in operation (STOP) and is placed in a cold and humid environment, enabling the preheating function to output DC current to heat up the motor drive can prevent the invasion of humidity into the motor drive, which creates condensation affects the normal function of the motor drive.
- Sets the output current level from the motor drive to the motor after enabling the preheating. The percentage of the preheating DC current is 100% of the rated current of the motor drive. When set to 0%, there is no output current.
- Therefore, when you set this parameter, slowly increase the percentage to reach the desired preheating temperature.

✔ **J4-06** Preheat Time

(0x12C6) Default: 0

Settings 0–100%

- Sets the motor output current cycle percentage of preheating. 0–100% corresponds to 0–10 seconds. When set to 0%, there is no output current. When set to 100%, there is a continuous output.
- For example, when set to 50%, the time for the motor output current in one cycle is 5 seconds each for ON and OFF, and after the drive stops (STOP), it automatically feeds the continuous periodic DC preheating motor.

📖 When the preheat MI source is the MI terminal, the preheating command (MI ON) enables the preheating function and continues to operate periodically with the MI signal until the drive runs (RUN) or the preheat command stops preheating (MI OFF), or the parameter turns off preheating function (Pr.J4-00, J4-03 and J4-06 are all set to 0).

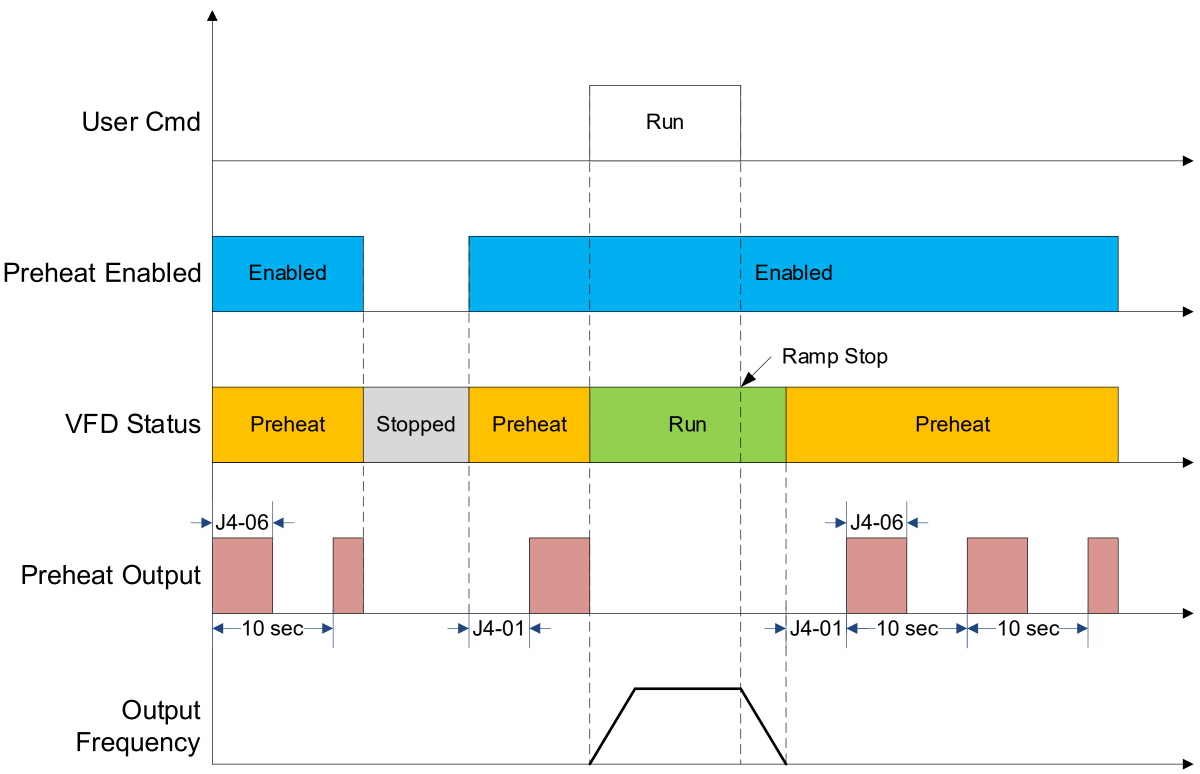
📖 Preheat function starts: When Pr.J4-00, J4-03 and J4-06 are not set to 0, the preheat function starts.

📖 Preheating function: When the AC motor drive is in operation (RUN) or stops operating (STOP), set the above parameters (when Pr.J4-00 Preheat MI Source is set as MI, and MI is ON), the Preheat function is enabled whenever the motor drive is in STOP status and lasts for the time set in Pr.J4-01.

Sequential Diagram of the Preheating Function

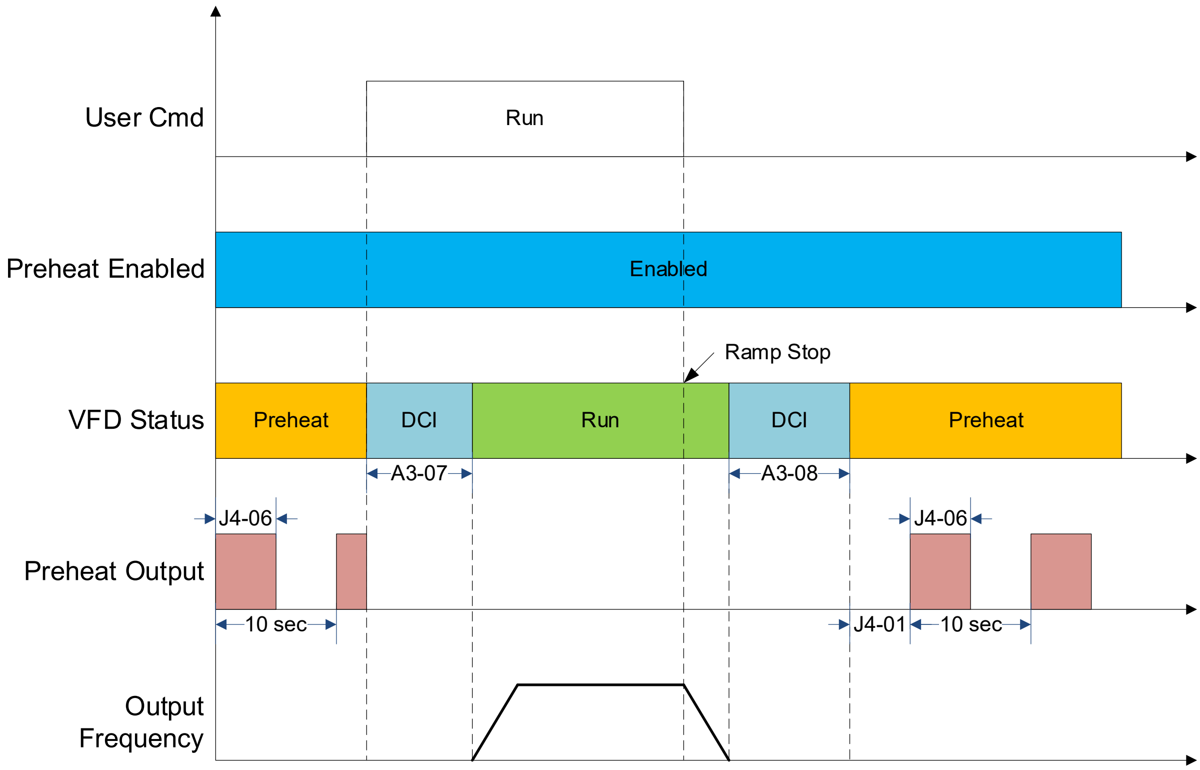
1. Preheating function description

   Set Pr.J4-00, J4-03 and J4-06 not to zero (50% in the diagram, when Pr.J4-00 source selection is set as MI and MI is ON), if the AC motor drive is in STOP status and lasts for the time of Pr.J4-01, the preheating is enabled to output DC current. At the same time, MO (Preheat output indication) is ON, and the sequence of preheat goes from ON (5 sec.) to OFF (5 sec.). When the preheating function is enabled and the drive is in operation (RUN), the preheat function stops temporarily and the MO is OFF. The preheat function restarts when the drive stops (STOP) for the time of Pr.J4-01.



2. Preheating works with DC brake function

When DC brake and preheating are both enabled at the same time, the AC motor drive operates with the same logic described above for preheating. The only difference is that no matter the drive is in operation (RUN) or stops operating (STOP), DC brake enables first. When the drive stops for the time set in Pr.J4-01, preheating is activated.



J4-07 Preheat Indn

(0x12C7) Default: 0

Settings 0: Disable

1–2: Relay1–Relay2

3–4: MO1–MO2

5–9: Reserved

10–15: MO/Relay10–15

📖 Selects preheat indication output signal. When the function activates, the corresponded output terminal indicates.

📖 Relay 1–2 and MO1–MO2 are control board multi-function (contact, photo coupler) output terminals; MO/ Relay 10–15 are extension card multi-function output terminals (contact, photo coupler).

J5. FireMode

J5-00 FireMode Status

(0x1300) Default: Read only

Settings bit 0: FireMode enabled
- 0 = FireMode OFF
- 1 = FireMode ON

bit 1: FireMode active
- 0 = FireMode is inactive
- 1 = FireMode is active

bit 2: FireMode direction is forward
- 0 = FireMode direction is not forward
- 1 = FireMode direction is forward

bit 3: FireMode direction is reverse
- 0 = FireMode direction is not reverse
- 1 = FireMode direction is reverse

bit 4: FireMode stop mode is active
- 0 = FireMode stop mode is inactive
- 1 = FireMode stop mode is active

bit 5: FireMode parameter lock
- 0 = FireMode parameter is not locked
- 1 = FireMode parameter lock

bit 6: Run enable
- 0 = Not allow to Run
- 1 = Allow to Run

bit 7: Start Enable
- 0 = Not allow to Start
- 1 = Allow to Start

bit 8–15: Reserve

- Displays the FireMode status. For example, when the FireMode is ON and operates in forward direction, bit0–2 is ON.

J5-01 FireMode

(0x1301) Default: 0

Settings 0: Disable
1: Enable, Limited OPER
2: Enable, Unlimited OPER

- Setting 0: FireMode function is disabled.
- Setting 1: FireMode function is enabled. When a high priority fault occurs during the fire, the drive automatically resets and operates with a limit. (Refer to description of Pr.J5-07–J5-09.)
- Setting 2: FireMode function is enabled. When a high priority fault occurs during the fire, the drive automatically resets and operates without limit. (Refer to description of Pr.J5-07–J5-09.)

- The fire mode is used to force the drive to operate from normal mode to the fire mode when an emergency or fire drill event occurs, so as to help resolve on-site incidents.
- When the drive switches from normal mode to the fire mode and is in operation, the drive operates at its maximum capacity and limit, which means that the drive protection such as LVx low voltage will be ignored, so the drive could continue operating to perform its function.
- From the above, when the drive is in fire mode and the fire mode record 1–3 warranty error code is recorded (0 for no record), the original warranty condition of the drive will be invalid. That is, the after-sales service will be handled out of the warranty.
- Refer to description in Pr.J5-07 Table 2 for high/ low priority.
- If there is a low priority fault before running in fire mode, the drive automatically clears the fault and runs after operating in fire mode.
- If there is a high priority fault before running in fire mode, the fire mode fault treatment is set to auto reset. When the fault state ends after the fire mode operation, the drive automatically clears the fault and continues operating.
- If there is a high-priority fault before running in fire mode, and the fire mode error treatment is set to manual reset, then the fault must be manually reset after running in fire mode before running.
- During the fire mode operation, any behavior and state of HOA/ Local Remote will be ignored and controlled in speed mode. After the fire mode is released, it returns to the current state of HOA/ Local Remote, including the motor control method.

J5-02 FireMode MI Src

(0x1302) Default: 0

Settings 0: Disable
1: Reserved
2–7: MI1–MI6
8–9: Reserved
10–15: MI10–MI15

- FireMode MI Src When the fire mode is enabled and the specified MI source is ON, the drive FireMode operates.
- MI1–MI6 are control board multi-function input terminals; MI10–MI15 are IO extension card multi-function input terminals.

J5-03 FireMode FREQ Src

(0x1303) Default: 0

Settings 0: Disable
1–6: Reserve
7–9: AI1–AI3
10–11: Reserve
12–13: AI10–AI11
14–15: Reserve
16: Multi-step speed
17: FireMode FREQ Cmd
18: Up/Down terminal

19: STOP
20: PID

- Selects FireMode frequency source.
- Setting 7–9, 12–13: Operates according to the AIx signal corresponded value. AI signal 0–10V/ 4–20 mA, 0 Hz corresponds to the maximum operation frequency (Pr.C2-17).
- AI1–AI3 are analog input terminals of control board, AI10–AI11 are analog input terminals for IO extension card.
- 16: Operates according to multi-speed setting Pr.C1-18–C1-37.
- 17: Operates according to FireMode frequency command Pr.J5-05.
- 18: Operates according to Up/ Down terminals Pr.C1-13–C1-15.
- 19: Does not run when the fire mode activates.
- 20: Operates according to PID function (refer to Parameter Group P).

J5-04 FireMode Direction MI Src

(0x1304) Default: 0

Settings 0: FWD
1: REV
2–7: MI1–MI6
8–9: Reserved
10–15: MI10–MI15

- Selects FireMode direction MI source, through parameter setting direction or MI terminals to switch the selection. When setting MI1 = OFF, the direction is forward; MI1 = ON, the direction is reverse.
- MI1–MI6 are control board multi-function input terminals; MI10–MI15 are IO extension card multi-function input terminals.

J5-05 FireMode FREQ Cmd

(0x1305) Default: 60.00

Settings 0.00–599.00 Hz

- When FireMode is enabled (Pr.J5-01 ≠ 0) and the FireMode MI source is specified (for example, Pr.J5-02 = 2, MI1), and the FireMode speed source is set as FireMode frequency command (Pr.J5-03 = 17), FireMode frequency command (Pr.J5-05) is set as 60 Hz; when MI1 ON, the drive is in FireMode and operates to 60 Hz.

J5-06 FireMode Control bits

(0x1306) Default: 0

Settings bit 0: RUN Enable
bit 2: FireMode PR Lock
bit 3–15: Reserved

- The FireMode can be used with RUN Enable function (refer to description of Pr.A1-21).
- bit 0: When the bit is OFF, the FireMode operation is not affected by the RUN Enable function (ON or OFF); when the bit is ON, the FireMode operation is affected by the RUN enable function and the digital keypad displays “Run Disabled” warning message. The MI source specified in

Pr.A1-21 must be ON, then the “Run Disabled” message of the digital keypad disappears, and the drive goes into FireMode when the fire occurs.

- As above, when the RUN Enable function is switched from ON to OFF during the FireMode operation, the digital keypad displays “Run Disabled” warning message, but the FireMode will be still operating.
- When the drive switches from FireMode back to normal mode operation, regardless of whether the drive operates with RUN Enable function, it ramps to stop.
- When the FireMode is in progress, for the fire protection priority and safety consideration, all parameters of the drive are not accepted to be changed, so as to ensure that the drive controls the fire field through the fire protection system and is not interfered by other factors.
- bit 2: The FireMode parameters (Pr.J5-01–J5-09, J5-31) can only be edited when the bit is OFF in normal mode; the parameters cannot be edited when the bit is ON.

J5-07 FireMode Fault Handle

(0x1307) Default: 0

Settings 0: Manual reset
1: Automatic reset

J5-08 FireMode Auto Reset Times

(0x1308) Default: 1

Settings 1–5

J5-09 FireMode Auto Reset Delay

(0x1309) Default: 5.0

Settings 5.0–120.0 sec.

- During the FireMode operation, when a low priority fault occurs, the drive does not stop and continues operating. If a high priority fault occurs, the drive handles the fault according to Pr.J5-07–J5-09 (Table 1). Refer to description in Table 2 for the high/ low priority.
- Enable the FireMode (Pr.J5-01 = 1) and set the FireMode fault treatment as automatic reset (Pr.J5-07 = 1), when the drive is in FireMode and a high priority fault occurs, the drive stops and waits for the fault returning to normal level (for example, ov fault occurs if the voltage exceeds), there will be a limit according to the reset times setting (Pr.J5-08) to automatically reset the fault, the drive restarts after the delay time (Pr.J5-09) and operates to the frequency command specified in FireMode.
- As above, when the reset time reaches the setting value, for example 5 times (Pr.J5-08), when the sixth fault occurs, the drive stops and does not auto reset the fault. In this case, you must manually reset the fault.
- Enable the FireMode (Pr.J5-01 = 2) and set the FireMode fault treatment as automatic reset (Pr.J5-07 = 1), when the drive is in FireMode and a high priority fault occurs, the drive stops and waits for the fault returning to normal level (for example, ov fault occurs if the voltage exceeds), the drive will auto reset the fault without limit and restarts after the delay time (Pr.J5-09) and operates to the frequency command specified in FireMode. **It is important to note that the unlimited automatic fault reset will not stop until the FireMode stops or the drive is damaged and cannot operate, it also affects the product warranty.**

Table 1 - Fault treatment parameters under FireMode

J5-01 (FireMode)	J5-07 = 1 Automatic reset (FireMode Fault Handle)	J5-08 (FireMode Auto Reset Times)	J5-09 (FireMode Auto Reset Delay)
0: Disable	X	X	X
1: Enable, Limited OPER	V	V	V
2: Enable, Unlimited OPER	V	X	V

- When FireMode is in progress, the fault message in Table 2 will be detected, recorded, and handled with or without stopping the drive.
- When a low priority fault occurs during FireMode operation, regardless of the setting of Pr.J5-07, the drive does not stop and continues operating.
- When a high priority fault occurs during FireMode operation, the drive resets the fault through Pr.J5-07. In all the faults, the high priority fault*1 can only be manually reset, but the high priority fault*2 cannot be reset through manually/ automatic reset mode. It can only be cleared by rebooting the drive, and the fault must be cleared before the drive restarts.

Table 2 - Fault detection under each mode. (V means detectable)

Code	Fault Name	Normal Mode	FireMode	
			High Priority	Low Priority
1	Over-current during acceleration (ocA)	V	V	
2	Over-current during deceleration (ocd)	V	V	
3	Over-current during steady operation (ocn)	V	V	
4	Ground fault (GFF)	V		V
5	IGBT short circuit between upper bridge and lower bridge (occ)	V	V	
6	Over-current at stop (ocS)	V	V	
7	Over-voltage during acceleration (ovA)	V	V	
8	Over-voltage during deceleration (ovd)	V	V	
9	Over-voltage at constant speed (ovn)	V	V	
10	Over-voltage at stop (ovS)	V	V	
11	Low-voltage during acceleration (LvA)	V		V
12	Low-voltage during deceleration (Lvd)	V		V
13	Low-voltage at constant speed (Lvn)	V		V
15	Phase loss protection (OrP)	V		V
16	IGBT overheating (oH1)	V		V
17	Capacitor overheating (oH2)	V		V
18	IGBT temperature detection failure (tH1o)	V		V
19	Capacitor hardware error (tH2o)	V		V
21	Over load (oL)	V		V
22	Electronic thermal relay 1 protection (EoL1)	V		V
23	Electronic thermal relay 2 protection (EoL2)	V		V
24	Motor overheating PTC / KTY84 / PT100 / PT1000 (oH3)	V		V
25	Interrupt Error (INTR)	V		V
26	Over-torque 1 (ot1)	V		V
27	Over-torque 2 (ot2)	V		V

Code	Fault Name	Normal Mode	FireMode	
			High Priority	Low Priority
28	Under current (uC)	V		V
30	EEPROM write error (cF1)	V		V
31	EEPROM read error (cF2)	V	V*1	
33	U-phase error (cd1)	V	V*1	
34	V-phase error (cd2)	V	V*1	
35	W-phase error (cd3)	V	V*1	
37	oc hardware error (Hd1)	V	V*1	
39	occ hardware error (Hd3)	V	V*1	
40	Auto-tuning error (AUE)	V		V
48	AI1 loss (ACE)	V		V
49	External fault (EF)	V		V
50	Emergency stop (EF1)	V		V
51	External base block (bb)	V		V
52	Password is locked (Pcod)	V		V
58	Modbus transmission time-out (CE10)	V		V
61	Y-connection/ D-connection switch error (ydc)	V		V
63	Over slip error (oSL)	V		V
68	Reverse direction of the speed feedback (SdRv)	V		V
69	Over speed rotation feedback (SdOr)	V		V
70	Large deviation of speed feedback (SdDe)	V		V
71	Watchdog (WDTT)	V		V
72	STO loss (STL1)	V	V*2	
76	Safe Torque Off (STO)	V	V*1	
77	STO loss 2 (STL2)	V	V*2	
79	Safe Torque Off 1 (STO1)	V	V*1	
80	Safe Torque Off 2 (STO2)	V	V*1	
82	Output phase loss U phase (OPHL)	V		V
83	Output phase loss V phase (OPHL)	V		V
84	Output phase loss W phase (OPHL)	V		V
87	Overload protection at low frequency (oL3)	V		V
88	Model ID Change (IDCH)	V	V*1	
89	Rotor position detection error (RoPd)	V		V
90	Forced to stop (FStp)	V		V
94	Initializing power board communication error when power ON (POCF)	V		V
95	Board identification error during power-on initialization (IDDE)	V		V
96	Power board communication error (PMCF)	V		V
97	AI2 loss (ACE)	V		V
98	AI3 loss (ACE)	V		V
99	AI10 loss (ACE)	V		V
100	AI11 loss (ACE)	V		V
101	CANopen guarding error (CGdE)	V		V
102	CANopen heartbeat error (CHbE)	V		V
104	CANopen bus off error (CbFE)	V		V
114	ECAP models over voltage (ECOV)	V	V	

Code	Fault Name	Normal Mode	FireMode	
			High Priority	Low Priority
115	ECAP models low voltage (ECLV)	V		V
118	Monitor signal 1 trigger (BX1e)	V		V
119	Monitor signal 2 trigger (BX2e)	V		V
120	Monitor signal 3 trigger (BX3e)	V		V
121	Monitor signal 4 trigger (BX4e)	V		V
122	Monitor signal 5 trigger (BX5e)	V		V
123	Monitor signal 6 trigger (BX6e)	V		V
124	Monitor signal 7 trigger (BX7e)	V		V
125	Monitor signal 8 trigger (BX8e)	V		V
132	Under load protection (ULD)	V		V
133	Over load protection (OLD)	V		V
134	Electronic thermal relay 3 protection (EOL3)	V		V
135	Electronic thermal relay 4 protection (EOL4)	V		V
142	Auto-tune error (AUE1) (No-feedback current error)	V		V
143	Auto-tune error (AUE2) (Motor phase loss error)	V		V
144	Auto-tune error (AUE3) (No-load current (I_0) error)	V		V
148	Auto-tune error (AUE4) (Lsigma measuring error)	V		V
149	Auto-tune error (AUE5)	V		V
150	Auto-tune error (AUE6)	V		V
151	Auto-tune error (AUE7)	V		V
152	Auto-tune error (AUE8)	V		V
153	Auto-tune error (AUE9)	V		V
154	Auto-tuning error (AUEa)	V		V
155	Auto-tuning error (AUEb)	V		V
156	Auto-tuning error (AUEc)	V		V
213	Protection initialization error (ThIF)	V		V
214	Power-on process initialization time-out (POTO)	V		V
300	Large amount leakage error (LEKE)	V		V
301	High pressure error (HPS)	V		V
302	Low pressure error (LPSE)	V		V
303	Dry pump error (dryE)	V		V
304	Dry pump auto-tune error (dAUE)	V		V
305	Pipe blockage (JAME)	V		V
306	ExCOM card break (ECCb)	V		V
307	Communication time-out (ECto)	V		V

J5-10	FireMode Log 1 Start Date	
(0x130A)		Default: Read only
	Settings 0–12319999	
J5-11	**FireMode Log 1 Start Time**	
(0x130C)		Default: Read only
	Settings 0–245959	
J5-12	**FireMode Log 1 End Date**	
(0x130E)		Default: Read only
	Settings 0–12319999	
J5-13	**FireMode Log 1 End Time**	
(0x1310)		Default: Read only
	Settings 0–245959	
J5-14	**FireMode Log 1 Fault Code**	
(0x1312)		Default: Read only
	Settings 0–65535	
J5-15	**FireMode Log 1 Warning Code**	
(0x1313)		Default: Read only
	Settings 0–65535	
J5-16	**FireMode Log 1 Warranty Fault**	
(0x1314)		Default: Read only
	Settings 0–65535	
J5-17	**FireMode Log 2 Start Date**	
(0x1315)		Default: Read only
	Settings 0–12319999	
J5-18	**FireMode Log 2 Start Time**	
(0x1317)		Default: Read only
	Settings 0–245959	
J5-19	**FireMode Log 2 End Date**	
(0x1319)		Default: Read only
	Settings 0–12319999	
J5-20	**FireMode Log 2 End Time**	
(0x131B)		Default: Read only
	Settings 0–245959	
J5-21	**FireMode Log 2 Fault Code**	
(0x131D)		Default: Read only
	Settings 0–65535	
J5-22	**FireMode Log 2 Warning Code**	
(0x131E)		Default: Read only
	Settings 0–65535	

J5-23	FireMode Log 2 Warranty Fault	
(0x131F)		Default: Read only
	Settings 0–65535	

J5-24	FireMode Log 3 Start Date	
(0x1320)		Default: Read only
	Settings 0–12319999	

J5-25	FireMode Log 3 Start Time	
(0x1322)		Default: Read only
	Settings 0–245959	

J5-26	FireMode Log 3 End Date	
(0x1324)		Default: Read only
	Settings 0–12319999	

J5-27	FireMode Log 3 End Time	
(0x1326)		Default: Read only
	Settings 0–245959	

J5-28	FireMode Log 3 Fault Code	
(0x1328)		Default: Read only
	Settings 0–65535	

J5-29	FireMode Log 3 Warning Code	
(0x1329)		Default: Read only
	Settings 0–65535	

J5-30	FireMode Log 3 Warranty Fault	
(0x132A)		Default: Read only
	Settings 0–65535	

- In the fire mode, records three groups of relevant information during the fire for investigation. Each set of record information includes a total of 7 parameters including start date and time, end date and time, fault code, warning code and warranty code. There are 21 related record parameters in total (Pr.J5-10–J5-30).
- The date in the parameter is expressed in the form of “month/ day/ AD year”, a total of 8 codes. The time expression is the 24-hour format “hour/ minute/ second” with a total of 8 codes.
- For information about fault codes and warning codes, refer to Chapter 8 Fault Treatment. The scope of fault code records covers low priority and high priority faults (Table 2).
- During the fire, no matter how many faults has occurred, only the first fault code, warning code and warranty code will be recorded. For example, there are three faults 13 (Lvn), 12 (Lvd) and 11 (LvA) occurred in the fire, only the first fault code (13) will be recorded.
- For example, there are 3 faults (13 Lvn, 12 Lvd and 11 LvA) during the first fire (Table 3), and there is no warning and warranty code. The start and end date of Record 1 is 05/01/2023, the start and end time of Record 1 is 00/00/00 to 00/10/00, a total of 10 minutes, and the record fault code is 13 (Lvn).
- For example, there are 2 faults (11 Lvn and 5 occ) during the first fire (Table 3), and there is no warning code. The start and end date of Record 3 is 05/20/2023, the start and end time of

Record 3 is 18/00/00 to 18/30/00, the fault code of Record 3 is 11 (LvA) and the warranty code is 5 (occ).

- From the above, since the warranty fault record is 5 (oc), the original warranty condition of the drive will be invalid, and the after-sales service will be handled outside the warranty.
- Since there are only 3 parameters in the fire mode record, the related information will be saved in Pr.J5-10–J5-16 when the first fire occurs. The information of the second fire occurrence will also exist in the same position, but the original information of the first fire will be pushed back to Pr.J5-17–J5-23. In the same way, the record information is stacked backwards, and the latest fire related information will be saved in Pr.J5-10–J5-16.

Table 3 - Parameter record method

Fire Occurrence Time / FireMode Record	1st Fire	2nd Fire	3rd Fire	4th Fire
	(J5-02 MI OFF to ON to OFF)			
J5-10 FireMode Log 1 Start Date	05012023	05102023	05202023	06012023
J5-11 FireMode Log 1 Start Time	000000	090000	180000	120000
J5-12 FireMode Log 1 End Date	05012023	05102023	05202023	06012023
J5-13 FireMode Log 1 End Time	001000	095900	183000	120500
J5-14 FireMode Log 1 Fault Code	13 (Lvn)	1 (ocA)	11 (LvA)	7 (ovA)
J5-15 FireMode Log 1 Warning Code	0	0	0	0
J5-16 FireMode Log 1 Warranty Fault	0	0	5 (occ)	0
J5-17 FireMode Log 2 Start Date	0	(J5-10) 05012023	(J5-10) 05102023	(J5-10) 05202023
J5-18 FireMode Log 2 Start Time	0	(J5-11) 000000	(J5-11) 090000	(J5-11) 180000
J5-19 FireMode Log 2 End Date	0	(J5-12) 05012023	(J5-12) 05102023	(J5-12) 05202023
J5-20 FireMode Log 2 End Time	0	(J5-13) 001000	(J5-13) 095900	(J5-13) 183000
J5-21 FireMode Log 2 Fault Code	0	(J5-14) 13 (Lvn)	(J5-14) 1 (ocA)	(J5-14) 0
J5-22 FireMode Log 2 Warning Code	0	(J5-15) 0	(J5-15) 0	(J5-15) 0
J5-23 FireMode Log 2 Warranty Fault	0	(J5-16) 0	(J5-16) 0	(J5-16) 5 (occ)
J5-24 FireMode Log 3 Start Date	0	0	(J5-10) 05012023	(J5-10) 05102023
J5-25 FireMode Log 3 Start Time	0	0	(J5-11) 000000	(J5-11) 090000
J5-26 FireMode Log 3 End Date	0	0	(J5-12) 05012023	(J5-12) 05102023
J5-27 FireMode Log 3 End Time	0	0	(J5-13) 001000	(J5-13) 095900

Fire Occurrence Time / FireMode Record	1st Fire	2nd Fire	3rd Fire	4th Fire
	(J5-02 MI OFF to ON to OFF)			
J5-28 FireMode Log 3 Fault Code	0	0	(J5-14) 13 (Lvn)	(J5-14) 1 (ocA)
J5-29 FireMode Log 3 Warning Code	0	0	(J5-15) 0	(J5-15) 0
J5-30 FireMode Log 3 Warranty Fault	0	0	(J5-16) 0	(J5-16) 0

J5-31 FireMode Indn

(0x132B) Default: 0

Settings 0: Disable

1–2: Relay1–Relay2

3–4: MO1–MO2

5–9: Reserved

10–15: MO/Relay10–15

- When the drive is in Fire Mode, the specified MO contact activates.
- Relay 1–2 and MO1–MO2 are control board multi-function (contact, photo coupler) output terminals; MO/ Relay 10–15 are extension card multi-function output terminals (contact, photo coupler).

J6. Time Function

〆 You can set this parameter during operation.

〆 J6-00 Low Battery Action

(0x1340) Default: 0

Settings 0: No warning
1: Warning after power on
2: Warning each hour
3: Warning each day

- Install a button-type battery CR2032 in the drive before using the scheduling function and set the Calendar through the digital keypad.
- When the drive detects low battery of the CR2032, it prompts according to this parameter.

〆 J6-01 Time Function 1

(0x1341) Default: 0

〆 J6-02 Time Function 2

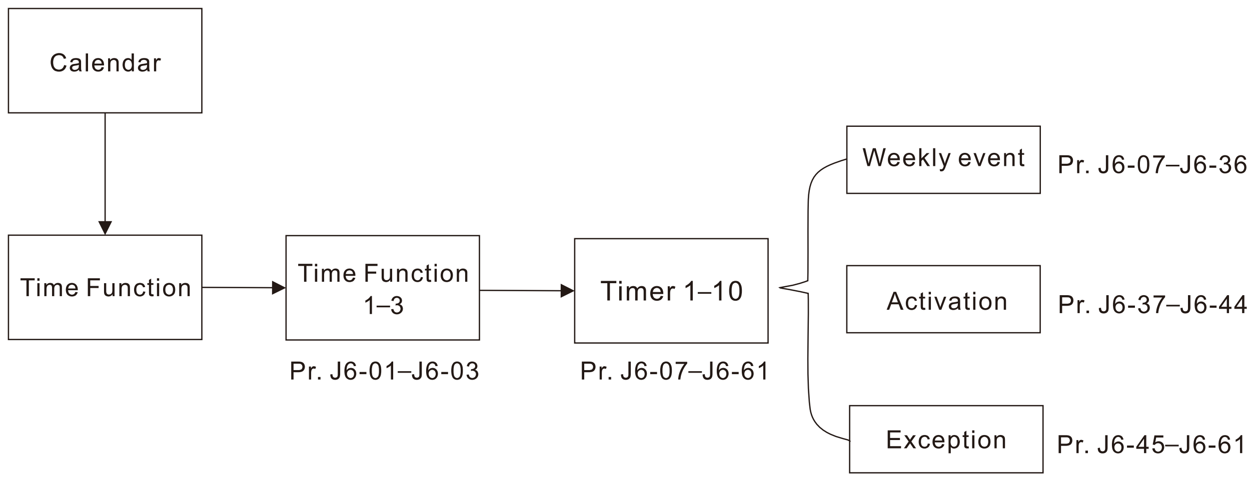
(0x1342) Default: 0

〆 J6-03 Time Function 3

(0x1343) Default: 0

Settings bit0: Timer 1
bit1: Timer 2
bit2: Timer 3
bit3: Timer 4
bit4: Timer 5
bit5: Timer 6
bit6: Timer 7
bit7: Timer 8
bit8: Timer 9
bit9: Timer 10

- The scheduling function switches different groups of PID functions according to the planning of the timer. For example, you can switch to program PID2 for water level control when the water consumption is low at night; and switch back to PID1 for low control when the water consumption is high at daytime.



📖 There are 3 time functions for VP3000, each Time Function has 10 timers that can be activated separately. When activate one timer, the corresponded bit is ON, and the bit is OFF when disable the timer.

📖 When setting Pr.J6-01 Time Function 1 to enable Timer 1–3, the corresponded bit0–2 is ON, other bits are OFF; when setting Pr.J6-02 Time Function 2 to enable Timer 3–4, the corresponded bit2–3 is ON, other bits are OFF.

✓ J6-04 Time Function 1 MI Src

(0x1344) Default: 0

✓ J6-05 Time Function 2 MI Src

(0x1345) Default: 0

✓ J6-06 Time Function 3 MI Src

(0x1346) Default: 0

Settings 0: Disable
1: Enable
2–7: MI1–MI6
8–9: Reserved
10–15: MI10–MI15

📖 The Time Function must be enabled through parameter settings or turn ON the specified MI terminal.

📖 MI1–MI6 are control board multi-function input terminals; MI10–MI15 are IO extension card multi-function input terminals.

✓ J6-07 Timer 1 Configuration

(0x1347) Default: 0

Settings bit0: Monday
bit1: Tuesday
bit2: Wednesday
bit3: Thursday
bit4: Friday
bit5: Saturday
bit6: Sunday
bit7: Activation 1
bit8: Activation 2
bit9: Activation 3
bit10: Activation 4
bit11: Exception
bit12: Holiday
bit13: Workday

✓ J6-08 Timer 1 Start Time

(0x1348) Default: 00:00

Settings 00:00–23:59 (hh:mm)

J6-09 Timer 1 Duration

(0x1349) Default: 00:00:00

Settings 00:00:00–07:00:00 (dd:hh:mm)

J6-37 Activation 1 Start Date

(0x136F) Default: 01:01

Settings 01:01–31:12 (dd:mm)

J6-38 Activation 1 End Date

(0x1370) Default: 1:01 AM

Settings 01:01–31:12 (dd:mm)

- The time function determines the final output of the timer based on the combination and setting of the weekly events, activation, and exception schedule.
- The weekly events selections are Monday to Sunday (bit0–6), the activations are Activation 1–4 (bit7–10), and the exceptions are holiday and workday (bit12–13).
- There are ten timers in the Time Function. The weekly event of each timer can set timer configuration, start/ end date and duration (Pr.J6-07–J6-36), and the maximum duration can be set to 7 days (day:hour:minute, 07:00:00).
- As above, the activation of each timer can set the activation start date and activation end date, which provides Activation 1–4, a total of 4 groups of activation settings (Pr.J6-37–J6-44). In addition, the start date can be set larger than the end date. For example, the start date is 1/12, end date is 31/1, then the activation would be 1/12–31/12 and 1/1–31/1.
- As above, refer to the parameter description for the exception time function of each timer. When setting the exception time as workday, bit11 and bit13 must be ON.
  - Example 1:
    If the weekly event is set as 8:00 AM to 5:00 PM on Monday, Wednesday and Friday, then set the timer bit0, 2, and 4 to ON; set the start time as 8:00 (hour:minute, 08:00) and the duration time as 9 hours (hour:minute, 09:00), then the final output would be as the table below.
  - Example 2:
    If the weekly event is set as Monday, Wednesday and Friday from 8:00 AM to 5:00 PM the next day, then set the timer bit0, 2, and 4 to ON; set the start time as 8:00 (hour:minute, 08:00) and the duration time as 1 day and 9 hours (day:hour:minute, 01:09:00), then the final output would be as the table below.
  - Example 3:
    If the weekly event is set from 00:00 AM to 5:00 PM the day after tomorrow on Sunday, set the timer bit6 to ON; and set the start time as 0:00 (hour:minute, 00:00) and the duration time as 2 day and 17 hours (day:hour:minute, 02:17:00), then the final output would be as the table below.
  - Example 4:
    If the weekly event is set as Monday, Wednesday and Friday from 11:00 AM to 10:00 AM the next day, set the timer bit0, 2, and 4 to ON; and set the start time as 11:00 (hour:minute, 11:00) and the duration time as 23 hours (day:hour:minute, 00:23:00), the activation start date to 3/1 (day:month, 03:01) and end date to 6/1 (day:month, 06:01), then the final output

would be as the table below.

- Example 5:

  If the weekly event is set from 8:00 AM to 5:00 PM from Monday to Friday, set the timer bit0–4 to ON; and set the start time as 8:00 (hour:minute, 08:00) and the duration time as 9 hours (hour:minute, 09:00), set the exception as 1, exception type bit0 as OFF (workday), and the exception 1 start day as 7/1 (day:month: 07:01), exception 1 duration as 2 days, then the final output would be as the table below.

bit13	bit12	bit11	bit10	bit9	bit8	bit7	bit6	bit5	bit4	bit3	bit2	bit1	bit0	Settings
Work -day	Holiday	Exception Type	Activation 4	Activation 3	Activation 2	Activation 1	Sun.	Sat.	Fri.	Thurs.	Wed.	Tues.	Mon.	Content
									ON		ON		ON	Example 1 Weekly event
									8:00–17:00		8:00–17:00		8:00–17:00	Final Output
									ON		ON		ON	Example 2 Weekly event
								0:00–17:00	8:00–23:59	0:00–17:00	8:00–23:59	0:00–17:00	8:00–23:59	Final Output
							ON							Example 3 Weekly event
							0:00–23:59					0:00–17:00	0:00–23:59	Final Output
									ON		ON		ON	Example 4
								0:00–10:00	11:00–23:59 (6/1)	0:00–10:00	11:00–23:59 (4/1)	0:00–10:00	11:00–23:59 (2/1)	Weekly event
						ON			6/1	5/1	4/1	3/1		Activation
									11:00–23:59	0:00–10:00	11:00–23:59	0:00–10:00		Final Output
									ON	ON	ON	ON	ON	Example 5
									8:00–17:00 (6/1)	8:00–17:00 (5/1)	8:00–17:00 (4/1)	8:00–17:00 (3/1)	8:00–17:00 (2/1)	Weekly event
ON		ON					8/1	7/1						Exception Workday
							0:00–23:59	0:00–23:59	8:00–17:00	8:00–17:00	8:00–17:00	8:00–17:00	8:00–17:00	Final Output

J6-10 Timer 2 Configuration

(0x134B) Default: 0

Settings 0–16383

J6-11 Timer 2 Start Time

(0x134C) Default: 00:00

Settings 00:00–23:59 (hh:mm)

J6-12 Timer 2 Duration

(0x134D) Default: 00:00:00

Settings 00:00:00–07:00:00 (dd:hh:mm)

Refer to description of Pr.J6-07.

J6-13 Timer 3 Configuration
(0x134F) Default: 0

Settings 0–16383

J6-14 Timer 3 Start Time
(0x1350) Default: 00:00

Settings 00:00–23:59 (hh:mm)

J6-15 Timer 3 Duration
(0x1351) Default: 00:00:00

Settings 00:00:00–07:00:00 (dd:hh:mm)

Refer to description of Pr.J6-07.

J6-16 Timer 4 Configuration
(0x1353) Default: 0

Settings 0–16383

J6-17 Timer 4 Start Time
(0x1354) Default: 00:00

Settings 00:00–23:59 (hh:mm)

J6-18 Timer 4 Duration
(0x1355) Default: 00:00:00

Settings 00:00:00–07:00:00 (dd:hh:mm)

Refer to description of Pr.J6-07.

J6-19 Timer 5 Configuration
(0x1357) Default: 0

Settings 0–16383

J6-20 Timer 5 Start Time
(0x1358) Default: 00:00

Settings 00:00–23:59 (hh:mm)

J6-21 Timer 5 Duration
(0x1359) Default: 00:00:00

Settings 00:00:00–07:00:00 (dd:hh:mm)

Refer to description of Pr.J6-07.

J6-22 Timer 6 Configuration
(0x135B) Default: 0

Settings 0–16383

J6-23 Timer 6 Start Time
(0x135C) Default: 00:00

Settings 00:00–23:59 (hh:mm)

J6-24 Timer 6 Duration
(0x135D) Default: 00:00:00

Settings 00:00:00–07:00:00 (dd:hh:mm)

Refer to description of Pr.J6-07.

J6-25 Timer 7 Configuration
(0x135F) Default: 0

Settings 0–16383

J6-26 Timer 7 Start Time
(0x1360) Default: 00:00

Settings 00:00–23:59 (hh:mm)

J6-27 Timer 7 Duration
(0x1361) Default: 00:00:00

Settings 00:00:00–07:00:00 (dd:hh:mm)

Refer to description of Pr.J6-07.

J6-28 Timer 8 Configuration
(0x1363) Default: 0

Settings 0–16383

J6-29 Timer 8 Start Time
(0x1364) Default: 00:00

Settings 00:00–23:59 (hh:mm)

J6-30 Timer 8 Duration
(0x1365) Default: 00:00:00

Settings 00:00:00–07:00:00 (dd:hh:mm)

Refer to description of Pr.J6-07.

J6-31 Timer 9 Configuration
(0x1367) Default: 0

Settings 0–16383

J6-32 Timer 9 Start Time
(0x1368) Default: 00:00

Settings 00:00–23:59 (hh:mm)

J6-33 Timer 9 Duration
(0x1369) Default: 12:00:00 AM

Settings 00:00:00–07:00:00 (dd:hh:mm)

Refer to description of Pr.J6-07.

J6-34 Timer 10 Configuration
(0x136B) Default: 0

Settings 0–16383

J6-35 Timer 10 Start Time
(0x136C) Default: 00:00

Settings 00:00–23:59 (hh:mm)

J6-36 Timer 10 Duration
(0x136D) Default: 12:00:00 AM

Settings 00:00:00–07:00:00 (dd:hh:mm)

Refer to description of Pr.J6-07.

✎ J6-39 Activation 2 Start Date

(0x1371) Default: 01:01

Settings 01:01–31:12

✎ J6-40 Activation 2 End Date

(0x1372) Default: 01:01

Settings 01:01–31:12

📖 Refer to description of Pr.J6-37, J6-38.

✎ J6-41 Activation 3 Start Date

(0x1373) Default: 01:01

Settings 01:01–31:12

✎ J6-42 Activation 3 End Date

(0x1374) Default: 1:01 AM

Settings 01:01–31:12

📖 Refer to description of Pr.J6-37, J6-38.

✎ J6-43 Activation 4 Start Date

(0x1375) Default: 01:01

Settings 01:01–31:12

✎ J6-44 Activation 4 End Date

(0x1376) Default: 01:01

Settings 01:01–31:12

📖 Refer to description of Pr.J6-37, J6-38.

✎ J6-45 Exception Enable Number

(0x1377) Default: 3

Settings 0–12

📖 There are 12 exception schedules in total. This parameter defines the enable number of exception schedule, for example, when you set this parameter to 6, the exception schedules are enabled in order from 1 to 6.

✎ J6-46 Exception Type

(0x1378) Default: 0

Settings bit0: Exception 1
bit1: Exception 2
bit2: Exception 3
bit3: Exception 4
bit4: Exception 5
bit5: Exception 6
bit6: Exception 7
bit7: Exception 8
bit8: Exception 9
bit9: Exception 10

bit10: Exception 11
bit11: Exception 12

📖 This parameter defines the type of exception schedule 1–12 as workday (default) or holiday.
📖 When the exception is defined as workday, the corresponded bit is OFF; if it is defined as holiday, the corresponded bit is ON.
📖 When Pr.J6-46 defines Exception 1–3 as holiday and the rest of exceptions are workday, then the corresponded bit0–2 is ON, and the other bits are OFF.

✎ J6-47 Exception 1 Start Date
(0x1379) Default: 01:01
Settings 01:01–31:12 (dd:mm)

✎ J6-48 Exception 1 Duration Days
(0x137A) Default: 0
Settings 0–60 days

📖 Defines 12 groups (Pr.J6-45–J6-61) of exception dates.
📖 The first 3 groups set the interval, for example, the start date is 1/1 (day:month, 01:01) and the duration is 3 days, the exception time is set from 1/1 to 3/1.
📖 The last 9 groups set the start date, for example, the start date is 28/2 (day:month, 28:02), the exception time is 28/2 from 00:00 to 23:59 on the day.

✎ J6-49 Exception 2 Start Date
(0x137B) Default: 01:01
Settings 01:01–31:12 (dd:mm)

✎ J6-50 Exception 2 Duration Days
(0x137C) Default: 0
Settings 0–60 day

📖 Refer to description of Pr.J6-47, J6-48.

✎ J6-51 Exception 3 Start Date
(0x137D) Default: 01:01
Settings 01:01–31:12 (dd:mm)

✎ J6-52 Exception 3 Duration Days
(0x137E) Default: 0
Settings 0–60 day

📖 Refer to description of Pr.J6-47, J6-48.

✎ J6-53 Exception 4 Start Date
(0x137F) Default: 01:01
Settings 01:01–31:12 (dd:mm)

✎ J6-54 Exception 5 Start Date
(0x1380) Default: 01:01
Settings 01:01–31:12 (dd:mm)

J6-55 Exception 6 Start Date

(0x1381) Default: 01:01

Settings 01:01–31:12 (dd:mm)

J6-56 Exception 7 Start Date

(0x1382) Default: 01:01

Settings 01:01–31:12 (dd:mm)

J6-57 Exception 8 Start Date

(0x1383) Default: 01:01

Settings 01:01–31:12 (dd:mm)

J6-58 Exception 9 Start Date

(0x1384) Default: 01:01

Settings 01:01–31:12 (dd:mm)

J6-59 Exception 10 Start Date

(0x1385) Default: 01:01

Settings 01:01–31:12 (dd:mm)

J6-60 Exception 11 Start Date

(0x1386) Default: 01:01

Settings 01:01–31:12 (dd:mm)

J6-61 Exception 12 Start Date

(0x1387) Default: 01:01

Settings 01:01–31:12 (dd:mm)

📖 Refer to description of Pr.J6-47.

n. Communication

n0. COM Card Information

n0-00 RS-485 COM Port Protocol Sel

(0x1540) Default: 0

Settings 0: Modbus Slave
1: Modbus Master
2: BACnet MS/TP

✓ n0-01 COM Card Timeout Disposal

(0x1541) Default: 0

Settings 0: By COM Stop Method and display Warning
1: By OPER FREQ after COM Timeout and display Warning
2: By Drive Stop Method and display Warning
3: by Drive Stop Method and display Fault
4: by Drive Stop Method and display Warning after stop
5: by Drive Stop Method and display Fault after stop

- Defines the treatment when communication timeout. Communication timeout is defined as communication disconnection between COM card and upper controller (ECto) or disconnection of the communication card (ECCb).
- 0: Displays Warning after COM is OFF. When ECto occurs, the communication card gives the stop command (0x2000 = 1, 0x6000 = 0); when ECCb occurs, the drive gives the stop command (0x2000 = 1, 0x6000 = 0) and the screen displays Warning message.
- 1: Displays Warning after COM is OFF. When ECto or ECCb occurs, the drive operates the specified frequency according to Pr.n0-02 and the screen displays Warning message.
- 2: Displays Warning after COM is OFF. When ECto or ECCb occurs, the drive stops according to the setting for Pr.A2-00 Stop Method and the screen displays Warning message.
- 3: Displays Fault after COM is OFF. When ECto or ECCb occurs, the drive stops according to the setting for Pr.A2-00 Stop Method and the screen displays Fault message.
- 4: Displays Warning after COM is OFF. When ECto or ECCb occurs, the drive stops according to the setting for Pr.A2-00 Stop Method and the screen displays Warning message after the drive stops.
- 5: Displays Fault after COM is OFF. When ECto or ECCb occurs, the drive stops according to the setting for Pr.A2-00 Stop Method and the screen displays Fault message after the drive stops.

✓ n0-02 OPER FREQ after COM Timeout

(0x1542) Default: 0.00

Settings 0.00–599.00 Hz

- When you set Pr.C1-01 as 2 (RS-485 serial communication input) and Pr.n0-01 = 1, the AC motor drive operates with the frequency set in this parameter whenever communication timeout occurs.

n0-03 COM Card ID

(0x1543) Default: Read only

Settings 0: N/A
1: DeviceNet
2: Profibus-DP
3: CANopen
5: EtherNet
8: BACnet IP
12: Profinet

n0-04 COM Card Version

(0x1544) Default: Read only

Settings Read only

n0-05 COM Card Date Code

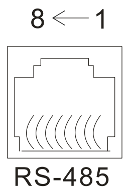
(0x1545) Default: Read only

Settings Read only

📖 This parameter shows the year, week, and day when the program is completed.

n1. Modbus

When using the communication interface, the diagram on the right shows the communication port pin definitions. We recommend that you connect the AC motor drive to your PC by using Delta IFD6530 or IFD6500 as a communication converter. Refer to the RJ45 terminal on Section 3-4-1 Wiring for details of the communication port on the right. Refer to Section 6-1 Modbus Communication for more details.



Modbus RS-485
Pin 1–2,7,8: Reserved
Pin 3, 6: GND
Pin 4: SG-
Pin 5: SG+

n1-00 Modbus Decoding Method

(0x1580) Default: 0

Settings 0: Delta defined 2000
1: Delta defined 6000

		Decoding Method 1	Decoding Method 2
Source of Operation Control	Digital Keypad	Digital keypad controls the drive action regardless of decoding method 1 or 2.	
	External Terminal	External terminal controls the drive action regardless of decoding method 1 or 2.	
	RS-485	Refer to address: 2000h–20FFh	Refer to address: 6000h–60FFh
	CANopen	Refer to index: 2020-01h–2020-FFh	Refer to index: 2060-01h–2060-FFh
	COM Card	Refer to address: 2000h–20FFh	Refer to address: 6000h–60FFh
	PLC	PLC command controls the drive action regardless of decoding method 1 or 2.	

n1-01 Modbus Address

(0x1581) Default: 1

Settings 1–254

📖 Sets the communication address for the drive if the AC motor drive is controlled through RS-485 serial communication. The communication address for each AC motor drive must be unique.

n1-02 Modbus COM Baud Rate

(0x1582) Default: 2

Settings 0: 4.8 Kbps
1: 9.6 Kbps
2: 19.2 Kbps
3: 38.4 Kbps
4: 57.6 Kbps
5: 76.8 Kbps
6: 115.2 Kbps

📖 Sets the transmission speed between the computer and the AC motor drive.

n1-03 Modbus Package Format

(0x1583) Default: 1

Settings
0: 7, N, 2 (ASCII)
1: 7, E, 1 (ASCII)
2: 7, O, 1 (ASCII)
3: 7, E, 2 (ASCII)
4: 7, O, 2 (ASCII)
5: 8, N, 1 (ASCII)
6: 8, N, 2 (ASCII)
7: 8, E, 1 (ASCII)
8: 8, O, 1 (ASCII)
9: 8, E, 2 (ASCII)
10: 8, O, 2 (ASCII)
11: 8, N, 1 (RTU)
12: 8, N, 2 (RTU)
13: 8, E, 1 (RTU)
14: 8, O, 1 (RTU)
15: 8, E, 2 (RTU)
16: 8, O, 2 (RTU)

- Control by PC (Computer Link)
  When using the RS-485 serial communication interface, you must specify each drive's communication address in Pr.n1-01. The computer then implements control using the drives' individual addresses.
- Modbus ASCII (American Standard Code for Information Interchange): Each byte of data is the combination of two ASCII characters. For example, one byte of data: 64 Hex, shown as '64' in ASCII, consists of '6' (36Hex) and '4' (34Hex).

n1-04 Modbus Timeout Check Time

(0x1584) Default: 0.0

Settings 0.0–100.0 sec.

- Sets the communication time-out value.

n1-05 Modbus Timeout Disposal

(0x1585) Default: 0

Settings
0: Continue OPER
1: Warning & continue OPER
2: Fault & ramp to stop
3: Fault & coast to stop

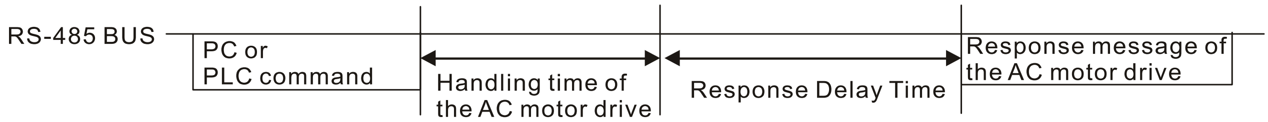
- Determines the treatment when an error is detected that the host controller does not continuously transmit data to the AC motor drive during Modbus communication. The detection time is based on the Pr.n1-04 setting.

n1-06 Modbus Response Delay Time

(0x1586) Default: 2.0

Settings 0.0–200.0 ms

If the host controller does not finish the transmitting/receiving process, you can use this parameter to set the response delay time after the AC motor drive receives communication command as shown in the following picture.



n1-07 Modbus MO Mask

(0x1587) Default: 0

Settings 0: Disable

1: Enable

bit 0–1: Relay1–2

bit 2–3: MO1–MO2

bit 4–8: Reserved

bit 9–14: MO10–MO15

n1-08 Modbus AO Mask

(0x1588) Default: 0

Settings 0: Disable

1: Enable

bit 0–1: AO1–AO2

bit 2–3: Reserved

bit 4–5: AO10–AO11

n1-09 Modbus Master Target Selection

(0x1589) Default: 0

Settings 0: None

1: InnerPLC

2: D2D

Select the Modbus Master target through this parameter before using Modbus Master function.

n2. CANopen

n2-00 CANopen Decoding Method

(0x1590) Default: 0

Settings 0: Delta defined 2000

1: Delta defined 6000

2: DS402

Source of OPER control	Decoding Method 1	Decoding Method 2	Decoding Method 3
CANopen	Refer to index: 2020-01h–2020-FFh	Refer to address: 3000-01h–307F-40h	DS402 object (6007-00h…)

n2-01 CANopen Slave Address

(0x1591) Default: 0

Settings 0: Disable

1–127

n2-02 CANopen COM Baud Rate

(0x1592) Default: 0

Settings 0: 1 Mbps

1: 500 Kbps

2: 250 Kbps

3: 125 Kbps

4: 100 Kbps

5: 50 Kbps

n2-03 CANopen Master Function

(0x1593) Default: 0

Settings 0: Disable

1: Enable

n2-04 CANopen Master Address

(0x1594) Default: 100

Settings 0–127

n2-05 CANopen Control Word

(0x1595) Default: 0

Settings 0–0xFFFF

✓ n2-06 CANopen MO Mask

(0x1596) Default: 0

Settings 0: Disable

1: Enable

bit 0–1: Relay1–2

bit 2–3: MO1–MO2

bit 4–8: Reserved

bit 9–14: MO10–MO15

n2-07 CANopen AO Mask

(0x1597) Default: 0

Settings
0: Disable
1: Enable
bit 0–1: AO1–AO2
bit 2–3: Reserved
bit 4–5: AO10–AO11

n2-08 CANopen CiA 301 Status

(0x1598) Default: Read only

Settings
0: Initializing
1: Reset Application
2: Reset COM
3: Pre-operational
4: Operational
5: Stopped

n2-09 CANopen CiA 402 Status

(0x1599) Default: Read only

Settings
0: Not ready to switch on
1: Switch on Disabled
2: Ready to switch on
3: Switched on
4: Operation enabled
5: Quick stop active
6: Fault reaction active
7: Fault

n2-10 CANopen Fault REC

(0x1599) Default: Read only

Settings
bit0: CANopen Guarding Timeout
bit1: CANopen Heartbeat Timeout
bit2: CANopen Bus-off
bit3: CANopen SYNC Timeout
bit4: CANopen Format Error

n3. BACnet MS/TP

n3-00 BACnet MS/TP Decoding Method

(0x15A0) Default: 0

Settings 0: Delta defined 2000

Refer to description of Pr.n1-00.

n3-01 BACnet MAC ID

(0x15A1) Default: 10

Settings 0–127

n3-02 Max BACnet MAC ID Setting

(0x15A2) Default: 127

Settings 0–127

n3-03 BACnet COM Baud Rate

(0x15A3) Default: 2

Settings 0: 9.6 Kbps
1: 19.2 Kbps
2: 38.4 Kbps
3: 76.8 Kbps

n3-04 BACnet Device ID

(0x15A4) Default: 10

Settings 0–4194303

n3-05 BACnet Password

(0x15A6) Default: 0

Settings 0–65535

n3-06 BACnet MO Mask

(0x15A7) Default: 0

Settings 0: Disable
1: Enable
bit 0–1: Relay1–2
bit 2–3: MO1–MO2
bit 4–8: Reserved
bit 9–14: MO10–MO15

n3-07 BACnet AO Mask

(0x15A8) Default: 0

Settings 0: Disable
1: Enable
bit 0–1: AO1–AO2
bit 2–3: Reserved
bit 4–5: AO10–AO11

n4. DeciveNet & Profibus

n4-00 DeviceNet Decoding Method

(0x15B0) Default: 0

Settings 0: Delta defined 2000

1: Delta defined 6000

Refer to description of Pr.n1-00.

n4-01 DeviceNET Address

(0x15B1) Default: 1

Settings 0–63

n4-02 DeviceNet COM Baud Rate

(0x15B2) Default: 3

Settings 0: 10 Kbps

1: 20 Kbps

2: 50 Kbps

3: 100 Kbps

4: 125 Kbps

5: 250 Kbps

6: 500 Kbps

7: 800 Kbps

8: 1 Mbps

n4-03 DeviceNet Control Word

(0x15B3) Default: 0

Settings bit0 Additional setting of COM card speed rate

bit 0 = 0: Standard

bit0 = 1: Delta Defined

n4-04 DeviceNet MO Mask

(0x15B4) Default: 0

Settings 0: Disable

1: Enable

bit 0–1: Relay1–2

bit 2–3: MO1–MO2

bit 4–8: Reserved

bit 9–14: MO10–MO15

n4-05 DeviceNET AO Mask

(0x15B5) Default: 0

Settings 0: Disable

1: Enable

bit 0–1: AO1–AO2

bit 2–3: Reserved

bit 4–5: AO10–AO11

n4-06 Profibus Decoding Method

(0x15B6) Default: 0

Settings 0: Delta defined 2000

1: Delta defined 6000

Refer to description of Pr.n1-00.

n4-07 Profibus Address

(0x15B7) Default: 1

Settings 1–125

n4-08 Profibus MO Mask

(0x15B8) Default: 0

Settings 0: Disable

1: Enable

bit 0–1: Relay1–2

bit 2–3: MO1–MO2

bit 4–8: Reserved

bit 9–14: MO10–MO15

n4-09 Profibus AO Mask

(0x15B9) Default: 0

Settings 0: Disable

1: Enable

bit 0–1: AO1–AO2

bit 2–3: Reserved

bit 4–5: AO10–AO11

n5. EtherNET

n5-00 EtherNET Decoding Method

(0x15C0) Default: 0

Settings 0: Delta defined 2000
1: Delta defined 6000

Refer to description of Pr.n1-00.

n5-01 EtherNET IP Configuration

(0x15C1) Default: 0

Settings 0: Static IP
1: DHCP
2: BOOTP

0: Set the IP address manually.

1: IP address is dynamically set by the host controller.

n5-02 EtherNET IP Address 1

(0x15C2) Default: 0

Settings 0–223

n5-03 EtherNET IP Address 2

(0x15C3) Default: 0

Settings 0–255

n5-04 EtherNET IP Address 3

(0x15C4) Default: 0

Settings 0–255

n5-05 EtherNET IP Address 4

(0x15C5) Default: 0

Settings 0–255

Use Pr.n5-02–n5-05 with a EtherNET communication card.

n5-06 EtherNET Mask Address 1

(0x15C6) Default: 0

Settings 0–255

n5-07 EtherNET Mask Address 2

(0x15C7) Default: 0

Settings 0–255

n5-08 EtherNET Mask Address 3

(0x15C8) Default: 0

Settings 0–255

n5-09 EtherNET Mask Address 4

(0x15C9) Default: 0

Settings 0–255

✎ n5-10 EtherNET Gateway Address 1

(0x15CA) Default: 0

Settings 0–223

✎ n5-11 EtherNET Gateway Address 2

(0x15CB) Default: 0

Settings 0–255

✎ n5-12 EtherNET Gateway Address 3

(0x15CC) Default: 0

Settings 0–255

✎ n5-13 EtherNET Gateway Address 4

(0x15CD) Default: 0

Settings 0–255

✎ n5-14 EtherNET Password

(0x15CE) Default: 0

Settings 0–4294967295

n5-15 EtherNET Reset

(0x15CF) Default: 0

Settings 0: Disable

1: Reset

n5-16 EtherNET Control Word

(0x15D0) Default: 0

Settings bit0: Enable IP filter

bit1: Enable Internet parameters

bit2: Enable Login Password

📖 bit1: When the IP address is set, this bit is enabled. After updating the parameters for the communication card, this bit changes to disabled.

📖 bit2: When you enter the login password, this bit is enabled. After updating the parameters for the communication card, this bit changes to disabled.

✎ n5-17 EtherNET MO Mask

(0x15D1) Default: 0

Settings 0: Disable

1: Enable

bit 0–1: Relay1–2

bit 2–3: MO1–MO2

bit 4–8: Reserved

bit 9–14: MO10–MO15

n5-18 EtherNET AO Mask

(0x15D2) Default: 0

Settings 0: Disable
1: Enable
bit 0–1: AO1–AO2
bit 2–3: Reserved
bit 4–5: AO10–AO11

n5-19 EtherNET Status

(0x15D3) Default: Read only

Settings bit0: Enable login password

- bit0: When the communication card is set with a password, this bit is enabled. When the password is cleared, this bit changes to disabled.

n5-20 EIP COM Card Identify Method

(0x15D4) Default: 1

Settings 0: by the device's family
1: by the device's series

- 0: by the device’s family, for example: CMC-EIP02.
- 1: by the device’s series, for example: VP3000 (CMC-EIP02).

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o. Monitor & Recorder

o0. Status Monitor

⌁ o0-00 Status Display 1

(0x1640) Default: 0

⌁ o0-01 Status Display 2

(0x1641) Default: 0

⌁ o0-02 Status Display 3

(0x1642) Default: 0

Settings
0: Display output current (A) (unit: Amp)
1: Display counter value (c) (Unit: CNT)
2: Display the motor's actual output frequency (H.) (Unit: Hz)
3: Display the drive's DC bus voltage (v) (Unit: V_{DC})
4: Display the drive's output voltage (E) (Unit: V_{AC})
5: Display the drive's output power angle (n) (Unit: deg)
6: Display the drive's output power (P) (Unit: kW)
7: Display the motor speed rpm (r) (Unit: rpm)
8: Display the drive's estimated output torque, motor's rated torque is 100% (t) (Unit: %)
11: Display AI1 analog input terminal signal (1.) (Unit: %)
12: Display AI2 analog input terminal signal (2.) (Unit: %)
13: Display AI3 analog input terminal signal (3.) (Unit: %)
14: Display the drive's IGBT temperature (i.) (Unit: °C)
15: Display the drive's capacitance temperature (c.) (Unit: °C)
16: The digital input status (ON / OFF) (i)
17: The digital output status (ON / OFF) (o)
18: Display multi-step speed (S)
19: The corresponding CPU digital input pin status (d)
20: The corresponding CPU digital output pin status (0.)
21: Display the drive's IGBT temperature (i) (Unit: %)
22: Display the drive's capacitance temperature (c.) (Unit: %)
25: Overload count (0.00–100.00%) (o.) (Unit: %)
26: Ground fault GFF (G.) (Unit: %)
27: DC bus voltage ripple (r.) (Unit: V_{DC})
28: Display PLC register D1043 data (C)
29: Display PM pole SECT (4.)
34: Operation speed of fan (F.) (Unit: %)
36: Present operating carrier frequency of the drive (Unit: Hz) (J.)
38: Drive Status (6.)
39: Display the drive's estimated output torque, positive and negative, using Nt-m as unit (t 0.0: positive torque; -0.0: negative torque (C.)
41: kWh display (J) (Unit: kWh)
42: P-PID1 reference (h.) (Unit: %)

43: P-PID2 reference (h.) (Unit: %)
44: P-PID1 feedback (b) (Unit: %)
45: P-PID2 feedback (b) (Unit: %)
46: P-PID1 output frequency (b.) (Unit: Hz)
47: P-PID2 output frequency (b.) (Unit: Hz)
48: Hardware ID 1 (0)
49: Motor temperature (KTY84-130 only) (c.) (Unit: %)
51: PMSVC torque offset (t.)
52: AI10% (7.) (Unit: %)
53: AI11% (8.) (Unit: %)
54: Hardware ID 2 (0)
55: Hardware ID 3 (0)
68: STO version (d)
69: STO checksum-high word (d)
70: STO checksum-low word (d)

📖 Pr.o0-00–o0-02 set the internal value of the drive, input and output values, status, physical quantity, etc. that the user needs to observe.

✎ o0-03 Current Display Filter Time

(0x1643) Default: 0.100

Settings 0.001–65.535 sec.

📖 Set this parameter to reduce the fluctuation of the current display value on the keypad.

✎ o0-04 DC bus Display Filter Time

(0x1644) Default: 0.100

Settings 0.001–65.535 sec.

📖 Set this parameter to reduce the fluctuation of the DC bus display value on the keypad.

✎ o0-05 Status Display Filter Time

(0x1645) Default: 0.100

Settings 0.001–65.535 sec.

📖 Sets the general filter time for the output frequency, motor rpm and power display on the digital keypad. (VP3000 does not have motor speed feedback, therefore, the above motor rpm is the value converted from the output frequency.)

✎ o0-06 Drive Ready Indn

(0x1646) Default: 0

Settings 0: Disable
1–2: Relay1–Relay2
3–4: MO1–MO2
5–9: Reserved
10–15: MO/Relay10–15

📖 Selects the MO/Relay terminal for the “Drive Ready” status indication.

📖 If the AC motor drive starts without any abnormal status, the terminal contact selected in Pr.o0-

06 activates.

✎ o0-07 Run Indn

(0x1647) Default: 0

Settings 0: Disable
1–2: Relay1–Relay2
3–4: MO1–MO2
5–9: Reserved
10–15: MO/Relay10–15

- Selects the MO/Relay terminal for the "Drive RUN" status indication.
- When the AC motor drive is in the non-stop status, the terminal contact selected in Pr.o0-07 activates.

✎ o0-08 Output Amp Detection Level

(0x1648) Default: 0.0

Settings 0.0–200.00%

✎ o0-09 Output Amp Exceed Indn

(0x1649) Default: 0

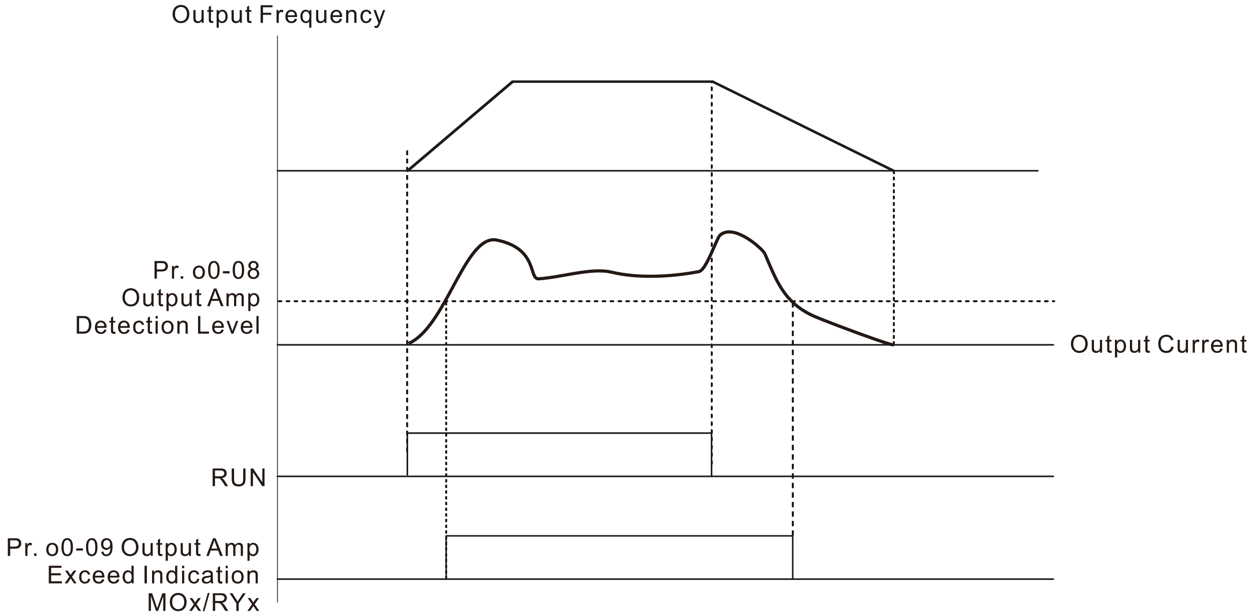
Settings 0: Disable
1–2: Relay1–Relay2
3–4: MO1–MO2
5–9: Reserved
10–15: MO/Relay10–15

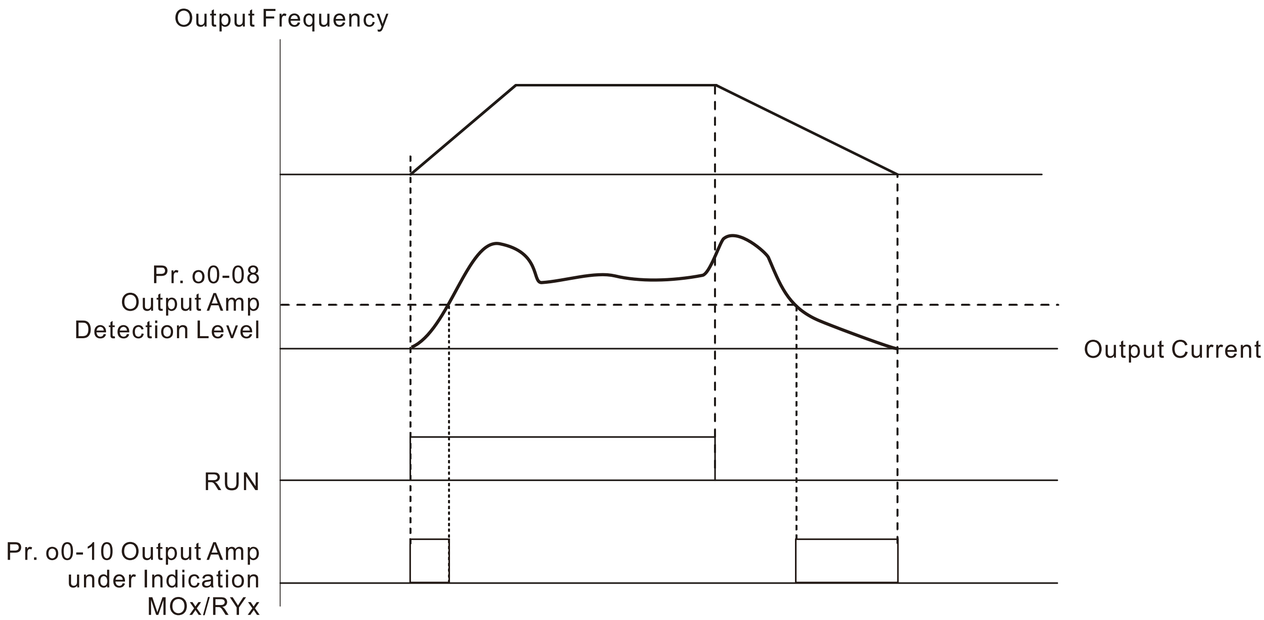
✎ o0-10 Output Amp under Indn

(0x164A) Default: 0

Settings 0: Disable
1–2: Relay1–Relay2
3–4: MO1–MO2
5–9: Reserved
10–15: MO/Relay10–15

- Pr.o0-08 is the detection level of Pr. o0-09 and o0-10. 100% corresponds to Pr.A0-01 Drive continuous rated current.
- When the drive output current is higher than Pr.o0-08 current level, the terminal contact selected in Pr.o0-09 activates.
- When the drive output current is lower than Pr.o0-08 current level, the terminal contact selected in Pr.o0-10 activates.





⌁ o0-11 Target Speed Width

(0x164B) Default: 0.1

Settings 0.1–5.0%

⌁ o0-12 At Target Speed Indn

(0x164C) Default: 0

Settings 0: Disable

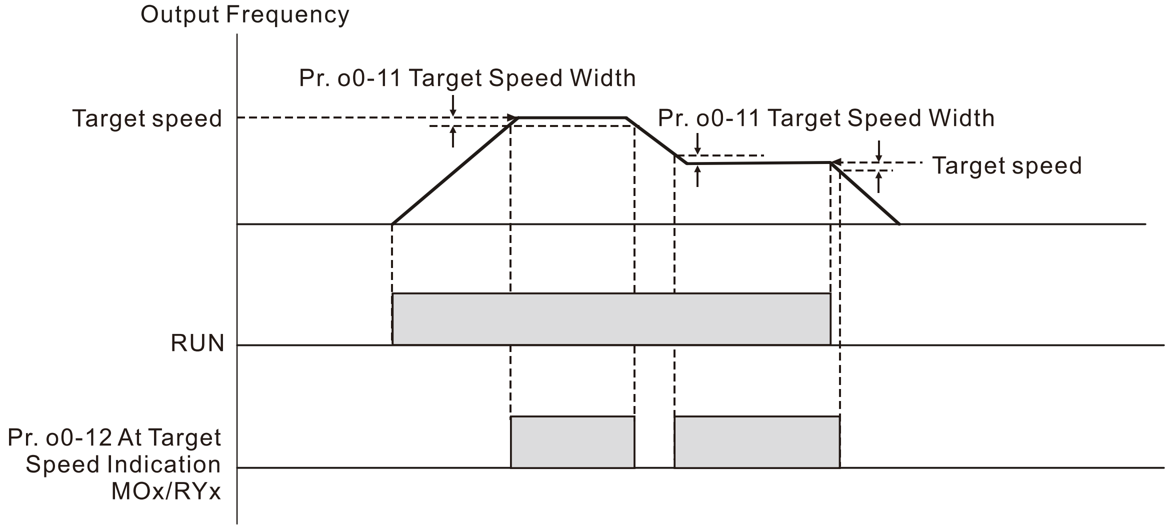
1–2: Relay1–Relay2

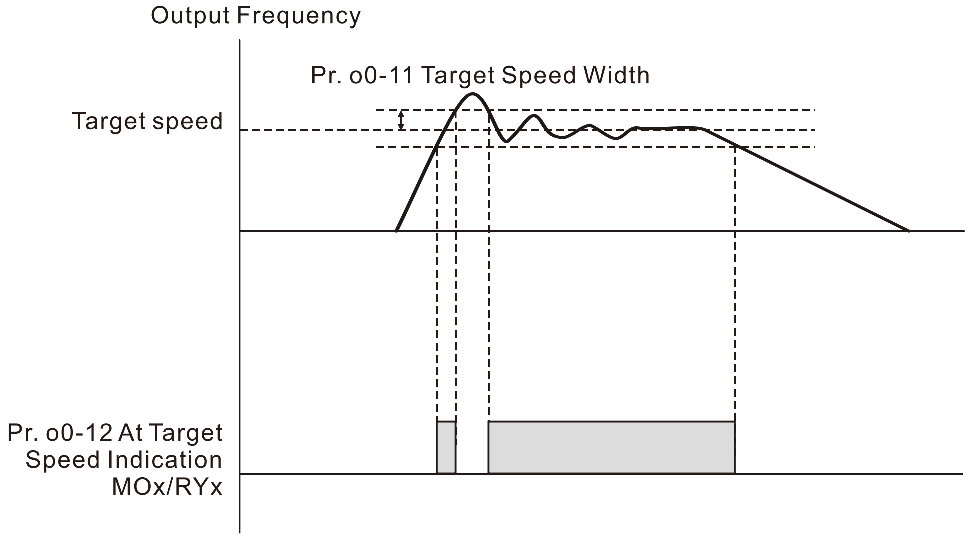
3–4: MO1–MO2

5–9: Reserved

10–15: MO/Relay10–15

- When the drive output frequency reaches the set speed width in Pr.o0-11, the terminal contact selected in Pr.o0-12 activates.
- When Pr.d1-04 IM1 rated speed = 1750 rpm, target speed = 800 rpm and Pr.o0-11 = 1%, the terminal contact selected in Pr.o0-12 activates within the range of “800 +/- 17.5” rpm.





o0-13 Output FREQ Detection Level

(0x164D) Default: 30.00

Settings 0.00–599.00 Hz

o0-14 Output FREQ Exceed Indn

(0x164E) Default: 0

Settings 0: Disable

1–2: Relay1–Relay2

3–4: MO1–MO2

5–9: Reserved

10–15: MO/Relay10–15

o0-15 Output FREQ under Indn

(0x164F) Default: 0

Settings 0: Disable

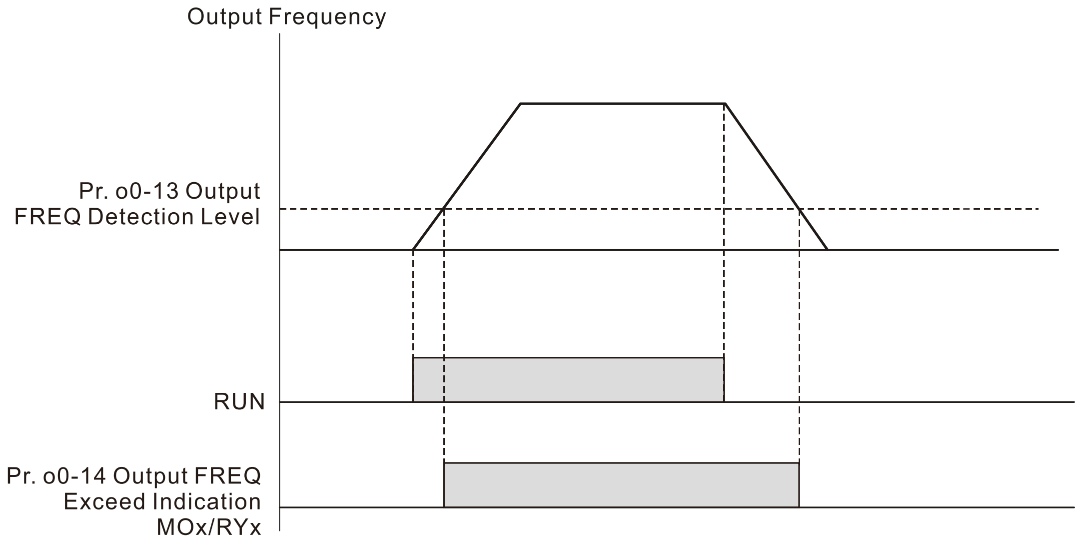
1–2: Relay1–Relay2

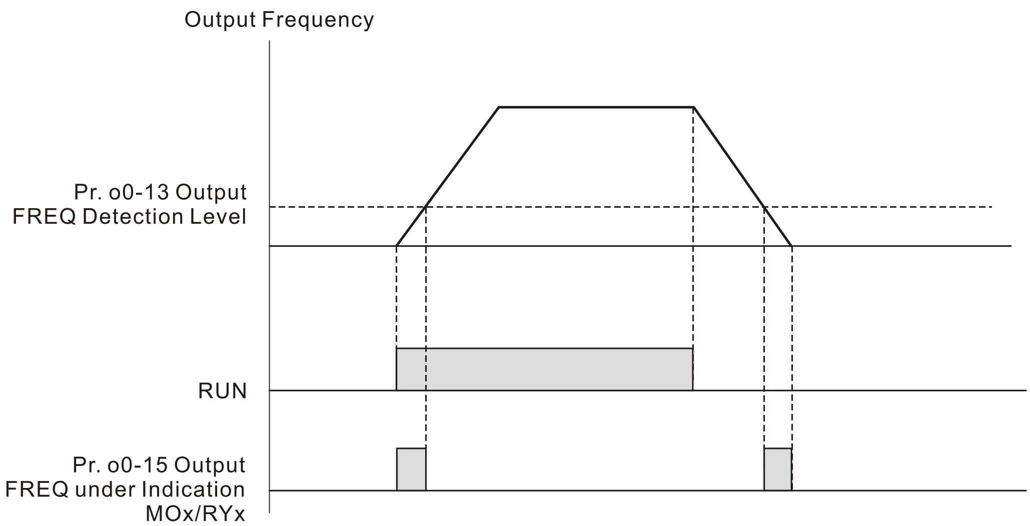
3–4: MO1–MO2

5–9: Reserved

10–15: MO/Relay10–15

- When the drive output frequency is higher than the setting for Pr.o0-13 (actual output frequency H ≥ Pr.o0-13, the terminal contact selected in Pr.o0-14 activates.
- When the drive output frequency is lower than the setting for Pr.o0-13 (actual output frequency H < Pr.o0-13), the terminal contact selected in Pr.o0-15 activates.





✎ o0-16 Output FREQ1 Level

(0x1650) Default: 60.00

Settings 0.00–599.00 Hz

✎ o0-17 Output FREQ1 Width

(0x1651) Default: 2.00

Settings 0.00–599.00 Hz

✎ o0-18 At Output FREQ1 Indn

(0x1652) Default: 0

Settings 0: Disable

1–2: Relay1–Relay2

3–4: MO1–MO2

5–9: Reserved

10–15: MO/Relay10–15

o0-19 Output FREQ2 Level

(0x1653) Default: 60.00

Settings 0.00–599.00 Hz

o0-20 Output FREQ2 Width

(0x1654) Default: 2.00

Settings 0.00–599.00 Hz

o0-21 At Output FREQ2 Indn

(0x1655) Default: 0

Settings 0: Disable

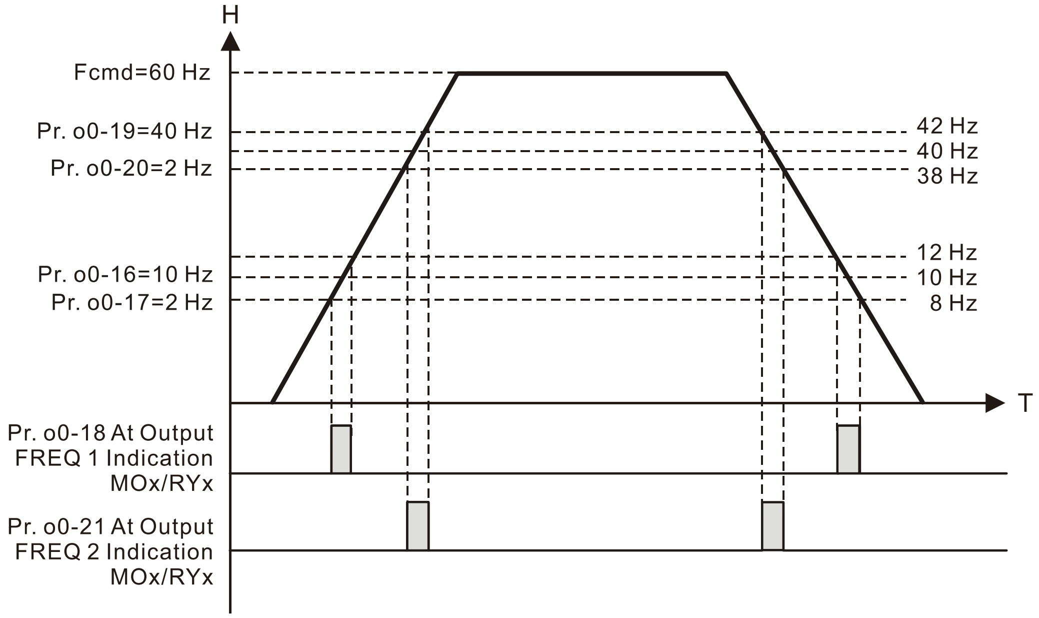
1–2: Relay1–Relay2

3–4: MO1–MO2

5–9: Reserved

10–15: MO/Relay10–15

- When the drive output frequency reaches Pr.o0-16 output frequency 1 level, the terminal contact selected in Pr.o0-18 activates.
- When the drive output frequency reaches Pr.o0-19 output frequency 2 level, the terminal contact selected in Pr.o0-21 activates.



o0-22 0 Hz Cmd Indn at Run

(0x1656) Default: 0

Settings 0: Disable

1–2: Relay1–Relay2

3–4: MO1–MO2

5–9: Reserved

10–15: MO/Relay10–15

- When the AC motor drive frequency command is set to 0, the terminal contact selected in Pr.o0-22 activates.
- This function only activates when the drive is in operation.

o0-23 0 Hz Cmd Indn

(0x1657) Default: 0

Settings 0: Disable
1–2: Relay1–Relay2
3–4: MO1–MO2
5–9: Reserved
10–15: MO/Relay10–15

- When the AC motor drive frequency command is set to 0 or stop, the terminal contact selected in Pr.o0-23 activates.

o0-24 0 Hz Width

(0x1658) Default: 0.1

Settings 0.1–5.0%

o0-25 0 Hz Output Indn at Run

(0x1659) Default: 0

Settings 0: Disable
1–2: Relay1–Relay2
3–4: MO1–MO2
5–9: Reserved
10–15: MO/Relay10–15

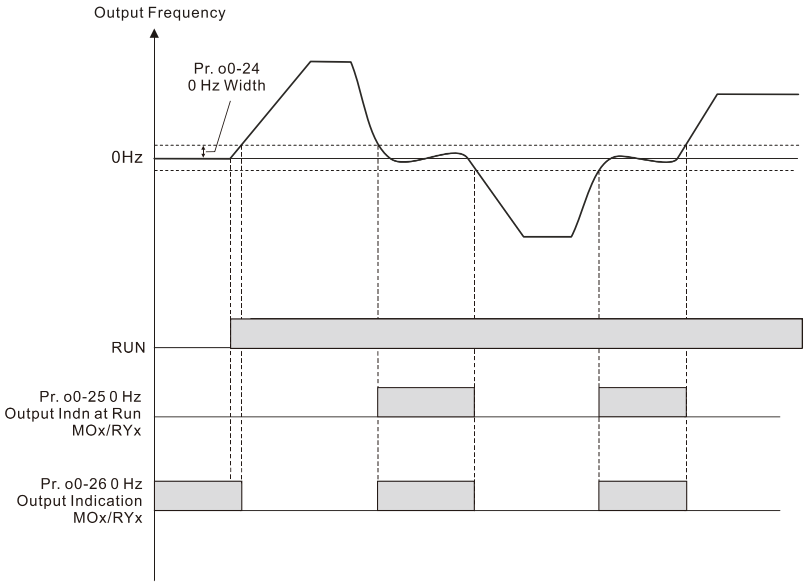
- When the drive actual output frequency is 0, the terminal contact selected in Pr.o0-25 activates.
- This function only activates when the drive is in operation.

o0-26 0 Hz Output Indn

(0x165A) Default: 0

Settings 0: Disable
1–2: Relay1–Relay2
3–4: MO1–MO2
5–9: Reserved
10–15: MO/Relay10–15

- When the drive actual output frequency is 0 or stopped, the terminal contact selected in Pr.o0-26 activates.



o0-27 FREQ Cmd AO Sel

(0x165B) Default: 0

Settings 0: Disable
1–2: AO1–AO2
3–4: Reserve
5–6: AO10–AO11

- Use this parameter to select analog output terminals that are defined as “Frequency command output”.
- 100% corresponds to Pr.C2-17 maximum operation frequency.

o0-28 FREQ Profile AO Sel

(0x165C) Default: 0

Settings 0: Disable
1–2: AO1–AO2
3–4: Reserve
5–6: AO10–AO11

- Use this parameter to select analog output terminals that are defined as “Frequency profile”.
- 100% corresponds to Pr.C2-17 maximum operation frequency.

o0-29 Motor RPM AO Sel

(0x165D) Default: 0

Settings 0: Disable
1–2: AO1–AO2
3–4: Reserve
5–6: AO10–AO11

- Use this parameter to select analog output terminals that are defined as “Motor speed output”.
- 100% corresponds to Pr.C2-17 maximum operation frequency.

✓ o0-30 Output FREQ AO Sel

(0x165E) Default: 0

Settings 0: Disable
1–2: AO1–AO2
3–4: Reserve
5–6: AO10–AO11

- Use this parameter to select analog output terminals that are defined as "Output frequency output".
- 100% corresponds to Pr.C2-17 maximum operation frequency.

✓ o0-31 Output Current AO Sel

(0x165F) Default: 0

Settings 0: Disable
1–2: AO1–AO2
3–4: Reserve
5–6: AO10–AO11

- Use this parameter to select analog output terminals that are defined as "Output current output".
- 100% corresponds to 2.5 times of Pr.A0-01 drive continuous rated current.

✓ o0-32 Output Voltage AO Sel

(0x1660) Default: 0

Settings 0: Disable
1–2: AO1–AO2
3–4: Reserve
5–6: AO10–AO11

- Use this parameter to select analog output terminals that are defined as "Output voltage output".
- 100% corresponds to 2 times of motor rated voltage.

✓ o0-34 Output Torque AO Sel

(0x1662) Default: 0

Settings 0: Disable
1–2: AO1–AO2
3–4: Reserve
5–6: AO10–AO11

- Use this parameter to select analog output terminals that are defined as "Output torque".
- The motor rated torque is 100%.

o0-35 Output Power AO Sel

(0x1663) Default: 0

Settings 0: Disable
1–2: AO1–AO2
3–4: Reserve
5–6: AO10–AO11

- Use this parameter to select analog output terminals that are defined as "Output power".
- 100% corresponds to 2 times of the drive rated power.

o0-36 Power Factor AO Sel

(0x1664) Default: 0

Settings 0: Disable
1–2: AO1–AO2
3–4: Reserve
5–6: AO10–AO11

- Use this parameter to select analog output terminals that are defined as "Power factor".
- Power factor -1.000–1.000 correspond to -100%–100%.

o0-59 DC bus Voltage AO Sel

(0x167B) Default: 0

Settings 0: Disable
1–2: AO1–AO2
3–4: Reserve
5–6: AO10–AO11

- Use this parameter to select analog output terminals that are defined as "DC bus voltage".
- 460V models: 100% corresponds to 900 V_{DC}.

o0-37 Recent 1Hr OPER KW-hour

(0x1665) Default: Read only

Settings 0.0–6553.5 kW-hour

- Degree (kW-hr): Often referred to as kilowatt-hour, it is a unit of energy, which is equivalent to the energy consumed by an electrical device with a power of 1000 watts after 1 hour of use, which is equal to 3.6 million joules. "Kilowatt-hour" is usually used as a unit of billing for electricity delivered by power companies to consumers.
- Pr.o0-37 displays the power consumption of the drive in the previous hour.

o0-38 Cumulative OPER KW-hour

(0x1666) Default: Read only

Settings 0.0–999.9 kW-hour

o0-39 Cumulative OPER MW-hour

(0x1667) Default: Read only

Settings 0–999 MW-hour

o0-40 Cumulative OPER GW-hour

(0x1668) Default: Read only

Settings 0–999 MW-hour

- The accumulative operating degrees are recorded in three units of degrees (kW-hour), thousand degrees (MW-hour) and million degrees (GW-hour). When the accumulated degree reaches 1,000 degrees, carry to 1,000 degrees; when the thousand degrees accumulated to 1,000,000 degrees, carry to million degrees. If the degree is less than one hour, it will be discarded and not recorded.
- Pr.o0-38–o0-40 are the accumulative motor operating degrees (kW-hour), accumulative motor operating thousand degrees (MW-hour) and accumulative motor operating million degrees (GW-hour).
- The total accumulative motor operating degrees is (GW+MW+kW)-hour.
- The parameters related to the operating degree record can be cleared through the reset kWh function in the parameter reset function.
- The operating degree record parameter is only available for reading, it cannot be manually modified or written into any value.
- When executing parameter copy function, the operating degree record parameters cannot be copied.

o0-41 Cumulative OPER Minutes

(0x1669) Default: 0

Settings 0–60 minutes

o0-42 Cumulative OPER Hours

(0x166A) Default: 0

Settings 0–24 hours

o0-43 Cumulative OPER Days

(0x166B) Default: 0

Settings 0–65535 days

- Pr.o0-41–o0-43 are the accumulative operating minutes, operating hours and operating days of the drive.
- The total accumulative operating time of the drive: days + hours + minutes.
- Set these parameter as 0 to clear the accumulative value. An operation time shorter than 60 seconds is not recorded.

o0-44 Drive Output Efficiency

(0x166C) Default: Read only

Settings 0.0–99.9%

- This parameter is the immediate output frequency of the drive.

o0-45 Drive Output PF Angle

(0x166D) Default: Read only

Settings -90.0–90.0 deg

- This parameter is the immediate output power angle of the drive.

o0-46 Drive Output Apparent Power

(0x166E) Default: Read only

Settings 0.0–6553.5 kVA

📖 This parameter is the immediate output apparent power of the drive.

o0-47 Drive Output Active Power

(0x166F) Default: Read only

Settings 0.0–6553.5 kW

📖 This parameter is the immediate output active power of the drive.

o0-48 Drive Output Reactive Power

(0x1670) Default: Read only

Settings 0.0–6553.5 kVar

📖 This parameter is the immediate output reactive power of the drive.

o0-49 Motor Rated Power Consumed

(0x1671) Default: 100.00

Settings 0.00–100.00%

📖 This parameter is the average power consumed by the motor under constant frequency operation (drive by mains power instead of the AC motor drive).

📖 100% corresponds to the motor rated power.

📖 According to Pr.o0-49 (Motor Rated Power Consumed), the operating degrees consumed by the motor at a constant frequency can be calculated under the same operation time. Subtract this information from the accumulative operating degrees calculated by the drive to the possible energy saved by using the drive and record the value in Pr.o0-50–o0-52 respectively.

📖 If it is set to 0, the energy-saving degree function will not be counted.

o0-50 kW-hour Power Saved

(0x1672) Default: Read only

Settings 0.0–999.9 kW-hour

o0-51 MW-hour Power Saved

(0x1673) Default: Read only

Settings 0–999 MW-hour

o0-52 GW-hour Power Saved

(0x1674) Default: Read only

Settings 0–999 MW-hour

📖 Pr.o0-50–o0-52 are the accumulative power degrees (kW-hour), thousand degrees (MW-hour) and million degrees (GW-hour) saved by the operation of the drive.

📖 The total accumulative power saved degrees is (GW+MW+kW)-hour.

o0-53 Carbon Emission Reduction

(0x1675) Default: Read only

Settings 0.0–6553.5 tn

📖 Carbon emission (tn): Carbon emissions refer to the greenhouse gases directly or indirectly produced by human activities. The total weight of these greenhouse gases is called carbon emissions. Of the various greenhouse gases, carbon dioxide (CO2) takes the most proportion in the atmosphere. Therefore, the weight of carbon dioxide is the most common measure of carbon emissions. For example, the production of one kilowatt-hour of electricity will produce 0.554 kg of carbon dioxide, which can also be explained as “the production of electricity generates carbon emissions, and the carbon emissions per kilowatt-hour of electricity are 0.554 kg”.

- This parameter is the cumulated calculation of the AC motor drive carbon emission reduction.
- Using the total cumulative operating energy savings and the carbon emission coefficient to calculate the carbon emission reduction of the drive.

o0-54 Carbon Emission Factor

(0x1676) Default: 0.500

Settings 0.000–65.535 tn/MWh

- Use Pr.o0-54 to set the carbon emission coefficient (the definition of carbon emission coefficient is different for each country; it will be adjusted year by year according to the fuel power generation. For example, the carbon emission coefficient of Taiwan from 2004 to 2009 is 0.562–0.509.)

✎ o0-55 Power Saved Record Reset

(0x1677) Default: 0

Settings 0–1

0: Disable

- Set Pr.o0-55 as 1 to reset the cumulative power saved record, after the reset, this parameter returns to 0.
- Parameters related to energy saving during operation can only be cleared to zero by setting Pr.o0-55 to 1. Parameter initialization cannot modify these parameters.
- When executing parameter copy function, the parameters related to energy saving during operation cannot be copied.
- Because the energy saving may not be accumulated only with the motor, but also accumulate with the construction of the factory. When the motor is replaced, it is still necessary to continue accumulating based on the current accumulated value as the complete energy saving data of the whole plant.

o1. Signal & Recorder Function

For the convenience of using the drive, VP3000 allows the user to select 8 groups of real-time signal monitoring and recording function.

When the signal exceeds the range set by the user, or when a specific condition is met, a Signal Even can be triggered. When the signal event is established, it can trigger a warning or fault message of the drive, or as a trigger for the signal record module. This function records the signal waveform of the specific period before the event occurs to the SD card.

NOTE: the SD card must be formatted as FAT32 first.

Regardless of the signal monitoring or signal recording function, the signal source can be specified through the menu, or you can specify the signal source of monitoring directly by inputting the monitoring address.

- Pr.o1-00–o1-32: Signal channel 1–8 settings (including channel signal selection, signal address, signal data type, channel filter time, etc. of each channel.)
- Pr.o1-33–o1-45: Recorder 1–8 settings (including recorder function selection, trigger method, trigger source A & B selection, recorder time setting, channel source, etc. of recorder 1–8)
- Pr.o2-00–o2-56: Monitor 1–8 settings (including channel source selection, trigger method, trigger action, trigger indication, upper and lower limits, monitor hysteresis, etc. of monitor 1–8)

Recorder Function Quick Start

Step 1: The related motor and control parameters have been adjusted (refer to Chapter 5 Initial Operation and Adjustment in User Manual).

Step 2: Insert the SD card to the drive and format the SD card (Keypad menu 12 SD Card Management \ Format SD card. Refer to Chapter 4 Keypad in the User Manual).

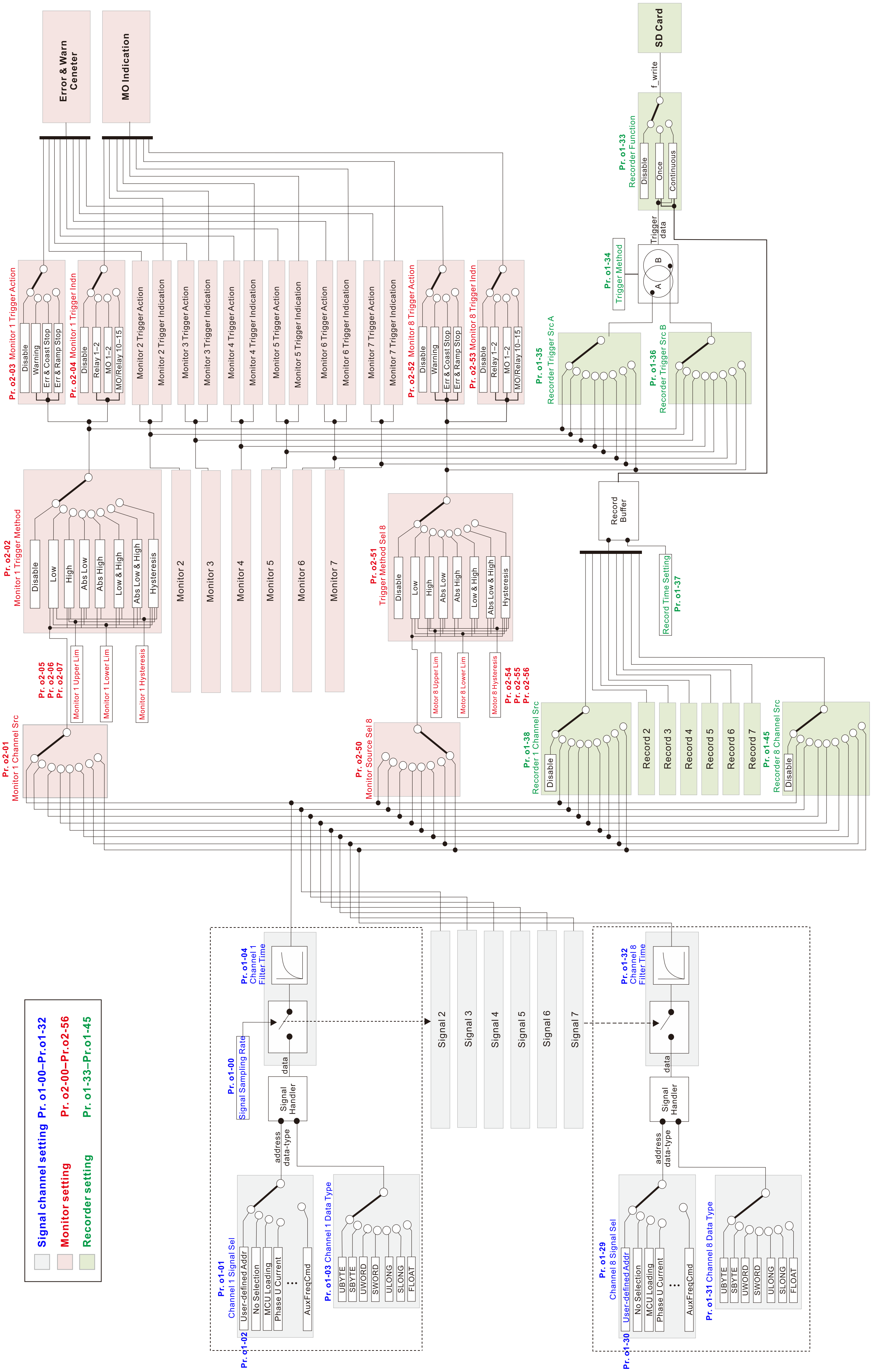
Step 3: The waveform can be recorded after enabling the recorder function*1. Set Pr.o1-33 ≥ 1 to enable the recorder function, set it to 0 to disable the function. The recorder only records once when Pr.o1-33 is set as 1 and the trigger event is established*2. When Pr.o1-33 is set as 2 and the trigger event is established*2, it records multiple times until the capacity of SD card is full or records on a loop.

Step 4: Refer to Chapter 4 for descriptions of reviewing recorder data.

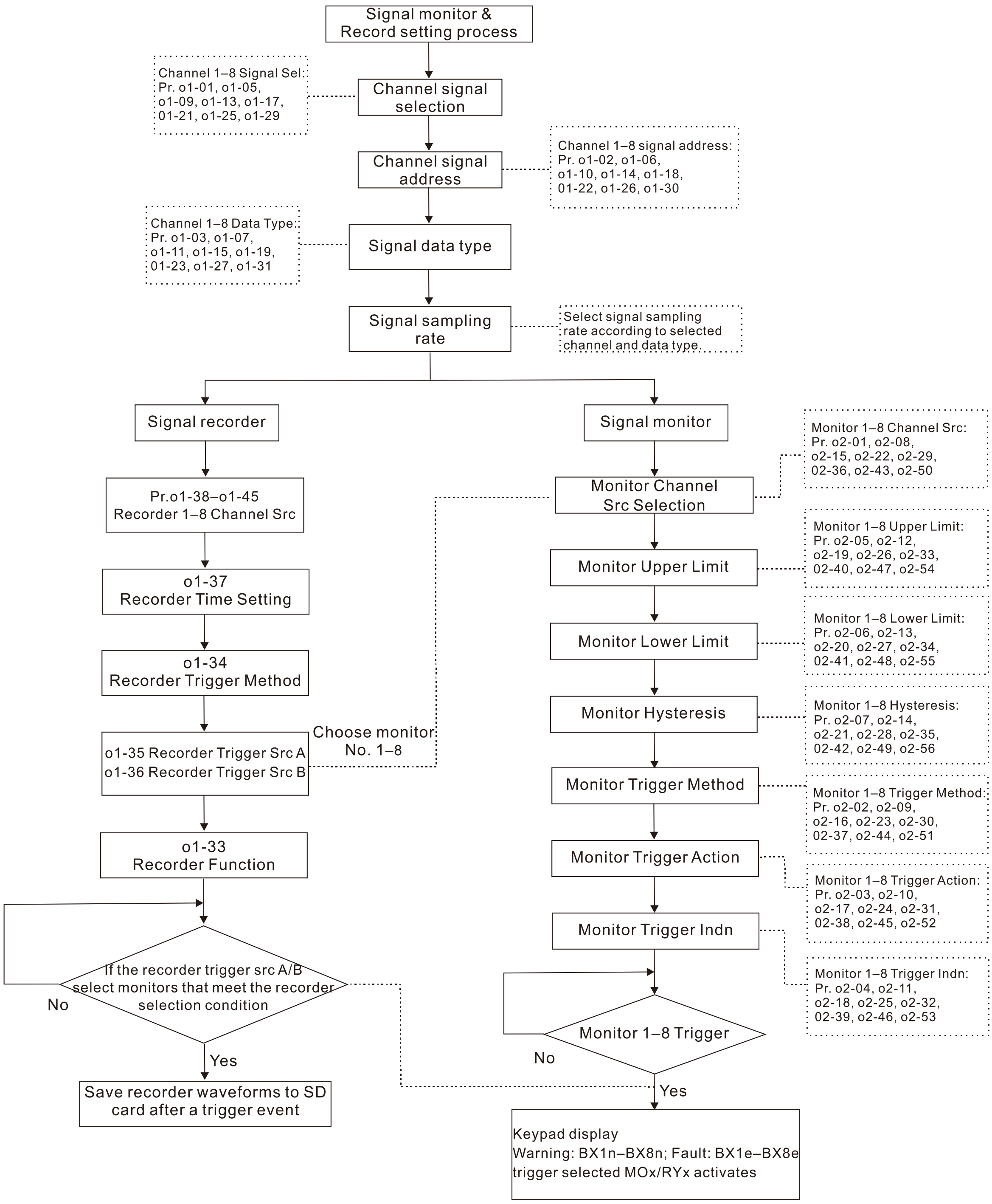
NOTE:

4. The drive automatically configures with the common signal*2 according to the selected motor and control mode, for example, the default channel signals of IMVF and IMFOC are different, refer to the Channel 1 signal table in Pr.o1-01 for further description.
5. The trigger event establishes once a fault occurs to the drive, and that current waveform record is saved in the SD card.

📖 Diagram of channel selection, monitor and recorder function.



📖 Setting process of channel selection, monitor and recorder function:



o1-00 Signal Sampling Rate

(0x1680) Default: 0

Settings 0: 1 kHz
1: 2 kHz
2: 5 kHz
3: 10 kHz

📖 Use this parameter to set the signal sampling rate of the channel. The signal record module can select the appropriate sampling rate for signal sampling.

📖 Due to the limitation of SD card write-in rate and buffer zone, the defined data stream speed of the record is 80 KB/s.

Sampling Rate

Total byte Number	Data Stream	1k	2k	5k	10k
	1	1	2	5	10
	4	4	8	20	40
	8	8	16	40	80
	10	10	20	50	~~100~~
	12	12	24	60	
	14	14	28	70	
	16	16	32	80	
	18	18	36	~~90~~	
	20	20	40		
	22	22	44		
	24	24	48		
	26	26	52		
	28	28	56		
	30	30	60		
	32	32	64		

The data stream in the gray zone is > 80 KB/s, the fool-proof logic prevents parameters from being set to this area.

📖 For example: Pr.o1-00 = 3, 10 kHz

Pr.o1-01 = 31, o1-03 = 5 SLONG (4-byte)

Pr.o1-05 = 39, o1-07 = 2 UWORD (2-byte)

Pr.o1-09 = 33, o1-03 = 6 FLOAT (4-byte)

If setting Pr.o1-38 = 1 (Recorder 1 Source = Channel 1) uses 40 KB/s, Pr.o1-39 = 2 (Recorder 2 Source = Channel 2) uses 20 KB/s, then setting Pr.o1-40 = 3 (Recorder 3 Source = Channel 3) will exceed the limitation of 80 KB/s, Pr.o1-40 will automatically return to 0 (Disable) via the fool-proof mechanism.

	Pr.	ID No.	Description	Data Stream
	o1-00	3	Sampling Rate = 10 kHz	-
Channel 1 Setting	o1-01	31	User Frequency Cmd	-
	o1-03	5 (automatically input)	SLONG (4-byte)	-
Channel 2 Setting	o1-05	39	Motor Ctrl State	-
	o1-07	2 (automatically input)	UWORD (2-byte)	-
Channel 3 Setting	o1-09	33	Speed Reference	-
	o1-11	6 (automatically input)	FLOAT (4-byte)	-
Recorder Setting	o1-38	1	Recorder 1 Source = Channel 1	40 KB/s
	o1-39	2	Recorder 2 Source = Channel 2	60 KB/s
	o1-40	3	Recorder 3 Source = Channel 3	100 KB/s
Fool-proof Logic	o1-40	0 (automatically return)	Recorder 3 Source = OFF	60 KB/s

o1-01 Channel 1 Signal Sel

(0x1681) Default: 18

o1-05 Channel 2 Signal Sel

(0x1685) Default: 6

o1-09 Channel 3 Signal Sel

(0x1689) Default: 31

o1-13 Channel 4 Signal Sel

(0x168D) Default: 34

o1-17 Channel 5 Signal Sel

(0x1692) Default: 11

o1-21 Channel 6 Signal Sel

(0x1697) Default: 24

o1-25 Channel 7 Signal Sel

(0x169C) Default: 3

o1-29 Channel 8 Signal Sel

(0x16A1) Default: 4

Settings 0: Signal Address

1–55 (Number of Signal List)

- 🕮 Pr.o1-01, o1-05, o1-09, o1-13, o1-17, o1-21, o1-25 and o1-29 select the signal of Channel 1–8 (refer to Signal Channel Selection Table).
- 🕮 When Pr.o1-01 = 0, it means that the signal in the channel signal selection table is not used, and the specific signal address can be directly set in Pr.o1-02.
- 🕮 Channel signal selection will list the number of decimal Dn (n represents 1–3 decimal digits) of the monitoring item in each option, for example, when it is set as 3, the signal selection is U Current (%, D2), where D2 represents the U-phase current with 2 decimal digits.
- 🕮 Channel Signal Selection Table:

Channel Signal Selection List (Pr.o1-01, o1-05, o1-09, o1-13, o1-17, o1-21, o1-25, o1-29)			Channel Data Type (Pr.o1-03, o1-07, o1-11, o1-15, o1-19, 01-23, o1-27, o1-31)		Number of Byte
ID No.	Description	Description	Settings	Description	
0	User-defined Address	The signal address corresponds to Pr.o1-02 Channel 1	User inputs	0: UBYTE 1: SBYTE 2: UWORD 3: SWORD 4: ULONG 5: SLONG 6: FLOAT	0
1	No selection	No selection	2 (Pr. auto fill in)	UWORD	2
2	MCU Loading (%, D2)	MCU Loading	2 (Pr. auto fill in)	UWORD	2
3	U Current (%)	U-phase current (Pr.A0-01 as 100%)	3 (Pr. auto fill in)	SWORD	2
4	V Current (%)	V-phase current (Pr.A0-01 as 100%)	3 (Pr. auto fill in)	SWORD	2
5	W Current (%)	W-phase current (Pr.A0-01 as 100%)	3 (Pr. auto fill in)	SWORD	2

Channel Signal Selection List (Pr.o1-01, o1-05, o1-09, o1-13, o1-17, o1-21, o1-25, o1-29)			Channel Data Type (Pr.o1-03, o1-07, o1-11, o1-15, o1-19, 01-23, o1-27, o1-31)		Number of Byte
ID No.	Description	Description	Settings	Description	
6	VBus HBW LPF (V)	DC bus feedback (Cap-less models)	2 (Pr. auto fill in)	UWORD	2
7	VBus SW LPF (V)	DC bus feedback (through the software filter)	2 (Pr. auto fill in)	UWORD	2
8–10	Reserve	Reserve	2 (Pr. auto fill in)	UWORD	2
11	OutputAmp RMS (%, D2)	Output Current (Pr.A0-01 as 100%)	2 (Pr. auto fill in)	UWORD	2
12	OutputAmp RMS LPF (%, D2)	Output Current (Low Pass Filter)	2 (Pr. auto fill in)	UWORD	2
13	Carrier Frequency (Hz)	Carrier Frequency	2 (Pr. auto fill in)	UWORD	2
14	PWM mode (0: SV, 1: DP)	PWM mode	2 (Pr. auto fill in)	UWORD	2
15–17	Reserve	Reserve	3 (Parameter automatically fill in)	SWORD	2
18	Top Fault Code	Fault code	2 (Pr. auto fill in)	UWORD	2
19	Vde Cmd (V, D1)	d-axis voltage command	3 (Pr. auto fill in)	SWORD	2
20	Vqe Cmd (V, D1)	q-axis voltage command	3 (Pr. auto fill in)	SWORD	2
21	Vas Cmd (V, D1)	A-phase voltage command	3 (Pr. auto fill in)	SWORD	2
22	Vbs Cmd (V, D1)	B-phase voltage command	3 (Pr. auto fill in)	SWORD	2
23	Vcs Cmd (V, D1)	C-phase voltage command	3 (Pr. auto fill in)	SWORD	2
24	Output voltage (Vac, D1)	Output voltage	3 (Pr. auto fill in)	SWORD	2
25	Id Reference (A, D2)	d-axis current command	3 (Pr. auto fill in)	SWORD	2
26	Iq Reference (A, D2)	q-axis current command	3 (Pr. auto fill in)	SWORD	2
27	Id Feedback (A, D2)	d-axis current feedback	3 (Pr. auto fill in)	SWORD	2
28	Iq Feedback (A, D2)	q-axis current feedback	3 (Pr. auto fill in)	SWORD	2
29	ACR Bandwidth (Hz)	ACR BW	2 (Pr. auto fill in)	UWORD	2
30	ASR Bandwidth (Hz, D1)	ASR Bandwidth	2 (Pr. auto fill in)	UWORD	2
31	User Frequency Cmd (Hz, D3)	User frequency command (Hz, D3)	5 (Pr. auto fill in)	SLONG	4
32	Speed Reference (Hz, D1)	Speed reference (Hz, D1)	3 (Pr. auto fill in)	SWORD	2
33	Speed Reference (Hz)	Speed reference (Hz)	6 (Pr. auto fill in)	FLOAT	4
34	Output Frequency (Hz, D1)	Output frequency (Hz, D1)	3 (Pr. auto fill in)	SWORD	2
35	Output Frequency (I32, Hz, D2)	Output frequency (I32, Hz, D2)	5 (Pr. auto fill in)	SLONG	4
36	Estimated speed (Hz, D2)	Estimated speed	3 (Pr. auto fill in)	SWORD	2
37	Estimate torque (%, D1)	Estimated torque	3 (Pr. auto fill in)	SWORD	2
38	Reserve	Reserve	2 (Pr. auto fill in)	UWORD	2
39	Motor Ctrl State	Motor control state	2 (Pr. auto fill in)	UWORD	2

Channel Signal Selection List (Pr.o1-01, o1-05, o1-09, o1-13, o1-17, o1-21, o1-25, o1-29)			Channel Data Type (Pr.o1-03, o1-07, o1-11, o1-15, o1-19, 01-23, o1-27, o1-31)		Number of Byte
ID No.	Description	Description	Settings	Description	
40	Apparent power (%, D3)	Apparent power (Pr.d1-01 as 100%)	3 (Pr. auto fill in)	SWORD	2
41	Active power (%, D3)	Active power (Pr.d1-01 as 100%)	3 (Pr. auto fill in)	SWORD	2
42	Reactive power (%, D3)	Reactive power (Pr.d1-01 as 100%)	3 (Pr. auto fill in)	SWORD	2
43	Power factor (D3)	Power factor	3 (Pr. auto fill in)	SWORD	2
44	Power Factor Ang (Deg, D2)	Power factor angle	3 (Pr. auto fill in)	SWORD	2
45	Mi Status	MI status	2 (Pr. auto fill in)	UWORD	2
46	Mo Status	MO status	2 (Pr. auto fill in)	UWORD	2
47	Ai1 ValuePct (%, D2)	AI1 percentage value	2 (Pr. auto fill in)	UWORD	2
48	Ai2 ValuePct (%, D2)	AI2 percentage value	2 (Pr. auto fill in)	UWORD	2
49	Ai3 ValuePct (%, D2)	AI3 percentage value	2 (Pr. auto fill in)	UWORD	2
50	Ao1 ValuePct (%, D2)	AO1 percentage value	2 (Pr. auto fill in)	UWORD	2
51	Ao2 ValuePct (%, D2)	AO2 percentage value	2 (Pr. auto fill in)	UWORD	2
52	Ao10 ValuePct (%, D2)	AO10 percentage value	2 (Pr. auto fill in)	UWORD	2
53	Ao11 ValuePct (%, D2)	AO11 percentage value	2 (Pr. auto fill in)	UWORD	2
54	Main Freq Cmd (Hz, D3)	Main frequency command	5 (Pr. auto fill in)	SLONG	4
55	Aux Freq Cmd (Hz, D3)	Auxiliary frequency command	5 (Pr. auto fill in)	SLONG	4
56–57	Reserve	Reserve	2 (Pr. auto fill in)	UWORD	2
58	CAP NTC Degree (D2)	Capacitor NTC temperature	3 (Pr. auto fill in)	SWORD	2
59	IGBT NTC Max Degree (D2)	IGBT NTC max. temperature	3 (Pr. auto fill in)	SWORD	2

📖 The function defines the setting value according to the selected motor and control mode, you can also change the setting value manually.

📖 When the control mode is set as IMVF/ IMSVC/ SMSVC, the channel signal selection will be automatically set as below. The total number of Byte is 18 and the maximum sampling rate of Pr.o1-00 can only be set as 2 kHz.

Pr.	Pr. Name	Setting Value	Option	Number of Byte
o1-01	Channel 1 Signal Selection	18	Top Fault Code	2
o1-05	Channel 2 Signal Selection	6	VBus HBW LPF (V, D1)	2
o1-09	Channel 3 Signal Selection	31	UserFrequencyCmd (Hz, D3)	4
o1-13	Channel 3 Signal Selection	34	Output Frequency (Hz, D1)	2
o1-17	Channel 4 Signal Selection	11	OutputAmp RMS (%, D2)	2
o1-21	Channel 5 Signal Selection	24	Output voltage (Vac, D1)	2
o1-25	Channel 6 Signal Selection	3	U Current (%)	2
o1-29	Channel 7 Signal Selection	4	V Current (%)	2

📖 When the control mode is set as IMFOC/ SMFOC, the channel signal selection will be automatically set as below. The total number of Byte is 18 and the maximum sampling rate of Pr.o1-00 can only be set as 2 kHz.

Pr.	Pr. Name	Setting Value	Option	Number of Byte
o1-01	Channel 1 Signal Selection	18	Top Fault Code	2
o1-05	Channel 2 Signal Selection	6	VBus HBW LPF (V, D1)	2
o1-09	Channel 3 Signal Selection	31	UserFrequencyCmd (Hz, D3)	4
o1-13	Channel 3 Signal Selection	36	Estimated Speed (Hz, D2)	2
o1-17	Channel 4 Signal Selection	25	Id Reference (A, D2)	2
o1-21	Channel 5 Signal Selection	26	Iq Reference (A, D2)	2
o1-25	Channel 6 Signal Selection	27	Id Feedback (A, D2)	2
o1-29	Channel 7 Signal Selection	28	Iq Feedback (A, D2)	2

o1-02 Channel 1 Signal Address
(0x1682) Default: 0

o1-06 Channel 2 Signal Address
(0x1686) Default: 0

o1-10 Channel 3 Signal Address
(0x168A) Default: 0

o1-14 Channel 4 Signal Address
(0x168E) Default: 0

o1-18 Channel 5 Signal Address
(0x1693) Default: 0

o1-22 Channel 6 Signal Address
(0x1698) Default: 0

o1-26 Channel 7 Signal Address
(0x169D) Default: 0

o1-30 Channel 8 Signal Address
(0x16A2) Default: 0

Settings 0–0xFFFFFFFF

📖 When Channel 1–8 signal selection = 0 “Signal Address”, it means that the signal in the channel signal selection table is not used. You can set the specific signal address through Pr.o1-02, o1-06, o1-10, o1-14, o1-18, o1-22, o1-26 and o1-30.

o1-03 Channel 1 Data Type
(0x1683) Default: 2

o1-07 Channel 2 Data Type
(0x1687) Default: 2

o1-11 Channel 3 Data Type
(0x168B) Default: 5

o1-15 Channel 4 Data Type
(0x168F) Default: 3

o1-19 Channel 5 Data Type
(0x1694) Default: 2

o1-23 Channel 6 Data Type
(0x1699) Default: 3

o1-27 Channel 7 Data Type
(0x169E) Default: 3

o1-31 Channel 8 Data Type
(0x16A3) Default: 3

Settings
0: UBYTE
1: SBYTE
2: UWORD
3: SWORD
4: ULONG
5: SLONG
6: FLOAT

- Pr.o1-03, o1-07, o1-11, o1-15, o1-19, o1-23, o1-27 and o1-31 select the data type of Channel 1–8.
- If Pr.o1-01 is set as VFD default, then Pr.o1-03 automatically writes in the corresponded data type.
- For example: Pr.o1-01 = 11 (output current), Pr.o1-03 automatically writes in 2 (UWORD).

o1-04 Channel 1 Filter Time
(0x1684) Default: 0.0

o1-08 Channel 2 Filter Time
(0x1688) Default: 0.0

o1-12 Channel 3 Filter Time
(0x168C) Default: 0.0

o1-16 Channel 4 Filter Time
(0x1691) Default: 0.0

o1-20 Channel 5 Filter Time
(0x1696) Default: 0.0

o1-24 Channel 6 Filter Time
(0x169B) Default: 0.0

o1-28 Channel 7 Filter Time
(0x16A0) Default: 0.0

o1-32 Channel 8 Filter Time
(0x16A5) Default: 0.0

Settings 0.0–6553.5 ms

- Pr.o1-04, o1-08, o1-12, o1-16, o1-20, o1-24, o1-28, and o1-32 set the low pass filter time of Channel 1–8.

⌿ o1-33 Recorder Function

(0x16A6) Default: 0

Settings 0: Disable

1: One-Time Record

2: Continuously Record

- The recorder function saves data to the SD card. Refer to Section 4-2-1 for precautions before using this function.
- The following table shows the combination of function A, B and C that can be used at the same time, for example, use A, B and C separately as single function, or use function B and C at the same time.
- From the following table, Functions A and C cannot be used at the same time. If you misuse these two functions, it will display the SDih (SD card function exhibited execution) message on the keypad. When you enable Function A, and then enable Function C, the drive executes Function C instead of Function A. If you enable Function C first, Function A will not be allowed to enable.

Function	A	B	C
	Drive – Recorder	Designer Software – Waveform Monitoring	Drive – PLC
Use at the same time	✓	x	x
	x	✓	x
	x	x	✓
	x	✓	✓

- Pr.o1-33 selects the operation method of the continuously record or the one-time record.
- Continuously record: When the trigger condition is established, the signal data will be continuously written to the SD card according to the sampling frequency and record length set at that time.
- One-time record: Only records the data within a specific time range before and after the trigger event occurs (set by Pr.o1-37) to the SD card. When the one-time record completes, the parameter automatically returns to 0.
- When you enable the recorder function (Pr.o1-33 ≥ 1) after the drive starts:
  - If none of the trigger event occurs before the drive is powered off, the recorder function will be automatically enabled in the next bootup.
  - If any of the trigger event occurs before the drive is powered off:
    Pr.o1-33 = 1 (One-time record), the recorder function will not be enabled in the next bootup.
    Pr.o1-33 = 2 (Continuously record), the recorder function will automatically enable in the next bootup. It stops operation when you disable the recorder function (Pr.o1-33 = 0).
- When the recorder function is enabled (Pr.o1-33 ≥ 1), if you need to change the original setting 1 (One-time record) to 2 (Continuously record), you must disable the function before changing the setting. The setting sequence of Pr.o1-33 would be 1 (One-time record) → 0 (Disable) → 2 (Continuously record).

o1-34 Recorder Trigger Method

(0x16A7) Default: 0

Settings 0: Src A

1: Src A Reverse

2: Src A and Src B

3: Src A or Src B

4: Src A xor Src B

- Use Pr.o1-34 to select the trigger method of the recorder.
- For example: Pr.o1-34 = 2 (Source A and source B), when the monitoring conditions selected in Pr.o1-35 and o1-36 are triggered, the recorder function records the waveform to the SD card according to Pr.o1-33 and o1-37 settings.

o1-35 Recorder Trigger Src A

(0x16A8) Default: 1

o1-36 Recorder Trigger Src B

(0x16AA) Default: 1

Settings 1–8 Monitor No.

- Pr.o1-35 and o1-36 set the monitor of source A and source B respectively.

✓ o1-37 Recorder Time Setting

(0x16AB) Default: 20

Settings 20–600 sec.

- The user can specify the recording data length when triggering: the recording length before triggering is determined by Pr.o1-37, and the recording length after the triggering is always 20 seconds.

o1-38 Recorder 1 Channel Src

(0x16AC) Default: 0

o1-39 Recorder 2 Channel Src

(0x16AD) Default: 0

o1-40 Recorder 3 Channel Src

(0x16AF) Default: 0

o1-41 Recorder 4 Channel Src

(0x16B0) Default: 0

o1-42 Recorder 5 Channel Src

(0x16B1) Default: 0

o1-43 Recorder 6 Channel Src

(0x16B2) Default: 0

o1-44 Recorder 7 Channel Src

(0x16B4) Default: 0

o1-45 Recorder 8 Channel Src

(0x16B5) Default: 0

Settings 0–8 Channel No.

- Pr.o1-38–o1-44 select the channel source of recorder 1–8.

o2. Monitor Function

o2-00 Monitor Trigger Status

(0x16C0) Default: Read only

Settings 0–0x00FF

📖 This parameter displays the trigger status of Monitor 1–8. bit0–bit7 correspond to Monitor 1–8 respectively.

📖 For example: Pr.o2-00 = 0000 0000 0000 0001, it means that the signal of Monitor 1 reaches the Monitor 1 trigger condition set in Pr.o2-02.

o2-01 Monitor 1 Channel Src

(0x16C1) Default: 1

o2-08 Monitor 2 Channel Src

(0x16CB) Default: 2

o2-15 Monitor 3 Channel Src

(0x16D5) Default: 3

o2-22 Monitor 4 Channel Src

(0x16DF) Default: 4

o2-29 Monitor 5 Channel Src

(0x16E9) Default: 5

o2-36 Monitor 6 Channel Src

(0x16F3) Default: 6

o2-43 Monitor 7 Channel Src

(0x16FD) Default: 7

o2-50 Monitor 8 Channel Src

(0x1707) Default: 8

Settings 1–8 Channel No.

📖 Pr.o2-01, o2-08, o2-15, o2-22, o2-29, o2-36, o2-43, and o2-50 select the signal channel source of Monitor 1–8.

o2-02 Monitor 1 Trigger Method

(0x16C2) Default: 2

o2-09 Monitor 2 Trigger Method

(0x16CC) Default: 0

o2-16 Monitor 3 Trigger Method

(0x16D6) Default: 0

o2-23 Monitor 4 Trigger Method

(0x16E0) Default: 0

o2-30 Monitor 5 Trigger Method

(0x16EA) Default: 0

o2-37 Monitor 6 Trigger Method

(0x16F4) Default: 0

o2-44 Monitor 7 Trigger Method

(0x16FE) Default: 0

o2-51 Monitor 8 Trigger Method

(0x1708) Default: 0

Settings 0: Disable
1: Low
2: High
3: Abs Low
4: Abs High
5: Low & High
6: Abs Low & Abs High
7: Hysteresis

- Pr.o2-02, o2-09, o2-16, o2-23, o2-30, o2-37, o2-44, and o2-51 select the trigger method of Monitor 1–8.
- Trigger action and non-action conditions:

Trigger method = 1 Low:

Action condition: the signal selected by the monitor is lower than [the monitor lower limit – (0.5 × hysteresis)].

Non-action condition: the signal selected by the monitor is higher than [the monitor lower limit + (0.5 × hysteresis)].

Trigger method = 2 High:

Action condition: the signal selected by the monitor is higher than [the monitor upper limit + (0.5 × hysteresis)].

Non-action condition: the signal selected by the monitor is lower than [the monitor upper limit – (0.5 × hysteresis)].

Trigger method = 3 Abs Low:

Action condition: the absolute value of signal selected by the monitor is lower than the absolute value of [the monitor lower limit – (0.5 × hysteresis)].

Non-action condition: the absolute value of signal selected by the monitor is higher than the absolute value of [the monitor lower limit + (0.5 × hysteresis)].

Trigger method = 4 Abs High:

Action condition: the absolute value of signal selected by the monitor is higher than the absolute value of [the monitor upper limit + (0.5 × hysteresis)].

Non-action condition: the absolute value of signal selected by the monitor is lower than the absolute value of [the monitor upper limit – (0.5 × hysteresis)].

Trigger method = 5 Low & High:

Action condition: the signal selected by the monitor is higher than [the monitor upper limit + (0.5 × hysteresis)] or lower than [the monitor lower limit – (0.5 × hysteresis)].

Non-action condition: the signal selected by the monitor is between [the monitor upper limit – (0.5 × hysteresis)] and [the monitor lower limit + (0.5 × hysteresis)].

Trigger method = 6 Abs Low & Abs High:

Action condition: the absolute value of signal selected by the monitor is higher than the absolute value of [the monitor upper limit + (0.5 × hysteresis)] or lower than the absolute value of [the monitor lower limit – (0.5 × hysteresis)].

Non-action condition: the absolute value of signal selected by the monitor is between the absolute value of [the monitor upper limit – (0.5 × hysteresis)] and [the monitor lower limit + (0.5 × hysteresis)].

Trigger method = 7 Hysteresis:

Action condition: the signal selected by the monitor is higher than [the monitor upper limit + (0.5 × hysteresis)].

When the signal is between [the monitor upper limit + (0.5 × hysteresis)] and [the monitor lower limit – (0.5 × hysteresis)], the action status remains.

Non-action condition: the signal selected by the monitor is lower than [the monitor lower limit – (0.5 × hysteresis)].

📖 For example: Pr.o1-01 = 93 (Capacitor NTC temperature), Pr.o2-01 = 1 (Channel 1), Pr.o2-02 = 2 (high), Pr.o2-05 = +100.00 and Pr.o2-07 = 2.00.

Action condition: the signal selected by the monitor is higher than [the monitor upper limit + (0.5 × hysteresis)].

The signal is higher than 100.00 + (0.5×2.00) = 100.00 + 1.00 = 101.00

Non-action condition: the signal selected by the monitor is lower than [the monitor upper limit – (0.5 × hysteresis)].

The signal is lower than 100.00 – (0.5×2.00) = 100.00 – 1.00 = 99.00

o2-03 Monitor 1 Trigger Action

(0x16C3) Default: 0

o2-10 Monitor 2 Trigger Action

(0x16CD) Default: 0

o2-17 Monitor 3 Trigger Action

(0x16D7) Default: 0

o2-24 Monitor 4 Trigger Action

(0x16E1) Default: 0

o2-31 Monitor 5 Trigger Action

(0x16EB) Default: 0

o2-38 Monitor 6 Trigger Action

(0x16F5) Default: 0

o2-45 Monitor 7 Trigger Action

(0x16FF) Default: 0

o2-52 Monitor 8 Trigger Action

(0x1709) Default: 0

Settings 0: Disable

1: Warning

2: Fault & ramp to stop

3: Fault & coast to stop

📖 Pr.o2-03, o2-10, o2-17, o2-24, o2-31, o2-38, o2-45 and o2-52 respectively set the trigger action of the monitor selected in o2-01, o2-08, o2-15, o2-22, o2-29, o2-36, o2-43 and o2-50.

o2-04 Monitor 1 Trigger Indn

(0x16C4) Default: 0

o2-11 Monitor 2 Trigger Indn

(0x16CE) Default: 0

o2-18 Monitor 3 Trigger Indn

(0x16D8) Default: 0

o2-25 Monitor 4 Trigger Indn

(0x16E2) Default: 0

o2-32 Monitor 5 Trigger Indn

(0x16EC) Default: 0

o2-39 Monitor 6 Trigger Indn

(0x16F6) Default: 0

o2-46 Monitor 7 Trigger Indn

(0x1700) Default: 0

o2-53 Monitor 8 Trigger Indn

(0x170A) Default: 0

Settings 0: Disable

1–2: Relay1–Relay2

3–4: MO1–MO2

5–9: Reserved

10–15: MO/Relay10–15

16–19: Reserved

📖 After the monitor selected in Pr.o2-01, o2-08, o2-15, o2-22, o2-29, o2-36, o2-43, and o2-50 is triggered, the terminal contact selected in o2-04, o2-11, o2-18, o2-25, o2-32, o2-39, o2-46, and o2-53 activates respectively.

o2-05 Monitor 1 Upper Limit

(0x16C5) Default: 0.00

o2-12 Monitor 2 Upper Limit

(0x16CF) Default: 0.00

o2-19 Monitor 3 Upper Limit

(0x16D9) Default: 0.00

o2-26 Monitor 4 Upper Limit

(0x16E3) Default: 0.00

o2-33 Monitor 5 Upper Limit

(0x16ED) Default: 0.00

o2-40 Monitor 6 Upper Limit

(0x16F7) Default: 0.00

o2-47	Monitor 7 Upper Limit	
(0x1701)		Default: 0.00
o2-54	Monitor 8 Upper Limit	
(0x170B)		Default: 0.00
	Settings -21474836.00–21474836.00	

📖 Pr.o2-05, o2-12, o2-19, o2-26, o2-33, o2-40, o2-47, and o2-54 set the upper limit of Monitor 1–8 respectively.

o2-06	Monitor 1 Lower Limit	
(0x16C7)		Default: 0.00
o2-13	Monitor 2 Lower Limit	
(0x16D1)		Default: 0.00
o2-20	Monitor 3 Lower Limit	
(0x16DB)		Default: 0.00
o2-27	Monitor 4 Lower Limit	
(0x16E5)		Default: 0.00
o2-34	Monitor 5 Lower Limit	
(0x16EF)		Default: 0.00
o2-41	Monitor 6 Lower Limit	
(0x16F9)		Default: 0.00
o2-48	Monitor 7 Lower Limit	
(0x1703)		Default: 0.00
o2-55	Monitor 8 Lower Limit	
(0x170D)		Default: 0.00
	Settings -21474836.00–21474836.00	

📖 Pr.o2-06, o2-13, o2-20, o2-27, o2-34, o2-40, o2-48, and o2-55 set the lower limit of Monitor 1–8 respectively.

o2-07	Monitor 1 Hysteresis	
(0x16C9)		Default: 0.00
o2-14	Monitor 2 Hysteresis	
(0x16D3)		Default: 0.00
o2-21	Monitor 3 Hysteresis	
(0x16DD)		Default: 0.00
o2-28	Monitor 4 Hysteresis	
(0x16E7)		Default: 0.00
o2-35	Monitor 5 Hysteresis	
(0x16F1)		Default: 0.00
o2-42	Monitor 6 Hysteresis	
(0x16FB)		Default: 0.00
o2-49	Monitor 7 Hysteresis	
(0x1705)		Default: 0.00

o2-56 Monitor 8 Hysteresis

(0x170F) Default: 0.00

Settings 0.00–100000.00

📖 Pr.o2-07, o2-14, o2-21, o2-28, o2-35, o2-40, o2-49, and o2-56 set the hysteresis of Monitor 1–8 respectively.

o3. PDM Function

For the life estimation of the AC motor drive key components, it includes the life of fans, capacitors, IGBTs, relays, etc. When the remaining life of any key component is lower than the set value, the specified output terminal acts as an indication.

o3-00 Component Life Status

(0x1740) Default: 0000h

Settings bit0: IGBT Life
bit1: DC bus Cap Life
bit2: PB Cap Life
bit3: Fan Life
bit4: PB Relay Life
bit5: IO Relay 1 Life
bit6: IO Relay 2 Life
bit7: Fan Spd Fdb 1
bit8: Fan Spd Fdb 2
bit9: Fan Spd Fdb 3

- This parameter represents whether the service life of each main component is lower than the set level. bitx = 1 means the service life of that component is lower than the set level. The user can know whether the service life of each component is abnormal from Pr.o3-00.
- For example: Pr.o3-00 = 0001h means that the service life of IGBT is lower than the set value in Pr.o3-09.
- When the service life of component is abnormal, the keypad displays status code PD01–10 (not warning codes). For example: when the keypad displays PD01, it means that the IGBT life is abnormal.
- bit7–9 are the feedback signals of fan 1–3 respectively. The software controls the comparison between the fan speed and the actual feedback speed. When the error between the above two speeds exceeds 20%, the status of bit7–9 changes from 0 to 1.
- Fan 1: the fan installed in the external fan position 1.
  Fan 2: the fan installed in the external fan position 2.
  Fan 1: the fan installed in the internal fan position 1.

✓ o3-01 Component Life Lower than Level Indn

(0x1741) Default: 0

Settings 0: Disable
1–2: Relay 1–2
3–4: MO1–MO2
5–9: Reserved
10–15: MO/Relay 10–15

- When the service life of any component is lower than the set level, the terminal contact selected in Pr.o3-01 activates.

o3-02 IGBT Life

(0x1742) Default: 100.00

Settings 0.00–100.00%

📖 This parameter displays the current life estimation of IGBT.

o3-03 DC bus Cap Life

(0x1743) Default: 100.00

Settings 0.00–100.00%

📖 This parameter displays the current life estimation of DC bus capacitor.

o3-04 PB Cap Life

(0x1744) Default: 100.00

Settings 0.00–100.00%

📖 This parameter displays the current life estimation of power board capacitor.

o3-05 Fan Life

(0x1745) Default: 100.00

Settings 0.00–100.00%

📖 This parameter displays the current life estimation of fan.

o3-06 PB Relay Life

(0x1746) Default: 100.00

Settings 0.00–100.00%

📖 This parameter displays the current life estimation of power relay.

o3-07 IO Relay1 Life

(0x1747) Default: 100.00

Settings 0.00–100.00%

📖 This parameter displays the current life estimation of power board relay 1.

o3-08 IO Relay2 Life

(0x1748) Default: 100.00

Settings 0.00–100.00%

📖 This parameter displays the current life estimation of power board relay 2.

o3-09 IGBT Life Warring Level

(0x1749) Default: 10.00

Settings 0.00–100.00%

📖 When the service life of IGBT is lower than the setting for Pr.o3-09, Pr.o3-00 bit0 = 1.

o3-10 DC bus Cap Life Warring Level

(0x174A) Default: 10.00

Settings 0.00–100.00%

📖 When the service life of DC bus capacitor is lower than the setting for Pr.o3-10, Pr.o3-00 bit1=1.

o3-11 PB Cap Life Warring Level

(0x174B) Default: 10.00

Settings 0.00–100.00%

📖 When the service life of PB capacitor is lower than the setting for Pr.o3-11, Pr.o3-00 bit2 = 1.

o3-12 Fan Life Warring Level

(0x174C) Default: 10.00

Settings 0.00–100.00%

📖 When the service life of fan is lower than the setting for Pr.o3-12, Pr.o3-00 bit3 = 1.

o3-13 PB Relay Life Warring Level

(0x174D) Default: 10.00

Settings 0.00–100.00%

📖 When the service life of power relay is lower than the setting for Pr.o3-13, Pr.o3-00 bit4 = 1.

o3-14 IO Relay 1 Life Warring Level

(0x174E) Default: 10.00

Settings 0.00–100.00%

📖 When the service life of IO relay 1 is lower than the setting for Pr.o3-14, Pr.o3-00 bit5 = 1.

o3-15 IO Relay 2 Life Warring Level

(0x174F) Default: 10.00

Settings 0.00–100.00%

📖 When the service life of IO relay 2 is lower than the setting for Pr.o3-15, Pr.o3-00 bit6 = 1.

o3-16 System Life

(0x1750) Default: 100.00

Settings 0.00–100.00%

📖 This parameter displays the percentage of the remaining service life of the drive.

∗ o3-18 Estimated Life Remains

(0x1752) Default: 0.0

Settings 0.0–6553.5 days

📖 The remaining life of the system is estimated based on the minimum remaining life of the key components and the system running time.

📖 Average daily consumption rate = (100% – system life display) ÷ (system operating time), use this value to calculate the remaining life. Remaining life = existing life ÷ average daily consumption rate.

For example: Pr.o3-15 = 300 days, Pr.o3-14 = 70%

The average daily consumption (100% – 70%) ÷ 300 = 0.1% Life

The life remains = 70% ÷ 0.1% = 700 (day) o4. Fault Record 1–2

o4-00 Fault Code REC 1

(0x1780) Default: Read only

o4-19 Fault Code REC 2

(0x1793) Default: Read only

Settings
0: No fault record
1: Over-current during acceleration (ocA)
2: Over-current during deceleration (ocd)
3: Over-current during steady operation (ocn)
4: Ground fault (GFF)
5: IGBT short circuit between upper bridge and lower bridge (occ)
6: Over-current at stop (ocS)
7: Over-voltage during acceleration (ovA)
8: Over-voltage during deceleration (ovd)
9: Over-voltage at constant speed (ovn)
10: Over-voltage at stop (ovS)
11: Low-voltage during acceleration (LvA)
12: Low-voltage during deceleration (Lvd)
13: Low-voltage at constant speed (Lvn)
15: Phase loss protection (OrP)
16: IGBT overheating (oH1)
17: Capacitor overheating (oH2)
18: IGBT temperature detection failure (tH1o)
19: Capacitor hardware error (tH2o)
21: Over load (oL)
22: Electronic thermal relay 1 protection (EoL1)
23: Electronic thermal relay 2 protection (EoL2)
24: Motor overheating (oH3) PTC / KTY84 / PT100 / PT1000 (oH3)
25: Interrupt error (INTR)
26: Over-torque 1 (ot1)
27: Over-torque 2 (ot2)
28: Under current (uC)
30: EEPROM write error (cF1)
31: EEPROM read error (cF2)
32: EEPROM Error (cF3)
33: U-phase error (cd1)
34: V-phase error (cd2)
35: W-phase error (cd3)
37: oc hardware error (Hd1)
39: oc hardware error (Hd3)
40: Auto-tuning error (AUE)
48: AI1 loss (ACE)

49: External fault (EF)
50: Emergency stop (EF1)
52: Password is locked (Pcod)
58: Modbus transmission time-out (CE10)
61: Y-connection/ D-connection switch error (ydc)
63: Over slip error (oSL)
68: Reverse direction of the speed feedback (SdRv)
69: Over speed rotation feedback (SdOr)
70: Large deviation of speed feedback (SdDe)
71: Watchdog (WDTT)
72: STO Loss 1 (STL1)
76: Safe torque off (STO)
77: STO Loss 2 (STL2)
79: Safe torque off 1 (STO1)
80: Safe torque off 2 (STO2)
82: Output phase loss U phase (OPHL)
83: Output phase loss V phase (OPHL)
84: Output phase loss W phase (OPHL)
87: Overload protection at low frequency (oL3)
88: Model ID change (IDCH)
89: Rotor position detection error (RoPd)
94: Initializing power board communication error when power ON (POCF)
95: Board identification error during power-on initialization (IDDE)
96: Power board communication error (PMCF)
97: AI2 loss (ACE)
98: AI3 loss (ACE)
99: AI10 loss (ACE)
100: AI11 loss (ACE)
101: CANopen guarding error (CGdE)
102: CANopen heartbeat error (CHbE)
104: CANopen bus off error (CbFE)
114: ECAP models over voltage (ECOV)
115: ECAP models over voltage (ECOV)
118: Monitor signal 1 trigger (BX1e)
119: Monitor signal 2 trigger (BX2e)
120: Monitor signal 3 trigger (BX3e)
121: Monitor signal 4 trigger (BX4e)
122: Monitor signal 5 trigger (BX5e)
123: Monitor signal 6 trigger (BX6e)
124: Monitor signal 7 trigger (BX7e)
125: Monitor signal 8 trigger (BX8e)
132: Under load protection (ULD)

133: Overload protection (OLD)
134: Electronic thermal relay 3 protection (EOL3)
135: Electronic thermal relay 4 protection (EOL4)
142: Auto-tune error (AUE1)
143: Auto-tune error (AUE2)
144: Auto-tune error (AUE3)
148: Auto-tune error (AUE4)
149: Auto-tune error (AUE5)
150: Auto-tune error (AUE6)
151: Auto-tune error (AUE7)
152: Auto-tune error (AUE8)
153: Auto-tune error (AUE9)
154: Auto-tune error (AUE10)
155: Auto-tune error (AUE11)
156: Auto-tune error (AUE12)
213: Protection initialization error (ThIF)
214: Power-on process initialization time-out (POTO)
300: Large amount leakage error (LEKE)
301: High pressure error (HPS)
302: Low pressure error (LPSE)
303: Dry pump error (dryE)
304: Dry pump auto-tune error (dAUE)
305: Pipe blockage (JAME)
306: ExCOM card break (ECCb)
307: Communication time-out (ECto)

📖 This parameter displays the Fault Record 1–2.

o4-01 OPER Time at Fault REC 1

(0x1781) Default: Read only

Settings 0–2359 hours/ minutes

o4-02 OPER Days at Fault REC 1

(0x1782) Default: Read only

Settings 0–65535 days

o4-20 OPER Time at Fault REC 2

(0x1794) Default: Read only

Settings 0–2359 hours/ minutes

o4-21 OPER Days at Fault REC 2

(0x1795) Default: Read only

Settings 0–65535 days

📖 Pr.o4-01 and o4-02 display the accumulative operation time of the drive at “Fault record 1”; Pr.o4-20 and o4-21 display the accumulative operation time of the drive at “Fault record 2”.

📖 For example: Pr.o4-01 = 2129, o4-02 = 234, the accumulative operation time of the drive at

"Fault record 1" is 234 days 21 hours and 29 minutes.

o4-03 Date of Fault REC 1

(0x1783) Default: Read only

Settings 0–1231 month/day

o4-04 Time of Fault REC 1

(0x1784) Default: Read only

Settings 0–2359 hours/ minutes

o4-22 Date of Fault REC 2

(0x1796) Default: Read only

Settings 0–1231 month/day

o4-23 Time of Fault REC 2

(0x1797) Default: Read only

Settings 0–2359 hours/ minutes

- Pr.o4-03 and o4-04 display the time of "Fault record 1"; Pr.o4-22 and o4-23 display the time of "Fault record 2".
- For example: Pr.o4-03 = 0509, o4-04 = 1834, "Fault record 1" occurs at 18:34 on May 9th.

o4-05 FREQ Cmd at Fault REC 1

(0x1785) Default: Read only

Settings 0.00–599.00

o4-24 FREQ Cmd at Fault REC 2

(0x1798) Default: Read only

Settings 0.00–599.00 Hz

- Displays the frequency command at Fault record 1–2.

o4-06 Output FREQ at Fault REC 1

(0x1786) Default: Read only

Settings 0.00–599.00

o4-25 Output FREQ at Fault REC 2

(0x1799) Default: Read only

Settings 0.00–599.00 Hz

- Displays the output frequency at Fault record 1–2.

o4-07 Output Current at Fault REC 1

(0x1787) Default: Read only

Settings 0.0–6553.5 A

o4-26 Output Current at Fault REC 2

(0x179A) Default: Read only

Settings 0.0–6553.5 A

- Displays the output current at Fault record 1–2.

o4-08 Output Voltage at Fault REC 1

(0x1788) Default: Read only

Settings 0.0–6553.5 V_{DC}

o4-27 Output Voltage at Fault REC 2

(0x179B) Default: Read only

Settings 0.0–6553.5 V_{DC}

📖 Displays the output voltage at Fault record 1–2.

o4-09 DC bus at Fault REC 1

(0x1789) Default: Read only

Settings 0.0–6553.5 V_{DC}

o4-28 DC bus at Fault REC 2

(0x179C) Default: Read only

Settings 0.0–6553.5 V_{DC}

📖 Displays the DC bus voltage at Fault record 1–2.

o4-10 IGBT Temp at Fault REC 1

(0x178A) Default: Read only

Settings -3276.8–3276.7°C

o4-29 IGBT Temp at Fault REC 2

(0x179D) Default: Read only

Settings -3276.8–3276.7°C

📖 Displays the IGBT temperature at Fault record 1–2.

o4-11 Cap Temp at Fault REC 1

(0x178B) Default: Read only

Settings -3276.8–3276.7°C

o4-30 Cap Temp at Fault REC 2

(0x179E) Default: Read only

Settings -3276.8–3276.7°C

📖 Displays the capacitor temperature at Fault record 1–2.

o4-12 Fan Speed at Fault REC 1

(0x178C) Default: Read only

Settings 0–65535 rpm

o4-31 Fan Speed at Fault REC 2

(0x179F) Default: Read only

Settings 0–65535 rpm

📖 Displays the fan speed at Fault record 1–2.

o4-13 Motor Speed at Fault REC 1

(0x178D) Default: Read only

Settings 0–65535 rpm

o4-32 Motor Speed at Fault REC 2

(0x17A0) Default: Read only

Settings 0–65535 rpm

- Displays the motor speed at Fault record 1–2.

o4-15 Output Torque at Fault REC 1

(0x178F) Default: Read only

Settings 0.0–6553.5%

o4-34 Output Torque at Fault REC 2

(0x17A2) Default: Read only

Settings 0.0–6553.5%

- Displays the output torque at Fault record 1–2.
- The motor rated torque is 100%.

o4-16 MI Status at Fault REC 1

(0x1790) Default: Read only

Settings 0000h–FFFFh

o4-35 MI Status at Fault REC 2

(0x17A3) Default: Read only

Settings 0000h–FFFFh

- Displays the MI status at Fault record 1–2.

o4-17 MO/Rly Status at Fault REC 1

(0x1791) Default: Read only

Settings 0000h–FFFFh

o4-36 MO/Rly Status at Fault REC 2

(0x17A4) Default: Read only

Settings 0000h–FFFFh

- Displays the MO status at Fault record 1–2.

o4-18 Drive Status at Fault REC 1

(0x1792) Default: Read only

Settings 0000h–FFFFh

o4-37 Drive Status at Fault REC 2

(0x17A5) Default: Read only

Settings 0000h–FFFFh

- Displays the drive status at Fault record 1–2.

o5. Fault Record 3–4

o5-00 Fault Code REC 3
(0x17C0) Default: Read only

Settings 0–65535

o5-01 OPER Time at Fault REC 3
(0x17C1) Default: Read only

Settings 0–2359 hours/ minutes

o5-02 OPER Days at Fault REC 3
(0x17C2) Default: Read only

Settings 0–65535 days

o5-03 Date of Fault REC 3
(0x17C3) Default: Read only

Settings 0–1231 month/day

o5-04 Time of Fault REC 3
(0x17C4) Default: Read only

Settings 0–2359 hours/ minutes

o5-05 FREQ Cmd at Fault REC 3
(0x17C5) Default: Read only

Settings 0.00–599.00 Hz

o5-06 Output FREQ at Fault REC 3
(0x17C6) Default: Read only

Settings 0.00–599.00 Hz

o5-07 Output Current at Fault REC 3
(0x17C7) Default: Read only

Settings 0.0–6553.5 A

o5-08 Output Voltage at Fault REC 3
(0x17C8) Default: Read only

Settings 0.0–6553.5 V_{DC}

o5-09 DC bus at Fault REC 3
(0x17C9) Default: Read only

Settings 0.0–6553.5 V_{DC}

o5-10 IGBT Temp at Fault REC 3
(0x17CA) Default: Read only

Settings -3276.8–3276.7°C

o5-11 Cap Temp at Fault REC 3
(0x17CB) Default: Read only

Settings -3276.8–3276.7°C

o5-12 Fan Speed at Fault REC 3
(0x17CC) Default: Read only

Settings 0–65535 rpm

o5-13	Motor Speed at Fault REC 3	
(0x17CD)		Default: Read only
	Settings 0–65535 rpm	
o5-15	Output Torque at Fault REC 3	
(0x17CF)		Default: Read only
	Settings 0.0–6553.5%	
o5-16	MI Status at Fault REC 3	
(0x17D0)		Default: Read only
	Settings 0000h–FFFFh	
o5-17	MO/Rly Status at Fault REC 3	
(0x17D1)		Default: Read only
	Settings 0000h–FFFFh	
o5-18	Drive Status at Fault REC 3	
(0x17D2)		Default: Read only
	Settings 0000h–FFFFh	
o5-19	Fault Code REC 4	
(0x17D3)		Default: Read only
	Settings 0–65535	
o5-20	OPER Time at Fault REC 4	
(0x17D4)		Default: Read only
	Settings 0–2359 hours/ minutes	
o5-21	OPER Days at Fault REC 4	
(0x17D5)		Default: Read only
	Settings 0–65535 days	
o5-22	Date of Fault REC 4	
(0x17D6)		Default: Read only
	Settings 0–1231 month/day	
o5-23	Time of Fault REC 4	
(0x17D7)		Default: Read only
	Settings 0–2359 hours/ minutes	
o5-24	FREQ Cmd at Fault REC 4	
(0x17D8)		Default: Read only
	Settings 0.00–599.00 Hz	
o5-25	Output FREQ at Fault REC 4	
(0x17D9)		Default: Read only
	Settings 0.00–599.00 Hz	
o5-26	Output Current at Fault REC 4	
(0x17DA)		Default: Read only
	Settings 0.0–6553.5 A	

o5-27 Output Voltage at Fault REC 4
(0x17DB) Default: Read only

Settings 0.0–6553.5 V_{DC}

o5-28 DC bus at Fault REC 4
(0x17DC) Default: Read only

Settings 0.0–6553.5 V_{DC}

o5-29 IGBT Temp at Fault REC 4
(0x17DD) Default: Read only

Settings -3276.8–3276.7°C

o5-30 Cap Temp at Fault REC 4
(0x17DE) Default: Read only

Settings -3276.8–3276.7°C

o5-31 Fan Speed at Fault REC 4
(0x17DF) Default: Read only

Settings 0–65535 rpm

o5-32 Motor Speed at Fault REC 4
(0x17E0) Default: Read only

Settings 0–65535 rpm

o5-34 Output Torque at Fault REC 4
(0x17E2) Default: Read only

Settings 0.0–6553.5%

o5-35 MI Status at Fault REC 4
(0x17E3) Default: Read only

Settings 0000h–FFFFh

o5-36 MO/Rly Status at Fault REC 4
(0x17E4) Default: Read only

Settings 0000h–FFFFh

o5-37 Drive Status at Fault REC 4
(0x17E5) Default: Read only

Settings 0000h–FFFFh

📖 Refer to description of Parameter Group o4.

o6. Fault Record 5–6

o6-00 Fault Code REC 5
(0x1800) Default: Read only

Settings 0–65535

o6-01 OPER Time at Fault REC 5
(0x1801) Default: Read only

Settings 0–2359 hours/ minutes

o6-02 OPER Days at Fault REC 5
(0x1802) Default: Read only

Settings 0–65535 days

o6-03 Date of Fault REC 5
(0x1803) Default: Read only

Settings 0–1231 month/day

o6-04 Time of Fault REC 5
(0x1804) Default: Read only

Settings 0–2359 hours/ minutes

o6-05 FREQ Cmd at Fault REC 5
(0x1805) Default: Read only

Settings 0.00–599.00 Hz

o6-06 Output FREQ at Fault REC 5
(0x1806) Default: Read only

Settings 0.00–599.00 Hz

o6-07 Output Current at Fault REC 5
(0x1807) Default: Read only

Settings 0.0–6553.5 A

o6-08 Output Voltage at Fault REC 5
(0x1808) Default: Read only

Settings 0.0–6553.5 V_{DC}

o6-09 DC bus at Fault REC 5
(0x1809) Default: Read only

Settings 0.0–6553.5 V_{DC}

o6-10 IGBT Temp at Fault REC 5
(0x180A) Default: Read only

Settings -3276.8–3276.7°C

o6-11 Cap Temp at Fault REC 5
(0x180B) Default: Read only

Settings -3276.8–3276.7°C

o6-12 Fan Speed at Fault REC 5
(0x180C) Default: Read only

Settings 0–65535 rpm

o6-13 Motor Speed at Fault REC 5

(0x180D) Default: Read only

Settings 0–65535 rpm

o6-15 Output Torque at Fault REC 5

(0x180F) Default: Read only

Settings 0.0–6553.5%

o6-16 MI Status at Fault REC 5

(0x1810) Default: Read only

Settings 0000h–FFFFh

o6-17 MO/Rly Status at Fault REC 5

(0x1811) Default: Read only

Settings 0000h–FFFFh

o6-18 Drive Status at Fault REC 5

(0x1812) Default: Read only

Settings 0000h–FFFFh

o6-19 Fault Code REC 6

(0x1813) Default: Read only

Settings 0–65535

o6-20 OPER Time at Fault REC 6

(0x1814) Default: Read only

Settings 0–2359 hours/ minutes

o6-21 OPER Days at Fault REC 6

(0x1815) Default: Read only

Settings 0–65535 days

o6-22 Date of Fault REC 6

(0x1816) Default: Read only

Settings 0–1231 month/day

o6-23 Time of Fault REC 6

(0x1817) Default: Read only

Settings 0–2359 hours/ minutes

o6-24 FREQ Cmd at Fault REC 6

(0x1818) Default: Read only

Settings 0.00–599.00 Hz

o6-25 Output FREQ at Fault REC 6

(0x1819) Default: Read only

Settings 0.00–599.00 Hz

o6-26 Output Current at Fault REC 6

(0x181A) Default: Read only

Settings 0.0–6553.5 A

o6-27 Output Voltage at Fault REC 6

(0x181B) Default: Read only

Settings 0.0–6553.5 V_{DC}

o6-28 DC bus at Fault REC 6

(0x181C) Default: Read only

Settings 0.0–6553.5 V_{DC}

o6-29 IGBT Temp at Fault REC 6

(0x181D) Default: Read only

Settings -3276.8–3276.7°C

o6-30 Cap Temp at Fault REC 6

(0x181E) Default: Read only

Settings -3276.8–3276.7°C

o6-31 Fan Speed at Fault REC 6

(0x181F) Default: Read only

Settings 0–65535 rpm

o6-32 Motor Speed at Fault REC 6

(0x1820) Default: Read only

Settings 0–65535 rpm

o6-34 Output Torque at Fault REC 6

(0x1822) Default: Read only

Settings 0.0–6553.5%

o6-35 MI Status at Fault REC 6

(0x1823) Default: Read only

Settings 0000h–FFFFh

o6-36 MO/Rly Status at Fault REC 6

(0x1824) Default: Read only

Settings 0000h–FFFFh

o6-37 Drive Status at Fault REC 6

(0x1825) Default: Read only

Settings 0000h–FFFFh

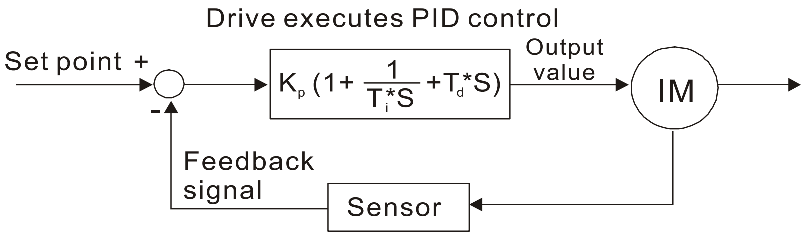
📖 Refer to description of Parameter Group o4.

P. PID Function

Common applications for PID control:

- Flow control: Use a flow sensor to feedback the flow data and perform accurate flow control.
- Pressure control: Use a pressure sensor to feedback the pressure data and perform precise pressure control.
- Air volume control: Use an air volume sensor to feedback the air volume data to achieve excellent air volume regulation.
- Temperature control: Use a thermocouple or thermistor to feedback temperature data for comfortable temperature control.
- Speed control: Use a speed sensor to feedback motor shaft speed or input another machine speed as a target value for synchronous control.

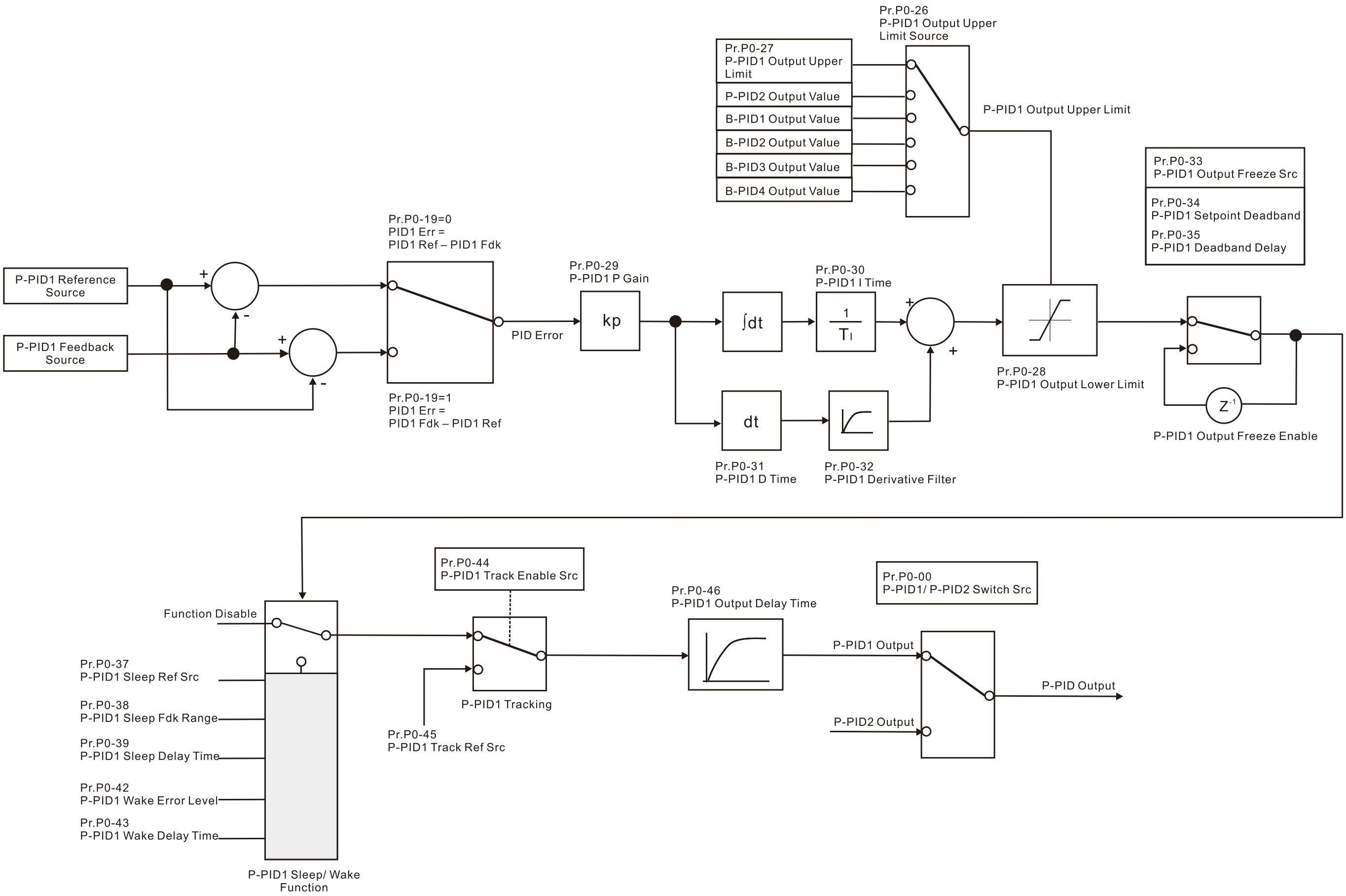
PID control loop:



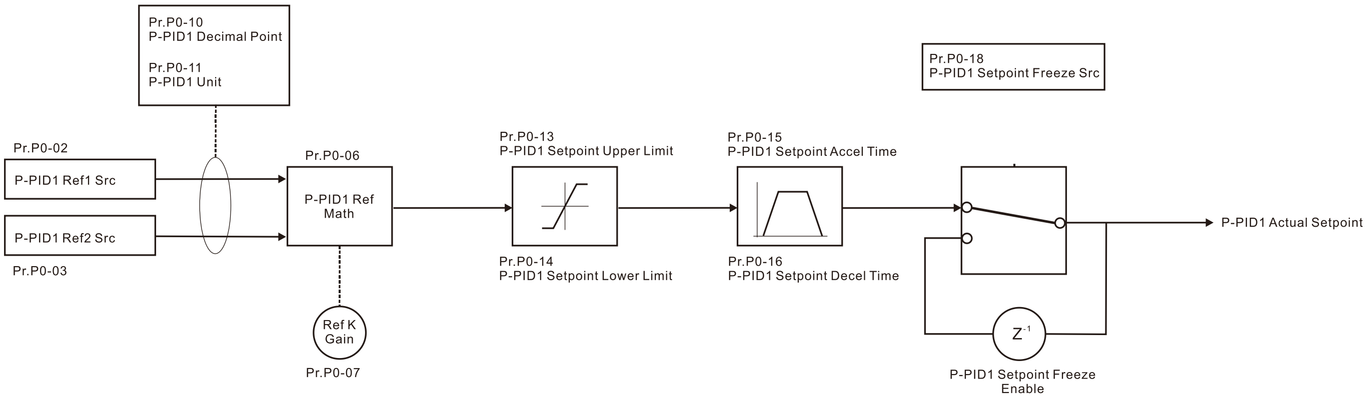
K_P Proportional Gain (P), T_i Integral Time (I), T_d Differential Time (D), S Calculation

P0. Process PID1

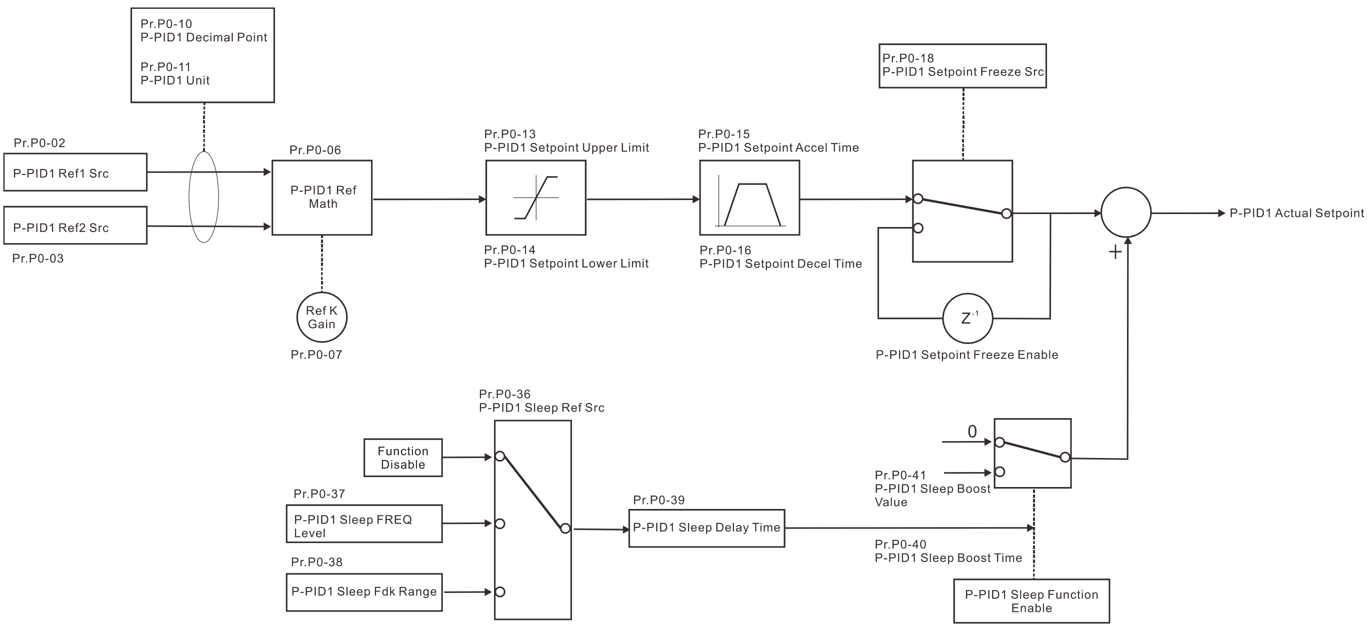
- Process PID1 control diagram:



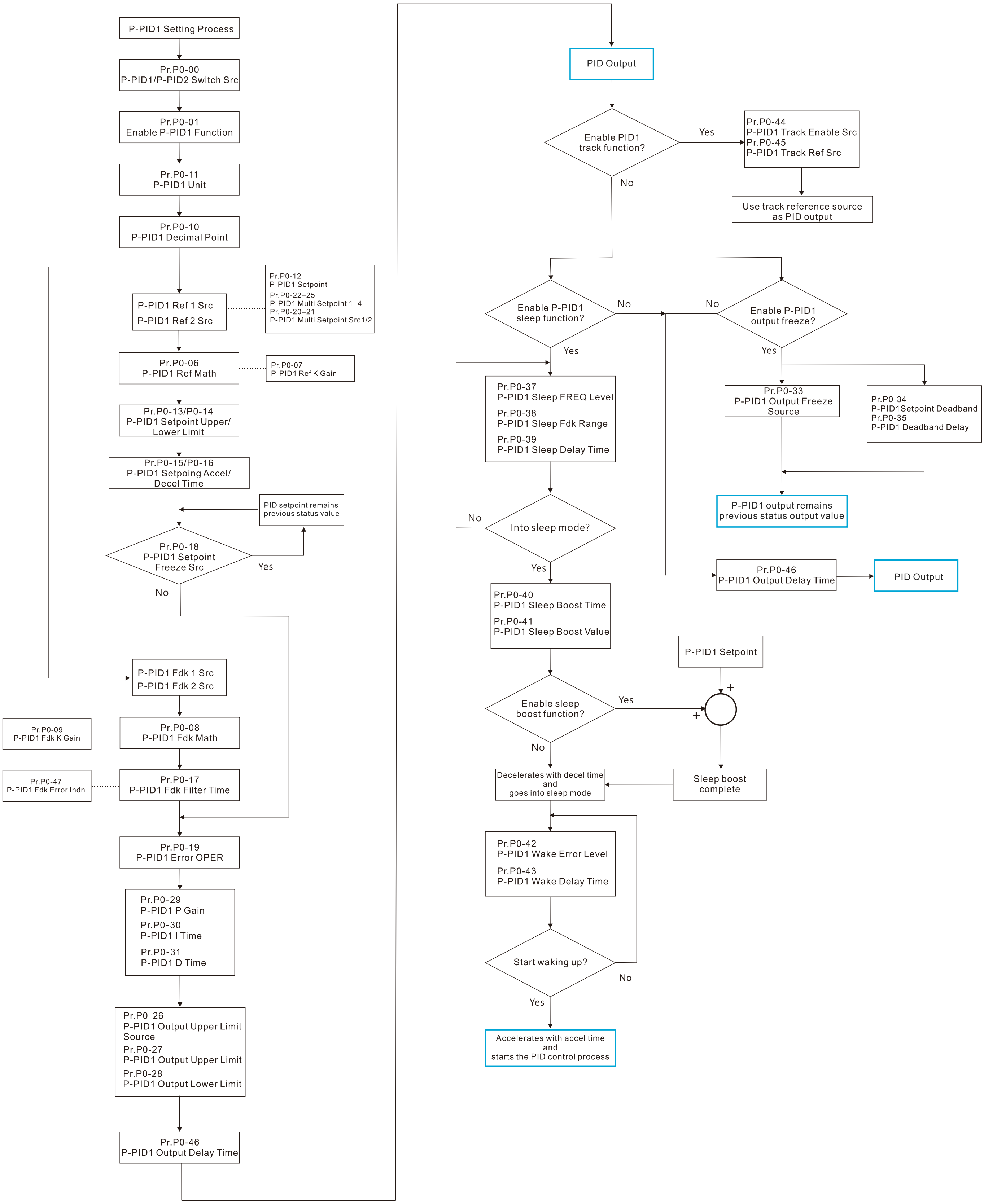
- Process PID1 setpoint diagram (not using sleep boost function)



- Process PID1 setpoint diagram (using sleep boost function)



- Process PID1 parameter setting process



✎ P0-00 P-PID1/P-PID2 Switch Src

(0x1880) Default: 0

Settings 0: P-PID1
1: P-PID2
2–7: MI1–MI6
8–9: Reserve
10–15: MI10–MI15
16–25: Reserve
26–28: Time Function 1–3
29–30: Reserve
31–38: Monitor 1–8

- Use Pr.P0-00 to select using P-PID1 or P-PID2.
- Use the ON and OFF status of the MI terminal to determine: if it is ON, switch to P-PID2; if it is OFF, it would be P-PID1.
- Use the output of time module or monitor module to determine whether to use P-PID1 or P-PID2.
  For example: set Pr.P0-00 = 26 (Time function 1) as PID1/ PID2 switching source. In this case, set Time Function 1 first as, for example, 13:00–14:00 on Monday, when Time Function 1 activates, it automatically switches to PID2 at 13:00 on Monday, and returns to PID1 when the Time Function 1 is OFF after 14:00.
- The same principle for using Monitor module. You can set to the monitor a certain physical quantity (such as flow rate). Monitor 1 will activate when the physical quantity exceeds a certain value, and it switches to PID2 at this time.

✎ P0-01 P-PID1 Function

(0x1881) Default: 0

Settings 0: Disable
1: Enable

- Pr.P0-01 determines whether to enable Process PID1.

✎ P0-02 P-PID1 Ref1 Src

(0x1882) Default: 0

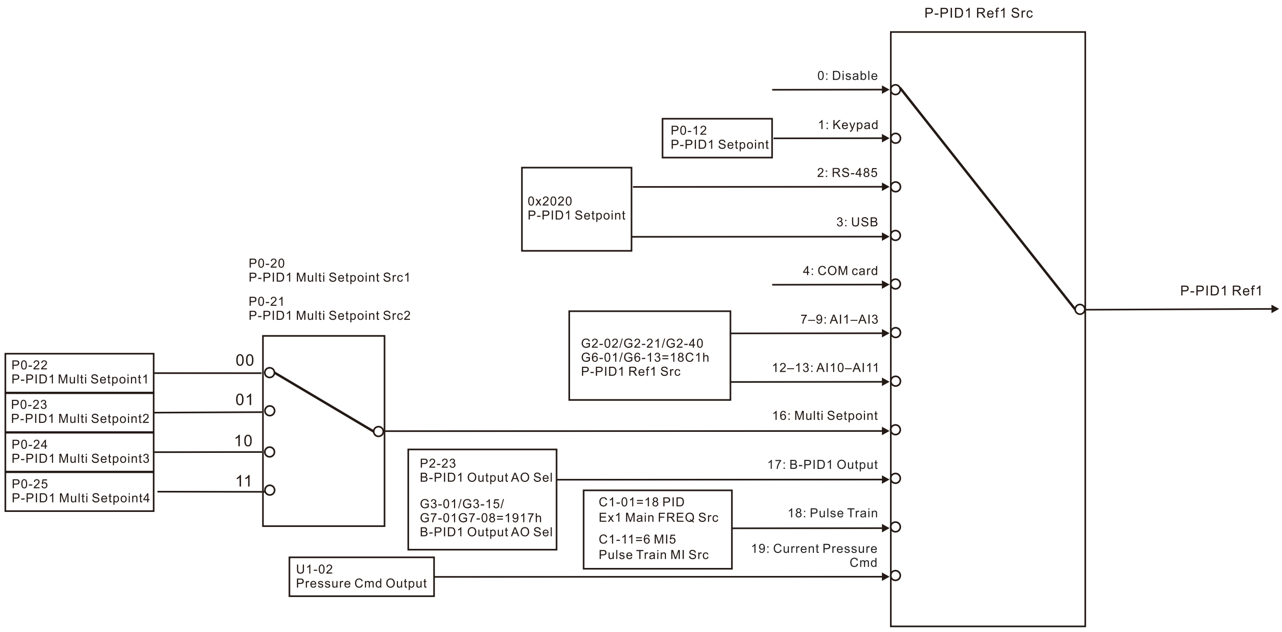
✎ P0-03 P-PID1 Ref2 Src

(0x1883) Default: 0

Settings 0: Disable
1: Keypad
2: RS-485
3: USB
4: COM Card
5–6: Reserve
7–9: AI1–AI3
10–11: Reserve

12–13: AI10–AI11
14–15: Reserve
16: Multi Setpoint
17: B-PID1 Output
18: Pulse Train
19: Current Pressure Cmd

- Use Pr.P0-02 and P0-03 to select P-PID1 reference 1 and reference 2 source.
- You can set PID reference 1 and reference 2 sources as the same one. However, the AI source is an exception, PID reference 1 and reference 2 sources cannot be set as the same AI source.



P0-04 P-PID1 Fdk1 Src

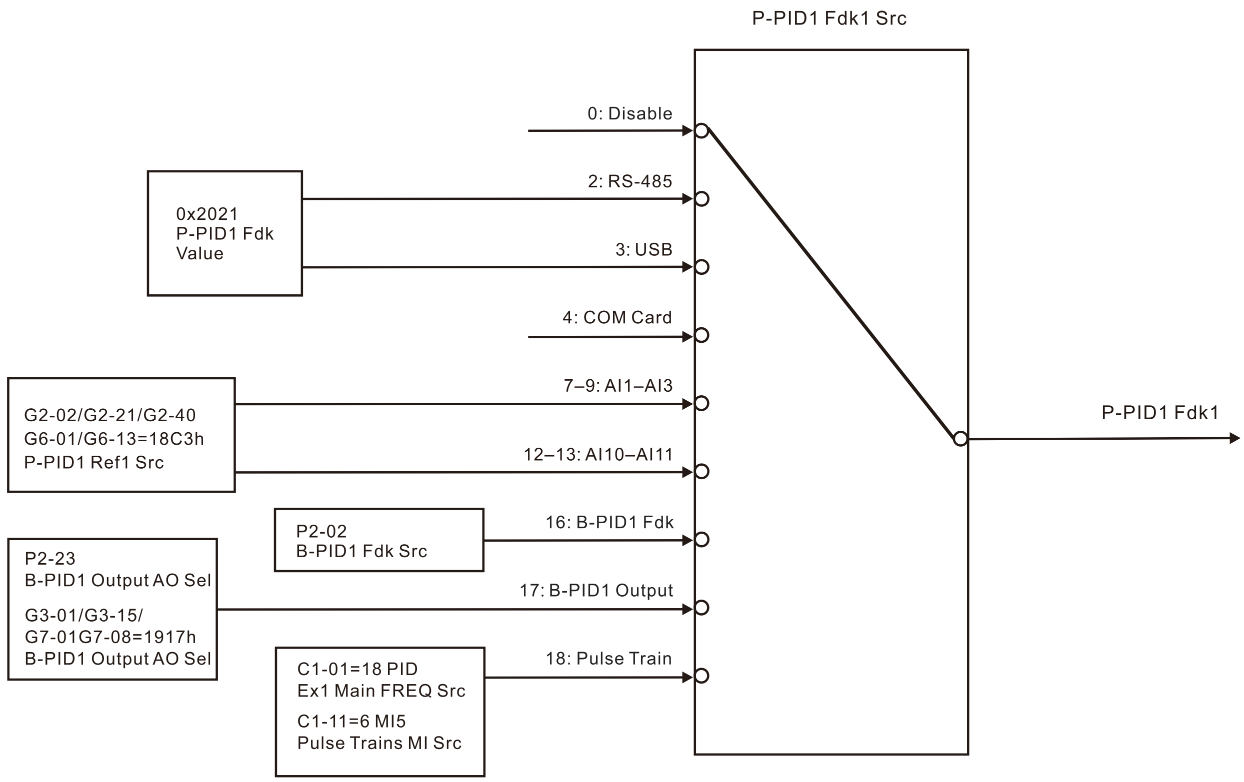
(0x1884) Default: 0

P0-05 P-PID1 Fdk2 Src

(0x1885) Default: 0

Settings
0: Disable
1: Reserve
2: RS-485
3: USB
4: COM Card
5–6: Reserve
7–9: AI1–AI3
10–11: Reserve
12–13: AI10–AI11
14–15: Reserve
16: B-PID1 Fdk
17: B-PID1 Output
18: Pulse Train

- Use Pr.P0-04 and P0-05 to select P-PID1 feedback 1 and feedback 2 source.



P0-06 P-PID1 Ref Math

(0x1886) Default: 0

Settings 0: Ref1

1: Ref1 + K*Ref2

2: Ref1 – K*Ref2

3: Ref1*K*Ref2

4: Ref1/K*Ref2

5: MIN(Ref1, Ref2)

6: MAX(Ref1, Ref2)

7: AVE(Ref1, Ref2)

8: K*sqrt(Ref1)

9: K*sqrt(Ref1-Ref2)

10: K*sqrt(Ref1+Ref2)

11: sqrt(Ref1)+K*sqrt(Ref2)

12: $(Ref1 – K*Ref2)^2$

13: $(Ref1)^2$ +K* $(Ref2)^2$

📖 Use Pr.P0-06 to select the mathematical operation method for P-PID1 reference 1 and reference 2 source.

P0-07 P-PID1 Ref K Gain

(0x1887) Default: 1.00

Settings -300.00– 300.00

📖 Use Pr.P0-06 to select the mathematical operation gain K for P-PID1 reference 1 and reference 2 source.

✓ P0-08 P-PID1 Fdk Math

(0x1888) Default: 0

Settings 0: Fdk1
1: Fdk1 + K*Fdk2
2: Fdk1 – K*Fdk2
3: Fdk1*K*Fdk2
4: Fdk1/K*Fdk2
5: MIN(Fdk1, Fdk2)
6: MAX(Fdk1, Fdk2)
7: AVE(Fdk1, Fdk2)
8: K*sqrt(Fdk1)
9: K*sqrt(Fdk1-Fdk2)
10: K*sqrt(Fdk1+Fdk2)
11: sqrt(Fdk1)+K*sqrt(Fdk2)
12: $(Fdk1 – K*Fdk2)^2$
13: $(Fdk1)^2 +K* (Fdk2)^2$

📖 Use Pr.P0-08 to select the mathematical operation method for P-PID1 feedback 1 and feedback 2 source.

✓ P0-09 P-PID1 Fdk K Gain

(0x1889) Default: 1.00

Settings -300.00– 300.00

📖 Use Pr.P0-09 to select the mathematical operation gain K of PID1 feedback 1/ 2 source.

✓ P0-10 P-PID1 Decimal Point

(0x188A) Default: 2

Settings 0: No Decimal Point
1: One Decimal Point
2: Two Decimal Point
3: Three Decimal Point

📖 Sets the decimal point of P-PID1 unit.

✎ P0-11 P-PID1 Unit

(0x188B) Default: 0

Settings
0: Hz
0 1: rpm
2: %
3: m/s
4: kW
5: HP
6: ppm
7: 1/m
8: kg/s
9: kg/m
10: kg/h
11: lb/s
12: lb/m
13: lb/h
14: ft/s
15: ft/m
16: m
17: ft
18: degC
19: degF
20: mbar
21: bar
22: Pa
23: kPa
24: mWG
25: inWG
26: ftWG
27: psi
28: atm
29: L/s
30: L/m
31: L/h
32: m3/s
33: m3/h
34: GPM
35: CFM

📖 Selects the using unit of P-PID1.

P0-12 P-PID1 Setpoint

(0x188C) Default: 0

Settings -30000–30000 PID1 unit

When setting Pr.P0-02 and P0-03 (P-PID1 Ref1/2 Src) = 1 (Keypad), Pr.P0-12 is the specified parameter of P-PID1 source.

P0-13 P-PID1 Setpoint Upper Limit

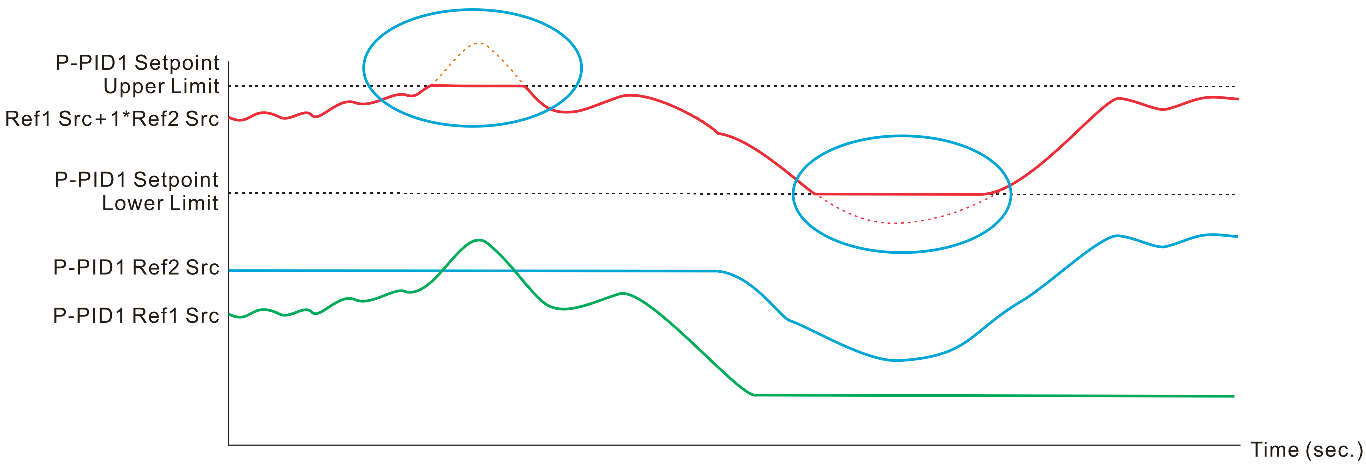
(0x188D) Default: 10000

P0-14 P-PID1 Setpoint Lower Limit

(0x188E) Default: 0

Settings -30000–30000 PID unit

Since VP3000 provides two sets of PID reference source for mathematical operation, the physical quantity setpoint on the system may exceed expectations. Use Pr.P0-13 and P0-14 to set the setpoint upper and lower limits of the PID setpoint calculation result, which can prevent the unexpected surge of the calculation source from exceeding the upper or lower limit that the system can withstand.



P0-15 P-PID1 Setpoint Accel Time

(0x188F) Default: 0.0

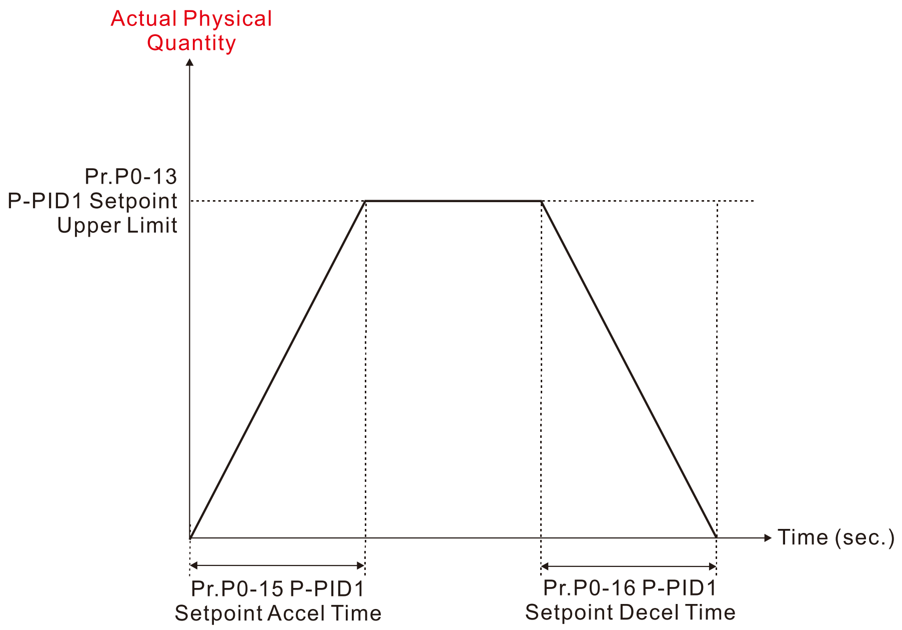
P0-16 P-PID1 Setpoint Decel Time

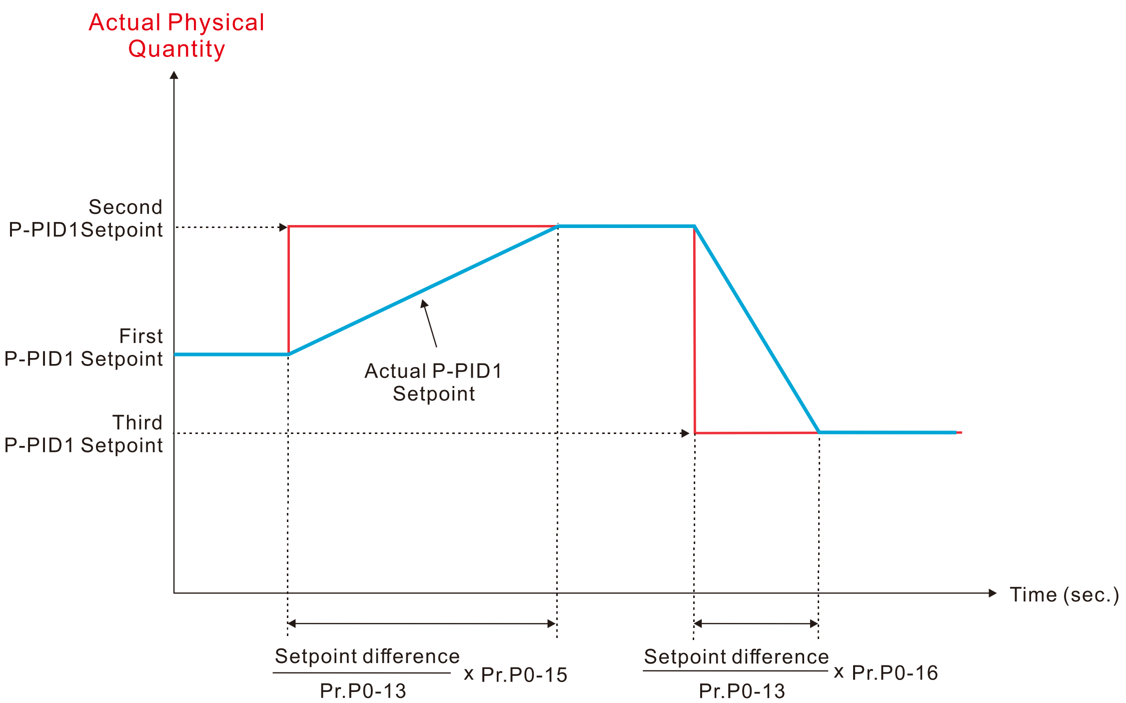
(0x1890) Default: 0.0

Settings 0.0–1800.0 sec.

P-PID1 setpoint acceleration time determines the required time for the drive setpoint accelerates from 0 to Pr.P0-13 P-PID1 setpoint upper limit. P-PID1 setpoint deceleration time determines the required time for the drive setpoint decelerates from PID1 setpoint upper limit to 0.

For applications that need to prevent the PID output drops or rises suddenly due to the PID setpoint step change, and affecting the application process or causing equipment damage, you can use Pr.P0-15 and P0-16 (P-PID1 setpoint accel/ decel time).





P0-17 P-PID1 Fdk Filter Time

(0x1891) Default: 0.000

Settings 0.000–30.000 sec.

Filter the PID feedback that is last used for PID control to filter out the interference noise.

P0-18 P-PID1 Setpoint Freeze Src

(0x1892) Default: 0

Settings 0: Disable

1: Enable

2–7: MI1–MI6

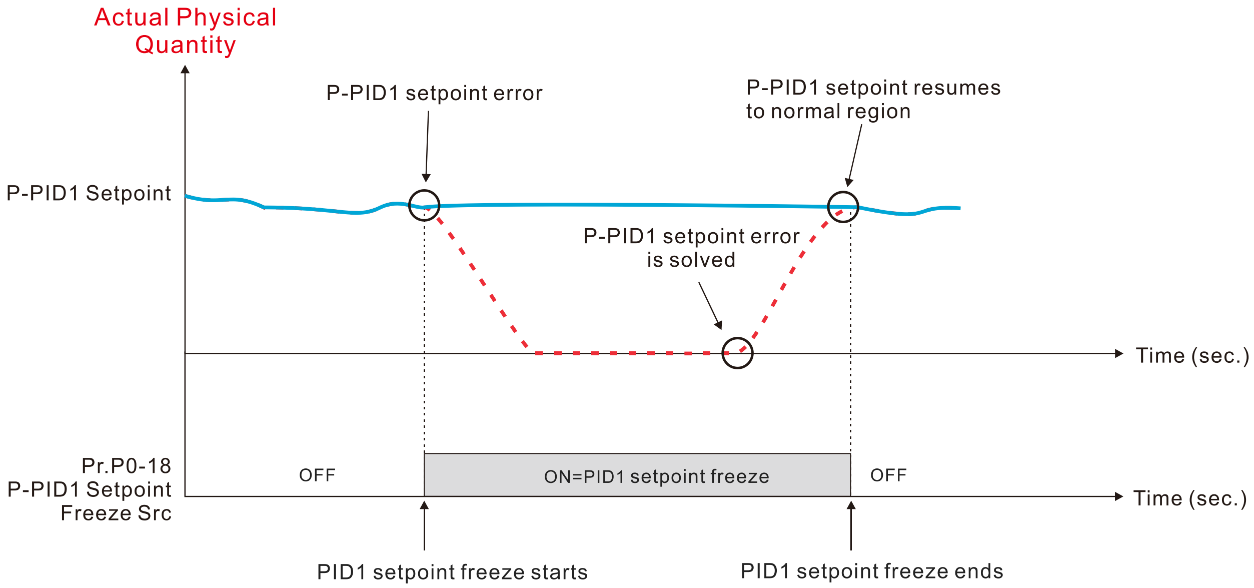
8–9: Reserve

10–15: MI10–MI15

16–25: Reserve

26–28: Time Function 1–3
29–30: Reserve
31–38: Monitor 1–8

📖 When an error occurs to the PID reference source, this parameter freezes the PID setpoint to remain at the previous status output and repair the system in real time. After troubleshooting, you can use the previous set PID reference source as the PID control command.



P0-19 P-PID1 Error OPER

(0x1893) Default: 0

Settings 0: PID1 err = PID1 Ref – PID1 Fdk
1: PID1 err = PID1 Fdk – PID1 Ref

📖 PID1 Error = Target value (set point) – Feedback Use this setting when the detection value increases if the output frequency increases.

📖 PID1 Error = Feedback – Target value (set point) Use this setting when the detection value decreases if the output frequency increases.

P0-20 P-PID1 Multi Setpoint Src1

(0x1894) Default: 0

P0-21 P-PID1 Multi Setpoint Src2

(0x1895) Default: 0

Settings 0: OFF
1: ON
2–7: MI1–MI6
8–9: Reserve
10–15: MI10–MI15
16–25: Reserve
26–28: Time Function 1–3
29–30: Reserve
31–38: Monitor 1–8

P0-22 P-PID1 Multi Setpoint1

(0x1896) Default: 0

P0-23 P-PID1 Multi Setpoint2

(0x1897) Default: 0

P0-24 P-PID1 Multi Setpoint3

(0x1898) Default: 0

P0-25 P-PID1 Multi Setpoint4

(0x1899) Default: 0

Settings -30000–30000 PID1 unit

- When using Pr.P0-02 and P0-03 to select P-PID1 Ref1 Src and P-PID1 Ref2 Src as 16: Multi Setpoint, the AC motor drive follows the status of Pr.P0-20 and P0-21 (P-PID1 Multi Setpoint Src 1 & 2) to combine four groups of internal setting, as shown in the table below, and uses to determine the internal setting (Pr.P0-22–P0-25) as the PID1 set point.

P-PID1 Multi Setpoint Src / P-PID1 Multi Setpoint	P0-21	P0-20
	P-PID1 Multi Setpoint Src2	P-PID1 Multi Setpoint Src1
P-PID1 Multi Setpoint 1 (P0-22)	OFF	OFF
P-PID1 Multi Setpoint 2 (P0-23)	OFF	ON
P-PID1 Multi Setpoint 3 (P0-24)	ON	OFF
P-PID1 Multi Setpoint 4 (P0-25)	ON	ON

- PID1 multi set point can also be set directly through P-PID1 multi set point source: Pr.P0-20 or P0-21 = 0 (OFF) or 1 (ON). You can also select MI1–MI6, MI10–MI15, Time function 1–3 or Monitor 1–3 to set the ON or OFF status.

P0-26 P-PID1 Output Upper Limit Src

(0x189A) Default: 0

Settings 0: P-PID1 Output Upper Limit
1: P-PID2 Output
2: B-PID1 Output
3: B-PID2 Output
4: B-PID3 Output
5: B-PID4 Output

P0-27 P-PID1 Output Upper Limit

(0x189B) Default: 60.00

Settings 0.00–600.00 Hz

P0-28 P-PID1 Output Lower Limit

(0x189C) Default: 0.00

Settings 0.00–P0-27 setting value (Hz)

- User Pr.P0-26 to select P-PID1 output upper limit source.
- Pr.P0-26 = 0: When P-PID1 outputs its upper limit, the setting of Pr.P0-27 is the output upper limit of P-PID1.

For example: refer to the diagram below

A: Pr.P0-26 = 0 (P-PID1 output upper limit)

When P-PID1 output is larger than Pr.P0-27 setting value, P-PID1 output = P-PID1 output upper limit.

B: Pr.P0-26 = 1 (P-PID2 output)

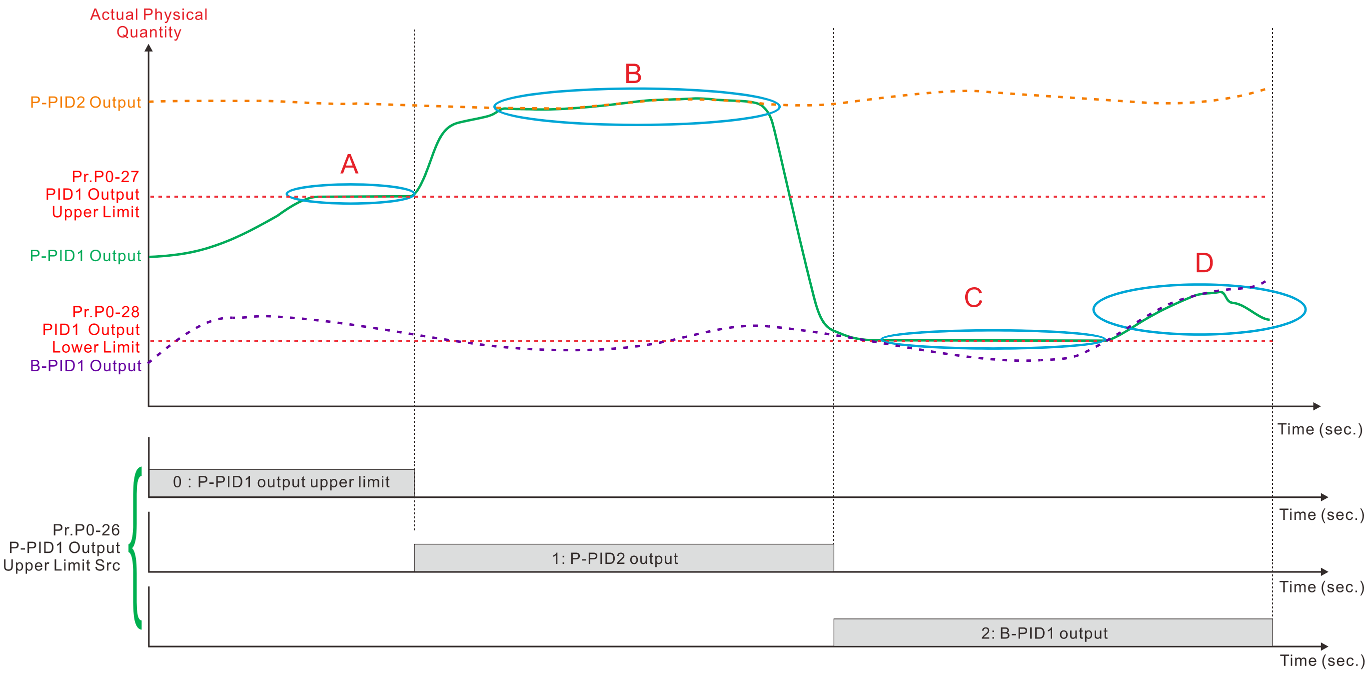
When P-PID1 output is larger than P-PID2 output, P-PID1 output = P-PID2 output.

C: Pr.P0-26 = 2 (B-PID1 output, if the B-PID1 output < Pr.P0-28 P-PID1 output lower limit)

When P-PID1 output is smaller than B-PID1 output, P-PID1 output = P-PID1 output lower limit.

D: Pr.P0-26 = 2 (B-PID1 output, if the B-PID1 output > Pr.P0-28 P-PID1 output lower limit)

When P-PID1 output is larger than B-PID1 output, P-PID1 output = B-PID1 output.



P0-29 P-PID1 P Gain

(0x189D) Default: 1.00

Settings 0.01– 100.00

📖 The P gain is mainly used to immediately reduce the deviation in proportion when there is a deviation in the system. Increasing proportional gain usually gets faster response speed. If you set the value too high, overshoot occurs, and it may cause system oscillation and instability. If you set the gain to a lower value, the response will be late.

📖 The output of P control is proportional to the input error signal. If the integral (I) time = 0 and the differential (D) time = 0, then only the P gain acts, and the system output has a steady-state error.

📖 Adjust Proportional Gain (P):

Turn off the Ti and Td, or remain Ti and Td in constant value, then adjust the proportional gain (P).

Increase: Faster status feedback, but excessive adjustment increases the overshoot.

Decrease: Smaller overshoot, but excessive adjustment slows down the transient response.

P0-30 P-PID1 I Time

(0x189E) Default: 60.0

Settings 0.0–6000.0 sec.

- Use the integral controller to eliminate the deviation during stable system operation. The integral control does not stop working until the deviation is zero.
- The integral is affected by the integral time. When the integral time is long, there is a small I controller gain, with slower response and slow external control. When the integral time is short, there is a large I controller gain, with faster response and rapid external control. When the integral time is too short, it may cause overshoot or oscillation for the output frequency and system.
- Set Integral Time to 0.00 to disable the I controller.
- Adjust Integral Time (I):
  The integral time (I) accumulates from the time difference, if the vibration cycle is longer than the setting for integral time, the integration enhances. Increase the integral time (I) to reduce the vibration.
  Increase: Reduce the overshoot, excessive adjustment causes worse transient response.
  Decrease: Faster transient response, but the transient time will be longer, and takes more time to achieve the steady state. Excessive adjustment causes larger overshoot.

P0-31 P-PID1 D Time

(0x189F) Default: 0.000

Settings 0.000–10.000 sec.

- Use the differential controller to show the system deviation change, as well as to preview the change in the deviation. You can use the differential controller to eliminate the deviation in order to improve the system state. Using a suitable differential time can reduce overshoot and shorten adjustment time; however, the differential operation increases noise interference. Note that a too large differential causes more noise interference. In addition, the differential shows the change, and the differential output is 0 when there is no change. Note that you cannot use the differential control independently. You must use it with the other two controllers for the PD controller or PID controller.
- Sets the D controller gain to determine the deviation change response. Using a suitable differential time reduces the P and I controllers overshoot to decrease the oscillation for a stable system. A differential time that is too long may cause system oscillation.
- The differential controller acts on the change in the deviation and cannot reduce the interference. Do not use this function when there is significant interference.
- Adjust Differential Time (D):
  When the vibration cycle is shorter and continuous, it means that the differential time setting is too large and causes excessive output. Decrease the setting of D gain to reduce the vibration. If the D gain is set to 0, adjust the PID control again.

✎ P0-32 P-PID1 Derivative Filter

(0x18A0) Default: 0.0

Settings 0.0–10.0 sec.

Since the deviation controller acts on the change of deviation, its immunity to interference is poor. Use this parameter to filter the differential time (D) and eliminate the noise.

✎ P0-33 P-PID1 Output Freeze Src

(0x18A1) Default: 0

Settings
0: Disable
1: Enable
2–7: MI1–MI6
8–9: Reserve
10–15: MI10–MI15
16–25: Reserve
26–28: Time Function 1–3
29–30: Reserve
31–38: Monitor 1–8

In the application of PID control, you can remain the PID output at previous status output through this function to prevent the motor stop running from unexpected events (for example, feedback sensor failure) or routine equipment maintenance, and to ensure that the drive remains outputting during troubleshooting or maintenance without motor stopping due to the above situation.

✎ P0-34 P-PID1 Setpoint Deadband

(0x18A2) Default: 0

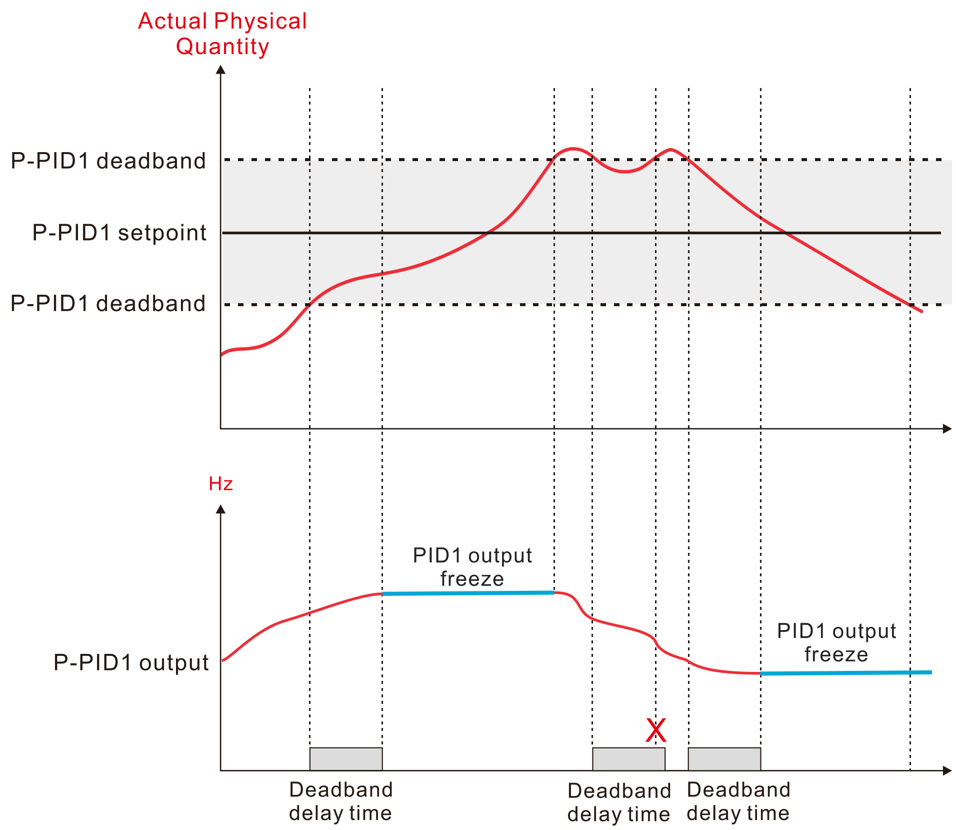
Settings 0–10000

✎ P0-35 P-PID1 Deadband Delay

(0x18A3) Default: 0.0

Settings 0.0–3600.0 sec.

When the PID1 feedback enters P-PID1 set point dead band and remains for the dead band delay time, the PID1 output remains at the previous status output until the PID1 feedback exits the PID1 set point dead band range.



P0-36 P-PID1 Sleep Ref Src

(0x18A4) Default: 0

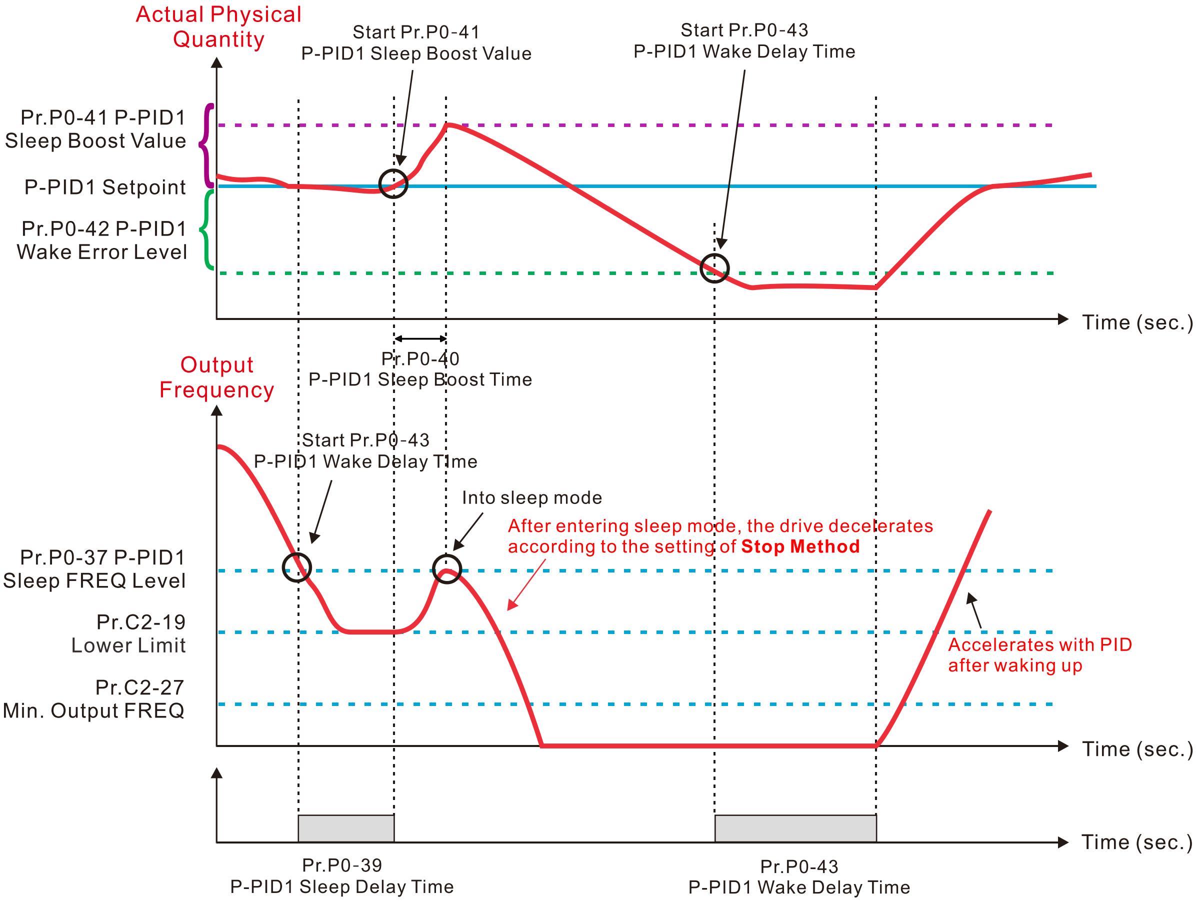
Settings 0: Disable

1: Motor FREQ

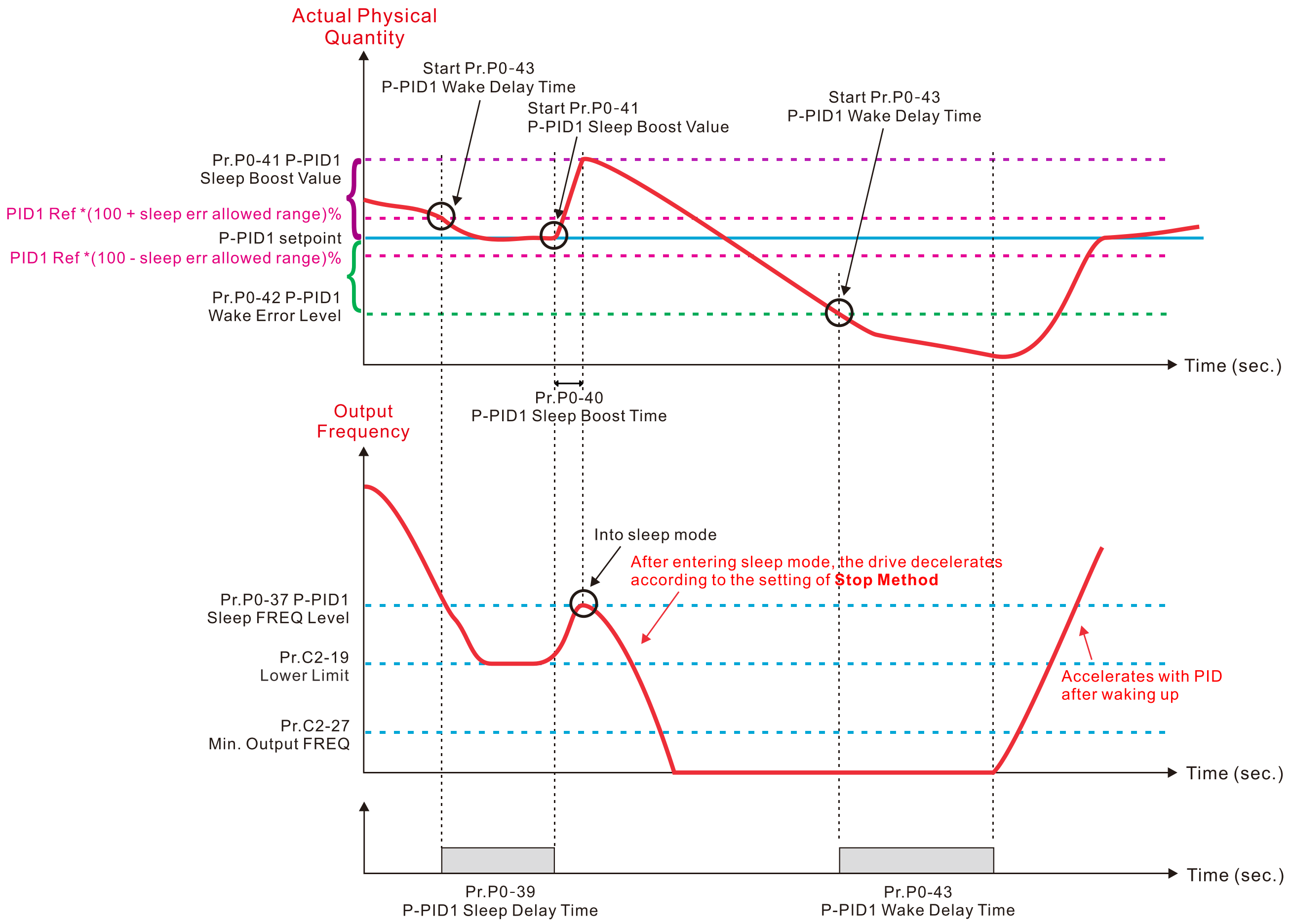
2: Fdk value

Under PID control, when the drive operates at an extremely low speed to maintain the physical quantity at the set point, the motor can be completely stopped through the sleep function to save energy, and to avoid running at low speed in the low efficiency range for a long time. When the physical quantity error needs to be controlled by the AC motor drive, you can wake the drive by setting the wake function. (Since the lubrication or cooling of some equipment depends on the speed of the motor, providing this function can prevent this type of equipment from running at low speed for a long time and cause premature mechanical aging.)

Pr.P0-36 P-PID1 sleep reference source = 1 (Motor Frequency)



Pr.P0-36 P-PID1 sleep reference source = 2 (Feedback Value)



P0-37 P-PID1 Sleep FREQ Level

(0x18A5) Default: 0.00

Settings 0.00–60.00 Hz

P0-38 P-PID1 Sleep Fdk Range

(0x18A6) Default: 0.00

Settings 0.00–100.00%

P0-39 P-PID1 Sleep Delay Time

(0x18A7) Default: 60.0

Settings 0.0–3600.0 sec.

Sleep judgment: Pr.P0-36 P-PID1 sleep reference source = 1 (Motor Frequency)
Under this sleep reference source, if you need to enable sleep function, set Pr.P0-37 (P-PID1 Sleep FREQ Level) > 0 and set Pr.P0-39 (P-PID1 Sleep Delay Time). When the motor operating frequency is lower than or equal to sleep level, the sleep delay time starts to count. During the counting:

1. If the motor operating frequency is lower than or equal to sleep level, and the sleep delay time is reached, then the drive enters sleep mode.
2. If the motor operating frequency is higher than sleep level during the delay time counting, then the drive skips out of the sleep delay count and remains at PID control.

Sleep judgment: Pr.P0-36 P-PID1 sleep reference source = 2 (Feedback Value)
Under this sleep reference source, if you need to enable sleep function, set Pr.P0-38 (P-PID1 Sleep Feedback Range) > 0 and set Pr.P0-39 (P-PID1 Sleep Delay Time). If the feedback physical quantity is in the range of [PID setpoint × (100± sleep error allowed range) %], the sleep detection starts to count. During the counting:

1. If the feedback physical quantity exceeds the range of [PID setpoint × (100± sleep error allowed range) %], the drive skips out of the speed count and remains at PID control.
2. If the feedback physical quantity exceeds the range of [PID setpoint × (100± sleep error allowed range) %], and the sleep detection count remains for the time× of sleep delay/ detect time, then the drive enters sleep mode.

P0-40 P-PID1 Sleep Boost Time

(0x18A8) Default: 0.0

Settings 0.0–3600.0 sec.

P0-41 P-PID1 Sleep Boost Value

(0x18A9) Default: 0

Settings 0–30000 PID1 unit

Before entering sleep mode from the PID mode, the sleep boost will be performed first:
If Pr.P0-40 (P-PID1 Sleep Boost Time) and Pr.P0-41 (P-PID1 Sleep Boost Value) are set as default (default are both 0), then the drive directly enters sleep mode.
When Pr.P0-40 (P-PID Sleep Boost Time) and Pr.P0-41 (P-PID1 Sleep Boost Value) are both set > 0, the drive performs boosting to the physical quantity before entering the sleep mode and controls the actual physical quantity to PID set point + PID1 boost value with PID control.

📖 If the PID actual boost time does not complete the sleep boost time counting, and the actual physical quantity has controlled to PID set point + PID1 boost value, then drive directly enters the sleep mode.

📖 If the PID actual boost time reaches the set sleep boost time, but the actual physical quantity is not controlled to PID set point + PID1 boost value, the drive still enters the sleep mode.

📖 If the actual physical quantity feedback is lower than the PID set point during the PID boosting process, the drive skips from boosting mode back to PID control and re-executes the sleep judging logic.

📖 The stopping behavior in sleep mode refers to the parameter setting of stop method.

✎ P0-42 P-PID1 Wake Error Level

(0x18AA) Default: 0

Settings 0–10000 PID1 unit

✎ P0-43 P-PID1 Wake Delay Time

(0x18AB) Default: 0.50

Settings 0.00–60.00 PID1 unit

📖 Wake judgment:

1. Pr.P0-36 P-PID1 sleep reference source = 1 (Motor Frequency):
   During sleep process, if [physical quantity set point – physical quantity feedback] is lower than or equal to the wake error and remains for the time set in wake delay time, the drive turns from sleep mode to PID control mode.
2. Pr.P0-36 P-PID1 sleep reference source = 2 (Feedback Value):
   During sleep process, if the absolute value of [physical quantity set point – physical quantity feedback] is larger than the wake error and remains for the time set in wake delay time, the drive turns from sleep mode to PID control mode.

✎ P0-44 P-PID1 Track Enable Src

(0x18AC) Default: 0

Settings 0: Disable
1: Enable
2–7: MI1–MI6
8–9: Reserve
10–15: MI10–MI15
16–25: Reserve
26–28: Time Function 1–3
29–30: Reserve
31–38: Monitor 1–8

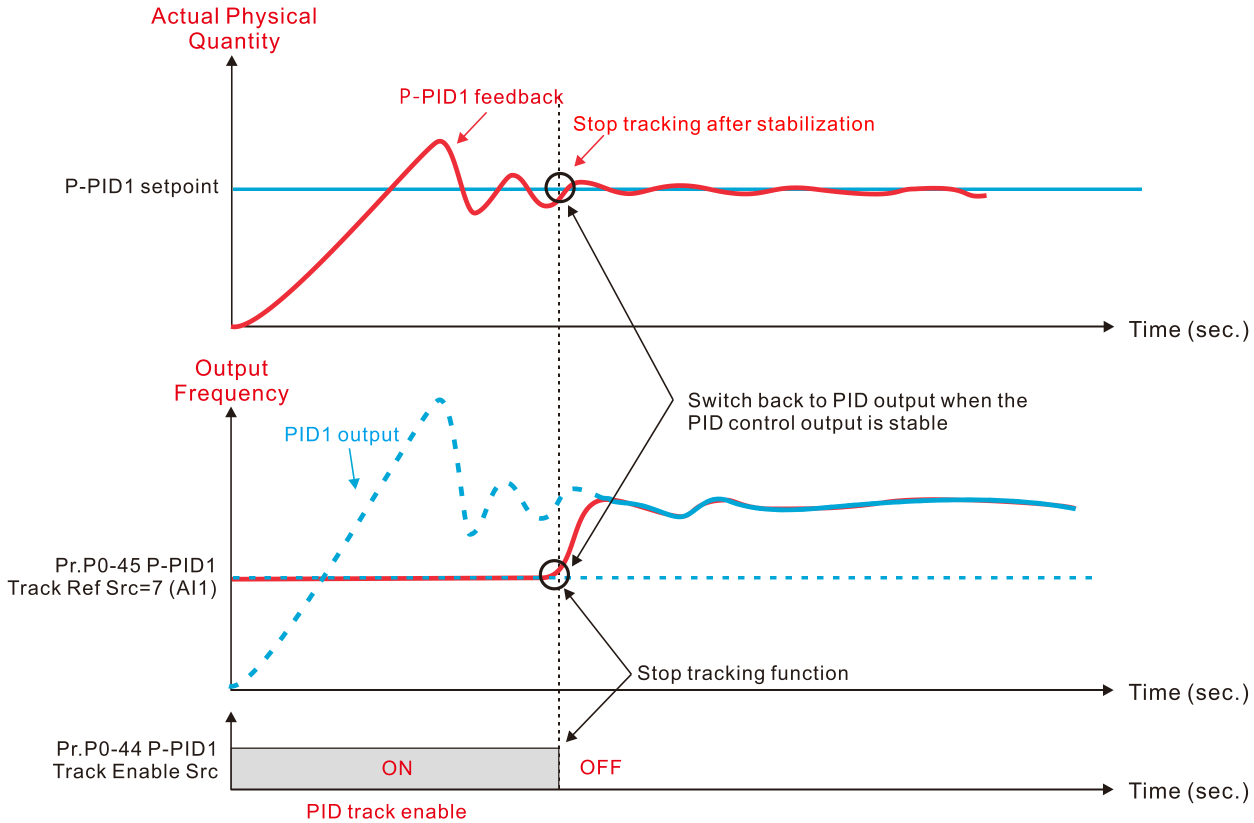
✎ P0-45 P-PID1 Track Ref Src

(0x18AD) Default: 0

Settings 0: Disable
1: Reserved
2: RS-485

3: USB
4: COM Card
5–6: Reserve
7–9: AI1–AI3
10–11: Reserve
12–13: AI10–AI11
14–15: Reserve

- For the application that is known the integral transient causes sudden frequency jump and severe vibration, or the physical quantity cannot be converge to the set point immediately at the initial stage of PID control (for example, in tension control occasions, if using PID control at the initial stage of furling, the PID control will be up to the maximum PID upper limit output since the tension cannot be established immediately; however, when the tension is established, the furling may be broken because the PID cannot response in time), you can enable the track function and use other sources (AI1–AI3 or Fieldbus) as PID output, and then switch back to PID output when the PID control output is stable, to prevent sudden frequency jump caused by the original integral transient.
- In certain applications that required higher accuracy and following of physical quantity, we usually decrease setting of integral time. Under this setting, when a larger physical quantity error occurs (system sudden disturbance), the convergence process usually causes severe frequency vibration, and the system will stabilize after a long time. The above situation of large physical quantity error rarely occurs to the application occasion and is not expected to adjust through PID controller parameters. In this case, you can use this function as PID output first, and switch back to PID output when the PID control output is stable.
- Pr.P0-45 determines the track reference source when using P-PID1 track function.



✔ P0-46 P-PID1 Output Delay Time

(0x18AE) Default: 0.000

Settings 0.000–30.000 sec.

- Sets the time constant of the low pass filter for PID control output, increase the setting may affect the response speed of the drive.
- The frequency output for the PID controller will be filtered by a delay function. This function can slow down the change of output frequency, a long delay time means a large degree of filtering, and vice versa.
- An inappropriate setting of delay time may cause system vibration.

P0-47 P-PID1 Fdk Error Indn

(0x18AF) Default: 0

Settings 0: Disable
1–2: Relay1–Relay2
3–4: MO1–MO2
5–9: Reserve
10–15: MO/Relay10–15
16–19: Reserve

- PID feedback error indication is used when the sensor failure or there is wiring problem between the drive and the sensor.
- Selects the MO/Relay terminal for the “P-PID1 feedback error” status indication.
- When an error occurs to PID feedback, the terminal selected by Pr.P0-47 “activates”.
- You must use PID feedback error indication when using PID control. It can prevent dangerous status such as impact caused by rapid acceleration of the motor due to abnormal feedback.

P1. Process PID2

P1-00 P-PID2 Function

(0x18C0) Default: 0

Settings 0: Disable
1: Enable

Refer to description in Pr.P0-01.

P1-01 P-PID2 Ref1 Src

(0x18C1) Default: 0

P1-02 P-PID2 Ref2 Src

(0x18C2) Default: 0

Settings 0: Disable
1: Keypad
2: RS-485
3: USB
4: COM Card
5–6: Reserve
7–9: AI1–AI3
10–11: Reserve
12–13: AI10–AI11
14–15: Reserve
16: Multi Setpoint
17: B-PID1 Output
18: Pulse Train
19: Current Pressure Cmd

Refer to description in Pr.P0-02 and P0-03.

P1-03 P-PID2 Fdk1 Src

(0x18C3) Default: 0

P1-04 P-PID2 Fdk2 Src

(0x18C4) Default: 0

Settings 0: Disable
1: Reserve
2: RS-485
3: USB
4: COM Card
5–6: Reserve
7–9: AI1–AI3
10–11: Reserve
12–13: AI10–AI11
14–15: Reserve
16: B-PID1 Fdk

17: B-PID1 Output
18: Pulse Train

📖 Refer to description in Pr.P0-04 and P0-05.

P1-05 P-PID2 Ref Math

(0x18C5) Default: 0

Settings
0: Ref1
1: Ref1 + K*Ref2
2: Ref1 – K*Ref2
3: Ref1*K*Ref2
4: Ref1/K*Ref2
5: MIN(Ref1, Ref2)
6: MAX(Ref1, Ref2)
7: AVE(Ref1, Ref2)
8: K*sqrt(Ref1)
9: K*sqrt(Ref1-Ref2)
10: K*sqrt(Ref1+Ref2)
11: sqrt(Ref1)+K*sqrt(Ref2)
12: $(Ref1 – K*Ref2)^2$
13: $(Ref1)^2 + K* (Ref2)^2$

📖 Refer to description in Pr.P0-06.

P1-06 P-PID2 Ref K Gain

(0x18C6) Default: 1.00

Settings -300.00–300.00

📖 Refer to description in Pr.P0-07.

P1-07 P-PID2 Fdk Math

(0x18C7) Default: 0

Settings
0: Fdk1
1: Fdk1 + K*Fdk2
2: Fdk1 – K*Fdk2
3: Fdk1*K*Fdk2
4: Fdk1/K*Fdk2
5: MIN(Fdk1, Fdk2)
6: MAX(Fdk1, Fdk2)
7: AVE(Fdk1, Fdk2)
8: K*sqrt(Fdk1)
9: K*sqrt(Fdk1-Fdk2)
10: K*sqrt(Fdk1+Fdk2)
11: sqrt(Fdk1)+K*sqrt(Fdk2)
12: $(Fdk1 – K*Fdk2)^2$
13: $(Fdk1)^2 + K* (Fdk2)^2$

📖 Refer to description in Pr.P0-08.

P1-08 P-PID2 Fdk K Gain

(0x18C8) Default: 1.00

Settings -300.00–300.00

📖 Refer to description in Pr.P0-09.

P1-09 P-PID2 Decimal Point

(0x18C9) Default: 2

Settings 0: No Decimal Point
1: One Decimal Point
2: Two Decimal Point
3: Three Decimal Point

📖 Refer to description in Pr.P0-10.

P1-10 P-PID2 Unit

(0x18CA) Default: 0

Settings Refer to Pr. P0-11

📖 Refer to description in Pr.P0-11.

P1-11 P-PID2 Setpoint

(0x18CB) Default: 0

Settings -30000–30000 PID2 unit

📖 Refer to description in Pr.P0-12.

P1-12 P-PID2 Setpoint Upper Limit

(0x18CC) Default: 10000

Settings -30000–30000 PID unit

P1-13 P-PID2 Setpoint Lower Limit

(0x18CD) Default: 0

Settings -30000–P1-12 setting value (PID unit)

📖 Refer to description in Pr.P0-13 and P0-14.

P1-14 P-PID2 Setpoint Accel Time

(0x18CE) Default: 0.0

P1-15 P-PID2 Setpoint Decel Time

(0x18CF) Default: 0.0

Settings 0.0–1800.0 sec.

📖 Refer to description in Pr.P0-15 and P0-16.

P1-16 P-PID2 Fdk Filter Time

(0x18D0) Default: 0.000

Settings 0.000–30.000 sec.

📖 Refer to description in Pr.P0-17.

✎ P1-17 P-PID2 Setpoint Freeze Src

(0x18D1) Default: 0

Settings
0: Disable
1: Enable
2–7: MI1–MI6
8–9: Reserve
10–15: MI10–MI15
16–25: Reserve
26–28: Time Function 1–3
29–30: Reserve
31–38: Monitor 1–8

📖 Refer to description in Pr.P0-18.

✎ P1-18 P-PID2 Error OPER

(0x18D2) Default: 0

Settings
0: PID2 err = PID2 Ref – PID2 Fdk
1: PID2 err = PID2 Fdk – PID2 Ref

📖 Refer to description in Pr.P0-19.

✎ P1-19 P-PID2 Multi Setpoint Src1

(0x18D3) Default: 0

✎ P1-20 P-PID2 Multi Setpoint Src2

(0x18D4) Default: 0

Settings
0: OFF
1: ON
2–7: MI1–MI6
8–9: Reserve
10–15: MI10–MI15
16–25: Reserve
26–28: Time Function 1–3
29–30: Reserve
31–38: Monitor 1–8

✎ P1-21 P-PID2 Multi Setpoint1

(0x18D5) Default: 0

✎ P1-22 P-PID2 Multi Setpoint2

(0x18D6) Default: 0

✎ P1-23 P-PID2 Multi Setpoint3

(0x18D7) Default: 0

✎ P1-24 P-PID2 Multi Setpoint4

(0x18D8) Default: 0

Settings -30000–30000 PID2 unit

📖 Refer to description in Pr.P0-20–P0-25.

✗ P1-25 P-PID2 Output Upper Limit Src

(0x18D9) Default: 0

Settings
0: P-PID1 Output Upper Limit
1: P-PID2 Output
2: B-PID1 Output
3: B-PID2 Output
4: B-PID3 Output
5: B-PID4 Output

✗ P1-26 P-PID2 Output Upper Limit

(0x18DA) Default: 60.00

Settings 0.00–600.00 Hz

✗ P1-27 P-PID2 Output Lower Limit

(0x18DB) Default: 0.00

Settings 0.00–P1-26 setting value (Hz)

📖 Refer to description in Pr.P0-26–P0-28.

✗ P1-28 P-PID2 P Gain

(0x18DC) Default: 1.00

Settings 0.01–100.00

📖 Refer to description in Pr.P0-29.

✗ P1-29 P-PID2 I Time

(0x18DD) Default: 60.0

Settings 0.0–6000.0 sec.

📖 Refer to description in Pr.P0-30.

✗ P1-30 P-PID2 D Time

(0x18DE) Default: 0.000

Settings 0.000–10.000 sec.

📖 Refer to description in Pr.P0-31.

✗ P1-31 P-PID2 Derivative Filter

(0x18DF) Default: 0.0

Settings 0.0–10.0 sec.

📖 Refer to description in Pr.P0-32.

✗ P1-32 P-PID2 Output Freeze Src

(0x18E0) Default: 0

Settings
0: Disable
1: Enable
2–7: MI1–MI6
8–9: Reserve
10–15: MI10–MI15
16–25: Reserve

26–28: Time Function 1–3
29–30: Reserve
31–38: Monitor 1–8

📖 Refer to description in Pr.P0-33.

✎ P1-33 P-PID2 Deadband Zone

(0x18E1) Default: 0

Settings 0–10000

✎ P1-34 P-PID2 Deadband Delay

(0x18E2) Default: 0.0

Settings 0.0–3600.0 sec.

📖 Refer to description in Pr.P0-34 and P0-35.

✎ P1-35 P-PID2 Sleep Ref Src

(0x18E3) Default: 0

Settings 0: Disable
1: Motor FREQ
2: Fdk value

📖 Refer to description in Pr.P0-36.

✎ P1-36 P-PID2 Sleep FREQ Level

(0x18E4) Default: 0.00

Settings Low limit Freq–High limit Freq Hz
0.00–60.00 Hz

✎ P1-37 P-PID2 Sleep Fdk Range

(0x18E5) Default: 0.00

Settings 0.00–100.00%

✎ P1-38 P-PID2 Sleep Delay Time

(0x18E6) Default: 60.0

Settings 0.0–3600.0 sec.

📖 Refer to description in Pr.P0-37–P0-39.

✎ P1-39 P-PID2 Sleep Boost Time

(0x18E7) Default: 0.0

Settings 0.0–3600.0 sec.

✎ P1-40 P-PID2 Sleep Boost Value

(0x18E8) Default: 0

Settings 0–30000 PID2 unit

📖 Refer to description in Pr.P0-40–P0-41.

✎ P1-41 P-PID2 Wake Error Level

(0x18E9) Default: 0

Settings 0–10000 PID2 unit

P1-42 P-PID2 Wake Delay Time

(0x18EA) Default: 0.50

Settings 0.00–60.00 PID2 unit

Refer to description in Pr.P0-42–P0-43.

P1-43 P-PID2 Track Enable Src

(0x18EB) Default: 0

Settings 0: Disable
1: Enable
2–7: MI1–MI6
8–9: Reserve
10–15: MI10–MI15
16–25: Reserve
26–28: Time Function 1–3
29–30: Reserve
31–38: Monitor 1–8

P1-44 P-PID2 Track Ref Src

(0x18EC) Default: 0

Settings 0: Disable
1: Reserve
2: RS-485
3: USB
4: COM Card
5–6: Reserve
7–9: AI1–AI3
10–11: Reserve
12–13: AI10–AI11
14–15: Reserve

Refer to description in Pr.P0-44–P0-45.

P1-45 P-PID2 Output Delay Time

(0x18ED) Default: 0.000

Settings 0.000–30.000 sec.

Refer to description in Pr.P0-46.

P1-46 P-PID2 Fdk Error Indn

(0x18EE) Default: 0

Settings 0: Disable
1–2: Relay1–Relay2
3–4: MO1–MO2
5–9: Reserve
10–15: MO/Relay10–15
16–19: Reserve

Refer to description in Pr.P0-47.

P2. Basic PID1

P2-00 B-PID1 Function

(0x1900) Default: 0

Settings
0: Disable
1: Enable
2: Enable after Run

Refer to description in Pr.P0-01.

P2-01 B-PID1 Ref Src

(0x1901) Default: 0

Settings
0: Disable
1: Keypad
2: RS-485
3: USB
4: COM Card
5–6: Reserve
7–9: AI1–AI3
10–11: Reserve
12–13: AI10–AI11
14–15: Reserve
16: Multi Setpoint
17: Pulse Train

Refer to description in Pr.P0-02.

P2-02 B-PID1 Fdk Src

(0x1902) Default: 0

Settings
0: Disable
1: Reserve
2: RS-485
3: USB
4: COM Card
5–6: Reserve
7–9: AI1–AI3
10–11: Reserve
12–13: AI10–AI11
14–15: Reserve
16: Pulse Train

Refer to description in Pr.P0-04.

P2-03 B-PID1 Setpoint

(0x1903) Default: 0

Settings -30000–30000 PID unit

Refer to description in Pr.P0-12.

✓ P2-04 B-PID1 Setpoint Upper Limit

(0x1904) Default: 10000

✓ P2-05 B-PID1 Setpoint Lower Limit

(0x1905) Default: 0

Settings -30000–30000 PID unit

📖 Refer to description in Pr.P0-13 and P0-14.

✓ P2-06 B-PID1 Fdk Filter Time

(0x1906) Default: 0.000

Settings 0.000–30.000 sec.

📖 Refer to description in Pr.P0-17.

✓ P2-07 B-PID1 Error OPER

(0x1907) Default: 0

Settings 0: PID1 err = PID1 Ref – PID1 Fdk
1: PID1 err = PID1 Fdk – PID1 Ref

📖 Refer to description in Pr.P0-19.

✓ P2-08 B-PID1 Multi Setpoint Src1

(0x1908) Default: 0

✓ P2-09 B-PID1 Multi Setpoint Src2

(0x1909) Default: 0

Settings 0: OFF
1: ON
2–7: MI1–MI6
8–9: Reserve
10–15: MI10–MI15
16–25: Reserve
26–28: Time Function 1–3
29–30: Reserve
31–38: Monitor 1–8

✓ P2-10 B-PID1 Multi Setpoint1

(0x190A) Default: 0

✓ P2-11 B-PID1 Multi Setpoint2

(0x190B) Default: 0

P2-12 B-PID1 Multi Setpoint3

(0x190C) Default: 0

✓ P2-13 B-PID1 Multi Setpoint4

(0x190D) Default: 0

Settings -30000–30000 PID1 unit

📖 Refer to description in Pr.P0-20–P0-25.

P2-14 B-PID1 Output Upper Limit

(0x190E) Default: 10000

P2-15 B-PID1 Output Lower Limit

(0x190F) Default: 0

Settings -30000–30000

Refer to description in Pr.P0-27–P0-28.

P2-16 B-PID1 P Gain

(0x1910) Default: 1.00

Settings 0.01–100.00

Refer to description in Pr.P0-29.

P2-17 B-PID1 I Time

(0x1911) Default: 60.0

Settings 0.0–6000.0 sec.

Refer to description in Pr.P0-30.

P2-18 B-PID1 D Time

(0x1912) Default: 0.000

Settings 0.000–10.000 sec.

Refer to description in Pr.P0-31.

P2-19 B-PID1 Derivative Filter

(0x1913) Default: 0.0

Settings 0.0–10.0 sec.

Refer to description in Pr.P0-32.

P2-20 B-PID1 Output Freeze Src

(0x1914) Default: 0

Settings
0: Disable
1: Enable
2–7: MI1–MI6
8–9: Reserve
10–15: MI10–MI15
16–25: Reserve
26–28: Time Function 1–3
29–30: Reserve
31–38: Monitor 1–8

Refer to description in Pr.P0-33.

P2-21 B-PID1 Deadband Zone

(0x1915) Default: 0

Settings 0–10000

⌿ P2-22 B-PID1 Deadband Delay

(0x1916) Default: 0.0

Settings 0.0–3600.0 sec.

📖 Refer to description in Pr.P0-34 and P0-35.

⌿ P2-23 B-PID1 Output AO Sel

(0x1917) Default: 0

Settings 0: Disable

1–2: AO1–AO2

3–4: Reserve

5–6: AO10–AO11

📖 Use this parameter to select analog output terminals that are defined as “Basic PID1 output”.

📖 The upper limit of Pr.P2-14 B-PID1 output is 100%.

P3. Basic PID2

P3-00 B-PID2 Function

(0x1940) Default: 0

Settings 0: Disable
1: Enable
2: Enable after Run

Refer to description in Pr.P0-01.

P3-01 B-PID2 Ref Src

(0x1941) Default: 0

Settings 0: Disable
1: Keypad
2: RS-485
3: USB
4: COM Card
5–6: Reserve
7–9: AI1–AI3
10–11: Reserve
12–13: AI10–AI11
14–15: Reserve
16: Multi Setpoint
17: Pulse Train

Refer to description in Pr.P0-02.

P3-02 B-PID2 Fdk Src

(0x1942) Default: 0

Settings 0: Disable
1: Reserve
2: RS-485
3: USB
4: COM Card
5–6: Reserve
7–9: AI1–AI3
10–11: Reserve
12–13: AI10–AI11
14–15: Reserve
16: Pulse Train

Refer to description in Pr.P0-04.

P3-03 B-PID2 Setpoint

(0x1943) Default: 0

Settings -30000–30000 PID unit

Refer to description in Pr.P0-12.

P3-04 B-PID2 Setpoint Upper Limit

(0x1944) Default: 10000

P3-05 B-PID2 Setpoint Lower Limit

(0x1945) Default: 0

Settings -30000–30000 PID unit

Refer to description in Pr.P0-13 and P0-14.

P3-06 B-PID2 Fdk Filter Time

(0x1946) Default: 0.000

Settings 0.000–30.000 sec.

Refer to description in Pr.P0-17.

P3-07 B-PID2 Error OPER

(0x1947) Default: 0

Settings 0: PID1 err = PID1 Ref – PID1 Fdk

1: PID1 err = PID1 Fdk – PID1 Ref

Refer to description in Pr.P0-19.

P3-08 B-PID2 Multi Setpoint Src1

(0x1948) Default: 0

P3-09 B-PID2 Multi Setpoint Src2

(0x1949) Default: 0

Settings 0: OFF

1: ON

2–7: MI1–MI6

8–9: Reserve

10–15: MI10–MI15

16–25: Reserve

26–28: Time Function 1–3

29–30: Reserve

31–38: Monitor 1–8

P3-10 B-PID2 Multi Setpoint1

(0x194A) Default: 0

P3-11 B-PID2 Multi Setpoint2

(0x194B) Default: 0

P3-12 B-PID2 Multi Setpoint3

(0x194C) Default: 0

P3-13 B-PID2 Multi Setpoint4

(0x194D) Default: 0

Settings -30000–30000 PID unit

Refer to description in Pr.P0-20–P0-25.

P3-14 B-PID2 Output Upper Limit

(0x194E) Default: 10000

P3-15 B-PID2 Output Lower Limit

(0x194F) Default: 0

Settings -30000–30000 Hz

📖 Refer to description in Pr.P0-27–P0-28.

P3-16 B-PID2 P Gain

(0x1950) Default: 1.00

Settings 0.01–100.00

📖 Refer to description in Pr.P0-29.

P3-17 B-PID2 I Time

(0x1951) Default: 60.0

Settings 0.0–6000.0 sec.

📖 Refer to description in Pr.P0-30.

P3-18 B-PID2 D Time

(0x1952) Default: 0.000

Settings 0.000–10.000 sec.

📖 Refer to description in Pr.P0-31.

P3-19 B-PID2 Derivative Filter

(0x1953) Default: 0.0

Settings 0.0–10.0 sec.

📖 Refer to description in Pr.P0-32.

P3-20 B-PID2 Output Freeze Src

(0x1954) Default: 0

Settings 0: Disable
1: Enable
2–7: MI1–MI6
8–9: Reserve
10–15: MI10–MI15
16–25: Reserve
26–28: Time Function 1–3
29–30: Reserve
31–38: Monitor 1–8

📖 Refer to description in Pr.P0-33.

P3-21 B-PID2 Deadband Zone

(0x1955) Default: 0

Settings 0–10000

✎ P3-22 B-PID2 Deadband Delay

(0x1956) Default: 0.0

Settings 0.0–3600.0 sec.

📖 Refer to description in Pr.P0-34 and P0-35.

✎ P3-23 B-PID2 Output AO Sel

(0x1957) Default: 0

Settings 0: Disable

1–2: AO1–AO2

3–4: Reserve

5–6: AO10–AO11

📖 Refer to description in Pr.P2-23.

P4. Basic PID3

P4-00 B-PID3 Function

(0x1980) Default: 0

Settings 0: Disable
1: Enable
2: Enable after Run

Refer to description in Pr.P0-01.

P4-01 B-PID3 Ref Src

(0x1981) Default: 0

Settings 0: Disable
1: Keypad
2: RS-485
3: USB
4: COM Card
5–6: Reserve
7–9: AI1–AI3
10–11: Reserve
12–13: AI10–AI11
14–15: Reserve
16: Multi Setpoint
17: Pulse Train

Refer to description in Pr.P0-02.

P4-02 B-PID3 Fdk Src

(0x1982) Default: 0

Settings 0: Disable
1: Reserve
2: RS-485
3: USB
4: COM Card
5–6: Reserve
7–9: AI1–AI3
10–11: Reserve
12–13: AI10–AI11
14–15: Reserve
16: Pulse Train

Refer to description in Pr.P0-04.

P4-03 B-PID3 Setpoint

(0x1983) Default: 0

Settings -30000–30000 PID unit

Refer to description in Pr.P0-12.

✓ P4-04 B-PID3 Setpoint Upper Limit

(0x1984) Default: 10000

✓ P4-05 B-PID3 Setpoint Lower Limit

(0x1985) Default: 0

Settings -30000–30000 PID unit

📖 Refer to description in Pr.P0-13 and P0-14.

✓ P4-06 B-PID3 Fdk Filter Time

(0x1986) Default: 0.000

Settings 0.000–30.000 sec.

📖 Refer to description in Pr.P0-17.

✓ P4-07 B-PID3 Error OPER

(0x1987) Default: 0

Settings 0: PID1 err = PID1 Ref – PID1 Fdk
1: PID1 err = PID1 Fdk – PID1 Ref

📖 Refer to description in Pr.P0-19.

✓ P4-08 B-PID3 Multi Setpoint Src1

(0x1988) Default: 0

✓ P4-09 B-PID3 Multi Setpoint Src2

(0x1989) Default: 0

Settings 0: OFF
1: ON
2–7: MI1–MI6
8–9: Reserve
10–15: MI10–MI15
16–25: Reserve
26–28: Time Function 1–3
29–30: Reserve
31–38: Monitor 1–8

✓ P4-10 B-PID3 Multi Setpoint1

(0x198A) Default: 0

✓ P4-11 B-PID3 Multi Setpoint2

(0x198B) Default: 0

✓ P4-12 B-PID3 Multi Setpoint3

(0x198C) Default: 0

✓ P4-13 B-PID3 Multi Setpoint4

(0x198D) Default: 0

Settings -30000–30000 PID3 unit

📖 Refer to description in Pr.P0-20–P0-25.

P4-14 B-PID3 Output Upper Limit

(0x198E) Default: 10000

P4-15 B-PID3 Output Lower Limit

(0x198F) Default: 0

Settings -30000–30000

Refer to description in Pr.P0-27–P0-28.

P4-16 B-PID3 P Gain

(0x1990) Default: 1.00

Settings 0.01–100.00

Refer to description in Pr.P0-29.

P4-17 B-PID3 I Time

(0x1991) Default: 60.0

Settings 0.0–6000.0 sec.

Refer to description in Pr.P0-30.

P4-18 B-PID3 D Time

(0x1992) Default: 0.000

Settings 0.000–10.000 sec.

Refer to description in Pr.P0-31.

P4-19 B-PID3 Derivative Filter

(0x1993) Default: 0.0

Settings 0.0–10.0 sec.

Refer to description in Pr.P0-32.

P4-20 B-PID3 Output Freeze Src

(0x1994) Default: 0

Settings
0: Disable
1: Enable
2–7: MI1–MI6
8–9: Reserve
10–15: MI10–MI15
16–25: Reserve
26–28: Time Function 1–3
29–30: Reserve
31–38: Monitor 1–8

Refer to description in Pr.P0-33.

P4-21 B-PID3 Deadband Zone

(0x1995) Default: 0

Settings 0–10000

✔ P4-22 B-PID3 Deadband Delay

(0x1996) Default: 0.0

Settings 0.0–3600.0 sec.

📖 Refer to description in Pr.P0-34 and P0-35.

✔ P4-23 B-PID3 Output AO Sel

(0x1997) Default: 0

Settings 0: Disable

1–2: AO1–AO2

3–4: Reserve

5–6: AO10–AO11

📖 Refer to description in Pr.P2-23.

P5. Basic PID4

P5-00 B-PID4 Function

(0x19C0) Default: 0

Settings 0: Disable
1: Enable
2: Enable after Run

Refer to description in Pr.P0-01.

P5-01 B-PID4 Ref Src

(0x19C1) Default: 0

Settings 0: Disable
1: Keypad
2: RS-485
3: USB
4: COM Card
5–6: Reserve
7–9: AI1–AI3
10–11: Reserve
12–13: AI10–AI11
14–15: Reserve
16: Multi Setpoint
17: Pulse Train

Refer to description in Pr.P0-02.

P5-02 B-PID4 Fdk Src

(0x19C2) Default: 0

Settings 0: Disable
1: Reserve
2: RS-485
3: USB
4: COM Card
5–6: Reserve
7–9: AI1–AI3
10–11: Reserve
12–13: AI10–AI11
14–15: Reserve
16: Pulse Train

Refer to description in Pr.P0-04.

P5-03 B-PID4 Setpoint

(0x19C3) Default: 0

Settings -30000–30000 PID unit

Refer to description in Pr.P0-12.

P5-04 B-PID4 Setpoint Upper Limit

(0x19C4) Default: 10000

P5-05 B-PID4 Setpoint Lower Limit

(0x19C5) Default: 0

Settings -30000–30000 PID unit

📖 Refer to description in Pr.P0-13 and P0-14.

P5-06 B-PID4 Fdk Filter Time

(0x19C6) Default: 0.000

Settings 0.000–30.000 sec.

📖 Refer to description in Pr.P0-17.

P5-07 B-PID4 Error OPER

(0x19C7) Default: 0

Settings 0: PID1 err = PID1 Ref – PID1 Fdk

1: PID1 err = PID1 Fdk – PID1 Ref

📖 Refer to description in Pr.P0-19.

P5-08 B-PID4 Multi Setpoint Src1

(0x19C8) Default: 0

P5-09 B-PID4 Multi Setpoint Src2

(0x19C9) Default: 0

Settings 0: OFF

1: ON

2–7: MI1–MI6

8–9: Reserve

10–15: MI10–MI15

16–25: Reserve

26–28: Time Function 1–3

29–30: Reserve

31–38: Monitor 1–8

P5-10 B-PID4 Multi Setpoint1

(0x19CA) Default: 0

P5-11 B-PID4 Multi Setpoint2

(0x19CB) Default: 0

P5-12 B-PID4 Multi Setpoint3

(0x19CC) Default: 0

P5-13 B-PID4 Multi Setpoint4

(0x19CD) Default: 0

Settings -30000–30000 PID4 unit

📖 Refer to description in Pr.P0-20–P0-25.

P5-14 B-PID4 Output Upper Limit

(0x19CE) Default: 10000

P5-15 B-PID4 Output Lower Limit

(0x19CF) Default: 0

Settings -30000–30000

Refer to description in Pr.P0-27–P0-28.

P5-16 B-PID4 P Gain

(0x19D0) Default: 1.00

Settings 0.01–100.00

Refer to description in Pr.P0-29.

P5-17 B-PID4 I Time

(0x19D1) Default: 60.0

Settings 0.0–6000.0 sec.

Refer to description in Pr.P0-30.

P5-18 B-PID4 D Time

(0x19D2) Default: 0.000

Settings 0.000–10.000 sec.

Refer to description in Pr.P0-31.

P5-19 B-PID4 Derivative Filter

(0x19D3) Default: 0.0

Settings 0.0–10.0 sec.

Refer to description in Pr.P0-32.

P5-20 B-PID4 Output Freeze Src

(0x19D4) Default: 0

Settings 0: Disable
1: Enable
2–7: MI1–MI6
8–9: Reserve
10–15: MI10–MI15
16–25: Reserve
26–28: Time Function 1–3
29–30: Reserve
31–38: Monitor 1–8

Refer to description in Pr.P0-33.

P5-21 B-PID4 Deadband Zone

(0x19D5) Default: 0

Settings 0–10000

✓ P5-22 B-PID4 Deadband Delay

(0x19D6) Default: 0.0

Settings 0.0–3600.0 sec.

📖 Refer to description in Pr.P0-34 and P0-35.

✓ P5-23 B-PID4 Output AO Sel

(0x19D7) Default: 0

Settings 0: Disable

1–2: AO1–AO2

3–4: Reserve

5–6: AO10–AO11

📖 Refer to description in Pr.P2-23.

U. Industry

U0. Pump Function

U0-00 Circulation Control

(0x1B00) Default: 0

Settings
0: Disable
1: Time Circulation
2: QTY Circulation
3: QTY Control
4: QTY + Time Circulation
5: QTY Control + Time Circulation

- Setting 1: Under multi-pump operation, the pump circulation system is set according to the pump running time. One AC motor drive supports up to eight pumps control at a time, each pump is switched according to a fixed operation time and switching delay time. The following Diagram 1 demonstrates Time Circulation Application, and Table 1 lists related parameters for the pump circulation mode.
- Setting 2: With multiple pumps , the pump circulation system is carried out according to the flow demand. One AC motor drive supports up to four pumps control to expand the controlled flow or pressure range (refer to Diagram 2 Quantitative Circulation Application) and can execute PID operation with flow or pressure feedback signals. When controlling the flow, the pumps are in parallel connection; when controlling the pressure range, the pumps are in serial connection. Therefore, the pump is turned on or off according to the flow demand.
- Setting 3: With multiple pumps , the pump circulation system is carried out according to the flow demand. One AC motor drive supports up to eight pumps control to expand the controlled flow or pressure range (refer to Diagram 3 Quantitative Control Application). The drive can also execute PID operation with the flow and pressure feedback signal. When controlling the flow, the pumps are in parallel connection; when controlling the pressure range, the pumps are in serial connection. In addition, the AC motor drive controls one master pump in this mode, and the rest are supplied by the mains power to the auxiliary pumps.
- Setting 2 and 3: Suitable for applications where the AC motor drive controls cascaded pumps. The advantage is using a drive with lower power to control a wide range of flow or pressure so that the pump does not run all the time, and to reduce abrasion.
- Setting 4: Executes time-circulation under the quantitative circulation, so that the AC motor drive can run the idle pumps regularly (controls up to four sets of pumps) to achieve the average use and to prolong the life of each pump, also to avoid rust damage caused by a specific pump not being used for a long time.
- Setting 5: Executes time-circulation under the quantitative circulation, so that the AC motor drive can run the idle pumps periodically through the output contact lapping the mains power (controls up to eight sets of pumps) to achieve the average use and to prolong the life of each pump, also to avoid rust damage caused by a specific pump not being used for a long time.

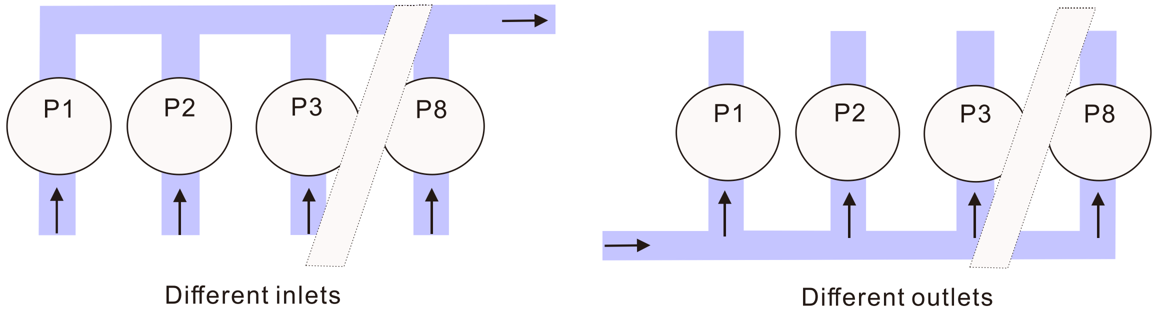


Diagram 1: Multi Inlets / Outlets Pump Application

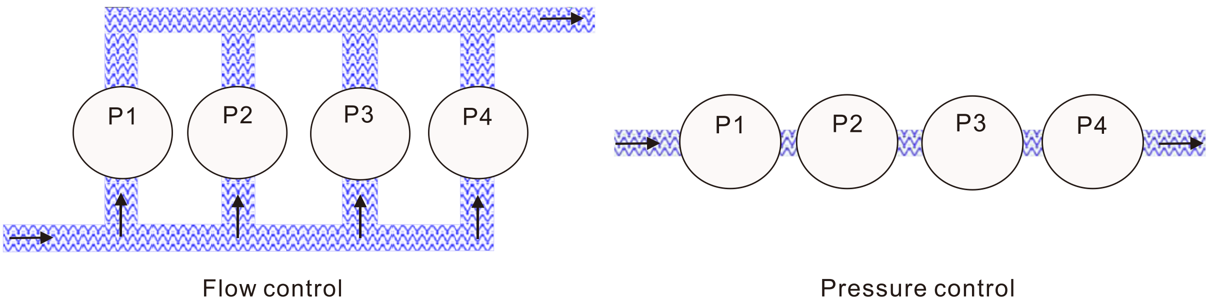


Diagram 2: QTY Circulation Application

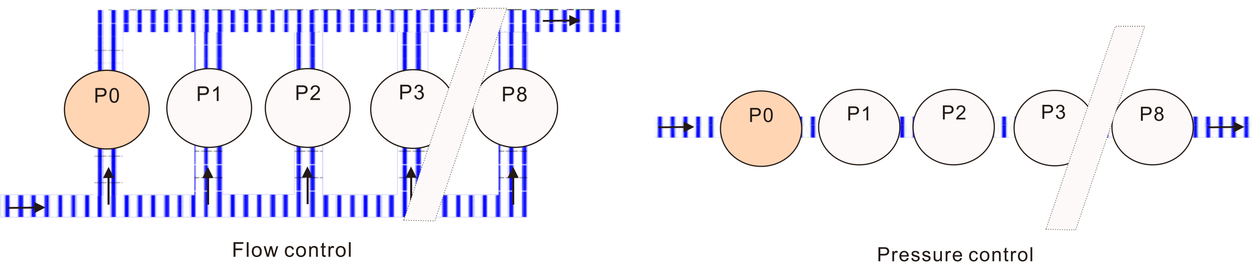


Diagram 3: QTY Control Application

Pr.	Pump Circulation Related Parameters					
U0-00 Circulation Control	0 Disable	1 Time Circulation	2 QTY Circulation	3 QTY Control	4 QTY + Time Circulation	5 QTY Control + Time Circulation
U0-01 Number of Pump	N/A	V	V	V	V	V
U0-02 Pump Status Word		V	V	V	V	V
U0-03 Pump Switch Type		V	-	-	V	V
U0-04 Circulation Time		V	-	-	V	V
U0-05 Time Circulation Switch Delay		V	-	-	-	-
U0-06 Time Circulation Output Delay		V	-	-	-	-

Pr.	Pump Circulation Related Parameters					
U0-07 AUX Pump Active FREQ Level		-	V	V	V	V
U0-08 AUX Pump Active Check Time		-	V	V	V	V
U0-09 AUX Pump Active Delay Time		-	V	-	V	V
U0-10 QTY Circulation Output Delay		-	V	-	V	-
U0-11 AUX Pump Deactive FREQ Level		-	V	-	V	-
U0-12 AUX Pump Deactive Check Time		-	V	V	V	V
U0-13 QTY Circulation Fault Action		-	V	-	V	-
U0-14 Output FREQ Reached Range		-	-	-	V	V
U0-15–U0-22 Pump 1–8 Output Enable Sel		V	V	V	V	V
U0-23–U0-31 Pump 1–8 Stop MI Src		V	V	V	V	V
U0-32–Uo-39 Pump 1–8 Operating Time		V	V	V	V	V
U0-40 Pump Operating Time Erase		V	V	V	V	V
A2-00 Stop Method		V	-	-	-	-
C2-19 FREQ Lower Limit		-	-	V	-	V

Table 1 Pump Circulation Related Parameters

U0-01 Number of Pump

(0x1B01) Default: 1

Settings 1–8

- According to Pr.U0-00 Circulation Control, Pr.U0-01 controls up to eight sets of pumps. After setting, the output terminal configuration of pump 1–8 automatically changes to the corresponding output content (refer to Table 2) and overwrites the previous set output terminal function. For example, when you set four sets of pumps, Pr.U0-15–U0-18 automatically correspond to 1 (RY1)–4 (MO2), and the rest of parameters (Pr.U0-19–U0-22) are set as 0 (Disable).
- When the setting for Pr.U0-01 is changed again (for example, changes from 4 to 2), Pr.U0-15 and U0-22 return to the default value listed in the Table 2 (column U0-01 number of pumps 02).

U0-01 Number of Pump	01	02	03	04	05	06	07	08
U0-15 Pump 1 Output Enable Sel	1 (RY1)	1 (RY1)	1 (RY1)	1 (RY1)	1 (RY1)	1 (RY1)	1 (RY1)	1 (RY1)
U0-16 Pump 2 Output Enable Sel	0	2 (RY2)	2 (RY2)	2 (RY2)	2 (RY2)	2 (RY2)	2 (RY2)	2 (RY2)

U0-01 Number of Pump	01	02	03	04	05	06	07	08
U0-17 Pump 3 Output Enable Sel	0	0	3 (MO1)	3 (MO1)	3 (MO1)	3 (MO1)	3 (MO1)	3 (MO1)
U0-18 Pump 4 Output Enable Sel	0	0	0	4 (MO2)	4 (MO2)	4 (MO2)	4 (MO2)	4 (MO2)
U0-19 Pump 5 Output Enable Sel	0	0	0	0	10 (RY10)	10 (RY10)	10 (RY10)	10 (RY10)
U0-20 Pump 6 Output Enable Sel	0	0	0	0	0	11 (RY11)	11 (RY11)	11 (RY11)
U0-21 Pump 7 Output Enable Sel	0	0	0	0	0	0	12 (RY12)	12 (RY12)
U0-22 Pump 8 Output Enable Sel	0	0	0	0	0	0	0	13 (RY13)

Table 2: Setting of Multi-function Output Terminal for Circulating Motors

U0-02 Pump Status Word

(0x1B02) Default: Read only

Settings 0–0xFFFF

- Pump operation status display bits. Displays the drive operation command to start or stop the multi-pump control function.
- bit0: Start or stop pump circulation mode.
- bit1–8: Current available pump number of the multi-pump system.
- bit9–10: The pressure increments or pressure decrement demand of multi-pump control, set as 0 when the pressure is balanced. bit00 is no demand, 01 means high demand and 10 means low demand.
- bit11: Pump operation basis.

bit	bit 8	bit 7	bit 6	bit 5	bit 4	bit 3	bit 2	bit 1	bit 0
OFF	Pump 8 OFF	Pump 7 OFF	Pump 6 OFF	Pump 5 OFF	Pump 4 OFF	Pump 3 OFF	Pump 2 OFF	Pump 1 OFF	Pump circulation mode OFF
ON	Pump 8 ON	Pump 7 ON	Pump 6 ON	Pump 5 ON	Pump 4 ON	Pump 3 ON	Pump 2 ON	Pump 1 ON	Pump circulation mode ON

bit	bit 11	bit 10	bit 9
OFF	Pump runs in sequence	Pump balanced	Pump balanced
ON	Pump runs by time	Low pressure increment demand	High pressure increment demand

U0-03 Pump Switch Type

(0x1B03) Default: 0

Settings 0: by the sequence

1: by the least running Time

- Through selecting the logic of priority switching to achieve the purpose of using multiple motors on average in the pump circulation system.
- The priority of the terminal sequence is to match the corresponding multi-function output terminals in each circulation control mode (Pr.U0-00 = 1–5).
- Minimum operation time: Starts in the order from the motor with the minimum operating hours among all running motors.
- The minimum operation time is only applicable for operation time record under Time Circulation Mode, as listed in the table below.

Pump Switch Type / Circulation Control	Terminal order	Minimum operation time
Time Circulation	V	V
QTY Circulation	V	-
QTY Control	V	-
QTY + Time Circulation	V	V
QTY Control + Time Circulation	V	V

- When Pr.U0-00 (Circulation Control) = 1–5, you can choose to record the operation time with the priority of the terminal sequence.
- When Pr.U0-00 (Circulation Control) = 2–3, you can only choose the priority of the terminal sequence. When the minimum operation time priority is selected, it is an invalid selection.
- When the circulation control is enabled (Pr.U0-00 ≠ 0) and the setting for Pr.U0-03 is changed before the drive runs, the output terminal immediately changes; accordingly, in the contrary, when the circulation control is enabled (Pr.U0-00 ≠ 0) and the setting for Pr.U0-03 is changed after the drive runs, the output terminal status will be valid in the next circulation.
- When the minimum operation time is enabled, the drive sorts the operation hours according to the amount of running motors at the moment, and then choose the motor that has the minimum operation hour to start after RUN command.

  As Example 1 below shows, the drive starts Motor 2, which having the minimum operation time among all eight motors.

  As Example 2 below shows, the drive only starts Motor 1 to Motor 5. Motor 8 does not start despite having the minimum operation time. Moreover, if more than one motor has the same minimum operation hour, the number of the motor takes the priority. Therefore, Motor 3 starts rather than Motor 5.

Motor operation time-Example 1

Motor No. / Motor Status	Status	Hour	Min./Sec.
Motor 1	ON	0	59 59
Motor 2	ON	0	12 12
Motor 3	ON	2	00 00
Motor 4	ON	0	43 11
Motor 5	ON	1	33 00
Motor 6	ON	3	50 05
Motor 7	ON	1	05 22
Motor 8	ON	10	20 21

Motor operation time-Example 2

Motor No. / Motor Status	Status	Hour	Min./Sec.
Motor 1	ON	0	59 59
Motor 2	ON	5	12 12
Motor 3	ON	0	33 00
Motor 4	ON	0	43 11
Motor 5	ON	0	33 00
Motor 6	OFF	3	50 05
Motor 7	OFF	1	05 22
Motor 8	OFF	0	00 21

Table 3 Example for Pump Circulation Priority Selection (U0-03)

⌿ U0-04 Circulation Time

(0x1B04) Default: 0

Settings 0–65000 min.

📖 Sets the fixed time for circulation, the unit is minutes. If Pr.U0-04 = 0, stop the timing. The currently running motors continue operating until a Stop command is given.

⌿ U0-05 Time Circulation Switch Delay

(0x1B05) Default: 0.1

Settings 0.1–3600.0 sec.

U0-06 Time Circulation Output Delay

(0x1B06) Default: 1.0

Settings 1.0–100.0 sec.

📖 Under time circulation, when the current pump operates for the time of Pr.U0-04 and lasts for the switch delay time of Pr.U0-05 and the output delay time of Pr.U0-06, the next pump operates continuously.

📖 When the output terminal is switched, the U, V and W output side of the drive may output without completely connected due to the system hardware delay effect. Ensure that the UVW output side of the drive is completely connected by setting Pr.U0-06 (Time Circulation Output Delay), and to avoid over current of the drive.

U0-07 AUX Pump Active FREQ Level

(0x1B07) Default: 60.00

Settings 0.00–599.00 Hz

- In quantitative circulation, quantitative control, Qty circulation + time circulation and Qty control + time circulation, the auxiliary pump active frequency level is required for the AC motor drive to drive the master pump.

U0-08 AUX Pump Active Check Time

(0x1B08) Default: 10.0

Settings 1.0–3600.0 sec.

- In quantitative circulation, quantitative control, Qty circulation + time circulation and Qty control + time circulation, when the AC motor drive drives the Master pump and reaches Pr.U0-07 (AUX Pump Active FREQ Level) and Pr.U0-08 (AUX Pump Active Check Time), the auxiliary pump is started for pressurization.

U0-09 AUX Pump Active Delay Time

(0x1B09) Default: 1.0

Settings 1.0–3600.0 sec.

- Sets the pump switching delay time for the Qty circulation pressurization or Qty circulation and Qty control + time circulation voltage stabilization.

U0-10 QTY Circulation Output Delay

(0x1B0A) Default: 1.0

Settings 1.0–100.0 sec.

- Sets the output delay time before the drive starts the Master pump under Qty circulation or Qty circulation + time circulation.

U0-11 AUX Pump Deactive FREQ Level

(0x1B0B) Default: 0.00

Settings 0.00–599.00 Hz

- Turn off the judging frequency of the auxiliary pump when decreasing pressure in QTY circulation or QTY + Time circulation mode.

U0-12 AUX Pump Deactive Check Time

(0x1B0C) Default: 1.0

Settings 1.0–3600.0 sec.

- In quantitative circulation and Qty circulation + time circulation, when the drive output frequency is lower than Pr.U0-11 (AUX Pump Deactive FREQ Level) and Pr.U0-12 (AUX Pump Deactive Check Time), deactivate the auxiliary pump for pressurization.
- In quantitative circulation and Qty control + time circulation, when the drive output frequency is lower than Pr.C2-19 (FREQ Lower Limit) and Pr.U0-12 (AUX Pump Deactive Check Time), deactivate the auxiliary pump for pressurization.

⌁ U0-13 QTY Circulation Fault Action

(0x1B0D) Default: 0

Settings 0: Stop All Pumps
1: Stop MAS Pump

- When a fault errors to the drive under Qty circulation or Qty circulation + time circulation mode, stop the pump according to the fault action.

⌁ U0-14 Output FREQ Reached Range

(0x1B0E) Default: 1.00

Settings 0.00–100.00%

- In Qty circulation + time circulation or Qty control + time circulation mode, when the output frequency reaches the range of (1± output frequency reached range) × frequency command and continues to exceed the pump circulation setting, it is judged as voltage stabilization and enters time circulation mode. Switch the current pump to the idle pump according to Pr.U0-03 (Pump Switch Type).

U0-15 Pump 1 Output Enable Sel

(0x1B0F) Default: 0

U0-16 Pump 2 Output Enable Sel

(0x1B10) Default: 0

U0-17 Pump 3 Output Enable Sel

(0x1B11) Default: 0

U0-18 Pump 4 Output Enable Sel

(0x1B12) Default: 0

U0-19 Pump 5 Output Enable Sel

(0x1B13) Default: 0

U0-20 Pump 6 Output Enable Sel

(0x1B14) Default: 0

U0-21 Pump 7 Output Enable Sel

(0x1B15) Default: 0

U0-22 Pump 8 Output Enable Sel

(0x1B16) Default: 0

Settings 0: Disable
1–2: Relay1–Relay2
3–4: MO1–MO2
5–9: Reserve
10–15: MO/Relay 10–15
16–19: Reserve

- Pump 1–8 output enable selection can flexibly enable, disable, or specify the output according to the setting.
- When Pr.U0-00 (Circulation Control) is set, the output terminal configuration of pump 1–8 automatically changes to the corresponding output content and overwrites the previous set output terminal function (refer to description in Pr.U0-01).

- Relay 1–2 and MO1–MO2 are control board multi-function (contact, photo coupler) output terminals; MO/ Relay 10–15 are extension card multi-function output terminals (contact, photo coupler).

U0-23 Pump 1 Stop MI Src
(0x1B17) Default: 0

U0-24 Pump 2 Stop MI Src
(0x1B18) Default: 0

U0-25 Pump 3 Stop MI Src
(0x1B19) Default: 0

U0-26 Pump 4 Stop MI Src
(0x1B1A) Default: 0

U0-27 Pump 5 Stop MI Src
(0x1B1B) Default: 0

U0-28 Pump 6 Stop MI Src
(0x1B1C) Default: 0

U0-29 Pump 7 Stop MI Src
(0x1B1D) Default: 0

U0-30 Pump 8 Stop MI Src
(0x1B1E) Default: 0

U0-31 Multi Pump Stop MI Src
(0x1B1F) Default: 0

Settings 0: Disable
1: Enable
2–7: MI1–MI6
8–9: Reserve
10–15: MI10–MI15

- Multi-pump circulation control can stop up to 8 motors. When the controlled motor fails or needs to be repaired, you can stop a single, multiple or all pumps through the setting of digital input terminal (refer to Table 4). You can enable this function by setting parameters or by the MI terminal.
- MI1–MI6 are control board multi-function input terminals; MI10–MI15 are IO extension card multi-function input terminals.
- When the specified digital input terminal is ON, the corresponded motor stops immediately and does not affect other operating motors.
- When select multi pump stop MI source (for example, as MI1), when MI1 is OFF, the pump is ON. When MI1 is ON, the pump is OFF and the operating motor coasts to stop.
- If the circulated pump turns off the motor (MI ON) before or during the circulation, when it takes turn to the stopped motor, the circulated pump skips it and runs to the next motor in sequence. If you turn on the stopped motor (MI OFF) before next circulation, it operates in sequence.

Pr.	U0-23	U0-24	U0-25	U0-26	U0-27	U0-28	U0-29	U0-30	U0-31
Pump OFF	1	2	3	4	5	6	7	8	ALL
Pump Stop MI Src	2–7 (MI1–6), 10–15 (MI10–15)								

Table 4 Correspondence between digital input terminal and pump stop

U0-32 Pump 1 Operating Time
(0x1B20) Default: Read only

U0-33 Pump 2 Operating Time
(0x1B22) Default: Read only

U0-34 Pump 3 Operating Time
(0x1B24) Default: Read only

U0-35 Pump 4 Operating Time
(0x1B26) Default: Read only

U0-36 Pump 5 Operating Time
(0x1B28) Default: Read only

U0-37 Pump 6 Operating Time
(0x1B2A) Default: Read only

U0-38 Pump 7 Operating Time
(0x1B2C) Default: Read only

U0-39 Pump 8 Operating Time
(0x1B2E) Default: Read only

Settings H-word: 65535 → 65535 hours

L-word: 05959 → 59 minutes/ 59 seconds

- Records operation time for Pump 1–8, each parameter fully records hours: minutes: seconds.
- When circulation control is enabled (Pr.U0-00 ≠ 0), the output frequency is > 0 Hz and output current is > 0 A, the motor operation time is recorded.
- When the record reaches the upper limit 65535 hours (about 7.5 years), clear the motor operation time manually to keep tracking the operation status of each motor and the service life of the motor.
- Pr.b0-01 (Parameter reset) does not clear the pump operation time record, you can only clear this record through Pr.U0-40.

✗ U0-40 Pump Operating Time Erase
(0x1B30) Default: 0

Settings 0: Disable

1: Erase Pump1 Operating Time

2: Erase Pump2 Operating Time

3: Erase Pump3 Operating Time

4: Erase Pump4 Operating Time

5: Erase Pump5 Operating Time

6: Erase Pump6 Operating Time

7: Erase Pump7 Operating Time

8: Erase Pump8 Operating Time

10: Erase all Pumps Operating Time

- Clear the operation time for single pump or all pumps as needed.
- When setting 1, Pump 1 operation time returns to zero; when setting 10, all the operation time of Pump 1–8 return to zero, refer to Table 5.
- When the parameters are set and the pump operation time is erased, the parameter value automatically changes to 0. For example, when Pr.U0-40 is set as 1 and Pump 1 operation time is cleared, Pr.U0-32 and Pr.U0-40 return to the default 0.
- When the circulation control is enabled (Pr.U0-00 ≠ 0) and the setting is changed before the drive runs (Pr.U0-03 = 1 by the least running time and Pr.U0-40 = 10), the output terminal immediately changes the first starting priority to Pump 0; in the contrary, when the circulation control is enabled (Pr.U0-00≠0) and the setting is changed after the drive runs (Pr.U0-03 = 1 by the least running time and Pr.U0-40 = 10), the output terminal status will be valid in the next circulation, and the one with the smaller serial number will take priority.

Pump	Pump Operating Time (Operated hour: minute: second)	Pump Operating Time Erase
Pump 1	U0-32	U0-40 = 1 (Clear Pump 1)
Pump 2	U0-33	U0-40 = 2 (Clear Pump 2)
Pump 3	U0-34	U0-40 = 3 (Clear Pump 3)
Pump 4	U0-35	U0-40 = 4 (Clear Pump 4)
Pump 5	U0-36	U0-40 = 5 (Clear Pump 5)
Pump 6	U0-37	U0-40 = 6 (Clear Pump 6)
Pump 7	U0-38	U0-40 = 7 (Clear Pump 7)
Pump 8	U0-39	U0-40 = 8 (Clear Pump 8)
All pumps	N/A	U0-40 = 10 (Clear all pumps)

Table 5 Pump operation time and time erase

Circulation Control Mode

1. Time Circulation

- After the function enables, the pump operates according to the setting for Pr.U0-04 (Circulation Time). When the operation time is up, it executes the stop command and disconnects the output terminal. After the time of Pr.U0-05 (Time Circulation Switch Delay) and Pr.U0-06 (Time Circulation Output Delay), it connects the next sequence motor and starts to run to the target frequency (refer to Figure 4, 5, and 6), and repeat the circulation.
- The time circulation ramps to stop or coasts to stop according to the setting for Pr.A2-00 (Stop Method). When setting coast to stop, it is recommended to enable the speed tracking function to avoid over current of the drive caused by the motor rotor running freely.

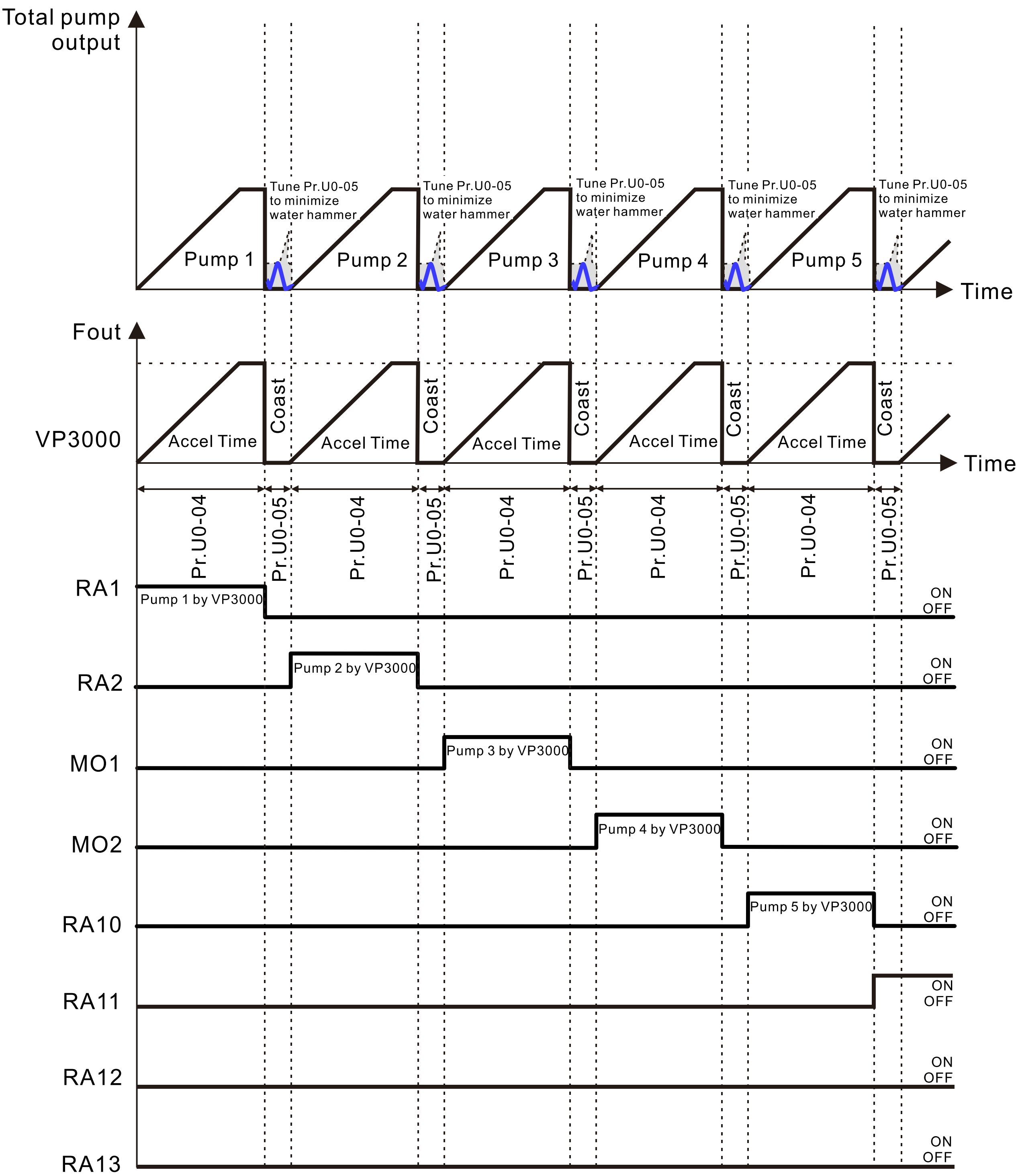


Figure 4 Time Circulation Terminal Sequence (Coast to stop)

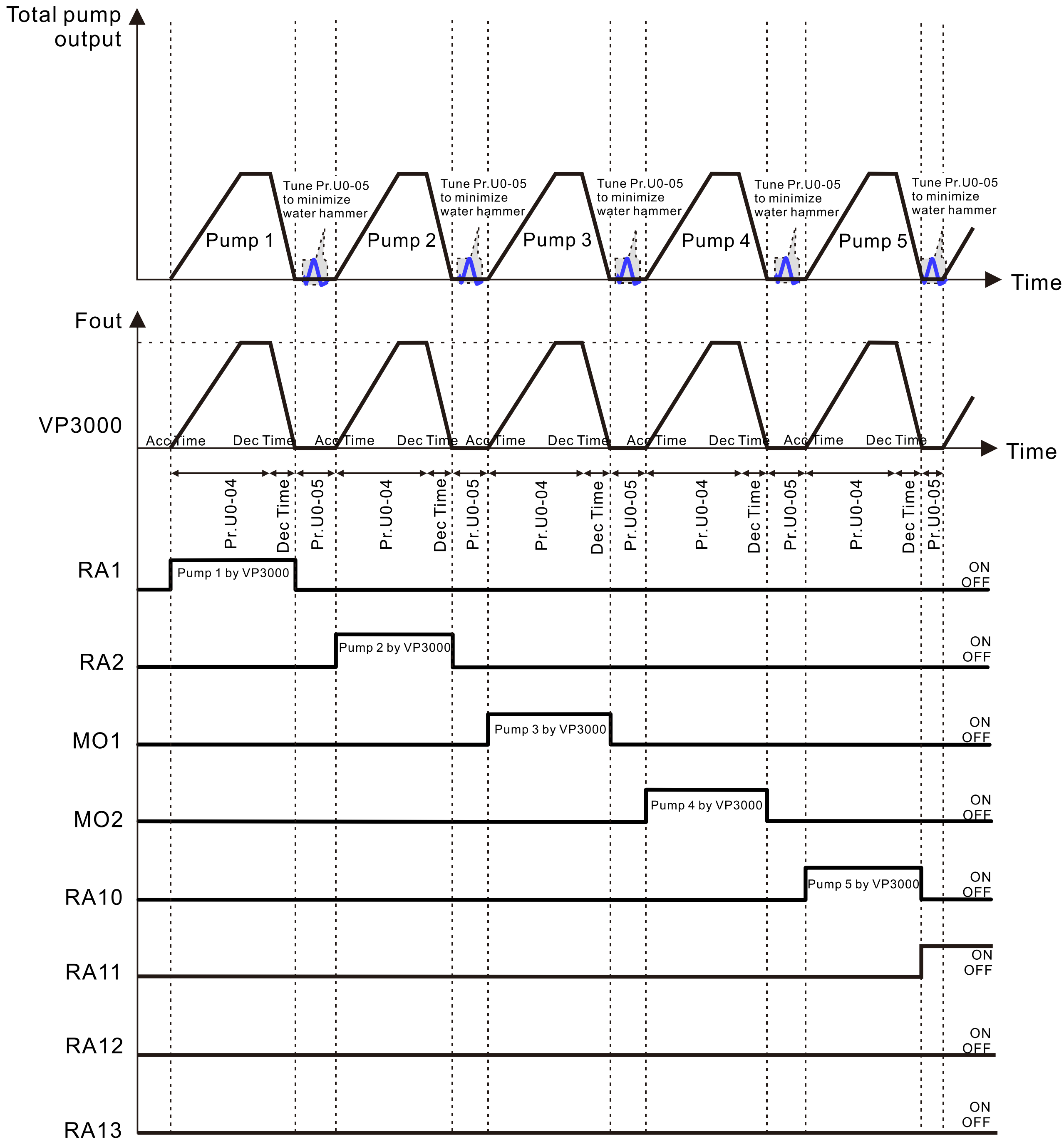


Figure 5 Time Circulation Terminal Sequence (Ramp to stop)

- The time circulation includes Pr.U0-05 (Time Circulation Switch Delay) and Pr.U0-06 (Time Circulation Output Delay) in pump-to-pump switching (refer to Figure 6).
- When the output terminal is switched, the U, V and W output side of the drive may output without completely connected due to the system hardware delay effect. Ensure that the UVW output side of the drive is completely connected by setting Pr.U0-06 (Time Circulation Output Delay), and to avoid over current of the drive.

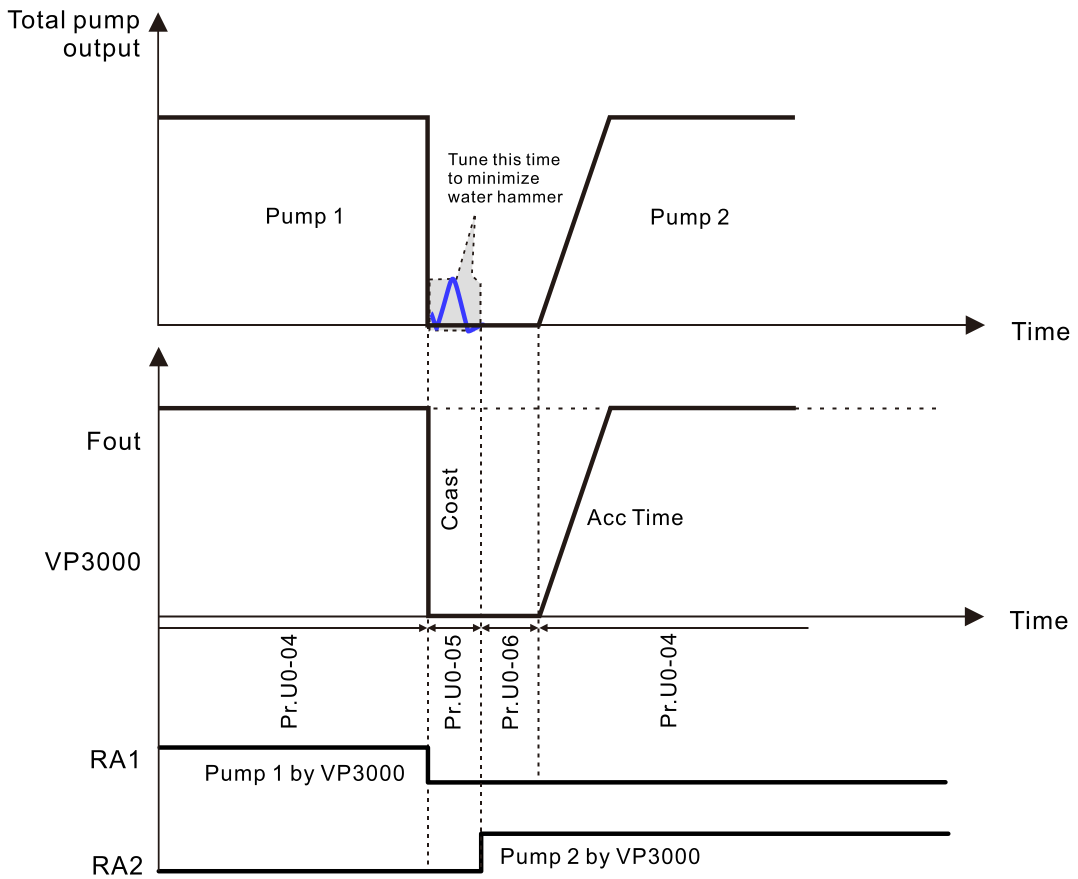


Figure 6 Time Circulation Output Delay Sequence

- Parameter Setting

Pr.	Description
U0-00 = 1	Circulation Control is set as "Time Circulation"
U0-01 = X	Number of Pump ● Up to 8 sets, after setting, Pump 1–8 output enable automatically sets according to Pr. U0-01

U0-01	01	02	03	04	05	06	07	08	
U0-15 Pump 1 Output	1 RA1	1 RA1	1 RA1	1 RA1	1 RA1	1 RA1	1 RA1	1 RA1	Pump 1 by Drive
U0-16 Pump 2 Output	0	2 RA2	2 RA2	2 RA2	2 RA2	2 RA2	2 RA2	2 RA2	Pump 2 by Drive
U0-17 Pump 3 Output	0	0	3 MO1	3 MO1	3 MO1	3 MO1	3 MO1	3 MO1	Pump 3 by Drive
U0-18	0	0	0	4 MO2	4 MO2	4 MO2	4 MO2	4 MO2	Pump 4 by Drive

Pr.	Description
	(continued table below)

Pump 4 Output									
U0-19 Pump 5 Output	0	0	0	0	10 RA10	10 RA10	10 RA10	10 RA10	Pump 5 by Drive
U0-20 Pump 6 Output	0	0	0	0	0	11 RA11	11 RA11	11 RA11	Pump 6 by Drive
U0-21 Pump 7 Output	0	0	0	0	0	0	12 RA12	12 RA12	Pump 7 by Drive
U0-22 Pump 8 Output	0	0	0	0	0	0	0	13 RA13	Pump 8 by Drive

Pr.	Description
U0-03 = X	Pump Switch Type ● Terminal sequence or minimum operation time
U0-04 = X	Circulation Time ● Pump Operating Time
U0-05 = X	Time Circulation Switch Delay ● Switch Delay Time between pumps
U0-06 = X	Time Circulation Output Delay ● Delay time before pump operates
U0-15–U0-22 = X	Pump 1–8 Output Enable Sel ● Pump output indication
U0-23–U0-31 = X	Pump 1–8 Stop MI Src ● Pumps inhibit output
U0-32–U0-39	Pump 1–8 Operating Time ● Pump actual operating time (read only)
U0-40 = X	Pump Operating Time Erase ● Reset operation time for single pump or all pumps

📖 Pumps inhibit output

Pump 1–8 Stop MI Src After setting and enabling MI, the corresponding pump can be stopped.

Pr.	U0-23	U0-24	U0-25	U0-26	U0-27	U0-28	U0-29	U0-30	U0-31
Pump OFF	1	2	3	4	5	6	7	8	ALL
Pump Stop MI Src	2–7 (MI1–6), 10–15 (MI10–15)								

📖 Wiring: Time Circulation (by time) can control up to eight motors. The following diagram shows an example of controlling four motors at the same time.

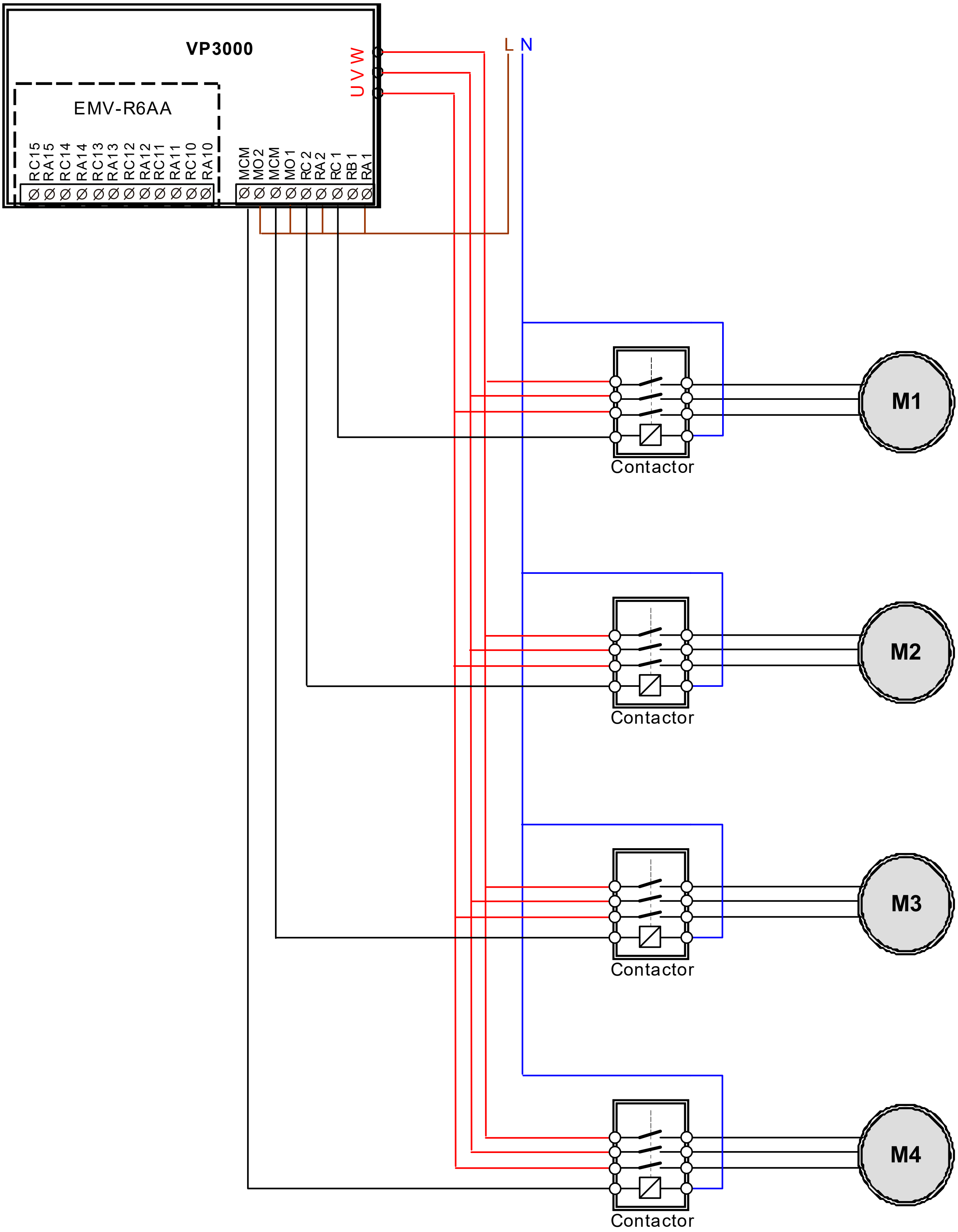


Figure 7 Time Circulation Wiring

2. QTY Circulation

- After the function is enabled, when the demand for water consumption increases, the master pump output frequency exceeds Pr.U0-07 (AUX Pump Active FREQ Level) and lasts for the time of Pr.U0-08 (AUX Pump Active Check Time), it selects the auxiliary pump with the prior pump switching mode according to the terminal sequence, and the master pump coasts to stop and disconnects the output terminal. After the auxiliary pump active delay time (Pr.U0-09), the master pump switches to mains power and connects with the next sequence motor for the time of Pr.U0-10 (QTY Circulation Output Delay), and then the AC motor drive starts another master pump (refer to Figure 8) for the incremental circulation according to the demand. In addition, adjust Pr.U0-09 (AUX Pump Active Delay Time) can alleviate water hammering, the actual value is fine-tuned according to the system.
- After the function is enabled, when the demand for water consumption decreases, the master pump output frequency is lower than Pr.U0-11 (AUX Pump Deactive FREQ Level) and lasts for the time of Pr.U0-12 (AUX Pump Deactive Check Time), it selects the auxiliary pump with the prior pump switching mode according to the terminal sequence and disconnects the output terminal. If the water demand still decreases for the time of Pr.U0-12, it stops the next auxiliary pump (refer to Figure 9) and repeats this circulation until all the auxiliary pumps are stopped. In addition, adjust Pr.U0-12 (AUX Pump Deactive Check Time) can alleviate water hammering, the actual value is fine-tuned according to the system.

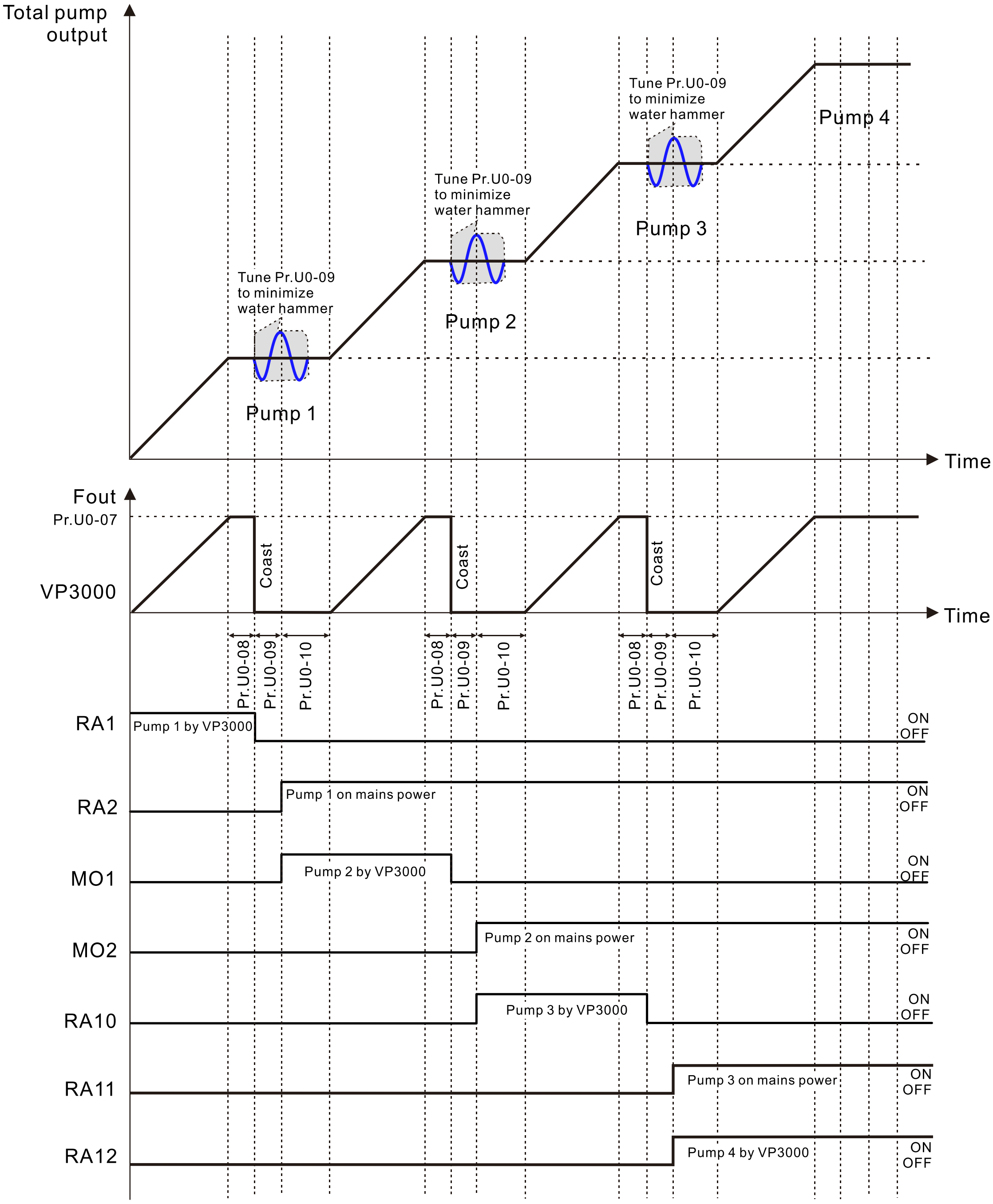


Figure 8 QTY Circulation Terminal Sequence (Pressure Increasing)

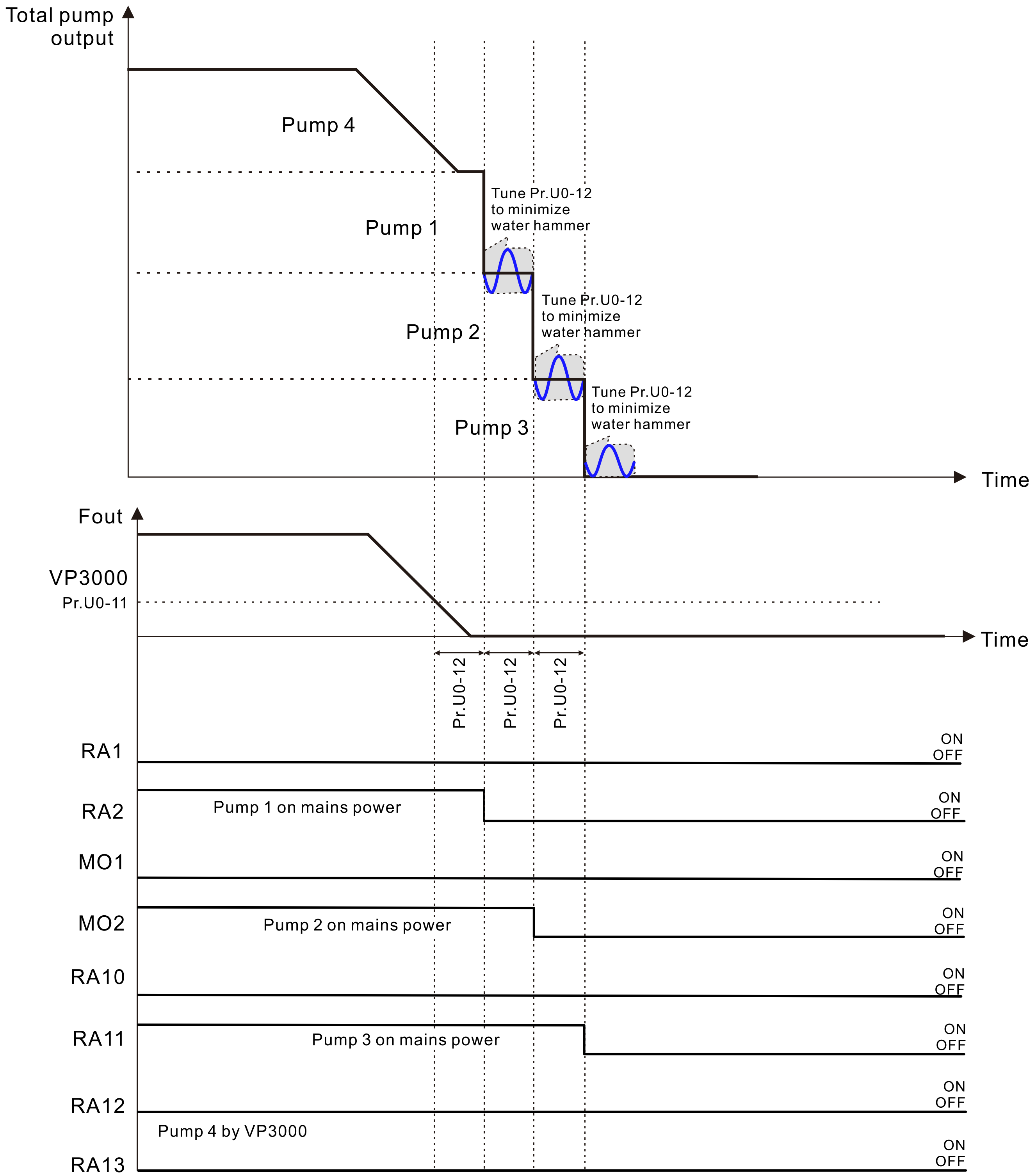


Figure 9 QTY Circulation Terminal Sequence (Pressure Decreasing)

Parameter Setting

<table>
<tr><th>Pr.</th><th>Description</th></tr>
<tr><td>U0-00 = 2</td><td>Circulation Control is set as “QTY Circulation”</td></tr>
<tr><td>U0-01 = X</td><td>Number of Pump
Up to 4 sets of pumps, after setting, the pump output automatically enables according to Pr.U0-01
Each set of pump uses two output terminals
<table>
<tr><td>U0-01</td><td>01</td><td>02</td><td>03</td><td>04</td><td></td></tr>
<tr><td>U0-15
Pump 1
Output</td><td>1
RA1</td><td>1
RA1</td><td>1
RA1</td><td>1
RA1</td><td>Pump 1 by Drive</td></tr>
<tr><td>U0-16
Pump 1
Output</td><td>2
RA2</td><td>2
RA2</td><td>2
RA2</td><td>2
RA2</td><td>Pump 1 by Main</td></tr>
<tr><td>U0-17
Pump 2
Output</td><td>0</td><td>3
MO1</td><td>3
MO1</td><td>3
MO1</td><td>Pump 2 by Drive</td></tr>
<tr><td>U0-18
Pump 2
Output</td><td>0</td><td>4
MO2</td><td>4
MO2</td><td>4
MO2</td><td>Pump 2 by Main</td></tr>
<tr><td>U0-19
Pump 3
Output</td><td>0</td><td>0</td><td>10
RA10</td><td>10
RA10</td><td>Pump 3 by Drive</td></tr>
<tr><td>U0-20
Pump 3
Output</td><td>0</td><td>0</td><td>11
RA11</td><td>11
RA11</td><td>Pump 3 by Main</td></tr>
<tr><td>U0-21
Pump 4
Output</td><td>0</td><td>0</td><td>0</td><td>12
RA12</td><td>Pump 4 by Drive</td></tr>
<tr><td>U0-22
Pump 4
Output</td><td>0</td><td>0</td><td>0</td><td>13
RA13</td><td>Pump 4 by Main</td></tr>
</table></td></tr>
<tr><td>U0-07 = X</td><td>AUX Pump Active FREQ Level
AUX Pump Active Switching FREQ</td></tr>
<tr><td>U0-08 = X</td><td>AUX Pump Active Check Time
AUX Pump Active Switching FREQ check time</td></tr>
<tr><td>U0-09 = X</td><td>AUX Pump Active Delay Time
Switch Delay Time between pumps</td></tr>
<tr><td>U0-10 = X</td><td>QTY Circulation Output Delay
Delay time before pump operates</td></tr>
<tr><td>U0-11 = X</td><td>AUX Pump Deactive FREQ Level
AUX Pump Deactive Switching FREQ</td></tr>
<tr><td>U0-12 = X</td><td>AUX Pump Deactive Check Time
AUX Pump Deactive Switching FREQ check time</td></tr>
<tr><td>U0-13 = X</td><td>QTY Circulation Fault Action
Stop all pumps or the master pump output</td></tr>
</table>

Pr.	Description
U0-15–U0-22 = X	Pump 1–8 Output Enable Sel ● Pump output indication
U0-23–U0-31 = X	Pump 1–8 Stop MI Src ● Pumps inhibit output
U0-32–U0-39	Pump 1–8 Operating Time ● Pump actual operating time (read only)
U0-40 = X	Pump Operating Time Erase ● Reset operation time for single pump or all pumps

📖 Disable Motor

Pump 1–4 Stop MI Src After setting and enabling MI, the corresponding pump can be stopped.

Pr.	U0-23	U0-24	U0-25	U0-26	U0-27	U0-28	U0-29	U0-30	U0-31
Pump OFF	1	2	3	4	-	-	-	-	ALL
Pump Stop MI Src	2–7 (MI1–6), 10–15 (MI10–15)								

- When the output of all motors is prohibited, the motors running on the mains stop, and the motors controlled by the AC motor drive coasts to stop.
- For the pumps controlled by the AC motor drive, if the MI is enabled, it will take effect in the next circulation.
- If a fault occurs during the QTY circulation, the pump output will be stopped according to Pr.U0-13 QTY Circulation Fault Action.

📖 Wiring: Time Circulation (by time) can control up to four motors. The following diagram shows an example of controlling four motors at the same time.

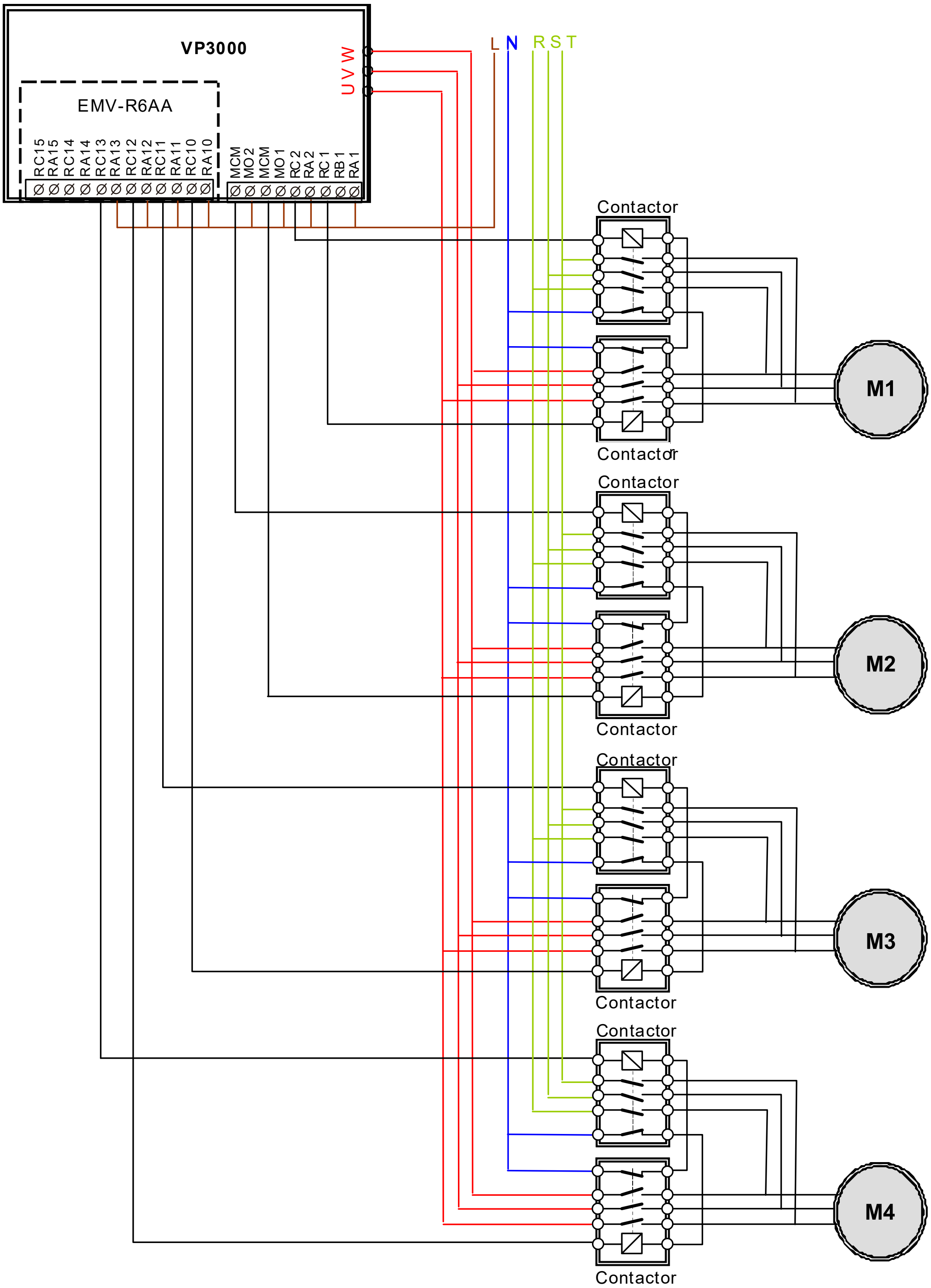


Figure 10 QTY Circulation Wiring

3. QTY Control

- After the function is enabled, when the demand for water consumption increases, the master pump output frequency exceeds Pr.U0-07 (AUX Pump Active FREQ Level) and lasts for the time of Pr.U0-08 (AUX Pump Active Check Time), the output terminal is OFF, and the auxiliary pump is started and connected to the mains power. When the demand remains unchanged for the time of Pr.U0-08 (AUX Pump Active Check Time), it turns off the output terminal and starts another auxiliary pump to connect to the mains power until all the auxiliary pumps are connected to the mains (refer to Figure 11).
- After the function is enabled, when the demand of water consumption decreases and the master pump output frequency is lower than or equal to the lower limit and lasts for the time of Pr.U0-12 (AUX Pump Deactive Check Time), disconnect the output terminal, and disconnect the auxiliary pump from the mains power. When the demand remains unchanged for the time of Pr.U0-12, disconnect the output terminal, and disconnect another auxiliary pump from the mains until all the auxiliary pumps are OFF (refer to Figure 12).
- The switching mode of the auxiliary pump is only based on the priority of the terminal sequence. When the pressure increases, the terminal with smaller sequence takes the priority; when the pressure decreases, the terminal with larger sequence is given priority.

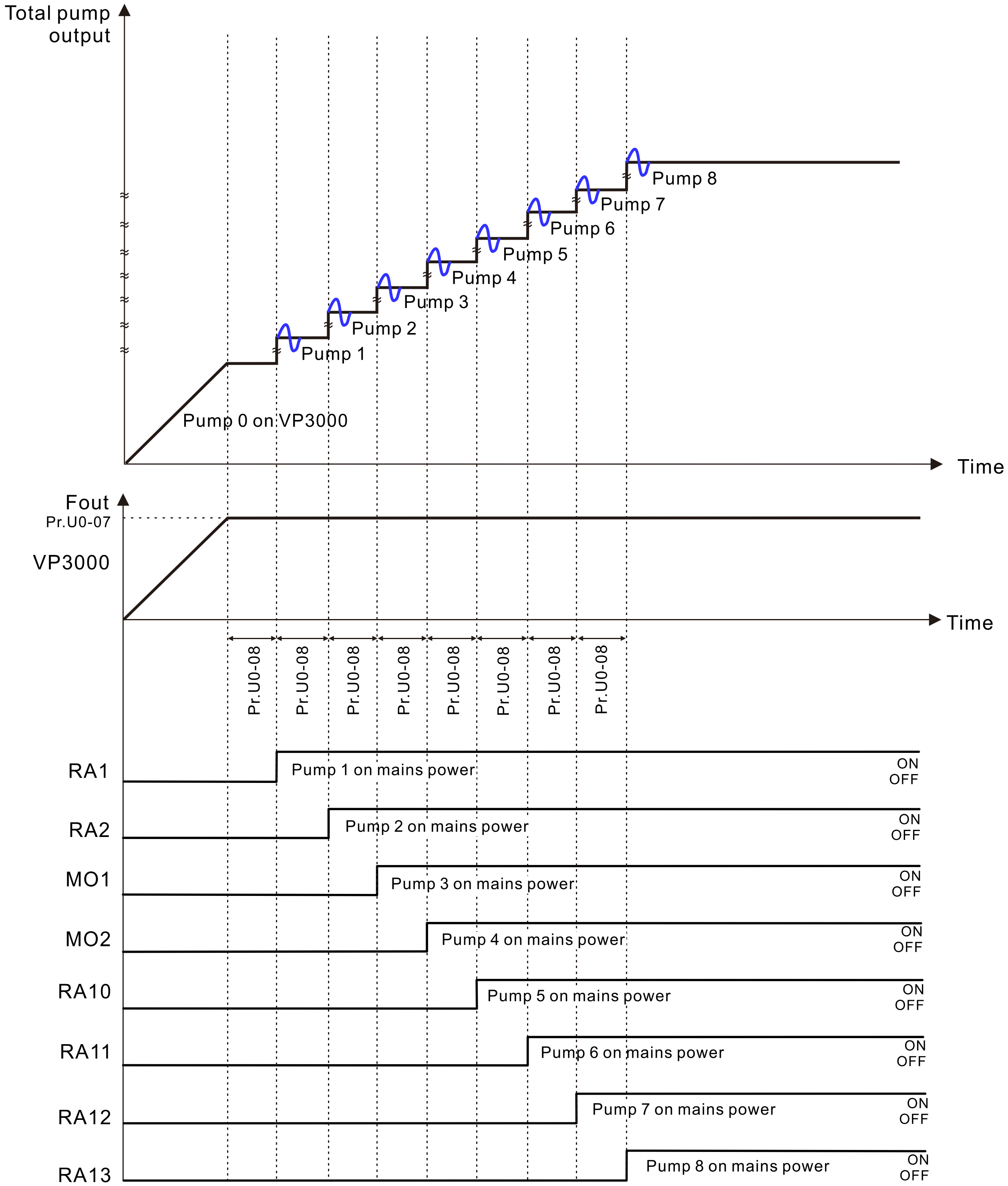


Figure 11 QTY Control Terminal Sequence (Pressure Increasing)

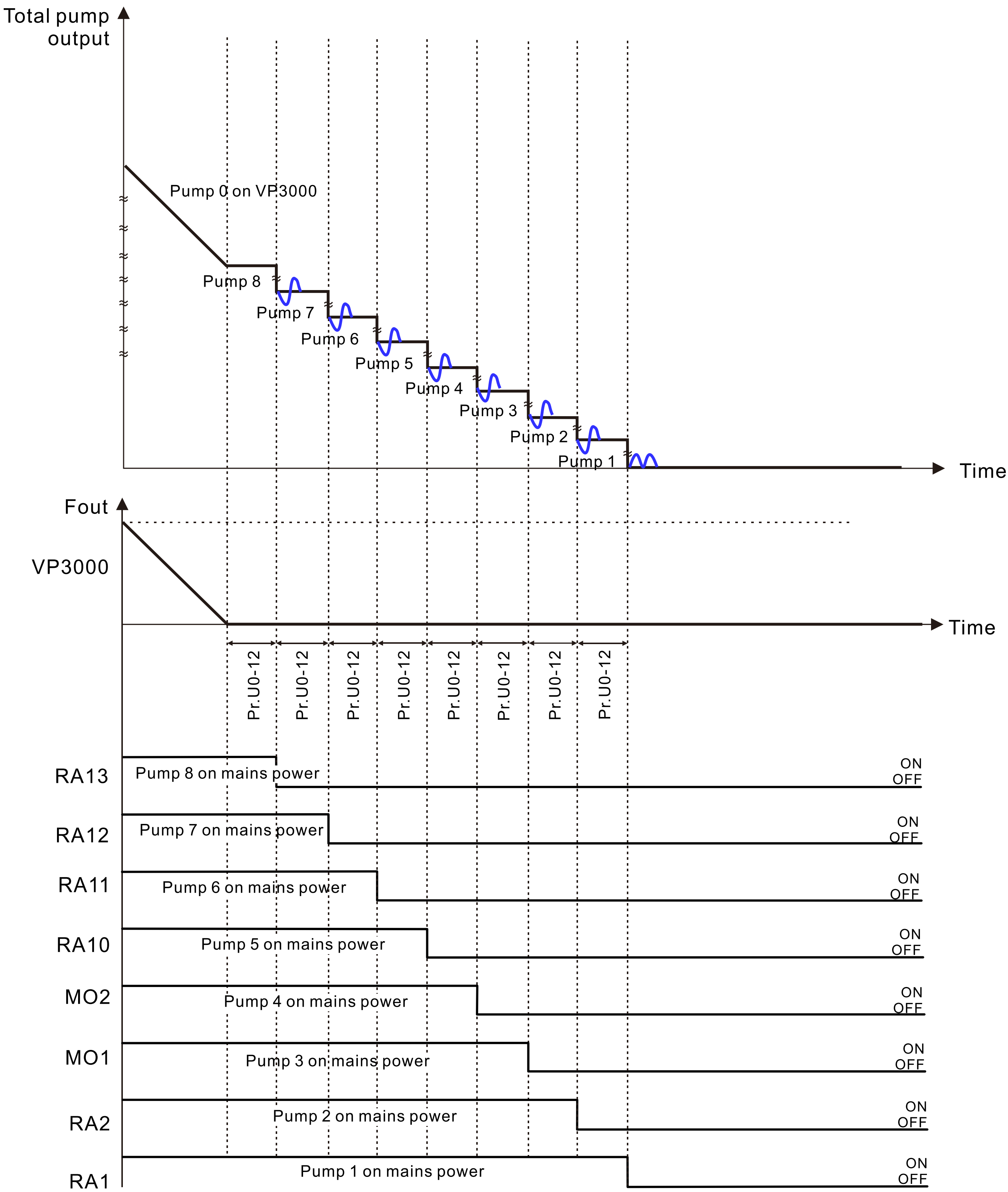


Figure 12 QTY Control Terminal Sequence (Pressure Decreasing)

Parameter Setting

<table>
<tr><th>Pr.</th><th>Description</th></tr>
<tr><td>U0-00 = 3</td><td>Circulation Control is set as "QTY Control"</td></tr>
<tr><td>U0-01 = X</td><td>Number of Pump
● Up to 8 sets of pumps, after setting, the pump output automatically enables according to Pr.U0-01
<table>
<tr><td>U0-01</td><td>01</td><td>02</td><td>03</td><td>04</td><td>05</td><td>06</td><td>07</td><td>08</td><td></td></tr>
<tr><td>U0-15 Pump 1 Output</td><td>1 RA1</td><td>1 RA</td><td>1 RA</td><td>1 RA</td><td>1 RA</td><td>1 RA</td><td>1 RA</td><td>1 RA</td><td>Pump 1 by Main</td></tr>
<tr><td>U0-16 Pump 2 Output</td><td>0</td><td>2 RA2</td><td>2 RA2</td><td>2 RA2</td><td>2 RA2</td><td>2 RA2</td><td>2 RA2</td><td>2 RA2</td><td>Pump 2 by Main</td></tr>
<tr><td>U0-17 Pump 3 Output</td><td>0</td><td>0</td><td>3 MO1</td><td>3 MO1</td><td>3 MO1</td><td>3 MO1</td><td>3 MO1</td><td>3 MO1</td><td>Pump 3 by Main</td></tr>
<tr><td>U0-18 Pump 4 Output</td><td>0</td><td>0</td><td>0</td><td>4 MO2</td><td>4 MO2</td><td>4 MO2</td><td>4 MO2</td><td>4 MO2</td><td>Pump 4 by Main</td></tr>
<tr><td>U0-19 Pump 5 Output</td><td>0</td><td>0</td><td>0</td><td>0</td><td>10 RA10</td><td>10 RA10</td><td>10 RA10</td><td>10 RA10</td><td>Pump 5 by Main</td></tr>
<tr><td>U0-20 Pump 6 Output</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>11 RA11</td><td>11 RA11</td><td>11 RA11</td><td>Pump 6 by Main</td></tr>
<tr><td>U0-21 Pump 7 Output</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>12 RA12</td><td>12 RA12</td><td>Pump 7 by Main</td></tr>
<tr><td>U0-22 Pump 8 Output</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>13 RA13</td><td>Pump 8 by Main</td></tr>
</table>
</td></tr>
<tr><td>U0-07 = X</td><td>AUX Pump Active FREQ Level
● AUX Pump Active Switching FREQ</td></tr>
<tr><td>U0-08 = X</td><td>AUX Pump Active Check Time
● AUX Pump Active Switching FREQ check time</td></tr>
<tr><td>C2-19 = X</td><td>FREQ Lower Limit
● AUX Pump Deactive Switching FREQ</td></tr>
<tr><td>U0-12 = X</td><td>AUX Pump Deactive Check Time
● When the auxiliary pump is decompressed, the output frequency is lower than or equal to the lower limit and the deactive check time.</td></tr>
<tr><td>U0-15–U0-22 = X</td><td>Pump 1–8 Output Enable Sel
● Pump output indication</td></tr>
<tr><td>U0-23–U0-31 = X</td><td>Pump 1–8 Stop MI Src
● Pumps inhibit output</td></tr>
<tr><td>U0-32–U0-39</td><td>Pump 1–8 Operating Time
● Pump actual operating time (read only)</td></tr>
</table>

Pr.	Description
U0-40 = X	Pump Operating Time Erase ● Reset operation time for single pump or all pumps

📖 Disable Motor

Pump 1–8 Stop MI Src After setting and enabling MI, the corresponding pump can be stopped.

Pr.	U0-23	U0-24	U0-25	U0-26	U0-27	U0-28	U0-29	U0-30	U0-31
Pump OFF	1	2	3	4	5	6	7	8	ALL
Pump Stop MI Src	2–7 (MI1–6), 10–15 (MI10–15)								

📖 Wiring: Fixed Quantity Control can control up to eight motors. The following diagram shows an example of controlling four motors at the same time.

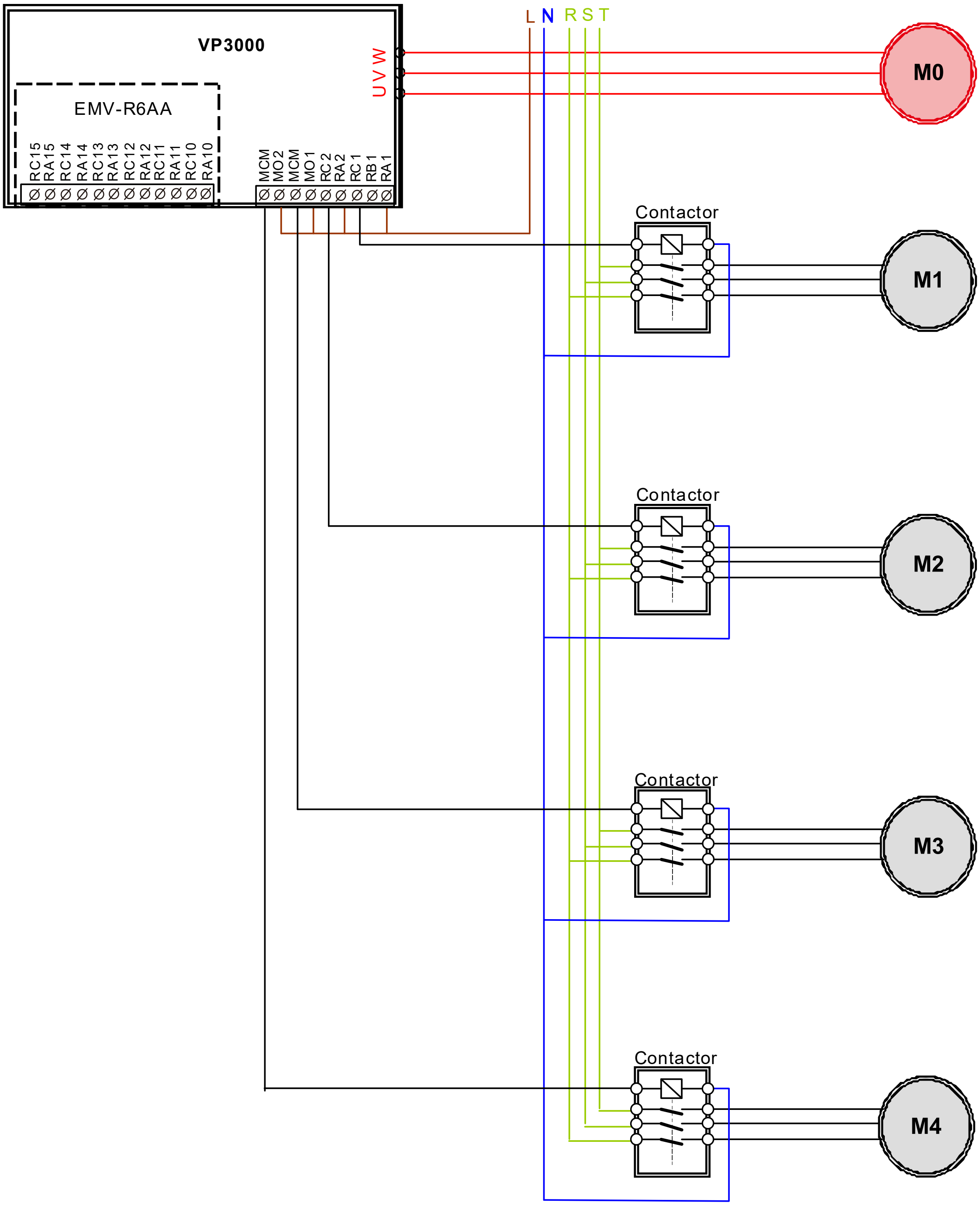


Diagram 13: QTY Control Wiring

4. QTY + Time Circulation

- Executes time-circulation under the quantitative circulation, so that the AC motor drive can run the idle pumps regularly to achieve the average use and to prolong the life of each pump, also to avoid rust damage caused by a specific pump not being used for a long time.
- Refer to the above for the QTY circulation function description. When the water pressure is balanced and there are idle pumps in the system, the pressure balance is identified within Pr.U0-14 (Output FREQ Reached Range) and for the time of Pr.U0-04 (Circulation Time), the current master pump is switched to mains power and transfers to auxiliary pumps, and then starts the next set of master pumps in sequence.
- The system supports up to 4 sets of pumps under QTY + time circulation mode. When the system water demand only needs single pump to balance the pressure, the AC motor drive runs single master pump according to Pr.U0-04 (Circulation Time) (refer to Figure 14), and then switches the master pump to Pump 2, Pump 3 and Pump 4 in sequence.

System Pump Qty / Pump Demand	One Pump (Situation 1)	2 Pumps (Situation 2)	3 Pumps (Situation 3)	4 Pumps
Pump 1	Master pump	Auxiliary pump	Auxiliary pump	Auxiliary pump
Pump 2		Master pump	Auxiliary pump	Auxiliary pump
Pump 3			Master pump	Auxiliary pump
Pump 4				Master pump
Time Circulation Operation	Yes	Yes	Yes	No

- When the system water demand only needs two pumps to balance the pressure, and the AC motor drive runs one set of master pumps and the mains power supplies to one auxiliary pump, turn off the first auxiliary pump (Pump 1) first according to Pr.U0-04 (Circulation Time) to reduce the master pump pressure and increase the speed. The current master pump (Pump 2) then cuts off from the mains power to become an auxiliary pump, and the next pump (Pump 3) will be started as the master pump (refer to Figure 15), and so on.
- When the system water demand needs three pumps to balance the pressure, and the AC motor drive runs one set of master pumps and the mains power supplies to two auxiliary pumps, turn off the first auxiliary pump (Pump 1) first according to Pr.U0-04 (Circulation Time) to reduce the master pump pressure and increase the speed. The current master pump (Pump 3) then cuts off from the mains power to become an auxiliary pump, and the next pump (Pump 4) will be started as the master pump (refer to Figure 16), and so on.
- When the system water demand needs all pumps operation (or no idle pumps) to balance the pressure, the pumps remain in QTY circulation mode and will not enter time circulation mode.

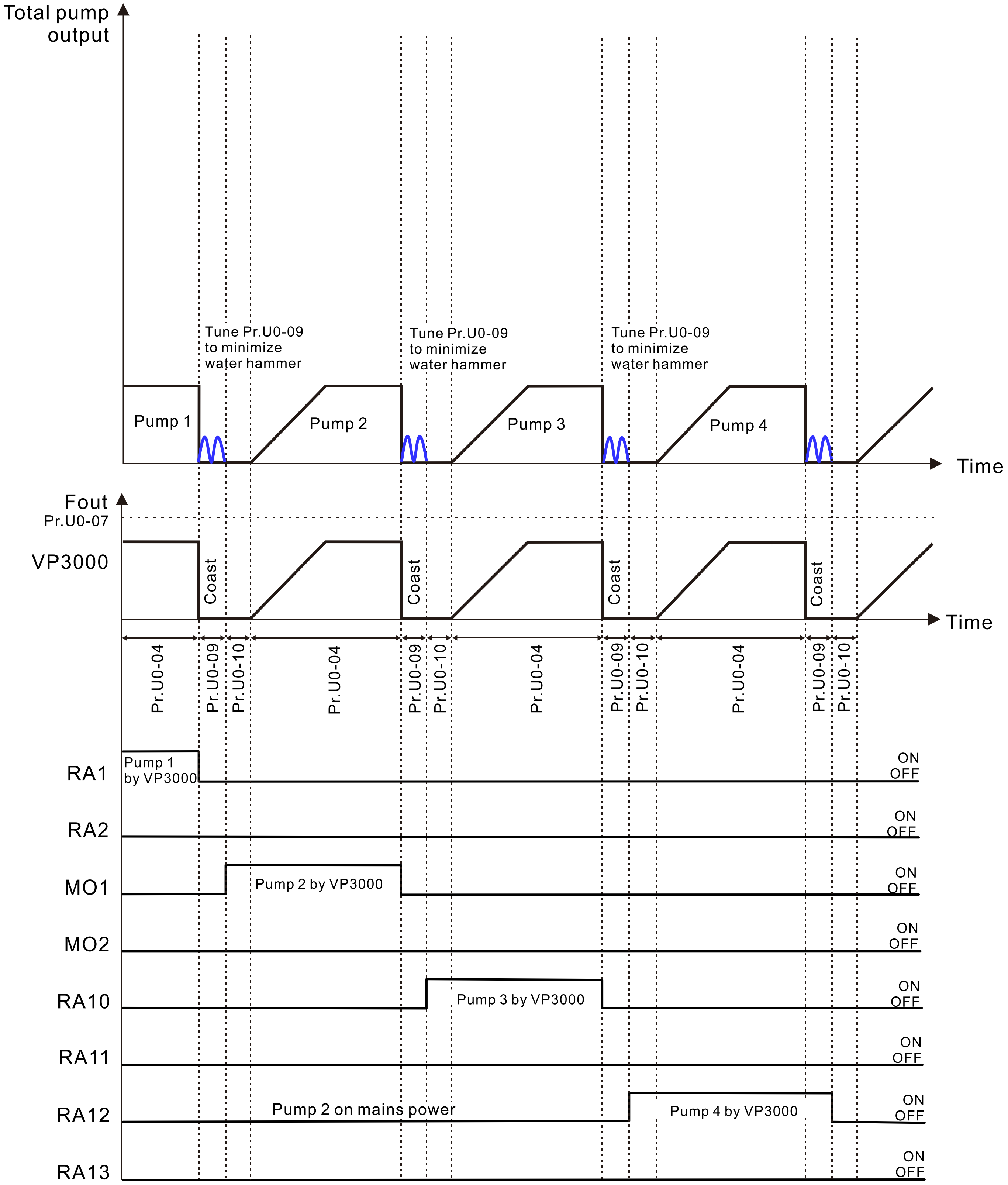


Figure 14 Situation 1 Sequence

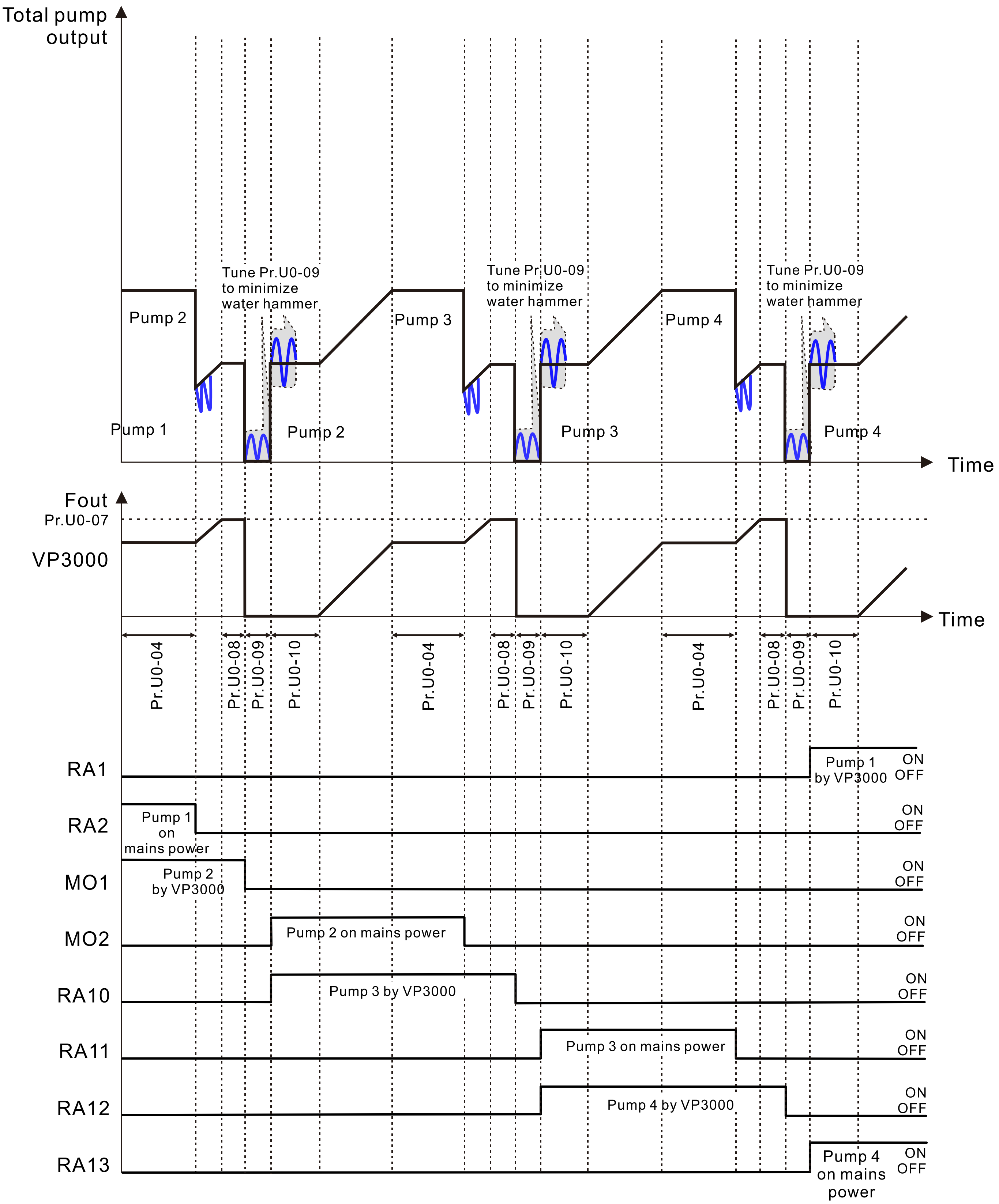


Figure 15 Situation 2 Sequence

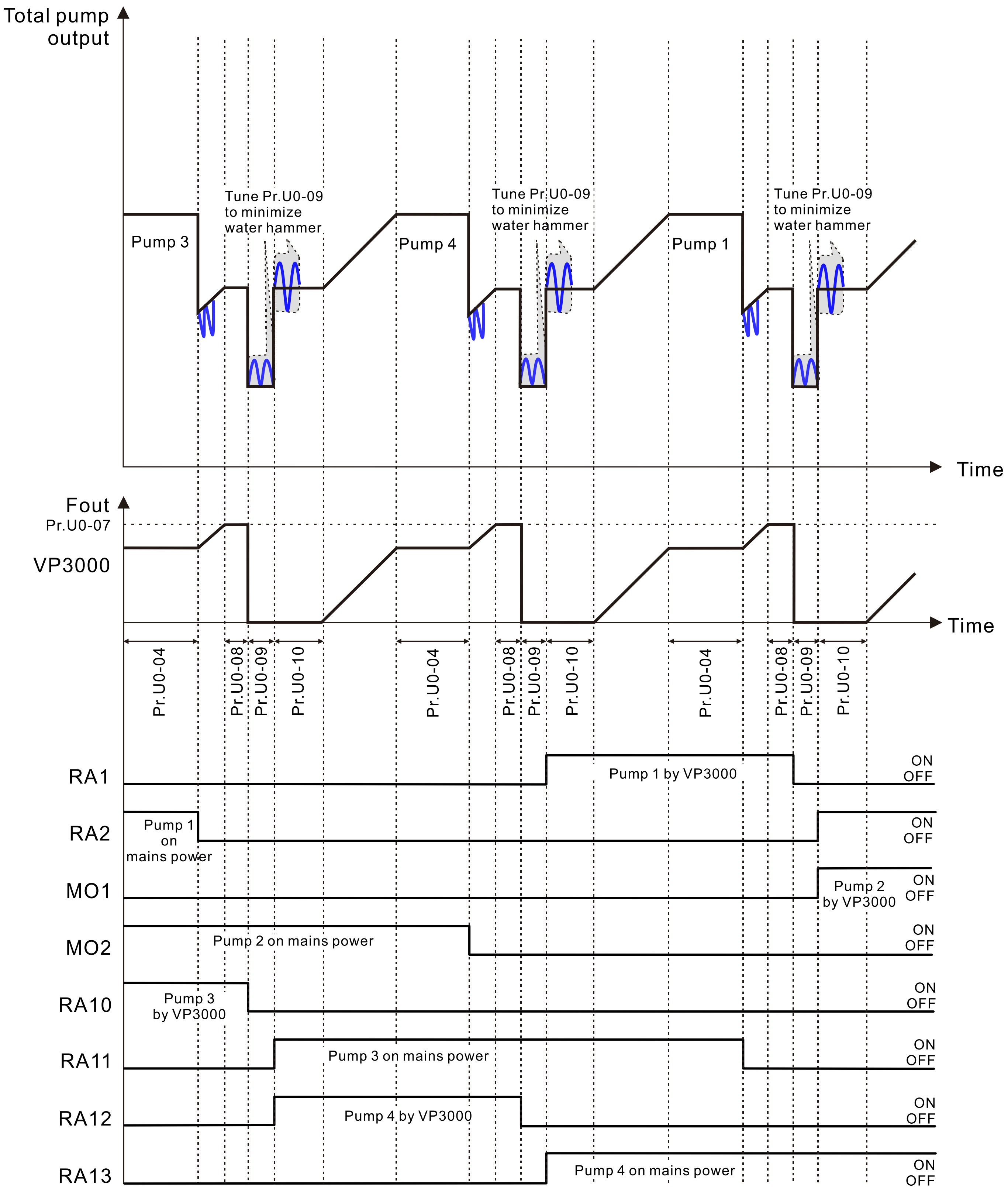


Figure 16 Situation 3 Sequence

🕮 Parameter Setting

<table>
<tr><th>Pr.</th><th>Description</th></tr>
<tr><td>U0-00 = 4</td><td>Circulation Control is set as “QTY + Time Circulation”</td></tr>
<tr><td>U0-01 = X</td><td>Number of Pump
● Up to 4 sets of pumps, after setting, the pump output automatically enables according to Pr. U0-01
● Each set of pump uses two output terminals
<table>
<tr><td>U0-01</td><td>01</td><td>02</td><td>03</td><td>04</td><td></td></tr>
<tr><td>U0-15
Pump 1 Output</td><td>1
RA1</td><td>1
RA1</td><td>1
RA1</td><td>1
RA1</td><td>Pump 1 by Drive</td></tr>
<tr><td>U0-16
Pump 1 Output</td><td>2
RA2</td><td>2
RA2</td><td>2
RA2</td><td>2
RA2</td><td>Pump 1 by Main</td></tr>
<tr><td>U0-17
Pump 2 Output</td><td>0</td><td>3
MO1</td><td>3
MO1</td><td>3
MO1</td><td>Pump 2 by Drive</td></tr>
<tr><td>U0-18
Pump 2 Output</td><td>0</td><td>4
MO2</td><td>4
MO2</td><td>4
MO2</td><td>Pump 2 by Main</td></tr>
<tr><td>U0-19
Pump 3 Output</td><td>0</td><td>0</td><td>10
RA10</td><td>10
RA10</td><td>Pump 3 by Drive</td></tr>
<tr><td>U0-20
Pump 3 Output</td><td>0</td><td>0</td><td>11
RA11</td><td>11
RA11</td><td>Pump 3 by Main</td></tr>
<tr><td>U0-21
Pump 4 Output</td><td>0</td><td>0</td><td>0</td><td>12
RA12</td><td>Pump 4 by Drive</td></tr>
<tr><td>U0-22
Pump 4 Output</td><td>0</td><td>0</td><td>0</td><td>13
RA13</td><td>Pump 4 by Main</td></tr>
</table></td></tr>
<tr><td>U0-03 = X</td><td>Pump Switch Type
● Terminal sequence or minimum operation time</td></tr>
<tr><td>U0-04 = X</td><td>Circulation Time
● Pump Operating Time</td></tr>
<tr><td>U0-07 = X</td><td>AUX Pump Active FREQ Level
● AUX Pump Active Switching FREQ</td></tr>
<tr><td>U0-08 = X</td><td>AUX Pump Active Check Time
● AUX Pump Active Switching FREQ check time</td></tr>
<tr><td>U0-09 = X</td><td>AUX Pump Active Delay Time
● Switch Delay Time between pumps</td></tr>
<tr><td>U0-10 = X</td><td>QTY Circulation Output Delay
● Delay time before pump operates</td></tr>
<tr><td>U0-11 = X</td><td>AUX Pump Deactive FREQ Level
● AUX Pump Deactive Switching FREQ</td></tr>
<tr><td>U0-12 = X</td><td>AUX Pump Deactive Check Time
● AUX Pump Deactive Switching FREQ check time</td></tr>
<tr><td>U0-13 = X</td><td>QTY Circulation Fault Action
● Stop all pumps or the master pump output</td></tr>
<tr><td>U0-14 = X</td><td>Output FREQ Reached Range
● If the system reaches stable voltage</td></tr>
</table>

Pr.	Description
U0-15–U0-22 = X	Pump 1–8 Output Enable Sel ● Pump output indication
U0-23–U0-31 = X	Pump 1–8 Stop MI Src ● Pumps inhibit output
U0-32–U0-39	Pump 1–8 Operating Time ● Pump actual operating time (read only)
U0-40 = X	Pump Operating Time Erase ● Reset operation time for single pump or all pumps

📖 Disable Motor

Pump 1–4 Stop MI Src After setting and enabling MI, the corresponding pump can be stopped.

Pr.	U0-23	U0-24	U0-25	U0-26	U0-27	U0-28	U0-29	U0-30	U0-31
Pump OFF	1	2	3	4	-	-	-	-	ALL
Pump Stop MI Src	2–7 (MI1–6), 10–15 (MI10–15)								

- When the output of all motors is prohibited, the motors running on the mains stop, and the motors controlled by the AC motor drive coasts to stop.
- For the pumps controlled by the AC motor drive, if the MI is enabled, it will take effect in the next circulation.
- If a fault occurs during the QTY circulation, the pump output will be stopped according to Pr.U0-13 QTY Circulation Fault Action.

📖 Wiring: QTY + Time Circulation can control up to four motors. The following diagram shows an example of wiring.

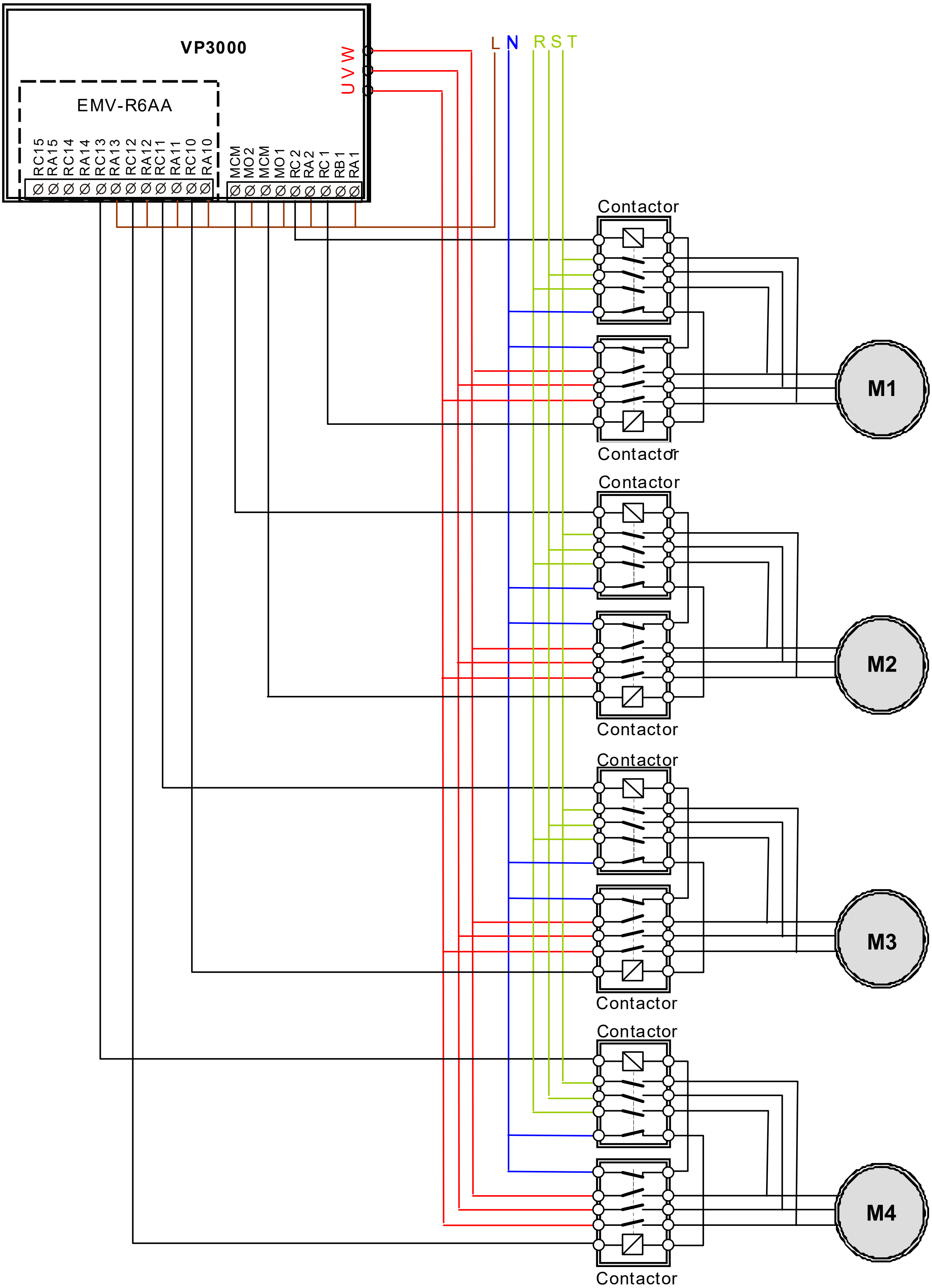


Figure 17 QTY + Time Circulation Wiring

5. QTY Control + Time Circulation

- Executes time-circulation under the quantitative circulation, so that the AC motor drive can run the idle pumps periodically through the output contact lapping the mains power to achieve the average use and to prolong the life of each pump, also to avoid rust damage caused by a specific pump not being used for a long time.
- Refer to the above for the QTY control function description. When the water pressure is balanced and there are idle pumps in the system, the pressure balance is identified within Pr.U0-14 (Output FREQ Reached Range) and for the time of Pr.U0-04 (Circulation Time), the current auxiliary pump is switched OFF according to Pr.U0-03 (Pump Switch Type), and then starts the next set of auxiliary pumps in sequence.
- The system supports up to 8 sets of pumps under QTY control + Time circulation mode. When the system water demand only needs two pumps to balance the pressure, and the AC motor drive runs one set of master pumps and the mains power supplies to one auxiliary pump, turn off the first auxiliary pump (Pump 1) first according to Pr.U0-04 (Circulation Time) for the time of Pr.U0-09 (AUX Pump Active Delay Time), and then start another auxiliary pump (Pump 2). After the next counting cycle, turn off the current auxiliary pump and the next auxiliary pump (Pump 3, refer to Figure 18) will be started after the time of Pr.U0-09 (AUX Pump Active Delay Time), and so on.

System Pump Qty / Pump Demand	2 Pumps Situation 1	3 Pumps Situation 2	4 Pumps	5 Pumps Situation 3	6 Pumps	7 Pumps	8 Pumps	9 Pumps
QTY Control Pump	Master pump	Master pump	Master pump	Master pump	Master pump	Master pump	Master pump	Master pump
Pump 1	Auxiliary pump	Auxiliary pump	Auxiliary pump	Auxiliary pump	Auxiliary pump	Auxiliary pump	Auxiliary pump	Auxiliary pump
Pump 2		Auxiliary pump	Auxiliary pump	Auxiliary pump	Auxiliary pump	Auxiliary pump	Auxiliary pump	Auxiliary pump
Pump 3			Auxiliary pump	Auxiliary pump	Auxiliary pump	Auxiliary pump	Auxiliary pump	Auxiliary pump
Pump 4				Auxiliary pump	Auxiliary pump	Auxiliary pump	Auxiliary pump	Auxiliary pump
Pump 5					Auxiliary pump	Auxiliary pump	Auxiliary pump	Auxiliary pump
Pump 6						Auxiliary pump	Auxiliary pump	Auxiliary pump
Pump 7							Auxiliary pump	Auxiliary pump
Pump 8								Auxiliary pump
Time Circulation Operation	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No

- When the system water demand needs three pumps to balance the pressure, and the AC motor drive runs one set of master pumps and the mains power supplies to two auxiliary pumps, turn off the first auxiliary pump (Pump 1) first according to Pr.U0-04 (Circulation Time), and start another auxiliary pump (Pump 3, Pump 2 remains operation during the process) after the time of

Pr.U0-09 (AUX Pump Active Delay Time). After the next counting cycle, turn off the second auxiliary pump (Pump 2) and the fourth auxiliary pump (Pump 4, Pump 3 remains operation during the process, refer to Figure 19) will be started after the time of Pr.U0-09 (AUX Pump Active Delay Time), and so on.

- When the system water demand needs five pumps to balance the pressure, and the AC motor drive runs one set of master pump and the mains power supplies to four auxiliary pumps, turn off the first auxiliary pump (Pump 1) first according to Pr.U0-04 (Circulation Time), and start the fifth auxiliary pump (Pump 5, Pump 2–4 keep operating during the process) after the time of Pr.U0-09 (AUX Pump Active Delay Time). After the next counting cycle, turn off the second auxiliary pump (Pump 2) and start the sixth auxiliary pump (Pump 6, Pump 3–5 keep operating during the process) after the time of Pr.U0-09 (AUX Pump Active Delay Time), and so on.
- When the system water demand needs all pumps operation (or no idle pumps) to balance the pressure, the pumps remain in QTY control mode and will not enter time circulation mode.

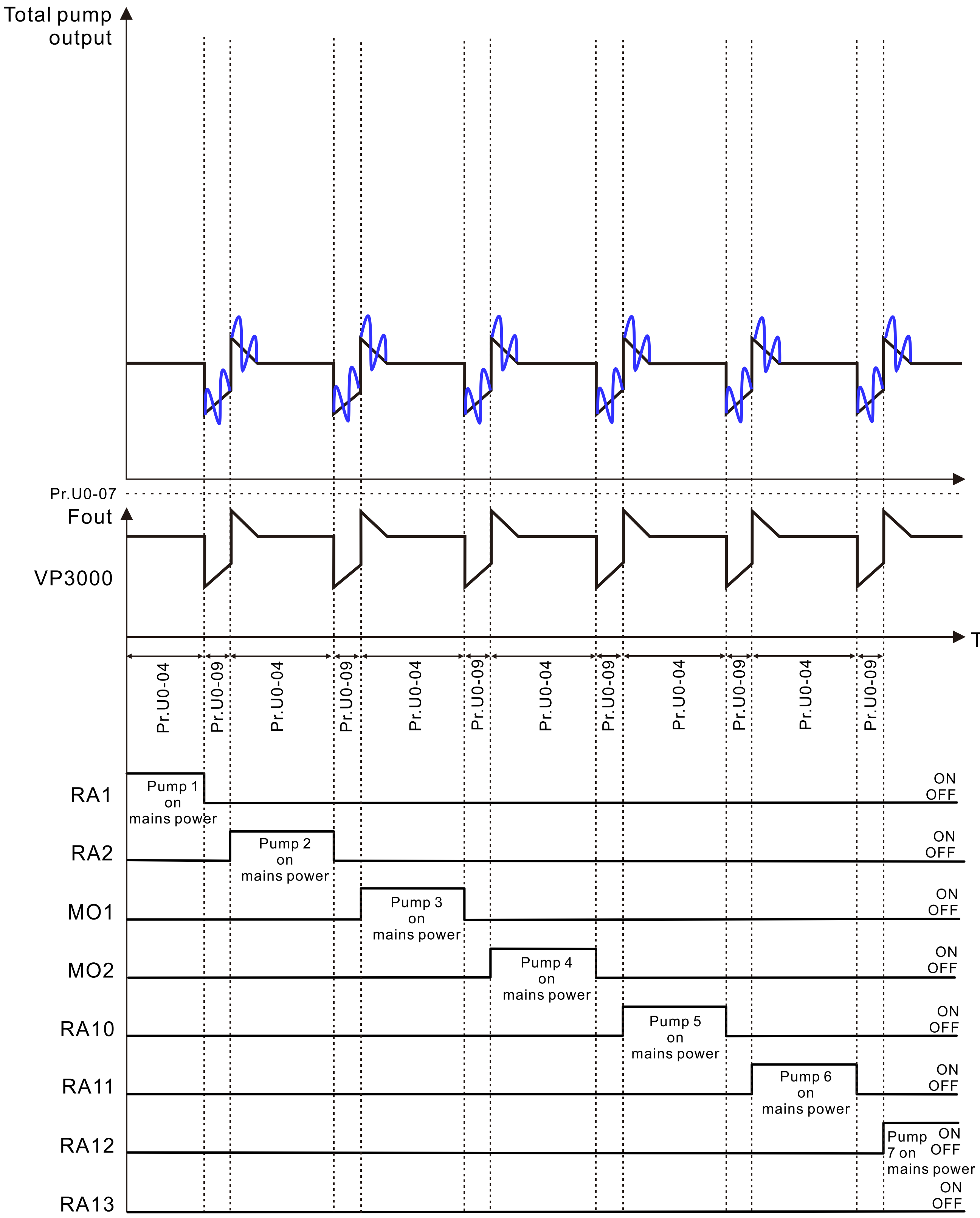


Figure 18 Situation 1 Sequence

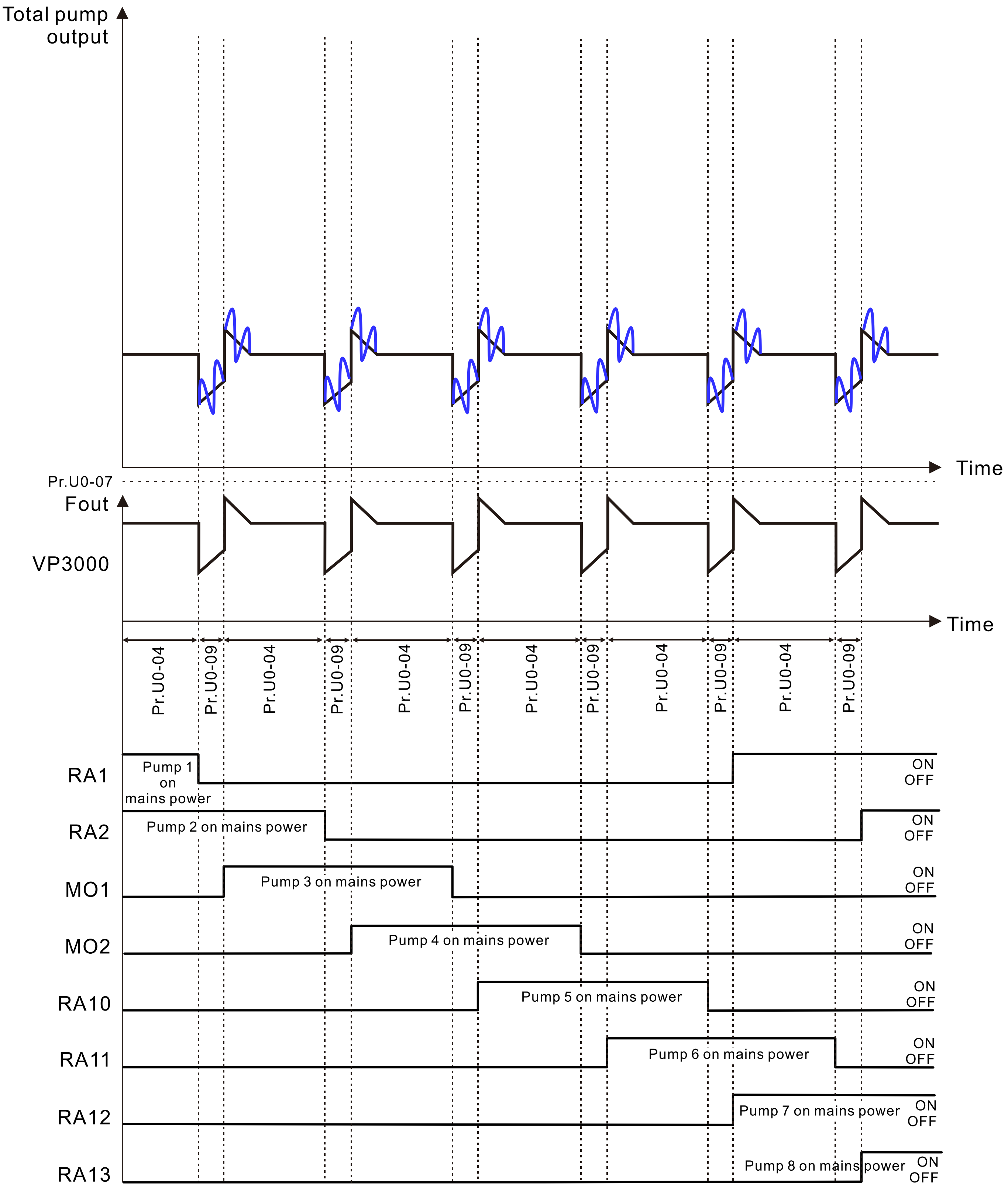


Figure 19 Situation 2 Sequence

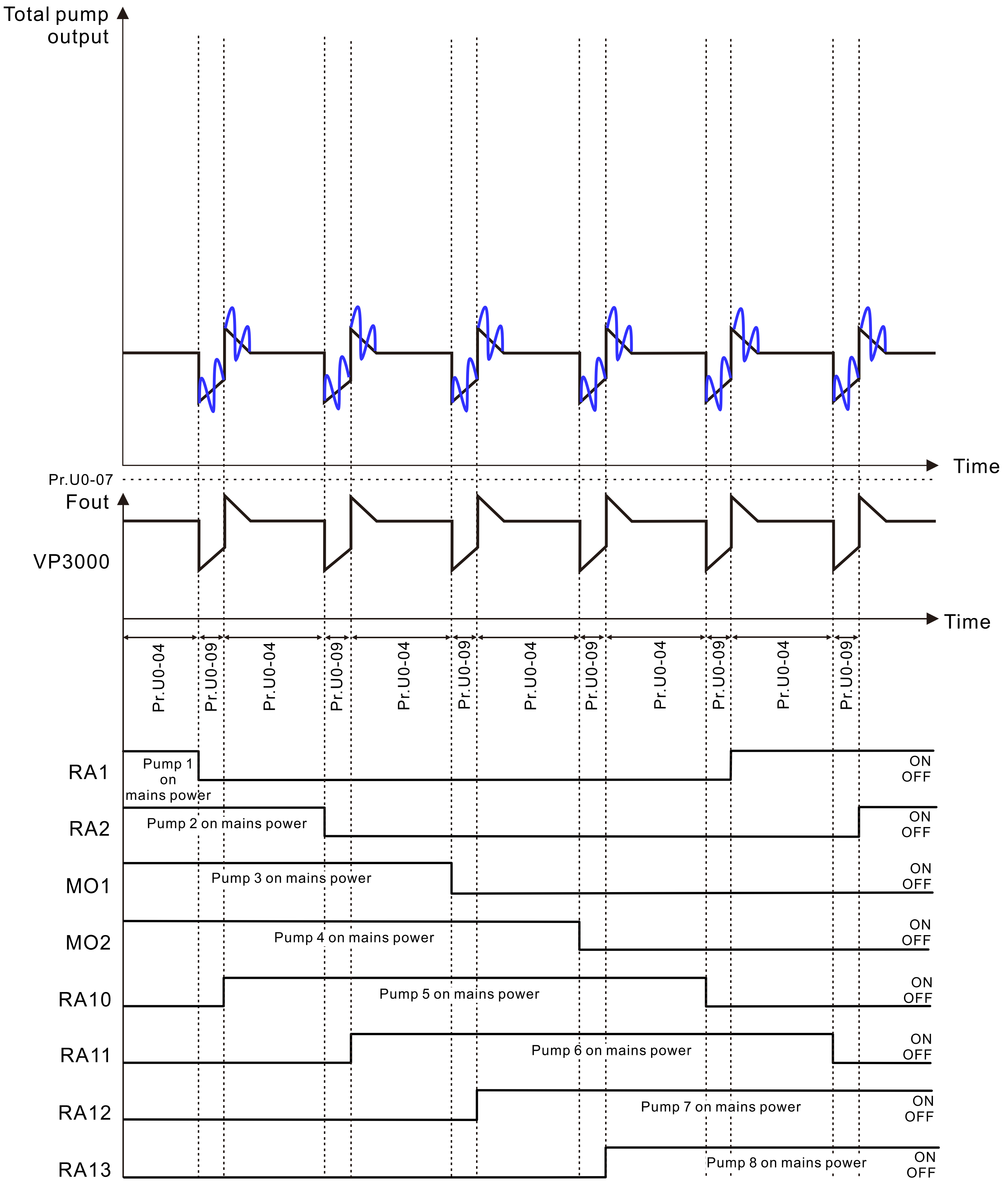


Figure 20 Situation 3 Sequence

🕮 Parameter Setting

<table>
<tr><th>Pr.</th><th>Description</th></tr>
<tr><td>U0-00 = 5</td><td>Circulation Control is set as “QTY control + Time Circulation”</td></tr>
<tr><td>U0-01 = X</td><td>Number of Pump
● Up to 8 sets of pumps, after setting, the pump output automatically enables according to Pr. U0-01
<table>
<tr><td>U0-01</td><td>01</td><td>02</td><td>03</td><td>04</td><td>05</td><td>06</td><td>07</td><td>08</td><td></td></tr>
<tr><td>U0-15
Pump 1
Output</td><td>1
RA1</td><td>1
RA1</td><td>1
RA1</td><td>1
RA1</td><td>1
RA1</td><td>1
RA1</td><td>1
RA1</td><td>1
RA1</td><td>Pump 1 by
Main</td></tr>
<tr><td>U0-16
Pump 2
Output</td><td>0</td><td>2
RA2</td><td>2
RA2</td><td>2
RA2</td><td>2
RA2</td><td>2
RA2</td><td>2
RA2</td><td>2
RA2</td><td>Pump 2 by
Main</td></tr>
<tr><td>U0-17
Pump 3
Output</td><td>0</td><td>0</td><td>3
MO1</td><td>3
MO1</td><td>3
MO1</td><td>3
MO1</td><td>3
MO1</td><td>3
MO1</td><td>Pump 3 by
Main</td></tr>
<tr><td>U0-18
Pump 4
Output</td><td>0</td><td>0</td><td>0</td><td>4
MO2</td><td>4
MO2</td><td>4
MO2</td><td>4
MO2</td><td>4
MO2</td><td>Pump 4 by
Main</td></tr>
<tr><td>U0-19
Pump 5
Output</td><td>0</td><td>0</td><td>0</td><td>0</td><td>10
RA10</td><td>10
RA10</td><td>10
RA10</td><td>10
RA10</td><td>Pump 5 by
Main</td></tr>
<tr><td>U0-20
Pump 6
Output</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>11
RA11</td><td>11
RA11</td><td>11
RA11</td><td>Pump 6 by
Main</td></tr>
<tr><td>U0-21
Pump 7
Output</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>12
RA12</td><td>12
RA12</td><td>Pump 7 by
Main</td></tr>
<tr><td>U0-22
Pump 8
Output</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>13
RA13</td><td>Pump 8 by
Main</td></tr>
</table></td></tr>
<tr><td>U0-03 = X</td><td>Pump Switch Type
● Terminal sequence or minimum operation time</td></tr>
<tr><td>U0-04 = X</td><td>Circulation Time
● Pump Operating Time</td></tr>
<tr><td>U0-07 = X</td><td>AUX Pump Active FREQ Level
● AUX Pump Active Switching FREQ</td></tr>
<tr><td>U0-08 = X</td><td>AUX Pump Active Check Time
● AUX Pump Active Switching FREQ check time</td></tr>
<tr><td>U0-09 = X</td><td>AUX Pump Active Delay Time
● Switch Delay Time between pumps</td></tr>
<tr><td>C2-19 = X</td><td>FREQ Lower Limit
● AUX Pump Deactive Switching FREQ</td></tr>
<tr><td>U0-12 = X</td><td>AUX Pump Deactive Check Time
● AUX Pump Deactive Switching FREQ check time</td></tr>
</table>

Pr.	Description
U0-14 = X	Output FREQ Reached Range ● If the system reaches stable voltage
U0-15–U0-22 = X	Pump 1–8 Output Enable Sel ● Pump output indication
U0-23–U0-31 = X	Pump 1–8 Stop MI Src ● Pumps inhibit output
U0-32–U0-39	Pump 1–8 Operating Time ● Pump actual operating time (read only)
U0-40 = X	Pump Operating Time Erase ● Reset operation time for single pump or all pumps

🕮 Disable Motor

Pump 1–8 Stop MI Src After setting and enabling MI, the corresponding pump can be stopped.

Pr.	U0-23	U0-24	U0-25	U0-26	U0-27	U0-28	U0-29	U0-30	U0-31
Pump OFF	1	2	3	4	5	6	7	8	ALL
Pump Stop MI Src	2–7 (MI1–6), 10–15 (MI10–15)								

🕮 Wiring: Fixed Quantity Control can control up to eight motors. The following diagram shows an example of controlling four motors at the same time.

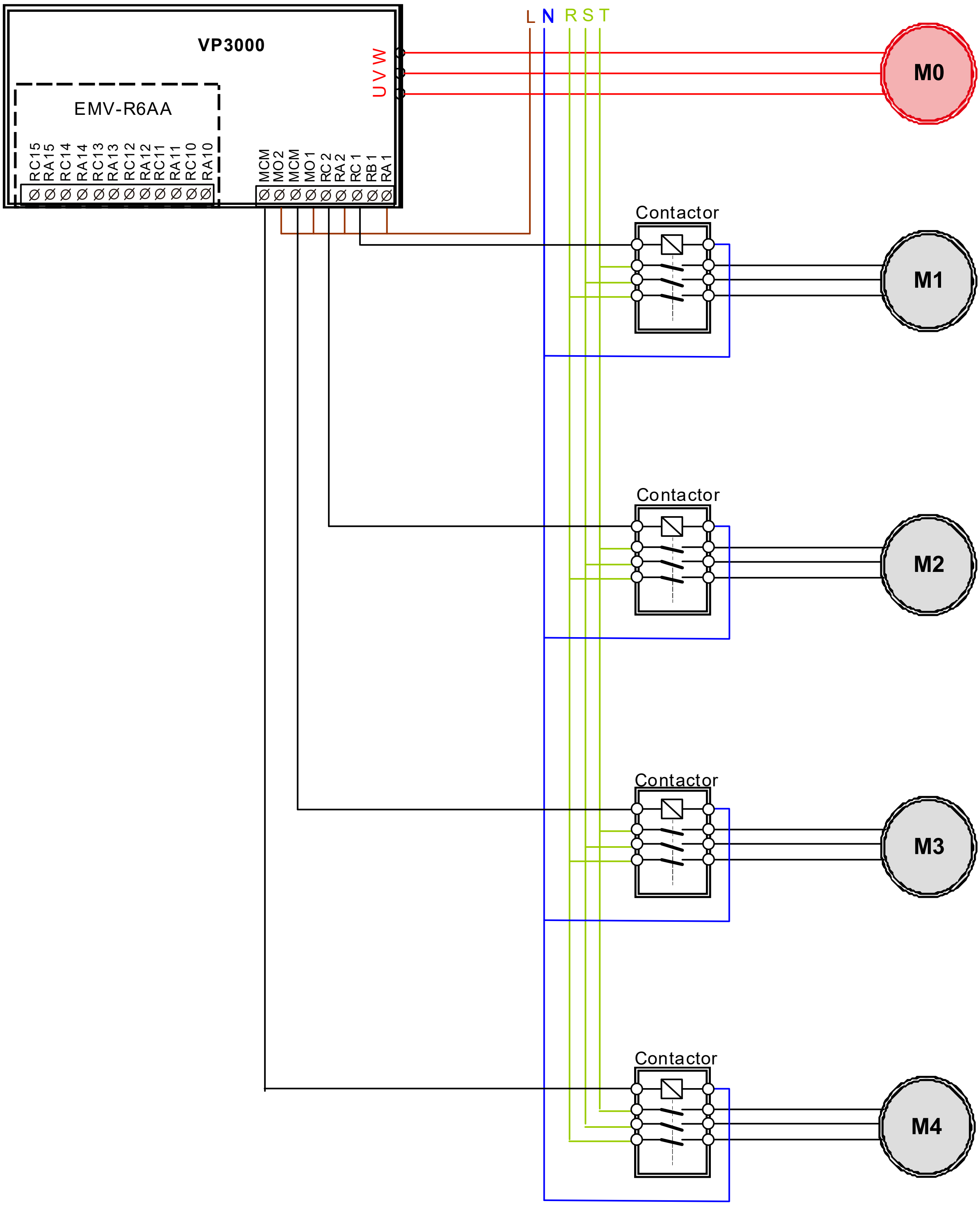


Figure 21 QTY Control + Time Circulation

U1. Pump Schedule

⌁ U1-00 Pump Schedule Setting

(0x1B40) Default: 0

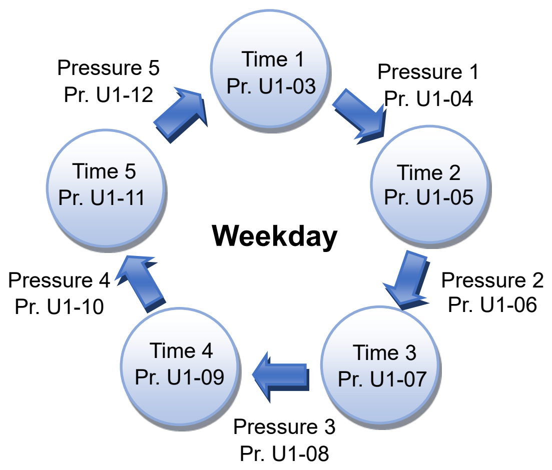
Settings bit0: Weekday

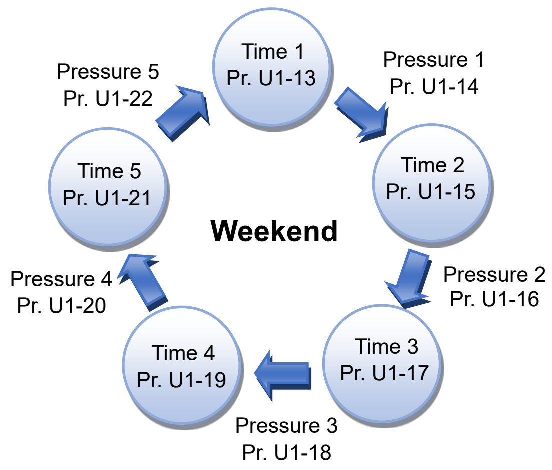
bit1: Weekend

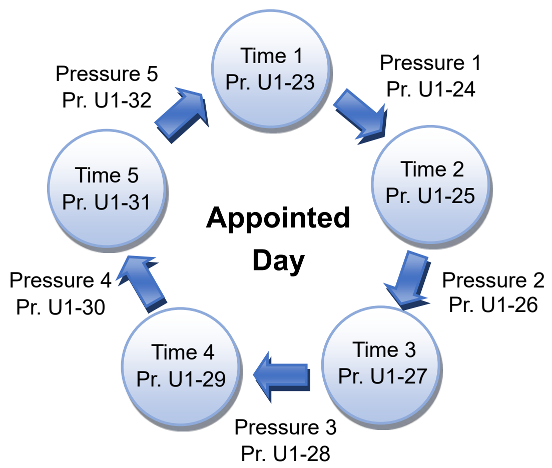
bit2: Appt

bti3–15: Reserve

- This parameter arranges the pump schedule. Correct the time before using this function.
- The schedule target pressure function is only valid when you set the PID reference source 1 & 2 in the parameter group P as “Current pressure command” first. The actual input of target pressure to the PID module will be limited by the parameters of P-PID1 & 2 setpoint upper and lower limits.
- To meet different water demands in various seasons, with the calendar actual time of the keypad and the pump schedule function, the user can arrange the target pressure in specific time period to achieve the purpose of energy saving. The schedule can be divided into three phases: Daily, weekend and appointed days, each phase can be set separately and:
  bit0 = 1 means the weekday schedule is enabled.
  bit1 = 1 means the weekend schedule is enabled.
  bit2 = 1 means the appointed schedule is enabled.
- Priority: Appointed day > weekend > weekday > date that is not in the schedule setting
- The latter set time must be greater than the previous set time, otherwise the subsequence time setting will be regarded as invalid, and the pump only runs to the valid time period in the end.
- There cannot be blank settings between each section of parameter settings. When the system detects that the parameters are blank, the setting is invalid.
- You can set the schedule less than 5 phases.
- The target pressure on non-scheduled days is default as 0 to avoid unexpected operation of the system.
- When entering a scheduled day from a non-scheduled day, it remains at the non-scheduled day target setting first and switches when the time of first period is reached.
- When entering a non-scheduled day from a scheduled day, it restores to the previous non-schedule day target pressure setting.
- When crossing days, the pressure operation setting is set according to the last effective time period of the previous day.



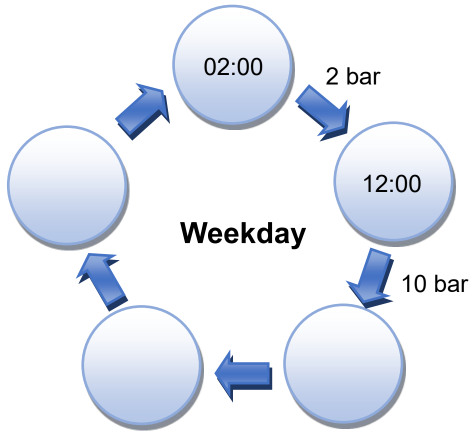


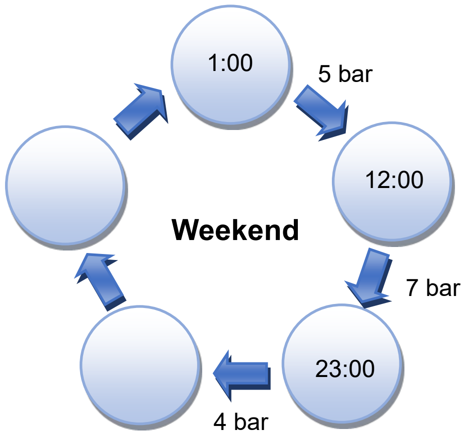


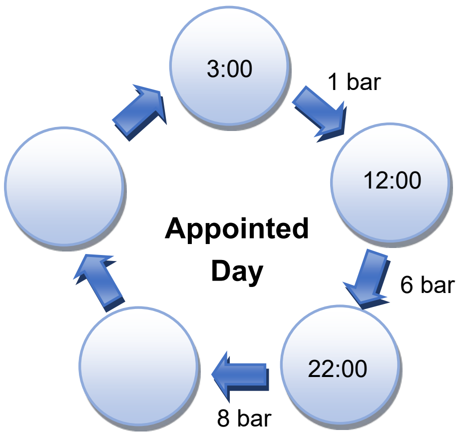
📖 For example:

- Weekend Definition is Saturday and Sunday (Pr. U1-01 = 0).
- Appointed day is defined as 2/1–2/5.

Setting Range	Weekday					Weekend		Week-day	Appointed Day					Week-end
									2/1	2/2	2/3	2/4	2/5	
Time	Mon.	Tues.	Wedn.	Thurs.	Fri.	Sat.	Sun.	Mon.	Tues.	Wedn.	Thurs.	Fri.	Sat.	Sun.
00:00	4	10	10	10	10	10	4	4	10	8	8	8	8	8
01:00	4	10	10	10	10	5	5	4	10	8	8	8	8	5
02:00	2	2	2	2	2	5	5	2	10	8	8	8	8	5
03:00	2	2	2	2	2	5	5	2	1	1	1	1	1	5
04:00	2	2	2	2	2	5	5	2	1	1	1	1	1	5
12:00	10	10	10	10	10	7	7	10	6	6	6	6	6	7
22:00	10	10	10	10	10	7	7	10	8	8	8	8	8	7
23:00	10	10	10	10	10	4	4	10	8	8	8	8	8	4
00:00	10	10	10	10	10	4	4	10	8	8	8	8	8	4







U1-01 Weekend Definition

(0x1B41) Default: 0

Settings 0: Saturday and Sunday
1: Sunday
2: No Weekend

Weekend days can be defined according to the needs. Setting 0 means weekdays are from Monday to Friday, which means weekends are Saturday and Sunday; setting 1 means weekday is from Monday to Saturday, which means weekend is only Sunday.

U1-02 Pressure Cmd Output

(0x1B42) Default: 0

Settings -30000–30000

U1-03 Weekday Start Time 1

(0x1B43) Default: 0

Settings 00:00–23:59

U1-04 Weekday Pressure Setpoint 1

(0x1B44) Default: 0

Settings -30000–30000

U1-05 Weekday Start Time 2
(0x1B45) Default: 0
Settings 00:00–23:59

U1-06 Weekday Pressure Setpoint 2
(0x1B46) Default: 0
Settings -30000–30000

U1-07 Weekday Start Time 3
(0x1B47) Default: 0
Settings 00:00–23:59

U1-08 Weekday Pressure Setpoint 3
(0x1B48) Default: 0
Settings -30000–30000

U1-09 Weekday Start Time 4
(0x1B49) Default: 0
Settings 00:00–23:59

U1-10 Weekday Pressure Setpoint 4
(0x1B4A) Default: 0
Settings -30000–30000

U1-11 Weekday Start Time 5
(0x1B4B) Default: 0
Settings 00:00–23:59

U1-12 Weekday Pressure Setpoint 5
(0x1B4C) Default: 0
Settings -30000–30000

U1-13 Weekend Start Time 1
(0x1B4D) Default: 0
Settings 00:00–23:59

U1-14 Weekend Pressure Setpoint 1
(0x1B4E) Default: 0
Settings -30000–30000

U1-15 Weekend Start Time 2
(0x1B4F) Default: 0
Settings 00:00–23:59

U1-16 Weekend Pressure Setpoint 2
(0x1B50) Default: 0
Settings -30000–30000

U1-17 Weekend Start Time 3
(0x1B51) Default: 0
Settings 00:00–23:59

✎ **U1-18** Weekend Pressure Setpoint 3

(0x1B52) Default: 0

Settings -30000–30000

✎ **U1-19** Weekend Start Time 4

(0x1B53) Default: 0

Settings 00:00–23:59

✎ **U1-20** Weekend Pressure Setpoint 4

(0x1B54) Default: 0

Settings -30000–30000

✎ **U1-21** Weekend Start Time 5

(0x1B55) Default: 0

Settings 00:00–23:59

✎ **U1-22** Weekend Pressure Setpoint 5

(0x1B56) Default: 0

Settings -30000–30000

✎ **U1-23** Appt Start Date 1

(0x1B57) Default: 0

Settings 01:01–12:31

00:00 No function

✎ **U1-24** Appt End Date 1

(0x1B58) Default: 0

Settings 01:01–12:31

00:00 No function

✎ **U1-25** Appt Start Date 2

(0x1B59) Default: 0

Settings 01:01–12:31

00:00 No function

✎ **U1-26** Appt End Date 2

(0x1B5A) Default: 0

Settings 01:01–12:31

00:00 No function

✎ **U1-27** Appt Start Date 3

(0x1B5B) Default: 0

Settings 01:01–12:31

00:00 No function

✎ **U1-28** Appt End Date 3

(0x1B5C) Default: 0

Settings 01:01–12:31

00:00 No function

✎ U1-29 Appt Start Date 4

(0x1B5D) Default: 0

Settings 01:01–12:31

00:00 No function

✎ U1-30 Appt End Date 4

(0x1B5E) Default: 0

Settings 01:01–12:31

00:00 No function

✎ U1-31 Appt Start Date 5

(0x1B5F) Default: 0

Settings 01:01–12:31

00:00 No function

✎ U1-32 Appt End Date 5

(0x1B60) Default: 0

Settings 01:01–12:31

00:00 No function

- Start day ≤ End day: from the appointed start date (inclusive) to the appointed end date (inclusive), the pump operates to the set appointed start time (Pr.U1-33–U1-41).
- Start day > End day: from the appointed start date (inclusive) to the end of that year, and to the appointed end date (inclusive) in the next year, the pump operates to the set appointed start time (Pr.U1-33–U1-41).
- The date is invalid when setting as 00.00. The section of from that start date to end date is invalid.

✎ U1-33 Appt Start Time 1

(0x1B61) Default: 0

Settings 00:00–23:59

✎ U1-34 Appt Pressure Setpoint 1

(0x1B62) Default: 0

Settings -30000–30000

✎ U1-35 Appt Start Time 2

(0x1B63) Default: 0

Settings 00:00–23:59

✎ U1-36 Appt Pressure Setpoint 2

(0x1B64) Default: 0

Settings -30000–30000

✎ U1-37 Appt Start Time 3

(0x1B65) Default: 0

Settings 00:00–23:59

✎ U1-38 Appt Pressure Setpoint 3

(0x1B66) Default: 0

Settings -30000–30000

U1-39 Appt Start Time 4

(0x1B67) Default: 0

Settings 00:00–23:59

U1-40 Appt Pressure Setpoint 4

(0x1B68) Default: 0

Settings -30000–30000

U1-41 Appt Start Time 5

(0x1B69) Default: 0

Settings 00:00–23:59

U1-42 Appt Pressure Setpoint 5

(0x1B6A) Default: 0

Settings -30000–30000

- All the appointed days run with the appointed schedule and pressure setpoint, that is, when the set date is the appointed date in Pr.U1-23–U1-32, the schedule will be arranged according to Pr.U1-33–U1-42.
- The appointed date starts with the Appt Start Date and ends with the Appt End Date.
  For example: when setting 1/2 as the start date and 1/3 (13:00) as the end date, both 1/2 and 1/3 are the appointed dates and the pump operates to the set period of the time (1/3 12:59).
- If the end date is less than the start date, it will operate across years.
  For example: when setting 12/30 as the start date and 1/2 (13:00) as the end date, 12/30, 12/31, 1/1 and 1/2 are all the appointed dates and the pump operates to the set period of the time (1/2 12:59).

U2. Fluid Estimator

U2-00 Flow Estimation Method

(0x1B80) Default: 0

Settings 0: Disable

1: Q-H Estimation

2: Q-P Estimation

📖 Use the following two flow estimation methods to estimate the system flow without using a flow meter:

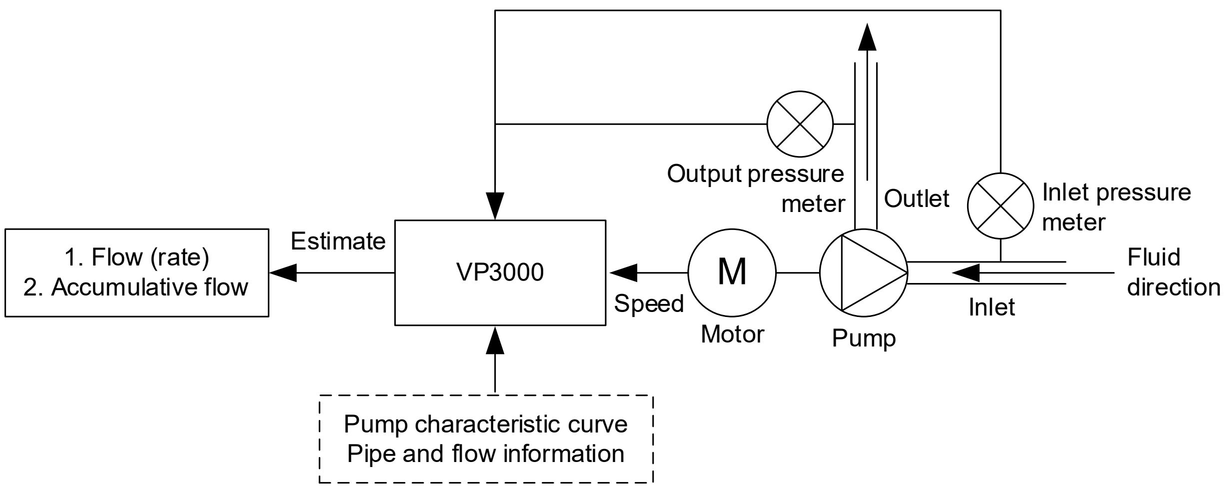
1: Q-H Estimation: install two pressure sensors at the inlet and outlet respectively and set Pr.U2-23–U2-39.

- The analog input function needs to set the corresponding parameters, set AI1 as pressure input (outlet), and set AI2 as pressure input (inlet).
- Set parameters of the inlet and outlet diameter, pump rated speed, fluid density, pressure sensor height difference, pump curve head 1–5, and pump curve flow 1–5.
- Set flow estimation method as 1 (enabling Q-H estimation), start the drive and begin operation. If any of the above parameters is not set, the estimation will not be performed (the estimated value is 0).

2: Q-P Estimation: set Pr.U2-23–U2-24 and U2-30–U2-44.

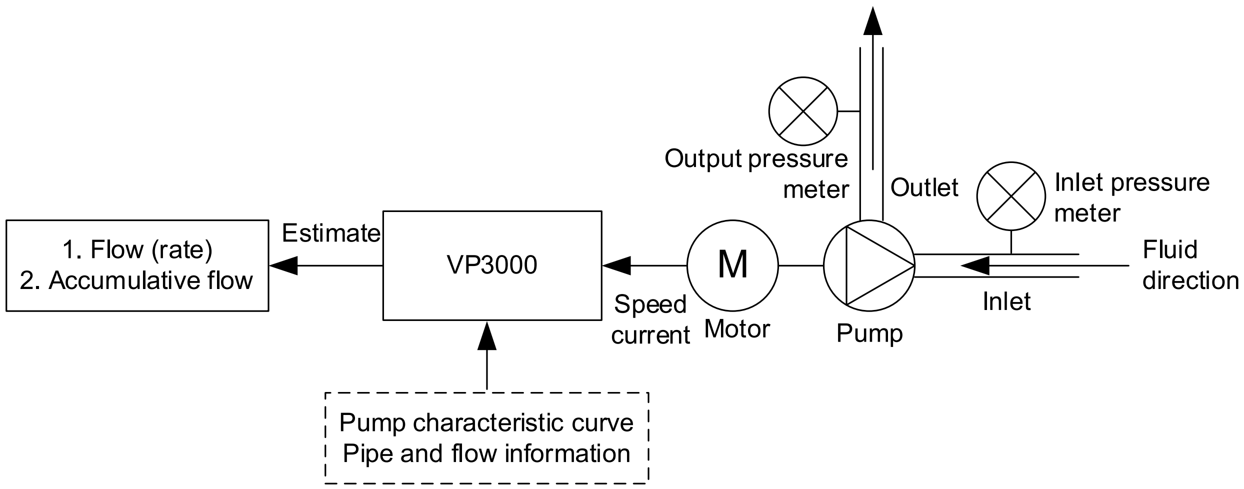
- Sets parameters of the inlet and outlet diameter, pump rated speed, fluid density, pump curve power 1–5 and pump curve flow 1–5 (P1–P5 and Q1–Q5 need to be set from large to small).
- Set flow estimation method as 2 (enabling Q-P estimation), start the drive and begin operation. If any of the above parameters is not set, the estimation will not be performed (the estimated value is 0).

📖 Head method: use the drive to read the data from the pressure sensor at the pump inlet/ outlet and use the flow-head characteristic curve (Q-H curves) provided by the pump factory to calculate the flow and accumulated fluid of the pump system volume.



Item	Descriptions
Motor speed (rpm)	Input the rotor speed (rpm) estimated from the drive internal estimation.
Pump inlet and outlet pressure (bar)	Set the input outlet pressure and input inlet pressure from AI1 to AI3.
Pipe and fluid information	Including pump inlet and outlet diameters, fluid density and pump inlet/ outlet pressure sensor height difference, etc.
Pump characteristic curve	A two-dimensional look-up table curve is constructed from Q-H curve 1–5 and Q-H flow (rate) curve 1–5.

📖 Power method: use the motor shaft power calculated by the drive and the Q-P curves provided by the pump factory to calculate the flow and cumulative fluid volume of the pump system.



Item	Descriptions
Motor speed (rpm)	Input the rotor speed (rpm) estimated from the drive internal estimation.
Output torque (Nm)	Outputs from the drive internal estimated electromagnetic torque.
Output power (kW)	Outputs from the drive internal estimated motor shaft power.
Pipe and fluid information	Including the inlet / outlet diameters and fluid density.
Pump characteristic curve	A two-dimensional look-up table curve is constructed from Q-P curve 1–5 and Q-P flow (rate) curve 1–5.

📖 The estimation result will be updated after the drive starts operating and returns to 0 when the drive stops.

📖 When using Q-H estimation, It is suggested not to install a pressure reduction (such as a check valve) between the pressure sensor and the pump. The pressure reduction affects the estimation accuracy. If there is a pressure reduction between the pressure sensor and the pump, the error may reach more than 5% depending on the assembled pressure reduction. The error caused by the pressure reduction can be included in the Q-H parameters for correction.

📖 It is easy to cause inaccurate flow estimation when the inlet and outlet diameters are set below 0.005m. The flow estimation status bit will be used to remind the user whether the setting is within this area.

📖 It is easy to cause inaccurate flow estimation when the output speed is lower than 100 rpm. In general application scenarios, the efficiency of the water pump at low speed is not good, and the operation time is short. The flow estimation status bit is used to remind the user whether the setting is within this area.

📖 If the motor controlled by the drive is an induction motor, it is recommended to enable the slip compensation function to make the actual output speed consistent with the target speed and improve the accuracy of flow estimation.

U2-01 Cavitation Detect Control Bit

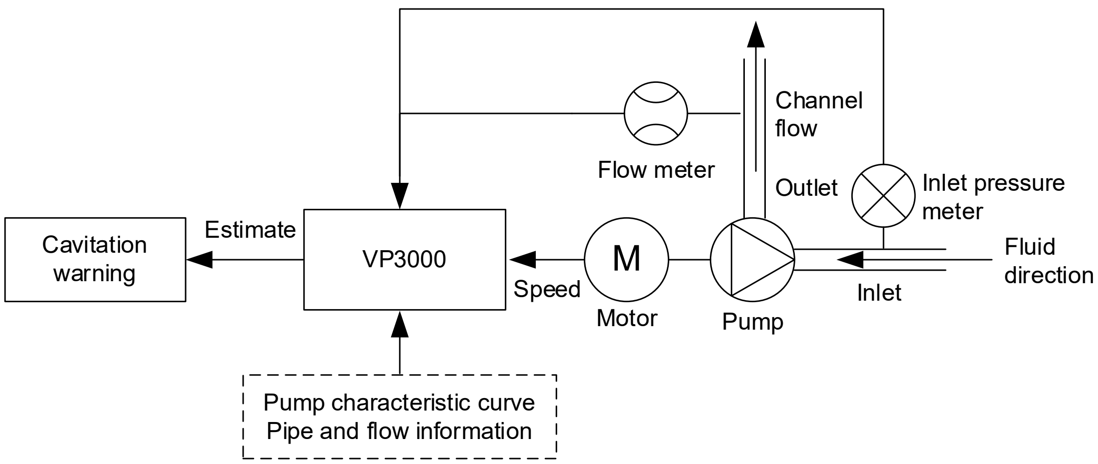
(0x1B81) Default: 0

Settings bit 0: Cavitation Enable
bit 1: Flow Input Sel
bit 2: Cavitation Warning
bit3–bit15: Reserve

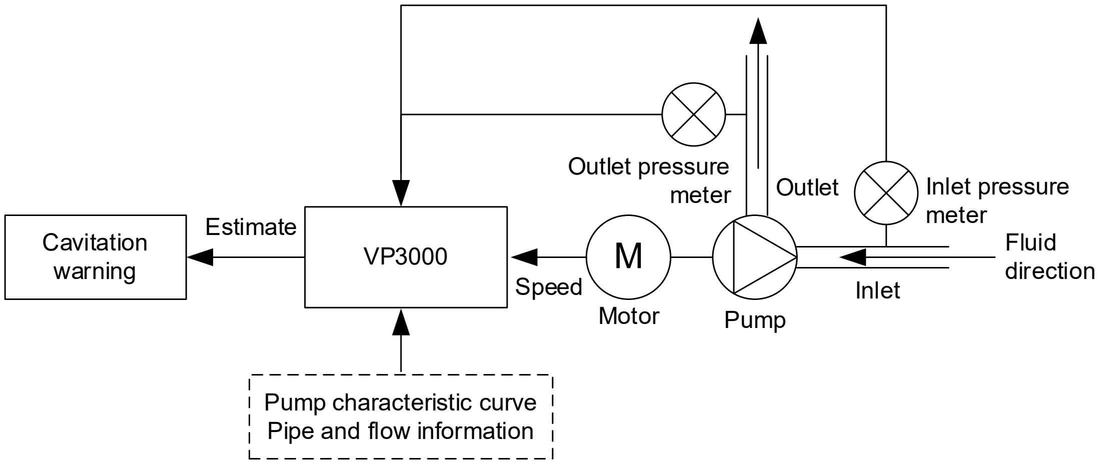
📖 Use the pressure sensor at the water pump inlet and the flow (rate) information of the flow channel, combined with the flow (rate) - required net positive suction head characteristic curve (HPSHr Curves) provided by the pump factory, to estimate whether there are bubbles in the water pump.

bit	Function	Setting
0	Cavitation enable	0: Disable Cavitation
		1: Enable Cavitation
1	Flow input selection	0: by analog flow meters
		1: by Q-H estimation
2	Cavitation warning	0: No warning
		1: Warn but continue operation

1. Use entity flow meters



2. Use Q-H to simulate the flow meter



Item	Descriptions
Motor speed (rpm)	Input the motor speed estimated from the drive.
Inlet pressure of the pump	Input the pressure value from external AI (the unit is Bar after switching from digital to analog).
Outlet pressure of the pump	Input the pressure value from external AI (the unit is Bar after switching from digital to analog).
Channel flow (rate)	Input the flow value from external AI (the unit is 0.01 m^3/hr after switching from digital to analog) or obtain the value from the flow estimation simulated calculation.
Pipe and fluid information	Including pipe diameters, fluid density and fluid temperature, etc.
Pump characteristic curve	Input the Q-H flow (rate) curve 1–5 and NPSHr curve 1–5 for the table look-up.
Cavitation warning	The drive shows warning when detecting cavitation, but it does not stop running.

📖 Defines the required flow to be detected by a flow meter or by the Q-H estimation method, refer to Pr.G2-02 for further description.

📖 When the cavitation is detected, the drive displays the warning Cavi to remind the user that cavitation may have occurred in the pipeline for early maintenance.

U2-02 Flow Estimation Status Bit

(0x1B82) Default: Read only

Settings bit 0: Q-H Estimation
bit 1: Q-P Estimation
bit 2: Cavitation Detecting
bit 3: Q-H Setting Incomplete
bit 4: Fluid Density Setting Incorrect
bit 5: Pump Rated RPM Setting Incorrect
bit 6: Inlet Diameter too Small
bit 7: Outlet Diameter too Small
bit 8: RPM under Flow Estimation Limit
bit 9: Incomplete Setting of Cavitation
bit 10: RPM under Cavitation Limit

📖 This parameter indicates the estimating status of flow and cavitation.

<table>
<tr><th>bit</th><th>Status Description</th><th colspan="2">Condition</th><th>Status</th></tr>
<tr><td rowspan="2">0</td><td rowspan="2">Q-H estimation is working</td><td colspan="2">Any flag of bit3–bit8 is established</td><td>0</td></tr>
<tr><td colspan="2">All flags of bit3–bit8 are not established</td><td>1</td></tr>
<tr><td rowspan="2">1</td><td rowspan="2">Q-P estimation is working</td><td colspan="2">Any flag of bit4–bit8 is established</td><td>0</td></tr>
<tr><td colspan="2">All flags of bit4–bit8 are not established</td><td>1</td></tr>
<tr><td rowspan="2">2</td><td rowspan="2">Cavitation detection is working</td><td colspan="2">Any flag of bit4–bit7, bit9, bit10 is established</td><td>0</td></tr>
<tr><td colspan="2">bit4~bit7, bit9 and bit10 are not established</td><td>1</td></tr>
<tr><td rowspan="2">3</td><td rowspan="2">Q-H setting incomplete</td><td colspan="2">The non-bit0 = 1 condition is established</td><td>0</td></tr>
<tr><td colspan="2">The following two conditions must be established:
1. Pr.U2-00 (Flow estimation method) = 1 (Q-H)
2. Any of the following parameters is set incorrectly:
Pr.U2-03, U2-07 (Inlet pressure AI source),
Pr.U2-04, U2-08 (Inlet pressure AI max value),
Pr.U2-06, U2-10 (Inlet pressure unit)</td><td>1</td></tr>
<tr><td rowspan="2">4</td><td rowspan="2">Fluid density setting incorrect</td><td colspan="2">Pr.U2-26 (Fluid density) ≠ 0</td><td>0</td></tr>
<tr><td colspan="2">Pr.U2-26 (Fluid density) = 0</td><td>1</td></tr>
<tr><td rowspan="2">5</td><td rowspan="2">Pump rated rpm setting incorrect</td><td colspan="2">Pr.U2-25 (Pump rated speed) ≠ 0</td><td>0</td></tr>
<tr><td colspan="2">Pr.U2-25 (Pump rated speed) = 0</td><td>1</td></tr>
<tr><td rowspan="2">6</td><td rowspan="2">Inlet diameter too small (exceeds the limit of flow estimation)</td><td colspan="2">Pr.U2-23 (Pump inlet diameter) < 0.005 m</td><td>0</td></tr>
<tr><td colspan="2">Pr.U2-23 (Pump inlet diameter) ≥ 0.005 m</td><td>1</td></tr>
<tr><td rowspan="2">7</td><td rowspan="2">Outlet diameter too small (exceeds the limit of flow estimation)</td><td colspan="2">Pr.U2-24 (Pump outlet diameter) < 0.005 m</td><td>0</td></tr>
<tr><td colspan="2">Pr.U2-24 (Pump outlet diameter) ≥ 0.005 m</td><td>1</td></tr>
<tr><td rowspan="2">8</td><td rowspan="2">RPM under flow estimation limit</td><td colspan="2">Motor speed ≥ 100 rpm</td><td>0</td></tr>
<tr><td colspan="2">Motor speed <100 rpm</td><td>1</td></tr>
<tr><td rowspan="2">9</td><td rowspan="2">Incomplete setting of cavitation</td><td rowspan="2">1. Pr.U2-01 (Cavitation detect control bit) sets the control bit as flow meter.
2. Pr.U2-01 (Cavitation detect control) sets the control bit as Q-H estimation.</td><td>Parameter settings are complete</td><td>0</td></tr>
<tr><td>Parameter settings are incomplete</td><td>1</td></tr>
<tr><td rowspan="2">10</td><td rowspan="2">RPM under cavitation limit</td><td colspan="2">Motor speed ≥ 100 rpm</td><td>0</td></tr>
<tr><td colspan="2">Motor speed < 100 rpm</td><td>1</td></tr>
</table>

✓ U2-03 Inlet Pressure AI Src

(0x1B83) Default: 0

Settings 0: Disable
1–6: Reserve
7–9: AI1–AI3
10–11: Reserve
12–13: AI10–AI11

📖 Sets the inlet pressure analog input signal source.

✓ U2-04 Inlet Pressure AI Max Value

(0x1B84) Default: 10

Settings AVI: 0–10 V
ACI: 0–20 mA / 4–20 mA

📖 Sets the maximum engineering value corresponding to the analog signal.

✓ U2-05 Inlet Pressure Decimal Point

(0x1B85) Default: 0

Settings 0: No Decimal Point
1: One Decimal Point
2: Two Decimal Point
3: Three Decimal Point

✓ U2-06 Inlet Pressure Unit

(0x1B86) Default: 0

Settings 0: mbar
1: bar
2: Pa
3: kPa
4: mWG
5: inWG
6: ftWG
7: psi
8: atm

📖 Sets the inlet pressure unit (Pr.U2-06) and the decimal points (Pr.U2-05).

✓ U2-07 Outlet Pressure AI Src

(0x1B87) Default: 0

Settings 0: Disable
1–6: Reserve
7–9: AI1–AI3
10–11: Reserve
12–13: AI10–AI11

📖 Sets the outlet pressure analog input signal source.

U2-08 Outlet Pressure AI Max Value

(0x1B88) Default: 10

Settings AVI: 0–10 V

ACI: 0–20 mA / 4–20 mA

Sets the maximum engineering value corresponding to the analog signal.

U2-09 Outlet Pressure Decimal Point

(0x1B89) Default: 0

Settings 0: No Decimal Point

1: One Decimal Point

2: Two Decimal Point

3: Three Decimal Point

U2-10 Outlet Pressure Unit

(0x1B8A) Default: 0

Settings 0: mbar

1: bar

2: Pa

3: kPa

4: mWG

5: inWG

6: ftWG

7: psi

8: atm

Sets the outlet pressure unit (Pr.U2-10) and the decimal points (Pr.U2-09).

U2-11 Flow Meter AI Src

(0x1B8B) Default: 0

Settings 0: Disable

1–6: Reserve

7–9: AI1–AI3

10–11: Reserve

12–13: AI10–AI11

Sets the flow meter analog input signal source.

U2-12 Flow Meter AI Max Value

(0x1B8C) Default: 10

Settings 0–30000

Sets the maximum engineering value corresponding to the analog signal.

U2-13 Flow Decimal Point

(0x1B8D) Default: 0

Settings 0: No Decimal Point

1: One Decimal Point

2: Two Decimal Point
3: Three Decimal Point

✎ U2-14	Flow Unit	
(0x1B8E)		Default: 0
	Settings	0: L/s 1: L/m 2: L/h 3: m3/s 4: m3/h 5: GPM 6: CFM

📖 Sets the flow meter units (Pr.U2-14) and the decimal points (Pr.U2-13).

U2-15	Inlet Pressure Display	
(0x1B8F)		Default: Read only
	Settings	-30000–30000 (Unit: refer to Pr.U2-06, decimal point: refer to Pr.U2-05)

U2-16	Outlet Pressure Display	
(0x1B9A)		Default: Read only
	Settings	-30000–30000 (Unit: refer to Pr.U2-10, decimal point: refer to Pr.U2-09)

U2-17	Flow Meter Output	
(0x1B9B)		Default: Read only
	Settings	0–4294967295 (Unit: refer to Pr.U2-14, decimal point: refer to Pr.U2-13)

U2-18	Flow Estimation Output	
(0x1B9D)		Default: Read only
	Settings	0–4294967295 (Unit: refer to Pr.U2-14, decimal point: refer to Pr.U2-13)

✎ U2-19	Flow Accumulated Src	
(0x1B9E)		Default: 0
	Settings	0: Flow Estimation 1: Flow Meter

📖 Sets the accumulated flow signal source.

U2-20	Flow Accumulated m^3	
(0x1B9F)		Default: Read only
	Settings	0.0–999.9 m^3

U2-21	Flow Accumulated km^3	
(0x1BA1)		Default: Read only
	Settings	0–65535 km^3

📖 To execute flow estimation, you need to enable the flow estimation function (Pr.U2-00) and configure according to the instruction of Pr.U2-00, the estimated accumulative flow will be displayed in Pr.U2-20 and U2-21.

📖 If you need to reset the accumulative flow, refer to Pr.U2-22 description.

✎ U2-22 Flow Accumulated Reset

(0x1BA3) Default: 0

Settings 0: Disable
1: Reset after Power On
2: Reset Immediately

- This parameter is power-off memory.
- Refer to Pr.U2-20 and U2-21 for flow volume.
- 0: No reset, the previous flow volume (Pr.U2-20 and U2-21) continues to accumulate every time it starts and stops accumulating when the accumulation reaches the limit value.
- 1: Reset the accumulated flow when the drive is first powered on and initialized.
- 2: Reset the accumulated flow immediately (it directly reset the accumulated flow after setting no matter the flow estimation function is operating or not).
- The flow accumulated value cannot be cleared through Pr.b0-01 Parameter Reset.

✎ U2-23 Pump Inlet Diameter

(0x1BA4) Default: 0.0

Settings 0.0–6500.0 mm

✎ U2-24 Pump Outlet Diameter

(0x1BA5) Default: 0.0

Settings 0.0–6500.0 mm

- The pipe diameter at pressure sensor location.
- If there is no pressure sensor, enter the pipe diameter of the pump inputs and outlets.

✎ U2-25 Pump Rated Speed

(0x1BA6) Default: 3000

Settings 0–65535 rpm

✎ U2-26 Fluid Density

(0x1BA7) Default: 995.7

Settings 0.0–6550.0 kg/m^3

- The density of the fluid in the pipe at the operating temperature.

✎ U2-27 Fluid Oper Temp

(0x1BA8) Default: 30.00

Settings 0.00–600.00°C

✎ U2-28 Pressure Sensor Height Diff

(0x1BA9) Default: 0.00

Settings -30.00–30.00 m

- The height difference = outlet – inlet.

U2-29 Cavitation Detect Tolerance
(0x1BAA) Default: 0.00

Settings 0.00–600.00 m

- The larger value of this parameter, the easier the cavitation warning occurs. It is equivalent to increase the value of NPSHr (Pr.U2-45–U2-49), which can be protected before the cavitation occurs.

U2-30 Pump Curve Head 1
(0x1BAB) Default: 0.00

U2-31 Pump Curve Head 2
(0x1BAC) Default: 0.00

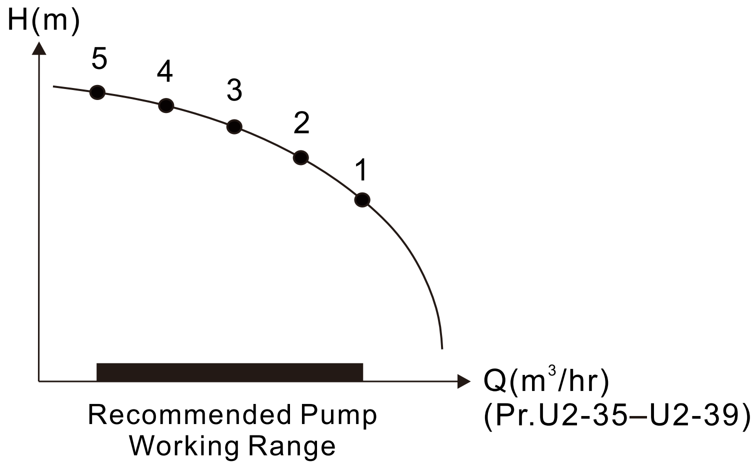
U2-32 Pump Curve Head 3
(0x1BAD) Default: 0.00

U2-33 Pump Curve Head 4
(0x1BAE) Default: 0.00

U2-34 Pump Curve Head 5
(0x1BAF) Default: 0.00

Settings 0.00–655.00 m

- Refer to the head flow curve provided by the pump manufacturer.



U2-35 Pump Curve Flow 1
(0x1BB0) Default: 0.00

U2-36 Pump Curve Flow 2
(0x1BB1) Default: 0.00

U2-37 Pump Curve Flow 3
(0x1BB2) Default: 0.00

U2-38 Pump Curve Flow 4
(0x1BB3) Default: 0.00

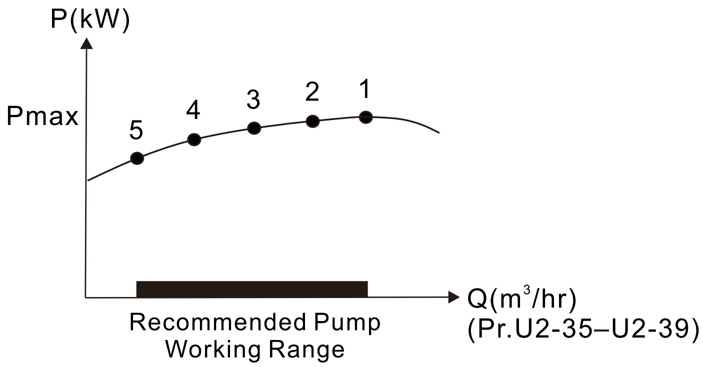
U2-39 Pump Curve Flow 5
(0x1BA8) Default: 0.00

Settings 0.00–655.00 m^3/hr

- Refer to the flow curve provided by the pump manufacturer.

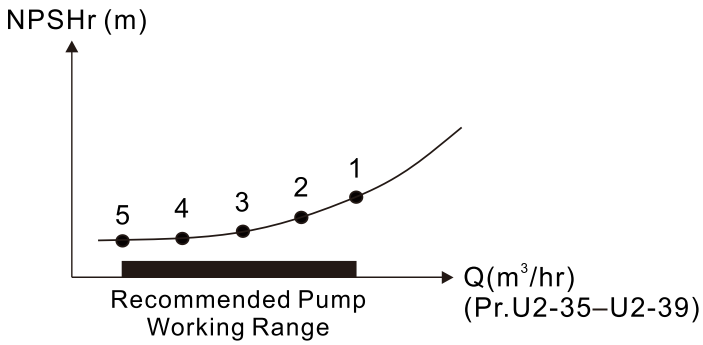
U2-40	Pump Curve Power 1	
(0x1BB4)		Default: 0.00
U2-41	Pump Curve Power 2	
(0x1BB5)		Default: 0.00
U2-42	Pump Curve Power 3	
(0x1BB6)		Default: 0.00
U2-43	Pump Curve Power 4	
(0x1BB7)		Default: 0.00
U2-44	Pump Curve Power 5	
(0x1BB8)		Default: 0.00
	Settings 0.00–655.00 kW	

Refer to the power flow curve provided by the pump manufacturer.



U2-45	Pump Curve NPSHr 1	
(0x1BB9)		Default: 0.00
U2-46	Pump Curve NPSHr 2	
(0x1BBA)		Default: 0.00
U2-47	Pump Curve NPSHr 3	
(0x1BBB)		Default: 0.00
U2-48	Pump Curve NPSHr 4	
(0x1BBB)		Default: 0.00
U2-49	Pump Curve NPSHr 5	
(0x1BBC)		Default: 0.00
	Settings 0.00–655.00 m	

Refer to the NPSHr curve provided by the pump manufacturer, select the above 5 curves, and ensure to cover the suggested pump working range.



U3. Pump Protection

U3-00 Pressure Protection Src

(0x1BC0) Default: 0

Settings 0: Disable
1: P-PID1 Fdk
2: P-PID2 Fdk

U3-01 Heavy Leakage Detect Level

(0x1BC1) Default: 85

Settings 0–85%

- The base is the target value set by the PID control.
- This parameter is the deviation from the target value set by the PID control.

U3-02 Heavy Leakage Detect time

(0x1BC2) Default: 15.0

Settings 0.1–300.0 sec.

U3-03 Heavy Leakage Current Level

(0x1BC3) Default: 20

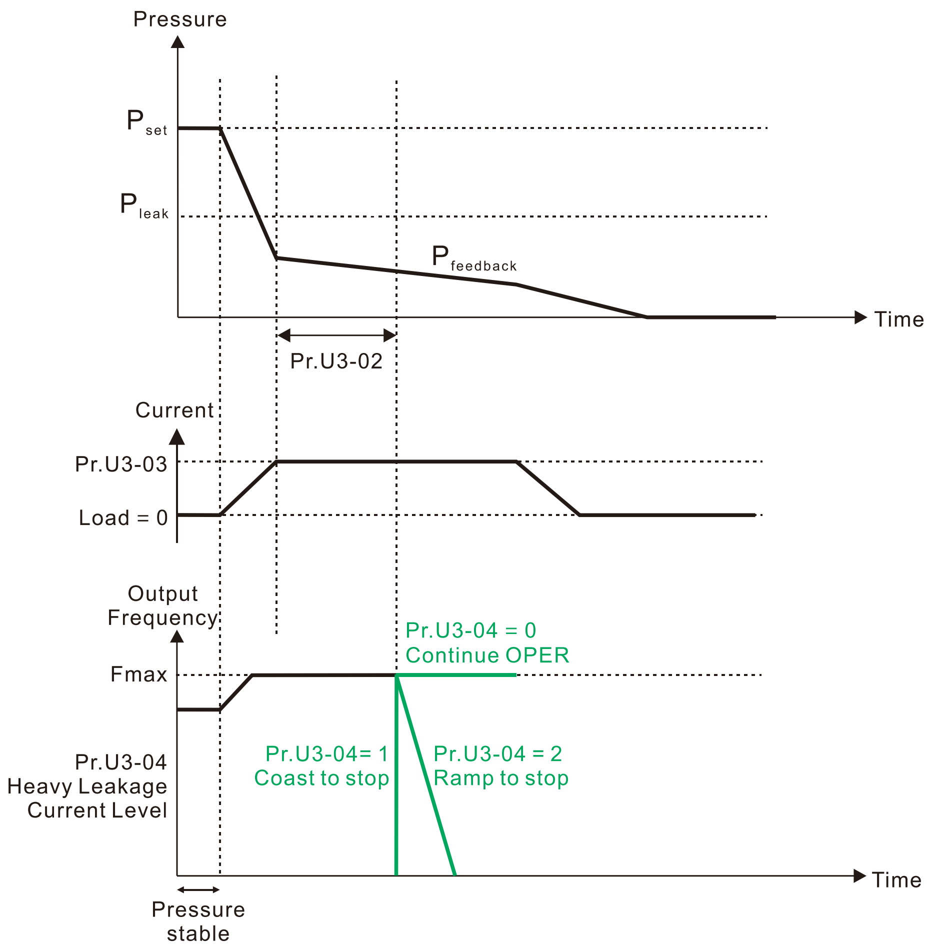
Settings 0–100%

U3-04 Heavy Leakage Treatment

(0x1BC4) Default: 0

Settings 0: Warning & continue OPER
1: Fault and coast to stop
2: Fault & Ramp to Stop

- P_{set} = Target pressure, $P_{feedback}$ = Feedback pressure, P_{leak} = Large leakage warning level.
- When the drive is operating and the frequency operates to the maximum frequency, the drive output current rated percentage is higher than Pr.U3-03 and the detected pressure feedback is smaller than the P_{leak} = Target pressure × (1 – Pr.U3-01) after the continuous time of Pr.U3-02, the heavy leakage is triggered. Select the treatment according to Pr.U3-04, and the AC motor drive displays warning LEKn or fault LEKE according to the setting.
- When the heavy leakage is triggered, the drive does not accept cleaning command.
- The heavy leakage pressure detection source should be set as single process / Basic PID analog feedback value.
- Operation status includes standby, accelerating, constant speed, decelerating and ramping to stop.
- When any of the Pr.U3-03 and U3-01 is set as 0, the heavy leakage loading detection function is disabled.



U3-05 Hi-Pressure Alarm Level

(0x1BC5) Default: 25

Settings 0–50%

📖 This parameter is based on the target value set by the PID control.

U3-06 Hi-Pressure Alarm Detect Time

(0x1BC6) Default: 5.0

Settings 0.1–300.0 sec.

U3-07 Hi-Pressure Alarm Treatment

(0x1BC7) Default: 1

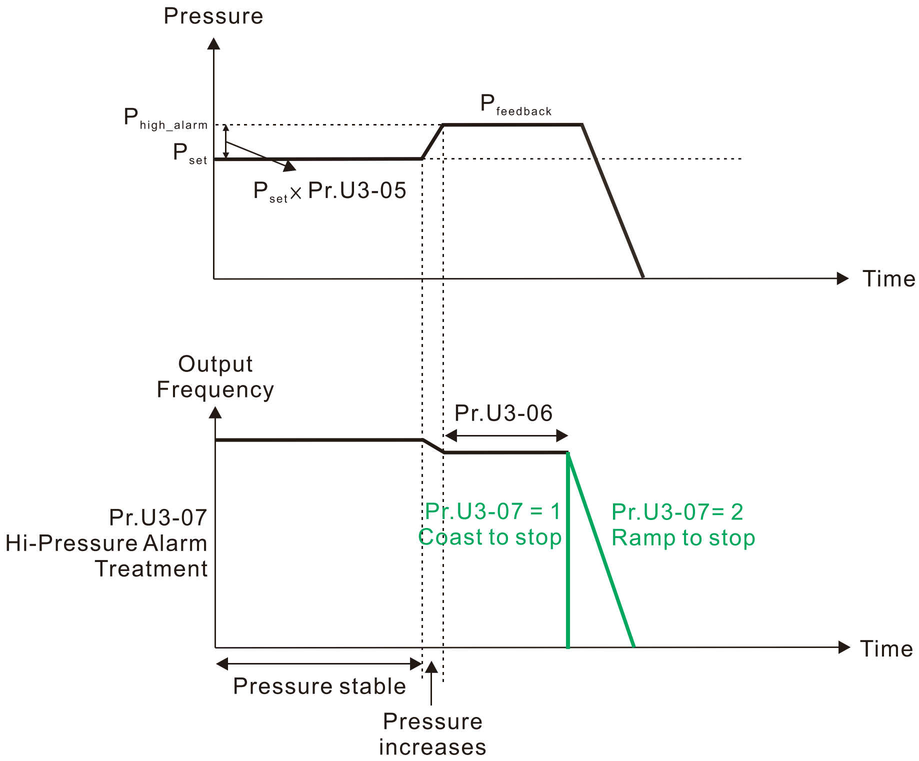
Settings 1: Fault and coast to stop

2: Fault & Ramp to Stop

📖 P_{set} = Target pressure, $P_{feedback}$ = Feedback pressure, P_{high_alarm} = High pressure warning level.

📖 When the detected feedback pressure is higher than the P_{high_alarm} = Target pressure × (1 + Pr.U3-05) for the continuous time of Pr.U3-06, the drive handles HPS fault according to Pr.U3-07 and coasts to stop or ramps to stop.

📖 The pressure detection source should be set as single process / Basic PID analog feedback value.



U3-08 Lo-Pressure Alarm Level

(0x1BC8) Default: 25

Settings 0–50%

📖 This parameter is based on the target value set by the PID control.

U3-09 Lo-Pressure Alarm Detect Time

(0x1BC9) Default: 5.0

Settings 0.1–300.0 sec.

U3-10 Lo-Pressure Alarm Treatment

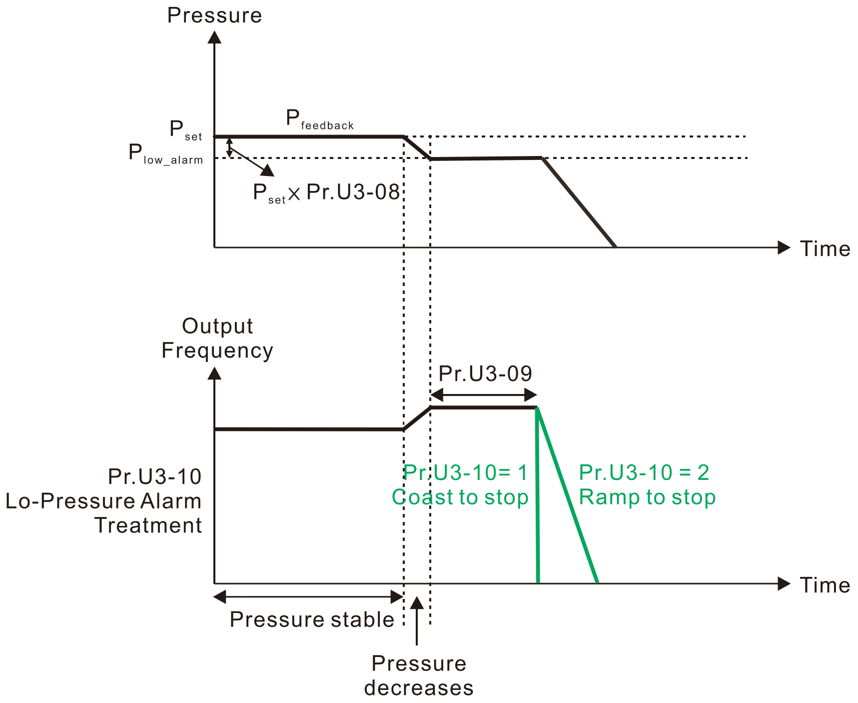
(0x1BCA) Default: 0

Settings 0: Warning & continue OPER
1: Fault and coast to stop
2: Fault & Ramp to Stop

📖 P_{set} = Target pressure, $P_{feedback}$ = Feedback pressure, P_{low_alarm} = Low pressure warning level.

📖 When the detected feedback pressure is lower than P_{low_alarm} = Target pressure × (1 – Pr.U3-08) for the continuous time of Pr.U3-09, the drive displays LPSn warning or LPSE fault according to the setting for Pr.U3-10.

📖 The pressure detection source should be set as single process / Basic PID analog feedback value.



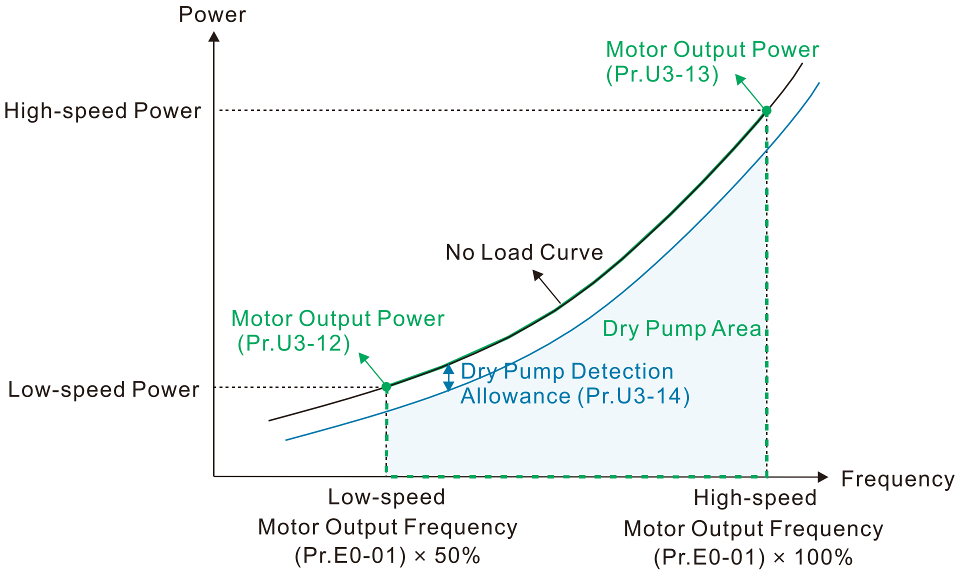
U3-11 Dry Pump Curve Autotune

(0x1BCB) Default: 0

Settings 0: Disable

1: Enable

- In the industry application, the pipe may have no water, or the water flow is exceptionally small or there is too much air in the pipe due to broken pipe/ source abnormality, which makes the water pump idle without load (low power) and causes increasing pump temperature and bearing loss.
- Establish an anhydrous state first, enable the load autotuning curve (Pr.U3-11 = 1) and press the RUN key, then the drive displays tUn and automatically runs to 50% and 100% of the rated frequency, and record the output power respectively for Pr.U3-12 and U3-13.
- If there is an error in the automatic detection curve, the drive displays a warning dAUE to remind the user to re-detect.
- The range below this load curve is the region where dry pump occurs.



- Before dry pump auto-tunes, it is recommended to set the motor basic parameters (rated power/ rated current/ rated speed/ motor parameters, etc.) first, so that the tuned curve will be more realistic.
- When the dryn warning is triggered, the drive will be in standby status and waiting for automatic restart.
- When the dryn warning is triggered, the drive does not accept Start command.
- When the dryn warning is triggered, the drive does not accept Cleaning command.
- The drive can accept Stop command when the dryn warning is triggered and is waiting for restart, clears the dryn warning and returns Pr.U3-18 to the original user setting.

U3-12 50% Rated FREQ Output Power

(0x1BCC) Default: 0

Settings 0–120%

U3-13 100% Rated FREQ Output Power

(0x1BCD) Default: 0

Settings 0–120%

- When Pr.U3-11 = 1 enables curve auto-tune, input the dry pump auto-tuning result to Pr.U3-12 and U3-13.

U3-14 Dry Pump Detect Level

(0x1BCE) Default: 10

Settings 0–50%

- The value of this parameter determines the sensitivity of dry pump detection. The larger the setting, the harder it is to trigger dry pump warning dryn, and the smaller the setting, the easier it is to trigger dry pump warning.
- The dry pump warning is easily to be triggered if the water consumption is too small, adjust this parameter to avoid the dry pump warning.

U3-15 Dry Pump Detect Function

(0x1BCF) Default: 0

Settings 0: Disable
1: Enable

U3-16 Dry Pump Detect Time

(0x1BD0) Default: 15.0

Settings 0.0–300.0 sec.

- When the load is lower than the dry pump loading curve and remains for the time of Pr.U3-16, the drive gives the dryn warning and stops according to Pr.U3-19 (Dry Pump Alarm Treatment).

U3-17 Dry Pump Restart Delay Time

(0x1BD1) Default: 30

Settings 1–1000 min

U3-18 Dry Pump Restart Times Limit

(0x1BD2) Default: 5

Settings 0–20

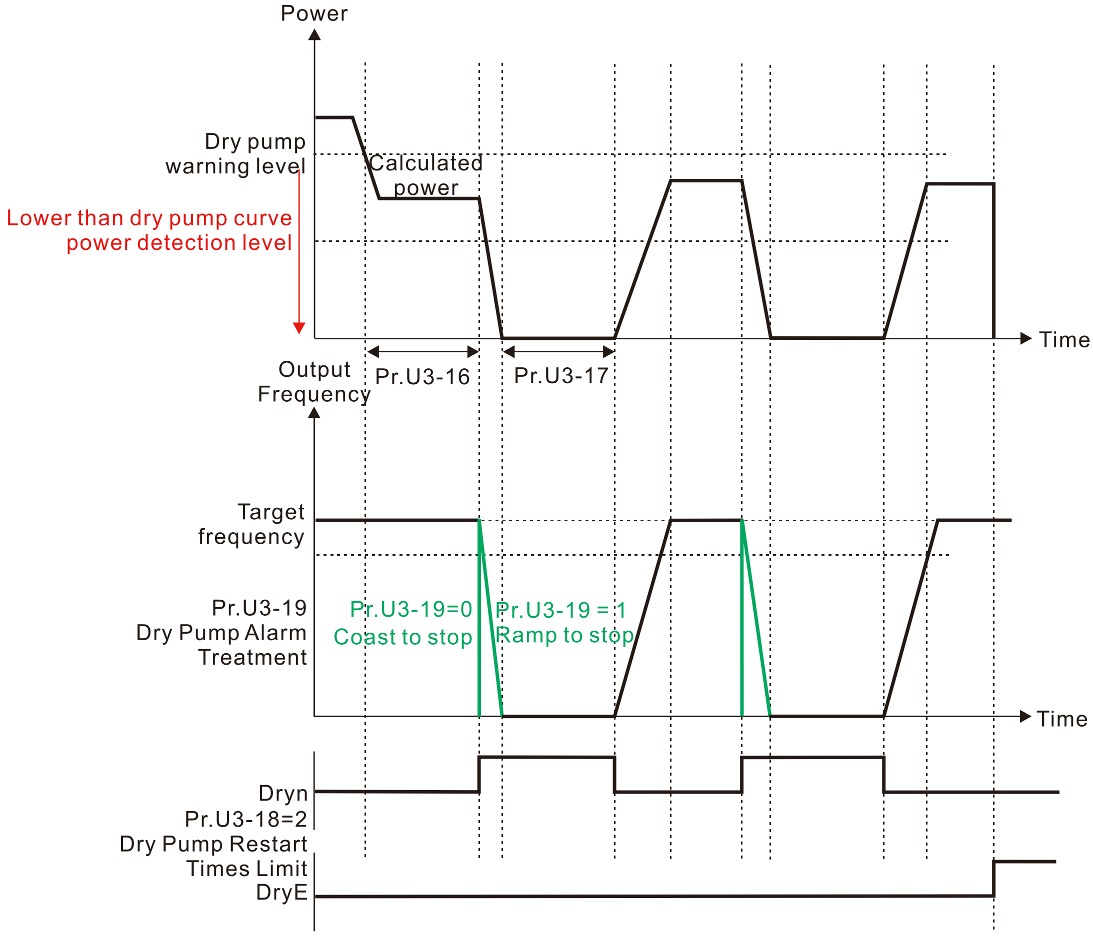
U3-19 Dry Pump Alarm Treatment

(0x1BD3) Default: 1

Settings 1: Warn and coast to stop

2: Warn and ramp to stop

- Re-detects whether the trigger condition of dry pump is still remained after the delay time of Pr.U3-17. If the trigger condition is cleared, the drive clears the dryn warning and resumes to the original state. If the dry pump condition still exists, the drive remains dryn warning and waits for the next detection restarts.
- If the restart time exceeds the setting value for Pr.U3-18, a dryE fault will be reported.
- When the dryE fault is triggered and reset, or when the drive power is cycled, Pr.U3-18 returns to the original user setting.



U3-20 Pump Clean Function

(0x1BD4) Default: 0

Settings 0: Disable

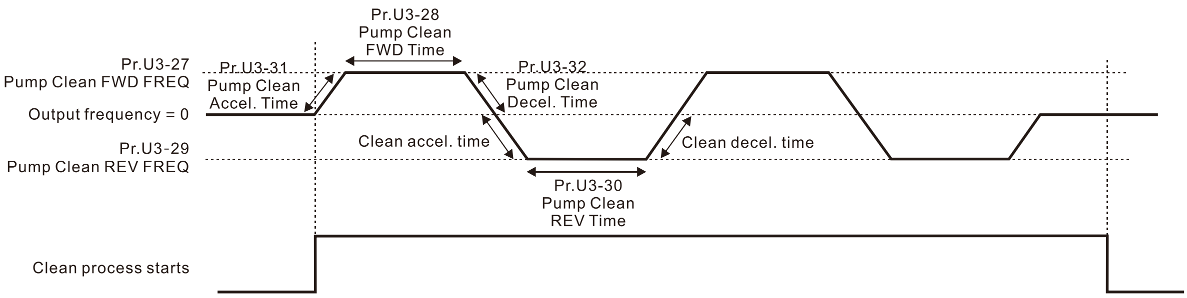
1: Enable by MI Src

2: Enable by Jam Current Limit

3: Enable by Scheduled Time

- There are three methods of cleaning function:

- Pr.U3-20 = 1, 3: DI (set Pr.U3-21 synchronously) and timing trigger (set Pr.U3-24 and U3-25 synchronously) are used for daily maintenance.
- Pr.U3-20 = 2: The cleaning function triggered by excessive jam current (set Pr.U3-24 and U3-25 synchronously) is used for protection.
- Regardless of whether the drive is currently running in forward or reverse direction, the cleaning process always starts from the forward direction.



📖 Enabled by MI source:

- Set specific MI terminal function as cleaning trigger.
- Pr.U3-26 (Pump clean cycle times) can set the cleaning cycles, which is counted as one cycle for forward and reverse once. Set Pr.U3-27 (Pump clean FWD frequency), Pr.U3-28 (Pump clean FWD time), Pr.U3-29 (Pump clean REV frequency), Pr.U3-30 (Pump clean REV time), Pr.U3-31 (Pump clean acceleration time) and Pr.U3-32 (Pump clean deceleration time), the MI is enabled for cleaning after setting the above parameters, and the drive resumes to the previous action when the cleaning completes (for example, if the drive was operating before cleaning, it resumes operation after the cleaning process, and accelerates/ decelerates according to the previous system setting).
- When the MI signal is established, the drive starts from the current operation status (forward or reverse) according to the system set acceleration / deceleration time, and executes the cleaning process when it moves to 0 Hz.
- When the MI signal is loss, it resumes to the drive previous action. For example, the previous action of the drive is RUN, it accelerates to the target frequency command according to the system set acceleration time; if the previous action of the drive is STOP, it decelerates to 0 Hz according to the system set deceleration time.
- The cleaning trigger method is set as level trigger when MI terminal is triggered. When MI is ON, the drive operates and the cleaning function operates; when MI is OFF, the cleaning function is disabled.

📖 Enabled by jam current limit:

- The setting range of Pr.U3-22 (Jam current detect level) and the actual loading correspond to Pr.H2-05 (ocA stall prevention level), the setting upper limit should be smaller than Pr.H2-05 and H2-07 (ocn stall prevention level) to prevent cleaning from being unable to triggered. And then set Pr.U3-23 (Jam current detect time), U3-26 (Pump clean cycle time), which can set the cleaning cycle that is counted as one cycle for forward and reverse once. Set Pr.U3-27 (Pump clean FWD frequency), Pr.U3-28 (Pump clean FWD time), Pr.U3-29 (Pump clean REV frequency), Pr.U3-30 (Pump clean REV time), Pr.U3-31 (Pump clean acceleration time) and Pr.U3-32 (Pump clean deceleration time).

- After setting the above parameters, as long as the drive is in operation (including accelerating, decelerating, in constant speed and decelerating and stop) and the current is higher than Pr.U3-22 (Jam current detect level) for the continuous time of Pr.U3-23 (Jam current detect time), the cleaning function is enabled. When the cleaning cycle completes, if the current is still larger than Pr.U3-22, the drive coasts to stop and triggers the JAME fault; if the current is not larger than the set Pr.U3-22, the drive resumes to previous action after the cleaning completes (for example, if the drive was in operation, it resumes to operation according to the previous set acceleration/ deceleration time after the cleaning completes).
- It is edge trigger when the cleaning function is set as over current trigger method. When the output current is larger than the setting cleaning load condition, it triggers the drive operation and cleaning operation. The cleaning function will be closed when the cleaning cycle completes.
- When the output current is larger than Pr.U3-22 and remains for the time of Pr.U3-23, it triggers the cleaning function, the drive displays CLE which means the cleaning function is operating. If the cleaning cycle (Pr.U3-26) is finished and the drive detects another stock within one cleaning cycle, it displays JAME fault and coasts to stop.

📖 Enabled by scheduled time:

- Verify if the calendar time is correct before enabling the cleaning function by scheduled time, and only enable the cleaning by this method after ensuring the time is correct. Pr.U3-24 (Pump clean weekday selection) sets the daily cleaning time. And then set Pr.U3-26 (Pump clean cycle time), which can set the cleaning cycle that is counted as one cycle for forward and reverse once, Pr.U3-27 (Pump clean FWD frequency), Pr.U3-28 (Pump clean FWD time), Pr.U3-29 (Pump clean REV frequency), Pr.U3-30 (Pump clean REV time), Pr.U3-31 (Pump clean acceleration time) and Pr.U3-32 (Pump clean deceleration time).
- Cleaning will start when the set day and time are reached and will resume to the previous drive action when the cleaning completes (for example, if the drive was operating, it resumes to operation according to the previous set acceleration/ deceleration time). If the scheduled cleaning has been started and the drive is suddenly powered off at this time, as long as the power is restored within the scheduled cleaning time range, it starts cleaning from 0 cycle and does not continue form the previous cleaning cycles.
- It is edge trigger when the cleaning function set as triggered by scheduled time. When the calendar time condition is met, it triggers the drive operation and cleaning operation. The cleaning function will be closed when the cleaning cycle completes.

📖 In the cleaning operation process triggered by the above each source, if the operation source is set as MI terminal or the keypad has given a STOP command, it ends the cleaning function and the drive operation. After the function is ended, it needs to go through the process of cleaning function MI terminal changes from OFF to ON, triggering the cleaning by scheduled time, and the over-current condition (during operation) again to enable the cleaning function.

Combination 1 of cleaning trigger and the user operation command

Trigger Event / Current Status	Keypad gives Start operation command	Keypad gives Stop operation command	MI gives Start operation command (OFF→ON)	MI gives Stop operation command (ON→OFF)
Cleaning command triggered	Cleaning operates	Stop operation*	Cleaning operates	Stop operation*
Cleaning is canceled/ ended	Normal operation	Stop operation	Normal operation	Stop operation

NOTE: * With a premise that user commands are issued during the cleaning.

Combination 2 of cleaning trigger and the user operation command

Trigger Event / Current Status	MI remains Start operation command (ON)	MI remains Stop operation command (OFF)
Cleaning command triggered	Cleaning operates	Cleaning operates
Cleaning is canceled/ ended	Stop operation	Stop operation

- Note that the cleaning action gives priority to forward and reverse rotation of the pump, Pr.A1-27 FWD/ REV direction setting is set directly to 0 (enable FWD/ REV) and resumes to user setting value after the cleaning function completes. It is NOT recommended to set parameters during cleaning process, which may cause the cleaning incomplete.
- If you enable the cleaning function during stop or at STOP status, the function will be started until the cleaning process completes.
- The cleaning process is set according to Pr.U3-26–U3-32.
- Correct the RTC time before setting Pr.U3-20 to 3.
- The AC motor drive displays CLE during the cleaning process, which means the cleaning function is operating, and resumes to the drive control mode before the cleaning when the cleaning process is completed. If the jam current still exists after the cleaning process triggered by the jam current, a JAME fault is displayed and the drive coasts to stop.

U3-21 Pump Clean Function MI Src

(0x1BD5) Default: 0

Settings 0: Disable
1: Reserve
2–7: MI1–MI6
5–9: Reserve
10–15: MI10–MI15

U3-22 Jam Current Detect Level

(0x1BD6) Default:
Default for H2-05

Settings 0–Max. setting value for H2-05

U3-23 Jam Current Detect Time

(0x1BD7) Default: 60.0

Settings 0.0–300.0 sec.

- The cleaning function will be triggered when the output current is larger than Pr.U3-22 and remains for the time of Pr.U3-23, the drive displays CLE meaning the cleaning function is in operation. If the jam current still exists after the cleaning process, a JAME fault displays and the drive coasts to stop.

U3-24 Pump Clean Weekday Sel

(0x1BD8) Default: 0

Settings
- bit 0: Sunday
- bit 1: Monday
- bit 2: Tuesday
- bit 3: Wednesday
- bit 4: Thursday
- bit 5: Friday
- bit 6: Saturday
- bit 7–15: Reserved

U3-25 Pump Clean Start Time

(0x1BD9) Default: 0

Settings 00:00–23:59

📖 Timing cleaning function will be triggered on the time set in Pr.U3-24 and U3-25 every week.

U3-26 Pump Clean Cycle Times

(0x1BDA) Default: 5

Settings 1–30

U3-27 Pump Clean FWD FREQ

(0x1BDB) Default: 40.00

Settings 0.00–Fmax Hz

U3-28 Pump Clean FWD Time

(0x1BDC) Default: 2.0

Settings 0.0–300.0 sec.

U3-29 Pump Clean REV FREQ

(0x1BDD) Default: 40.00

Settings 0.00–Fmax Hz

U3-30 Pump Clean REV Time

(0x1BDE) Default: 2.0

Settings 0.0–300.0 sec.

U3-31 Pump Clean Accel Time

(0x1BEF) Default: 1.0

Settings 0.0–300.0 sec.

U3-32 Pump Clean Decel Time

(0x1BF0) Default: 1.0

Settings 0.0–300.0 sec.

U4. Master-Slave Multi-Pump Control

U4-00 Master-Slave Pump Control

(0x1C00) Default: 0

Settings bit 0: Enable

bit 1: Backup Master

bit2–15: Reserve

- In a multi-pump control system, it is necessary to perform operations such as increasing and decreasing slave pumps, constant pressure control , sleep boosting and wheel pumps based on the system pressure demand and actual pressure feedback amount.
- Sets the backup master pump. Set bit1 as 1 to set the pump as the backup master pump.
- The station defined in the multiple master pump system is as the following:

<table>
<tr><th colspan="2">Master Pump</th><th>Slave Pump</th></tr>
<tr><td colspan="2">The pump that gives command to the slave pump. Only the absolute master pump or the backup master pump is able to be the Master, and the pump status is displayed in Pr.U4-01 (Master-slave pump status), the digital keypad can display in the extra status column.</td><td rowspan="3">The pump that accepts commands from the master pump</td></tr>
<tr><th>Absolute Master Pump</th><th>Backup Master Pump</th></tr>
<tr><td>Address 1 (Pr.n1-01 = 1), it becomes the master pump when the drive has no fault</td><td>When the non-absolute master pump sets Pr.U4-00 (Master-slave pump control) bit1 = 1 (backup master).</td></tr>
</table>

- Conditions for the establishment or departure of the master pump:

Changing Condition	Absolute Master Pump	Backup Master Pump
Changes from Salve to Master	N/A	1. No ANL warning 2. Pr.U4-00 bit0 = 1 (Enable master-slave pump control) 3. Pr.U4-00 bit1 = 1 (Backup master) 4. There are no other master pumps The event is triggered when all of the above conditions are met.
Changes from Master to Slave	N/A	1. Pr.U4-00 bit1 = 0 (Normal slave) 2. With ANL warning 3. There is a master pump with smaller address online (including absolute master) The event is triggered when any one of the above conditions is met.
Disengage multi-pump Control System	1. Pr.U4-00 bit0 = 0 (Disable master-slave pump control) 2. Non-system fault is triggered 3. With ANL warning and has triggered a fault	1. Pr.U4-00 bit0 = 0 (Disable master-slave pump control) 2. Non-system fault is triggered 3. With ANL fault triggered The event is triggered when any one of the above

Changing Condition	Absolute Master Pump	Backup Master Pump
	The event is triggered when any one of the above conditions is met.	conditions is met.
Return to multi-pump Control System	1. Pr.U4-00 bit0 = 1 (Enable master-slave pump control) 2. Non-system fault is cleared 3. Without ANL warning or fault triggered The event is triggered when all of the above conditions are met.	1. Without ANL fault triggered 2. Non-system fault is cleared The event is triggered when all of the above conditions are met.
Remains Master status but stop	1. System fault is triggered 2. User gives STOP command The event is triggered when any one of the above conditions is met.	1. System fault is triggered 2. User gives STOP command The event is triggered when any one of the above conditions is met.

Treatment for absolute master failure

Failure treatment: if a disconnection, power loss or malfunction occurs, the master becomes slave, and the master pump will be transferred to other pump numbers. Assumed that there are three roles of absolute master, backup master and slave on-line at the same time, the behaviors when they fail are summarized in the table below. The details are described in the following.

Fail Status	Absolute Master Pump	Backup Master Pump	Slave Pump
Communication cable disconnection	Continues operating and pressure command	Becomes master and continues the operation and pressure command from the absolute master.	If there is master on-line, it receives the command; if not, it operates according to Pr.U4-02 (Pump AI feedback loss treatment).
Malfunction, power loss	1. If it is a system fault, the whole system stops and does not allow to leave the master 2. If it is a non-system fault, it directly disengages the multi-pump system. 3. When the non-system fault is reset, the master will be retrieved.	1. If it is master pump, it leaves the master pump and disengage the multi-pump system. The next master pump continues the operation and pressure command from the previous master pump. 2. If it is a system fault, the whole system stops and does not allow to leave the master	Disengage from the multi-pump system

Fail Status	Absolute Master Pump	Backup Master Pump	Slave Pump
		3. If it is a non-system fault, it directly disengages the multi-pump system. 4. After the non-system fault is reset, the pump resumes to slave and operates according to command of master pump.	
Pressure sensor broken	If ANL and ACE are triggered, the multi-pump system will be separated. ANL will operate according to Pr.U4-02 (Pump AI feedback loss treatment), ACE will directly stop.	If ANL and ACE are triggered, the master will be given up and operates according to Pr.U4-02 (Pump AI feedback loss treatment).	Operates according to the master command; if not, it operates according to Pr.U4-02 (Pump AI feedback loss treatment).

U4-01 Master-Slave Pump Status

(0x1C01) Default: Read only

Settings 0: No Master-Slave Control
1: Master
2: Slave

📖 Sets the pump as master or slave pump.

✎ U4-02 Pump AI Fdk Loss Treatment

(0x1C02) Default: 0

Settings 0: No Warning
1: ANL Warning & Continue OPER
2: ACE Fault & Stop OPER

✎ U4-03 Pump FREQ at Fdk Loss

(0x1C03) Default: 0

Settings 0–Fmax Hz

📖 This parameter is only valid for Slave pump.

📖 Refer to Pr.n1-05 (Modbus Timeout Disposal) and Pr.n1-04 (Modbus Timeout Check Time) for the communication failure conditions and fault handling.

📖 If a disconnection occurs in the multi-pump circumstances, the frequency command of slave pump refers to Pr.U4-03.

U4-04 Setpoint Deviation Level

(0x1C04) Default: 0

Settings 0–50%

📖 This parameter is based on the target value set by the PID control.

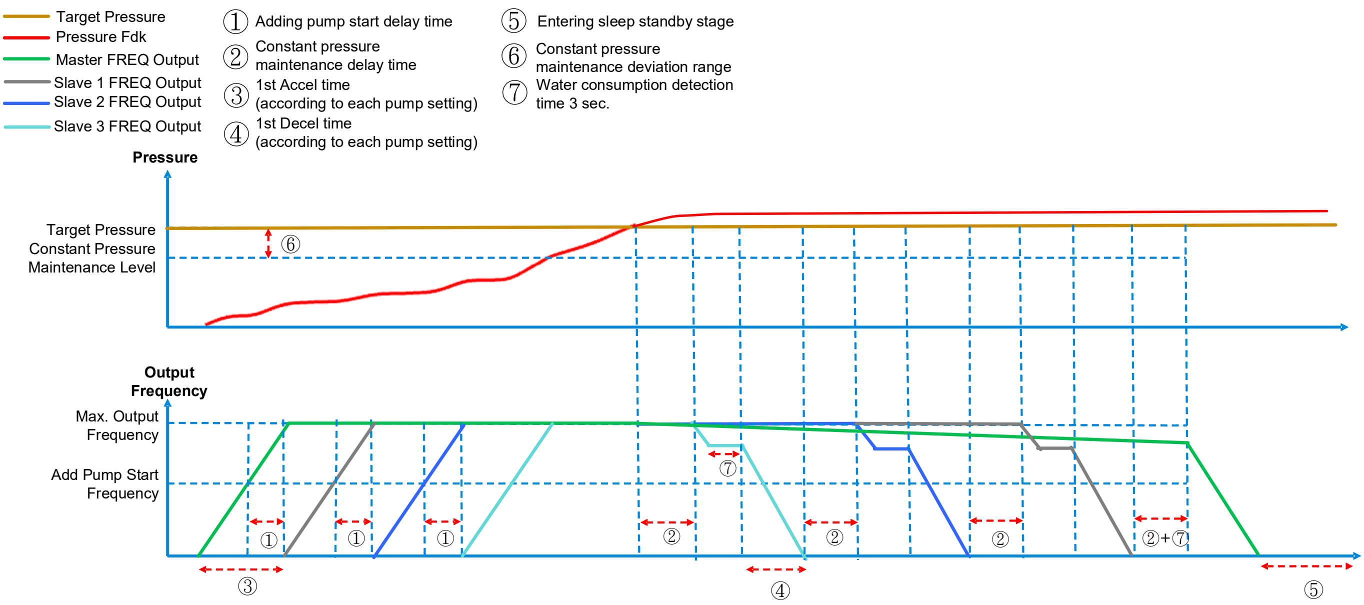
U4-05 Setpoint Deviation Detect T

(0x1C05) Default: 10

Settings 1–600 sec.

📖 If the deviation keeps within the range of Pr.U4-04 and exceeds the time set in Pr.U4-05, the AC motor drive decelerates to stop to be constant pressure status (this deceleration time is the setting for Pr.C2-03). The system is in standby status when the deviation is within the range of PID set point (Pr.U4-04) during deceleration. In standby status, when the system pressure is lower than the condition of high consumption or low consumption of water, the AC motor drive resumes operation to provide the system pressurization.

📖 Refer to Pr.U4-06–U4-08 for setting methods of high consumption and low consumption.



U4-06 Low Consump Restart Offset

(0x1C06) Default: 10

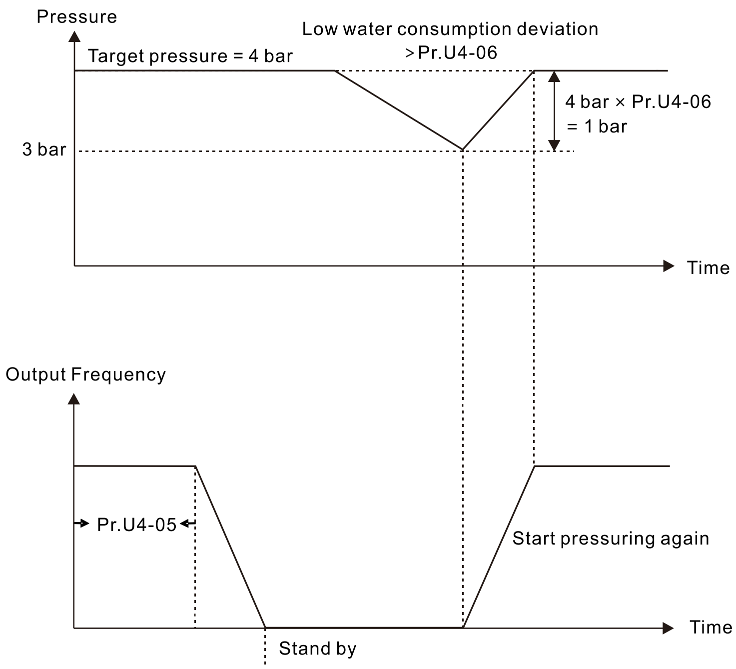
Settings 0–50%

📖 This parameter is based on the target value set by the PID control.

📖 When the system is in standby status and the pressure exceeds the deviation of low consumption, the AC motor drive starts the pressurization.

📖 Example for low consumption restart detection (set Pr.U4-06 = 25%):

When the AC motor drive is in constant pressure status, the feedback value drops to a deviation larger than or equal to 1 bar (4 bar × 25% = 1 bar). That is, the drive starts running when the feedback value is smaller than 3 bar.



U4-07 High Consump Restart Offset

(0x1C07) Default: 0

Settings 0–100%

📖 This parameter is based on the target value set by the PID control.

U4-08 High Consump Detect Time

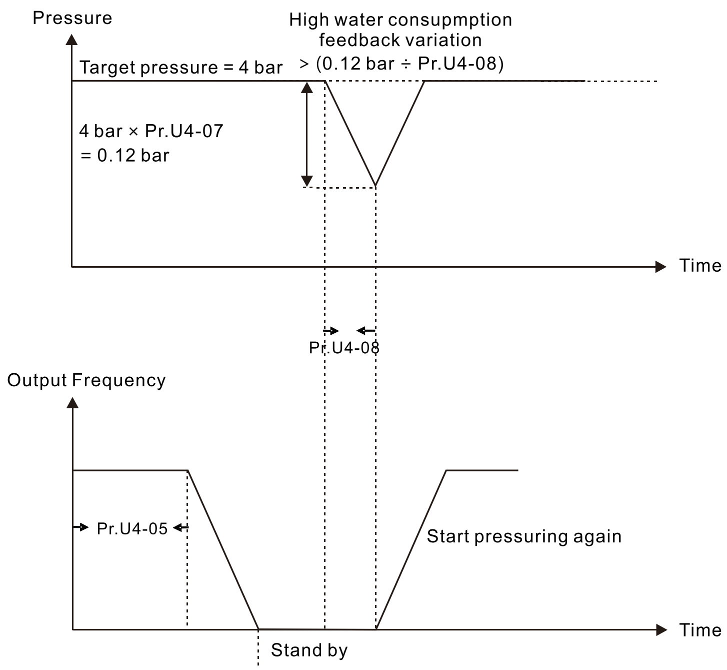
(0x1C08) Default: 0.5

Settings 0.1–10.0 sec.

📖 When the system is in standby status and the pressure change exceeds the feedback change value per unit time defined by Pr.U4-07 and U4-08, the AC motor drive starts the pressurization.

📖 Example for high consumption restart detection:

When the AC motor drive is in constant pressure status, it does not operate until the feedback change value exceeds 0.12 bar within 0.5 seconds, which means the AC motor drive starts operating when the feedback value is less than 3.88 bar within 0.5 seconds.



U4-09 FREQ to Start Aux Pump

(0x1C09) Default: Fmax

Settings 0.00–Fmax Hz

U4-10 Delay to Start Aux Pump

(0x1C0A) Default: 1.0

Settings 0.0–120.0 sec.

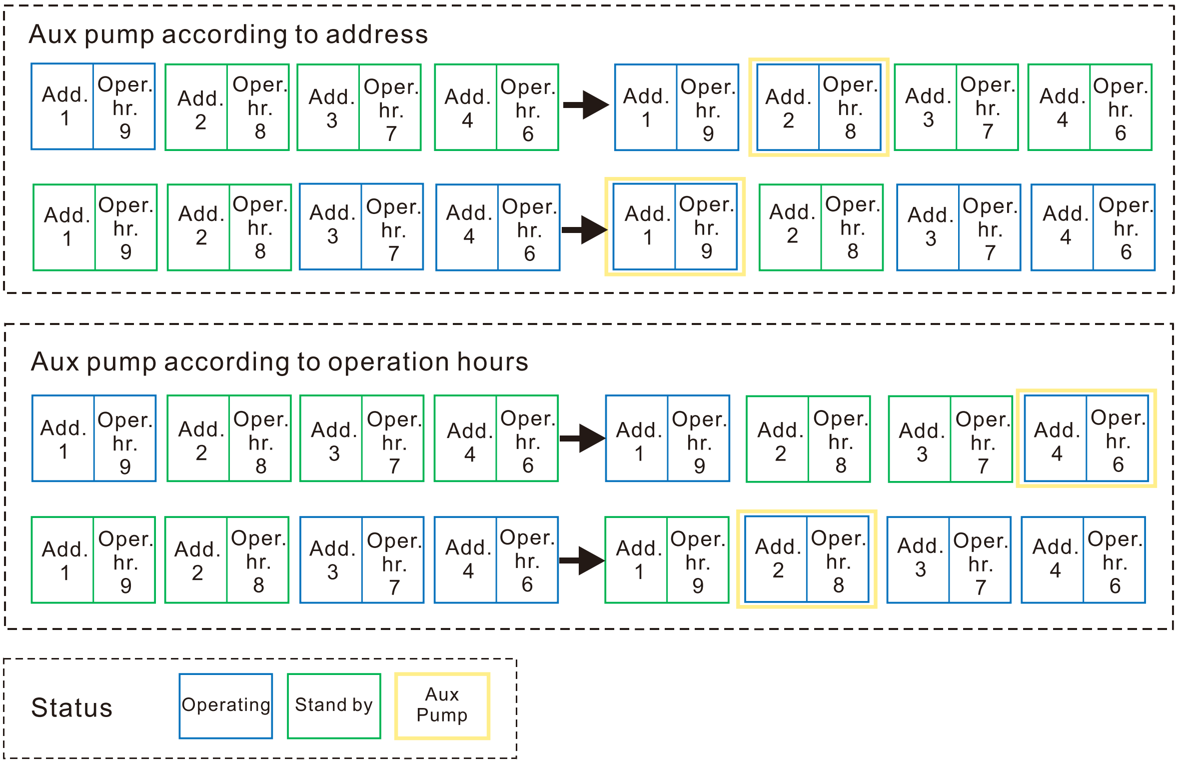
- This parameter is valid for master pump.
- Refer to Pr.A3-00 for the maximum operation frequency.
- The following two conditions must be met at the same time before adding pumps:
  - Master feedback pressure < constant pressure level, and continuously counts for the time longer than Pr.U4-05 (Setpoint deviation detect T).
  - The frequency output value of any slave being output on-line > Master set Pr.U4-09 (Frequency to start auxiliary pump).
- The master feedback pressure of auxiliary pump frequency command < constant pressure maintenance level, which will accumulate to the maximum frequency.
- The definition of constant pressure maintenance level: Target pressure × [1 – Pr.U4-04 (Setpoint deviation level).
- The sequence of increasing and decreasing pumps can be set according to Pr.U4-11 (Pump start-up sequence selection).
- Reduce pump for multi-pump: The AC motor drive reduces the pump after confirming that the operation is stable based on the feedback pressure is larger than or equal to the setpoint for the detection time of Pr.U4-05.
- The pump being reduced directly gives 0 Hz frequency command, when the pump output frequency reduces to 0 Hz, it completes the reduce pump operation process.
- When the master gives a STOP command, all the master and slave pumps decelerate to 0 Hz.

U4-11 Pump Start-up Sequence Sel

(0x1C0B) Default: 1

Settings 0: by Sequence of Pump
1: by OPER Time

- 0: According to the sequence of pump (1 --> 2 --> 3 --> 4 --> 5 --> 6 --> 7 --> 8 --> 1).
- 1: According to the shortest operating time.



U4-12 Cycle Time Sel

(0x1C0C) Default: 2

Settings 0: Disable

1: by Absolute Time of Circulation

2: by Constant Time of Circulation

U4-13 Absolute Time of Circulation

(0x1C0D) Default: 00:00

Settings 00:00–23:59

U4-14 Constant Time of Circulation

(0x1C0E) Default: 5.0

Settings 0.0–200.0 hr

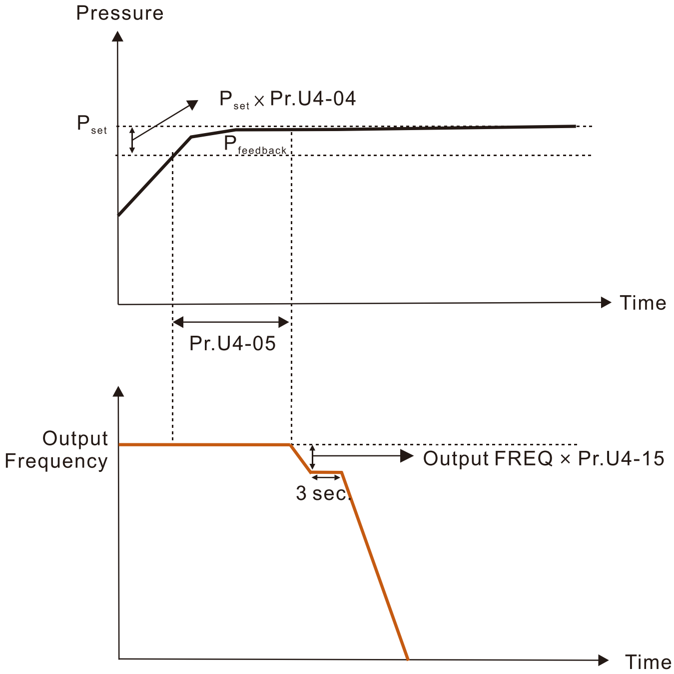
- This parameter is valid for master pump.
- Define the time circulation type according to Pr.U4-12. When the absolute time equals to Pr.U4-13 or the master pump operation time is larger than Pr.U4-14, starts switch master pump and auxiliary pump.

U4-15 FREQ Drop% of Water Consump

(0x1C0F) Default: 5.0

Settings 0.0–50.0%

- P_{set} = Target pressure, $P_{feedback}$ = Feedback pressure.
- During the pump reduction process, the operating frequency of the pump reduction station will be decelerated. The deceleration range is the operating frequency × Pr.U4-15 and lasts for 3 seconds. After water detection, the pump reduction station decelerates to 0 Hz. In this interval, if the feedback pressure of the master station is less than the constant pressure maintenance level or a low consumption restart condition is triggered, the pump reduction will be cancelled.



U4-16 Sleep Pressure Boost Delay

(0x1C10) Default: 10.0

Settings 0.0–120.0 sec.

📖 If the pressure boost value has not reached the value before sleep after the set time in Pr.U4-16, the drive resumes to general control state.

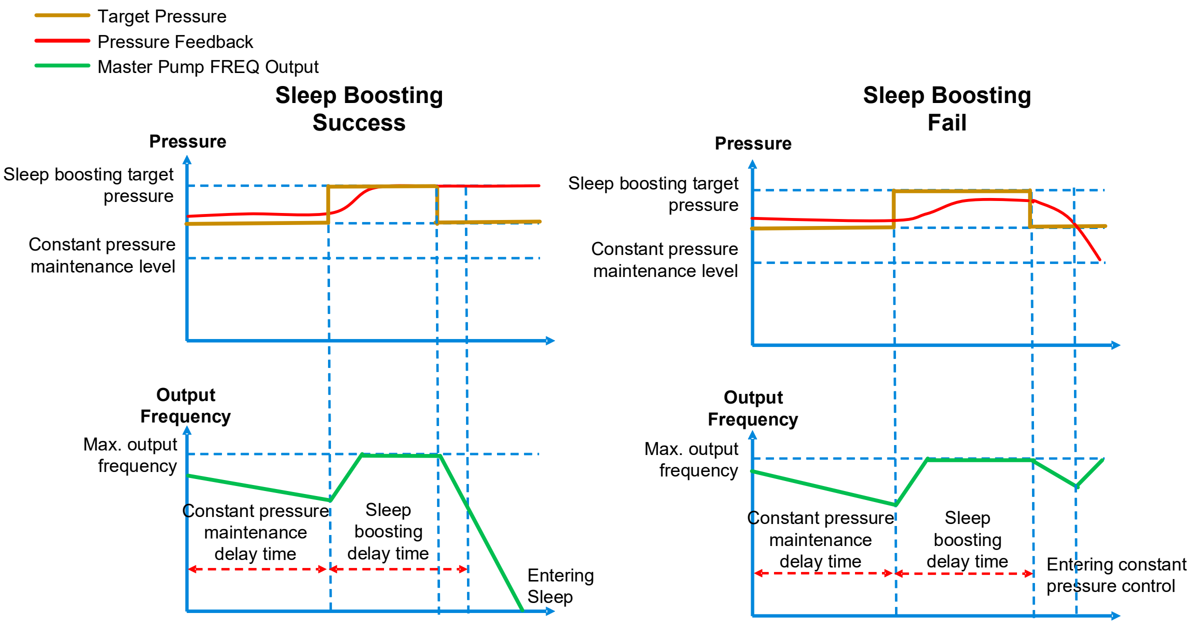
U4-17 Sleep Pressure Boost Setting

(0x1C11) Default: 0.0

Settings 0.0–50.0%

📖 This parameter is based on the target value set by the PID control.

📖 When entering sleep mode, the sleep target pressure equals to the target pressure × (1 + Pr.U4-17) to reach the target pressure value. you can increase Pr.U4-17 to increase the sleep time.



Appendix A. Revision History

Add Information	
Description	Related Chapter
Add Pr. n0-01 setting value and update its setting name and descriptions	Chapter 01, 02
Add Pr. G3-01 and G3-15 setting value	Chapter 02
Add Pr. H1-08 descriptions	Chapter 02
Add descriptions of Parameter group o1	Chapter 02

Modified Information	
說明	影響範圍
Update Pr. G3-01 description	Chapter 01, 02
Update Pr. H1-02 description	Chapter 01, 02
Update the symbol of “parameter can be set during run” of Pr. J4-00, J4-06	Chapter 01, 02
Update description of Pr. G1-00–G1-03, G2-02	Chapter 02
Update default setting of Pr. G2-04, G2-23, G2-42	Chapter 02
Update settings of Pr. G2-13, G2-32, G2-51	Chapter 02
Delete setting bit 1 of Pr. J5-06	Chapter 02
Update description of Pr. o1-01, o1-05, o1-09, o1-13, o1-17, o1-21, o1-25, o1-29, o1-33	Chapter 02
Update description of Pr. U1-00, U1-30–U1-32, U1-40–U1-42, U2-01, U2-02, U2-22, U3-01, U3-02–U3-04, U3-06–U3-07, U3-17–U3-20, U4-11, U4-15	Chapter 11

Smarter. Greener. Together.

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