

- Voltage Monitoring Relays p9-1
- Current Monitoring Relays p9-5
- Phase Shift Monitoring Relays p9-8
- Frequency Monitoring Relays p9-8
- Earth Leakage Relays p9-18



For three-phase systems,  
without neutral



PMV10 A440



PMV20...



PMV30...



PMV40...

Order code	Rated voltage to control Ue (phase to phase)	Qty per pkg	Wt
	[V] 50/60Hz	n°	[kg]

Three-phase system, without neutral.  
Phase loss and incorrect phase sequence. Instantaneous trip.

PMV10 A440	208-480VAC	1	0.050
PMV20 A240	100-240VAC	1	0.120
PMV20 A575	208-575VAC	1	0.120
PMV20 A600	380-600VAC	1	0.120

### General characteristics

- Voltage monitoring relay, self powered, for phase loss and incorrect phase sequence
- Phase loss detection if one of the voltages is <70% rated value
- Phase loss tripping time: 60ms
- 1 relay output with 1 changeover contact (SPDT)
- Modular DIN 43880 housing: 1-module for PMV10; 2-module for PMV20
- IEC protection degree: IP40 on front (only when placed in IP40 enclosure or control board); IP20 at terminals.

### Certifications and compliance

Certifications obtained: GOST; UL Listed, for USA and Canada (File E93601) as Auxiliary Devices.  
Compliant with standards: IEC/EN 60255-5, IEC/EN 61000-6-2, IEC/EN 61000-6-3, UL 508, CSA C22.2 n° 14.

### Operational diagram

See page 9-10.

Order code	Rated voltage to control Ue (phase to phase)	Qty per pkg	Wt
	[V] 50/60Hz	n°	[kg]

Three-phase system, without neutral.  
Minimum AC voltage. Delayed trip.  
Phase loss and incorrect phase sequence. Instantaneous trip.

PMV30 A240	208-240VAC	1	0.130
PMV30 A575	380-575VAC	1	0.130
PMV30 A600	600VAC	1	0.130

### General characteristics

- Voltage monitoring relay, self powered, for minimum voltage, phase loss and incorrect phase sequence
- Configurable rated voltage (Ue):
  - PMV30 A240: 208-220-230-240VAC
  - PMV30 A575: 380-400-415-440-460-480-525-575VAC
- Excellent tripping accuracy
- TRMS measurements (True Root Mean Square)
- Control of phase-to-phase voltages
- Phase loss detection if one of the voltages is <70% rated value
- Phase loss tripping time: 60ms
- 1 relay output with 1 changeover contact (SPDT)
- Modular DIN 43880 housing, 2-module
- IEC protection degree: IP40 on front (only when placed in IP40 enclosure or control board); IP20 at terminals.

### ADJUSTMENTS

- “V min” Minimum voltage tripping threshold 80-95% Ue
- “Delay” Tripping time 0.1-20s
- “Reset delay” Resetting time 0.1-20s.

### Certifications and compliance

Certifications obtained: GOST; UL Listed, for USA and Canada (File E93601), as Auxiliary Devices.  
Compliant with standards: IEC/EN 60255-5, IEC/EN 61000-6-2, IEC/EN 61000-6-3, UL 508, CSA C22.2 n° 14.

### Operational diagram

See page 9-10.

Order code	Rated voltage to control Ue (phase-to-phase)	Qty per pkg	Wt
	[V] 50/60Hz	n°	[kg]

Three-phase system, without neutral.  
Asymmetry. Delayed trip.  
Phase loss and incorrect phase sequence. Instantaneous trip.

PMV40 A240	208-240VAC	1	0.130
PMV40 A575	380-575VAC	1	0.130
PMV40 A600	600VAC	1	0.130

### General characteristics

- Voltage monitoring relay, self powered, for asymmetry, phase loss and incorrect phase sequence
- Excellent tripping accuracy
- TRMS measurements (True Root Mean Square)
- Control of phase-to-phase voltages
- Phase loss detection if one of the voltages is <70% rated value
- Phase loss tripping time: 60ms
- 1 relay output with 1 changeover contact (SPDT)
- Modular DIN 43880 housing, 2-module
- IEC protection degree: IP40 on front (only when placed in IP40 enclosure or control board); IP20 at terminals.

### ADJUSTMENTS

- “Asymmetry” High voltage asymmetry tripping threshold 5-15% Ue
- “Delay” Tripping time 0.1-20s
- “Reset delay” Resetting time 0.1-20s

### Certifications and compliance

Certifications obtained: GOST; UL Listed, for USA and Canada (File E93601), as Auxiliary Devices.  
Compliant with standards: IEC/EN 60255-5, IEC/EN 61000-6-2, IEC/EN 61000-6-3, UL 508, CSA C22.2 n° 14.

### Operational diagram

See page 9-10.

### For three-phase systems, without neutral



PMV50...

Order code	Rated voltage to control Ue (phase-to-phase)	Qty per pkg	Wt
	[V] 50/60Hz	n°	[kg]

Three-phase system, without neutral.  
Minimum and maximum AC voltage. Delayed trip.  
Phase loss and incorrect phase sequence. Instantaneous trip.

PMV50 A240	208...240VAC	1	0.130
PMV50 A575	380...575VAC	1	0.130
PMV50 A600	600VAC	1	0.130

#### General characteristics

- Voltage monitoring relay, self powered, for minimum and maximum voltage, phase loss and incorrect phase sequence
- Configurable rated voltage (Ue):
  - PMV50 A240: 208-220-230-240VAC
  - PMV50 A575: 380-400-415-440-460-480-525-575VAC
- High tripping accuracy
- TRMS measurements (True Root Mean Square)
- Control of phase-to-phase voltages
- Phase loss detection if one of the voltages is <70% rated value
- Phase loss tripping time: 60ms
- 1 relay output with 1 changeover contact (SPDT)
- Modular DIN 43880 housing, 2 module
- IEC degree of protection: IP40 on front (only when placed in IP40 enclosure or control board); IP20 on terminals.

#### ADJUSTMENTS

- "V max" Maximum voltage tripping threshold 105...115% Ue
- "V min" Minimum voltage tripping threshold 80...95% Ue
- "Delay" for each Tripping time 0.1...20s
- "Reset delay" Resetting time 0.1...20s.

#### Certifications and compliance

Certifications obtained: EAC; UL Listed, for USA and Canada (cULus - File E93601) as Auxiliary Devices.  
Compliant to standards: IEC/EN 60255-5, IEC/EN 61000-6-2, IEC/EN 61000-6-3, UL 508, CSA C22.2 n° 14.

#### Operational diagram

See page 9-10.



PMV70...

Order code	Rated voltage to control Ue (phase to phase)	Qty per pkg	Wt
	[V] 50/60Hz	n°	[kg]

Three-phase system, without neutral.  
Minimum and maximum AC voltage and asymmetry.  
Delayed trip.  
Phase loss and incorrect phase sequence. Instantaneous trip.

PMV70 A240	208...240VAC	1	0.130
PMV70 A575	380...575VAC	1	0.130
PMV70 A600	600VAC	1	0.130

#### General characteristics

- Voltage monitoring relay, self powered, for minimum and maximum voltage, phase loss, incorrect phase sequence and asymmetry
- Configurable rated voltage (Ue):
  - PMV70 A240: 208-220-230-240VAC
  - PMV70 A575: 380-400-415-440-460-480-525-575VAC
- Excellent tripping accuracy
- TRMS measurements (True Root Mean Square)
- Control of phase-to-phase voltages
- Phase loss detection if one of the voltages is <70% rated value
- Phase loss tripping time: 60ms
- 1 relay output with 1 changeover contact (SPDT)
- Modular DIN 43880 housing, 2 module
- IEC degree of protection: IP40 on front (only when placed in IP40 enclosure or control board); IP20 at terminals.

#### ADJUSTMENTS

- "V max" Maximum voltage tripping threshold 105...115% Ue
- "V min" Minimum voltage tripping threshold 80...95% Ue
- "Delay" for each Tripping delay 0.1...20s
- "Asymmetry" High voltage asymmetry tripping threshold 5...15% Ue.

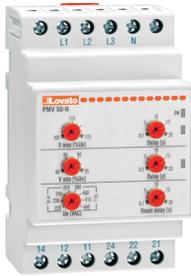
#### Certifications and compliance

Certifications obtained: EAC; UL Listed, for USA and Canada (cULus - File E93601), as Auxiliary Devices.  
Compliant with standards: IEC/EN 60255-5, IEC/EN 61000-6-2, IEC/EN 61000-6-3, UL 508, CSA C22.2 n° 14.

#### Operational diagram

See page 9-10.

### For three-phase systems with or without neutral



PMV50N...

Order code	Rated voltage to control Ue (phase to phase)	Qty per pkg	Wt
	[V] 50/60Hz	n°	[kg]

Three-phase system, with or without neutral.  
Minimum and maximum AC voltage. Delayed trip.  
Phase loss, neutral loss and incorrect phase sequence.  
Instantaneous trip.

<b>PMV50N A240</b>	208...240VAC	1	0.200
<b>PMV50N A440</b>	380...440VAC	1	0.200
<b>PMV50N A600</b>	480...600VAC	1	0.200

#### General characteristics

- Voltage monitoring relay, self powered, for minimum and maximum voltage, phase loss, neutral loss and incorrect phase sequence
- 4 configurable rated voltage (Ue):
  - PMV50N A240: 208-220-230-240VAC (phase-phase) 120-127-132-138VAC (phase-neutral)
  - PMV50N A440: 380-400-415-440VAC (phase-phase) 220-230-240-254VAC (phase-neutral)
  - PMV50N A600: 480-525-575-600VAC (phase-phase) 277-303-332-347VAC (phase-neutral)
- Excellent tripping accuracy
- TRMS measurements (True Root Mean Square)
- Phase loss detection when one of the voltages is <70% rated voltage
- Phase or neutral loss tripping time: 60ms
- 2 relay outputs, each with 1 changeover contact (SPDT)
- Modular DIN 43880 housing, 3 module
- IEC degree of protection: IP40 on front (only when placed in IP40 enclosure or control board); IP20 at terminals.

#### ADJUSTMENTS

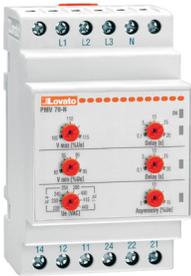
- “V max” Maximum voltage tripping threshold 105...115% Ue  
 “V min” Minimum voltage tripping threshold 80...95% Ue  
 “Delay” for each Tripping time 0.1...20s  
 “Reset Delay” Resetting time 0.1...20s.

#### Certifications and compliance

Certifications obtained: EAC.  
Compliant with standards: IEC/EN 60255-5, IEC/EN 61000-6-2, IEC/EN 61000-6-3, UL 508, CSA C22.2 n° 14.

#### Operational diagram

See page 9-11.



PMV70N...

Order code	Rated voltage to control Ue (phase to phase)	Qty per pkg	Wt
	[V] 50/60Hz	n°	[kg]

Three-phase system, with or without neutral.  
Minimum and maximum AC voltage and asymmetry.  
Delayed trip.  
Phase loss, neutral loss and incorrect phase sequence.  
Instantaneous trip.

<b>PMV70N A240</b>	208...240VAC	1	0.200
<b>PMV70N A440</b>	380...440VAC	1	0.200
<b>PMV70N A600</b>	480...600VAC	1	0.200

#### General characteristics

- Voltage monitoring relay, self powered, for minimum and maximum voltage, phase loss, neutral loss, incorrect phase sequence and asymmetry
- 4 configurable rated voltage (Ue):
  - PMV70N A240: 208-220-230-240VAC (phase-phase) 120-127-132-138VAC (phase-neutral)
  - PMV70N A440: 380-400-415-440VAC (phase-phase) 220-230-240-254VAC (phase-neutral)
  - PMV70N A600: 480-525-575-600VAC (phase-phase) 277-303-332-347VAC (phase-neutral)
- Excellent tripping accuracy
- TRMS measurements (True Root Mean Square)
- Phase loss detection when one of the voltages is <70% rated value
- Phase or neutral loss tripping time: 60ms
- 2 relay outputs, each with 1 changeover contact (SPDT)
- Modular DIN 43880 housing, 3 module
- IEC degree of protection: IP40 on front (only when placed in IP40 enclosure or control board); IP20 at terminals.

#### ADJUSTMENTS

- “V max” Maximum voltage tripping threshold 105...115% Ue  
 “V min” Minimum voltage tripping threshold 80...95% Ue  
 “Delay” for each Tripping time 0.1...20s  
 “Asymmetry” High voltage asymmetry tripping threshold 5...15% Ue.

#### Certifications and compliance

Certifications obtained: EAC.  
Compliant with standards: IEC/EN 60255-5, IEC/EN 61000-6-2, IEC/EN 61000-6-3, UL 508, CSA C22.2 n° 14.

#### Operational diagram

See page 9-11.

### For three-phase systems, with or without neutral



PMV80N...

Order code	Rated voltage to control Ue (phase to phase)	Qty per pkg	Wt
	[V] 50/60Hz	n°	[kg]

Three-phase system, with or without neutral.  
Minimum and maximum AC voltage, minimum and maximum frequency. Delayed trip.  
Phase loss, neutral loss and incorrect phase sequence.  
Instantaneous trip.

PMV80N A240	208...240VAC	1	0.200
PMV80N A440	380...440VAC	1	0.200
PMV80N A600	480...600VAC	1	0.200

#### General characteristics

- Voltage monitoring relay, self powered, for minimum and maximum voltage, minimum and maximum frequency, phase loss, neutral loss and incorrect phase sequence
- 4 configurable rated voltage (Ue):
  - PMV80N A240: 208-220-230-240VAC (phase-phase) 120-127-132-138VAC (phase-neutral)
  - PMV80N A440: 380-400-415-440VAC (phase-phase) 220-230-240-254VAC (phase-neutral)
  - PMV80N A600: 480-525-575-600VAC (phase-phase) 277-303-332-347VAC (phase-neutral)
- Excellent tripping accuracy
- TRMS measurements (True Root Mean Square)
- Phase loss detection if one of the voltages is <70% rated value
- Phase or neutral loss tripping time: 60ms
- 2 relay outputs, each with 1 changeover contact (SPDT)
- Modular DIN 43880, 3 module
- IEC degree of protection: IP40 on front (only when placed in IP40 enclosure or control board); IP20 at terminals.

#### ADJUSTMENTS

- "V max" Maximum voltage tripping threshold 105...115% Ue
- "V min" Minimum voltage tripping threshold 80...95% Ue
- "Hz min/max" Minimum/maximum frequency tripping threshold 1...10%
- "V delay" Tripping time 0.1...20s
- "Hz delay" Tripping time 0.1...5s.

#### Certifications and compliance

Certifications obtained: EAC.  
Compliant with standards: IEC/EN 60255-5, IEC/EN 61000-6-2, IEC/EN 61000-6-3, UL 508, CSA C22.2 n° 14.

#### Operational diagram

See page 9-11.

### For single-phase systems



PMV55...

Order code	Rated voltage to control Ue	Qty per pkg	Wt
	[V] 50/60Hz	n°	[kg]

Single-phase system.  
Minimum and maximum AC voltage. Delayed trip.

PMV55 A240	208...240VAC	1	0.125
PMV55 A440	380...440VAC	1	0.125

#### General characteristics

- Voltage monitoring relay, self powered, for minimum and maximum voltage
- 4 configurable rated voltage (Ue):
  - PMV55 A240: 208-220-230-240VAC
  - PMV55 A440: 380-400-415-440VAC
- Excellent tripping accuracy
- TRMS measurements (True Root Mean Square)
- 1 relay output with 1 changeover contact (SPDT)
- Modular DIN 43880 housing, 2 module
- IEC degree of protection: IP40 on front (only when placed in IP40 enclosure or control board); IP20 at terminals.

#### ADJUSTMENTS

- "V max" Maximum voltage tripping threshold 105...115% Ue
- "V min" Minimum voltage tripping threshold 80...95% Ue
- "Delay" for each Tripping time 0.1...20s
- "Reset delay" Resetting time 0.1...20s.

#### Certifications and compliance

Certifications obtained: EAC; UL Listed, for USA and Canada (cULus - File E93601), as Auxiliary Devices.  
Compliant with standards: IEC/EN 60255-5, IEC/EN 61000-6-2, IEC/EN 61000-6-3, UL 508, CSA C22.2 n° 14.

#### Operational diagram

See page 9-11.

### For single-phase systems



PMA20 240

Order code	Rated current $I_e$	Auxiliary supply voltage	Qty per pkg	Wt
	[A]	[V]	n°	[kg]
PMA20 240	5 or 16A	24...240V AC/DC	1	0.121

Single-phase system.  
AC/DC maximum current control.  
Auxiliary AC/DC power supply.  
Automatic or manual reset.

#### General characteristics

- Current monitoring relay for AC/DC maximum current control, AC/DC multivoltage auxiliary power supply
- Direct connection up to 16A max or by current transformer (CT)
- Excellent tripping accuracy
- TRMS current measurements (True Root Mean Square)
- Resetting and inhibition input
- 1 relay output with 1 changeover contact (SPDT)
- Modular DIN 43880 housing, 2 module
- IEC degree of protection: IP40 on front (only when placed in IP40 enclosure or control board); IP20 at terminals.

#### ADJUSTMENTS

- "Imax" Maximum current tripping threshold  
5...100%  $I_e$
- "Hysteresis" Maximum hysteresis threshold  
1...50%
- "Trip delay" Tripping time 0.1...30s
- "Inhibition time" Inhibition delay for external input or at power up 1...60s
- "Aut. reset delay" Automatic resetting time 0.1...30s
- "Mode"
- Rated current 5A or 16A
  - Relay output normally energised or de-energised
  - Tripping memory (Latch) On or Off.

#### Certifications and compliance

Certifications obtained: EAC; UL Listed, for USA and Canada (cULus - File E93601), as Auxiliary Devices - Modular ampere monitoring relays.  
Compliant with standards: IEC/EN 60255-5, IEC/EN 61000-6-2, IEC/EN 61000-6-3, UL 508, CSA C22.2 n° 14.

#### Operational diagram

See page 9-12.

### For single and three-phase systems



PMA30 240

Order code	Rated current I <sub>e</sub>	Auxiliary supply voltage	Qty per pkg	Wt
	[A]	[V]	n°	[kg]
<b>PMA30 240</b>	5 or 16A	24-240V AC/DC	1	0.121

Single-phase system.  
AC/DC minimum or maximum current control. Delayed trip.  
Auxiliary AC/DC power supply.  
Automatic or manual reset.

#### General characteristics

- Current monitoring relay for AC/DC minimum or maximum current control; AC/DC multivoltage auxiliary power supply
- Direct connection up to 16A max, or by current transformer (CT)
- Excellent tripping accuracy
- TRMS current measurements (True Root Mean Square)
- Resetting and inhibition input
- 1 relay output with 1 changeover contact (SPDT)
- Modular DIN 43880 housing, 2-module
- IEC protection degree: IP40 on front (only when placed in IP40 enclosure or control board); IP20 at terminals.

#### ADJUSTMENTS

- "Set point" Minimum or maximum current tripping threshold 5-100% I<sub>e</sub>
- "Hysteresis" Minimum or maximum hysteresis threshold 1-50%
- "Trip delay" Tripping time 0.1-30s
- "Inhibition time" Tripping delay for external input or at power up 1-60s
- "I<sub>e</sub>" Current scale selection: 5A or 16A
- "Mode"
- Min or max function
  - Relay output normally energised or de-energised
  - Tripping memory (Latch) On or Off.

#### Certifications and compliance

Certifications obtained: GOST; UL Listed, for USA and Canada (File E93601), as Auxiliary Devices - Modular ampere monitoring relays.

Compliant with standards: IEC/EN 60255-5, IEC/EN 61000-6-2, IEC/EN 61000-6-3, UL 508, CSA C22.2 n° 14.

#### Operational diagram

See pages 9-13 and 9-14.



PMA40 240

Order code	Rated current I <sub>e</sub>	Auxiliary supply voltage	Qty per pkg	Wt
	[A]	[V]	n°	[kg]
<b>PMA40 240</b>	0.02-0.05- 0.25-1-5- 16A	24-240V AC/DC	1	0.166

Single-phase system.  
AC/DC minimum and maximum current control. Delayed trip.  
Auxiliary AC/DC power supply.  
Automatic or manual reset.

#### General characteristics

- Current monitoring relay for AC/DC minimum and maximum current control, AC/DC multivoltage auxiliary power supply
- Direct connection up to 16A max, or by current transformer (CT)
- Excellent tripping accuracy
- TRMS current measurements (True Root Mean Square)
- Automatic or manual resetting (manual resetting by power removal)
- 2 relay outputs (Min and Max), configurable, each with 1 changeover contact (SPDT)
- Modular DIN 43880 housing, 3-module
- IEC protection degree: IP40 on front (only when placed in IP40 enclosure or control board); IP20 at terminals.

#### ADJUSTMENTS

- "I<sub>max</sub>" Maximum current tripping threshold 5-100% I<sub>e</sub>
- "I<sub>min</sub>" Minimum current tripping threshold 5-100% I<sub>e</sub>
- "Trip delay" Minimum and maximum current tripping time 0.1-30s
- "Inhibition time" Tripping time at power up 1-60s
- "I<sub>e</sub>" Current scale selection: 20mA, 50mA, 250mA, 1A, 5A or 16A
- "Mode"
- Separate or common relay outputs
  - Relay output normally energised or de-energised
  - Tripping memory (Latch) On or Off.

#### Certifications and compliance

Certifications obtained: GOST; UL Listed, for USA and Canada (File E93601), as Auxiliary Devices - Modular ampere monitoring relays.

Compliant with standards IEC/EN 60255-5, IEC/EN 61000-6-2, IEC/EN 61000-6-3, UL 508, CSA C22.2 n° 14.

#### Operational diagram

See page 9-15.

### For single and three-phase systems



PMA50...

Order code	Rated current I <sub>e</sub>	Auxiliary supply voltage	Qty per pkg	Wt
	[A]	[V]	n°	[kg]

Single and three-phase systems.  
Maximum AC current and minimum cosφ. Delayed trip.  
Phase loss and incorrect phase sequence. Instantaneous trip.  
Auxiliary AC power supply.  
Automatic or manual reset.

<b>PMA50 A240</b>	5 or 16A	220-240VAC	1	0.251
<b>PMA50 A415</b>		380-415VAC	1	0.251
<b>PMA50 A480</b>		440-480VAC	1	0.251

#### General characteristics

- Pump protection relay against dry running, auxiliary AC power supply
- Motor under-load and over-current control
- Direct connection up to 16A max, or by current transformer (CT)
- Excellent tripping accuracy
- Voltage control range 80-660VAC
- Current control range 0.1-16A
- Resetting and enabling consent input
- 1 relay output relay with 1 changeover contact (SPDT)
- Modular DIN 43880 housing, 3-module
- IEC protection degree: IP40 on front (only when placed in IP40 enclosure or control board); IP20 at terminals.

#### ADJUSTMENTS

- "Cosφ min" Minimum cosφ threshold 0.1-0.99 (under-load/dry running)
- "I<sub>max</sub>" Maximum (over) current threshold 10-100%I<sub>e</sub>
- "Trip delay" Tripping time for minimum cosφ and maximum current 0.1-10s
- "Inhibition time" Tripping delay for external input or at power up 1-60s
- "Aut. reset delay" Automatic reset time OFF-100min
- "Mode"
- Rated current 5A or 16A
  - Single or three phase
  - External reset On or Off.

#### Certifications and compliance

Certifications obtained: GOST; UL Listed, for USA and Canada (File E93601), as Auxiliary Devices - Modular ampere monitoring relays.

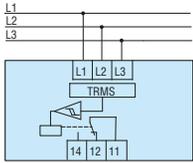
Compliant with standards: IEC/EN 60255-5, IEC/EN 61000-6-2, IEC/EN 61000-6-3, UL 508, CSA C22.2 n° 14.

#### Operational diagram

See page 9-16.

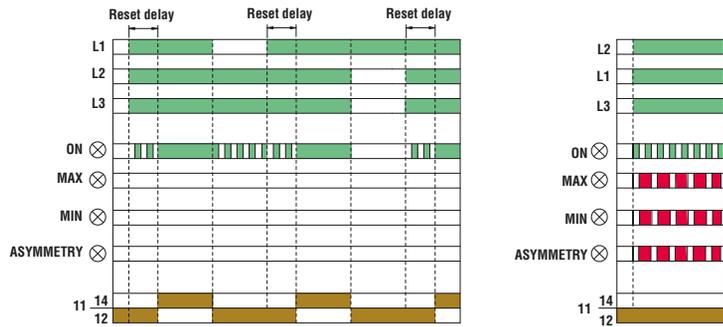


### Voltage monitoring relays for 3-phase systems without neutral

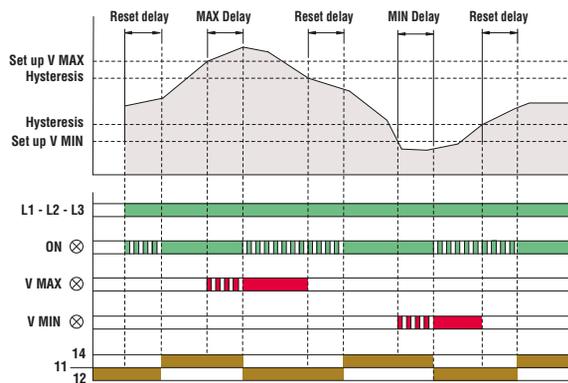


PMV10 - PMV20 - PMV30  
PMV40 - PMV50 - PMV70

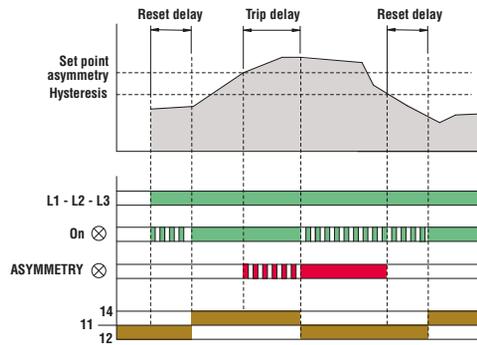
Phase loss and incorrect phase sequence (PMV10-PMV20-PMV30-PMV40-PMV50-PMV70)



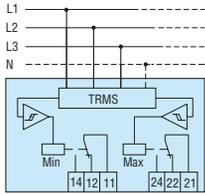
Maximum and minimum voltage (PMV30 - PMV50 - PMV70)



Asymmetry (PMV40 - PMV70)

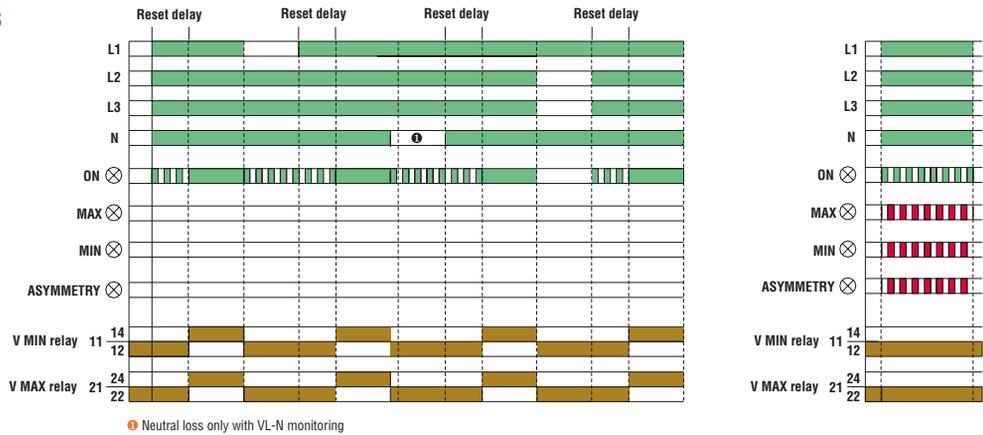


### Voltage monitoring relays for 3-phase systems c/w or w/o neutral

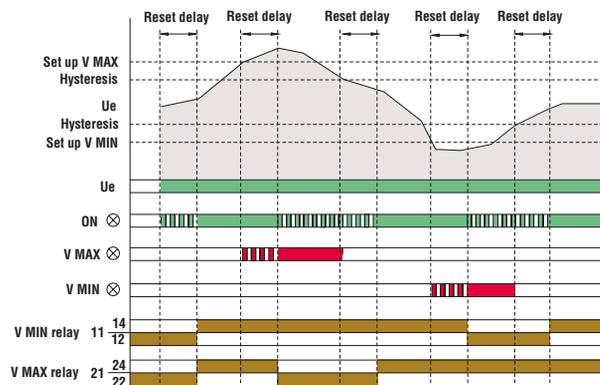


PMV50N - PMV70N - PMV80N

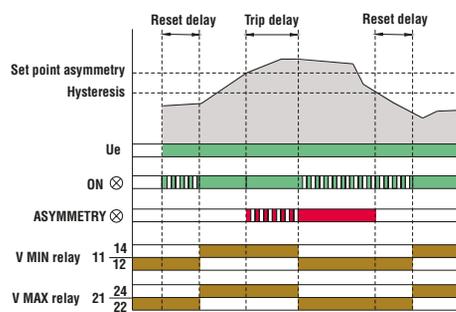
Phase loss and incorrect phase sequence (PMV50N - PMV70N - PMV80N)



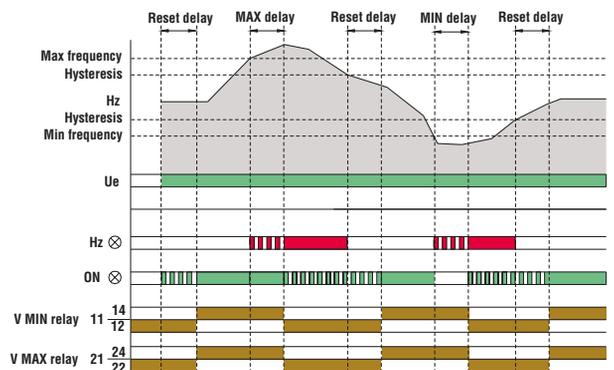
Maximum and minimum voltage (PMV50N - PMV70N - PMV80N)



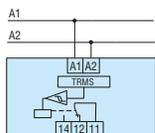
Asymmetry (PMV70N)



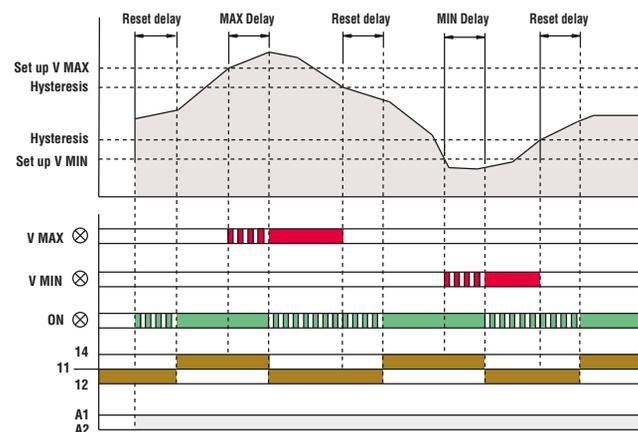
Maximum and minimum frequency (PMV80N)



### Voltage monitoring relay for 1-phase systems



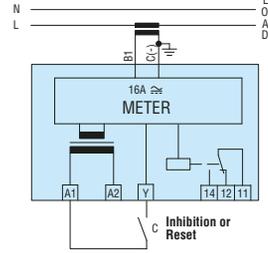
PMV55



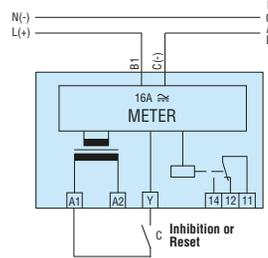
### Current monitoring relay for 1-phase systems

PMA20

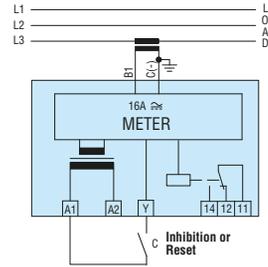
#### Single-phase connection with CT



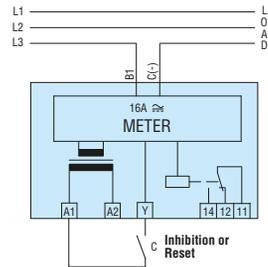
#### Single-phase direct connection



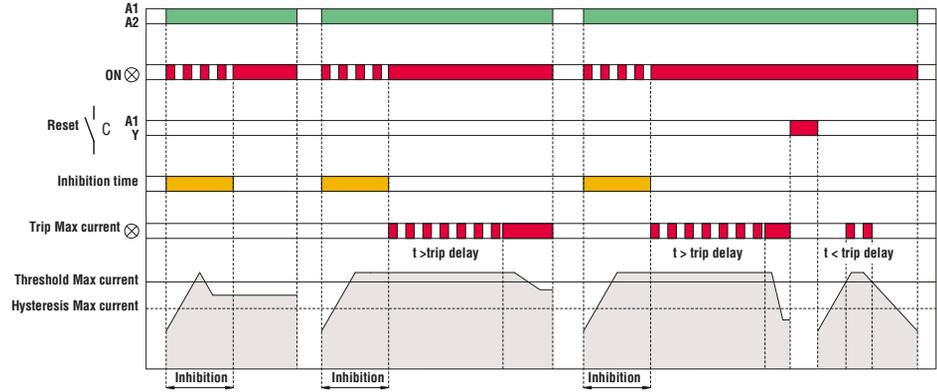
#### Three-phase connection with CT (1 phase control)



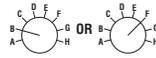
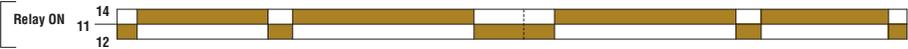
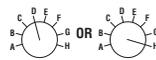
#### Three-phase direct connection (1 phase control)



#### Operation with tripping latch (Latch ON)



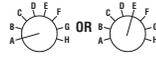
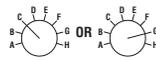
#### Positions



#### Operation with no tripping latch (Latch OFF)



#### Positions

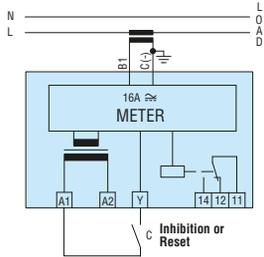


Operation			
Position	Ie	Relay output	Latch
A	5A	OFF	OFF
B		ON	ON
C		OFF	OFF
D		ON	ON
E	16A	OFF	OFF
F		ON	ON
G		OFF	OFF
H		ON	ON

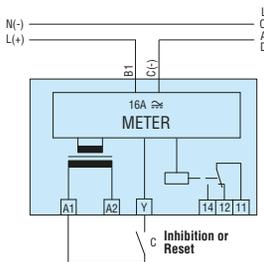
### Current monitoring relay for single phase and three phase systems

PMA30

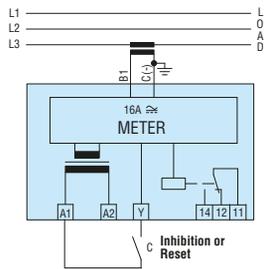
Single-phase connection by CT



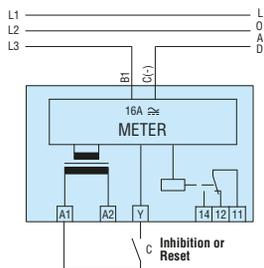
Single-phase direct connection



Three-phase connection by CT (1 phase control)

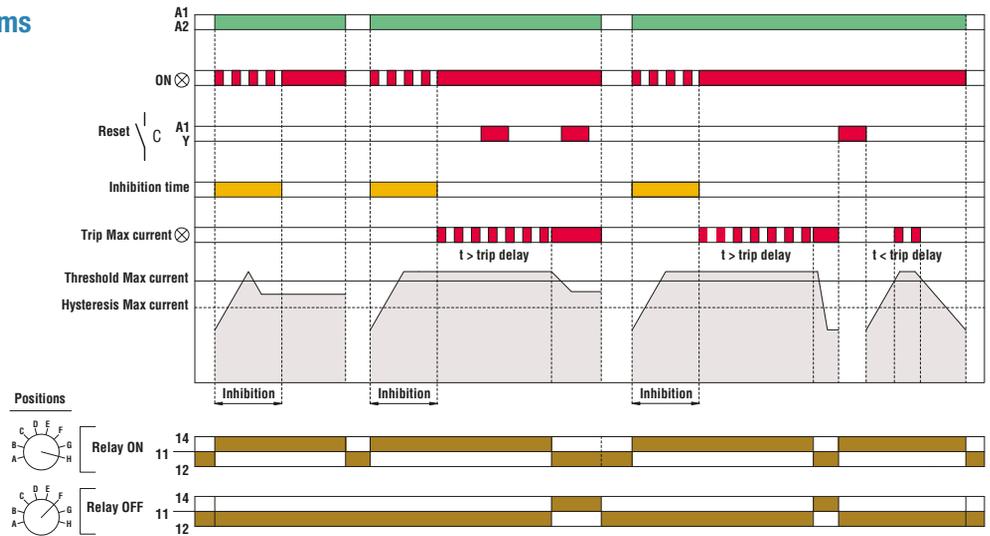


Three-phase direct connection (1 phase control)

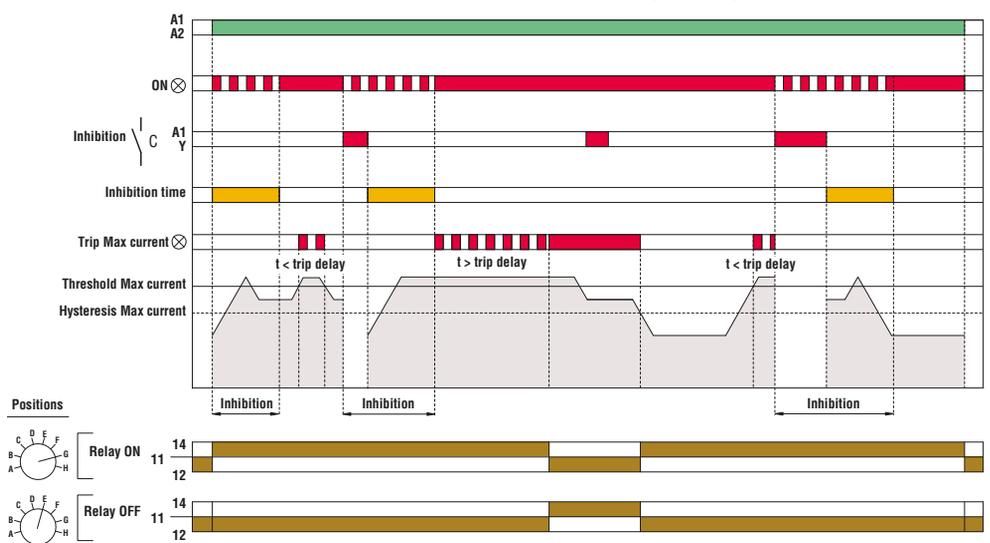


Operation			
Position	Function	Relay output	Latch
A	Minimum current	OFF	OFF
B		ON	ON
C		ON	OFF
D		ON	ON
E	Maximum current	OFF	OFF
F		ON	ON
G		ON	OFF
H		ON	ON

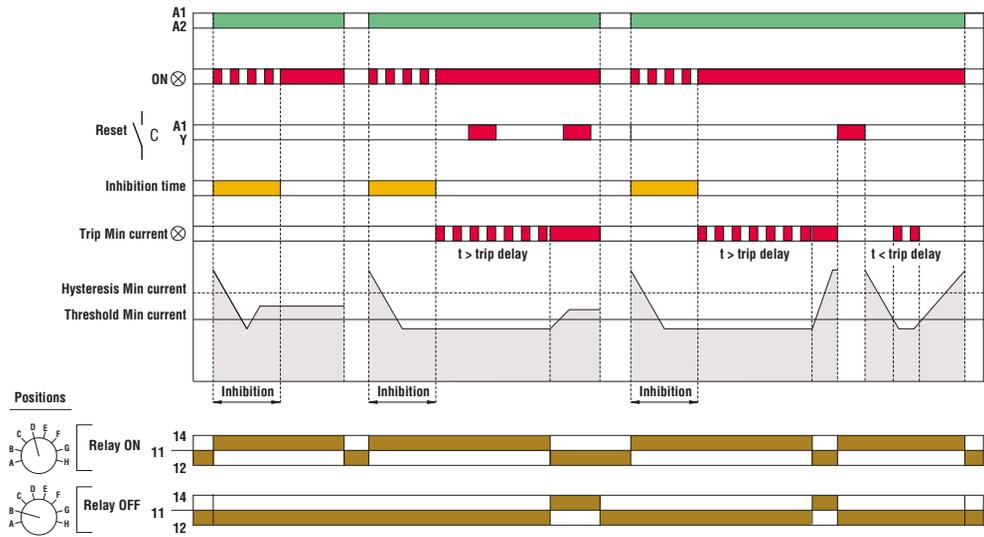
Maximum current control operation with tripping latch (Latch ON)



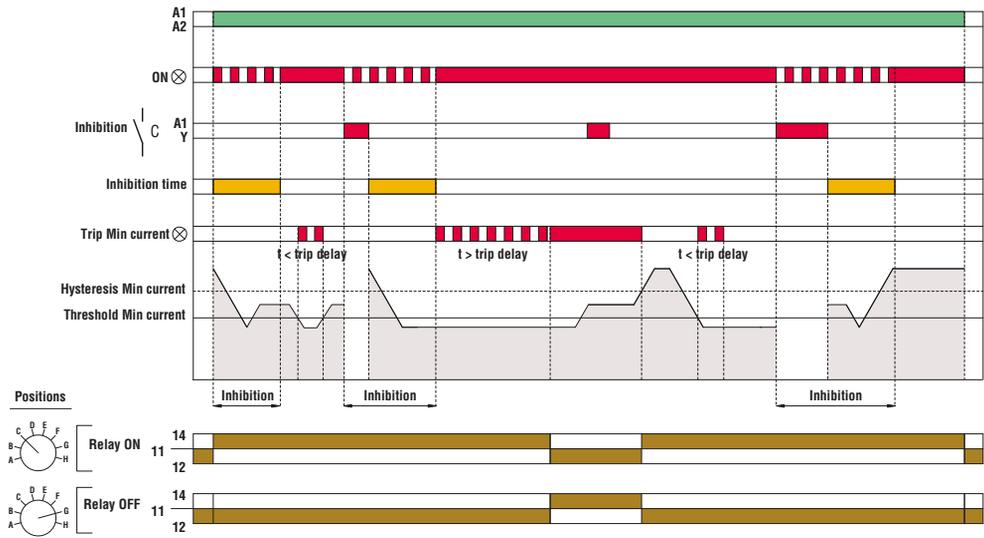
Maximum current control operation with no tripping latch (Latch OFF)



Minimum current control operation with tripping latch (Latch ON)



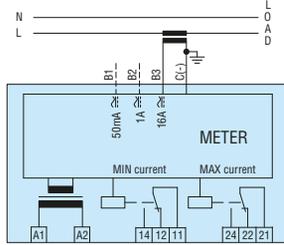
Minimum current control operation with no tripping latch (Latch OFF)



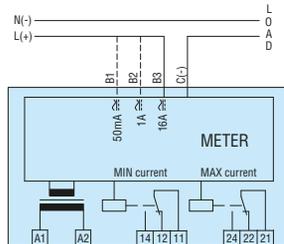
### Current monitoring relay for single phase and three phase systems

PMA40

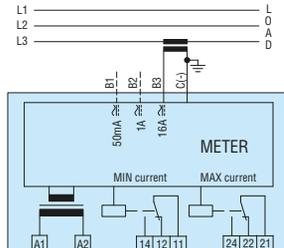
Single-phase connection by CT



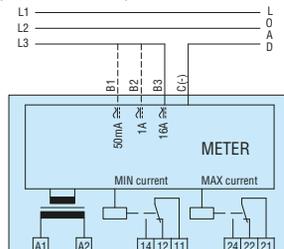
Single-phase direct connection



Three-phase connection by CT (1 phase control)

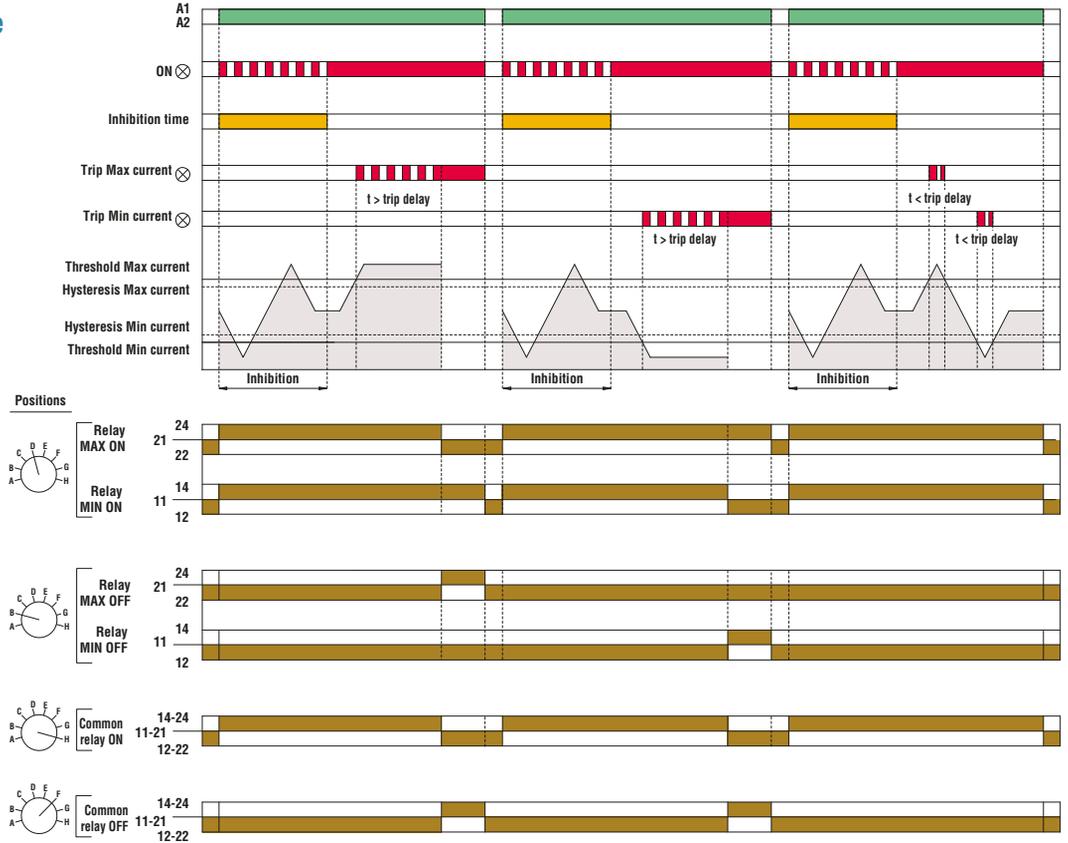


Three-phase direct connection (1 phase control)

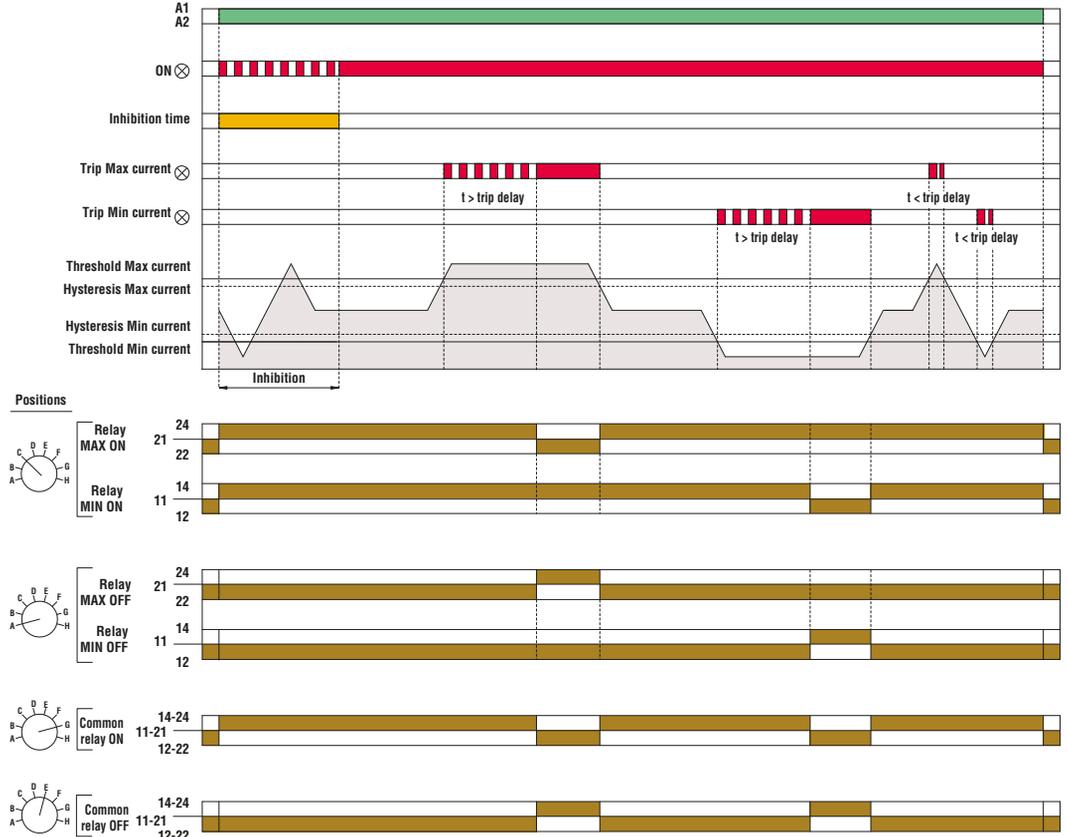


Operation			
Position	Operation	Relay output	Latch
A	Separate relays	OFF	OFF
B		ON	OFF
C		ON	ON
E	Common relays	OFF	OFF
F		ON	ON
G		ON	OFF
H		ON	ON

Operation with tripping latch (Latch ON)



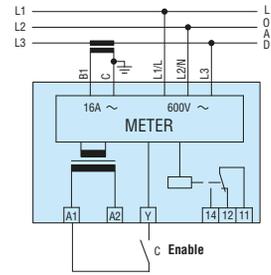
Operation with no tripping latch (Latch OFF)



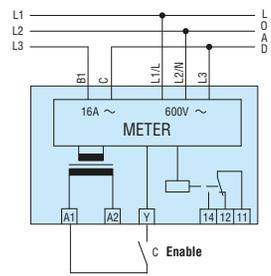
### Pump protection - motor under-load/over-current monitoring

PMA50

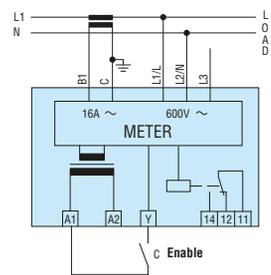
#### Three-phase connection by CT



#### Three-phase direct connection

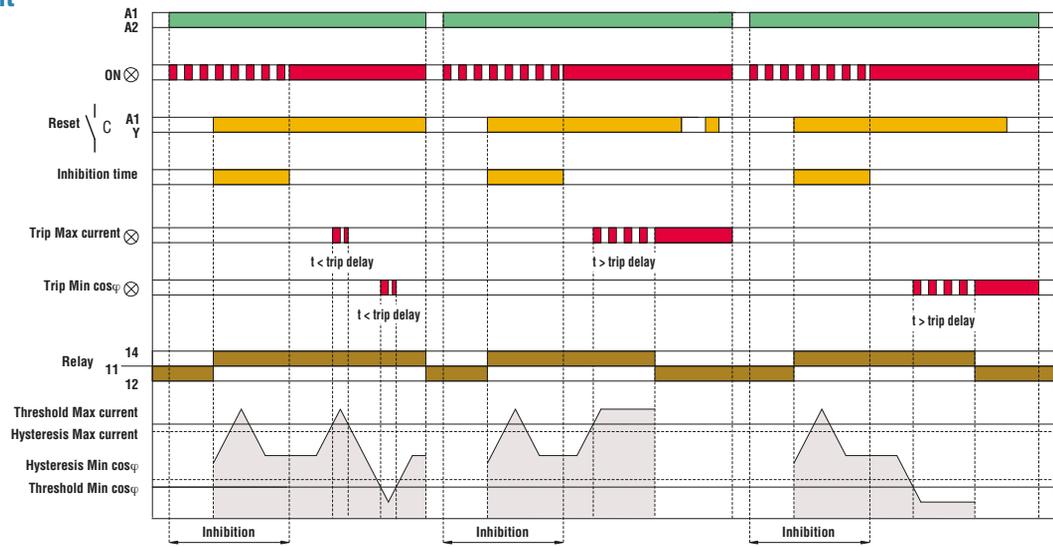


#### Single-phase connection by CT

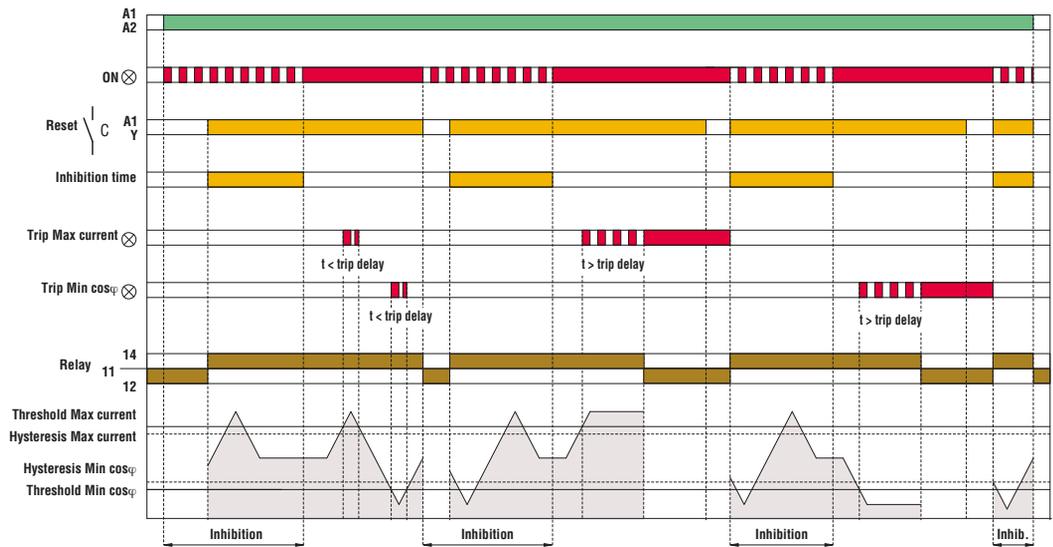


Operation			
Position	Ie	Connection	External reset
A	5A	1 phase	OFF
B		3 phase	ON
C			OFF
D			ON
E	16A	1 phase	OFF
F		3 phase	ON
G			OFF
H			ON

#### External reset disabled (OFF)



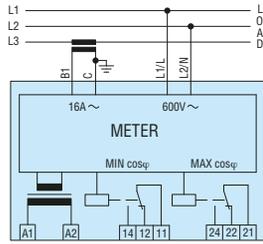
#### External reset enabled (ON)



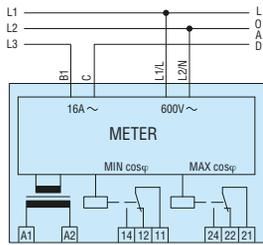
### Phase shift monitoring relay

PMA60

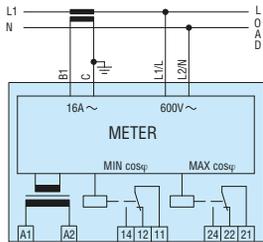
Three-phase connection by CT



Three-phase direct connection

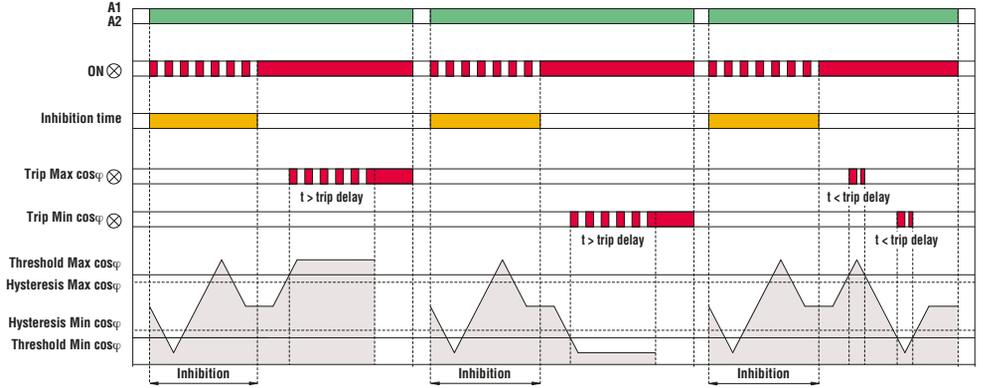


Single-phase connection by CT

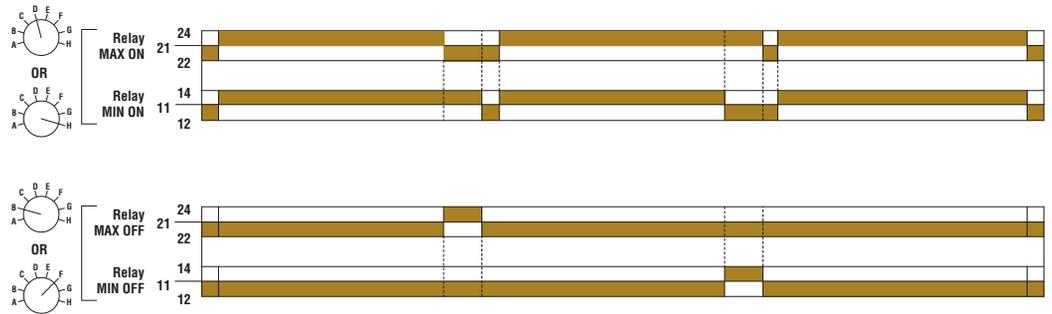


Operation			
Position	Connection	Relay output	Latch
A	1 phase	OFF	OFF
B		ON	ON
C		ON	OFF
D		ON	ON
E	3 phase	OFF	OFF
F		ON	ON
G		ON	OFF
H		ON	ON

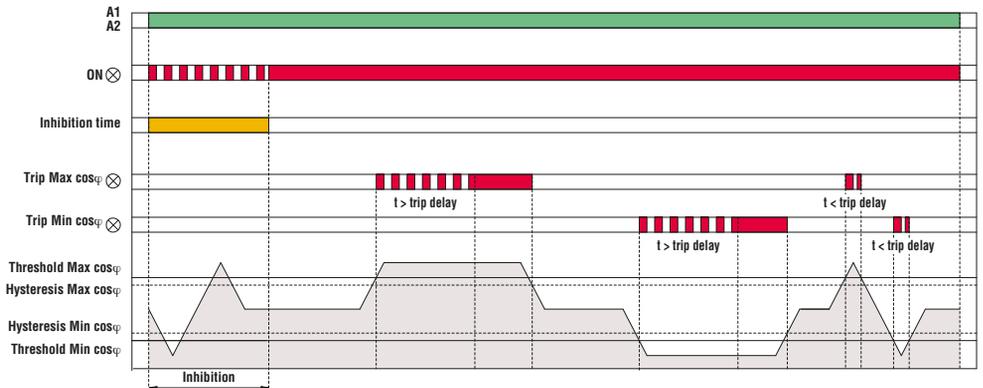
Operation with tripping latch (Latch ON)



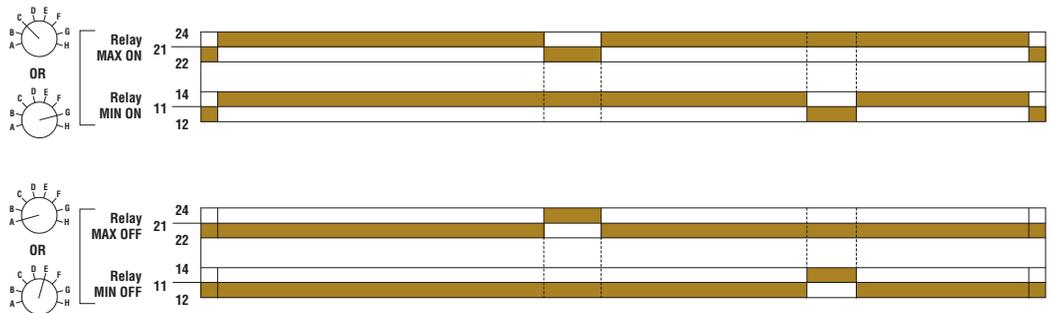
Positions



Operation with no tripping latch (Latch OFF)

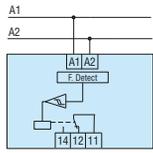


Positions

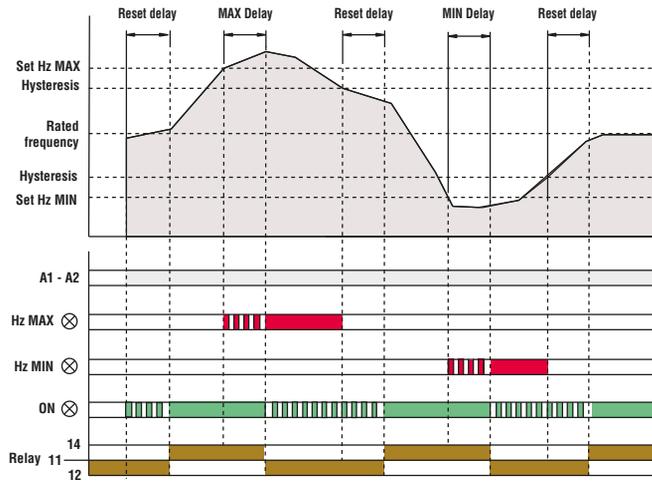


### Frequency monitoring relay

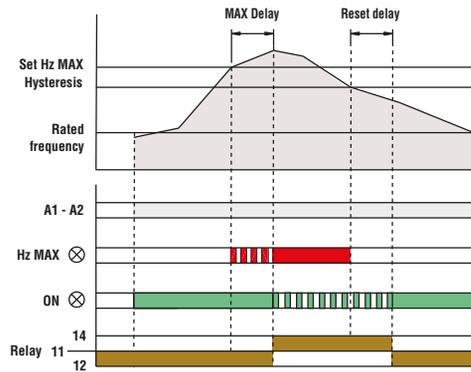
PMF20



MAX-MIN, MAX or MIN function



MAX function



### Relays with 1 operation threshold



R1D...

Order code	Rated auxiliary supply voltage	Output contacts	Qty per pkg	Wt
	[V]	4 <sup>1</sup>	n°	[kg]
1 OPERATION THRESHOLD. Flush mount. External CT.				
R1D 48	24-48VAC/DC	1	1	0.280
R1D 415	110-240-415V ①	1	1	0.280

① Supply voltage:  
110-125VAC (50/60Hz)/DC  
220-240VAC (50/60Hz)  
380-415VAC (50/60Hz).

#### General characteristics

- Earth leakage relay type A
- Green power LED indicator (ON)
- Red relay tripped LED indicator (TRIP)
- Front TEST and RESET buttons
- Configurable automatic or manual resetting
- Flush mount 96x96mm housing with transparent cover
- IEC degree of protection: IP20 terminals, IP40 on front with cover.

#### ADJUSTMENTS FOR R1D

- Configurable tripping set-point (I $\Delta$ n): 0.025-0.25A  
0.25-2.5A  
2.5-25A  
25-250A (with external multiplier RX10)
- Configurable tripping delay time (t): 0.02-0.5s  
0.2-5s

#### Reference standards

Compliant with standards: IEC/EN 60947-2.



RM1...

Order code	Rated auxiliary supply voltage	Output contacts	Qty per pkg	Wt
	[V]	4 <sup>1</sup>	n°	[kg]
1 OPERATION THRESHOLD. Modular, 35mm DIN (IEC/EN 60715) rail mounting. External CT. Fixed tripping set point and time.				
RM1 48	24-48VAC/DC	1	1	0.175
RM1 415	110-240-415V AC ①	1	1	0.175

① Supply voltage:  
110-125VAC (50/60Hz)/DC  
220-240VAC (50/60Hz)  
380-415VAC (50/60Hz).

#### General characteristics

- Earth leakage relay type A
- Configurable fail safe operation for RMT type only
- Green power LED indicator (ON)
- Red relay tripped LED indicator (TRIP)
- Front TEST and RESET buttons
- Configurable automatic or manual resetting
- Modular DIN 43880 housing, 2 module, with transparent cover, suitable for fixing on 35mm DIN rail (IEC/EN 60715)
- IEC degree of protection: IP20 terminals, IP40 on front with cover.

#### SETTINGS FOR RM1

- Selectable tripping set point (I $\Delta$ n): fixed 0.3A or 0.5A
- Selectable tripping time (t): fixed 0.02s or 0.5s

#### ADJUSTMENTS FOR RM AND RMT

- Configurable tripping set-point (I $\Delta$ n): 0.025-0.25A  
0.25-2.5A  
2.5-25A  
25-250A (with external multiplier RX10 for RM only)
- Configurable tripping delay time (t): 0.02-0.5s  
0.2-5s

#### Reference standards

Compliant with standards: IEC/EN 60947-2.

For dimensions see page 9-20.



31 RM...

Order code	Rated auxiliary supply voltage	Output contacts	Qty per pkg	Wt
	[V]	4 <sup>1</sup>	n°	[kg]
1 OPERATION THRESHOLD. Modular, 35mm DIN (IEC/EN 60715) rail mounting. External CT.				
31 RM 48	24-48VAC/DC	1	1	0.190
31 RM 415	110-240-415V ①	1	1	0.190

① Supply voltage:  
110-125VAC (50/60Hz)/DC  
220-240VAC (50/60Hz)  
380-415VAC (50/60Hz).

② 2 output relays, each with 1 changeover contact.



31 RMT...

Order code	Rated auxiliary supply voltage	Output contacts	Qty per pkg	Wt
	[V]	4 <sup>1</sup>	n°	[kg]
1 OPERATION THRESHOLD. Modular, 35 mm DIN (IEC/EN 60715) rail mounting. Ø 28 mm incorporated CT. Configurable fail safe.				
31 RMT 415	110-240-415V ①	2 ②	1	0.375

① Supply voltage:  
110-125VAC (50/60Hz)/DC  
220-240VAC (50/60Hz)  
380-415VAC (50/60Hz).

② 2 output relays, each with 1 changeover contact.

#### General characteristics

- Earth leakage relay type A
- Green power LED indicator (ON)
- Red relay tripped LED indicator (TRIP)
- Front TEST and RESET buttons
- Configurable automatic or manual resetting
- Compact housing for fixing on panel mounting plate
- IEC degree of protection: IP20 terminals.

#### ADJUSTMENTS FOR RC

- Configurable tripping set-point (I $\Delta$ n): 0.025-0.25A  
0.25-2.5A  
2.5-25A
- Configurable tripping delay time (t): 0.02-0.5s  
0.2-5s

#### Reference standards

Compliant with standards: IEC/EN 60947-2.

For dimensions see page 9-20.



31 RC60...

Order code	Rated auxiliary supply voltage	Output contacts	Qty per pkg	Wt
	[V]	4 <sup>1</sup>	n°	[kg]
1 OPERATION THRESHOLD. Compact panel mount. CT incorporated.				
31 RC ② 48	24-48VAC/DC	1	1	0.485
31 RC ② 415	110-240-415V ①	1	1	0.485

① Supply voltage:  
110-125VAC (50/60Hz)/DC  
220-240VAC (50/60Hz)  
380-415VAC (50/60Hz).

② Replace with the digit of the required diameter (35-60-80-110mm).



31 RC110...

### Relays with 2 operation thresholds



R2D...



R3D...



R4D...

Ordering code	Rated auxiliary supply voltage	Output contacts	Qty per pkg	Wt
	[V]	4'	n°	[kg]

2 OPERATION THRESHOLDS.  
Flush mount. External CT. Fail safe.

<b>R2D 415</b>	110-240-415V $\text{\textcircled{V}}$	2	1	0.395
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2 OPERATION THRESHOLDS.  
Flush mount. External CT.  
Fail safe. Flag Indicator.

<b>R3D 415</b>	110-240-415V $\text{\textcircled{V}}$	2	1	0.405
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2 OPERATION THRESHOLDS.  
Flush mount. External CT.  
Fault current measurement. Digital display.  
Fail safe. Flag Indicator.

<b>R4D 415</b>	110-240-415V $\text{\textcircled{V}}$	2	1	0.570
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**1** Supply voltage:  
110-125VAC (50/60Hz)  
220-240VAC (50/60Hz)  
380-415VAC (50/60Hz).

For dimensions see page 9-20.

#### General characteristics

- Earth leakage relay type A
- 2 output relays each with changeover contact, configurable 2 tripping or 1 tripping and 1 alarm
- Configurable fail safe prealarm and operation
- Automatic toroid connection control
- Green power LED indicator (ON)
- Red relay tripped LED indicator (TRIP)
- Red tripping prealarm LED indicator (ALARM)
- Front TEST button
- Manual resetting by front RESET button or remote contact closing
- Automatic resetting by remote contact closing or rear jumper connection
- Constant toroid-relay circuit control
- Flag indicator (TRIP MEMORY) (R3D-R4D only)
- Digital fault current measurement and display with configurable tripping value memory (R4D only)
- Shunt tripping circuit operating test (TCS) (R4D only)
- Flush mount 96x96mm housing with transparent cover
- IEC degree of protection: IP20 terminals, IP40 on front with cover.

#### ADJUSTMENTS FOR R2D and R3D

- Configurable tripping set-point (I $\Delta$ n): 0.025-0.25A  
0.25-2.5A  
2.5-25A  
25-250A (with external multiplier RX10)
- Prealarm set point fixed 70%
- Configurable tripping delay time (t): 0.02-0.5s  
0.2-5s

#### ADJUSTMENTS FOR R4D

- Configurable tripping set-point (I $\Delta$ n): 0.03-0.3A  
0.3-3A  
3-30A  
30-300A (with external multiplier RX10)
- Prealarm set point fixed 70%
- Configurable tripping delay time (t): 0.03-0.5s  
0.3-5s

#### Reference standards

Compliant with standards: IEC/EN 60947-2.

### Toroidal current transformers



31 RT...



31 RT...

Order code	Diameter	Openable	Qty per pkg	Wt.
	[mm]		n°	[kg]
<b>31 RT 35</b>	35	No	1	0.200
<b>31 RT 60</b>	60	No	1	0.245
<b>31 RT 80</b>	80	No	1	0.410
<b>31 RT 110</b>	110	No	1	0.400
<b>31 RT 210</b>	210	No	1	1.200
<b>31 RTA 110</b>	110	Yes	1	0.540
<b>31 RTA 210</b>	210	Yes	1	1.820

#### Reference standards

Compliant with standards: IEC/EN 60947-2.

### External multiplier

Order code	Description	Qty per pkg	Wt
		n°	[kg]
<b>31 RX 10</b>	10-fold multiplier suitable for R1D, RM, R2D, R3D and R4D types only	1	0.300

#### General characteristics

- Dimensions: refer to RT35 toroidal transformer on page 9-21.
- To connect between toroid and relay.

#### Reference standards

Compliant with standards: IEC/EN 60947-2.

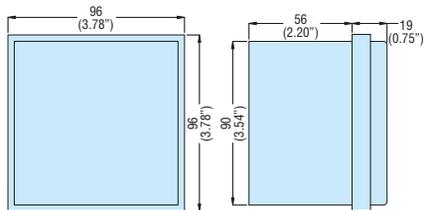
# PROTECTION RELAYS

Earth leakage relays  
Dimensions [mm (in)]

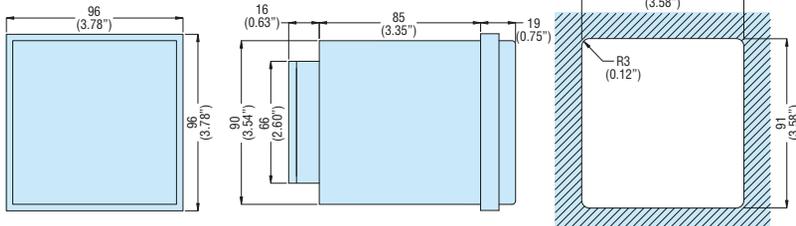


## Relays

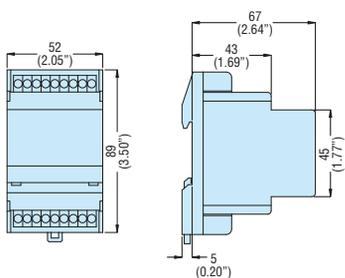
R1D - R2D - R3D



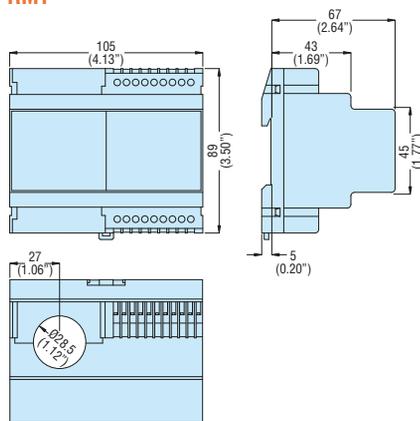
R4D



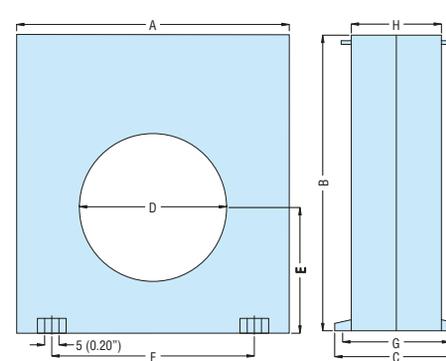
RM1 - RM



RMT



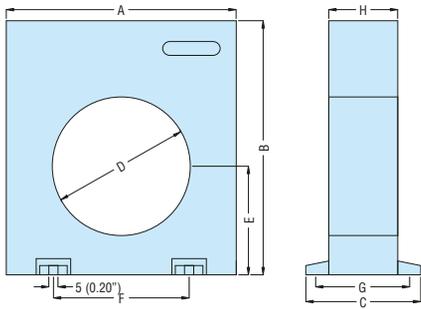
RC



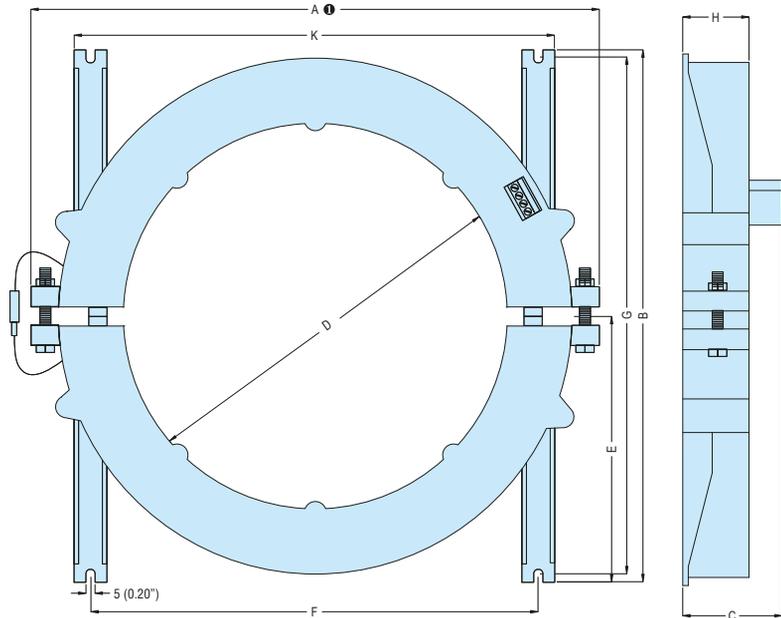
TYPE	A	B	C	D	E	F	G	H
RC35	100 (3.94")	110 (4.33")	70 (2.75")	35 (1.38")	47 (1.85")	60 (2.36")	60 (2.36")	50 (1.97")
RC60	100 (3.94")	110 (4.33")	70 (2.75")	60 (2.36")	47 (1.85")	60 (2.36")	60 (2.36")	50 (1.97")
RC80	150 (5.90")	160 (6.30")	70 (2.75")	80 (3.15")	70 (2.75")	110 (4.33")	60 (2.36")	50 (1.97")
RC110	150 (5.90")	160 (6.30")	70 (2.75")	110 (4.33")	70 (2.75")	110 (4.33")	60 (2.36")	50 (1.97")

## Toroidal transformers and multiplier

### RT35 - RT60 - RT80 - RT110 - RX10

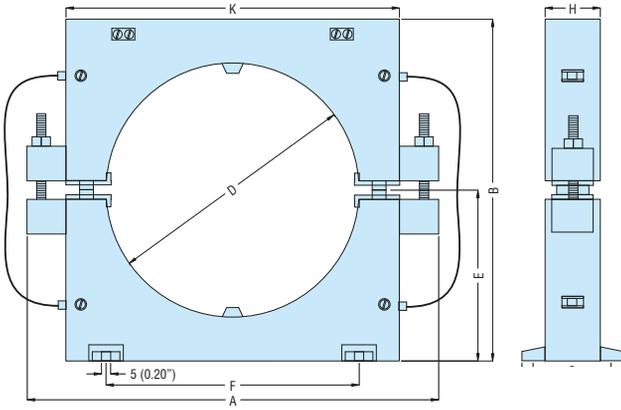


### RT210 - RTA210



① With screws, for RTA210 split-core type; fixed structure, without screws, for RT210 type.

### RTA110



TYPE	A	B	C	D	E	F	G	H	K
RT35	100 (3.94")	110 (4.33")	50 (1.97")	35 (1.38")	47 (1.85")	60 (2.36")	43 (1.69")	30 (1.18")	—
RT60	100 (3.94")	110 (4.33")	50 (1.97")	60 (2.36")	47 (1.85")	60 (2.36")	43 (1.69")	30 (1.18")	—
RT80	150 (5.90")	160 (6.30")	50 (1.97")	80 (3.15")	70 (2.75")	110 (4.33")	43 (1.69")	30 (1.18")	—
RT110	150 (5.90")	160 (6.30")	50 (1.97")	100 (3.94")	70 (2.75")	110 (4.33")	43 (1.69")	30 (1.18")	—
RT210	310 (12.20")	290 (11.41")	54 (2.12")	210 (8.27")	145 (5.71")	240 (9.45")	280 (11.02")	36 (1.42")	258 (10.16")
RTA110	180 (7.09")	150 (5.90")	45 (1.77")	110 (4.33")	75 (2.95")	110 (4.33")	38 (1.50")	25 (0.98")	145 (5.71")
RTA210	310 (12.20")	290 (11.41")	54 (2.12")	210 (8.27")	145 (5.71")	240 (9.45")	280 (11.02")	36 (1.42")	258 (10.16")
RX10	100 (3.94")	110 (4.33")	50 (1.97")	—	—	60 (2.36")	43 (1.69")	30 (1.18")	—