Pages 18-4 to 7

VOLTAGE MONITORING RELAYS
- For three-phase systems with or without neutral and single-phase systems
- Minimum and maximum AC voltage
- Phase loss and incorrect phase sequence
- Asymmetry
- Minimum and maximum frequency.

Pages 18-8 and 9

CURRENT MONITORING RELAYS
- For single and three-phase systems
- Maximum AC/DC current
- Minimum or maximum AC/DC current
- Minimum and maximum AC/DC current.

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PUMP PROTECTION RELAYS
- For single and three-phase systems
- Minimum cosφ for dry running protection
- Maximum AC current
- Phase loss and incorrect phase sequence.

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PHASE SHIFT MONITORING RELAYS
- For single and three-phase systems
- Minimum cosφ
- Maximum cosφ.

Page 18-11

FREQUENCY MONITORING RELAYS
- For single and three-phase systems
- Minimum frequency
- Maximum frequency.

Page 18-12

INTERFACE PROTECTION SYSTEM UNITS
- Compliant with Italian standard CEI 0-21, for low voltage
- Compliant with Italian standard CEI 0-16, for medium voltage.

- Modular version for switchgear panels, also suitable for rear mounting plate fixing
- Minimum and maximum voltage monitoring relays for single and three-phase systems, with or without neutral
- Voltage asymmetry, phase sequence and phase loss control relays
- Minimum and maximum current monitoring relays
- Frequency monitoring relays
- Interface protection system units compliant with Italian standards CEI 0-21 and CEI 0-16.

Voltage monitoring relays for three-phase systems without neutral

	PMV10	PMV20	PMV30	PMV40	PMV50	PMV70
Modular version	●(1U)	●(2U)	●(2U)	●(2U)	●(2U)	●(2U)
Minimum AC voltage			●		●	●
Maximum AC voltage					●	●
Phase loss	●	●	●	●	●	●
Incorrect phase sequence	●	●	●	●	●	●
Asymmetry				●	●	
Page	18-4				18-5	18-5

Voltage monitoring relays for three-phase systems with or without neutral

	PMV50N	PMV70N	PMV80N
Modular version	●(3U)	●(3U)	●(3U)
Minimum AC voltage	●	●	●
Maximum AC voltage	●	●	●
Phase loss	●	●	●
Neutral loss	●	●	●
Incorrect phase sequence	●	●	●
Asymmetry		●	
Minimum frequency			●
Maximum frequency			●
Page	18-6	18-6	18-7

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Voltage monitoring relay for single-phase systems

	PMV55
Modular version	●(2U)
Minimum AC voltage	●
Maximum AC voltage	●
Page	18-7

Current monitoring relays for single and three-phase systems

	PMA20	PMA30	PMA40
Modular version	●(2U)	●(2U)	●(3U)
Maximum AC/DC current	●		
Minimum or maximum AC/DC current		●	
Minimum and maximum AC/DC current			●
Page	18-8	18-9	

Pump protection relay for single and three-phase systems

	PMA50
Modular version	●(3U)
Minimum cosφ for dry running pump protection	●
Maximum AC current	●
Phase loss	●
Incorrect phase sequence	●
Page	18-10

Phase shift monitoring relay for single and three-phase systems

	PMA60
Modular version	●(3U)
Minimum cosφ	●
Maximum cosφ	●
Page	18-11

Frequency monitoring relay for single and three-phase systems

	PMF20
Modular version	●(2U)
Minimum frequency only	●
Maximum frequency only	●
Page	18-11

Interface protection system compliant with Italian standard CEI 0-16, for medium voltage

	PMVF30
Version	Flush mount (96x96mm/3.78x3.78")
Dual threshold voltage/frequency	●
Voltage release	●
Page	18-14

Interface protection system compliant with Italian standard CEI 0-21, for low voltage

	PMVF20	PMVF51
Version	Flush mount (96x96mm/3.78x3.78")	Modular (6U)
Dual threshold min and max voltage	●	●
Dual threshold min and max frequency	●	●
Page	18-12	18-13

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. 1 module housing.			
PMV10 A440	208...480VAC	1	0.050
2 modules housing.			
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 degree of protection: IP40 on front (only when placed in IP40 enclosure or control board); IP20 at terminals.

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 18-18.

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 degree of protection: 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: 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 18-18.

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 degree of protection: 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: 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 18-18.

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 18-18.

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 18-18.

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.			
PMV50N A240	208...240VAC	1	0.200
PMV50N A440	380...440VAC	1	0.200
PMV50N A600	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 18-19.

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.			
PMV70N A240	208...240VAC	1	0.200
PMV70N A440	380...440VAC	1	0.200
PMV70N A600	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 18-19.

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 18-19.

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 18-19.

For single-phase systems

PMA20 240

Order code	Rated current Ie	Auxiliary supply voltage	Qty per pkg	Wt
	[A]	[V]	n°	[kg]
Single-phase system. AC/DC maximum current control. Auxiliary AC/DC power supply. Automatic or manual reset.				
PMA20 240	5 or 16A	24...240V AC/DC	1	0.121

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% Ie
"Hysteresis"	Maximum hysteresis thresold 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 18-20.

For single and three-phase systems

PMA30 240

Order code	Rated current Ie	Auxiliary supply voltage	Qty per pkg	Wt
	[A]	[V]	n°	[kg]
Single and three-phase system. AC/DC minimum or maximum current control. Delayed trip. Auxiliary AC/DC power supply. Automatic or manual reset.				
PMA30 240	5 or 16A	24...240V AC/DC	1	0.121

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 degree of protection: 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% Ie
"Hysteresis"	Minimum or 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
"Ie"	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: 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 pages 18-21 and 22.

PMA40 240

Order code	Rated current Ie	Auxiliary supply voltage	Qty per pkg	Wt
	[A]	[V]	n°	[kg]
Single and three-phase system. AC/DC minimum and maximum current control. Delayed trip. Auxiliary AC/DC power supply. Automatic or manual reset.				
PMA40 240	0.02-0.05-0.25-1-5-16A	24...240V AC/DC	1	0.166

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 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% Ie
"Imin"	Minimum current tripping threshold 5...100% Ie
"Trip delay"	Minimum and maximum current tripping time 0.1...30s
"Inhibition time"	Inhibition time at power up 1...60s
"Ie"	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: 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 18-22 and 23.

For single and three-phase systems

PMA50...

Order code	Rated current Ie	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.				
PMA50 A240	5 or 16A	220...240VAC	1	0.251
PMA50 A415		380...415VAC	1	0.251
PMA50 A480		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 degree of protection: 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)
"Imax"	Maximum (over) current threshold 10...100%Ie
"Trip delay"	Tripping time for minimum cosφ and maximum current 0.1...10s
"Inhibition time"	Inhibition 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: 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 pages 18-23 and 24.

Phase shift monitoring relay for single and three-phase systems

PMA60...

Order code	Rated current Ie	Auxiliary supply voltage	Qty per pkg	Wt
	[A]	[V]	n°	[kg]
Single and three-phase systems. Minimum and maximum cosφ control. Delayed trip. AC auxiliary power supply. Automatic or manual reset.				
PMA60 A240	16A	220...240VAC	1	0.254
PMA60 A415		380...415VAC	1	0.254
PMA60 A480		440...480VAC	1	0.254

General characteristics
- Minimum and maximum phase shift monitoring relay, AC auxiliary power supply
- 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
- 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 degree of protection: 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 inductive
"Trip delay"	Tripping time for minimum cosφ 0.1...30s
"Cosφ max"	Maximum inductive cosφ threshold 0.1...0.99
"Trip delay"	Tripping time for maximum cosφ 0.1...30s
"Inhibition time"	Inhibition delay at power up 1...60s
"Mode"	• Single or three phase • Relay outputs normally energised or de-energised • Tripping memory (Latch) On or Off.

Certificartions 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 pages 18-24 and 25.

Frequency monitoring relay for single and three-phase systems

PMF20...

Order code	Rated voltage Ue	Qty per pkg	Wt
	[V] 50/60Hz	n°	[kg]
Single and three-phase systems. Minimum and maximum frequency. Delayed trip. Automatic reset.			
PMF20 A240	220...240VAC	1	0.125
PMF20 A415	380...415VAC	1	0.125

General characteristics
- Frequency monitoring relay, self powered, for minimum and maximum control
- Rated frequency selection: 50 or 60Hz
- Tripping threshold for minimum and maximum frequency
- Excellent tripping accuracy
- 1 relay output, configurable, 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

"Hz max"	Maximum frequency tripping threshold +1...+10%
"Delay"	Tripping time 0.1...20s
"Hz min"	Minimum frequency tripping threshold -1...-10%
"Delay"	Tripping time 0.1...20s
"Reset delay"	Resetting time 0.1...20s
"Mode"	• Minimum and maximum frequency • Output relay energised at maximum frequency • Output relay energised at minimum frequency • Output relay de-energised at maximum frequency.

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, ßCSA C22.2 n° 14.

Operational diagram
See page 18-25.

For low voltage

PMVF 20…

Order code	Rated voltage Control	Auxiliary	Qty per pkg	Wt
	[V]	[V]	n°	[kg]
Three-phase system, with or without neutral, in low voltage. Dual threshold minimum and maximum voltage and frequency protection. Flush mount type.				
PMVF 20	230VAC 400VAC	100...400VAC/ 110...250VDC	1	0.568
PMVF 20 D048		12...48VDC	1	0.580

Voltage threshold per CEI 0-21

Type of protection	Tripping threshold	Tripping time
Maximum voltage 59.S2	1.15Un	0.2s
Maximum voltage 59.S1 (moving mean over 10min)	1.10Un	≤ 3s
Minimum voltage 27.S1	0.85Un	0.4s
Minimum voltage 27.S2	0.4Un	0.2s

Frequency threshold per CEI 0-21

Type of protection	Tripping threshold	Tripping time
High external signal and low local control conditions.		
Maximum frequency 81>.S2	51.5Hz	0.1s
Minimum frequency 81<.S2	47.5Hz	0.1s
Low external signal and high local control conditions.		
Maximum frequency 81>.S2	51.5Hz	1s
Minimum frequency 81<.S2	47.5Hz	4s
High conditions for both external signal and local control.		
Maximum frequency 81>.S1	50.5Hz	0.1s
Minimum frequency 81<.S1	49.5Hz	0.1s

NOTE: Low conditions for both external signal and local control are not taken into consideration by the standard.

EXP10 03

Order code	Description
EXPANSION MODULES FOR PMVF 20. For independent signal in case of phase power unbalance (LSP).	
EXP10 03	2 relay outputs 5A 250VAC
Communication ports.	
EXP10 18❶	IEC/EN 61850 interface
EXP10 10	Opto-isolated USB interface
EXP10 11	Opto-isolated RS232 interface
EXP10 12	Opto-isolated RS485 interface
EXP10 13	Opto-isolated Ethernet interface

❶ **IEC/EN 61850 protocol**
The EXP10 18 module will be made available only when the competent authorities have established the exact terms of the supervision and control of the specific commands (currently under study as specified in the Italian CEI 0-21 standard).

General characteristics
PMVF 20 interface protection system (SPI) unit has been developed according to the Italian CEI 0-21 standard prescriptions. It is used when a local generating system is connected in parallel with the low-voltage electric utility. The controls refer to limits of voltage and frequency monitoring.
In the case when either the voltage or the frequency are out of admissible limits, the SPI must step in by de-energising a relay output so that the interface device (DDI) trips.
PMVF 20 is equipped with 4 inputs having the following functions:
– DDI status feedback
– External signal for frequency selection (communication network malfunction)
– Local control for frequency selection
– Remote tripping (forced DDI opening independent of voltage and frequency values).
Also, there are two relay outputs for:
– DDI opening and closing
– Standby device opening (programmable: retentive normally energised, retentive normally de-energised or adjustable pulse).
The standby device control is compulsory in installations with more than 20kW and consists of a signal, with a 0.5s delay respect to the DDI opening command, transmitted only if the DDI fails and does not complete the disconnection.
By fitting the EXP10 03 expansion module on the PMVF 20, the following functions can be configured as:
– Programmable alarm
– Autonomous signalling in case of phase power unbalance (LSP), only if three CTs are also installed.

Operational characteristics
– Auxiliary voltage:
  • PMVF 20: 100…400VAC/110…250VDC
  • PMVF 20 D048: 12…48VDC
– Voltage inputs:
  • 400VAC (three-phase connection)
  • 230VAC (single-phase connection)
– Relay outputs 5A 250VAC AC1 / 5A 30VDC
– 4 digital inputs
– Current inputs (optional): Use via CTs with selectable /5A or /1A secondary
– Support of EXP series communications ports (USB, RS232, RS485, Ethernet) see section 28
– Parameter configuration and remote control (only with comunication expansion module) with software Synergy and Xpress
– Housing: Flush mount 96x96mm/3.78x3.78”
– IEC degree of protection: IP65 on front; IP20 on terminals
– **Predisposed for IEC/EN 61850 signal supervision using expansion or external module❶.**

Reference standards
Compliant with standards: Italian CEI 0-21, IEC/EN 60255-5, IEC/EN 61010-1, IEC/EN 61000-6-2, IEC/EN 61000-6-3.
Note for Italian CEI 0-21 standard:
According to standard prescriptions, once the installation is completed, the interface protection must be tested by the installer using a relay test box which controls the trip thresholds and timing.

Operational diagram
See page 18-26.

Programming software
Since PMVF 20 is standard-supplied pre-programmed, with specific default settings as per the Italian standard CEI 0-21, it can be put in service immediately without having to change any programming. Setup editing is password protected so that parameter settings cannot be tampered with by unauthorised personnel.

Supervision and energy management Synergy software
See section 27.

Configuration and remote control software Xpress
See section 27.

For low voltage

PMVF 51

Order code	Rated voltage Control	Auxiliary	Qty per pkg	Wt
	[V]	[V]	n°	[kg]
Three-phase system with or without neutral in low voltage. Dual threshold minimum and maximum voltage and frequency protection. Modular type with 2 relay outputs.				
PMVF 51	230VAC 400VAC	100...240VAC/ 110...250VDC	1	0.470

Voltage threshold per CEI 0-21

Type of protection	Tripping threshold	Tripping time
Maximum voltage 59.S2	1.15Un	0.2s
Maximum voltage 59.S1 (moving mean over 10min)	1.10Un	≤ 3s
Minimum voltage 27.S1	0.85Un	0.4s
Minimum voltage 27.S2	0.4Un	0.2s

Frequency threshold per CEI 0-21

Type of protection	Tripping threshold	Tripping time
High external signal and low local control conditions.		
Maximum frequency 81>.S2	51.5Hz	0.1s
Maximum frequency 81<.S2	47.5Hz	0.1s
Low external signal and high local control conditions.		
Maximum frequency 81>.S2	51.5Hz	1s
Minimum frequency 81<.S2	47.5Hz	4s
High conditions for both external signal and local control.		
Maximum frequency 81>.S1	50.5Hz	0.1s
Minimum frequency 81<.S1	49.5Hz	0.1s

NOTE: Low conditions for both external signal and local control are not taken into consideration by the standard.

EXM10...

Order code	Description
EXPANSION MODULES FOR PMVF 51. Communication ports.	
EXM10 10	Opto-isolated USB interface
EXM10 11	Opto-isolated RS232 interface
EXM10 12	Opto-isolated RS485 interface
EXM10 13	Opto-isolated Ethernet interface
EXM10 18❶	IEC/EN 61850 interface
Inputs and outputs.	
EXM10 01	2 digital opto-isolated inputs and 2 relay outputs 5A 250VAC

❶ **IEC/EN 61850 protocol**
The EXM10 18 module will be made available only when the competent authorities have established the exact terms of the supervision and control of the specific commands (currently under study as specified in the Italian CEI 0-21 standard).

General characteristics
PMVF 51 interface protection system (SPI) unit has been developed according to the Italian CEI 0-21 standard prescriptions. Each is used when a local solar generating system is connected in parallel with the low-voltage electric utility. The controls refer to limits of voltage and frequency monitoring.
In the case when either the voltage or the frequency are out of admissible limits, the SPI must step in by de-energising a relay output so that the interface device (DDI) trips.
PMVF 51 is equipped with 4 inputs having the following functions:
- DDI status feedback
- External signal for frequency selection (communication network malfunction)
- Local control for frequency selection
- Remote tripping (forced DDI opening, independent of voltage and frequency values).

Also, there are two relay outputs for:
- DDI opening and closing
- Standby device opening (programmable: retentive normally energised, retentive normally de-energised or adjustable pulse).

The standby device control is compulsory in installations with more than 20kW and consists of a signal, with a 0.5s delay respect to the DDI opening command, transmitted only if the DDI failed and did not complete the disconnection.
PMVF 51 also has two additional relay outputs to configure as:
- Programmable alarm
- Autonomous signalling in case of phase power unbalance (LSP), only if three CTs are also installed.

Operational characteristics
- Auxiliary voltage: 100...240VAC/110...250VDC
- Voltage inputs:
  - 400VAC (three-phase connection)
  - 230VAC (single-phase connection)
- Relay outputs 5A 250VAC AC1 / 5A 30VDC
- 4 digital inputs
- Current inputs (optional): Use via CTs with selectable /5A or /1A secondary
- Support of EXM series communications inputs (USB, RS232, RS485, Ethernet) see section 28
- Modular housing:
  - PMVF 51: 6 module
- Parameter configuration and remote control (only with comunication expansion module) with software Synergy and Xpress
- Degree of protection for both: IP40 on front; IP20 on terminals
- **Predisposed for IEC/EN 61850 signal supervision using expansion or external module❶.**

Reference standards
Compliant with standards: Italian CEI 0-21, IEC/EN 60255-5, IEC/EN 61010-1, IEC/EN 61000-6-2, IEC/EN 61000-6-3.
Note for Italian CEI 0-21 standard:
According to standard prescriptions, once the installation is completed, the interface protection must be tested by the installer using a relay test box which controls the trip thresholds and timing.

Operational diagram
See pages 18-27.

Programming software
Since PMVF 51 is standard-supplied pre-programmed, with specific default factory settings as per the Italian standard CEI 0-21, it can be put in service immediately without having to change any programming. Setup editing is password protected so that parameter settings cannot be tampered with by unauthorised personnel.

Supervision and energy management Synergy software
See section 27.

Configuration and remote control software Xpress
See section 27.

For medium voltage

Order code	Rated voltage Control	Auxiliary	Qty per pkg	Wt
	[V]	[V]	n°	[kg]
Medium-voltage system. Dual threshold minimum and maximum voltage and frequency protection. Flush mount type.				
PMVF 30	Measure-ments via VTs in MV or direct in LV	100...400VAC/ 110...250VDC	1	0.566
PMVF 30 D048		12...48VDC	1	0.566

PMVF 30...

Voltage threshold per CEI 0-16

Type of protection	Tripping threshold	Tripping time
Maximum voltage 59.S2	1.2Un	0.6s
Maximum voltage 59.S1 (moving mean over 10min)	1.1Un	≤ 3s
Minimum voltage 27.S1	0.85Un	0.4s
Minimum voltage 27.S2	0.4Un	0.2s
Maximum residual voltage 59.V0 (59N)	5% √3 Un	25s

Frequency threshold per CEI 0-16
Frequency protection at voltage choice

Type of protection	Tripping threshold	Tripping time
Configuration in standard conditions.		
Maximum frequency 81>.S2	51.5Hz	1s
Minimum frequency 81<.S2	47.5Hz	4s
Limited configuration in case of local control or voltage choice condition		
Maximum frequency 81>.S1	50.2Hz	0.15s
Minimum frequency 81<.S1	49.8Hz	0.15s
– Voltage choice functions		
Maximum residual voltage 59.V0 (59N)	5% √3 Un	-
Minimum direct sequence voltage 27.Vd	70% Un	-
Maximum inverse sequence voltage 59.Vi	15% Un	-

EXP10...

Order code	Description
EXPANSION MODULES FOR PMVF 30. For auto reclosing management of automatic circuit breaker (DDI).	
EXP10 03	2 relay outputs 5A 250VAC
Communication ports.	
EXP10 18❶	IEC/EN 61850 interface
EXP10 10	Opto-isolated USB interface
EXP10 11	Opto-isolated RS232 interface
EXP10 12	Opto-isolated RS485 interface
EXP10 13	Opto-isolated Ethernet interface

❶ **IEC/EN 61850 protocol**
The EXP10 18 module will be made available only when the competent authorities have established the exact terms of the supervision and control of the specific commands (currently under study as specified in the Italian CEI 0-16 standard).

General characteristics
PMVF 30 interface protection system (PI) unit has been developed according to the Italian CEI 0-16 standard prescriptions. It is used when a local generating system is connected in parallel with the medium-voltage utility distribution grid. The controls refer to limits of voltage and frequency monitoring.
In the case when either the voltage or the frequency are out of admissible limits, the SPI must step in by de-energising a relay output so that the interface device (DDI) trips.
PMVF 30 is equipped with inputs having the following functions:
– DDI status feedback
– Interface protection system exclusion
– Local control
– Remote tripping (forced DDI opening, independent of voltage and frequency values).
In addition, there are two relay outputs to configure as:
– DDI opening
– Programmable (either as factory default for standby device opening or to set up as auto reclosing if the DDI is an automatic circuit breaker).

Standby device opening
In installations with more than 400kW, the standard specifies there must be a command signal, that releases another standby device, given within 1 second whenever the DDI opening fails or malfunctions.

Automatic DDI reclosing
Whenever an automatic circuit breaker is used as the DDI, the PMVF 30 is capable of controlling both the opening (according to the installation conditions indicated in the Italian CEI 0-16 standard) and the auto reclosing. The auto reclosing function includes defining the number of attempts and the time interval between an attempt and the following one as well as generating an alarm if the closing operation does not take place.
This function can be carried out through a programmable output of the PMVF 30 (unless it is already used for the standby device operation) or by installing an EXP10 03 expansion module.

Operational characteristics
– Auxiliary voltage:
  • PMVF 30: 100...400VAC/110...250VDC
  • PMVF 30 D048: 12...48VDC
– Voltage inputs (connection via VTs in MV or directly in LV end):
  • Primary: 400...150,000V
  • Secondary: 50...500V (for voltage/frequency); 50...150V (for residual voltage measurement)
– Relay outputs 5A 250VAC AC1 / 5A 30VDC
– 4 digital inputs
– 3 current inputs (for optional measuring): Use via CTs with selectable /5A or /1A secondary
– Support of EXP series communications puts (USB, RS232, RS485, Ethernet); see section 28
– Housing: Flush mount 96x96mm/3.78x3.78”
– Parameter configuration and remote control (only with comunication expansion module) with software Synergy and Xpress
– Degree of protection: IP65 on front; IP20 on terminals
– **Predisposed for IEC/EN 61850 signal supervision using expansion or external module❶.**

Reference standards
Compliant with standards: Italian CEI 0-16;
IEC/EN 60255-5, IEC/EN 61010-1, IEC/EN 61000-6-2, IEC/EN 61000-6-3.

Operational diagram
See page 18-28.

Programming software
Since PMVF 30 is standard-supplied pre-programmed, with specific default factory settings as per the Italian standard CEI 0-16, it can be put in service immediately without having to change any programming. Setup editing is password protected so that parameter settings cannot be tampered with by unauthorised personnel.

Supervision and energy management Synergy software
See section 27.

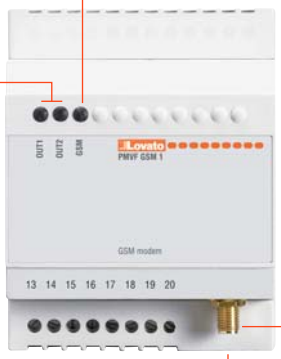
Configuration and remote control software Xpress
See section 27.

GSM modem for remote disconnection signal management

Compliant with Italian CEI 0-16 Standard, paragraph 8.8.6.5 and annex M, resolution 421/2014 of the AEEGSI

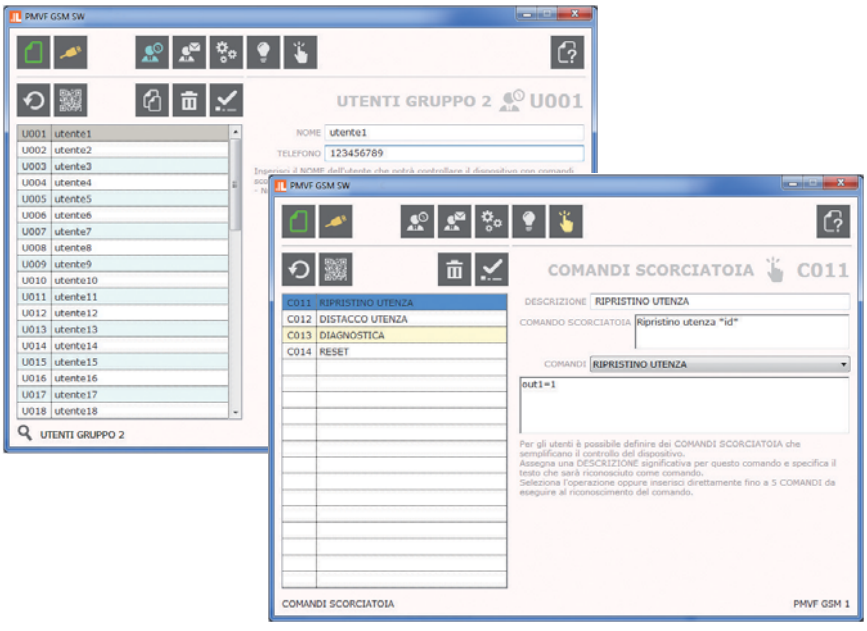
Order code	Description
	GSM Modem (modular - 4U). IP69K exterior aerial with 2.5 m cable. RJ45-USB programming cable (included).
PMVF GSM 1	9.5...35VDC/9.5...27VAC

PMVF GSM 1



Software

To configure the PMVF GSM 1 modem (using the RJ45-USB programming cable included), the PMVF GSM SW software must be used. This can be downloaded freely from the **www.LovatoElectric.com** website.
The software allows you to set:
– the users enabled to exchange messages with the modem
– the active customer code (POD)
– the functions assigned to the digital outputs and input
– the texts of the SMS associated with the commands.
Configuration is also possible off-line, creating a file to transfer to the modem at another time.



Application requirements
The Italian CEI 0-16 Standard, in paragraph 8.8.6.5 and annex M, prescribes that electricity production systems powered by wind or the sun through photovoltaics with a power equal to or greater than 100kW, connected to or to be connected to medium-voltage networks, have a GSM modem.
The modem must be able to receive the signals sent by the electricity distributor for the management of generation disconnection.

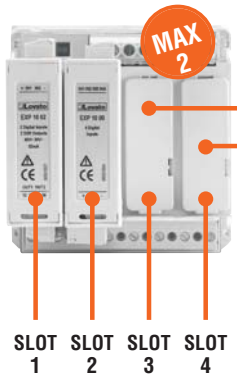
Functional characteristics
– Connection to the GSM network for sending and receiving SMS messages
– Programmable message texts
– Control output controlled by SMS for sending of intertripping signal to the protection interface
– Digital input for receiving the status of the Interface Device (DDI) and sending of successful DDI opening and closing SMSs
– POD management (active user code)
– Management of the list of caller IDs (CLI) up to 50 callers enabled
– Detection of mobile network coverage
– Full compatibility with medium-voltage PI LOVATO Electric PMVF 30: no software/hardware updates or programming required
– Compatibility with third-party PIs where the remote disconnection signal is transmitted via digital input (dry contact). For additional information contact our Customer Service office Tel. + 39 035 4282422; E-mail: service@LovatoElectric.com.

Operational characteristics
MODEM
– 35mm DIN (IEC/EN 60715) rail fixing
– 4 modules
– Supply: 9.5...35VDC / 9.5...27VAC
– Consumption: 200mW (5W peak)
– 2 digital outputs 3A 250VAC
– 1 self-supplied digital input
– Housing for 3V and 1.8V SIM card
– SIM PIN management
– Certified according to FCC rules, part 15
– Back-up battery 320mAh (3.7 V)
– Operating temperature: 0...+45°C; -30...+60°C with back-up battery disconnected (for disconnection procedure consult the manual supplied with the product)
– Protection rating: IP40 on front; IP20 on terminals.

AERIAL
– Quad band 850/900/1800/1900MHz
– Exterior IP69K
– 2.5m cable
– Fixing via M10 hole:
  • with adhesive seal
  • with threaded pin and nut.

Compliance
Compliant with standards: IEC/EN 60950-1 (≤2013-05); EN 50385; EN 301 489-7 V1.3.1; EN 301 489-1 V1.9.2; EN 301 511 V9.0.2

Maximum combination for PMVF 20 and PMVF 30 types
In addition to the two standard-supplied modules, another two expansion modules (one per type) can be installed from the following indicated below.



EXP10 03
Used as:
1. Phase power unbalance signal (LSP) for PMVF 20 or for auto reclosing control of circuit breaker for PMVF 30.
2. Programmable alarm.

EXP10 18
Ethernet interface according to IEC/EN 61850

EXP10 10
USB interface

EXP10 11
RS232 interface

EXP10 12
RS485 interface

EXP10 13
Ethernet TCP/IP interface

Maximum combination for PMVF 51 type
In addition to the standard-supplied module (1), two other expansion modules (one per type) can be installed from the indicated types.

EXM10 18
Ethernet interface per IEC/EN 61850

EXM10 10
USB interface

EXM10 11
RS232 interface

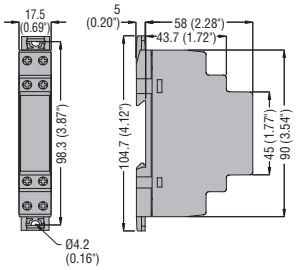
EXM10 12
RS485 interface

EXM10 13
Ethernet TCP/IP interface

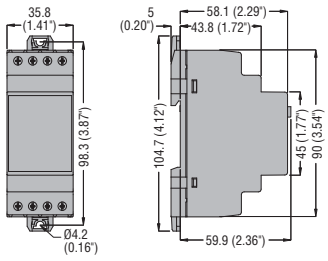
EXM10 01
Used as:
1. Phase power unbalance signal (LSP).
2. Programmable alarm.

PROTECTION RELAYS

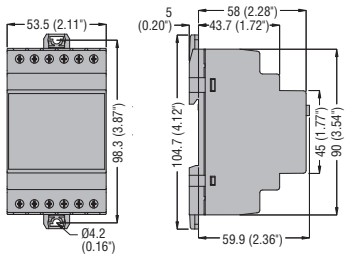
PMV10…



PMV… - PMF20
PMA20… - PMA30…



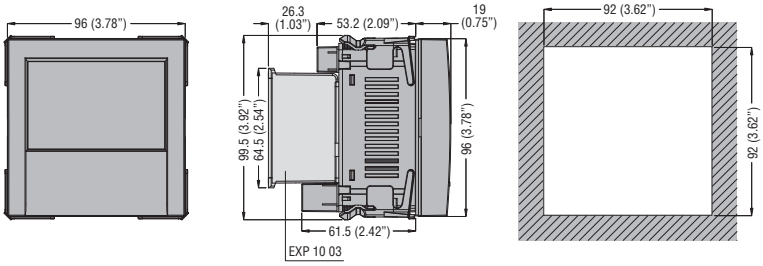
PMV…N - PMA40… -
PMA50… - PMA60…



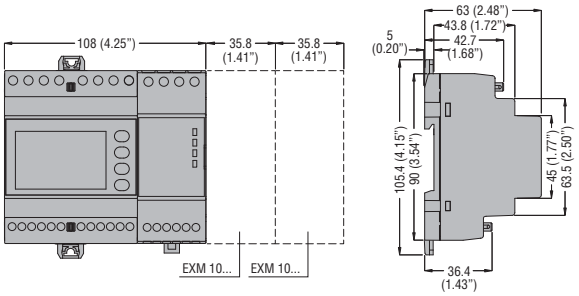
INTERFACE PROTECTION SYSTEM UNITS FOR LOW VOLTAGE

PMVF 20…

Cutout



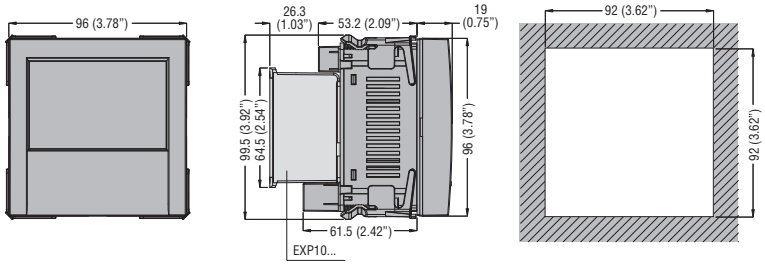
PMVF 51



INTERFACE PROTECTION SYSTEM UNIT FOR MEDIUM VOLTAGE

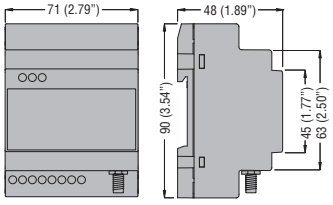
PMVF 30

Cutout



GSM MODEM FOR REMOTE DISCONNECTION SIGNAL

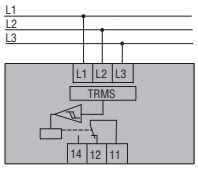
PMVF GMS 1



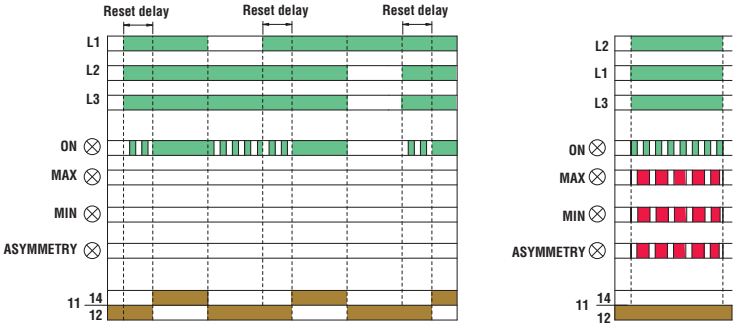
18

Voltage monitoring relays for 3-phase systems without neutral

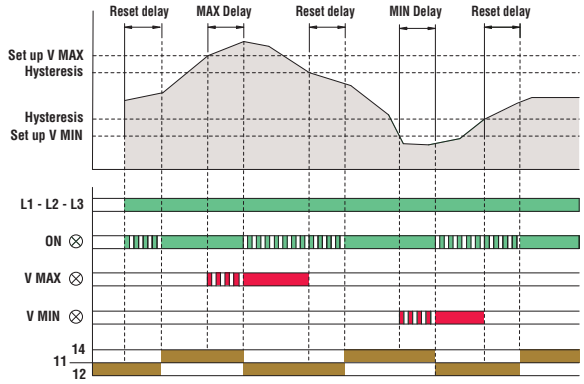
PMV10 - PMV20 - PMV30 - PMV40
PMV50 - PMV70



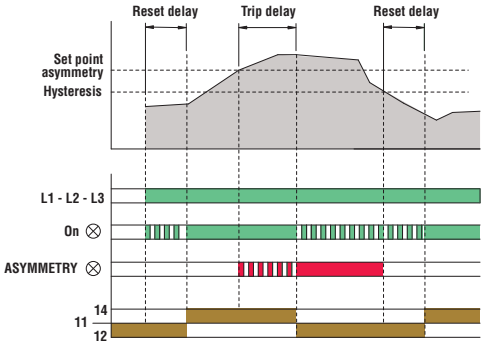
Phase loss and incorrect phase sequence (PMV10 - PMV20 - PMV30 - PMV40 - PMV50 - PMV70)



Maximum and minimum voltage (PMV30 - PMV50 - PMV70)

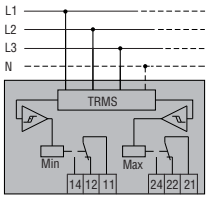


Asymmetry (PMV40 - PMV70)

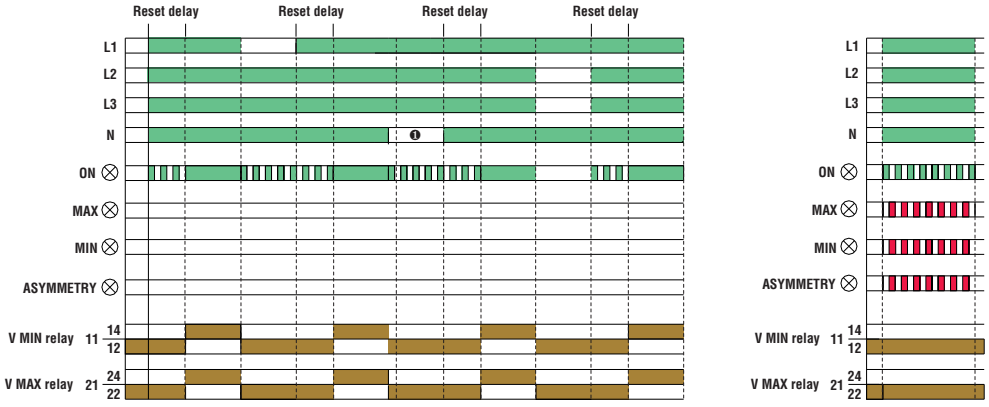


Voltage monitoring relays for 3-phase systems c/w or w/o neutral

PMV50N - PMV70N - PMV80N

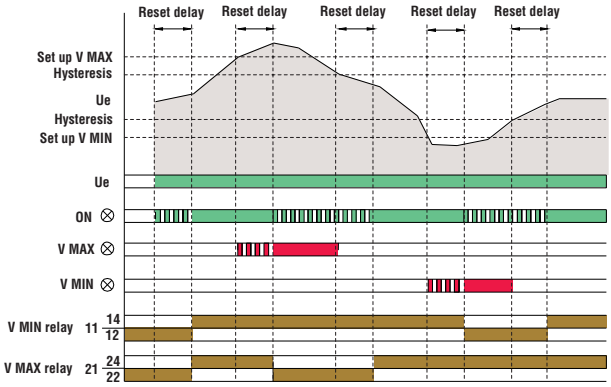


Phase loss and incorrect phase sequence (PMV50N - PMV70N - PMV80N)

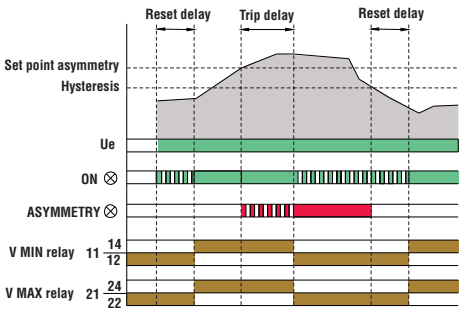


❶ Neutral loss only with VL-N monitoring

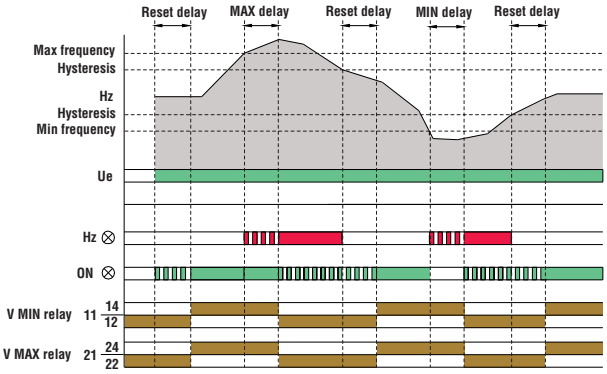
Maximum and minimum voltage (PMV50N - PMV70N - PMV80N)



Asymmetry (PMV70N)

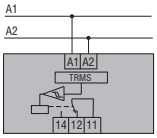


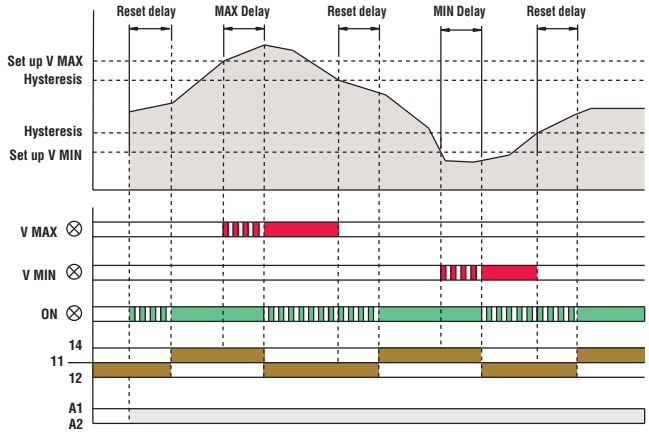
Maximum and minimum frequency (PMV80N)



Voltage monitoring relay for 1-phase systems

PMV55



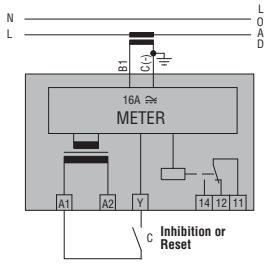


18

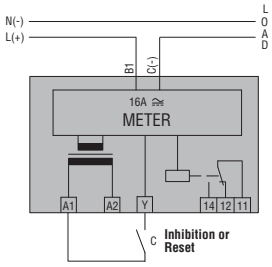
Current monitoring relay for 1-phase systems

PMA20

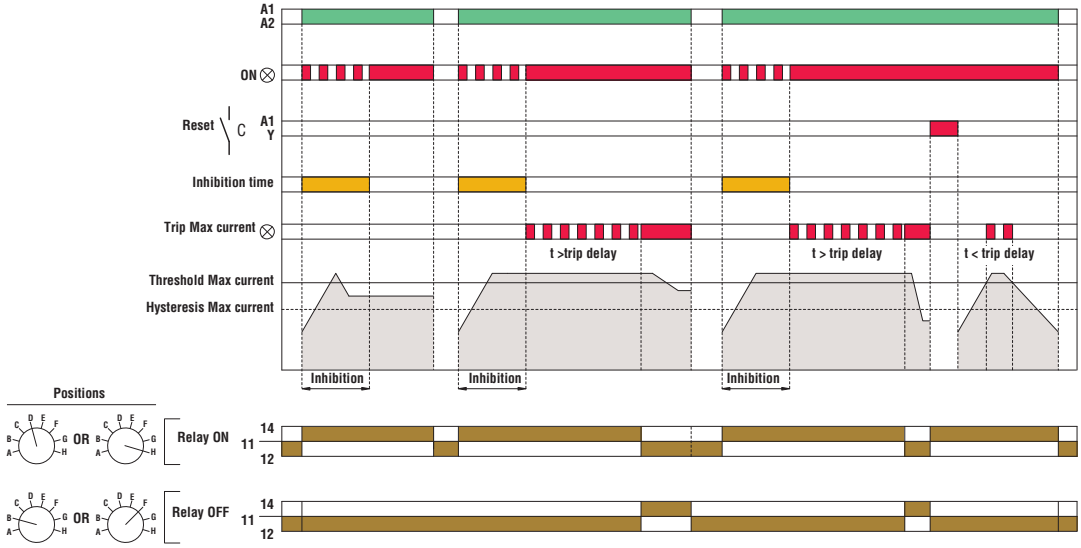
Single-phase connection with CT



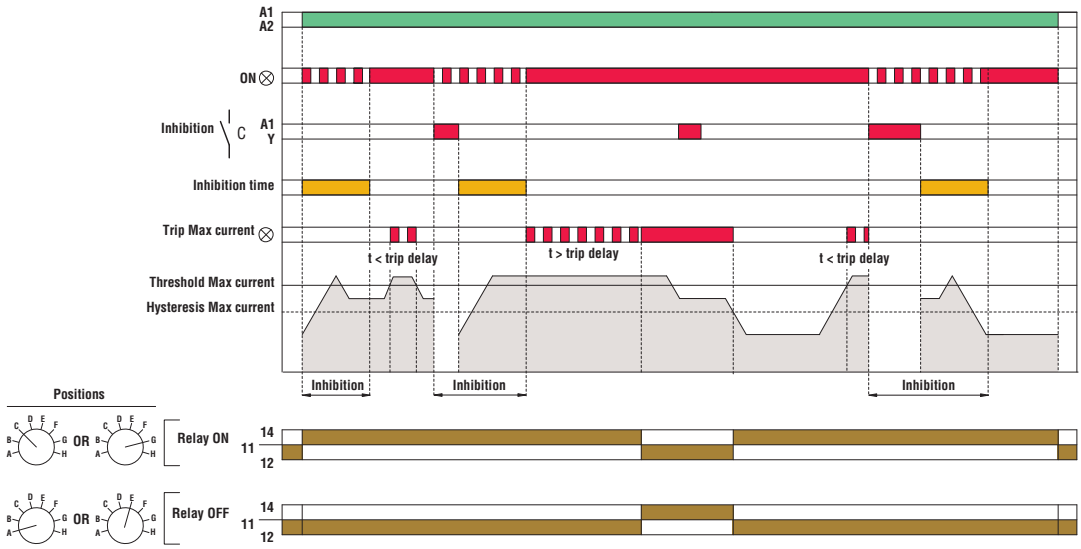
Single-phase direct connection



Operation with tripping latch (Latch ON)



Operation with no tripping latch (Latch OFF)

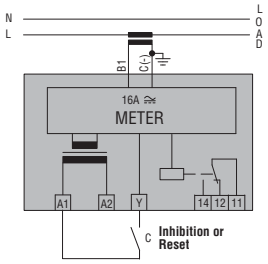


Operation			
Mode	Ie	Relay output	Latch
A	5A	OFF	OFF
B			ON
C		ON	OFF
D			ON
E	16A	OFF	OFF
F			ON
G		ON	OFF
H			ON

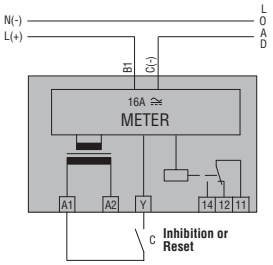
Current monitoring relay for single and three-phase systems

PMA30

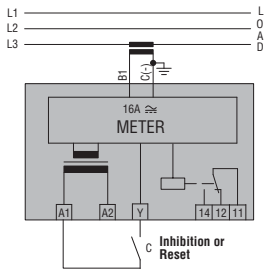
Single-phase connection by CT



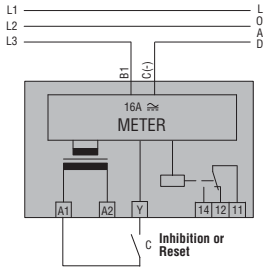
Single-phase direct connection



Three-phase connection by CT (1 phase control)

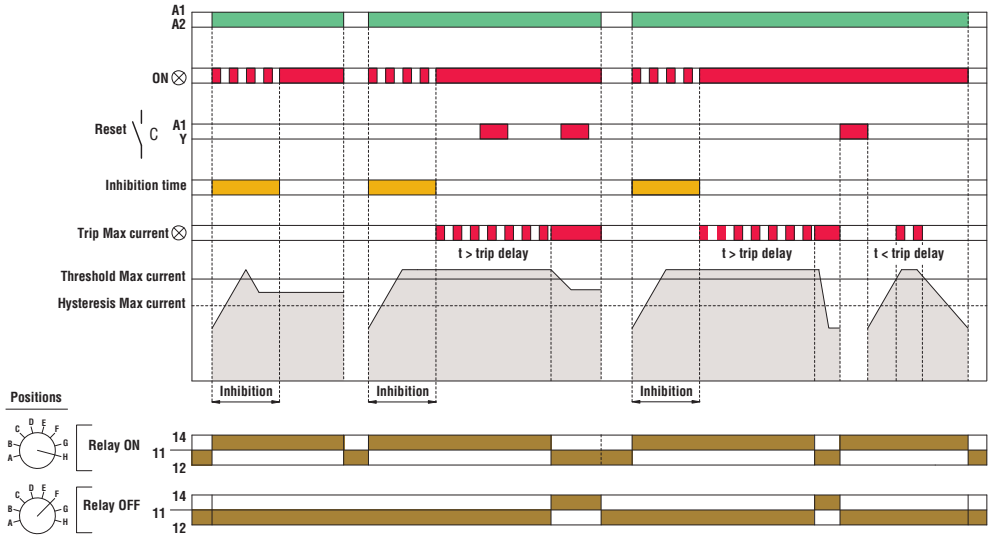


Three-phase direct connection (1 phase control)

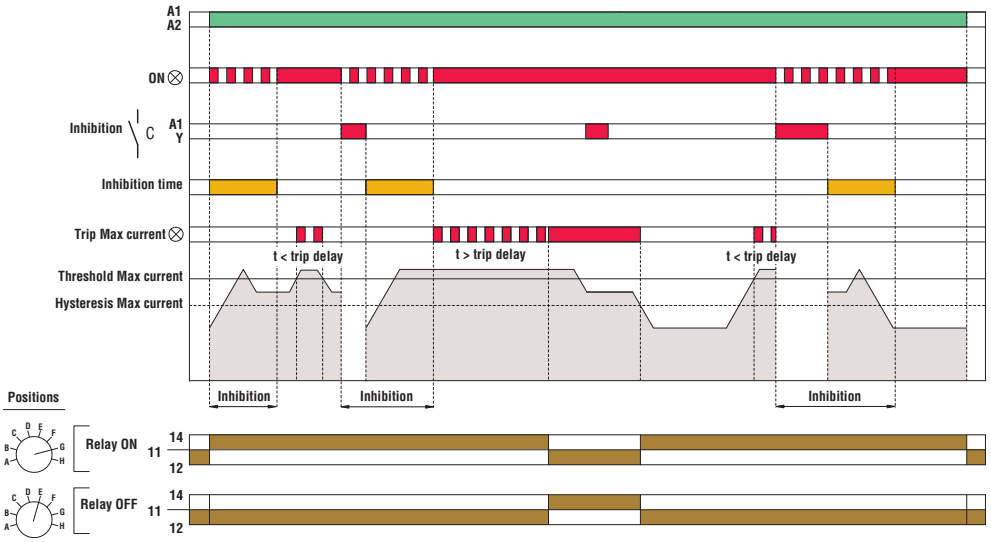


Operation			
Mode	Function	Relay output	Latch
A	Minimum current	OFF	OFF
B			ON
C		ON	OFF
D			ON
E	Maximum current	OFF	OFF
F			ON
G		ON	OFF
H			ON

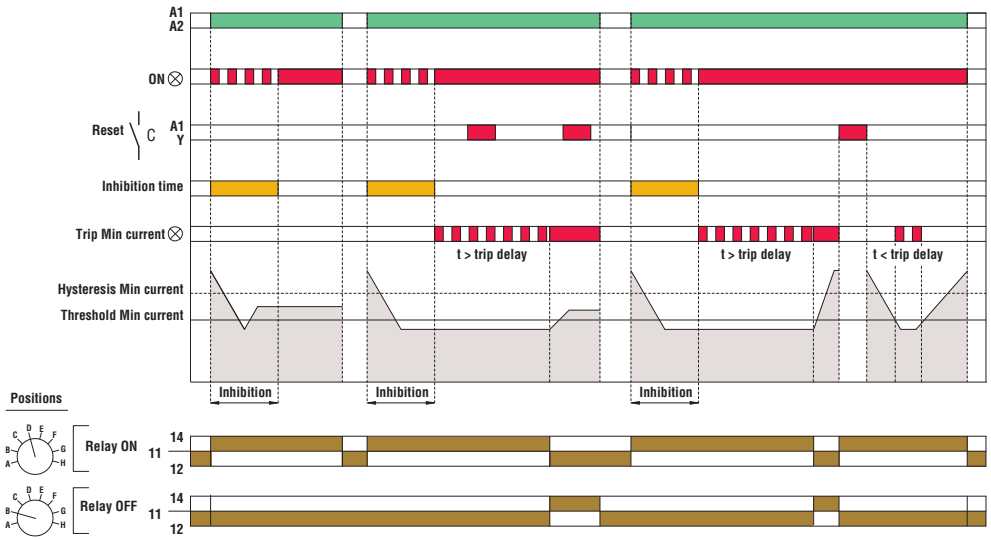
Maximum current control operation with tripping latch (Latch ON)



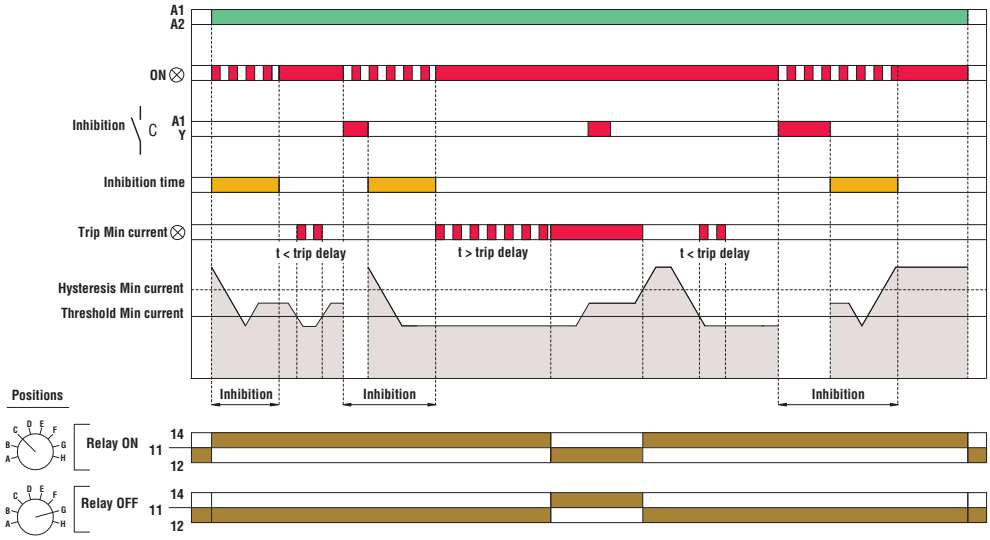
Maximum current control operation with no tripping latch (Latch OFF)



Minimum current control operation with tripping latch (Latch ON)



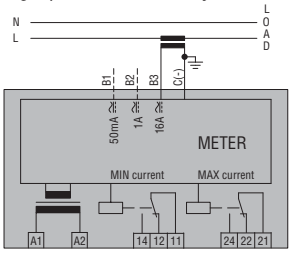
Minimum current control operation with no tripping latch (Latch OFF)



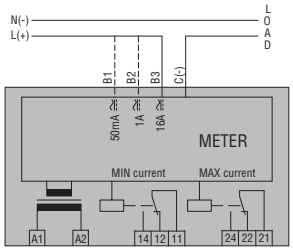
Current monitoring relay for single and three-phase systems

PMA40

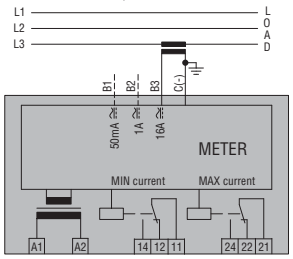
Single-phase connection by CT



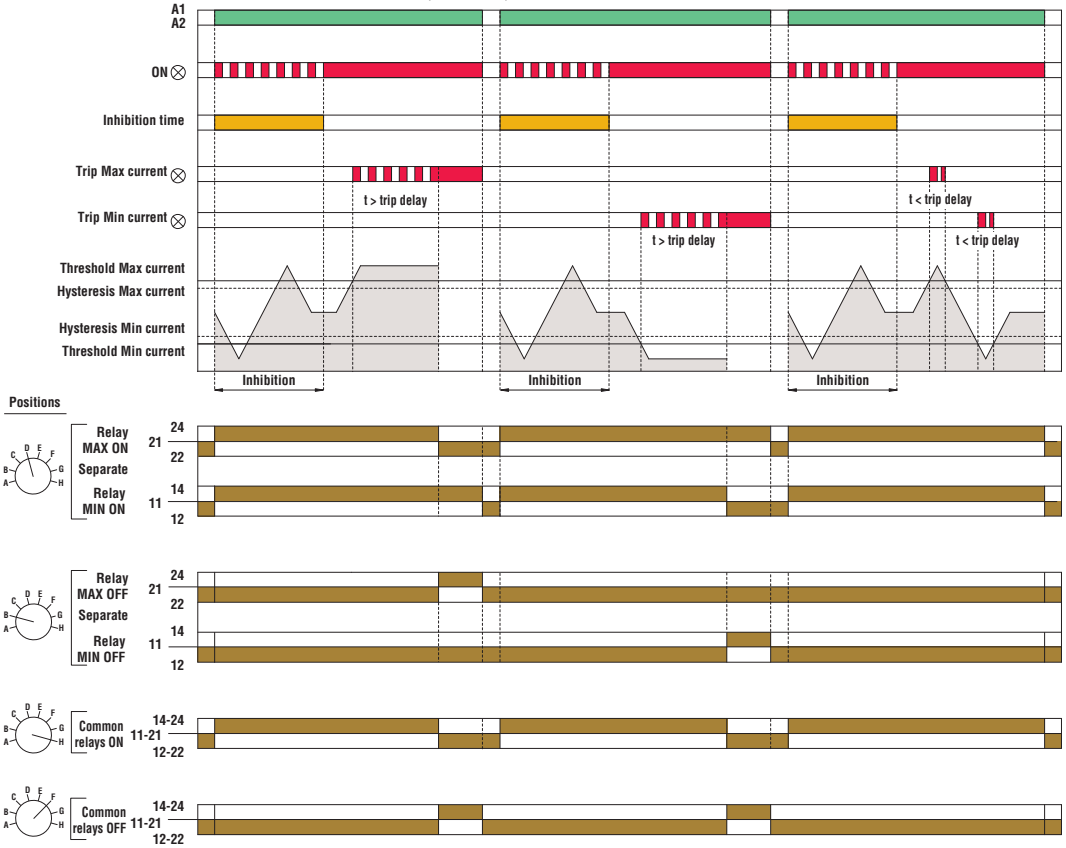
Single-phase direct connection



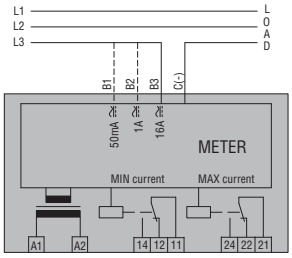
Three-phase connection by CT (1 phase control)



Operation with tripping latch (Latch ON)

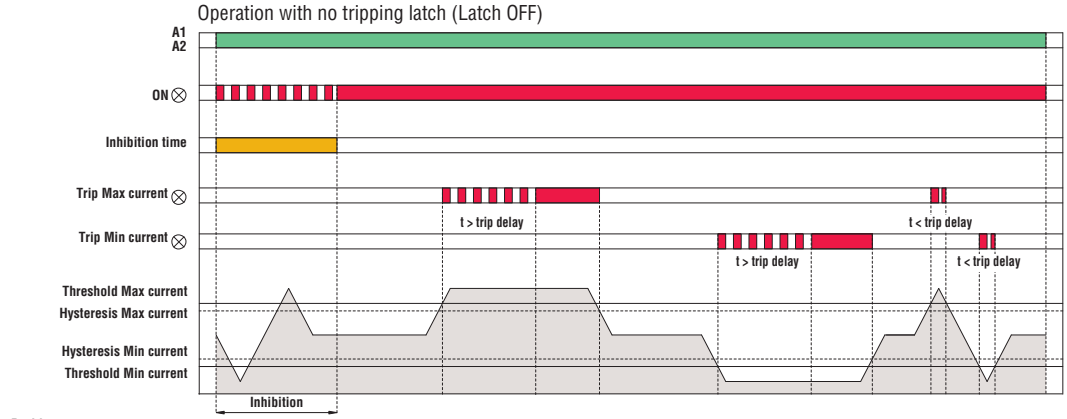


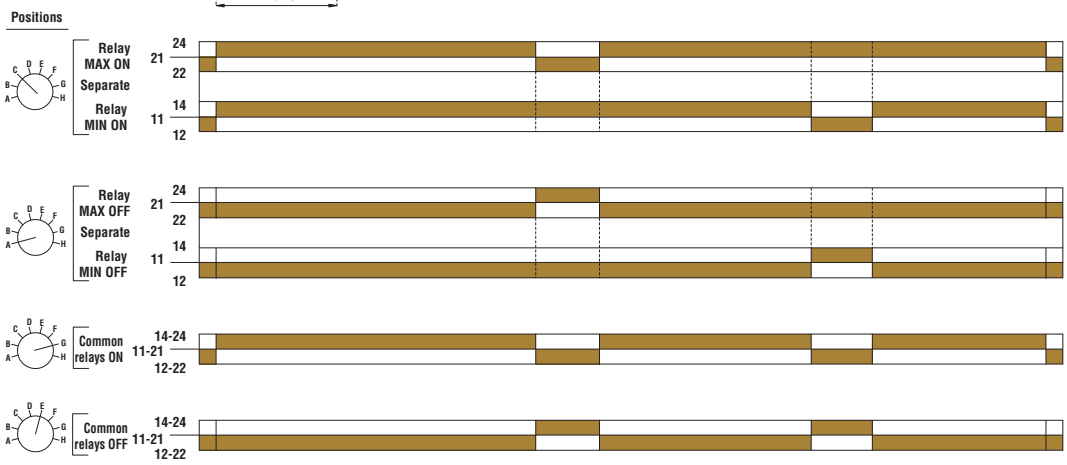
Three-phase direct connection
(1 phase control)



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

Operation with no tripping latch (Latch OFF)

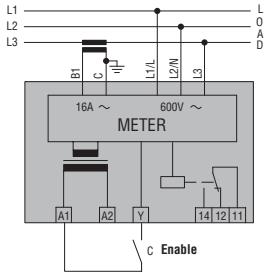




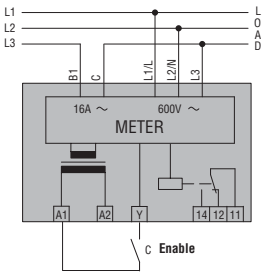
Pump protection - motor under-load/over-current monitoring

PMA50

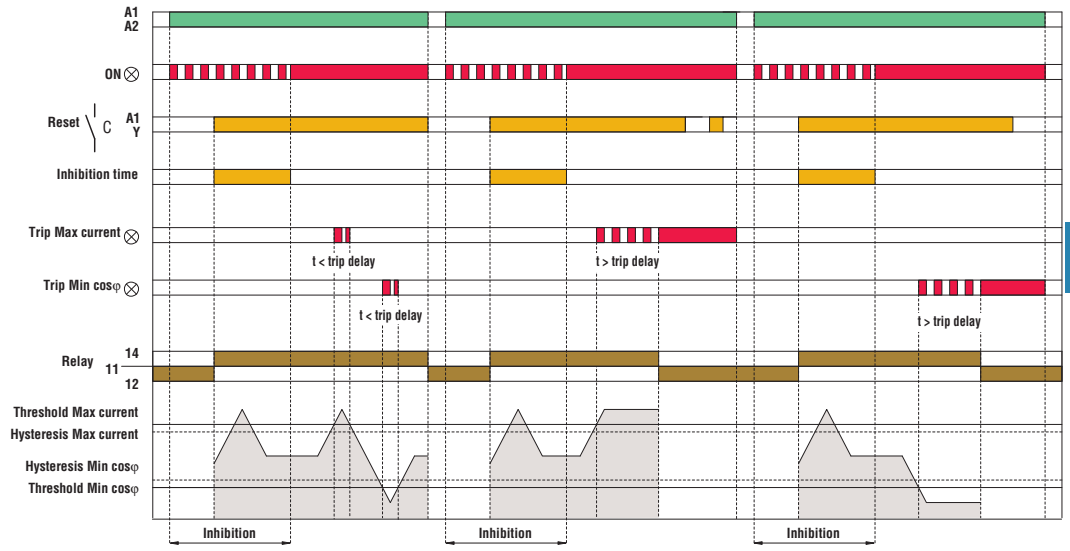
Three-phase connection by CT



Three-phase direct connection



External reset disabled (OFF)



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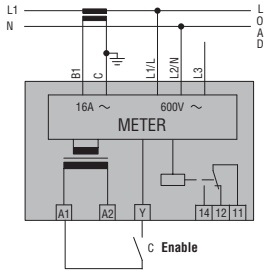
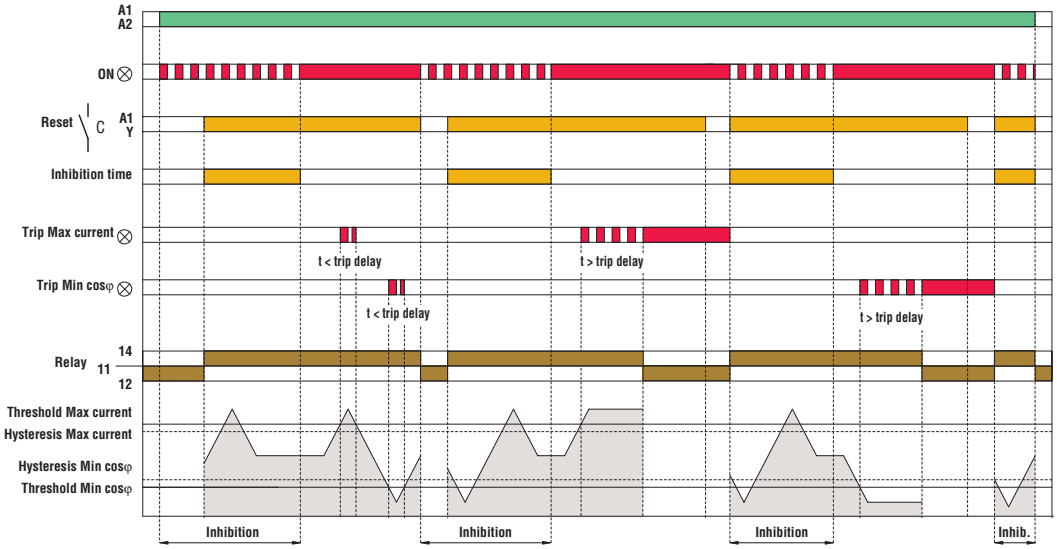
Single-phase connection by CT



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

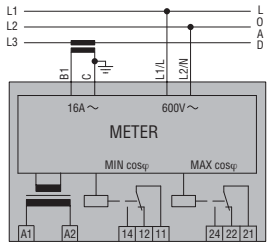
External reset enabled (ON)



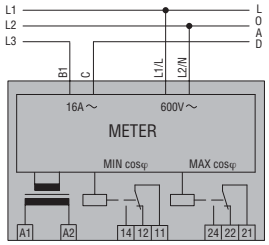
Phase shift monitoring relay

PMA60

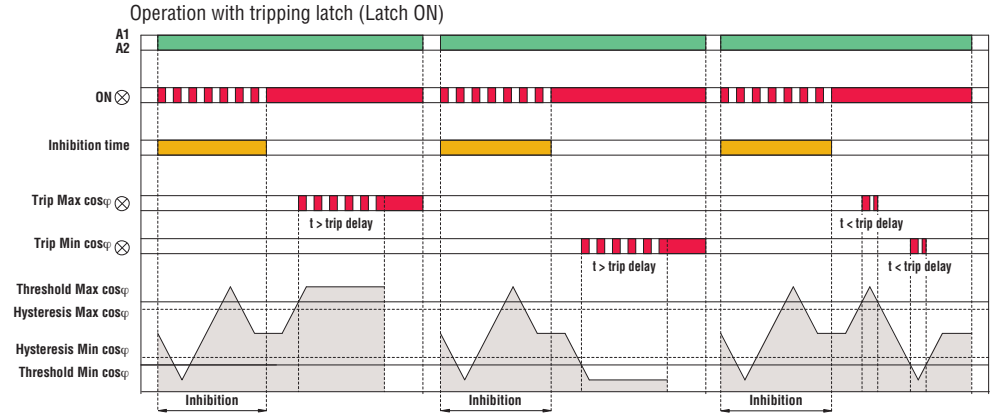
Three-phase connection by CT

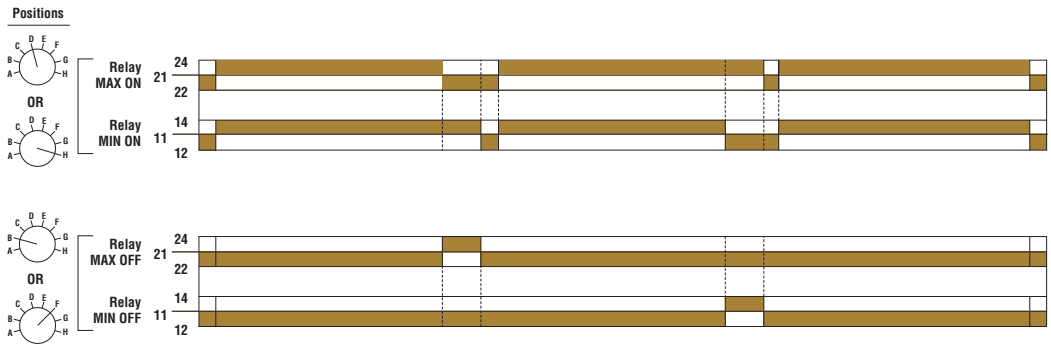


Three-phase direct connection

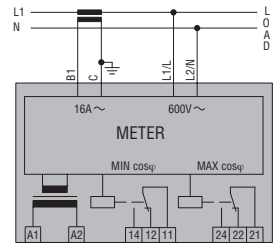


Operation with tripping latch (Latch ON)



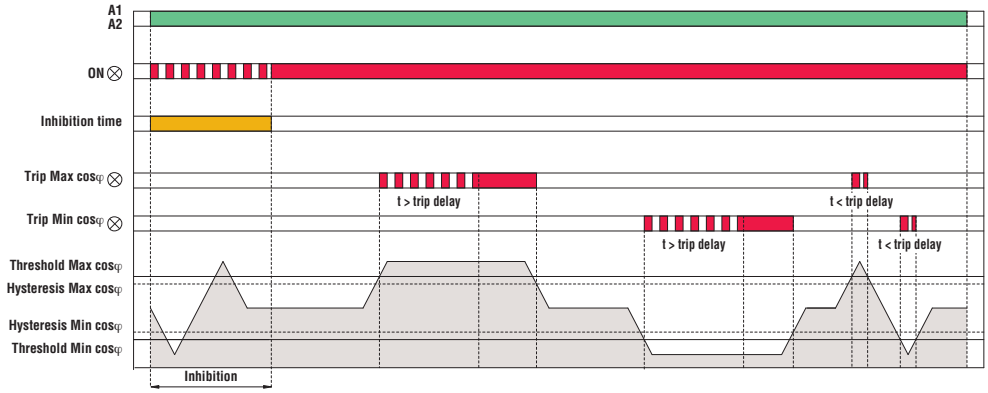


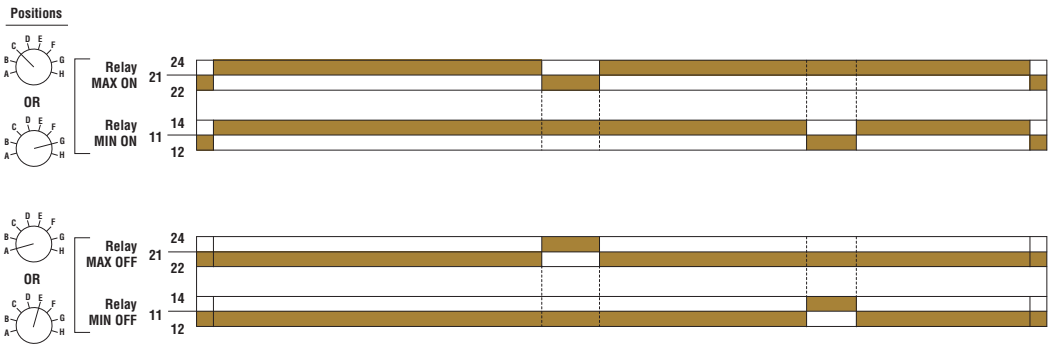
Single-phase connection by CT



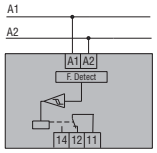
Operation			
Mode	Connection	Relay output	Latch
A	1 phase	OFF	OFF
B			ON
C		ON	OFF
D			ON
E	3 phase	OFF	OFF
F			ON
G		ON	OFF
H			ON

Operation with no tripping latch (Latch OFF)

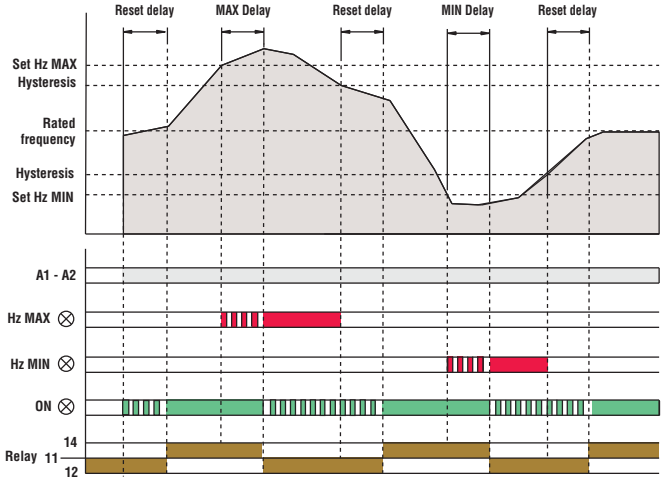




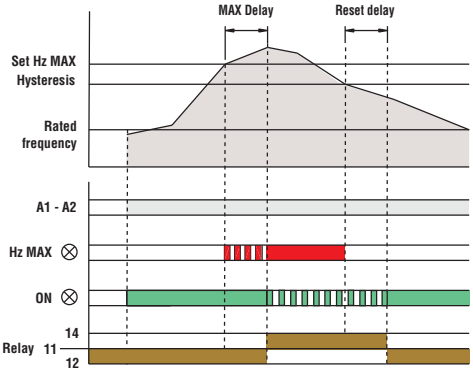
Frequency monitoring relay
PMF20



MAX-MIN, MAX or MIN function



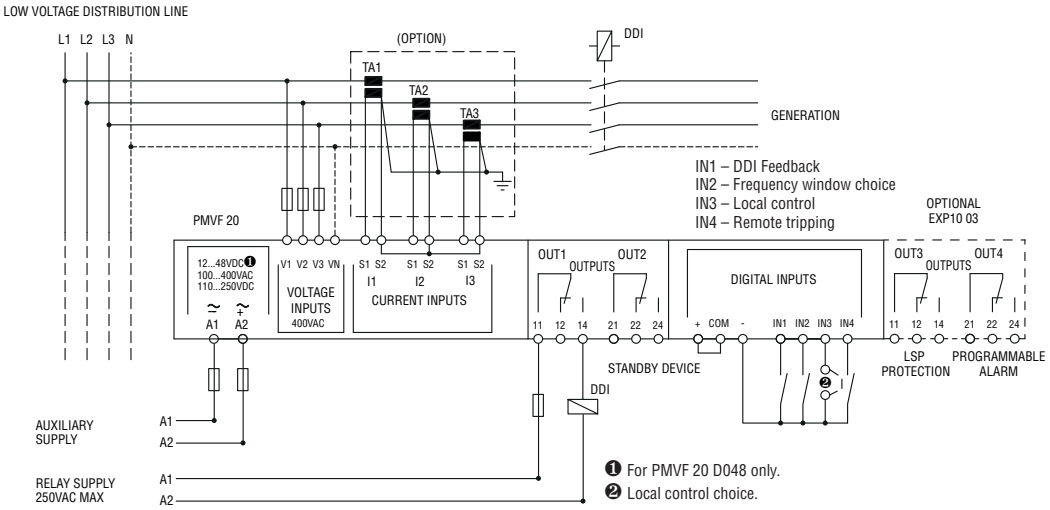
$\overline{\text{MAX}}$ function



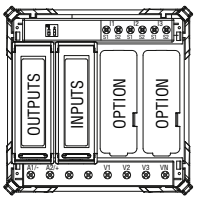
Interface protection systems compliant with Italian CEI 0-21 standard - For low voltage

PMVF 20...

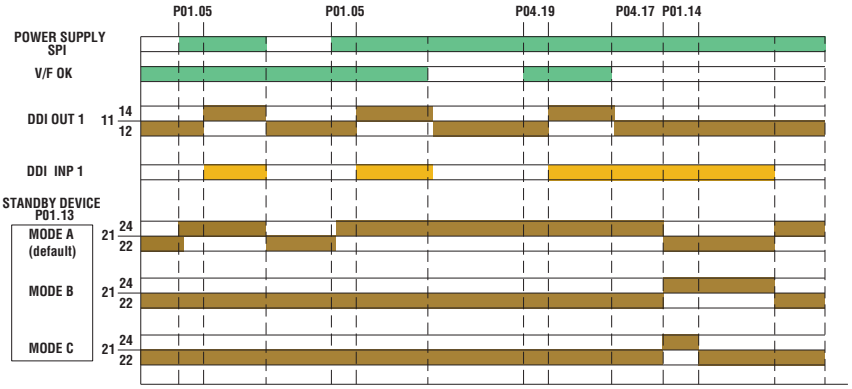
Three-phase connection



Rear view



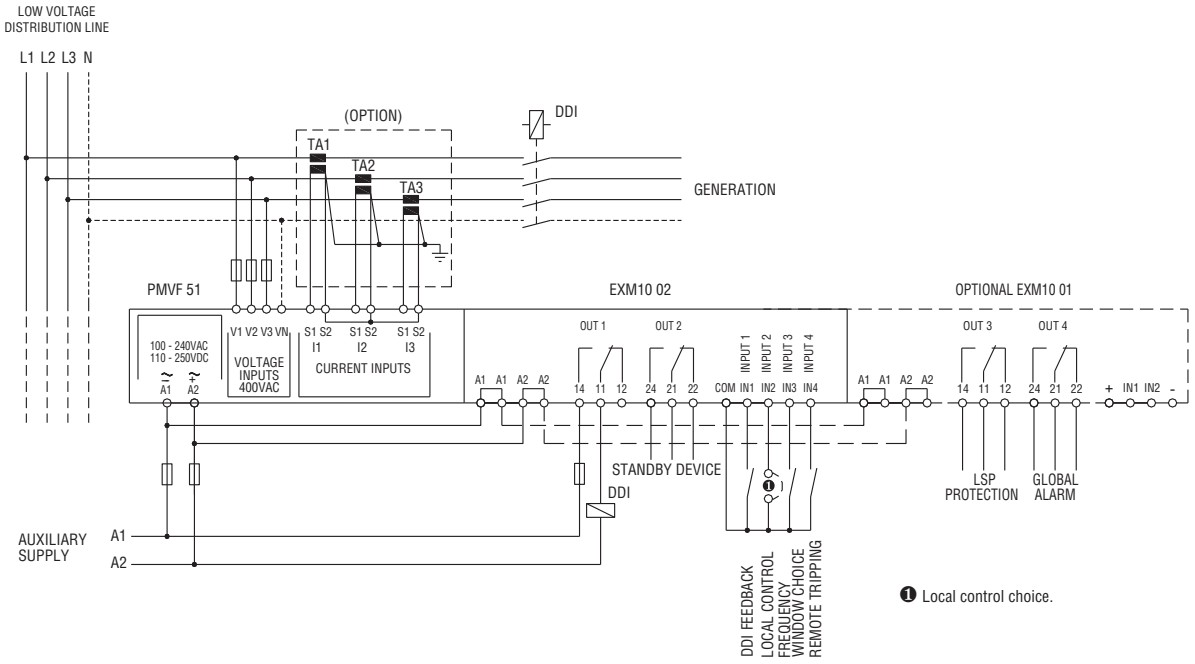
Activation modes for standby device



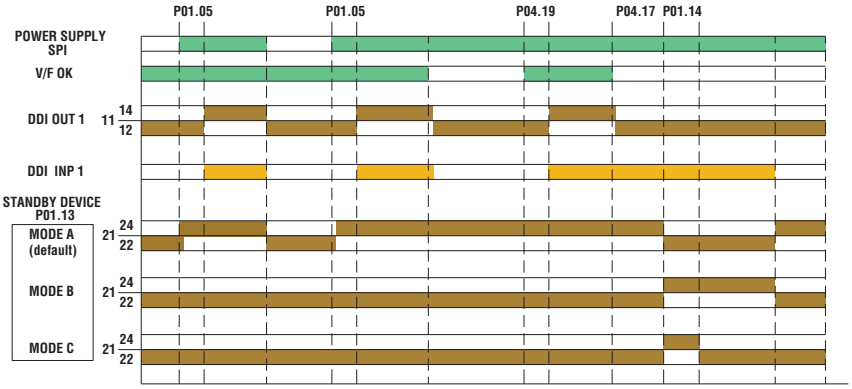
Interface protection systems compliant with Italian CEI 0-21 standard - For low voltage

PMVF 51

Three-phase connection



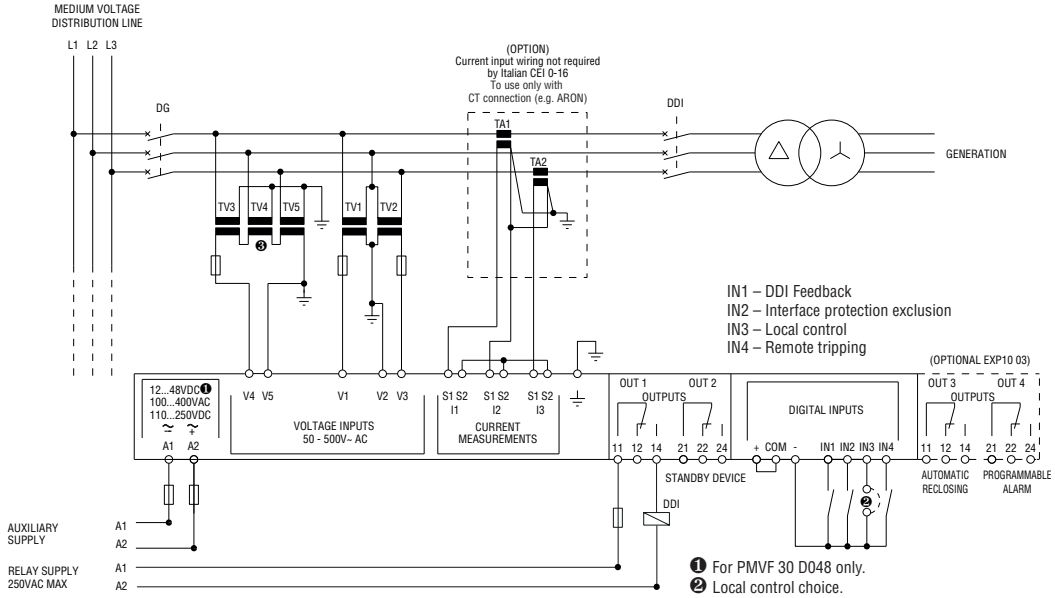
Activation modes for standby device



Interface protection systems compliant with Italian CEI 0-16 standard - For medium voltage

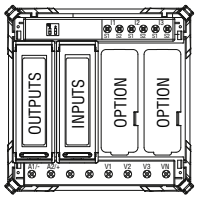
PMVF 30...

Connection through VTs in Medium Voltage
Three-phase connection

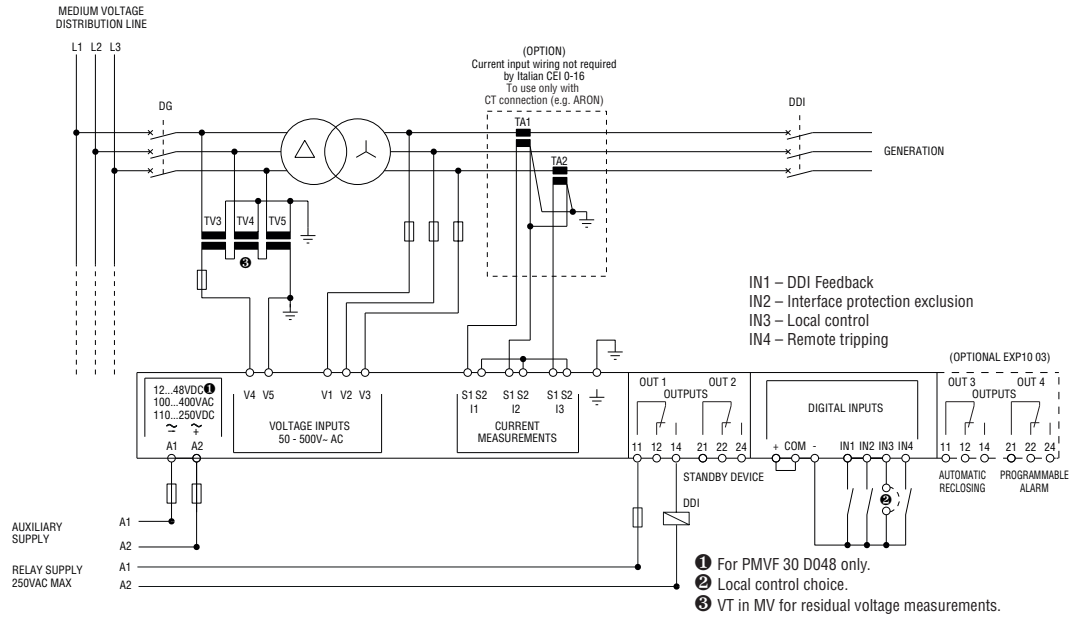


❶ For PMVF 30 D048 only.
❷ Local control choice.
❸ VT in MV for residual voltage measurements.

Rear view

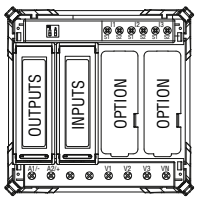


Direct connection in Low Voltage
Three-phase connection

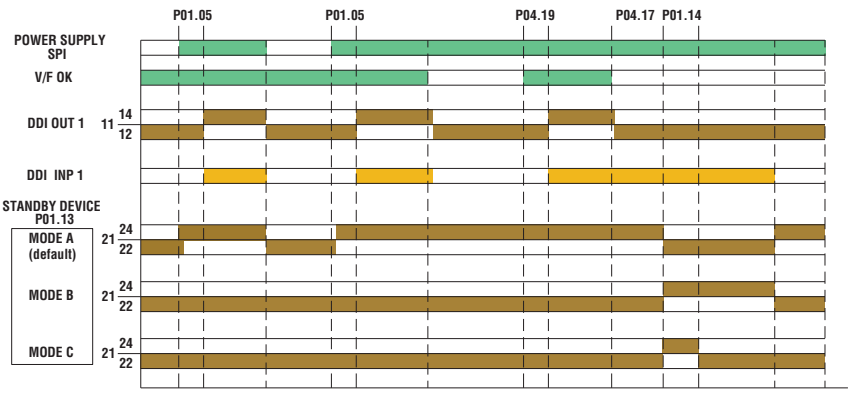


❶ For PMVF 30 D048 only.
❷ Local control choice.
❸ VT in MV for residual voltage measurements.

Rear view



Activation modes for standby device

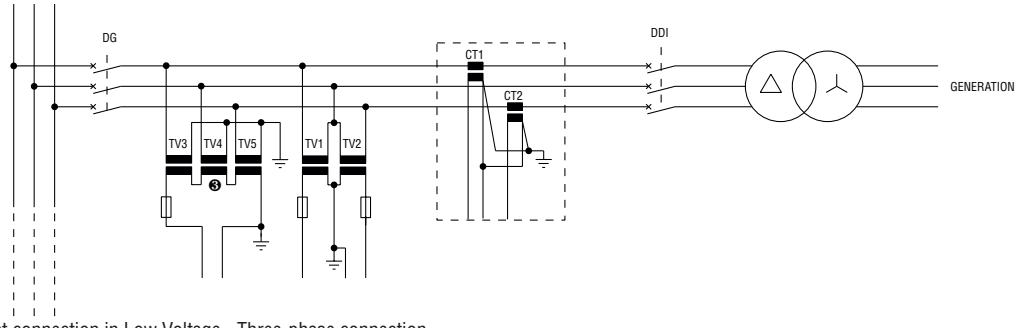


Interface protection systems compliant with Italian CEI 0-16 standard - For medium voltage
PMVF 30... with **PMVF GSM 1**

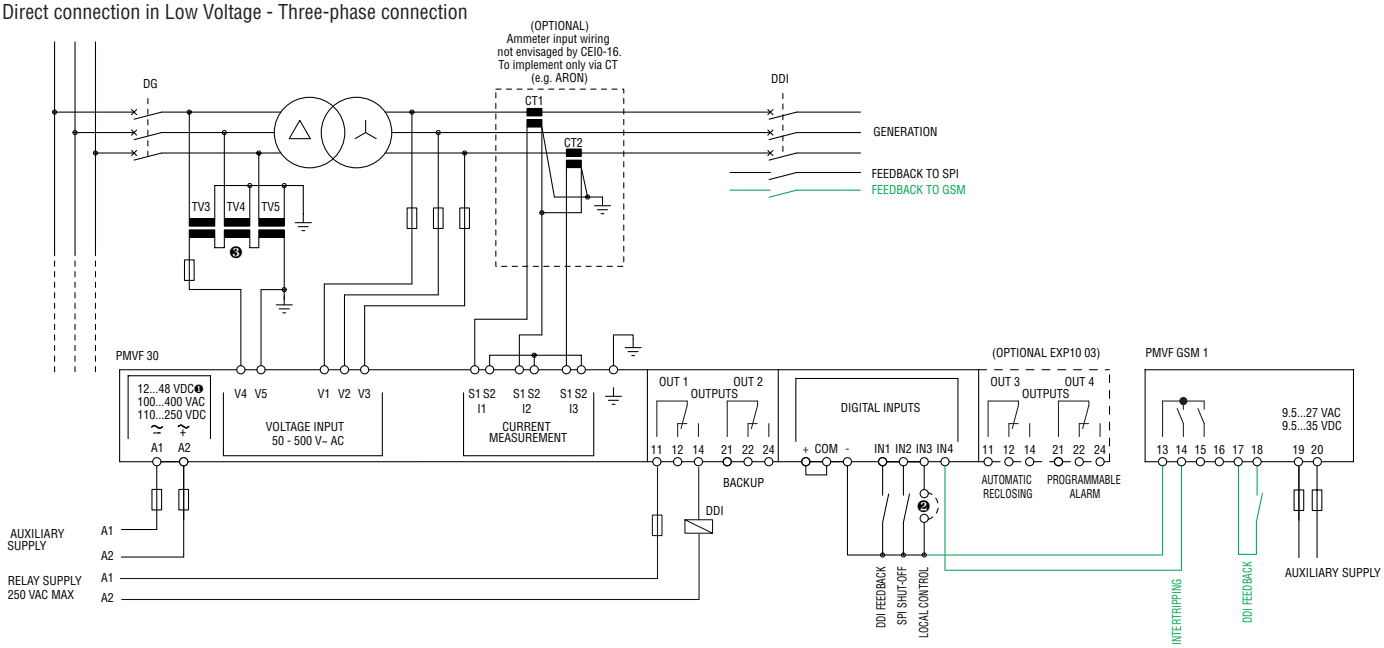
MEDIUM-VOLTAGE DISTRIBUTION NETWORK

L1 L2 L3

Connection through VTs in Medium Voltage



Direct connection in Low Voltage - Three-phase connection

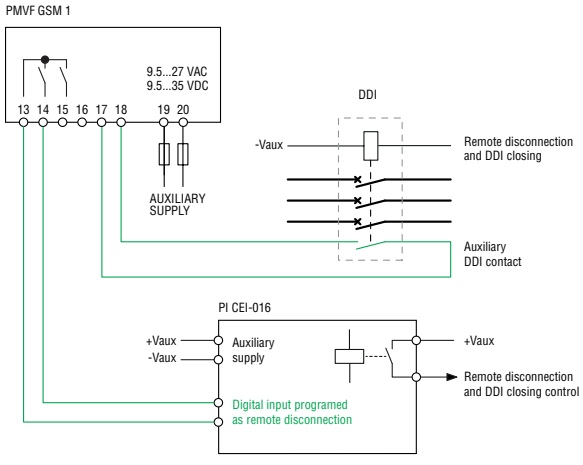


❶ For PMVF 30 D048 only.
❷ Local control choice.
❸ VT in MV for residual voltage measurements.

The connections coloured in GREEN, in addition to the GSM Modem, represent the only wiring necessary for the adaptation.

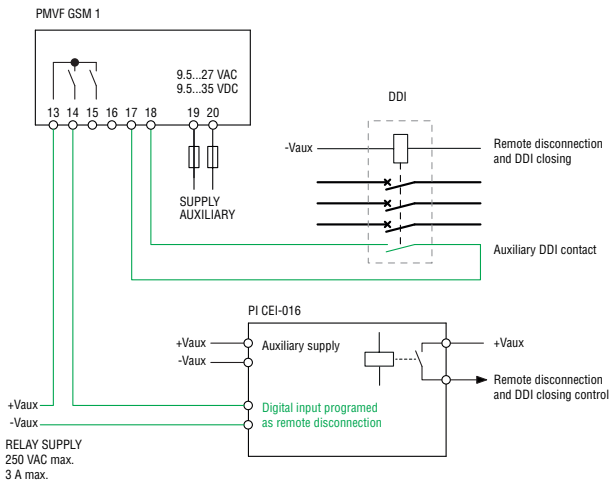
18

PMVF GSM 1 modem wiring diagram with other interface protections (PI) with self-supplied remote disconnection input



The connections coloured in GREEN, in addition to the GSM Modem, represent the only wiring necessary for the adaptation.

PMVF GSM 1 modem wiring diagram with other interface protections (PI) with remote disconnection input to be supplied



TYPE	Single phase	**PMV55**	—	—	—	—	
	Three phase	—	**PMV10**	**PMV20**	**PMV30**	**PMV40**	
	Three phase with/without neutral	—	—	—	—	—	
DESCRIPTION							
		Minimum and maximum AC voltage	Phase loss and incorrect phase sequence		Minimum AC voltage, phase loss and incorrect phase sequence	Asymmetry, phase loss and incorrect phase sequence	
CONTROL CIRCUIT							
Rated voltage to control (Ue)		208...240VAC	208...480VAC	100...240VAC	208...240VAC		
		380...440VAC		208...575VAC	380...575VAC		
				380...600VAC	600VAC		
Maximum voltage set-point		105...115% Ue	—	—	—	—	
Minimum voltage set-point		80...95% Ue	—	—	80...95% Ue	—	
Asymmetry set-point		—	—	—	—	5...15%Ue	
Minimum and maximum frequency set-point		—	—	—	—	—	
Tripping time		0.1...20s	60ms		0.1...20s		
Resetting time		0.1...20s (0.5s at power up)	0.5s		0.1...20s (0.5s at power up)		
Resetting hysteresis		3%	5%		3%		
Instantaneous tripping for Ue		<70% Ue configured	Umin<70% Umax		<70% Ue configured	<70% minimum Ue	
Repeat accuracy		< ±0.1%	< ±1%		< ±0.1%	< ±0.1%	
POWER SUPPLY							
Auxiliary voltage (Us)		Self powered					
Operating range		0.7...1.2Ue	0.85...1.1Ue		0.7...1.2Ue		
Frequency		50/60Hz ±5%					
Power consumption (maximum)		10VA (208...240VAC)❶ 17VA (380...440VAC)❶	20VA❶	28VA❶	11VA (208...240VAC)❶ 30VA (380...575VAC)❶ 19VA (600VAC)❶		
Power dissipation (maximum)		1.5W	2.2W	2.5W			
RELAY OUTPUTS							
Number of relays		1					
Relay state		Normally energised De-energises at tripping					
Contact arrangement		1 changeover SPDT					
Rated operational voltage		250VAC					
Maximum switching voltage		400VAC					
Conventional free-air thermal current (Ith)		8A					
UL/CSA and IEC/EN 60947-5-1 designation		B300					
Electrical life (with rated load)		10^5 cycles					
Mechanical life		$30x10^6$ cycles					
Indications		1 green LED for power on and tripping 2 red LEDs for tripping	1 green LED for power on and tripping		1 green LED for power on and tripping 1 red LED for tripping		
CONNECTIONS							
Terminal tightening torque (maximum)		0.8Nm (7lbin; 7...9lbin per UL/CSA)					
Conductor section min...max		0.2...4.0mm² (24...12AWG; 18...12 AWG per UL/CSA)					
INSULATION (input-output)							
IEC rated insulation voltage Ui		440VAC	480VAC	600VAC			
IEC rated impulse withstand voltage Uimp		6kV					
IEC power frequency withstand voltage		4kV					
AMBIENT CONDITIONS							
Operating temperature		–20...+60°C					
Storage temperature		–30...+80°C					
HOUSING							
Material		Self-extinguishing polyamide					

❶ Power consumption (maximum) at 50Hz.

	—	—	—	—	—
	PMV50	**PMV70**	—	—	—
	—	—	**PMV50 N**	**PMV70 N**	**PMV80 N**
	Minimum and maximum AC voltage, phase loss and incorrect phase sequence	Minimum and maximum AC voltage, phase loss, incorrect phase sequence and asymmetry	Minimum and maximum AC voltage, phase loss, neutral loss and incorrect phase sequence	Minimum and maximum AC voltage, phase loss, neutral loss, incorrect phase sequence and asymmetry	Minimum and maximum AC voltage and frequency, phase loss, neutral loss and incorrect phase sequence
	208...240VAC	208...240VAC	208...240VAC	208...240VAC	208...240VAC
	380...575VAC	380...575VAC	380...440VAC	380...440VAC	380...440VAC
	600VAC	600VAC	480...600VAC	480...600VAC	480...600VAC
	105...15% Ue	105...115% Ue	105...115% Ue	105...115% Ue	105...115% Ue
	80...95% Ue	80...95% Ue	80...95% Ue	80...95% Ue	80...95% Ue
	—	5...15% Ue	—	5...15% Ue	—
	—	—	—	—	1...10% rated frequency
	0.1...20s				0.1...20s / 0.1...5s frequency
	0.1...20s (0.5s at power up)	0.5s	0.1...20s	0.5s	0.5s
	3%	3%	3%	3%	3% / 0.5% frequency
	<70% Ue configured				
	< ±0.1%				
	Self powered				
	0.7...1.2Ue				
	50/60Hz ±5%				
	11VA (208...240VAC)❶ 30VA (380...575VAC)❶ 19VA (600VAC)❶		27VA max		
	2.5W		1.9W max		
	1		2		
	Normally energised De-energises at tripping				
	1 changeover SPDT		2 changeover SPDT		
	250VAC				
	400VAC				
	8A				
	B300				
	10^5 cycles				
	30x10^6 cycles				
	1 green LED for power on and tripping 2 red LEDs for tripping	1 green LED for power on and tripping 3 red LEDs for tripping	1 green LED for power on and tripping 2 red LEDs for tripping		
	0.8Nm (7lbin; 7...9lbin per UL/CSA - PMV...N excluded)				
	0.2...4.0mm² (24...12AWG; 18...12 AWG per UL/CSA - PMV...N excluded)				
	600VAC				
	6kV				
	4kV				
	–20...+60°C				
	–30...+80°C				
	Self-extinguishing polyamide				

TYPE		PMA20	PMA30	PMA40	
DESCRIPTION					
		Single-phase maximum current monitoring AC/DC multiscale	Single-phase minimum or maximum current monitoring AC/DC multiscale	Single-phase minimum and maximum current monitoring AC/DC multiscale	
CONTROL CIRCUIT					
Rated current to be monitored Ie		5 or 16A		0.02 - 0.05 - 0.25 - 1 - 5 - 16A	
Rated frequency		50/60Hz ±5%			
Overload capacity		5 Ie for 1s 160A for 10ms Constant 16A		50mA - 1A inputs 5 Ie for 1s 10Ie for 10ms Constant 2Ie	16A input 5 Ie for 1s 160A for 10ms Constant 16A
Connection		Direct or by current transformer			
Adjustment	Tripping values	5...100% f.s.			
	Tripping time	0.1...30s			
	Inhibition time	1...60s			
	Resetting hysteresis	1...50%		3% fixed	
Resetting		Automatic / Manual			
External input		Resetting / Inhibition		—	
Repeat accuracy		±1% with constant parameters			
AUXILIARY SUPPLY					
Auxiliary supply voltage Us		24...240VAC/DC			
Operating range		0.85...1.1 Us			
Rated frequency		50/60Hz ±5%			
Power consumption (maximum)		3.2VA		7VA	
Power dissipation (maximum)		1.6W		1.7W	
RELAY OUTPUTS					
Number of relays		1		2	
Relay state		Normally energised / de-energised (selectable)			
Contact arrangement		1 changeover contact SPDT each			
Rated operational voltage		250VAC			
Maximum switching voltage		400VAC			
IEC conventional free air thermal current Ith		8A			
UL/CSA and IEC/EN 60947-5-1 designation		B300			
Electrical life (with rated load)		10^5 cycles			
Mechanical life		$30x10^6$ cycles			
Indications		1 green LED for power on/inhibition 1 red LED for tripping		1 green LED for power on/inhibition 2 red LEDs for max/min tripping	
CONNECTIONS					
Tightening torque maximum		0.8Nm (7lbin; 7...9lbin per UL/CSA)			
Conductor section min...max		0.2...4.0mm² (24...12AWG; 18...12 AWG per UL/CSA)			
INSULATION (input-output)					
IEC rated insulation voltage Ui		415VAC			
IEC rated impulse withstand voltage Uimp		4kV			
IEC power frequency withstand voltage		2.5kV			
AMBIENT CONDITIONS					
Operating temperature		–20...+60°C			
Storage temperature		–30...+80°C			
HOUSING					
Material		Self-extinguishing polyamide			

TYPE		PMA50	PMA60
DESCRIPTION			
		Single and three-phase pump protection (motor under-load and over-current control) monitoring for max AC current, min cosφ, phase loss and incorrect phase sequence	Single and three-phase shift control for minimum and maximum cosφ monitoring
CURRENT AND COSφ CONTROL CIRCUIT			
Rated current Ie		5 or 16A	16A
Rated frequency		50/60Hz ±5%	
Overload capacity		5Ie for 1s 160A for 10ms Constant 16A	
Connection		Direct or by current transformer	
Adjustments	End-scale value	5 or 16A	16A
	Tripping for MAX current	10...100Ie	—
	Tripping for cosφ	0.1...0.99 cosφ (MIN)	0.1...0.99 cosφ (MIN and MAX)
	Tripping delay	0.1...10s	0.1...30s
	Inhibition time	1...60s	1...60s
	Automatic resetting delay	OFF...100min	—
External input		Consent for running/resetting	—
Repeat accuracy		±1% with constant parameters	
VOLTAGE CONTROL CIRCUIT			
Voltage measuring range (Ue)		80...660VAC	
Tripping time for phase loss		60ms	
AUXILIARY SUPPLY			
Auxiliary supply voltage Us		220...240VAC	
		380...415VAC (maximum voltage for UL/CSA)	
		440...480VAC	
Operating range		0.85...1.1 Us	0.85...1.1 Us
Frequency range		50/60Hz ±5%	50/60Hz ±5%
Power consumption (maximum)		4.5VA	4.4VA
Power dissipation (maximum)		2.3W	2.4W
RELAY OUTPUTS			
Number of relays		1	2
Relay state		Normally energised, de-energises at tripping	Normally energised / de-energised (ON-OFF) (configurable)
Contact arrangement		1 changeover contact SPDT each	
Rated operational voltage		250VAC	
Maximum switching voltage		400VAC	
IEC conventional free air thermal current Ith		8A	
UL/CSA and IEC/EN 60947-5-1 designation		B300	
Electrical life (With rated load)		10^5 cycles	
Mechanical life		$30x10^6$ cycles	
Indications		1 green LED for power on/inhibition 2 red LEDs for minimum/maximum tripping	
CONNECTIONS			
Tightening torque maximum		0.8Nm (7lbin; 7...9lbin per UL/CSA)	
Conductor section min...max		0.2...4.0mm² (24...12AWG; 18...12 AWG per UL/CSA)	
INSULATION (input-output)			
IEC rated insulation voltage Ui		600VAC	
IEC rated impulse withstand voltage Uimp		6kV	
IEC power frequency withstand voltage		2.5kV	
AMBIENT CONDITIONS			
Operating temperature		–20...+60°C	
Storage temperature		–30...+80°C	
HOUSING			
Material		Self-extinguishing polyamide	

TYPE		**PMF20**
DESCRIPTION		Single-phase minimum and maximum frequency control
FREQUENCY CONTROL CIRCUIT		
Rated frequency		50 or 60Hz selectable
Operating frequency range		40...70Hz
Adjustment	MAX tripping	101...110% operating frequency
	MIN tripping	90...99% operating frequency
	Resetting hysteresis	0.5%
	Inhibition time	0.1...20s
	Reset delay	0.1...20s
Resetting		Automatic
Repeat accuracy		< ±0.1%
AUXILIARY SUPPLY		
Auxiliary supply voltage Us		220...240VAC
		380...415VAC
Operating range		0.85...1.1 Us
Rated frequency		50/60Hz
Power consumption (maximum)		10VA (220...240VAC); 17VA (380...415VAC)
Power dissipation (maximum)		1.5W
RELAY OUTPUTS		
Number of relays		1
Relay state		Normally energised, de-energises at tripping❶
Contact arrangement		1 changeover contact SPDT
Rated operational voltage		250VAC
Maximum switching voltage		400VAC
IEC conventional free air thermal current Ith		8A
UL/CSA and IEC/EN 60947-5-1 designation		B300
Electrical life (with rated load)		10^5 cycles
Mechanical life		$30x10^6$ cycles
Indications		1 green LED for power on/tripping 2 red LEDs for min-max tripping
CONNECTIONS		
Tightening torque maximum		0.8Nm (7lbin; 7...9lbin per UL/CSA)
Conductor section min-max		0.2...4.0mm² (24...12AWG; 18...12 AWG per UL/CSA)
INSULATION (input - output)		
IEC rated insulation voltage Ui		575VAC
IEC rated impulse withstand voltage Uimp		6kV
IEC power frequency withstand voltage		4kV
AMBIENT CONDITIONS		
Operating temperature		–20...+60°C
Storage temperature		–30...+80°C
HOUSING		
Material		Self-extinguishing polyamide

❶ Normally de-energised, energises at tripping with $\overline{\text{MAX}}$ function configured.

TYPE		PMVF 20	PMVF 20 D048
AUXILIARY POWER SUPPLY			
Rated control supply voltage Us		100...400VAC/110...250VDC	12...48VDC
Operating limits		90...440VAC/93.5...300VDC	9...70VDC
Frequency		45...55Hz	—
Power consumption	AC supply	6VA at 110VAC; 8VA at 230VAC; 11VA at 400VAC	—
	DC supply	25mA at 110VDC; 11mA at 250VDC	250mA at 12VDC; 120mA 24VDC; 62mA at 48VDC
Power dissipation	AC supply	2.7W at 110VAC; 3W at 220V; 3.9W at 400VAC	—
	DC supply	2.6W at 110VAC; 2.8W at 250VDC	3W at 12VDC; 2.9W at 24VDC; 3W at 48VDC
Micro-breaking immunity		≤50ms at 110VAC ; ≤200ms at 230VAC	≤ 15ms at 12VDC; ≤30ms at 24VDC; ≤70ms at 48VDC
Overload category		III	III
VOLTAGE INPUTS			
Maximum rated operating voltage		400VAC L-L; 230VAC L-N 50Hz	
Measuring range		20...480VAC L-L; 10...276VAC L-N	
Frequency range		45...55Hz	
Overload category		IV	
CURRENT INPUTS (OPTIONAL)			
Rated operational current Ie		1A or 5A in AC programmable	
Measuring range		For 1A scale: 0.01...1.2A; for 5A scale: 0.01...6A	
Type of input		Shunts powered by external current transformer (low voltage) 5A max.	
Type of measurement		RMS	
Overload capacity		±20% Ie	
Overload peak		50A for 1 second	
Burden (per phase)		≤0.6W	
RELAY OUTPUTS			
Number of outputs		2	
Type of output		1 changeover contact/SPDT each	
Rated operating voltage		250VAC	
UL/CSA and IEC/EN 60947-5-1 designation		5A 250VAC AC1 /B300 ; 5A 30VDC	
Overload category		III	
DIGITAL INPUTS			
Number and type of inputs		4 negative (NPN)	
Input voltage		24VDC isolated	
Input current		7mA	
SUPPLY/VOLTAGE MEASURING CIRCUIT CONNECTIONS			
Type of terminals		Screw - removable	
Conductor section (min...max)		0.2...2.5mm² (24...12 AWG)	
Tightening torque		0.5Nm (4.5lbin)	
CURRENT MEASURING CIRCUIT CONNECTIONS			
Type of terminals		Screw - fixed	
Number of terminals		6 for external CT connections	
Conductor section (min...max)		0.2...4mm² (26...10 AWG)	
Tightening torque		0.8Nm (7lbin)	
RELAY OUTPUT CONNECTIONS			
Type of terminals		Screw - removable	
Conductor section (min...max)		0.2...2.5 mm² (24...12 AWG)	
Tightening torque		0.5Nm (4.5 lbin)	
INPUT CONNECTIONS – Input terminals			
Type of terminals		Screw - removable	
Conductor section (min...max)		0.2...1.5 mm² (28...14 AWG)	
Tightening torque		0.18Nm (1.7lbin)	
INPUT CONNECTIONS – COM and auxiliary voltage terminals			
Type of terminals		Screw - removable	
Conductor section (min...max)		0.2...2.5 mm² (24...12 AWG)	
Tightening torque		0.5Nm (4.5lbin)	
HOUSING			
Material		Polyamide	
Version		Flush mount 96x96mm / 3.78x3.78”	

TYPE		PMVF 51
AUXILIARY POWER SUPPLY		
Rated control supply voltage Us		100...240VAC/110...250VDC
Operating limits		85...264VAC/93.5...300VDC
Frequency		45...55Hz
Power consumption	AC supply	4.6VA at 110VAC; 12.5VA at 230VAC
	DC supply	23mA at 110VDC; 11mA 250VDC
Power dissipation	AC supply	2.5W at 110VAC; 2.7W at 230VAC
	DC supply	2.3W at 110VDC; 2.5W at 250VDC
Micro-breaking immunity		≤50ms at 100VDC; ≤200ms at 240VDC
Overload category		II
VOLTAGE INPUTS		
Maximum rated operating voltage		400VAC L-L; 230VAC L-N 50Hz
Measuring range		20...480VAC L-L; 10...276VAC L-N
Frequency range		45...55Hz
Overload category		IV
CURRENT INPUTS (OPTIONAL)		
Rated operational current Ie		1A or 5A in AC programmable
Measuring range		For 1A scale: 0.01...1.2A; for 5A scale: 0.01...6A
Type of measurement		RMS
Overload capacity		±20% Ie
Overload peak		50A for 1 second
Burden (per phase)		≤0.6W
RELAY OUTPUTS		
Number of outputs		2❶
Type of output		1 changeover contact/SPDT each
Rated operating voltage		250VAC
UL/CSA and IEC/EN 60947-5-1 designation		For NO contact: 5A 250VAC AC1/C300; 5A 30VDC For NC contact: 2A 250VAC AC1 / C300; 2A 30VDC
Overload category		II
DIGITAL INPUTS		
Number and type of inputs		4 positive (PNP)
Input voltage		12VDC isolated
Input current		7mA
SUPPLY/VOLTAGE MEASURING CIRCUIT CONNECTIONS		
Type of terminals		Screw - removable
Conductor section (min...max)		0.2...4mm² (24...12 AWG)
Tightening torque		0.8Nm (4.5lbin)
CURRENT MEASURING CIRCUIT CONNECTIONS		
Type of terminals		Screw - fixed
Number of terminals		6 for external CT connections
Conductor section (min...max)		0.2...2.5mm² (24...12 AWG)
Tightening torque		0.44Nm (4lbin)
RELAY OUTPUT CONNECTIONS		
Type of terminals		Screw - removable
Conductor section (min...max)		0.2...2.5 mm² (24...12 AWG)
Tightening torque		0.44Nm (4lbin)
INPUT CONNECTIONS – Input terminals		
Type of terminals		Screw - removable
Conductor section (min...max)		0.2...2.5 mm² (24...12 AWG)
Tightening torque		0.5Nm (4.5lbin)
HOUSING		
Material		Polyamide
Version		Modular 6U

❶ Single insulation between the two outputs. Both outputs must use the same voltage group.

TYPE		PMVF 30
AUXILIARY POWER SUPPLY		
Rated control supply voltage Us		100...400VAC/110...250VDC
Operating limits		90...440VAC/93.5...300VDC
Frequency		45...55Hz
Power consumption	AC supply	7.5VA at 110VAC; 10VA at 230VAC; 14VA at 400VAC
	DC supply	35mA at 110VDC; 14mA at 250VDC
Power dissipation	AC supply	4W at 110VAC; 4.2W at 220V; 5W at 400VAC
	DC supply	3.8W at 110VAC; 4W at 250VDC
Micro-breaking immunity		≤30ms at 110VAC ; ≤140ms at 230VAC
Overload category		III
VOLTAGE INPUTS		
Maximum rated operating voltage		50...500VAC (for voltages/frequency) / 50...150V (for residual voltage measurement)
Measuring range (Un)		400-150,000V (VT primary)
Frequency range		45...55Hz
Overload category		IV
CURRENT INPUTS (OPTIONAL)		
Rated operational current Ie		1A or 5A in AC programmable
Measuring range		For 1A scale: 0.01...1.2A; for 5A scale: 0.01...6A
Type of input		Shunts powered by external current transformer (low voltage) 5A max.
Type of measurement		RMS
Overload capacity		±100% Ie
Overload peak		50A for 1 second
Burden (per phase)		≤0.3W
RELAY OUTPUTS		
Number of outputs		2
Type of output		1 changeover contact/SPDT each
Rated operating voltage		250VAC
UL/CSA and IEC/EN 60947-5-1 designation		5A 250VAC AC1 /B300; 5A 30VDC
Overload category		III
DIGITAL INPUTS		
Number and type of inputs		4 negative (NPN)
Input voltage		24VDC isolated
Input current		7mA
SUPPLY/VOLTAGE MEASURING CIRCUIT CONNECTIONS		
Type of terminals		Screw - removable
Number of terminals		2 for power supply; 5 for voltage control
Conductor section (min...max)		0.2...2.5mm² (24...12 AWG)
Tightening torque		0.5Nm (4.5lbin)
CURRENT MEASURING CIRCUIT CONNECTIONS		
Type of terminal		Screw - fixed
Number of terminals		6 for external CT connections
Conductor section (min...max)		0.2...4mm² (26...10 AWG)
Tightening torque		0.8Nm (7lbin)
RELAY OUTPUT CONNECTIONS		
Type and (number) of terminals		Screw – removable (3)
Conductor section (min...max)		0.2...2.5 mm² (24...12 AWG)
Tightening torque		0.5Nm (4.5 lbin)
INPUT CONNECTIONS – Input terminals		
Type and (number) of terminals		Screw – removable (4)
Conductor section (min...max)		0.2...1.5 mm² (28...14 AWG)
Tightening torque		0.18Nm (1.7lbin)
INPUT CONNECTIONS – COM and auxiliary voltage terminals		
Type and (number) of terminals		Screw – removable (3)
Conductor section (min...max)		0.2...2.5 mm² (24...12 AWG)
Tightening torque		0.5Nm (4.5lbin)
HOUSING		
Material		Polyamide
Version		Flush mount 96x96mm / 3.78x3.78”

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