Automation and control 19 Monitoring relays



- Modular versions suitable for different type of installations, DIN rail, screw fixing or switchboard, 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
- Multifunction voltage and frequency monitoring relays with NFC technology and APP
- Frequency monitoring relays
- Minimum and maximum current monitoring relays
- Interface protection system units compliant with standards CEI 0-21, CEI 0-16, DEWA DRRG, ENA G59-3/G99, VDE-AR-N 4105, VDE V 0126-1-1, SEC (Saudi Electricity Company).

# SEC. - PAGE

Voltage monitoring relays	-	SEC.		
For three-phase systems, without neutral		19	-	4
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# **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 sequenceAsymmetry
- Minimum and maximum frequency.



Page 19-8

# MULTIFUNCTION VOLTAGE AND FREQUENCY MONITORING RELAYS

- Voltage and frequency monitoring relays for three-phase systems with or without neutral
- Programmable via NFC technology and APP
- Minimum and maximum AC voltage
- · Phase loss, neutral loss and incorrect
- phase sequence
- Asymmetry
- Minimum and maximum frequency.



Page 19-8

# FREQUENCY MONITORING RELAYS

# • For single and three-phase systems

- Minimum frequency
- Maximum frequency.



# 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.





# PUMP PROTECTION RELAYS

- For single and three-phase systems
- Minimum  $\text{cos}\phi$  for dry running protection
- Maximum AC current
- Phase loss and incorrect phase sequence.



# INTERFACE PROTECTION SYSTEM UNITS

- Compliant with Italian standard CEI 0-21, for low voltage
- Compliant with Italian standard CEI 0-16, for medium voltage
- Compliant with standard SHAMS DUBAI -DRRG (DEWA)
- Compliant with technical guide SEC (Saudi Electricity Company)
- Compliant with technical guide ENA G59-3/G99
- Compliant with technical guide VDE-AR-N 4105
   Compliant with technical guide VDE V 0126-1-1.





Voltage monitoring relays for three-phase systems without neutral	1.00		The Net	•	2220 2220	
	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	'	19	-4		19-5	19-5

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









2) 3) 3) 3)	N))
5553 DM/05N	

	PMV50N	PMV70N	PMV80N	PMV95N
Modular version	●(3U)	●(3U)	●(3U)	●(2U)
Minimum AC voltage	•	•	•	•
Maximum AC voltage	•	•	•	•
Phase loss	•	•	•	•
Neutral loss	•	•	•	•
Incorrect phase sequence	•	•	•	•
Asymmetry		•		•
Minimum frequency			•	•
Maximum frequency			•	•
Programmable via NFC technology and APP				•
Page	19-6	19-6	19-7	19-8

# Voltage monitoring relay for single-phase systems



	PMV55
Modular version	●(2U)
Minimum AC voltage	•
Maximum AC voltage	•
Page	19-7

# Frequency monitoring relays for single-phase and three-phase systems



	PMF20
Modular version	●(2U)
Minimum frequency	•
Maximum frequency	•
Page	19-9



9999999

# Current monitoring relays for single and three-phase systems

		5 5 5 5	
	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	19-9		19-10

99

# Pump protection relay for single and three-phase systems

systems	
	PMA50
Modular version	●(3U)
$ \begin{array}{l} \mbox{Minimum cos} \phi \mbox{ for dry running} \\ \mbox{pump protection} \end{array} $	•
Maximum AC current	•
Phase loss	•
Incorrect phase sequence	•
Page	19-11

# Interface protection system units





	PMVF20	PMVF30	PMVF51	PMVF60	PMVF70	PMVF80
CEI 0-21	•		•			
CEI 0-16		•				
DEWA DRRG				•		
SEC (Saudi Electricity Company)				•		
ENA G59-3/G99					•	
VDE-AR-N 4105						•
VDE V 0126-1-1						•
Page	19-12	19-14	19-13	19-15	19-15	19-15

Voltage monitoring relays

Ord

# For three-phase systems, without neutral



PMV10A440

		15
T		1:0
F		-18
_1		1
P	File Country	
2	I there.	
P	CN Led carefully or	
P	Plane seconce and	8
P	Phase sequence the phase loss with	1

10 00 00 00

der code	Rated voltage to control Ue	Qty per	Wt
	(phase-to-phase)	pkg	
	[V] 50/60Hz	n°	[kg]
	m, without neutral.	octantano	oue trip

loss and incorrect phase sequence. Instantaneous trip. nodule housing.

PMV10A440	208480VAC	1	0.050		
2 modules housing.					
PMV20A240	100240VAC	1	0.120		
PMV20A575	208575VAC	1	0.120		
PMV20A600	380600VAC	1	0.120		

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

Three-phase system, without neutral.

Order code

PMV40A240

PMV40A575

PMV40A600

Phase loss and in	age. Delayed trip. correct phase sequence	e. Instanta	neous trip.
PMV30A240	208240VAC	1	0.130
PMV30A575	380575VAC	1	0.130
PMV30A600	600VAC	1	0.130

Rated voltage

to control Ue

[V] 50/60Hz

208...240VAC

380...575VAC

600VAC

Three-phase system, without neutral.

Asymmetry. Delayed trip.

(phase-to-phase)

Phase loss and incorrect phase sequence. Instantaneous trip.

Qty

per

. pkg

n°

1

1

1

Wt

[kg]

0.130

0.130

0.130

# 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 modules for PMV20
- Mounting on 35mm DIN rail (IEC/EN/BS 60715) or screw fixing via pull out tabs
- IEC degree of protection: IP40 on front (only when placed in IP40 enclosure or control board); IP20 at terminals.

# **Certifications and compliance**

Certifications obtained: UL Listed, for USA and Canada (cULus - File E93601) as Auxiliary Devices; EAC. Compliant with standards: IEC/EN/BS 60255-27 IEC/EN/BS 61000-6-2, IEC/EN/BS 61000-6-3, UL 508, CSA C22.2 nº 14.

# General characteristics

- Voltage monitoring relay, self powered, for minimum voltage, phase loss and incorrect phase sequence
- Configurable rated voltage (Ue):
- PMV30A240: 208-220-230-240VAC
- PMV30A575: 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 modules Mounting on 35mm DIN rail (IEC/EN/BS 60715) or screw fixing via pull out tabs
- 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
	8095% Ue
"Delay"	Tripping time 0.120s
"Reset delay"	Resetting time 0.120s.

riosor dolay	riosounig	unio	0.1

# **Certifications and compliance**

Certifications obtained: UL Listed, for USA and Canada (cULus - File E93601), as Auxiliary Devices; EAC. Compliant with standards: IEC/EN/BS 60255-27, IEC/EN/BS 61000-6-2, IEC/EN/BS 61000-6-3, UL 508, CSA C22.2 nº 14.

# **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 modules
- Mounting on 35mm DIN rail (IEC/EN/BS 60715) or screw fixing via pull out tabs
- 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
	515% Ue
"Dolov"	Tripping time 0.1 20c

"Delay"	Tripping time 0.120s
"Reset delay"	Resetting time 0.120s.

# **Certifications and compliance**

Certifications obtained: UL Listed, for USA and Canada (cULus - File E93601), as Auxiliary Devices; EAC. Compliant with standards: IEC/EN/BS 60255-27 IEC/EN/BS 61000-6-2, IEC/EN/BS 61000-6-3, UL 508, CSA C22.2 nº 14.







PMV40...

Dimensions page 19-17



Voltage monitoring relays

# For three-phase systems, without neutral



PMV50...

Order code	Rated voltage to control Ue (phase-to-pha	per	Wt
	[V] 50/60Hz	n°	[kg]
	e system, without neu		

Minimum and maximum AC voltage. Delayed trip Phase loss and incorrect phase sequence. Instantaneous trip. PMV50A240 208...240VAC 0.130 1 PMV50A575 380...575VAC 0.130 1

600VAC

PMV50A600

Order code

- Voltage monitoring relay, self powered, for minimum and maximum voltage, phase loss and incorrect phase seauence

- Configurable rated voltage (Ue): PMV50A240: 208-220-230-240VAC <u>PMV50A575</u>: 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 modules Mounting on 35mm DIN rail (IEC/EN/BS 60715) or screw \_
- fixing via pull out tabs
- IEC degree of protection: IP40 on front (only when placed in IP40 enclosure or control board); IP20 on terminals.

# ADJUSTMENTS

0.130

1

Qty

per

pkg

Wt

"V max"	Maximum voltage tripping threshold
	105115% Ue
"V min"	Minimum voltage tripping threshold
	8095% Ue
"Delay" for each	Tripping time 0.120s
"Reset delay"	Resetting time 0.120s.

# **Certifications and compliance**

Certifications obtained: UL Listed, for USA and Canada (cULus - File E93601) as Auxiliary Devices; EAC. Compliant to standards: IEC/EN/BS 60255-27, IEC/EN/BS 61000-6-2, IEC/EN/BS 61000-6-3, UL 508, CSA C22.2 n° 14.

# **General characteristics**

- Voltage monitoring relay, self powered, for minimum and maximum voltage, phase loss, incorrect phase sequence and asymmetry Configurable rated voltage (Ue): • PMV70A240: 208-220-230-240VAC • <u>PMV70A575</u>: 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 modules Mounting on 35mm DIN rail (IEC/EN/BS 60715) or screw \_
- \_ fixing via pull out tabs IEC degree of protection: IP40 on front (only when placed
- in IP40 enclosure or control board); IP20 at terminals.

# ADJUSTMENTS

ADJUSTIVILIVIS	
"V max"	Maximum voltage tripping threshold
	105115% Ue
"V min"	Minimum voltage tripping threshold
	8095% Ue
"Delay" for each	Tripping delay 0.120s
"Asymmetry"	High voltage asymmetry tripping threshold
	515% Ue.

# **Certifications and compliance**

Certifications obtained: UL Listed, for USA and Canada (cULus - File E93601), as Auxiliary Devices; EAC. Compliant with standards: IEC/EN/BS 60255-27, IEC/EN/BS 61000-6-2, IEC/EN/BS 61000-6-3, UL 508, CSA C22.2 nº 14.

3 3

PMV70...

[V] 50/60Hz n° [kg] Three-phase system, without neutral. Minimum and maximum AC voltage and asymmetry. Delaved trip. Phase loss and incorrect phase sequence. Instantaneous trip. DB41/70 40 40 000 0401/00 4 0.400

PIVIV/UA240	208240VAC	1	0.130
PMV70A575	380575VAC	1	0.130
PMV70A600	600VAC	1	0.130

Rated voltage

to control Ue

(phase-to-phase)







Voltage monitoring relays

Ord

(

# For three-phase systems with or without neutral

PMI SP-S		
4	a	a Martin
1		
10		and a

PMV50N...

er 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 trin

PMV50NA240	208240VAC	1	0.200
PMV50NA440	380440VAC	1	0.200
PMV50NA600	480600VAC	1	0.200

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. Delaved trip.

Phase loss, neutral loss and incorrect phase sequence. Instantaneous trip.

PMV70NA240	208240VAC	1	0.200
PMV70NA440	380440VAC	1	0.200
PMV70NA600	480600VAC	1	0.200

### General characteristics

- Voltage monitoring relay, self powered, for minimum and maximum voltage, phase loss, neutral loss and incorrect phase sequence
- PM356 Sequence
   4 configurable rated voltages (Ue):
   PMV50NA240: 208-220-230-240VAC (phase-to-phase)
   120-127-132-138VAC (phase-to-neutral)
  - 120-12/-132-138VAG (phase-to-neutral)
     PMV50NA440: 380-400-415-440VAC (phase-to-phase)
     220-230-240-254VAC (phase-to-neutral)
     PMV50NA600: 480-525-575-600VAC (phase-to-phase)
     220-230-247VAC (phase-to-phase)
     220-230-247VAC (phase-to-phase)
  - 277-303-332-347VAC (phase-to-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 modules
- Mounting on 35mm DIN rail (IEC/EN/BS 60715) or screw fixing via pull out tabs
- 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
	105115% Ue
"V min"	Minimum voltage tripping threshold
	8095% Ue
"Delay" for each	Tripping time 0.120s
"Reset delay"	Resetting time 0.120s.

# Certifications and compliance

Certifications obtained: EAC. Compliant with standards: IEC/EN/BS 60255-27, IEC/EN/BS 61000-6-2, IEC/EN/BS 61000-6-3.

# **General characteristics**

- Voltage monitoring relay, self powered, for minimum and maximum voltage, phase loss, neutral loss, incorrect phase sequence and asymmetry
- phase sequence and asymmetry 4 configurable rated voltage (Ue): <u>PMV70NA240</u>: 208-220-230-240VAC (phase-to-phase) 120-127-132-138VAC (phase-to-neutral) <u>PMV70NA440</u>: 380-400-415-440VAC (phase-to-phase) 2020-240-25440VAC (phase-to-phase)
- 220-230-240-254VAC (phase-to-neutral) PMV70NA600: 480-525-575-600VAC (phase-to-phase)
- 277-303-332-347VAC (phase-to-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 modules
- Mounting on 35mm DIN rail (IEC/EN/BS 60715) or screw fixing via pull out tabs
- 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
	105115% Ue
"V min"	Minimum voltage tripping threshold
	8095% Ue
"Delay" for each	Tripping time 0.120s
"Asymmetry"	High voltage asymmetry tripping threshold
	515% Ue.

# Certifications and compliance

Certifications obtained: EAC. Compliant with standards: IEC/EN/BS 60255-27. IEC/EN/BS 61000-6-2, IEC/EN/BS 61000-6-3.



PMV70N...

# For three-phase systems, with or without neutral

Lovate			
G			
T SAL	pan "	1 Jack	
100		R ALL	
1	-of	120	

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.

Rated voltage

to control Ue

[V] 50/60Hz

Minimum and maximum AC voltage. Delayed trip

110...127VAC

208...240VAC

380...440VAC

Order code

PMV55A127

PMV55A240

PMV55A440

Single-phase system

PMV80NA240	208240VAC	1	0.200
PMV80NA440	380440VAC	1	0.200
PMV80NA600	480600VAC	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

- PM88e 105S, Netural 105S and incontect phase sequence
   4 configurable rated voltages (Ue):
   PMV80NA240: 208-220-230-240VAC (phase-to-phase) 120-127-132-138VAC (phase-to-neutral)
   PMV80NA440: 380-400-415-440VAC (phase-to-phase) 220-230-240-254VAC (phase-to-neutral)
   PMV80NA600: 480-525-575-600VAC (phase-to-phase) 0437VAC 277-303-332-347VAC (phase-to-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 modules \_
- Mounting on 35mm DIN rail (IEC/EN/BS 60715) or screw fixing via pull out tabs
- IEC degree of protection: IP40 on front (only when placed in IP40 enclosure or control board); IP20 at terminals.

ADJL	JSTN	<b>IENTS</b>

"V max"	Maximum voltage tripping threshold
	105115% Ue
"V min"	Minimum voltage tripping threshold
	8095% Ue
"Hz min/max"	Minimum/maximum frequency tripping
	threshold ±110% rated frequency
"V delay"	Tripping time 0.120s
"Hz delay"	Tripping time 0.15s.
,	

# **Certifications and compliance**

Certifications obtained: EAC Compliant with standards: IEC/EN/BS 60255-27, IEC/EN/BS 61000-6-2, IEC/EN/BS 61000-6-3.

### **General characteristics**

Wt

[kg]

0.125

0.125

0.125

Qty

per

pkg

n°

1

1

1

- Voltage monitoring relay, self powered, for minimum and maximum voltage
- 4 configurable rated voltage (Ue):
- PMV55A127: 110-115-120-127VAC
   PMV55A240: 208-220-230-240VAC
- PMV55A440: 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 modules
- Mounting on 35mm DIN rail (IEC/EN/BS 60715) or screw fixing via pull out tabs
- 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
	105115% Ue
"V min"	Minimum voltage tripping threshold
	8095% Ue
"Delay" for each	Tripping time 0.120s
"Pocot dolou"	Departing time 0.1 20c

'Reset delay' Resetting time 0.1...20s.

# **Certifications and compliance**

Certifications obtained: UL Listed, for USA and Canada (cULus - File E93601), as Auxiliary Devices; EAC. Compliant with standards: IEC/EN/BS 60255-27 IEC/EN/BS 61000-6-2, IEC/EN/BS 61000-6-3, UL 508, CSA C22.2 nº 14.

For single-phase systems



PMV55...



PHV 95-N

# 19 Monitoring relays

Multifunction voltage and frequency monitoring relays.

Order code



# **Multifunction voltage and** frequency monitoring relays for three systems with o neutral, with N technology and

nituriniy o-phoco			pkg		
e-phase		[V] 50/60Hz	n°	[kg]	
or without IFC d APP	Minimum and maxi frequency and asyn Phase loss, neutral	tem, with or without neutral. aximum AC voltage, minimum and maxin symmetry. Delayed trip. ral loss and phase sequence. Instantaneou via smartphone or tablet with NFC technol			
	PMV95NA240NFC	208240VAC	1	0.130	
	PMV95NA575NFC	380575VAC	1	0.130	
N))		ato tric			

PMV95N...



PM

....

-

Version 0

# 8 protection functions in a single product,

with possibility to enable or disable individually the functions of interest. maximum voltage

- minimum voltage \_
- maximum frequency
- minimum frequency \_
- \_ asymmetry
- \_ phase loss
- \_ neutral loss
- \_ incorrect phase sequence

### **Compact dimensions**

Suitable for three-phase systems with or without neutral. It comes in a 2 DIN module modular housing

Excellent accuracy of settings with digital setting of time and tripping thresholds.

Repeatability of settings, with possibility to save the programming on the smartphone to be copied in fast way on other relays without risk of error.



Simple and intuitive programming thanks to the graphic interface of the LOVATO NFC App that shows on the display of the smartphone the functions and parameters without need to consult the technical manual.

Bated voltage to control

Ue (phase-to-phase)

Qty

per

Wt

	•
4) 18 字 Jal 2014 17:15	[4년 정 및 <sub>4</sub> / 44 월 17:13 표 Setup
	GENERAL
95NA575NFC	P01.01 NOMINAL PHASE-TO-PHASE
	VOLTAGE 400 VAC L-L
	P01.02
	TYPE OF VOLTAGE CONTROL
	P01.03
-1	NOMINAL FREQUENCY Aut
	P01.04
<b>ER</b> 7	MAX VOLTAGE THRESHOLD 105.0 %

Protection of settings with a password



# **General characteristics**

- Multifunction voltage and frequency monitoring relay, self powered, for minimum and maximum voltage, minimum and maximum frequency, phase loss, neutral loss,
- incorrect phase sequence and asymmetry. NFC connectivity for parameter setting with LOVATO NFC App, freely downloadable from Google Play Store and App Store
- Simple, fast and intuitive programming
- Very high accuracy and repeatability of the settings \_
- Possibility to save the program on smartphone or tablet to be copied on other PMV95N, even with device powered off
- Possibility to enable or disable individually the functions of interest
- Possibility to protect the settings with a password \_ QR code for the direct connection to the website
- www.LovatoElectric.com for the download of the technical manual
- Excellent tripping accuracy
- \_ TRMS measurements (True Root Mean Square)
- Phase loss detection if one of the voltages is <70% rated value
- 1 relay output with changeover contact (SPDT)
- Modular DIN 43880 housing, 2 modules
- Mounting on 35mm DIN rail (IEC/EN/BS 60715) or screw fixing via pull out tabs
- IEC degree of protection: IP40 on front (only when placed in IP40 enclosure or control board); IP20 at terminals.
- Adjustments: consult the technical manual on the website www.LovatoElectric.com.

# **Certifications and compliance**

Certifications obtained: cULus. EAC. Compliant with standards: IEC/EN/BS 60255-27, IEC/EN/BS 61000-6-2, IEC/EN/BS 61000-6-3, UL 508, CSA C22.2 nº 14.

Dimensions

page 19-17

Frequency monitoring relays. Current monitoring relays

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ç

Ν

Order code

PMA20240

Rated

le

[A]

Single-phase system. AC/DC maximum current control.

Auxiliary AC/DC power supply.

Automatic or manual reset.

current

5 or 16A

# **Frequency monitoring** relays for single and three-phase systems

P907 28		7.0	-
1	N E	Net Mark	-
	C	•	
The second	10 M 10 1		-

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

PMF20A240	220240VAC	1	0.125
PMF20A415	380415VAC	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 modules Mounting on 35mm DIN rail (IEC/EN/BS 60715) or screw
- \_
- fixing via pull out tabs 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 101110% rated frequency
"Delay"	Tripping time 0.120s
"Hz min"	Minimum frequency tripping threshold
	9099% rated frequency
"Delay"	Tripping time 0.120s
"Reset delay"	Resetting time 0.120s
"Mode"	<ul> <li>Minimum and maximum frequency with output relay normally energised</li> </ul>
	<ul> <li>Maximum frequency with output relay normally energised</li> </ul>
	<ul> <li>Minimum frequency with output relay normally energised</li> </ul>
	Maximum frequency with output relay

normally de-energised.

# **Certifications and compliance**

Certifications obtained: UL Listed, for USA and Canada (cULus - File E93601), as Auxiliary Devices; EAC. Compliant with standards: IEC/EN/BS 60255-27, IEC/EN/BS 61000-6-2, IEC/EN/BS 61000-6-3, UL 508, CSA C22.2 nº 14.

# **General characteristics**

Qty

per

pkg

n°

1

Wt

[kg]

0.121

Auxiliary

supply

voltage

24...240V

AC/DC

[V]

- 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 modules Mounting on 35mm DIN rail (IEC/EN/BS 60715) or screw \_ fixing via pull out tabs
- IEC degree of protection: IP40 on front (only when placed in IP40 enclosure or control board); IP20 at terminals.

### ADJUSTMENTS

7 DOOOTHILITO	
"Imax"	Maximum current tripping threshold
	5100% le
"Hysteresis"	Maximum hysteresis threshold
	150%
"Trip delay"	Tripping time 0.130s
"Inhibition time"	Inhibition delay for external input or at
	power up 160s
"Aut. reset delay"	Automatic resetting time 0.130s
"Mode"	Rated current 5A or 16A
	<ul> <li>Relay output normally energised or</li> </ul>
	de-energised
	Tripping memory (latch) ON or OFF.

### **Certifications and compliance**

Certifications obtained: UL Listed, for USA and Canada (cULus - File E93601), as Auxiliary Devices - Modular ampere monitoring relays; EAC. Compliant with standards: IEC/EN/BS 60255-27, IEC/EN/BS 61000-6-2, IEC/EN/BS 61000-6-3, UL 508, CSA C22.2 nº 14.

# **Current monitoring relay** for single-phase systems



PMA20240



Current monitoring relays

0r

# **Current monitoring relays** for single and three-phase systems

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Reparent N. Addition Store (N

PMA30240

rder code		Auxiliary supply voltage	Qty per pkg	Wt
	[A]	[V]	n°	[kg]
سيمعنيوا المستم مأسمت				

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

Automatic or manual reset.

<b>PMA30240</b> 5	5 or 16A	24240V AC/DC	1	0.121
-------------------	----------	-----------------	---	-------

# General characteristics

- Current monitoring relay for AC/DC minimum or maximum current control
- AC/DC multivoltage auxiliary power supply \_ \_
- \_
- Automatic or manual reset. 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 modules Mounting on 35mm DIN rail (IEC/EN/BS 60715) or screw \_ fixing via pull out tabs
- \_ 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 5100% le
"Hysteresis"	Minimum or maximum hysteresis
	threshold 150%
"Trip delay"	Tripping time 0.130s
"Inhibition time"	Inhibition delay for external input or at
	power up 160s
"le"	Current scale selection: 5A or 16A
"Mode"	<ul> <li>Min or max function</li> </ul>
	· Relay output normally energised or de-
	energised

• Tripping memory (latch) ON or OFF.

**Certifications and compliance** Certifications obtained: UL Listed, for USA and Canada (cULus - File E93601), as Auxiliary Devices - Modular ampere monitoring relays; EAC. Compliant with standards: IEC/EN/BS 60255-27, IEC/EN/BS 61000-6-2, IEC/EN/BS 61000-6-3, UL 508, CSA C22.2 nº 14.

Order code Auxiliary Wt Rated Qty supply current per le voltage pkg [A] n° [V] [kg]

Single and three-phase system.

AC/DC minimum and maximum current control. Delayed trip. Auxiliary AC/DC power supply.

	Automatic or manu	al reset.			
_	PMA40240	0.02-0.05- 0.25-1-5- 16A	24240V 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 modules

.. .

- \_ Mounting on 35mm DIN rail (IEC/EN/BS 60715) or screw fixing via pull out tabs
- 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
	5100% le
"Imin"	Minimum current tripping threshold
	5100% le
"Trip delay"	Minimum and maximum current tripping
	time 0.130s
"Inhibition time"	Inhibition time at power up 160s
"le"	Current scale selection: 20mA, 50mA,
	250mA, 1A, 5A or 16A
"Mode"	Separate or common relay outputs
	<ul> <li>Relay output normally energised or</li> </ul>
	de-energised
	<ul> <li>Tripping memory (latch) ON or OFF.</li> </ul>

**Certifications and compliance** Certifications obtained: UL Listed, for USA and Canada (cULus - File E93601), as Auxiliary Devices - Modular Canada (CULUS - FIIe E93001), as Auxiliary Devices ampere monitoring relays; EAC. Compliant with standards IEC/EN/BS 60255-27, IEC/EN/BS 61000-6-2, IEC/EN/BS 61000-6-3, UL 508, CSA C22.2 nº 14.



PMA40240



Pump protection relays

# For single and three-phase systems

PIKA 16	5	 	-
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100	L.		-5

PMA50...

Order code	Rated current le	Auxiliary supply voltage	Qty per pkg	Wt
	[A]	[V]	n°	[kg]

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

Automatic of mai	iuui 10301.			
PMA50A240	5 or 16A	220240VAC	1	0.251
PMA50A415		380415VAC	1	0.251
PMA50A480		440480VAC	1	0.251

# **General characteristics**

- \_
- eneral 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 \_ \_
- \_
- \_

- 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 modules Mounting on 35mm DIN rail (IEC/EN/BS 60715) or screw fixing via pull out tabe fixing via pull out tabs
- 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 0.10.99 (under-load/dry running)
"Imax"	Maximum current threshold 10100%Ie
"Trip delay"	Tripping time for minimum $\cos\varphi$ and maximum current 0.110s
"Inhibition time"	Inhibition delay for external input or at power up 160s
"Aut. reset delay" "Mode"	Automatic reset time OFF100min • Rated current 5A or 16A • Single or three phase • External reset ON or OFF.

**Certifications and compliance** Certifications obtained: UL Listed, for USA and Canada (cULus - File E93601), as Auxiliary Devices - Modular ampere monitoring relays; EAC. Compliant with standards: IEC/EN/BS 60255-27, IEC/EN/BS 61000-6-2, IEC/EN/BS 61000-6-3, UL 508, CSA C22.2 n° 14.





Interface protection system units compliant with Italian standard CEI 0-21

Orde

Type of protection

Maximum voltage 59.S2

Maximum voltage 59.S1

Minimum voltage 27.S1

Minimum voltage 27.S2

Type of protection

(moving mean over 10min)



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Voltage threshold per CEI 0-21

Frequency threshold per CEI 0-21

PMVF20...

er code	Rated voltag Control	e Auxiliary	Qty per pkg	Wt
	[V]	[V]	n°	[kg]

Low voltage system. Dual threshold minimum and maximum voltage and frequency protection.

Flush mount type 96x96mm/3.78x3.78"

PMVF20	230VAC 400VAC	100400VAC/ 110250VDC	1	0.568
PMVF20D048		1248VDC	1	0.580

Tripping

1.15Un

1.10Un

0.85Un

0.15Un

Tripping

High external signal and low local control conditions.

Low external signal and high local control conditions.

High conditions for both external signal and local control.

NOTE: Low conditions for both external signal and local

control are not taken into consideration by the standard.

Description

EXPANSION MODULES FOR PMVF20.

Maximum frequency 81>.S2 51.5Hz

Minimum frequency 81<.S2 47.5Hz

Maximum frequency 81>.S2 51.5Hz

Minimum frequency 81<.S2 47.5Hz

Maximum frequency 81>.S1 50.2Hz

Minimum frequency 81<.S1 49.8Hz

threshold

threshold

Tripping

time

0.2s

≤ 3s

1.5s

0.2s

time

0.1s

0.1s

1s

4s

0.1s

0.1s

Tripping

# General characteristics

PMVF20 interface protection system (IP) 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 monitorina.

In the case when either the voltage or the frequency are out of admissible limits, PMVF... must step in by de-energising a relay output so that the interface device (DDI) trips

PMVF20 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

- PMVF20, 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: PMVF20: 100...400VAC/110...250VDC PMVF20 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
- Parameter configuration and remote control (only with communication 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/BS 61850 signal supervision using expansion or external module 0.

# Reference standards

Compliant with standards: Italian CEI 0-21, IEC/EN/BS 60255-27, IEC/EN/BS 61010-1, IEC/EN/BS 61000-6-2, IEC/EN/BS 61000-6-3.

Synergy: Supervision and Energy management software with remote and configuration capabilities. Xpress: Free software for Energy management controlling

one device only. See section 30.

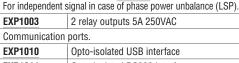
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	Communication	ports.		
Nº -	EXP1010	Opto-isolated USB interface		
l and	EXP1011	Opto-isolated RS232 interfa	се	
Contraction (Contraction) (Contraction)	EXP1012	Opto-isolated RS485 interfa	се	
	EXP1013	Opto-isolated Ethernet inter	face	
	EXP10180	IEC/EN/BS 61850 interface		
**************************************	the competent terms of the s	module will be made available authorities have established upervision and control of the urrently under study as specil 1 standard).	the exa specifi	act c
••	Order code	Description	Qty per pkg	Wt
	Backup power s	upply for interface protection	unit Pl	MVF20.
MVFUPS01 new	PMVFUPS01	Input 230VAC Output 230VAC with stored energy 200Ws and power 250VA	1	0.500

page 31-2

Order code

PI



11000	
mmunication	ports.
P1010	Opto-isolated USB interface
P1011	Opto-isolated RS232 interface
P1012	Opto-isolated RS485 interface

> General characteristics for PMVFUPS01 See page 19-13.





Interface protection system units compliant with Italian standard CEI 0-21

Order code

Rated voltage

Control

Auxiliary



# For low voltage

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	1000		[573]	Rain		-		000
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	10.0	1	1000	1120				

# PMVF51

		Ì		pkg		
		[V]	[V]	n°	[kg]	
	Low voltage sys Dual threshold i frequency prote Modular type w	minimum and ction.	maximum volta	ige and		
	PMVF51	230VAC 400VAC	100240VAC/ 110250VDC	1	0.470	
999999, 999999 9 99999 PMVF51						
Voltage threshold per CEI 0-21	Type of protecti	on	Tripping threshold	Trippi time	ng	
	Maximum volta	ge 59.S2	1.15Un	0.2s		
	Maximum volta (moving mean o	ge 59.S1	1.10Un	≤ 3s		
	Minimum voltag	ye 27.S1	0.85Un	1.5s		
	Minimum voltag	ge 27.S2	0.15Un	0.2s		
Frequency threshold per CEI 0-21	Type of protection		Tripping threshold	Trippi time	ng	
	High external s	ignal and lov	v local control c	onditic	ons.	
	Maximum frequency 81>.S2		51.5Hz	0.1s		
	Maximum frequ	ency 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	s for both exte	ernal signal and	local	control.	
	Maximum frequ	ency 81>.S1	50.2Hz	0.1s		
	Minimum frequ	ency 81<.S1	49.8Hz	0.1s		
	NOTE: Low cond control are not ta					
	Order code	Description				
	EXPANSION MC Communication		PMVF51.			
	EXM1010	Opto-isolate	ed USB interface			
	EXM1011	1	ed RS232 interfa			
Kerry and a second	EXM1012	Opto-isolate	ed RS485 interfa	се		
max]	EXM1013	Opto-isolate	ed Ethernet inter	face		
	EXM1018	IEC/EN/BS 6	61850 interface			
137 miles	Inputs and outp	uts.				
999999	EXM1001	2 digital opt outputs 5A	o-isolated input 250VAC	s and 2	2 relay	
EXM10	IEC/EN/BS 61 The EXM1018		he made availah	le only	when	

The EXM1018 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).

••	Order code	Description	Qty per pkg	Wt
COLORD A COLORD A	Backup power si	upply for interface protection	unit P	MVF51.
PMVFUPS01 new	PMVFUPS01	Input 230VAC Output 230VAC with stored energy 200Ws and power 250VA	1	0.500

### General characteristics

Wt

Qtv

per

PMVF51 interface protection system (IP) 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 monitorina.

In the case when either the voltage or the frequency are out of admissible limits, <u>PMVF51</u> must step in by de-energising a relay output so that the interface device (DDI) trips. PMVF51 is certified for use in single and three phase systems, where it is required in presence of storage systems connected in parallel to the distribution network and to the photovoltaic inverter on the AC side (presence of multiple energy generators simultaneously or exceeding the threshold of 11.08kW overall).

PMVF51 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. PMVF51 also has two additional relay outputs (EXM1001) 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
- Parameter configuration and remote control (only with communication expansion module) with software Synergy and Xpress
- Modular housing (6 modules) Mounting on 35mm DIN rail (IEC/EN/BS 60715) or screw fixing via pull out tabs
- Degree of protection for both: IP40 on front; IP20 on terminals
- Predisposed for IEC/EN/BS 61850 signal supervision using expansion or external moduleO.

### **Reference standards**

Compliant with standards: Italian CEI 0-21, IEC/EN/BS 60255-27, IEC/EN/BS 61010-1. IEC/EN/BS 61000-6-2, IEC/EN/BS 61000-6-3.

### Synergy: Supervision and Energy management software with remote and configuration capabilities.

# press: Free software for Energy management controlling one device only.

# See section 30.

# General characteristics for PMVFUPS01

CEI 0-21 and CEI 0-16 standards require an auxiliary power supply to feed the interface protection (IP), the interface switch (IS) and the backup switch for at least 5 seconds in the event of a power failure. PMVFUPS01 guarantees the necessary energy by accumulating it in capacitors, thus avoiding the use of batteries that require maintenance.

- Power supply: 230VAC, 50Hz
- Output voltage: 230VAC, 50Hz
- Output power: 250VA
- Accumulated energy: 200Ws Accumulation time: 15s
- 9U modular housing
- Operating temperature: -5...+ 55°C Degree of protection IP20.

# **Reference standards**

Compliant with standards: IEC/EN/BS 61010-1.

Accessories page 19-16

Dimensions page 19-17 Wiring diagrams page 19-18

Technical characteristics page 19-28

Interface protection system units compliant with Italian standard CEI 0-16

Control

[V]

Flush mount type 96x96mm/3.78x3.78"

Measure-

ments via

VTs in MV or

direct in LV

Order code

PMVF30

**PMVF30D048** 

frequency protection.

Rated voltage

Medium-voltage system. Dual threshold minimum and maximum voltage and

Auxiliarv

100...400VAC/

110...250VDC

12...48VDC

[V]

Qty Wt

per pkg

n°

1

1

[kg]

0.566

0.566

# For medium voltage

403V		014	-
402 V		018	
400V		1001	
50.0 Hz	Contract of	100%	315
E SEL		-	1
HENU		V	ENTER
			J

# PMVF30

Frequen Frequen

# Voltage 1

Lange Fullman Amount						
30						
e threshold per CEI 0-16	Type of protect	tion	Tripping threshold	Tripping time		
	Maximum volta	age 59.S2	1.2Un	0.6s		
	Maximum volta (moving mean		1.1Un	≤ 3s		
	Minimum volta	age 27.S1	0.85Un	0.4s		
	Minimum volta	Minimum voltage 27.S2 0.15Un 0.2				
	Maximum resivent voltage 59.V0		5% Urn	25s		
ency threshold per CEI 0-16 ency protection at voltage choice	Type of protect	Type of protection Tripping threshold				
	Configuration	Configuration in standard conditions.				
	Maximum freq	uency 81>.S2	51.5Hz	1s		
	Minimum frequ	uency 81<.S2	47.5Hz	4s		
	Limited configuration in case of local control or voltage choice condition.					
	Maximum freq	uency 81>.S1	50.2Hz	0.15s		
	Minimum frequency 81<.S1		49.8Hz	0.15s		
	<ul> <li>Voltage choice functions</li> </ul>					
		Maximum residual voltage 59.V0 (59N)		-		
	Minimum direc voltage 27.Vd	Minimum direct sequence voltage 27.Vd		-		
	Maximum inve voltage 59.Vi	rse sequence	15% Un	-		
	Order eede	Description				
	Order code	Description				
	EXPANSION MODULES FOR <u>PMVF30</u> . For auto reclosing management of automatic circuit breaker (DDI).					
	EXP1003	2 relay outp	outs 5A 250VA	C		
and a state of the	Communicatio	n ports.				
	EXP1010	Opto-isolat	ed USB interfa	се		
De a	EXP1011	Opto-isolat	ed RS232 inte	rface		
Ace -			ed RS485 inte	rface		
	EAFIUIZ			ated Ethernet interface		
동) 	EXP1012		ed Ethernet in	terface		

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)

	Order code	Description	Qty per pkg	Wt		
100	Backup power supply for interface protection unit PMVF30.					
ew	PMVFUPS01	Input 230VAC Output 230VAC with stored energy 200Ws and power 250VA	1	0.500		

## General characteristics

PMVF30 interface protection system (IP) 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, PMVF... must step in by de-energising a relay output so that the interface device (DDI) trips.

PMVF30 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 <u>PMVF30</u> 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 PMVF30 (unless it is already used for the standby device operation) or by installing an EXP1003 expansion module.

### **Operational characteristics**

- Auxiliary voltage:
- PMVF30: 100...400VAC/110...250VDC
- PMVF30D048: 12...48VDC Voltage inputs (connection via VTs in MV or directly in LV end):
- Primary: until 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
- Parameter configuration and remote control (only with communication expansion module) with software Synergy and Xpress
- Housing: Flush mount 96x96mm/3.78x3.78"
- Degree of protection: IP65 on front; IP20 on terminals
- Predisposed for IEC/EN/BS 61850 signal supervision using expansion or external module 0.

## **Reference standards**

Compliant with standards: Italian CEI 0-16; IEC/EN/BS 610255-27, IEC/EN/BS 61010-1, IEC/EN/BS 61000-6-2, IEC/EN/BS 61000-6-3.

Synergy: Supervision and Energy management software with remote and configuration capabilities.

press: Free software for Energy management controlling one device only. See section 30.

General characteristics for PMVFUPS01 See page 19-13.



Accessories 19-14 pages 19-16

EXP10.

Expansion modules page 31-2

Wiring diagrams page 19-20 and 21



Interface protection system units compliant with standards ENA G59-3/G99, SHAMS DUBAI -DRRG STANDARDS (DEWA), VDE-AR-N 4105, VDE V 0126-1-1, SEC (Saudi Electricity Company)

| Auxiliary



	<b>9</b> 9,	****	
- Mail	500000 5000000		anter al anti arti

new

# PMVF...

	CONTIN	Auxinary	pkg	
	[V]	[V]	n°	[kg]
	minimum and m ection, R.O.C.O.F			
Compliant with Electricity Com	n standards DEWA pany).	A DRRG and SE	C (Saud	di
PMVF60	Programmable	100240VAC/ 110250VDC	1	0.470
Compliant with	standards ENA G	359-3/G99.		
PMVF70	Programmable	100240VAC/ 110250VDC	1	0.470
Compliant with	standards VDE-A	R-N 4105 e VDI	E V 012	26-1-1.
PMVF80	Programmable	100240VAC/ 110250VDC	1	0.470

Rated voltage

Control

Order code

Voltage threshold	Protection type	PMVF60	PMVF70	PMVF80
	Maximum voltage threshold 2	•	•	•
	Maximum voltage threshold 1	(10 min. average)	•	(10 min. average)
	Minimum voltage threshold 1	•	•	•
	Minimum voltage threshold 2	•	•	•
Frequency threshold	Protection type	PMVF60	PMVF70	PMVF80
	Maximum frequency threshold 2	Optional set to OFF	•	•
	Maximum frequency threshold 1	•	•	Optional set to OFF
	Minimum frequency threshold 1	•	•	Optional set to OFF
	Minimum frequency threshold 2	Optional set to OFF	•	•



# EXM10...

### Order code Description

EXPANSION MODULES FOR PMVF ....

Communication ports.

oommanioanon	portor
EXM1010	Opto-isolated USB interface
EXM1011	Opto-isolated RS232 interface
EXM1012	Opto-isolated RS485 interface
EXM1013	Opto-isolated Ethernet interface
EXM1018	IEC/EN/BS 61850 interface
Inputs and output	uts.
EXM1001	2 digital inputs, opto-isolated and 2 relay outputs, rated 5A 250VAC

# IEC/EN/BS 61850 protocol

The EXP1018 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**

Wt

Qty

PMVF... interface protection system (IP) units have been developed in order to be used when a local generating system is connected in parallel with the 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 PI must step in by de-energising a relay output so that the interface device (IS) trips. PMVF... is equipped with 4 inputs having the following functions:

- IS status feedback
- \_ R.O.C.O.F/Vector shift delay or external signal for frequency selection (communication network malfunction)
- **Disabling signal**
- \_ Remote tripping (forced IS opening, independent of voltage and frequency values).
- Also, there are two relay outputs for:
- IS opening and closing
- Standby device opening (programmable: retentive normally energised, retentive normally de-energised or adjustable pulse).

The backup device consists of a signal contemporary or delayed respect to the IS opening command, transmitted only if the IS failed and did not complete the disconnection. PMVF... also has two additional relay outputs (EXM1001) 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)
   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 ports (USB, RS232, RS485, Ethernet) see section 31
- Parameter configuration and remote control (only with communication expansion module) with software
- ynergy and Xpress Modular housing (6 modules)
- Mounting on 35mm DIN rail (IEC/EN/BS 60715) or screw \_
- fixing via pull out tabs Degree of protection for both: IP40 on front; IP20 on
- terminals
- Predisposed for IEC/EN/BS 61850 signal supervision using expansion or external moduleO.

# **Reference standards**

Compliant with standards: DEWA DRRG (PMVF60); SEC (PMVF60); ENA G59-3/G99 (PMVF70); VDE-AR-N 4105, VDE V 0126-1-1 (PMVF80); IEC/EN/BS 60255-27; IEC/EN/BS 61010-1, IEC/EN/BS 61000-6-2, IEC/EN/BS 61000-6-4.

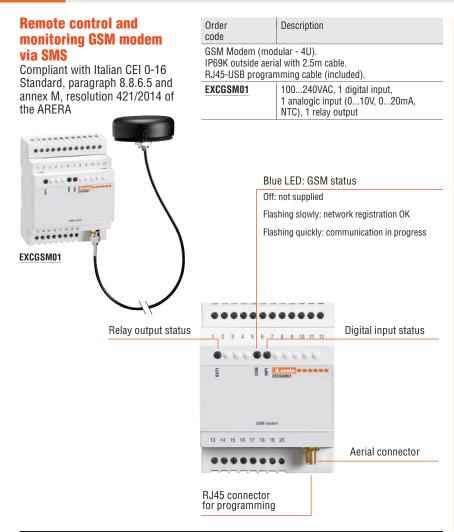
Synergy: Supervision and Energy management software with remote and configuration capabilities.

press: Free software for Energy management controlling one device only.

See section 30.

# 19 Monitoring relays Interface protection system unit compliant with G59 (ENA) technical guide



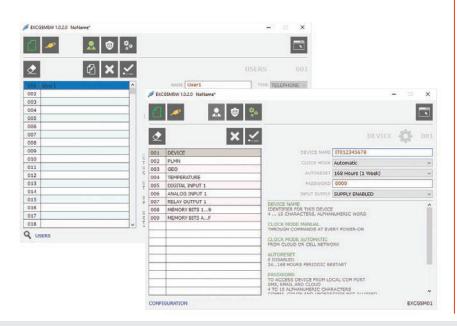


# **Software**

To configure the EXCGSM01 modem (using the RJ45-USB programming cable included), the EXCGSMSW software must be used. This can be downloaded for free from the www.LovatoElectric.com website. The software allows you to set:

- the users enabled to exchange messages with the modem
- the identifier of the modem, for example the active customer code (POD) in CEI 0-16 applications;
- the functions assigned to the digital output and input and to analog input;
- the texts of the SMS associated with the commands

the logic of the actions taken following the SMS arrival, change of input status, alarm situations. Configuration is also possible off-line, creating a file to transfer to the modem at another time.



### General characteristics

With EXCGSM01 it is possible to remotely operate a relay output and obtain information on the system by sending programmable SMS.

Using the configuration software (downloaded for free from www.LovatoElectric.com) the user can control the relay output and both the digital and analog inputs.

The logic is based on events (for example, the activation of the digital input or the arrival of an SMS with specific text), to which the user can decide specific actions (reply either by SMS or voice message, or by switching the relay output).

### Use with CEI 0-16

The CEI 0-16 standard in paragraph 8.8.6.5 and in attachment M prescribes that the electricity production plants powered by wind or solar photovoltaic sources with power greater than or equal to 100kW, connected or to be connected to medium voltage grids, are equipped with GSM modem. Thanks to this modem it is possible to manage the disconnection of the generation through the messages sent by the energy distributor

# **Functional characteristics**

- Connection to the GSM network for sending and receiving SMS messages
- Programmable message texts
- Command output piloted by SMS or internal logic, for example to send the remote disconnection command to the interface device CEI 0-16
- Programmable digital input, for example to detect the status of the Interface Switch (IS) and sending of successful IS opening and closing SMSs
- POD management (active user code) Management of the list of caller IDs (CLI) up to 5000 callers enabled
- Detection of mobile network coverage
- Full compatibility with medium-voltage PI LOVATO Electric PMVF30: 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 Technical support Tel. + 39 035 4282422; E-mail: service@LovatoElectric.com.

### **Operational characteristics** MODEM

- 35mm DIN (IEC/EN/BS 60715) rail fixing
- 4 modules
- Supply: 100...240VAC
- Consumption: 5VAC
- 1 digital output 3A 250VAC
- 1 self-supplied digital input
- 1 analog input 0...10V, 0...20mA, NTC \_ Housing for 3V and 1.8V SIM card
- \_ SIM PIN management
- \_ Temperature sensor
- \_ Update time, sunrise and sunset via GSM network
- Position update via GSM
- Certified according to FCC rules, part 15B
- \_ Operating temperature: -20...+60°C
- Protection rating: IP40 on front; IP20 on terminals.

### AFRIAI

- Quad band 850/900/1800/1900MHz
- Degree of protection: outside IP69K
- 2.5m cable
- Fixing via M10 hole:
- with adhesive seal
- with threaded pin and nut.

# Compliance

Wiring diagrams

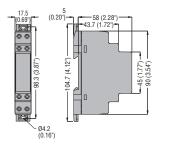
page 19-21

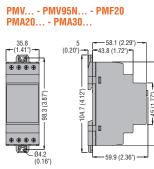
Compliant with electrical safety standards: EN/BS 62368, EN/BS 62311

Dimensions page 19-17



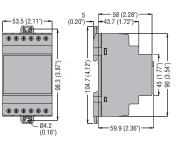
# MONITORING RELAYS PMV10...





# -59.9 (2.36")

# PMV50N... - PMV70N... - PMV80N... - PMA40... PMA50...



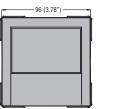
INTERFACE PROTECTION SYSTEM UNITS FOR LOW VOLTAGE PMVF20...

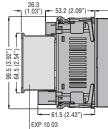


(2.50) 50

19 - (0.75")

36 (3.78'

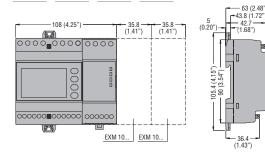




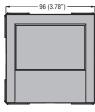
92 (3.62"

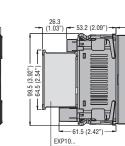
92 (3.62")

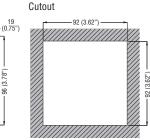
# <u>PMVF51</u> - <u>PMVF60</u> - <u>PMVF70</u> - <u>PMVF80</u>



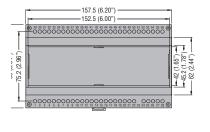
# INTERFACE PROTECTION SYSTEM UNIT FOR MEDIUM VOLTAGE PMVF30

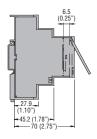






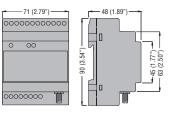
# BACKUP POWER SUPPLY PMVFUPS01





96 (3.78")

# GSM MODEM FOR REMOTE DISCONNECTION SIGNAL EXCGSM01

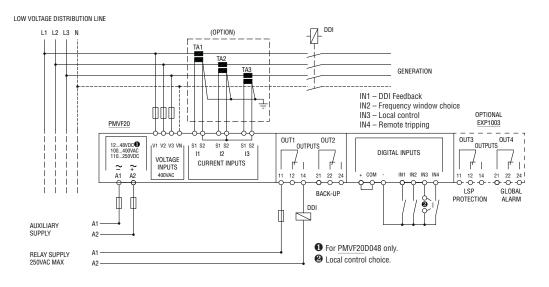




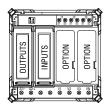


# PMVF20...

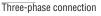
Three-phase connection

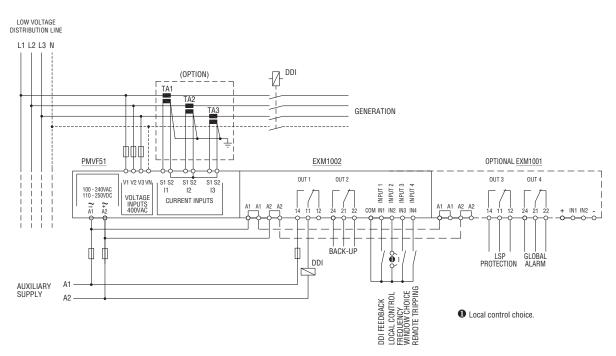






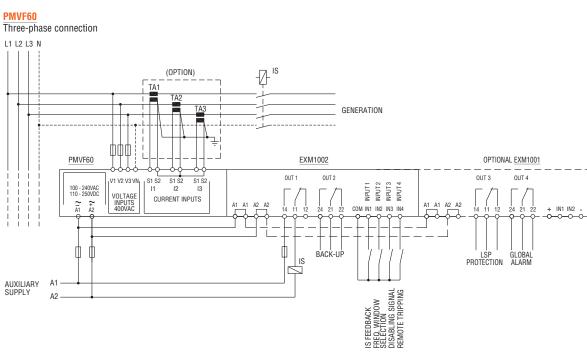
# PMVF51

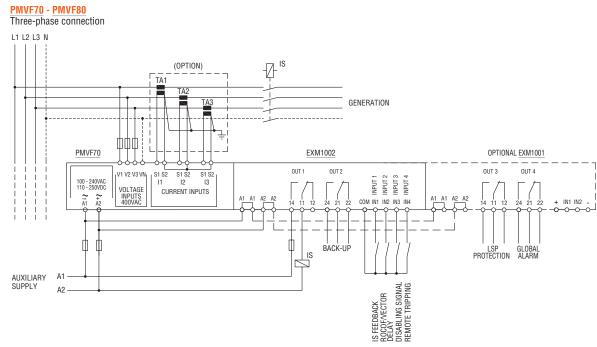












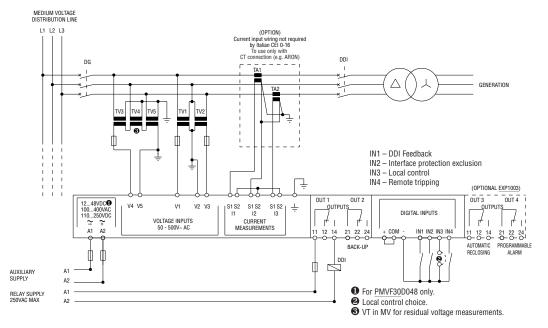




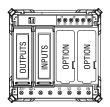


# PMVF30...

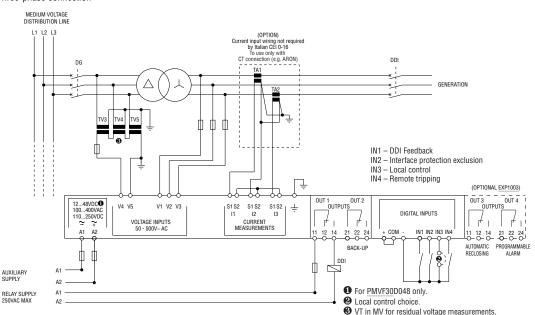
Connection through VTs in Medium Voltage Three-phase connection



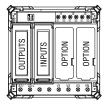
Rear view



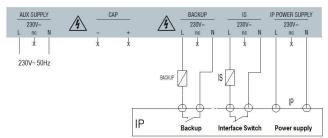
# Direct connection in Low Voltage Three-phase connection



### Rear view

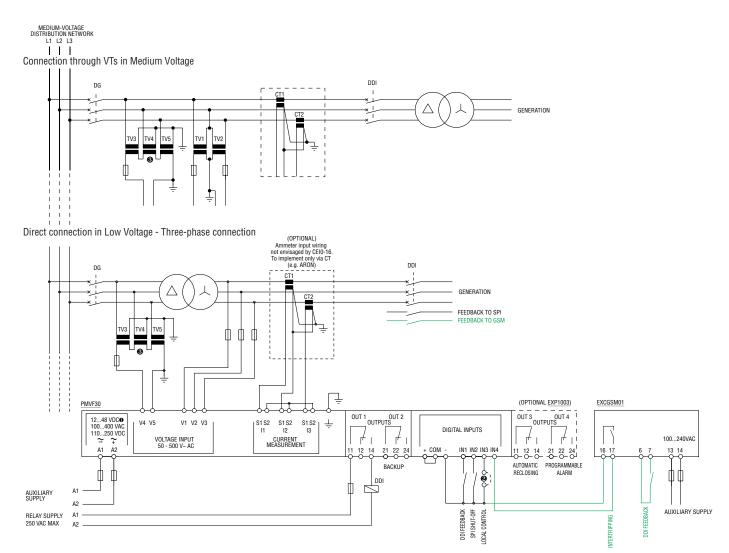


# PMVFUPS01





# PMVF30... with EXCGSM01

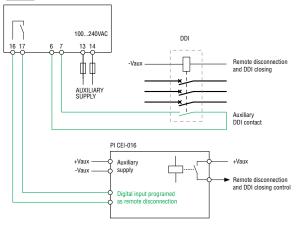


For <u>PMVF30D048</u> only.

- VT in MV for residual voltage measurements.

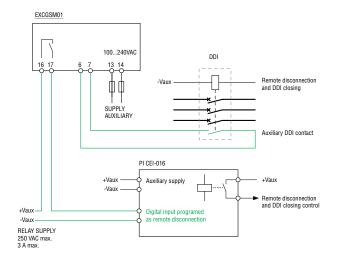
EXCGSM01 modem wiring diagram with other interface protections (PI) with self-supplied remote disconnection input





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

EXCGSM01 modem wiring diagram with other interface protections (PI) with remote disconnection input to be supplied



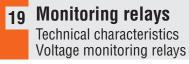


Voltage monitoring relays



Two place of two part of the part of	TYPE Single phase	PMV55	_	_	_	_		
DESCRIPTION         Minimum and maximum AC withing maximum AC withing maximum AC withing pass loss and monored plass sectors for control ((u) 200, FX0, CPC, UT 200,		-	PMV10	PMV20	PMV30	PMV40		
DESCRIPTION         Minimum and maximum AC voltage incorred plate sequence         Minimum AC voltage incorred plate sequence         Minimum AC voltage incorred plate sequence         Approxety incorred plate sequence         Approxety incorred plate sequence           CORTINOL CORQUIT         288400/AC         288400/AC         288400/AC         380575/AC         Image: Second incorred plate sequence         Image: Second incored plate sequence		-	_	_	_	_		
Minisuran dr. misitrum AC voltage misitrum AC voltage misitrum AC voltage particular sequence incret place se		I						
Bade Antipage         110.127/MC         298400/MC         100.24V/MC         208240/MC         208240/MC           208240/MC         208240/MC         300575/MC         300575/MC         300575/MC           Maximum voltage stepoint         100155% Ue         —         —         0.0.55% Ue         —           Argumm stepoint         —         —         —         0.0.55% Ue         —         —           Argumm stepoint         —         —         —         —         0.1.205         …           Minimum voltage stepoint         0.1.205         0.055         0.1.205         …         …           Resting hystensis         0.55         0.1.205         0.1.205         …					phase loss and	phase loss and		
Dot control (Úp)         208. 2479/AC         208. 5759/AD         360. 6007AC         6007AC           Mainum voltage set-point         105115% UB           806007AC         6007AC	CONTROL CIRCUIT					·		
Name         Non-With Control         Non-With Control         Non-With Control           Maximum voltage steppint         10515%. Ue           8055%. Ue           Asset Control          Asset Control          Asset Control          Asset Control		110127VAC	208480VAC	100240VAC	208?	240VAC		
Maximum voltage set-point         105. 15% Up               Asymmetry set-point          Asymmetry set-point          Ball Sets Up           Ball Sets Up           Ball Sets Up <td>to control (Ue)</td> <td>208240VAC</td> <td></td> <td>208575VAC</td> <td>3805</td> <td>75VAC</td>	to control (Ue)	208240VAC		208575VAC	3805	75VAC		
Minimum and voltage set-point         00.95% Ue           00.95% Ue            Agymmetry ast-point <td></td> <td>380440VAC</td> <td></td> <td>380600VAC</td> <td>600</td> <td>JVAC</td>		380440VAC		380600VAC	600	JVAC		
Agrimenty scholarit            S15%Ue           Ingring scholarit         0.120s         60ms         0.120s            Ingring time         0.120s         60ms         0.120s            Resetting time         0.120s         0.55%         (0.5.s at power up)            Resetting time         0.120s         0.55%         (0.5.s at power up)            Resetting time         0.120s         0.55%          0.120s            Resetting time         0.120s         0.55%          0.120s            Resetting time         0.120s         0.55%          0.120s            Resetting time                 Resetting time                   Resetting time	Maximum voltage set-point	105115% Ue		_	_			
Minimum adm rasionum frequency est-point         Image         Image <thimage< th="">         Image</thimage<>	Minimum voltage set-point	8095% Ue			8095% Ue			
tragenery set-point         Image: set-po	Asymmetry set-point					515%Ue		
Tipping inn         0.1.20s         0.20s		-		_	_	—		
Reacting time         0.120st (0.5 at power up)         0.5 st (0.5 at power up)         0.120st (0.5 at power up)         0.120st (0.5 at power up)           Resulting hysteresis         3%         5%         3%         2% Use configured         1% Use configured         2% Use configured         2% Use configured         2% Use configured         1% Use configured         2% Use configu		ļ			'	1		
control(0.58 at power up)(0.58 at power up)(0.58 at power up)(0.58 at power up)Resting hypers3%5%3%(( <td)< td=""><td></td><td></td><td></td><td></td><td></td><td></td></td)<>								
Instantaneous tripping for Ue         <70% Ue configured         Umin-20% Ue         <70% Ue configured         <<70% Ue configured         <<70% Ue configured         <<70% Ue configured         <<70% Ue configured         <            <         <           <         <		(0.5s at power up)			(0.5s at p	power up)		
Repeat accuracy POWER SUPPLY< $40.1\%$ $< 40.1\%$ $< 40.1\%$ $< 40.1\%$ $< 40.1\%$ $< 0.71\%$ Auxilary voltage (Us)0.712Ue0.851.1Ue0.712UE0.712UE0.712UE0.712UE0.712UE0.712UE0.712UE0.712UE0.712UE0.712UE0.712UE0.712UE0.712UE0.712UE0.712UE </td <td></td> <td></td> <td></td> <td></td> <td>-</td> <td></td>					-			
POWER SUPPLY         Self powered         Operating range         0.71.2Ue         Self powered         0.71.2Ue         Deverous and powered         0.71.2Ue         Deverous and powered								
Auxilary voltage (Us) $\odot$ Self powered $\odot$ O.T1.2Ue $O.T1.2Ue$ <t< td=""><td></td><td>&lt; ±0.1%</td><td>&lt;</td><td>±1%</td><td>&lt; ±0.1%</td><td>&lt; ±0.1%</td></t<>		< ±0.1%	<	±1%	< ±0.1%	< ±0.1%		
Operating range0.712Ue0.8511Ue0.712Ue0.712UeFrequency50/60Hz ±5%50/60Hz ±5%11VX (288240VAC) 0 30VA (380575VAC) 0 19VA (680A575VAC) 0 19VA (680575VAC) 0 10Catat arangement 1 changeover SPDT1Rated operational voltage Cornact arangement Conventional free air thermal Conventional free air thermal Curcest (th)1 250VAC1 250VACMaximum switching voltage Conventional free air thermal Curcest (th)10° cycles1 10° cycles1 10° cyclesUCCSA and ICELWIS 50047-5-1 designation10° cycles1 10° cycles1 10° cyclesConventional free int thermal curcest (th)1 10° cycles1 10° cycles1 10° cyclesConventional free int thermal curcest (th)1 10° cycles1 10° cycles1 10° cyclesConventional free int thermal curcest (th)1 10° cycles1 10° cycl								
Frequency         50/60Hz ±5%           Power consumption (maximum)         10VA (208240VAC) (0 17VA (308440VAC) (0 17VA (308440VAC) (0 19VA (300460VAC) (0 19VA (300575VAC) (0 19VA (300575VAC) (0 19VA (30040VAC) (0 19VA (300575VAC) (0 19VA (300575VAC) (0 19VA (30040VAC) (0 19VA (300575VAC) (0 19VA (30040VAC) (0 19VA (300575VAC) (0 10 ± 000VAC) (0 10 ± 000VAC) (0 10 ± 000VAC) (0 10 ± 000VAC (0 10 ± 000VAC) (0 10 ± 000VAC) (0 10 ± 000VAC (0 10 ± 000VAC) (0 10 ± 000VAC) (0 10 ± 000VAC) (0 10 ± 000VAC (0 10 ± 000VAC) (0 10 ± 000VAC) (0 10 ± 000VAC (0 10 ± 000VAC) (0 10 ± 000VAC (0 10 ± 000VAC) (0 10 ± 000VAC (0 10 ± 000VAC) (0 10 ± 000VAC) (0 10 ± 000VAC (0 10 ± 000VAC) (0 10 ± 000VAC) (0 10 ± 000VAC (0 10 ± 000VAC) (0 10 ± 000VAC (0 10 ± 000VAC) (0 10 ± 000VAC) (0 10 ± 000VAC (0 10 ± 000VAC) (0 10 ± 000VAC) (0 10 ± 000VAC (0 10 ± 000VAC) (0 10 ± 00VAC (0 10 ± 00VAC) (0 10 ± 00VAC (0 10 ± 00VAC) (0 10 ± 00VAC (0 10 ± 00VAC) (0 10 ± 00VAC) (0 10 ± 00VAC (0 10 ± 00VAC) (0 10 ± 00VAC) (0 10 ± 00VAC (0 10 ± 00VAC) (0 10 ± 00VAC) (0 10 ± 00VAC (0 10 ± 00VAC) (0 10 ±	Auxiliary voltage (Us)	ļ						
Power consumption (maximum)         10VA (28840VAC)O         20VAO         28VAO         11VA (28857SVAC)O           Power dissipation (maximum)         1.SW         2.2W         2.SW         10VA (28057SVAC)O         10VA (28055VA	Operating range	0.71.2Ue	0.85		0.7*	.1.2Ue		
Late Late Late Late Late Late Late Late		ļ						
Power dissipation (maximum)1.5W2.2W2.5WRELX OUTPUTSNumber of relaysRelay stateRelay stateContact arrangementContact arrangementConventional free air thermal esignationConventional free air thermal esignationConventional free air thermal esignationConventional free air thermal esignationConventional free air thermal and trippingUL/CSA and IE/CEN/BS 60947-6-1 designationBisoloBisoloBisoloConventional free and tripping1 green LED for power on and tripping 2 red LEDs for trippingCONNECTIONSConductor section minmaxConductor section minmaxNUSLATION (input-output)LEC rated insulation voltage Ui Ec rated insulation voltage Ui<	Power consumption (maximum)		20VA	28VA	30VA (380	575VAC) <b>0</b>		
RELAY OUTPUTS       1         Number of relays       1         Relay state       0         Relay state       0         Contact arrangement       1 changeover SPDT         Rated operational voltage       250VAC         Maximum Switching voltage       400VAC         Conventional free-air thermal current (ith)       8A         UUCSA and IE/CEV/BS 60947-5-1       8300         designation       8A         Electrical life       10 <sup>6</sup> cycles         (with rated load)       10 <sup>6</sup> cycles         Mechanical life       1 green LED for power on and tripping       1 green LED for power on and tripping         2 techtical life       1       1 green LED for power on and tripping       1 green LED for power on and tripping         CONVECTIONS       0.24.0mt <sup>2</sup> (2412AWG is 1812AWG for UL/CSA)       INSULATION (input-output)         EC rated insulation voltage Uilip       440VAC       480VAC       600VAC         IEC rated insulation voltage Uilip       6kV       EC power frequency withstand voltage       4kV         MEED rop output       -20+60°C       Poenal Green Current Curren	Power dissipation (maximum)	1.5W	2.2W		· · · · ·			
Number of relays       1         Relay state       Normally energised       De-energises at fripping         Contact arrangement       1 changeover SPDT         Rated operational voltage       250VAC         Maximum switching voltage       250VAC         Conventional ree-air thermal current (tth)       8A         Conventional free-air thermal degration       8A         Current (tth)       8300         UL/CSA and IE/CE/NBS 60947-5-1       8300         designation       10° cycles         Indications       1 green LED for power on and tripping 2 red LEDs for tripping       1 green LED for power on and tripping 1 red LED for power on and tripping 2 red LEDs for tripping         CONNECTIONS       0.8Mm (71b.in; 791b.in for UL/CSA)       Conductor section minmax         Conductor section minmax       0.24.0mm² (2412AWG; 1812AWG for UL/CSA)       INSULATION (input-output)         IEC rated insulation voltage Uimp       6kV       600VAC       EC rated insulation voltage Uimp         IEC rated insulation voltage Uimp       6kV       EC rated insulation voltage Uimp       Format with stand voltage Uimp         IEC rated insulation voltage Uimp       -0.2460°C       Storage temperature       -20460°C         Operating temperature       -30400°C       HOUSING       HOUSING						I		
Relay state       Normally energised De-energises at tripping         Contact arrangement       1 changeover SPDT       Rated operational voltage       250VAC       Image: SPDT       Image: SPDT<	Number of relays	[		1				
$ \begin{array}{ c c c } \hline \begin{tabular}{ c c c c } \hline \begin{tabular}{ c c c c c } \hline \begin{tabular}{ c c c c c c c c c c c c c c c c c c c$	Relay state							
Rated operational voltage         250VAC         Image: Status of the sta	Contact arrangement							
Conventional free-air thermal current (Ith)     8A       Current (Ith)     B300       UL/CSA and IEC/EN/BS 60947-5-1     B300       designation     10 <sup>6</sup> cycles       Electrical life     10 <sup>6</sup> cycles       (with rated load)     10 <sup>6</sup> cycles       Mechanical life     30x10 <sup>6</sup> cycles       Indications     1 green LED for power on and tripping     1 green LED for power on and tripping       2 red LEDs for tripping     1 green LED for power on and tripping     1 red LED for tripping       CONNECTIONS     0.8Nm (7lb.in; 79lb.in for UL/CSA)     Image: Conductor section minmax       Conductor section minmax     0.24.0mm² (2412AWG; 1812AWG for UL/CSA)     Image: Conductor section minmax       INSULATION (input-output)     6kV     Ec rated insulation voltage Ui     4k0VAC       IEC rated insulation voltage Ui     440VAC     480VAC     600VAC       IEC rated insulation voltage Uimp     6kV     Ec nover frequency withstand voltage     Image: Conductor section Dinmax       Conductor section minmax     -20+60°C     Ec nover frequency withstand voltage     Image: Conductor section Dinmax       IEC rated insulation voltage Uimp     6kV     Ec nover frequency withstand voltage     Image: Conductor section Dinmax       IEC rated insulation voltage Uimp     6kV     Ec nover frequency withstand voltage     Image: Conductor section Dinmax<				250VAC				
Conventional free-air thermal current (Ith)     8A       Current (Ith)     B300       UL/CSA and IEC/EN/BS 60947-5-1     B300       designation     10 <sup>6</sup> cycles       Electrical life     10 <sup>6</sup> cycles       (with rated load)     10 <sup>6</sup> cycles       Mechanical life     30x10 <sup>6</sup> cycles       Indications     1 green LED for power on and tripping     1 green LED for power on and tripping       2 red LEDs for tripping     1 green LED for power on and tripping     1 red LED for tripping       CONNECTIONS     0.8Nm (7lb.in; 79lb.in for UL/CSA)     Image: Conductor section minmax       Conductor section minmax     0.24.0mm² (2412AWG; 1812AWG for UL/CSA)     Image: Conductor section minmax       INSULATION (input-output)     6kV     Ec rated insulation voltage Ui     4k0VAC       IEC rated insulation voltage Ui     440VAC     480VAC     600VAC       IEC rated insulation voltage Uimp     6kV     Ec nover frequency withstand voltage     Image: Conductor section Dinmax       Conductor section minmax     -20+60°C     Ec nover frequency withstand voltage     Image: Conductor section Dinmax       IEC rated insulation voltage Uimp     6kV     Ec nover frequency withstand voltage     Image: Conductor section Dinmax       IEC rated insulation voltage Uimp     6kV     Ec nover frequency withstand voltage     Image: Conductor section Dinmax<				400VAC				
designationImage: constraint of the second sec				8A				
(with rated load)       Ideal Inferror Infer	designation							
Indications1 green LED for power on and tripping 2 red LEDs for tripping1 green LED for power on and tripping 1 red LED for trippingCONNECTIONSTerminal tightening torque (maximum)0.8Nm (7lb.in; 79lb.in for UL/CSA)Conductor section minmax0.24.0mm² (2412AWG; 1812AWG for UL/CSA)INSULATION (input-output)IEC rated insulation voltage Ui440VAC440VAC480VAC6kVIEC power frequency withstand voltageUmperating temperature-20+60°CStorage temperature-30+80°CHOUSING	(with rated load)							
and tripping 2 red LEDs for trippingand tripping 1 red LED for trippingCONNECTIONSTerminal tightening torque (maximum)0.8Nm (7lb.in; 79lb.in for UL/CSA)Conductor section minmax0.24.0mm² (2412AWG for UL/CSA)INSULATION (input-output)IEC rated insulation voltage Ui440VAC480VAC600VACIEC rated insulation voltage Ui440VAC480VAC6kVIEC power frequency withstand voltageOperating temperature-20+60°CStorage temperature-30+80°CHOUSING		<u> </u>		-				
CONNECTIONS       0.8Nm (7lb.in; 79lb.in for UL/CSA)         Terminal tightening torque (maximum)       0.8Nm (7lb.in; 79lb.in for UL/CSA)         Conductor section minmax       0.24.0mm² (2412AWG for UL/CSA)         INSULATION (input-output)       ISULATION (input-output)         IEC rated insulation voltage Ui       440VAC       480VAC       600VAC         IEC rated insulation voltage Uimp       6kV       6kV         IEC power frequency withstand voltage       4kV       4kV         AMBIENT CONDITIONS       -20+60°C       -20+60°C         Storage temperature       -30+80°C       -30+80°C	Indications	and tripping			and tr	ripping		
Terminal tightening torque (maximum)0.8Nm (7lb.in; 79lb.in for UL/CSA)Conductor section minmax0.24.0mm² (2412AWG for UL/CSA)INSULATION (input-output)IEC rated insulation voltage Ui440VAC480VAC600VACIEC rated impulse withstand voltage Uimp6kVIEC power frequency withstand voltage4kVAMBIENT CONDITIONSOperating temperature-20+60°CStorage temperature-30+80°CHOUSING	CONNECTIONS	2 100 LEDO 10. 00pp				or unpping		
Conductor section minmax       0.24.0mm² (2412AWG for UL/CSA)         INSULATION (input-output)       IEC rated insulation voltage Ui       440VAC       480VAC       600VAC       600VAC         IEC rated insulation voltage Ui       440VAC       480VAC       600VAC       600VAC         IEC rated insulation voltage Uimp       6kV       6kV       6kV         IEC power frequency withstand voltage       4kV       4kV       6kV         AMBIENT CONDITIONS       -20+60°C       5torage temperature       -30+80°C         HOUSING       -30+80°C       -30+80°C       -30+80°C	Terminal tightening torque		0./	8Nm (7lb.in; 79lb.in for UL	_/CSA)			
INSULATION (input-output)         IEC rated insulation voltage Ui       440VAC       480VAC       600VAC         IEC rated inpulse withstand voltage Uimp       6kV       6kV         IEC power frequency withstand voltage       4kV       6kV         AMBIENT CONDITIONS       -20+60°C       6kV         Storage temperature       -30+80°C       6kV			0.24.0m	12 12 12 12 12 12 12 12 12 12 12 12 12 1	/C for III /CSA)			
IEC rated insulation voltage Ui       440VAC       480VAC       600VAC       600VAC         IEC rated impulse withstand voltage Uimp       6kV       6kV       6kV         IEC power frequency withstand voltage       4kV       6kV       6kV         AMBIENT CONDITIONS       -20+60°C       6kV       6kV         Storage temperature       -30+80°C       6kV       6kV		<u>.</u>		·····				
IEC rated impulse withstand voltage Uimp     6kV       IEC power frequency withstand voltage     4kV       AMBIENT CONDITIONS     -20+60°C       Operating temperature     -20+60°C       Storage temperature     -30+80°C       HOUSING     -20+80°C		440VAC	480VAC	[	600VAC			
IEC power frequency withstand voltage     4kV       AMBIENT CONDITIONS       Operating temperature     -20+60°C       Storage temperature     -30+80°C       HOUSING	-			6kV				
AMBIENT CONDITIONS         Operating temperature         Storage temperature         -30+80°C         HOUSING								
Operating temperature     -20+60°C       Storage temperature     -30+80°C       HOUSING     -30+80°C		<u>.</u>		-111.4				
Storage temperature -30+80°C HOUSING				_20 ±60°C				
HOUSING								
		L						
	Material				:42			

• Power consumption (maximum) at 50Hz.





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Ţ	_	_	_	_			-
	PMV50	PMV70	_	_			-
			PMV50N	PMV70N	PM	IV80N	PMV95N
	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	AC voltage a phase loss, ne	and maximum and frequency, neutral loss and nase sequence	Minimum and maximum AC voltage and frequency, phase loss, neutral loss, incorrect phase sequence and asymmetry
					-		
]	208240VAC	208240VAC	208240VAC	208240VAC		.240VAC	208240VAC
]	380575VAC	380440VAC	380440VAC	380440VAC		.440VAC	380575VAC
J	600VAC	600VAC	480600VAC	480600VAC		600VAC	-
J	10515% Ue	105115% Ue	105115% Ue	105115% Ue		115% Ue	105115% Ue
J	8095% Ue	8095% Ue	8095% Ue	8095% Ue	809	95% Ue	8095% Ue
]	_	515% Ue	_	515% Ue			515% Ue
ļ	_	-	_	_	±110% rat	ated frequency	±110% rated frequency
	· · ·	0.1.	20s		0.120s	0.15s freq.	0.130s
	0.120s (0.5s at power up)	0.5s	0.120s (0.5s at power up)	0.5s		).5s	0.130s (0.5s at power up)
+	(0.53 at power up) 3%	3%	3%	3%	3%	0.5% freq.	15%
+		1 0.0		configured	•,•	0.070	1
+				.0.1%			
l	1		<u> </u>	1.1 /0			
	1		Self p	oowered			
				1.2Ue			
	50/60	Hz ±5%			Hz ±10%		
+		240VAC)		27VA	Z ±1070		30VA
J	30VA (380	575VAC)		L1 v/ .			0000
J	19VA (60	600VAC)					
/	2.5	5W		1.9W			2.5W
1	1	1		2			1
1				/ energised			
]	1 abanga		De-ellergise	es at tripping			
]	I Chanyeu	over SPDT	25(	2 changeover SPDT			1 changeover SPDT
]				OVAC			
				OVAC			
ļ			0	8A			
				300			
I				00			
	1		10 <sup>5</sup> ſ	cycles			
J							
J	<u> </u>			) <sup>6</sup> cycles			_,
ļ	1 green LED for power on and tripping	1 green LED for power on	1 green LED for power on	1 green LED f			1 green LED for power
ļ	and tripping 2 red LEDs for tripping	and tripping 3 red LEDs for tripping	and tripping 2 red LEDs for tripping	and tri 3 red LEDs f	pping for tripping		5 red LEDs for tripping
L			Elou Elou terro		01 11199		
T		18.0	Nm (7lb.in; 79lb.in for UL/C	SA - PMV50N/70N/80N excl	uded)		
J			· · · · · · · · · · · · · · · · · · ·		,		
J	1	0.24.0mm	n² (2412AWG; 1812AWG f	ior UL/CSA - PMV50N/70N/8/	ON excluded)		
)				OVAC			
)				SkV			
)			4	1kV			
)				+60°C			
)			-30	+80°C			
]			Self-extinguist	shing polyamide			

TYPE

# 19 Monitoring relays

Technical characteristics Current monitoring relays

PMA20

TYPE	PMA20	PMA30	PMA	40
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	1			
Rated current	5 or	16A	0.02 - 0.05 - 0.	25 - 1 - 5 - 16A
Rated frequency		50/60Hz ±5%		
Overload capacity			50mA - 1A inputs:	16A input:
	160A fc	for 1s or 10ms unt 16A	5 le for 1s 10le for 10ms Constant 2le	5 le for 1s 160A for 10ms Constant 16A
Connection		Direct or by current transformer		
Adjustment Tripping values		5100% f.s.		
Tripping time		0.130s		
Inhibition time		160s		
Resetting hysteresis	1{	50%	3% f	xed
Resetting		Automatic or manual		
External input	Resetting of			-
Repeat accuracy		±1% with constant parameters		
AUXILIARY SUPPLY				
Auxiliary supply voltage Us		24240VAC/DC		
Operating range		0.851.1Us		
Rated frequency	50/60Hz ±5%			
Power consumption (maximum)	2.2	2VA	71/	٨
Power dissipation (maximum)		5W	7VA 1.7W	
RELAY OUTPUTS	1.0	500	1.7	VV
		4	0	
Number of relays		1	2	
Relay state	I IIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIII	lormally energised / de-energised (selectable	e)	
Contacts 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/BS 60947-5-1 designation		B300		
Electrical life (with rated load)		10 <sup>5</sup> cycles		
Mechanical life		30x10 <sup>6</sup> cycles	1	
Indications	for power of	n LED In/inhibition for tripping	1 green power on/ 2 red LEDs for m	nhibition
CONNECTIONS	4			
Tightening torque maximum		0.8Nm (7lb.in; 79lb.in per UL/CSA)		
Conductor section minmax	0.2	4.0mm² (2412AWG; 1812AWG per UL/	CSA)	
INSULATION (input-output)	1		,	
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		
	1			
HOUSING				

PMA30



PMA40

19 Monitoring relays Technical characteristics Pump protection

TYPE		PMA50	
DESCRIPTION		FIIIMJU	
DESCRIPTION		Cingle and three phase nump protection	
		Single and three-phase pump protection (motor under-load and over-current control)	
		monitoring for max AC current, min $\cos\varphi$ ,	
		phase loss and incorrect phase sequence	
CURRENT AND	D COS $\phi$ CONTROL CIRCUIT		
Rated current	le	5 or 16A	
Rated frequend	су	50/60Hz ±5%	
Overload capad	city	5le for 1s	
		160A for 10ms	
0		Constant 16A	
Connection		Direct or by current transformer	
Adjustments	End-scale value	5 or 16A	
	Tripping for MAX current	10100le	
	Tripping for cosφ	0.10.99 cosφ (Min)	
	Tripping delay	0.110s	
	Inhibition time	160s	
	Automatic resetting	OFF100min	
	delay		
External input		Consent for running/resetting	
Repeat accurat		±1% with constant parameters	
VOLTAGE CON	TROL CIRCUIT		
Voltage measu	ıring range (Ue)	80660VAC	
Tripping time f	or phase loss	60ms	
AUXILIARY SU	JPPLY		
Auxiliary suppl	ly voltage Us	220240VAC	
		380415VAC (maximum voltage for UL/CSA)	
		440480VAC	
Operating rang	je	0.851.1Us	
Frequency rang	ge	50/60Hz ±5%	
Power consum	nption (maximum)	4.5VA	
Power dissipat	tion (maximum)	2.3W	
RELAY OUTPU	ITS		
Number of rela	avs	1	
Relay state		Normally energised,	
5		de-energises at tripping	
Contact arrang	jement	1 changeover contact SPDT	
Rated operatio	nal voltage	250VAC	
Maximum swit	tching voltage	400VAC	
IEC conventior	nal free air thermal current Ith	8A	
UL/CSA and IE	C/EN/BS 60947-5-1		
designation		B300	
Electrical life (	With rated load)	10 <sup>5</sup> cycles	
Mechanical life	9	30x10 <sup>6</sup> cycles	
Indications		1 green LED for power on/inhibition	
		2 red LEDs for tripping	
CONNECTIONS	5		
Tightening tore	que maximum	0.8Nm (7lb.in)	
Conductor sec	tion minmax	0.24.0mm <sup>2</sup> (2412AWG; 1812AWG per UL/CSA)	
INSULATION (input-output)			
IEC rated insulation voltage Ui		600VAC	
IEC rated impu	Ilse withstand voltage Uimp	6kV	
IEC power frequency withstand voltage		2.5kV	
AMBIENT CONDITIONS		·	
Operating temperature		-20+60°C	
Storage temperature		-30+80°C	
HOUSING		00100 0	
Material		Self-extinguishing polyamide	
matorial			





19 Monitoring relays Technical characteristics Frequency monitoring relays



TYPE		PMF20	
DESCRIPTION		Single-phase minimum and maximum frequency control	
FREQUENCY CONTROL	CIRCUIT		
Rated frequency		50 or 60Hz selectable	
Operating frequency rar	nge	4070Hz	
Adjustment MAX tr	ipping	101110% operating frequency	
, MIN tri		9099% operating frequency	
Resetti	ng hysteresis	0.5%	
Inhibiti	on time	0.120s	
Reset of	lelay	0.120s	
Resetting	-	Automatic	
Repeat accuracy		< ±0.1%	
AUXILIARY POWER SU	PPLY		
Rated supply voltage U	9	220240VAC	
		380415VAC	
Operating range		0.851.1Ue	
Rated frequency		50/60Hz	
Power consumption (m	aximum)	10VA (220240VAC); 17VA (380415VAC)	
Power dissipation (max		1.5W	
RELAY OUTPUTS			
Number of relays		1	
Relay state		Normally energised, de-energises at tripping	
Contact arrangement		1 changeover contact SPDT	
Rated operational voltage	ge	250VAC	
Maximum switching vo	Itage	400VAC	
IEC conventional free ai		8A	
UL/CSA and IEC/EN/BS designation	60947-5-1	B300	
Electrical life (with rated	l load)	10 <sup>5</sup> cycles	
Mechanical life		30x10 <sup>6</sup> cycles	
Indications		1 green LED for power on/tripping 2 red LEDs for min-max tripping	
CONNECTIONS			
Tightening torque maxi	mum	0.8Nm (7lb.in)	
Conductor section min-	max	0.24.0mm <sup>2</sup> (2412AWG)	
INSULATION (input - ou	itput)		
IEC rated insulation volt	tage Ui	575VAC	
IEC rated impulse withs	lse withstand voltage Uimp 6kV		
IEC power frequency wi		4kV	
AMBIENT CONDITIONS			
Operating temperature		–20+60°C	
Storage temperature		−30+80°C	
HOUSING			
Material		Self-extinguishing polyamide	

 ${\pmb 0}$  Normally de-energised, energises at tripping with  $\overline{\text{MAX}}$  function configured.

**Monitoring relays** Technical characteristics Interface protection system units



ТҮРЕ	PMVF20	PMVF20D048			
AUXILIARY POWER SUPPLY					
Rated control supply voltage Us	100400VAC/110250VDC	1248VDC			
Operating limits	90440VAC/110250VDC	970VDC			
Frequency	4555Hz				
Power consumption max	3.9VA				
· · · · · · · · · · · · · · · · · · ·	3.4W	2.5W			
Power dissipation max					
Micro-breaking immunity	≤50ms at 110VAC ; ≤200ms at 230VAC	≤ 15ms at 12VDC; ≤30ms at 24VDC; ≤70ms at 48VDC			
Overload category	III				
VOLTAGE INPUTS					
Maximum rated operating voltage	400VAC L-L; 230VAC L-N 50Hz				
Measuring range	20480VAC L-L; 10276VAC L-N				
Frequency range	45				
Overload category	I IIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIII	1			
CURRENT INPUTS (OPTIONAL)					
Rated operational current le	1A or 5A in AC programmable				
Measuring range	For 1A scale: 0.011.2A				
Type of input	Shunts powered by external current	transformer (low voltage) 5A max.			
Type of measurement	RN	-			
Overload capacity	±200	% le			
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/BS 60947-5-1	5A 250VAC AC1 /	B300 ; 5A 30VDC			
designation					
Overload category         III					
DIGITAL INPUTS					
Number and type of inputs	4 negative (NPN)				
Input voltage	24VDC isolated				
Input current	7n	nA			
SUPPLY/VOLTAGE MEASURING CIRCUIT CO	ONNECTIONS				
Type of terminals	Screw - re	emovable			
Conductor section (minmax)	0.22.5mm² (2412AWG)				
Tightening torque	0.5Nm (·				
CURRENT MEASURING CIRCUIT CONNECT	,				
Type of terminals	Screw	- fixed			
Number of terminals	6 for external C				
Conductor section (minmax)	0.24mm² (				
Tightening torque	0.8Nm (7lb.in)				
RELAY OUTPUT CONNECTIONS	0.000				
Type of terminals	Scrow - ri	emovable			
Conductor section (minmax)	Screw - removable				
Tightening torque	0.22.5 mm² (2412AWG) 0.5Nm (4.5lb.in)				
0 0 1	U.5NM (*	א.טוט.ווו)			
INPUT CONNECTIONS – Input terminals Type of terminals	C	amovable			
51	Screw - ru				
Conductor section (minmax)	0.21.5 mm² (2814AWG)				
Tightening torque	0.18Nm (1.7lb.in)				
INPUT CONNECTIONS – COM and auxiliary					
Type of terminals	Screw - re				
Conductor section (minmax)	0.22.5 mm² (2412AWG)				
Tightening torque	0.5Nm (	4.5lb.in)			
HOUSING					
Material	Polya				
Version	Flush mount 96x9	6mm / 3.78x3.78"			



**19 Monitoring relays** Technical characteristics Interface protection system units



TYPE AUXILIARY POWER SUPPLY		<u>PMVF51</u> - <u>PMVF60</u> - <u>PMVF70</u> - <u>PMVF80</u>	
Rated control supply vo	litage US	100240VAC/110250VDC	
Operating limits		85264VAC/93.5300VDC	
Frequency		4555Hz	
Power consumption AC supply		4.6VA at 110VAC; 12.5VA at 230VAC	
	DC supply	23mA at 110VDC; 11mA 250VDC	
	AC supply	2.5W at 110VAC; 2.7W at 230VAC	
	DC supply	2.3W at 110VDC; 2.5W at 250VDC	
Micro-breaking immuni	ty	≤50ms at 100VDC; ≤200ms at 240VDC	
Overload category			
VOLTAGE INPUTS			
Maximum rated operation	ng voltage	400VAC L-L; 230VAC L-N 50Hz	
Measuring range		20480VAC L-L; 10276VAC L-N	
Frequency range		4555Hz	
Overload category		IV	
CURRENT INPUTS (OP	TIONAL)		
Rated operational curre	nt le	1A or 5A in AC programmable	
Measuring range		For 1A scale: 0.011.2A; for 5A scale: 0.016A	
Type of measurement		RMS	
Overload capacity		±20% le	
Overload peak		50A for 1 second	
Burden (per phase)		≤0.6W	
RELAY OUTPUTS			
Number of outputs		20	
Type of output		1 changeover contact/SPDT each	
Rated operating voltage	•	250VAC	
UL/CSA and IEC/EN/BS 60947-5-1		For NO contact: 5A 250VAC AC1/C300;	
designation		5A 30VDC	
0		For NC contact: 2A 250VAC AC1 / C300;	
		2A 30VDC	
Overload category			
DIGITAL INPUTS			
Number and type of inp	uts	4 positive (PNP)	
Input voltage		24VDC isolated	
Input current		7mA	
SUPPLY/VOLTAGE MEA	SURING CIRCUIT CO	DNNECTIONS	
Type of terminals		Screw - removable	
Conductor section (min	max)	0.24mm² (2412AWG)	
Tightening torque		0.8Nm (4.5lb.in)	
CURRENT MEASURING	CIRCUIT CONNECT	IONS	
Type of terminals		Screw - fixed	
Number of terminals		6 for external CT connections	
Conductor section (minmax)		0.22.5mm² (2412AWG)	
		0.44Nm (4Ib.in)	
Tightening torque		0.44Nm (4lb.in)	
	,	0.44Nm (4lb.in)	
Tightening torque	,	0.44Nm (4lb.in) Screw - removable	
Tightening torque RELAY OUTPUT CONNE Type of terminals	ECTIONS	Screw - removable	
Tightening torque RELAY OUTPUT CONNE Type of terminals Conductor section (min	ECTIONS	Screw - removable 0.22.5 mm² (2412AWG)	
Tightening torque RELAY OUTPUT CONNE Type of terminals Conductor section (min Tightening torque	ECTIONS max)	Screw - removable	
Tightening torque RELAY OUTPUT CONNE Type of terminals Conductor section (min Tightening torque INPUT CONNECTIONS	ECTIONS max)	Screw - removable 0.22.5 mm² (2412AWG) 0.44Nm (4lb.in)	
Tightening torque RELAY OUTPUT CONNE Type of terminals Conductor section (min Tightening torque INPUT CONNECTIONS - Type of terminals	ECTIONS max) – Input terminals	Screw - removable 0.22.5 mm² (2412AWG) 0.44Nm (4lb.in) Screw - removable	
Tightening torque RELAY OUTPUT CONNE Type of terminals Conductor section (min Tightening torque INPUT CONNECTIONS - Type of terminals Conductor section (min	ECTIONS max) – Input terminals	Screw - removable           0.22.5 mm² (2412AWG)           0.44Nm (4lb.in)           Screw - removable           0.22.5 mm² (2412AWG)	
Tightening torque RELAY OUTPUT CONNE Type of terminals Conductor section (min Tightening torque INPUT CONNECTIONS - Type of terminals Conductor section (min Tightening torque	ECTIONS max) – Input terminals	Screw - removable 0.22.5 mm² (2412AWG) 0.44Nm (4lb.in) Screw - removable	
Tightening torque RELAY OUTPUT CONNE Type of terminals Conductor section (min Tightening torque INPUT CONNECTIONS - Type of terminals Conductor section (min Tightening torque HOUSING	ECTIONS max) – Input terminals	Screw - removable           0.22.5 mm² (2412AWG)           0.44Nm (4lb.in)           Screw - removable           0.22.5 mm² (2412AWG)           0.22.5 mm² (2412AWG)           0.5Nm (4.5lb.in)	
Tightening torque RELAY OUTPUT CONNE Type of terminals Conductor section (min Tightening torque INPUT CONNECTIONS - Type of terminals Conductor section (min Tightening torque	ECTIONS max) – Input terminals	Screw - removable           0.22.5 mm² (2412AWG)           0.44Nm (4lb.in)           Screw - removable           0.22.5 mm² (2412AWG)	

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

**Monitoring relays** Technical characteristics Interface protection system units

ТҮРЕ	PMVF30	PMVF30D048		
AUXILIARY POWER SUPPLY				
Rated control supply voltage Us	100400VAC /	110250VDC		
Operating limits	90440VAC / 9	93,5300VDC		
Frequency	455	55Hz		
Power consumption max	3.9VA	2.9W		
Power dissipation max	3.4W	2.9W		
Micro-breaking immunity	≤30ms a 110VAC; :	≤140ms a 230VAC		
Overload category				
VOLTAGE INPUTS				
Maximum rated operating voltage	50500VAC (for voltages/frequency) / 50150V (for residual voltage measurement)			
Measuring range (Un)	400-150,000V (VT primary)			
Frequency range	455	55Hz		
Overload category	Λ	1		
CURRENT INPUTS (OPTIONAL)	'			
Rated operational current le	1A or 5A in AC	programmable		
Measuring range	For 1A scale: 0.011.2A; for 5A scale: 0.016A			
Type of input	Shunts powered by external curre	ent transformer (low voltage) 5A max.		
Type of measurement	RM	IS		
Overload capacity	±100	% le		
Overload peak	50A for 1	second		
Burden (per phase)	≤0.0	3W		
RELAY OUTPUTS				
Number of outputs	2			
Type of output	1 changeover contact/SPDT each			
Rated operating voltage	250VAC			
UL/CSA and IEC/EN/BS 60947-5-1 designation	5A 250VAC AC1 /B300; 5A 30VDC			
Overload category				
DIGITAL INPUTS				
Number and type of inputs	4 negative (NPN)			
Input voltage	24VDC isolated			
Input current	7m	nA		
SUPPLY/VOLTAGE MEASURING CIRCUIT CO	ONNECTIONS			
Type of terminals	Screw - re			
Number of terminals	2 for power supply; 5 for voltage control			
Conductor section (minmax)	0.22.5mm² (2412AWG)			
Tightening torque	0.5Nm (4.5lb.in)			
CURRENT MEASURING CIRCUIT CONNECT				
Type of terminal	Screw - fixed			
Number of terminals	6 for external C			
Conductor section (minmax)	0.24mm² (2610AWG)			
Tightening torque	0.8Nm (7lb.in)			
RELAY OUTPUT CONNECTIONS	1			
Type and (number) of terminals	Screw – removable (3)			
Conductor section (minmax)	0.22.5 mm² (2412AWG)			
Tightening torque	0.5Nm (4.5lb.in)			
INPUT CONNECTIONS – Input terminals				
Type and (number) of terminals		Screw – removable (4)		
Conductor section (minmax)	0.21.5 mm² (2814AWG)			
Tightening torque	0.18Nm (1.7lb.in)			
INPUT CONNECTIONS – COM and auxiliary				
Type and (number) of terminals	Screw – removable (3)			
Conductor section (minmax)	0.22.5 mm <sup>2</sup> (2412AWG)			
Tightening torque	0.5Nm (4.5lb.in)			
HOUSING				
Material	Polyamide			
Version	Flush mount 96x96mm / 3.78x3.78"			