



- ◆ Versions: modular and 35mm DIN rail mount
- ◆ Minimum and maximum voltage monitoring relays for single and three phase systems, with or without neutral
- ◆ Voltage asymmetry, phase sequence and phase loss control relays
- ◆ Minimum and maximum current monitoring relays
- ◆ Frequency monitoring relay.



modulo

PAGES 11-4 TO 11

MODULAR MONITORING RELAYS

- Three-phase voltage control without neutral
- Three-phase voltage control with or without neutral
- Single-phase voltage control
- Single-phase current control
- Pump protection
- Phase shift control
- Frequency control.



PAGES 11-11 TO 13

DIN RAIL MOUNT MONITORING RELAYS

- Three-phase voltage control without neutral
- Three-phase voltage control with neutral
- Single-phase voltage control
- Three-phase voltage asymmetry control with or without neutral
- Three-phase phase sequence control with or without neutral
- Single-phase current control.

	SEC. PAGE
Modular voltage monitoring relays	
For three-phase systems, without neutral	11 - 4
For three-phase systems, with or without neutral	11 - 6
For single-phase systems	11 - 8
Modular current monitoring relays	
For single-phase systems	11 - 8
Modular pump protection relay	11 - 10
Modular phase shift monitoring relay	11 - 10
Modular frequency monitoring relay	11 - 11
DIN rail mount voltage monitoring relays	
For three-phase systems, without neutral	11 - 11
For three-phase systems, with neutral	11 - 11
For single-phase systems	11 - 12
Voltage asymmetry, phase sequence and phase loss control	11 - 12
Phase sequence control	11 - 12
DIN rail mount current monitoring relays	
For single-phase systems	11 - 10
Accessories	11 - 13

Voltage monitoring relays for three-phase systems without neutral



	PMV10	PMV20	PMV30	PMV40	PMV50	PMV60	PMV70	DRV3
Modular version	●(1U)	●(2U)	●(2U)	●(2U)	●(2U)	●(2U)	●(2U)	
Industrial version								●
Minimum AC voltage			●		●	●	●	●
Maximum AC voltage					●		●	●
Phase loss	●	●	●	●	●	●	●	
Incorrect phase sequence	●	●	●	●	●	●	●	
Asymmetry				●		●	●	
Page		11-4			11-5		11-6	11-11

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



	PMV50 N	PMV70 N	PMV80 N	DRV3N	DRA	ASF
Modular version	●(2U)	●(2U)	●(2U)	●		
Industrial version				●	●	●
Minimum AC voltage	●	●	●	●		
Maximum AC voltage	●	●	●	●		
Phase loss	●	●	●		●	
Neutral loss	●	●	●			
Incorrect phase sequence	●	●	●		●	●
Asymmetry		●			●	
Minimum frequency			●			
Maximum frequency			●			
Page	11-6	11-7		11-11	11-12	

Voltage monitoring relays for single-phase systems



	PMV55	DRV1
Modular version	●(2U)	
Industrial version		●
Minimum AC voltage	●	●
Maximum AC voltage	●	●
Page	11-8	11-12



Current monitoring relays



	PMA20	PMA30	PMA40	DLA1
Modular version	●(2U)	●(2U)	●(3U)	
Industrial version				●
Maximum AC/DC current	●			●
Minimum or maximum AC/DC current		●		
Minimum and maximum AC/DC current			●	
Page	11-8		11-9	11-13

Pump protection relay



	PMA50
Modular version	●(3U)
Minimum $\cos\varphi$ - dry running protection	●
Maximum AC current	●
Phase loss	●
Incorrect phase sequence	●
Page	11-10

Phase shift monitoring relays



	PMA60
Modular version	●(3U)
Minimum $\cos\varphi$	●
Maximum $\cos\varphi$	●
Page	11-10

Frequency monitoring relay



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



Voltage monitoring for three-phase systems without neutral



moduLo

PMV10 A440

Order code	Rated voltage to be controlled Ue (phase to phase)	Qty per pkg	Wt
	[V] 50/60Hz	n°	[kg]
Three-phase system, without neutral. Phase loss and incorrect phase sequence. Instantaneous tripping.			
PMV10 A440	208-480VAC	1	0.050
PMV20 A240	100-240VAC	1	0.120
PMV20 A575	208-575VAC	1	0.120
PMV20 A600	380-600VAC	1	0.120

General characteristics

- Voltage monitoring relay for phase loss and incorrect phase sequence; powered by the monitored voltage
- Detection of phase loss if one of the voltages is <70% rated value
- Tripping time for phase loss: 60ms
- 1 relay output with 1 changeover contact
- Modular DIN 43880 housing:
 - 1 module for PMV10
 - 2 modules for PMV20
- Degree of protection: IP40 on front (only when mounted in housing or electric board with IP40); IP20 on terminals.

Certifications and compliance

Certifications obtained: cULus, GOST.
Compliant with standards: IEC/EN 60255-6, IEC/EN 61000-6-2, IEC/EN 61000-6-3.

Operational diagram

See page W-19.



moduLo

PMV20...

Order code	Rated voltage to be controlled Ue (phase to phase)	Qty per pkg	Wt
	[V] 50/60Hz	n°	[kg]
Three-phase system, without neutral. Minimum AC voltage. Delayed tripping. Phase loss and incorrect phase sequence. Instantaneous tripping.			
PMV30 A240	208-240VAC	1	0.130
PMV30 A575	380-575VAC	1	0.130
PMV30 A600	600VAC	1	0.130

General characteristics

- Voltage monitoring relay for phase loss, incorrect phase sequence and minimum voltage control; powered by the monitored voltage
- Programmable rated voltages:
 - PMV30 A240: 208-220-230-240VAC
 - PMV30 A575: 380-400-415-440-460-480-525-575VAC
- Excellent tripping accuracy
- TRMS measurements (True Root Mean Square value)
- Control of phase-to-phase voltages
- Detection of phase loss if one of the voltages is <70% rated value
- Tripping time for phase loss: 60ms
- 1 relay output with 1 changeover contact
- Modular DIN 43880 housing, 2 modules
- Degree of protection: IP40 on front (only when mounted in housing or electric board with IP40); IP20 on terminals.

ADJUSTMENTS:

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

Certifications and compliance

Certifications obtained: cULus, GOST.
Compliant with standards: IEC/EN 60255-6, IEC/EN 61000-6-2, IEC/EN 61000-6-3.

Operational diagram

See page W-19.



moduLo

PMV30...

Order code	Rated voltage to be controlled Ue (phase to phase)	Qty per pkg	Wt
	[V] 50/60Hz	n°	[kg]
Three-phase system, without neutral. Asymmetry. Delayed tripping. Phase loss and incorrect phase sequence control. Instantaneous tripping.			
PMV40 A240	208-240VAC	1	0.130
PMV40 A575	380-575VAC	1	0.130
PMV40 A600	600VAC	1	0.130

General characteristics

- Voltage monitoring relay for phase loss, incorrect phase sequence and asymmetry control; powered by the monitored voltage
- Excellent tripping accuracy
- TRMS measurements (True Root Mean Square value)
- Control of phase-to-phase voltages
- Detection of phase loss if one of the voltages is <70% rated value
- Tripping time for phase loss: 60ms
- 1 relay output with 1 changeover contact
- Modular DIN 43880 housing, 2 modules
- Degree of protection: IP40 on front (only when mounted in housing or electric board with IP40); IP20 on terminals.

ADJUSTMENTS:

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

Certifications and compliance

Certifications obtained: cULus, GOST.
Compliant with standards: IEC/EN 60255-6, IEC/EN 61000-6-2, IEC/EN 61000-6-3.

Operational diagram

See page W-19.



moduLo

PMV40...



PMV50...

moduLo

Order code	Rated voltage to be controlled Ue (phase to phase)	Qty per pkg	Wt
	[V] 50/60Hz	n°	[kg]
Three-phase system, without neutral. Minimum and maximum AC voltage. Delayed tripping. Phase loss and incorrect phase sequence. Instantaneous tripping.			
PMV50 A240	208-240VAC	1	0.130
PMV50 A575	380-575VAC	1	0.130
PMV50 A600	600VAC	1	0.130

General characteristics

- Voltage monitoring relay for phase loss, incorrect phase sequence, minimum and maximum voltage control; powered by the monitored voltage
- 4 programmable rated voltages for PMV50 A240: 208-220-230-240VAC
- 8 programmable rated voltages for PMV50 A575: 380-400-415-440-460-480-525-575VAC
- Excellent tripping accuracy
- TRMS measurements (True Root Mean Square value)
- Control of phase-to-phase voltages
- Detection of phase loss if one of the voltages is <70% rated value
- Tripping time for phase loss: 60ms
- 1 relay output with 1 changeover contact
- Modular DIN 43880 housing, 2 modules
- Degree of protection: IP40 on front (only when mounted in housing or electric board with IP40); IP20 on terminals.

ADJUSTMENTS:

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

Certifications and compliance

Certifications obtained: cULus, GOST.
Compliant with standards: IEC/EN 60255-6, IEC/EN 61000-6-2, IEC/EN 61000-6-3.

Operational diagram

See page W-19.



PMV60...

moduLo

Order code	Rated voltage to be controlled Ue (phase to phase)	Qty per pkg	Wt
	[V] 50/60Hz	n°	[kg]
Three-phase system, without neutral. Minimum AC voltage and asymmetry. Delayed tripping. Phase loss and incorrect phase sequence. Instantaneous tripping.			
PMV60 A240	208-240VAC	1	0.130
PMV60 A575	380-575VAC	1	0.130
PMV60 A600	600VAC	1	0.130

General characteristics

- Voltage monitoring relay for phase loss, incorrect phase sequence, minimum voltage and asymmetry control; powered by the monitored voltage
- 4 programmable rated voltages for PMV60 A240: 208-220-230-240VAC
- 8 programmable rated voltages for PMV60 A575: 380-400-415-440-460-480-525-575VAC
- Excellent tripping accuracy
- TRMS measurements (True Root Mean Square value)
- Control of phase-to-phase voltages
- Detection of phase loss if one of the voltages is <70% rated value
- Tripping time for phase loss: 60ms
- 1 relay output with 1 changeover contact
- Modular DIN 43880 housing, 2 modules
- Degree of protection: IP40 on front (only when mounted in housing or electric board with IP40); IP20 on terminals.

ADJUSTMENTS:

- "V min" Minimum voltage tripping threshold 80-95% Ue
- "Asymmetry" High voltage asymmetry tripping threshold 5-15% Ue
- "Delay" Tripping time 0.1-20s
- "Reset delay" Resetting time 0.1-20s.

Certifications and compliance

Certifications obtained: cULus, GOST.
Compliant with standards: IEC/EN 60255-6, IEC/EN 61000-6-2, IEC/EN 61000-6-3.

Operational diagram

See page W-19.



PMV70...

Order code	Rated voltage to be controlled U _e (phase to phase)	Qty per pkg	Wt
	[V] 50/60Hz	n°	[kg]
Three-phase system, without neutral. Minimum and maximum AC voltage and asymmetry. Delayed tripping. Phase loss, incorrect phase sequence. Instantaneous tripping.			
PMV70 A240	208-240VAC	1	0.130
PMV70 A575	380-575VAC	1	0.130
PMV70 A600	600VAC	1	0.130

General characteristics

- Voltage monitoring relay for phase loss, incorrect phase sequence, minimum and maximum voltage and asymmetry control; powered by the monitored voltage
- 4 programmable rated voltages for PMV70 A240: 208-220-230-240VAC
- 8 programmable rated voltages for PMV70 A575: 380-400-415-440-460-480-525-575VAC
- Excellent tripping accuracy
- TRMS measurements (True Root Mean Square value)
- Control of phase-to-phase voltages
- Detection of phase loss if one of the voltages is <70% rated value
- Tripping time for phase loss: 60ms
- 1 relay output with 1 changeover contact
- Modular DIN 43880 housing, 2 modules
- Degree of protection: IP40 on front (only when mounted in housing or electric board with IP40); IP20 on terminals.

ADJUSTMENTS:

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

Certifications and compliance

Certifications obtained: cULus, GOST.
Compliant with standards: IEC/EN 60255-6, IEC/EN 61000-6-2, IEC/EN 61000-6-3.

Operational diagram

See page W-19.

Voltage monitoring for three-phase systems with or without neutral



PMV50N...



Order code	Rated voltage to be controlled U _e (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 tripping. Phase loss, neutral loss and incorrect phase sequence. Instantaneous tripping.			
PMV50N A240	208-240VAC	1	①
PMV50N A440	380-440VAC	1	①
PMV50N A600	480-600VAC	1	①

① Contact our Customer Service (Tel. +39 035 4282422; email: service@LovatoElectric.com).

General characteristics

- Voltage monitoring relay for minimum and maximum voltage, phase and neutral loss and incorrect phase sequence control of three-phase systems; powered by the monitored voltage
- 4 programmable rated voltages:
 - PMV50N A240: 208-220-230-240VAC (phase-phase); 120-127-132-138VAC (phase-neutral)
 - PMV50N A440: 380-400-415-440VAC (phase-phase); 220-230-240-254VAC (phase-neutral)
 - PMV50N A600: 480-525-575-600VAC (phase-phase); 277-303-332-347VAC (phase-neutral)
- Excellent tripping accuracy
- TRMS measurements (True Root mean square value)
- Detection of phase loss if one of the voltages is <70% rated value
- Tripping time for phase or neutral loss: 60ms
- 1 relay output with 1 changeover contact
- Modular DIN 43880 housing, 2 modules
- Degree of protection: IP40 on front (only when mounted in housing or electric board with IP40); IP20 on terminals.

ADJUSTMENTS:

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

Certifications and compliance

Certifications pending: cULus.
Compliant with standards: IEC/EN 60255-6, IEC/EN 61000-6-2, IEC/EN 61000-6-3.



PMV70N...



moduLo

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

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

PMV70N A240	208-240VAC	1	❶
PMV70N A440	380-440VAC	1	❶
PMV70N A600	180-600VAC	1	❶

❶ Contact our Customer Service (Tel. +39 035 4282422; email: service@LovatoElectric.com).

General characteristics

- Voltage monitoring relay for minimum and maximum voltage, asymmetry, phase and neutral loss and incorrect phase sequence control of three-phase systems; powered by the monitored voltage
- 4 programmable rated voltages:
 - PMV70N A240: 208-220-230-240VAC (phase-phase); 120-127-132-138VAC (phase-neutral)
 - PMV70N A440: 380-400-415-440VAC (phase-phase); 220-230-240-254VAC (phase-neutral)
 - PMV70N A600: 480-525-575-600VAC (phase-phase); 277-303-332-347VAC (phase-neutral)
- Excellent tripping accuracy
- TRMS measurements (True Root mean square value)
- Detection of phase loss if one of the voltages is <70% rated value
- Tripping time for phase or neutral loss: 60ms
- 1 relay output with 1 changeover contact
- Modular DIN 43880 housing, 2 modules
- Degree of protection: IP40 on front (only when mounted in housing or electric board with IP40); IP20 on terminals.

ADJUSTMENTS:

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

Certifications and compliance

Certifications pending: cULus.
Compliant with standards: IEC/EN 60255-6, IEC/EN 61000-6-2, IEC/EN 61000-6-3.



PMV80N...



moduLo

Order code	Rated voltage to be controlled 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 minimum and maximum frequency. Delayed tripping.
Phase loss, neutral loss and incorrect phase sequence.
Instantaneous tripping.

PMV80N A240	208-240VAC	1	❶
PMV80N A440	380-440VAC	1	❶
PMV80N A600	180-600VAC	1	❶

❶ Contact our Customer Service (Tel. +39 035 4282422; email: service@LovatoElectric.com).

General characteristics

- Voltage monitoring relay for minimum and maximum voltage and frequency, phase and neutral loss and incorrect phase sequence control of three-phase systems; powered by the monitored voltage
- 4 programmable rated voltages:
 - PMV80N A240: 208-220-230-240VAC (phase-phase); 120-127-132-138VAC (phase-neutral)
 - PMV80N A440: 380-400-415-440VAC (phase-phase); 220-230-240-254VAC (phase-neutral)
 - PMV80N A600: 480-525-575-600VAC (phase-phase); 277-303-332-347VAC (phase-neutral)
- Excellent tripping accuracy
- TRMS measurements (True Root mean square value)
- Detection of phase loss if one of the voltages is <70% rated value
- Tripping time for phase or neutral loss: 60ms
- 1 relay output with 1 changeover contact
- Modular DIN 43880 housing, 2 modules
- Degree of protection: IP40 on front (only when mounted in housing or electric board with IP40); IP20 on terminals.

ADJUSTMENTS:

"V max"	Maximum voltage tripping threshold 105-115% Ue
"V min"	Minimum voltage tripping threshold 80-95% Ue
"Hz max"	Maximum frequency tripping threshold +1 to +10%
"Hz min"	Minimum frequency tripping threshold +1 to +10% Ue
"V Delay"	Tripping time 0.1-20s.

Certifications and compliance

Certifications pending: cULus.
Compliant with standards: IEC/EN 60255-6, IEC/EN 61000-6-2, IEC/EN 61000-6-3.

Modular voltage monitoring relays

Modular current monitoring relays

Voltage monitoring for single-phase systems



PMV55...



Order code	Rated voltage to be controlled Ue	Qty per pkg	Wt
	[V] 50/60Hz	n°	[kg]
Single-phase system. Minimum and maximum AC voltage control. Delayed tripping.			
PMV55 A240	208-240VAC	1	0.125
PMV55 A440	380-440VAC	1	0.125

General characteristics

- Voltage monitoring relay for minimum and maximum voltage control of single-phase systems; powered by the monitored voltage
- 4 programmable rated voltages:
 - For PMV55 A240: 208-220-230-240VAC
 - For PMV55 A440: 380-400-415-440VAC
- Excellent tripping accuracy
- TRMS measurements (True Root Mean Square value)
- 1 relay output with 1 changeover contact
- Modular DIN 43880 housing, 2 modules
- Degree of protection: IP40 on front (only when mounted in housing or electric board with IP40); IP20 on terminals.

ADJUSTMENTS:

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

Certifications and compliance

Certifications obtained: cULus, GOST.
Compliant with standards: IEC/EN 60255-6,
IEC/EN 61000-6-2, IEC/EN 61000-6-3.

Operational diagram

See page W-19.

Current monitoring for single-phase systems



PMA20 240



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

General characteristics

- Current monitoring relay for maximum current control. AC/DC multivoltage auxiliary supply
- Direct connection or by current transformer (CT)
- Excellent tripping accuracy
- TRMS measurements (True Root Mean Square value)
- Resetting and inhibition input
- 1 relay output with 1 changeover contact
- Modular DIN 43880 housing, 2 modules
- Degree of protection: IP40 on front (only when mounted in housing or electric board with IP40); IP20 on terminals.

ADJUSTMENTS:

“I max”	Maximum current tripping threshold 5-100% Ie
“Hysteresis”	Maximum hysteresis threshold 1-50%
“Trip delay”	Tripping time 0.1-30s
“Inhibition time”	Tripping delay for external input or at power up 1-60s
“Aut. reset delay”	Automatic reset time 0.1-30s
“Mode”	<ul style="list-style-type: none"> • Rated current 5A or 16A, • Output relay normally energised or de-energised, • Tripping memory (Latch) On or Off.

Certifications and compliance

Certifications obtained: cULus, GOST.
Compliant with standards: IEC/EN 60255-6,
IEC/EN 61000-6-2, IEC/EN 61000-6-3.

Operational diagram

See page W-21.



PMA30 240

moduLo

Order code	Rated current I_e	Auxiliary supply voltage	Qty per pkg	Weight
	[A]	[V]	n°	[kg]
PMA30 240	5-16 multiscale	24-240V AC/DC	1	0.121

Single-phase system.
AC/DC minimum or maximum current control.
Delayed tripping.
Auxiliary AC/DC supply. Automatic or manual resetting.

General characteristics

- Current monitoring relay for minimum or maximum current control; AC/DC multivoltage auxiliary supply
- Direct connection or by current transformer (CT)
- Excellent tripping accuracy
- TRMS current measurements (True Root Mean Square value)
- Resetting and inhibition input
- 1 relay output with 1 changeover contact
- Modular DIN 43880 housing, 2 modules
- Degree of protection: IP40 on front (only when mounted in housing or electric board with IP40); IP20 on terminals.

ADJUSTMENTS:

“Set point”	Maximum or minimum current tripping threshold 5-100% I_e
“Hysteresis”	Maximum hysteresis threshold 1-50%
“Trip delay”	Tripping time 0.1-30s
“Inhibition time”	Tripping delay for external input or at power up 1-60s
“ I_e ”	Current scale selection: 5A or 16A
“Mode”	<ul style="list-style-type: none"> • Min or max function, • Output relay normally energised or de-energised, • Tripping memory (Latch) On or Off.

Certifications and compliance

Certifications obtained: cULus, GOST.
Compliant with standards: IEC/EN 60255-6, IEC/EN 61000-6-2, IEC/EN 61000-6-3.

Operational diagram

See page W-22 and 23.



PMA40 240

moduLo

Order code	Rated current I_e	Auxiliary supply voltage	Qty per pkg	Weight
	[A]	[V]	n°	[kg]
PMA40 240	0.02-0.05-0.25-1-5-16 multiscale	24-240V AC/DC	1	0.166

Single-phase system.
AC/DC minimum and maximum current control.
Delayed tripping.
Auxiliary AC/DC supply. Automatic or manual resetting.

General characteristics

- Current monitoring relay for minimum and maximum current control in AC/DC; AC/DC multivoltage auxiliary supply; automatic or manual resetting (manual reset by power removal)
- Direct connection or by current transformer (CT)
- Excellent tripping accuracy
- TRMS current measurements (True Root Mean Square value)
- 2 relay outputs (Min and Max), each with 1 changeover contact
- Modular DIN 43880 housing, 3 modules
- Degree of protection: IP40 on front (only when mounted in housing or electric board with IP40); IP20 on terminals.

ADJUSTMENTS:

“I max”	Maximum current tripping threshold 5-100% I_e
“I min”	Minimum current tripping threshold 5-100% I_e
“Trip delay”	Tripping time 0.1-30s
“Inhibition time”	Tripping delay at power up 1-60s
“ I_e ”	Current scale selection: 20mA, 50mA, 250mA, 1A, 5A or 16A
“Mode”	<ul style="list-style-type: none"> • Independent or parallel output relays, • Output relays normally energised or de-energised, • Tripping memory (Latch) On or Off.

Certifications and compliance

Certifications obtained: cULus, GOST.
Compliant with standards: IEC/EN 60255-6, IEC/EN 61000-6-2, IEC/EN 61000-6-3.

Operational diagram

See page W-24.

Modular pump protection relay. Modular phase shift monitoring relay

Pump protection



PMA50...



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

Single and three-phase systems.
Maximum AC current and minimum $\cos\varphi$. Delayed tripping.
Phase loss and incorrect phase sequence.
Instantaneous tripping. Auxiliary AC supply.
Automatic or manual resetting.

PMA50 A240	5 or 16	220-240VAC	1	0.251
PMA50 A415		380-415VAC	1	0.251
PMA50 A480		440-480VAC	1	0.251

General characteristics

- For dry running pump protection; auxiliary AC supply
- Direct connection, 16A max, or by external CT
- Voltage control range: 80-660VAC
- Current control range: 0.1-16A
- Excellent tripping accuracy
- Resetting or enabling input
- 1 relay output with 1 changeover contact
- Modular DIN 43880 housing, 3 modules
- Degree of protection: IP40 on front (only when mounted in housing or electric board with IP40); IP20 on terminals.

ADJUSTMENTS:

" $\cos\varphi$ min"	Minimum $\cos\varphi$ threshold 0.1-0.99
"I max"	Maximum current threshold 10-100% I_n
"Trip delay"	Tripping time for minimum $\cos\varphi$ and maximum current 0.1-10s
"Inhibition time"	Tripping delay for external input or at power up 1-60s
"Aut. reset delay"	Automatic reset time OFF-100min
"Mode"	<ul style="list-style-type: none"> • Rated current 5A or 16A, • Single or three phase, • External reset On or Off.

Certifications and compliance

Certifications obtained: cULus, GOST.
Compliant with standards: IEC/EN 60255-6, IEC/EN 61000-6-2, IEC/EN 61000-6-3.

Operational diagram

See page W-25.

Phase shift monitoring



PMA60...



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

Single and three-phase systems.
Minimum or maximum $\cos\varphi$. Delayed tripping.
Auxiliary AC supply.
Automatic or manual resetting.

PMA60 A240	16	220-240VAC	1	0.254
PMA60 A415		380-415VAC	1	0.254
PMA60 A480		440-480VAC	1	0.254

General characteristics

- Minimum or maximum phase shift monitoring; auxiliary AC supply; automatic or manual resetting (manual reset by power removal)
- Direct connection 16A max, or by external CT
- Voltage control range: 80-660VAC
- Current control range: 0.1-16A
- Resetting or inhibition input
- Excellent tripping accuracy
- 2 relay outputs (Min and Max), each with 1 configurable changeover contact
- Modular DIN 43880 housing, 3 modules
- Degree of protection: IP40 on front (only when mounted in housing or electric board with IP40); IP20 on terminals.

ADJUSTMENTS:

" $\cos\varphi$ min"	Minimum inductive $\cos\varphi$ threshold 0.1-0.99
"Trip delay"	Tripping time for minimum $\cos\varphi$ 0.1-30s
" $\cos\varphi$ max"	Maximum inductive $\cos\varphi$ threshold 0.1-0.99
"Trip delay"	Tripping time for maximum $\cos\varphi$ 0.1-30s
"Inhibition time"	Tripping delay at power up 1-60s
"Mode"	<ul style="list-style-type: none"> • Single or three phase, • Output relays normally energised or de-energised, • Tripping memory (Latch) On or Off.

Certifications and compliance

Certifications obtained: cULus, GOST.
Compliant with standards: IEC/EN 60255-6, IEC/EN 61000-6-2, IEC/EN 61000-6-3.

Operational diagram

See page W-26.

Modular frequency monitoring relay DIN rail mount voltage monitoring relays

Frequency monitoring



PMF20...

moduLo

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

Single-phase systems.
Minimum and maximum frequency control.
Delayed tripping. Automatic resetting.

PMF20 A240	220-240VAC	1	0.125
PMF20 A415	380-415VAC	1	0.125

General characteristics

- Frequency monitoring relay for minimum and maximum control; powered by monitored voltage
- Rated frequency choice: 50Hz or 60Hz
- Tripping threshold for minimum and maximum frequency
- Excellent tripping accuracy
- 1 relay output with 1 configurable changeover contact
- Modular DIN 43880 housing, 2 modules
- Degree of protection: IP40 on front (only when mounted in housing or electric board with IP40); IP20 on terminals.

ADJUSTMENTS:

"Hz max"	Max frequency trip threshold +1 to +10%
"Delay"	Tripping time 0.1-20s
"Hz min"	Min frequency trip threshold -1 to -10%
"Delay"	Tripping time 0.1-20s
"Reset delay"	Reset time 0.1-20s
"Mode"	<ul style="list-style-type: none"> • Minimum and maximum frequency • Output relay energised at max frequency • Output relay energised at min frequency • Output relay de-energised.

Certifications and compliance

Certifications obtained: cULus, GOST.
Compliant with standards: IEC/EN 60255-6, IEC/EN 61000-6-2, IEC/EN 61000-6-3.

Operational diagram

See page W-27.

Voltage monitoring for three-phase systems without neutral



31 DRV3...

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

Three-phase system without neutral.
Minimum and maximum AC voltage control. Delayed tripping.

31 DRV3 110	100-110-127VAC	1	0.400
31 DRV3 230	220-230-240VAC	1	0.400
31 DRV3 400	380-400-415VAC	1	0.400
31 DRV3 460	440-460-480VAC	1	0.400

General characteristics

- Voltage monitoring relay for minimum and maximum control; powered by monitored voltage
- Three rated voltages, selectable by dip switches; see middle column of order code table
- Excellent tripping accuracy
- 2 independent relay outputs (Min and Max), each with 1 changeover contact
- 45mm wide housing suitable for mounting on 35mm (IEC/EN 60715) DIN rail. For screw fixing adapter CE 106, see page 11-13
- Degree of protection: IP40 on front; IP20 on terminals.

ADJUSTMENTS:

"Max voltage"	Max voltage tripping threshold 102-110% Ue
"Min voltage"	Min voltage tripping threshold 85-98% Ue
"Delay max"	Maximum voltage tripping time 0.1-10s
"Delay min"	Minimum voltage tripping time 0.1-10s.

Certifications and compliance

Certifications obtained: GOST.
Compliant with standards: IEC/EN 60255-6.

Operational diagram

See page W-20.

Voltage monitoring for three-phase systems with neutral



31 DRV3N...

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

Three-phase system with neutral.
Minimum and maximum AC voltage control. Delayed tripping.

31 DRV3N 110	100-110-127VAC	1	0.400
31 DRV3N 230	220-230-240VAC	1	0.400
31 DRV3N 400	380-400-415VAC	1	0.400
31 DRV3N 460	440-460-480VAC	1	0.400

General characteristics

- Voltage monitoring relay for minimum and maximum control; powered by monitored voltage
- Three rated voltages, selectable by dip switches; see middle column of order code table
- Excellent tripping accuracy
- 2 independent relay outputs (Min and Max), each with 1 changeover contact
- 45mm wide housing suitable for mounting on 35mm (IEC/EN 60715) DIN rail. For screw fixing adapter CE 106, see page 11-13
- Degree of protection: IP40 on front; IP20 on terminals.

ADJUSTMENTS:

"Max voltage"	Max voltage tripping threshold 102-110% Ue
"Min voltage"	Min voltage tripping threshold 85-98% Ue
"Delay max"	Maximum voltage tripping time 0.1-10s
"Delay min"	Minimum voltage tripping time 0.1-10s.

Certifications and compliance

Certifications obtained: GOST.
Compliant with standards: IEC/EN 60255-6.

Operational diagram

See page W-20.

Voltage monitoring for single phase systems



31 DRV1...

Order code	Rated voltage to be controlled U _e	Qty per pkg	Wt
	[V] 50/60Hz	n°	[kg]
Single-phase system. Minimum and maximum AC voltage control. Delayed tripping.			
31 DRV1 110	100-110-127VAC	1	0.350
31 DRV1 230	220-230-240VAC	1	0.350
31 DRV1 400	380-400-415VAC	1	0.350
31 DRV1 460	440-460-480VAC	1	0.350

General characteristics

- Voltage monitoring relay for minimum and maximum control; powered by monitored voltage
- Three rated voltages, selectable by dip switches; see middle column of order code table
- Excellent tripping accuracy
- 1 relay output with 1 changeover contact
- 45mm wide housing suitable for mounting on 35mm (IEC/EN 60715) DIN rail. For screw fixing adapter CE 106, see page 11-13
- Degree of protection: IP40 on front; IP20 on terminals.

ADJUSTMENTS:

- “Max voltage” Max voltage tripping threshold 102-110% U_e
- “Min voltage” Min voltage tripping threshold 85-98% U_e
- “Delay max “ Maximum voltage tripping time 0.1-10s
- “Delay min “ Minimum voltage tripping time 0.1-10s.

Certifications and compliance

Certifications obtained: GOST.
Compliant with standards: IEC/EN 60255-6.

Operational diagram

See page W-20.

Voltage monitoring for three-phase systems with or without neutral



31 DRA...

Order code	Rated voltage to be controlled U _e (phase to phase)	Qty per pkg	Wt
	[V] 50Hz	n°	[kg]
Voltage asymmetry. Delayed tripping. Phase sequence and phase loss. Instantaneous tripping.			
31 DRA 220	220-240VAC (50Hz)	1	0,270
31 DRA 380	380-415VAC (50Hz)	1	0,270

General characteristics

- Voltage monitoring relay for asymmetry, phase sequence and phase loss control; powered by monitored voltage
- Sine wave form
- 1 relay output with 1 changeover contact
- 45mm wide housing suitable for mounting on 35mm (IEC/EN 60715) DIN rail. For screw fixing adapter CE 106, see page 11-13
- Degree of protection: IP40 on front; IP20 on terminals.

ADJUSTMENTS:

- “Asymmetry” Asymmetry 5-15% U_e⊕
- “Delay” Asymmetry tripping time 0.1-10s.

Certifications and compliance

Certifications obtained: GOST.
Compliant with standards: IEC/EN 60255-6.

Operational diagram

See page W-20.

⊕ With respect to measured value of line voltage, within the operating range 0.85-1.1 U_e.

Phase sequence for three-phase systems with or without neutral



31 ASF...

Order code	Rated voltage to be controlled U _e (phase to phase)	Qty per pkg	Wt
	[V] 50/60Hz	n°	[kg]
Phase sequence control. Instantaneous tripping.			
31 ASF 220	220-240VAC	1	0.145
31 ASF 380	380-415VAC	1	0.145
31 ASF 440	440-480VAC	1	0.145

General characteristics

- Phase sequence monitoring relay; powered by monitored voltage
- Suitable for motors connected to temporary lines or equipment where phase sequence must be correct to operate
- 1 relay output with 1 changeover contact
- 22.5mm wide housing suitable for mounting on 35mm (IEC/EN 60715) DIN rail. For screw fixing adapter CE 106, see page 11-13
- Degree of protection: IP40 on front; IP20 on terminals.

Certifications and compliance

Certifications obtained: GOST.
Compliant with standards: IEC/EN 60255-6.

Operational diagram

See page W-20.

DIN rail mount current monitoring relays Accessories

Current monitoring for single-phase systems



31 DLA1...

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

Single-phase system.
AC/DC maximum current control. Delayed tripping.
Auxiliary AC supply.
Automatic or manual resetting.

31 DLA1 10 24	1-5-10 multiscale	24VAC	1	0.250
31 DLA1 10 110		110-127VAC	1	0.250
31 DLA1 10 220		220-240VAC	1	0.250

General characteristics

- Current monitoring relay for maximum AC/DC current conditions
- 3 scale choices on terminal block: 0.05-1A; 0.25-5A; 0.5-10A
- Direct connection or by external CT (/1A; /5A; /10A)
- Galvanic isolation between supply and measuring circuits
- 1 relay output with 1 changeover contact
- 45mm wide housing suitable for mounting on 35mm DIN rail (IEC/EN 60715). For screw fixing, use CE 106 adapter
- Degree of protection: IP40 on front; IP20 on terminals.

ADJUSTMENTS:

- "Max current" Max current tripping threshold 5-100% end scale
- "Delay" Tripping time 0.1-10s
- "Inhibition" Start-up inhibition time 0.1-10s
- "Hysteresis" Resetting hysteresis 5-30%.

Certifications and compliance

Certifications obtained: GOST.
Compliant with standards: IEC/EN 60255-6.

Operational diagram

See page W-25.

Accessories for DIN rail mount and plug-in relays

Codice di ordinazione	Descrizione	Q.tà per conf.	Peso
		n°	[kg]
31 CE106	Screw fixing adapter for DIN rail mount relays on mounting plate	10	0.002