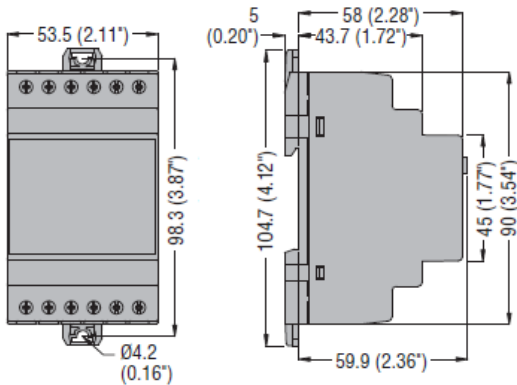


Order code	Rated current le	Auxiliary supply voltage	Qty per pkg	Wt
	[A]	[V]	n°	[kg]

Single and three-phase systems.
Minimum and maximum $\cos\phi$ control. Delayed trip.
AC auxiliary power supply.
Automatic or manual reset.

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



General characteristics

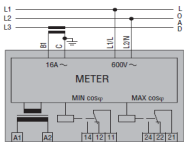
- Minimum and maximum phase shift monitoring relay, AC auxiliary power supply
- Direct connection up to 16A max or by current transformer (CT)
- Excellent tripping accuracy
- Voltage control range 80-660VAC
- Current control range 0.1-16A
- Automatic or manual resetting (manual resetting by power removal)
- 2 relay outputs (Min and Max), configurable, each with 1 changeover contact (SPDT)
- Modular DIN 43880 housing, 3 module
- IEC protection degree: IP40 on front (only when placed in IP40 enclosure or control board); IP20 at terminals.

ADJUSTMENTS

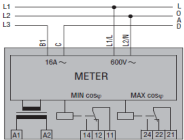
- “Cos ϕ min” Minimum $\cos\phi$ threshold 0.1-0.99 inductive
- “Trip delay” Tripping time for minimum $\cos\phi$ 0.1-30s
- “Cos ϕ max” Maximum inductive $\cos\phi$ threshold 0.1-0.99
- “Trip delay” Tripping time for maximum $\cos\phi$ 0.1-30s
- “Inhibition time” Tripping delay at power up 1-60s
- “Mode”
 - Single or three phase
 - Relay outputs normally energised or de-energised
 - Tripping memory (Latch) On or Off.

Phase shift monitoring relay
PMA60

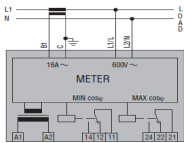
Three-phase connection by CT



Three-phase direct connection

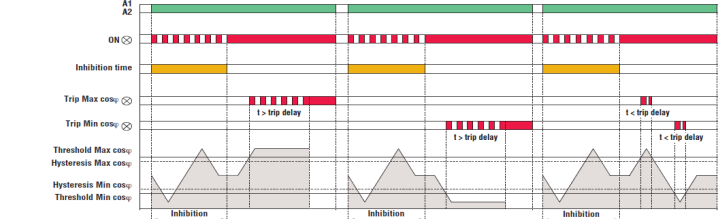


Single-phase connection by CT

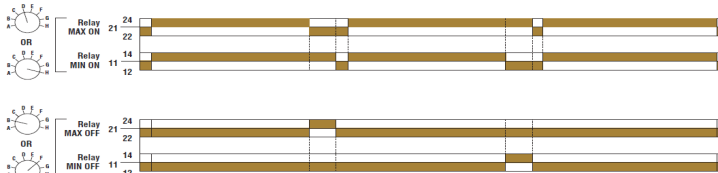


Mode	Connection	Relay output	Latch
A	1 phase	OFF	OFF
B		ON	ON
C		OFF	OFF
D		ON	ON
E	3 phase	OFF	OFF
F		ON	ON
G		OFF	OFF
H		ON	ON

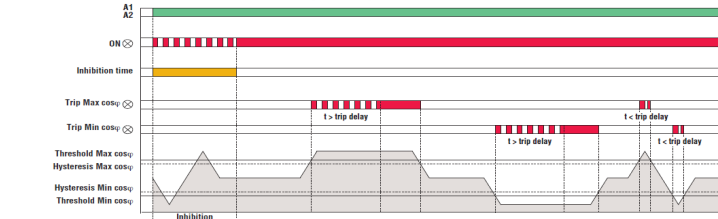
Operation with tripping latch (Latch ON)



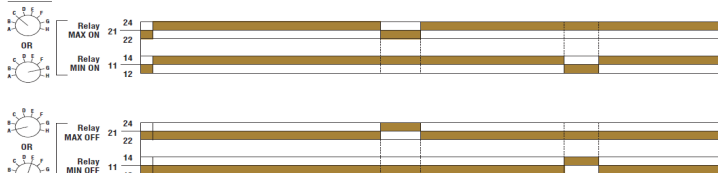
Positions



Operation with no tripping latch (Latch OFF)



Positions



Certifications and compliance

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

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