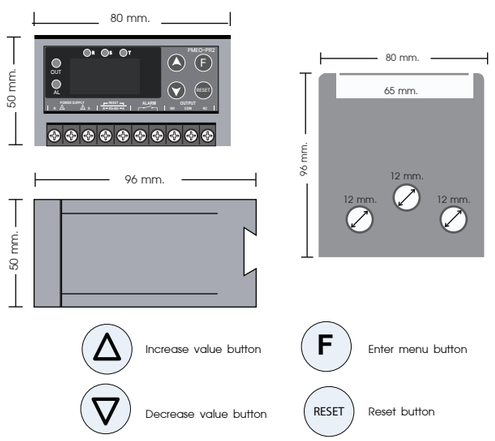
PMEO-PR2 ELECTRONIC OVERLOAD

TECHNICAL SPECIFICATION

Power Supply		380 VAC ± 15% 50/60Hz		
		12-30VAC/VDC		
Power Consumption		1.5 VA		
Display		7-Segment, 0.4 Inch 4 Digit		
	Type	Series		
	Range	0-5 A With CT	5-50 A Direct	5-60 A Direct
	Input	0.2-5 A Direct CT Ratio Programmable Max. 500A	0.5-50	0.5-60
	Resolution	10 mA		
	Accuracy	±1 of FS		
Output		Contact Relay		
	Output	5A/250VAC, 5A/30VDC		
	Alarm	5A/250VAC, 5A/30VDC		
Communication	Protocol	MODBUS RTU		
	Baud Rate	2400, 4800, 9600, 19200		
	Parity	None, Even, Odd		
	Data Bit	8 bit		
	Stop Bit	1, 2		
	Support Device Note	IP20		
Ambient Operation	Temperature	-10 °C to 60 °C		
	Humidity	<85% RH Non-Condensing		
Ambient Storage	Temperature	-20 °C to 80 °C		
	Humidity	<85% RH Non-Condensing		
Protection Degree		128		
Installation		DIN RAIL Mounting		
Material		ABS-V0		
Size		50 x 80 x 96 mm.		
Weight		225 g.		

DIMENSION



DESCRIPTION

- For protect dangerous which can happen to circuit and load because over current
- High accuracy by micro processor system. Start operation delay function, Lock rotor function, Operation hour alarm function, Over current alarm function.
- LED 7-Segment Red color 4 digits.
- LED show status Output and Alarm operation status.
- Alarm can set to use it or not and set to continue turn on or not.
- Hour Counter for count operation hour of motor for notification.
- Lock Rotor Function when end start time (st) to start motor but current still higher over setting value. It means device in Lock Rotor made Contact Relay cut circuit for stop motor in 100 mSec.

GENERAL DESCRIPTION

PMEO-PR2 is device protect electrical load motor to do not damage from over current, lock rotor Phase current loss, Phase unbalance can show current of each phase and average of all phase inside there is Hour Counter for counting operation hour when the operation to the required value and can Over Limit or Under Limit Current.

Operation

When PMEO-PR2 start operation output will operate immediately. It made motor operate and detect irregular condition of rotor lock current and reverse phase immediately when detected. It will stop operation of output suddenly but there are not irregular condition from lock rotor and reverse phase then Start Delay Time will start operate when start delay time has ended. It will detect irregular condition from over current, phase loss and phase unbalance. If there are over current. It will delay Over Delay Time when time has completed output will stop operation or phase current loss or unbalance phase output will stop operation immediately with delay.

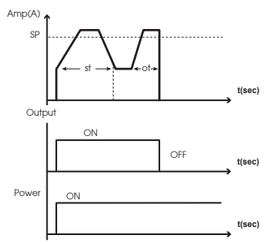
How to Reset Output Trip

When Output of PMEO-PR2 stop operation. It will back to operate as normal when press reset botton or turn on/off device only. When reset PMEO-PR2 will start operate again and delay Start Delay Time.

Over Current detecting function

Over Current detecting use average current value all 3 phase. If it has value over Set Point from setting. It will delay Over Delay Time. When time has complete Output Relay will stop operate (OFF) and display show result -OC- detail as Table 1.

Over Current Protection



Phase Loss Function

When detected current from some phase has lost (0 A) it will made Output Relay stop operate (OFF) and show the signature to inform which phase has gone. See detail as Table 1.

Unbalance Phase Function

PMEO-PR2 will measure current of each phase and all 3 phase average current for calculating % Unbalance (%UBL) follow as formula 1. When value from measured over than UB from setting. It will made Out Relay will stop operation (OFF) and display will show signal -Ub- see detail as Table 1.

$$\%UBL = 100X\frac{I_{MD}}{I_{avg}} \qquad (1)$$

When IMD and Iavg as formula (2) and (3)

$$I_{avg} = (\frac{I_a+I_b+I_c}{3}) \qquad (2)$$

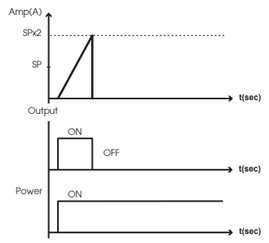
I_{MD} is Absolute maximum of difference value of each phase with average current value.

$$I_{MD} = Max\{|I_a - I_{avg}|,|I_b - I_{avg}|,|I_c - I_{avg}|\}\ ,a = Phase\ R,\ b = Phase\ S,\ c = Phase\ T \quad (3)$$

Lock Roter Function

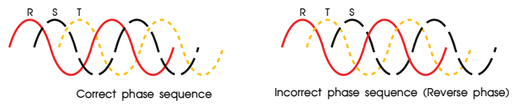
When average value of all 3 phase has over than 2 twice of LockRotor Setpoint wwill made Relay stop operation (OFF) and display will show signal -Lr- see detail as Table 1

Locked Rotor Protection



Phase sequence of current detecting function

Normally, usage phase sequence will be R-S-T if detected the sequence are R-T-S, S-R-T or T-S-R. It will made Output Relay stop operation (OFF) and screen shows signal -PH- see detail as Table 1.

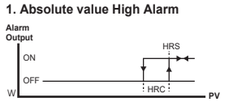


Graph shows phase sequence detected

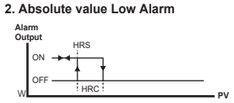
Alam Relay Operation

Alarm Relay will operate 2 function together are Hour Counter, Alarm Output and Absolute Value High or Absolute Low Alarm by if counted hour value more or equal to Setting Hour Counter (Hr5) then Alarm Relay will operate while showing -Hr- at screen and if Absolute Value high or Absolute Value Low. Alarm Relay will operate but do not show signal at display.

1. Absolute value High Alarm



2. Absolute value Low Alarm



Alarm Relay can set operation in Alarm Hold is Alarm Relay will hold operation until Reset Alarm Hold.

How to Reset Alarm Hold

1. Set ALLr in Parameter Config. is -CLr
2. Press F hold for 4 second when back to normal display screen. Device will Reset Alarm Hold value of Hours Counter.

When PMEO-PR2 check operation of motor mode that normal. Hours Counter will start counting If motor stop counting the device have no current Hour Counter will not count. If user set Setting Hours Counter (Hr5) to be 0. It means no operation hour counting (Hours Counter Dusable).

How to Reset Hours Counter

1. Press F button to Menu Config to Parameter HrC
2. Press Reset hold for 4 second Hours Counter that showing will be reset to be 0.

TABLE 1

MOTOR STATUS			DISPLAY OUTPUT		LED SIGNAL
Motor normal rotate			500.0		OUT ● R ● S ● T ●
Trip	Over current		-OC-	Flash	
	Lock Rotor		-Lr-	Flash	
	Phase current Loss	Phase R loss	L1--	Flash	OUT ○ R ○ S ● T ●
		Phase S loss	L-2-		OUT ○ R ● S ○ T ●
		Phase T loss	L--3		OUT ○ R ● S ● T ○
		Phase R, S loss	L12-		OUT ○ R ○ S ○ T ●
		Phase S, T loss	L-23		OUT ○ R ● S ○ T ○
		Phase R, T loss	L13		OUT ○ R ○ S ● T ○
	Unbalance current phase		-Ub-	Flash	OUT ○ R ● S ● T ●
	Reverse Phase		-PH-	Flash	OUT ○ R ● S ● T ●
Current Meter of each phase		R	35.4		R ● S ○ T ○
		S	35.4		R ○ S ● T ○
		T	35.4		R ○ S ○ T ●
Operation Hours Alarm			-Hr-	Flash	AL ●

OPERATION DISPLAY

Series 0-5 A

Primary since 5-99 display show decimal 2 position such as 5.00

Primary since 100-999 display show decimal 1 position such as 100.1

Series 5-50 A

Display show decimal 2 position such as 5.00

Series 5-60 A

Display show decimal 2 position such as 5.00

Protection Information

Protection Topic	Operation time (trip time)
Over current delay	ot (Over Delay Time)
Phase Loss Delay Time	PHLt (Phase Loss Delay Time)
Start Delay Time	St (Start Delay Time)
Unbalance Current Phase	8 Sec.
Rated Current Alarm	AL (Hystersis 500mSec.)
Lock Rotor Protection	100 mSec
Time Characteristic	Definite

ORDERING CODE

PMEO-PR2- [Rate Current] - [Option] - [Power Supply]

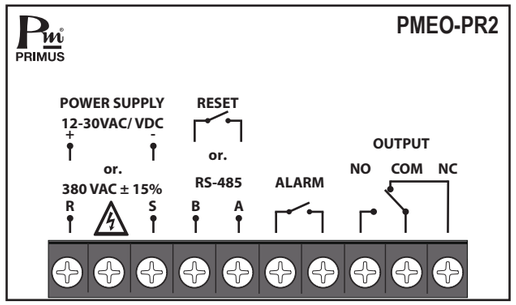
CODE	Rate Current
5	0.2-5 Amp.
50	5-50 Amp.
60	5-60 Amp.

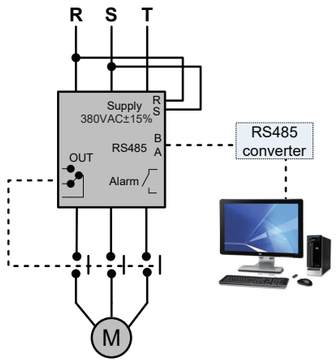
CODE	Option
M	RS-485
RES	External Reset

CODE	Power Supply
None	380 VAC ±15%
24	12-30 VAC/VDC

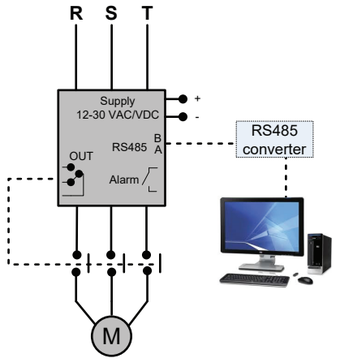
PMEO-PR2 ELECTRONIC OVERLOAD

WIRING DIAGRAM

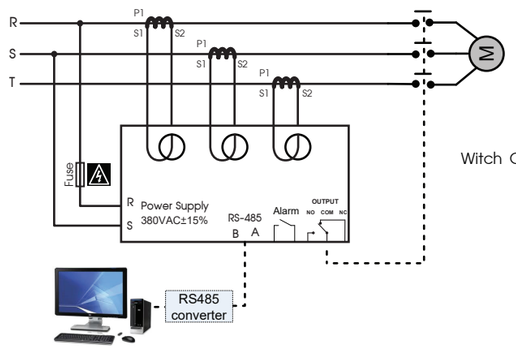




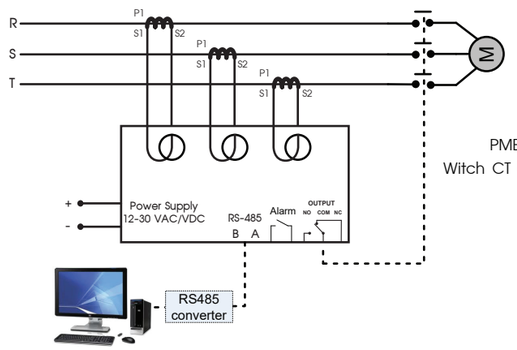
Direction



Direction



PMEO-PR2-5
Witch CT (Model 0-5 A only)

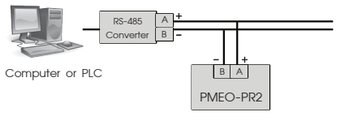


PMEO-PR2-5
Witch CT (Model 0-5 A only)

SERIAL COMMUNICATION

The PMEO-PR2 are Equipped With a RS-485 Series Communication Interface to Allow Connection to Computer or PLCs. MODBUS PROTOCOL is Provided as Standard Communication. The User Can Connect PMEO-PR2 as Network Up to 128 Device.

Wiring Diagram



MODBUS PROTOCOL

This MODBUS PROTOCOL Has Been Implement In Accordance With MODBUS.ORG MODBUS Application PROTOCOL Specification V1.1 With The Following Conditions Applying. The Following Conditions Apply Baudrate Can Selected Refer 22. Speed Setting The Format Is MODBUS RTU Refer 22. Speed Setting The Format Is MODBUS RTU UART Data Can Selected Refer 23. Communication Setting Data Is Considered To Be Half Duplex Using 2 Wire.

Modbus Function code

Function code	Operation	Brodcast
0x03	Read Holding Registers	No
0x04	Read Multiple Registers	No
0x06	Preset Single Registers	Yes
0x10	Preset Multiple Registers	Yes

Code	Name	Meaning
01	ILLEGAL FUNCTION	The function code received in the query is not an allowable action for the server (or slave).
02	ILLEGAL DATA ADDRESS	The data address received in the data field is not an allowable value for server (or slave).
03	ILLEGAL DATA VALUE	A value contained in the query data field is not an allowable value for server (or slave).

Example of a client request and server exception response

Request		Response	
Field Name	(Hex)	Field Name	(Hex)
Slave Address	01	Slave Address	01
Function	04	Function	84
Starting Address Hi	00	Exception Code	02
Starting Address Lo	00	CRC Hi	C2
Quantity of Input Reg. Hi	00	CRC Lo	C1
Quantity of Input Reg. Lo	1E		
CRC Hi	70		
CRC Lo	02		

Data Register

Address	Register Name	Low Limit	High Limit	Byte	Word	Format	Access	Commnet
0	Current Average			2	1	int	R	
1	R Phase Current			2	1	int	R	
2	T Phase Current			2	1	int	R	
3	S Phase Current			2	1	int	R	
4	Fault Status			2	1	int	R	See Fault Status
5	Primary	5	999	2	1	int	R/W	เฉพาะ Series 0-5A
6	Start Daley Time	1	3600	2	1	int	R/W	
7	Set Point	0	999.0	2	1	int	R/W	
8	Over Delay Time	0	3600	2	1	int	R/W	
9	Alarm Hold Function	0	12	2	1	int	R/W	
10	Alarm set Point	0	Set Point	2	1	int	R/W	
11	Hysteresis	0	Set Point	2	1	int	R/W	
12	% Unbalance	0	500	2	1	int	R/W	
13	Hour Counter Setting	0	9999	2	1	int	R/W	
14	Hour Counter Display			2	1	int	R	

FAULT STATUS

Fault Status **0b 0000 0000 0000 0000**

- Reverse Phase
- Unbalance Phase Current
- T Phase Loss
- Over current
- Lock rotor
- Phase R loss
- Phase S loss

PMEO-PR2N

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