

AMP RANGE	MODEL NO.	PRICE CODE NO.
.4 - 10	P-10-10	99-1170
10.1 - 25	P-10-25	99-1171
26 - 50	P-10-50	99-1172

1 INSIDE THE BOX ...

This instruction manual describes the installation and commissioning of the P10 pump protector. The P10 supervises induction motor driven equipment and provides alarms when abnormal conditions are detected. If the machines "normal" load level is exceeded, the internal relay change state and the alarm LED turns red. The output relay contact can be used for alarm indication and/or machine shut-down. The P10 is ideal for many different applications; e.g. as an electronic shear pin and as pump dry running protection, for motors up to 50A.

- Check the delivery. Your shipment should contain the P10 load monitor, a current transformer and this instruction manual.
- Check carefully that the ordered equipment complies with the motors input voltage and that the current transformer rating is as stated on the delivery packaging.
- Check that the contents have not been damaged in shipping.

Note!
If in doubt contact your supplier before starting to install or commissioning the product.

2 SAFETY

- Study this manual thoroughly before installing and using the monitor.
- The monitor must be installed by qualified personal.
- Always disconnect supply circuits prior to installing.
- The installation must comply with standard and local regulations.
- Pay special attention to this SAFETY section and the parts marked "CAUTION!" in sections 4 and 6.
- Should questions or uncertainties arise, please contact your local sales out-let or see chapter 9, SERVICE.

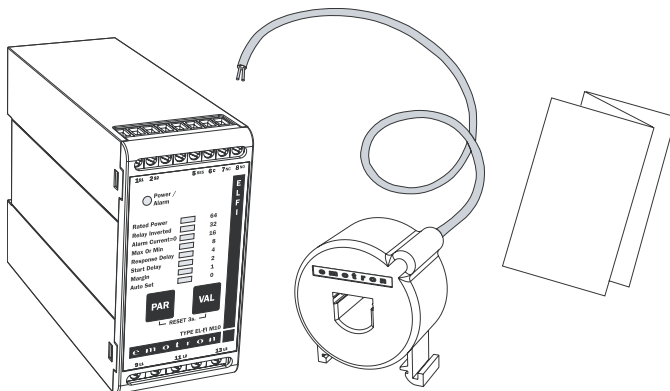
Note!
Removing or breaking the seal on the housing will invalidate the warranty.

3 WIRING

This wiring example shows how the P10 can be used to control the starting and stopping circuit of the motor. Other wiring configurations are possible.

1. The current transformer CTMxxx must be placed in the same phase that is connected to terminal 9, phase L1.
2. For single-phase connection see fig. 2.

Note!
If the START/STOP is connected according to fig. 1, it is recommended that terminals 6 and 7 be by-passed during settings. After the settings are completed the by-pass must be taken out.



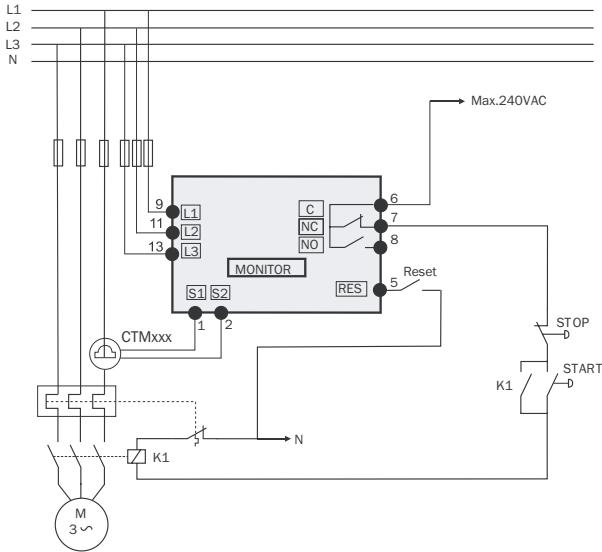


Fig 1. Standard wiring 3-phase motors.

ALTERNATIVE EXAMPLE FOR SINGLE-PHASE CONNECTION

This wiring example shows the alternative connection to be made with regard to a single-phase connection. Refer to fig. 1 for the remaining wiring.

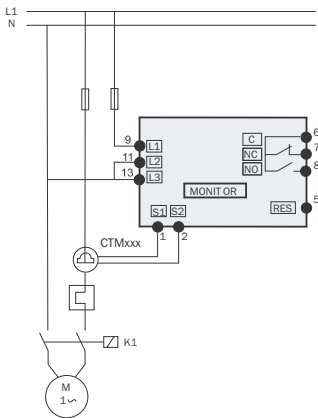


Fig 2. Single-phase wiring example.

LATCHED OR UN-LATCHED ALARM

Un-Latched (Auto Reset) when voltage supplied to terminal 5 and 6. Latched Alarm when terminal 5 and 6 opened (not connected).

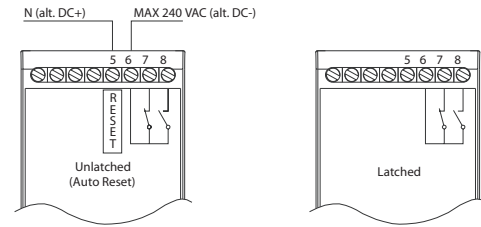


Fig 3. Wiring example for latched or un-latched alarm.

4 SELECTION CURRENT TRANSFORMER

FOR MOTORS UP TO 50 A

1. Check the rated motor current on the motor plate.
2. Compare this value with the Rated Motor Current in table 1.
3. From table 1, select the current transformer and the appropriate numbers of windings.

RATED MOTOR CURRENT (A)	CTM010	CTM025	CTM050
0.40 - 1.00	10		
1.01 - 2.00	5		
2.01 - 3.0	3		
3.1 - 5.0	2		
5.1 - 10.0	1		
10.1 - 12.5		2	
12.6 - 25		1	
26 - 50A			1

Table 1. Current transformer and number of primary windings.

Example

- Rated motor current = 12 A.
- Select 10.1 - 12.5 from the first column in table 1 and choose CTM 025 with two (2) primary windings.

Note!

Max length of CTM cable is 1 m (39.37 in). For motors with rated current over 50 A contact your supplier.

CAUTION!
Terminals 1 and 2 (S1, S2) carry live voltage.

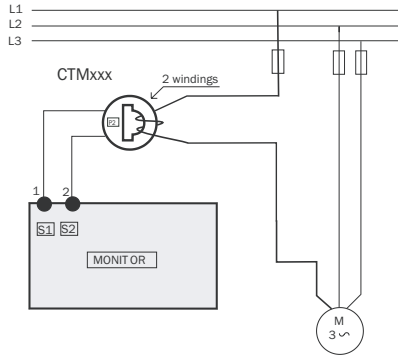


Fig 4. Example: CTM 025 with 2 windings for an 12 A motor.

Note!
Normally the appropriate Current Transformer (CTM xxx) will have been ordered and shipped with the P10, check that this is the case; contact the supplier if in doubt.

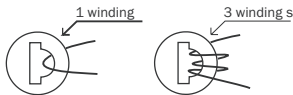


Fig 5. Example 1 and 3 windings.

Note!
The transformer connection and orientation are not polarity sensitive, but must be connected to L1.

5 OPERATION

LED

- A constant green LED indicates a parameter type.
- A flashing green LED indicates a value.

Under normal system operation, the eight LED's are all off (see table 2). Any LED's illuminated will be automatically switched off 30 seconds after the last key press.

AUTO SET

The alarm load level is automatically set by the AutoSet function, see section 6.

The value for a parameter, e.g. seconds, kW, HP or margin, can only be set as 0, 1, 2, 4, 8, 16, 32 or 64. Select closest value.

Current input

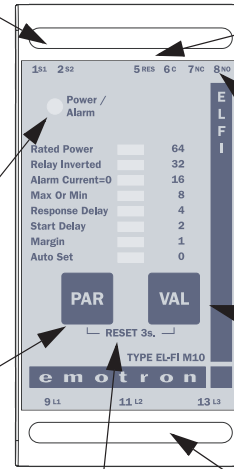
Terminal 1 and 2. Current Transformer; CTM 010, 025 or 050 (Max 50 A motor).

Power/Alarm

The Power/Alarm LED indicates green at "power on" and at normal load. Red at alarm.

PAR

Parameter change (LED light constant green) - pressing PAR key when parameter is displayed proceeds to next parameter.



Reset input

Terminal 5 and 6 are used for external reset and selection of latched/unlatched alarm.

Relay output

Terminal 6, 7 and 8 output relay.

VAL

Value setting - Pressing VAL key when green LED is flashing increases value. A changed value is confirmed by pressing PAR.

Motor terminals

Terminal 9 (L1), 11 (L2) and 13 (L3) for supply and motor voltage input.

Reset

Reset a latched alarm by pressing both PAR and VAL at the same time in 3 s.

6 PROGRAMMING

Set-up the monitor as below:

CAUTION!

Make sure that all safety measures have been taken before switching on the supply voltage and starting the motor/machine in order to avoid personal injury.

Set-up and first start

- Switch on the supply voltage - Power LED turns green.
- Press PAR once - "LED" AUTO SET turns green.
- Keep pressing PAR until the desired parameter is selected e.g. RATED POWER, see table 2 and 3.
- Press VAL - Factory set value or earlier set value flashes e.g. "64".
- Keep pressing VAL until desired value is displayed (0 - 64).
- Confirm chosen value by pressing PAR.
- Press PAR again and repeat steps B to F for all parameters except for AUTO SET. See table 2, 3 and fig. 6 for possible value setting for each of the eight parameters.

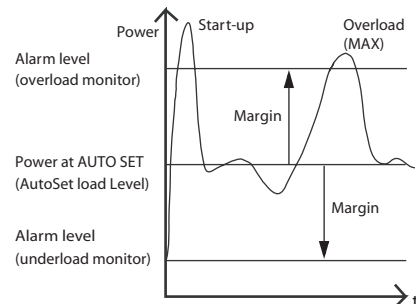


Fig 6. Alarm level and margin.

H. Start and run motor/system at normal load conditions, also wait until the START DELAY has expired.

Hint!

Short-circuit the output relay during the set-up, this prevents the equipment to stopping unintentionally, see Note! in section "Wiring".

- I. Press PAR once - "LED" AUTO SET turns green.
- J. Press and hold VAL for 3 seconds, at normal machine load. The Auto Set load level is automatically set and the LED is switched off.
- K. Set/re-set e.g. start delay, response delay, margin etc. if necessary (see table 2, 3 and fig. 6).

Example: Conveyor with overload protection

Conveyor with overload protection, motor 11 kW (fig. 6).

- 1. Check output power on motor plate and see table 3 (11 kW = Rated Motor Power 6.1- 12) - setting 8.
- 2. Switch on the supply voltage - Power LED green.
- 3. Press PAR once - "LED" AUTO SET turns green.
- 4. Keep pressing PAR until RATED POWER is selected.

- 5. Press VAL - Value "64" flashes (factory setting).
- 6. Set recommended value according to table 3. Keep pressing VAL until chosen value (8) flashes.
- 7. Confirm chosen value by pressing PAR.
- 8. Press PAR again and select MAX.
- 9. Press VAL. Chose the factory setting MAX - Overload Protection - "1".
- 10. Confirm chosen value (1) by pressing PAR.
- 11. Press PAR again and select RELAY INVERTED.
- 12. Press VAL. Chose the factory setting "no" = "0".
- 13. Confirm chosen value (0) by pressing PAR.

The above parameters are necessary to set for safe functioning. Note that "Rated power" for the motor must be set before Auto Set.

Hint!

Change the load on the machine to find out if appropriate load limit margin is set correctly. You can also reduce the margin by one or more steps to find out at what level the machine will trip. See fig. 6. Set/reset e.g. start delay, response delay, trip margin etc. if necessary (see table 2).

PARAMETER	VALUE	FACTORY SETTINGS	NOTE
RATED POWER	0 1 2 4 8 16 32 64	64	0 = Relay activated at alarm
RELAY INVERTED	0 (no) 1 (yes)	0	Alarm at no motor current
ALARM CURRENT = 0	0 (no) 1 (yes)	0	0 = under load
MAX OR MIN	0 (MIN) 1 (MAX)	1	1 = overload alarm
RESPONSE DELAY	0 1 2 4 8 16 32 64	2	Response delay in seconds (0=50 ms)
START DELAY	0 1 2 4 8 16 32 64	2	Start delay in seconds
MARGIN (% of rated power)	0 1 2 4 8 16 32 64	8	Load change for alarm sensitivity, fig. 6
AUTO SET	AutoSet load level is automatically set if VAL pressed key is for 3 seconds.		when AutoSet level is set.light. LED bar is switched off LED parameter AUTO SET is VAL key must be pressed when

Table 2. Parameters and values.

SETTING	RATED MOTOR POWER IN KW OR HP
0	0 - 0.5
1	0.51 - 1.5
2	1.51 - 2.5
4	2.51 - 6
8	6.1 - 12
16	12.1 - 24
32	24.1 - 48
64	48.1 - 75

Table 3. Setting of rated motor power

