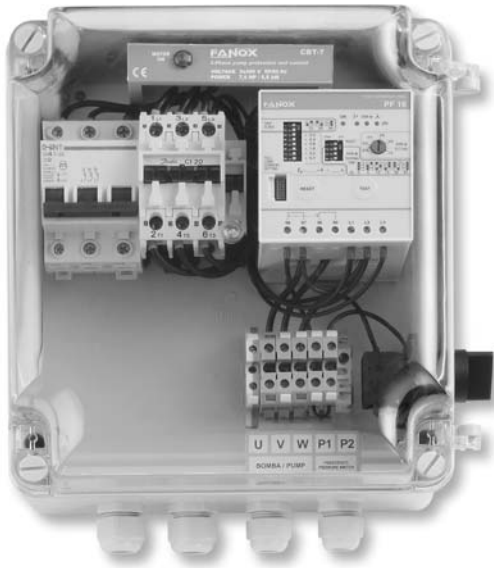


# INSTRUCTIONS MANUAL

## PROTECTION AND CONTROL PANELS FOR THREE-PHASE SUBMERSIBLE PUMPS



Models	Code	Range (A)	Motor 3 x 400 V 50/60 Hz	
			HP	kW
CBT-1	12301	1 ... 2.5	0.5 - 0.75 - 1	0.37-0.55-0.75
CBT-2	12302	2.5 ... 4.5	1.5 - 2	1.1 - 1.5
CBT-5	12305	4.5 ... 11	3 - 4 - 5 - 5.5	2.2-3-3.7-4
CBT-7	12307	11 ... 16	7.5	5.5
CBT-10	12310	16 ... 20	10	7.5

### Main description

- Protections:
  1. Dry running by power factor ( $\cos \varphi$ ).
  2. Overload with thermal memory.
  3. Phase loss or phase unbalance.
  4. Incorrect phase sequence.
  5. Short-circuit.
- Manual/remote or automatic reset (every 15 minutes approximately).
- Indicates cause of tripping.
- Control point for pressure switch, buoy, programmer...

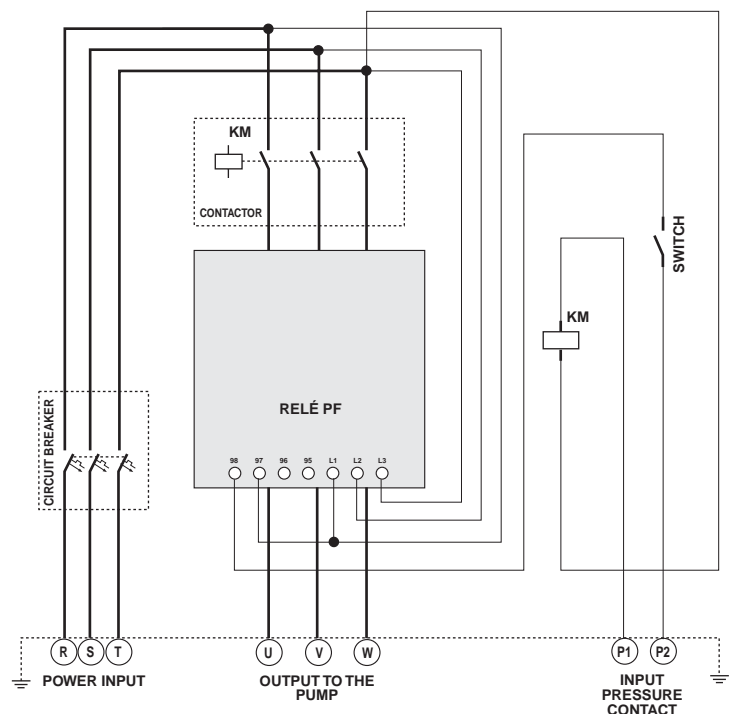
### Connexion diagram

To prevent electrical shocks whilst installing or operating the relay, disconnect the power supply.

1. Check that the auxiliary voltage supply is correct.
2. Connect the wires of the motor to U, V and W. Check that the phases have been placed in the correct sequence.
3. If terminals P1 and P2 are not going to be used for a pressure switch, a buoy, a timer, etc., they must be bridged with a cable.
4. Connect the power input to the terminals of the circuit breaker. Check that the phases have been placed in the correct sequence.

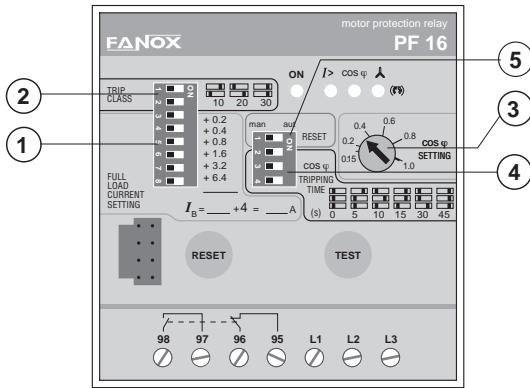
### Parts

- Plastic case with transparent lid, 230 x 250 x 150 mm.
- Circuit breaker 3P.
- Fanox PF electronic relay.
- Contactor.
- Stop/automatic switch.
- Connecting strip.
- Cable glands.



## Settings

Depending on the characteristics of the motor and of the installation, some simple adjustments must be made to the PF relay.



### Signalling

**ON** : relay in service  
**I>** : Tripping due to overload  
**cos φ** : Tripping due to underload  
**(P)** : Tripping due to incorrect phase sequence

### ① Current setting $I_B$ "Full load current"

This adjustment is to be made according to the nominal current of the motor  $I_N$  indicated in its characteristics plate (see panel)

In order to calculate the  $I_B$  to be adjusted in panels CBT-1 and CBT-2, the  $I_N$  has to be multiplied by 4 and 2 respectively.

In the rest of the cases, the  $I_B$  to be adjusted must be the same as the  $I_N$  of the motor.

Ref.	$I_B$ to be adjusted	Relay
CBT-1	$I_N \times 4$	PF 16
CBT-2	$I_N \times 2$	PF 16
CBT-5	$I_N$	PF 16
CBT-7	$I_N$	PF 16
CBT-10	$I_N$	PF 47

- With all the micro-switches to the left (OFF), the set current is the basic current of the relay (4A for the PF 16 and 16A for the PF 47)
- When we place a micro-switch to the right (ON), we add its value to the basic current. To obtain the necessary  $I_B$ , these values must be combined.

### Examples:

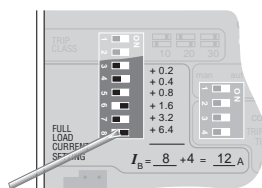
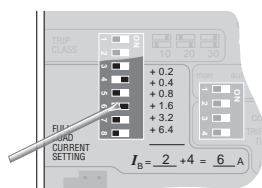
#### CBT-2 Panel.

Supposing that the nominal current of the motor, indicated on its characteristics plate is 3 A.

The current to be set will be:  
 $I_B = I_N \times 2 = 3 \times 2 = 6 \text{ A}$   
 $6 \text{ A} = 0,4 + 1,6 + 4$

#### CBT-7 Panel

$I_N = 12 \text{ A}$   
 $I_B = I_N = 12 \text{ A}$   
 $12 \text{ A} = 1,6 + 6,4 + 4$

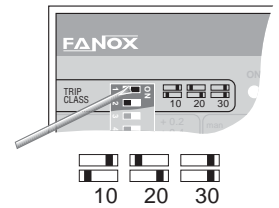


### ② Trip class setting "Trip class"

The different trip classes allow to adapt the overload protection to the different applications of motors.

For submersible pumps, adjust to class 10 (recommended value).

Place the first micro-switch to the right (ON) and the second to the left (OFF).

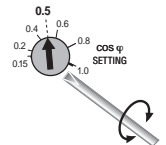


### ③ Underload setting "cos φ setting"

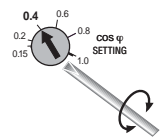
The adjustment of the underload trip level by  $\cos \varphi$  is made through a potentiometer graduated from 0.15 to 1.0.

#### 3.1 Quick adjustment:

a) If the pump is adequately dimensioned, the recommended value for the adjustment of the  $\cos \varphi$  is 0.5. This applies in the majority of cases. Adjust the potentiometer "cos φ setting" to 0,5



b) If the power of the motor is excessively dimensioned and during its functioning, unwanted trips should occur, the  $\cos \varphi$  adjusted factor should be reduced to 0.4.



#### 3.2 Step-by-step adjustment:

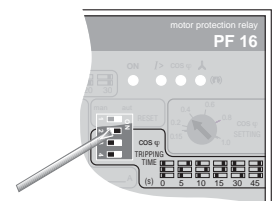
If the above mentioned  $\cos \varphi$  values are unknown, the underload trip setting can be made in the following way:

- Set the underload trip delay to zero by moving the three dipswitches to the left (trip delay).
- Using the potentiometer ( $\cos \varphi$  setting), set the  $\cos \varphi$  value to the minimum 0,15.
- Start up the motor and run it with the minimum estimated load.
- Slowly turn the  $\cos \varphi$  potentiometer clockwise until the relay trips and the  $\cos \varphi$  LED lights up.
- Turn the  $\cos \varphi$  potentiometer anticlockwise until the  $\cos \varphi$  is set at approximately 30% less than the previous value (point 4).
- Set the underload trip delay using the 3 corresponding dip switches.

### ④ Cos φ trip delay setting "cos φ tripping time"

Recommended time 5 seconds.

Place the first micro-switch to the right (ON) and the second and third to the left (OFF).



### ⑤ Reset mode setting "Reset"

To choose this mode, place the gliding micro-switch in "auto" position, to the right.

After any kind of trip, the reset will occur automatically after 20 minutes, uninterruptedly.

