PROTECTION AND CONTROL PANELS FOR THREE-PHASE SUBMERSIBLE PUMPS WITH SOFT STARTER

FANOX

CBS

Modelos	Código	Rango (A)	Motor 3 x 400 V 50/60 Hz	
			CV	kW
CBS-2	12321	3,8	0,5 a 2	0,37 a 1,5
CBS-3	12322	5,5	3	2,2
CBS-5	12323	7 a 9,5	4 a 5,5	3 a 4
CBS-7	12324	13	7,5	5,5
CBS-10	12326	16,5	10	7,5
CBS-12	12327	21	12,5	9,2
CBS-15	12328	24	15	11
CBS-20	12329	32	20	15
CBS-25	12330	40	25	18,5
CBS-30	12331	47	30	22
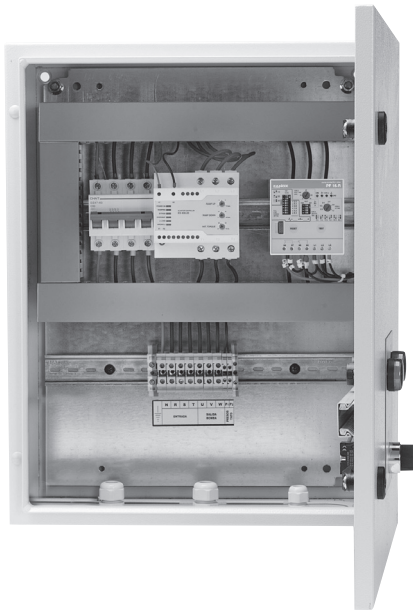
Main description

- Protections:
  - cos φ Dry running by power factor (cos φ).
  - $I>$ Overload with thermal memory.
  - ⅄ Phase loss or phase unbalance.
  - (ȹ) Incorrect phase sequence.
      Short-circuit.
- ⌐⌐ Soft Start and Stop.
- Manual/remote or automatic reset (adjustable from 2 to 75 m).
- Indicates cause of tripping.
- Control point for pressure switch, buoy, programmer…

Parts

- Metallic case:
  - From 0,5 to 5,5 CV: 400 x 300 x 200 mm, IP55
  - From 7,5 to 15 CV: 500 x 400 x 200 mm, IP55
  - From 20 to 25 CV: 600 x 400 x 200 mm, IP55
  - From 30 CV: 600 x 500 x 200 mm, IP55
- Circuit breaker 3P+N.
- Fanox PF electronic relay.
- Soft Starter ES 400.
- Switch ON/OFF
- Signalling LED´s
- Connecting strip.
- Cable glands.

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 4 and 5 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 if not, the LED ⅄ (ȹ) shall remain lit. In this case, two of the three network lines of the circuit breaker must be disconnected (e.g. R and T) and their position must be changed to establish the correct sequence.
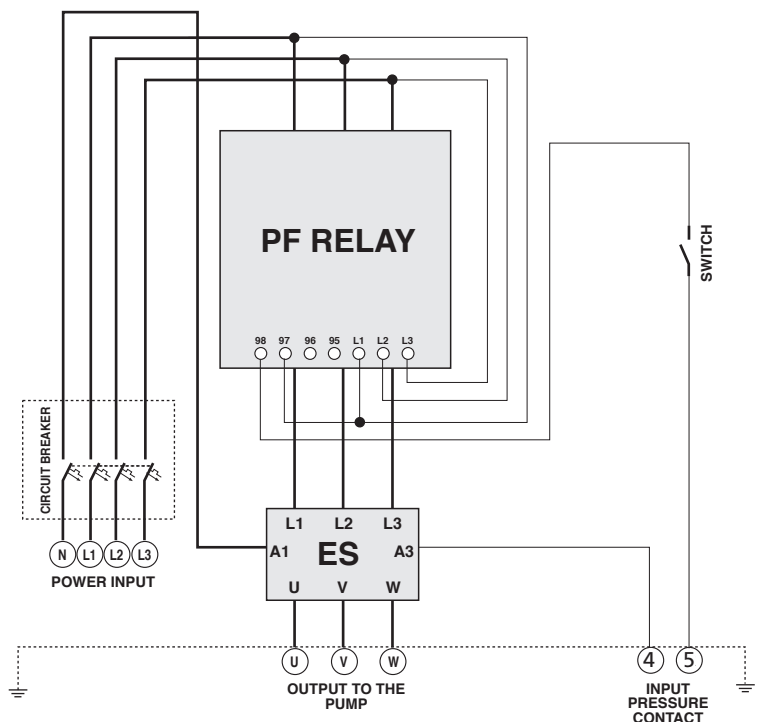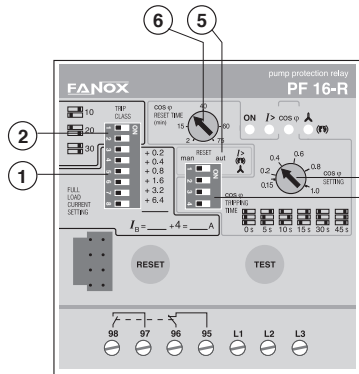
Soft starter (ES) adjustments:
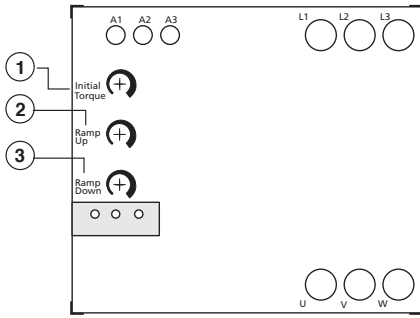
① Ramp-up time. Time from zero load to full load voltage.

② Ramp-down time. Time from full load to zero load voltage.

③ Initial Torque. % torque when ramp-up begins.

PF relay adjustments:

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

⅄ : Tripping due to phase loss or unbalance

(☏) : 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).

I_B to be adjusted must be the same as the I_N of the motor.

• With all the micro-switches to the left (OFF), the set current is the basic current of the relay (4A for the PF 16-R and 16A for the PF 47-R).

• 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.

Example:

CBT5-AS Panel

I_N = 10A

$I_B = I_N$ = 10A

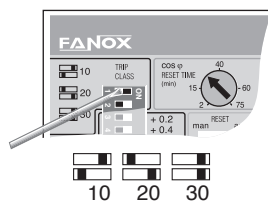10A = 4+(0,4+0,8+1,6+3,2)
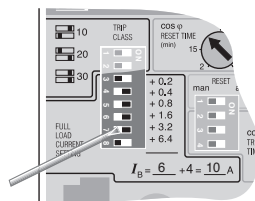
② Trip class setting "Trip class"

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).
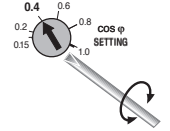

③ Underload setting "cos φ setting"

The adjustment of the underload trip level by cos φ is made trough a potentiometer graduated form 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 φ is 0.5. This applies in the majority of cases. Adjust the potentiometer "cos φ setting" to 0,5
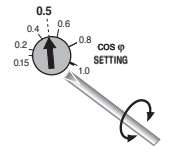
b) If the power of the motor is excessively dimensioned and during its functioning, unwanted trips should occur, the cos φ adjusted factor should be reduced to 0.4.


3.2 Step-by-step adjustment:

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

1. Set the underload trip delay to zero by moving the three dipswitches to the left (trip delay).

2. Using the potentiometer (cos φ setting), set the cos φ value to the minimum 0,15.

3. Start up the motor and run it with the minimum estimated load.

4. Slowly turn the cos φ potentiometer clockwise until the relay trips and the cos φ LED lights up.

5. Turn the cos φ potentiometer anticlockwise until the cos φ is set at approximately 30% less than the previous value (point 4).

6. 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).
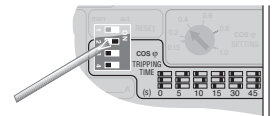
⑤ Reset mode setting "Reset"

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

After **I>** trip, the reset will occur after 4 minutes approximately, uninterruptedly, until normal conditions are recovered.

After **⅄** or **(☏)** trip, the reset will occur after 4 minutes, only if normal conditions have been recovered.
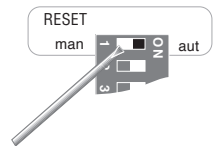
⑥ Cos φ Reset time setting

The adjustment of the reset time is made through the potentiometer ⑥ graduated from 2 to 75 minutes. Following the trip by cos φ, the reset will occur after the period of time adjusted.
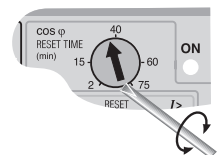
It is possible to extend the reset to 525 minutes via the PR-RM module