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REEFE DIGITAL

PRESSURE SWITCH

INSTRUCTION MANUAL

MODEL: EPS2T
CODE: 28421

CONTENTS

1. GENERAL

Carefully read the instructions before installing this unit. Verify the technical characteristics of the motor to assure the compatibility with the device. Since these units are rated at IP55, they need to be suitably protected from the weather, and the sun, by way of a cover. The membrane over the front panel can be susceptible to warping when damaged by excessive sun exposure and, thereby, allow ingress of water into the electrical internals of the switching device.

2. DESCRIPTION (diagram A)

EPS 2T is an electronic pressure switch with integrated digital manometer. It manages the start and stop of **three-phase** pumps up to 4kW (5,5 HP). Cut-in and cut-out pressures are easily adjustable through the users control panel.
Wiring is analogous to the traditional electromechanical switch.
It can operate as a differential pressure switch and as reverse pressure switch.
Unit EPS 2T in addition to all the features of the basic EPS includes instantaneous reading of current drawn. This patented system controls and manages the overcurrent, dry-run operation and fast-cycling.
Unit EPS 2T in addition to all the features of individual assembly includes the option to be synchronized to another unit EPS 2T managing and protecting 2 pumps operating in cascade with alternated starting sequence.

3. Operating Characteristics

- Adjustable cut-in and cut-out pressures.
- Integrated digital pressure gauge with bar and psi indication.
- Inner pressure transmitter.
- Dry-run protection: through the instantaneous current consumption in case of.
- Overload protection.
- Overvoltage protection.
- Short-circuit and phase-loss protection.
- ART Function (Automatic Reset Test). When the device has stopped the pump by the intervention of the dry-running protection system, the ART tries, with scheduled basis, to re-start the pump in order to restore the water supply. See “ART. Automatic reset function”. Must be activated in the step 5 of the ADVANCED MENU (Ar1).
- Fast cycling: when the hydropneumatic tank has lost too much air and, consequently, frequent start-stop cycles are produced this alarm is activated and is delays the start of the pump. Activated (rc2).
- Manual start push-button (ENTER).
- 3 operation modes: differential, reverse and synchronized.
- Control panel with 3-digit display, LED indicator lights and push-buttons.
- Available settings:
    - Stand-by mode.
    - Minimum period between fast cycles.
    - Start and stop delay.

4. Technical Characteristics

Rated Motor Power	4,4kW (5,5HP)
Power Supply	~3 x 230-400 Vac
Electric Outlet	~3 x 230-400 Vac
Pressure Max	1,2 MPa
Frequency	50/60Hz
Max. Current	10 A
Protection degree	IP55
Max water Temperature	40°C
Max environment Temperature	50°C
Max relative humidity	80% (31ºC) - 50% (40ºC)
Cut-in range (start pressure)	0,5÷11,5 bar
Cut-out range (stop pressure)	1÷12 bar
Max. differential (Pstop-Pstart)	11,5 bar
Minimum differential (Pstop-Pstart)	0,5 bar
Factory Setting (start/stop)	3/4 bar
Hydraulic inlet	G1/4" Female - Rotative nut
Net weight (without cables)	0,654 kg

5. Hydraulic Installation (diagram A)

EPS 2T equipment must be threaded to a fitting G1/4" male at the pumps outlet.
Before connecting the EPS 2T verify that the hydraulic system is properly installed, especially if the hydropneumatic tank is pressurized.

6. Electronic Connection (diagram B)

The electric connection must be performed by qualified personal in compliance with regulations of each country. Before making changes inside the device, it must be disconnected from the electric supply.
Wrong connection could spoil the electronic circuit.

The manufacturer declines all responsibility in damages caused by wrong connections.
When carrying out the electrical connection it is compulsory to use a differential switch of high sensitivity: I = 30 mA (class A o AC). It is compulsory to use a magnetothermic switch adapted to the motor load.
Check if the power supply is between 230-415V.

If you have purchased the unit without cables, follow diagram B:

- Use cables type H07RN-F 4G1 or 4G1,5 with section enough to the power installed. Do the pump connection U, V and Earth (SW1-2) or C1, C2 and to the control panel (Only SW3)
- Do the pump connection U, V, W and ⏚
- Do the power supply connection L1, L2, L3 and ⏚
- The earth conductor must be longer than the others. It will be the first one to be mounted during the assembly and the last one to be disconnected during the dismantling. **The earth conductors' connections are compulsory!**

7. Control Panel (diagram C)

The meanings of the different control panel elements are summarized on the following tables, where:

- O means lit LED light.
- ((O)) means slow-flashing.
- (((O))) means fast-flashing.

DISPLAY	ACTION
OPERATION MODE	Is showed on screen instantaneous pressure or instantaneous current consumption
ADJUSTMENT MODE	Is displayed on screen the adjusted start pressure blinking. Is displayed on screen the adjusted stop pressure blinking. Is displayed the adjusted rated current blinking.
ALARM MODE	Is displayed the alarm code
STAND-BY MODE	Are displayed 3 flashing dots
BASIC CONFIG. MODE	Displays the sequence of basic configuration parameters
ADVANCED CONFIG. MODE	Displays the sequence of advanced configuration parameters

LEDS	STATE	MEANING
bar	O	It indicates the instantaneous pressure in bar
	((O))	It indicates the instantaneous pressure in bar + pump operating
psi	O	It indicates the instantaneous pressure in psi
	(O)	It indicates the instantaneous pressure in psi + pump operating
A	O	It indicates the instantaneous current consumption in Ampere units
START	((O))	Pump is ON
	O	Is displayed the start pressure
	((O))	Adjusting start pressure
STOP	O	Is displayed the stop pressure
	((O))	Adjusting stop pressure
	O	Ratified dry-running or overload alarms
	((O))	Dry-running alarm performing ART or overload alarm preforming any of the 4 restore attempts
	(((O)))	Fast-cycling alarm
v	O	It indicates the instantaneous voltage consumption in voltage units

P-BUTTON	TOUCH	ACTION
	click!	**From state ON:** unit OFF. **From state OFF:** the pump starts and keeps opera- ting until reaching Pstop **From any configuration MENU:** the parameter value is accepted.
	HOLD DOWN	**From state ON:** unit OFF. **From state OFF:** the pump starts and keeps operating until the push-button is released.
	click!	Pstart is displayed on the screen for 3 seconds
	3”	Pstart adjustment mode.
	click!	Pstop is displayed on the screen for 3 seconds.
	3”	Pstart adjustment mode.
	click!	Displays instantaneous voltage. If it is already displayed, then we switch to instantaneous pressure view.
	3”	Rated current adjustment.
	click!	Displays instantaneous voltage. If it is already displayed, then we switch to instantaneous pressure view.
	3”	Adjust rated voltage between different options: 110V, 125V, 220V, 230V, 380V, 400V.

8. Startup (diagram C)

Before starting the device, please read the previous sections, especially “Hydraulic Installation” and “Electrical connection”.

Follow next steps:

1. Set the power supply voltage
   - Press V for 3 second duration.
   - The voltage value is displayed on screen, LED V lights up and the display is flashing.
   - The current intensity value is displayed on screen, LED A lights up and display is flashing.
   - By mean of + and − is adjusted the power supply voltage. See Note 1.
   - Press ⏻ for validation.
2. Set the pump rated current intensity value.
   - Press A for 3 second duration.
   - The current intensity value is displayed on screen, LED A lights up and display is flashing.
   - By mean of + and − is adjusted the rated current reflected in the characteristics plate of the motor. See Note 2.
   - Press ⏻ for validation.
3. Start the device by pressing ⏻
4. Set the cut-in (start) pressure:
   - Press + for 3 second duration
   - The start pressure value is displayed on screen, LED START lights up and the display is flashing.
   - By mean of + and − is adjusted the start pressure from 0,5 to 11,5 bar (+ version=11 bar).
   - Press ⏻ for validation.
5. Set the cut-out (stop) pressure:
   - Press − for 3 second duration
   - The start pressure value is displayed on screen, LED START lights up and the display is flashing.
   - By mean of + and − adjust the stop pressure between 1 and 12 bar (+ version=12 bar).
   - Press ⏻ for validation.
6. The unit is ready to operate but more optional adjustments can be set through basic and advanced MENUS. See the next chapter.

Remark 1: it is important to enter the exact power supply voltage specified on the nameplate.Please note that it is not mandatory but is an optional setting to activate the voltage alarms. The Voltage setting can be set to “OFF” and the unit will work without any problem.

Remark 2: it is important to state the exact current specified on the nameplate of the pump.

9. Basic Menu + (diagram C)

- Press simultaneously + for 5 second duration.
- By mean of and the values can be changed.
- Press for validation.
- The parameters sequence is :

it	TYPE		SYSTEM REACTION	FACTORY SETTING
1	BAR	P	We can select the pressure units displayed between bar and psi.	bar
2	rc0	rc2	Fast-cycling alarm: • rc0: alarm is unabled • rc1: activated, when hammering is detected, it delays the start to protect the pump. • rc2: activated and the pump is stopped on detection.	rc2
3	r.01	r.99	Only if fast-cycling alarm has been activated in the previous step (rc1&rc2). Choose the maximum time between 3 consecutive starts, that will be considered fast cycling (between 1 sec. and 99 sec.)	3 seconds
4	Sb0		Stand-by mode activated (Sb1), for low power consumption, or unabled (Sb0).	Sb0

10. Advanced Menu + +

- Press simultaneoulsy + + for 5 second duration.
- By mean of or the values can be changed.
- Press for validation.

- The parameter sequence is:

it	TYPE		SYSTEM REACTION	FACTORY SETTING
1	nc	no	Select the operation MODE as a conventional pressure switch (nc = normally closed) or reverse (no = normally open). *see remark 3	nc
2	E00	E01/02	Select the operation mode individual (E00) or Master/Slave (E01/E02) in case of be assembled in groups of two pumps.	E00
2.1	d.05	d.1	Sets the minimum gap between Pstart 1 and Pstart 2 and/or Pstop1 and Pstop 2.	d.05
3	ct0	ct9	Sets a time delay between 0 and 9 seconds to the start (is not available in synchronized operation mode).	ct0
4	dt0	dt9	Sets a time delay between 0 and 9 seconds to the stop.	dt0
5	AE1	AE0/AE2	(Only EPS 2). Select **AE0** to disable dry run alarm by current consumption. To have a dry run protection, the minimum pressure value must be set. Select **AE1** to enable dry run alarm without auto-learning mode. In this mode, the SW2 will learn the real consumption of the pump. Select **AE2** to enable dry run alarm without auto-learning mode. In this case, when the pump consumes a 40% less of the value set as rated current, the dry run alarm will appear.	AE1
6	Ar0	Ar1	Activation of the automatic restore system ART (Ar1) or disable (Ar0)	Ar0
7	P0.0	Px.x	It allows setting a minimum operating pressure under which the device would determine dry-running operation.	0 bar 0 psi
7.1	t05	t99	Set the time period between 5 and 99 seconds below the minimum operating pressure that will be considered a dry-running operation.	20”
8	c10	c30	It allows setting a % of nominal current above which the device will activate the overcurrent protection.	c20
9	H00	H99	Anti-flooding configuration. If activated, it stops the pump after programmed time (in minutes) of continuous operation. Disabled (H00), 1 minute (H01)... 99 minutes(H99)	H00
9.1	co1	co0	Only in case of tE1 activated. co1: nc (normally closed contact). co0: no (normally open contact).	co1
10	H00	H99	Anti-flooding configuration. If activated, it stops the pump after programmed time (in minutes) of continuous operation. Disabled (H00), 1 minute (H01)...99 minutes (H99)	H00
11	r	rS1	If we change rS0 to rS1 and push ENTER default values are restored.	rS0

Remark 3: by choosing “no” (normally open) it will operate as an auxiliary pressure control element in the suction of the pump. It will restart when the suction pressure reaches the configured PStart.

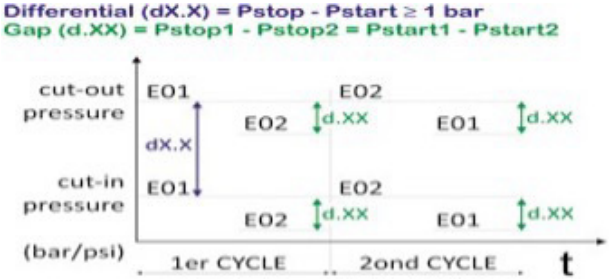
Example:

- **PStop: 0,9 bar**
- **PStart: 1,2 bar**

11. Synchronisation

EPS 2T can be synchronized to another unit EPS 2T managing and protecting 2 pumps operating in cascade with alternated starting sequence. Next steps must be followed:

1. GO TO ADVANCED MENU: + +
   - In **step 2**: select E01 in a unit (this one will be the master) and select E02 in the other unit (this one will be the slave).
   - In **step 3**: select **identical** parameters of gap between pressures d.XX. This is the difference between the starting pressure of main and auxiliary pumps, it is also the difference between stop pressures of both pumps.



2. Press repeatedly until exit the ADVANCED MENU.
3. SET **identical** cut-in and cut-out pressures in both units.

To optimize the synchronization, the minimum difference between the start and stop pressures must be at least 1 bar.

4. Press to disable the units. Is displayed “OFF”.
5. Press again in both units to activate the synchronization.

Remark 4: after 10 cycles the unit configured E01 will display pressure and the unit configured E02 will display current in Amps.

12. Pressure Sensor Calibration

In case of wrong lecture of the pressure sensor it can be adjusted again. For pressure sensor calibration it is necessary to have a pressure gauge in the installation. Proceed following next steps:

ZERO REGULATION

1. Press ENTER to disconnect the device.
2. Open the taps and leave the hydraulic net without pressure
3. Press simultaneously the buttons and until the display show 0.0 flashing

FULL SCALE

1. Start the pump until the pressure switch cuts-out.
2. Press the buttons and till the display flashes with a figure.
3. Adjust the pressure with the arrows push-buttons to get the pressure desired.
4. Press to validate.

Remark 5: pressure sensor de-calibration should not be a normal event. If it is frequently repeated contact the technical service.

13. Register Operation Data and Alarms ▲ + ▼ + A

- Press simultaneously A + ▲ + ▼ for 5 seconds duration.
- Press ● to advance in the REGISTER.
- The DATA sequence is:

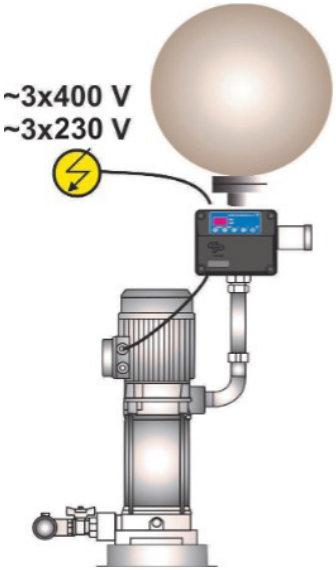
MESSAGE	DESCRIPTION	SCOPE
rEC		
HF xxx	Controller operating hours	0-65535
HP xxx	Pump operating hours	0-65535
CF xxx	Operating cycles Number of start-stop cycles	0-999999
Cr xxx	Number of connections to the power supply	0-65535
A01 xxx	Number of A01 alarms.	0-999
A02 xxx	Number of A02 alarms.	0-999
A04 xxx	Number of A04 alarms.	0-999
A05 xxx	Number of A05 alarms.	0-999
A08 xxx	Number of A08 alarms.	0-999
A09 xxx	Number of A09 alarms.	0-999
A11 xxx	Number of A11 alarms.	0-999
A27 xxx	Number of A27 alarms.	0-999
APM xxx	Number of over-pressure alarms (---).	0-999
rPM x.x	Maximum registered pressure.	
rSt	ENTER -> EXIT. ▲ + ▼ -> All the alarms are restored expect the operation data.	

14. Warnings and Alarms

COD.	ALARM	DESCRIPTION	SYSTEM REACTION
A01	O	DRY RUNNING	When a dry-run operation is detected, the pump is automatically stopped. By means of pressing ENTER the normal operation can be manually restored.
	((O))		After the activation of the dry-running alarm if the Automatic system reset (ART) is enabled, a first attempt at 5 minutes and then an attempt every 30 minutes for 24 hours is performed to restore the normal operation. This alarm can also be reset manually with the ENTER push-button. If the alarm persists after 24 h we find a definitive alarm.
A11	O	DRY RUNNING (BY MINIMUM PRESSURE)	Is displayed during normal operation if the pressure is below the minimum pressure (Px.x) - previously set - during a period (txx) - also previously set - in the ADVANCED MENU. If at any time the pressure exceeds the minimum pressure, the operation is restored automatically, and the alarm is cleared. Normal operation can also be restored manually by pressing ENTER.
A02	O	OVERLOAD	Overcurrent alarm is activated when the nominal pump current is exceeded. 4 automatic reset attempts prior to the final alarm are performed. During the attempts, display will show current. Normal operation can also be restored manually by pressing ENTER.
	((O))		
A04	(((O)))	FAST CYCLING	This alarm can be unabled or activa- ted in the BASIC MENU. The alarm is activated when 3 consecutive cycles occur in a range lower than the set time (between cycle and cycle). If it has been activated rc1, this alarm does not stop the normal operation but are added 5 seconds to the start delay in order to protect the electric pump. If it has been activated rc2, the pump is stopped. To RESET the normal operation press ENTER.
A05	O	DAMAGED PRESSURE TRANSMITTER	CONTACT WITH YOUR SUPPLIER.
A08	O	OVERVOLTAGE	Overvoltage alarm is activated when the power supply voltage is exceeded. 4 automatic reset attempts prior to the final alarm are performed. During the attempts display will show. Normal operation can also be restored manually by pressing ENTER.
	((O))		
A09	O	UNDERVOLTAGE	Undervoltage alarm is activated when the power supply voltage is under the minimum. 4 automatic reset attempts prior to the final alarm are performed. During the attempts, display will show. Normal operation can also be restored manually by pressing ENTER.
	((O))		
A27	O	SHORTCIRCUIT	Short-circuit alarm occurs if the rated current is exceeded by 40% in less than one second. It may be due to a phase failure or a short circuit in the motor. 4 automatic reset attempts are made before proceeding to the final alarm. Normal operation can also be restored manually by pressing ENTER.
	((O))		

DIAGRAM A

INDIVIDUAL



GROUPAL

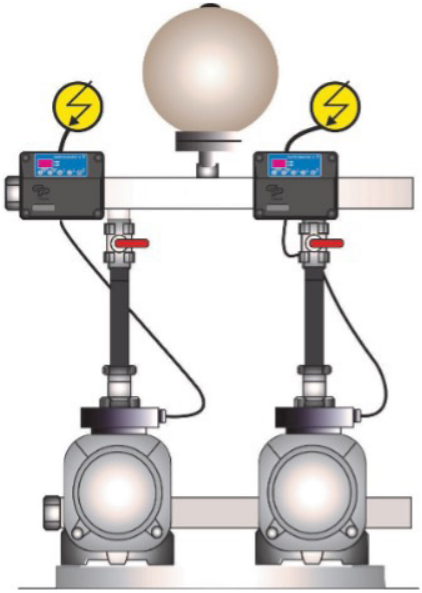
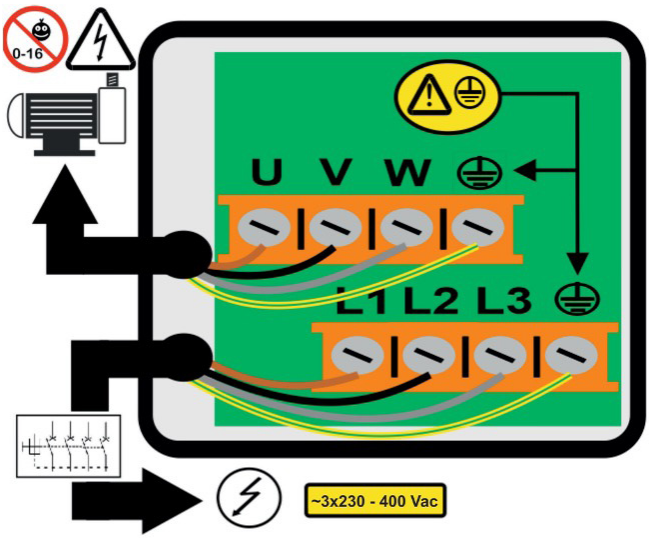


DIAGRAM B:



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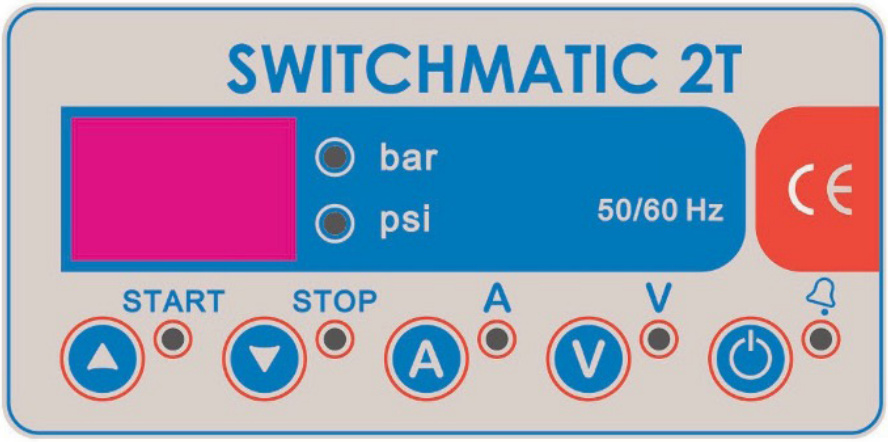
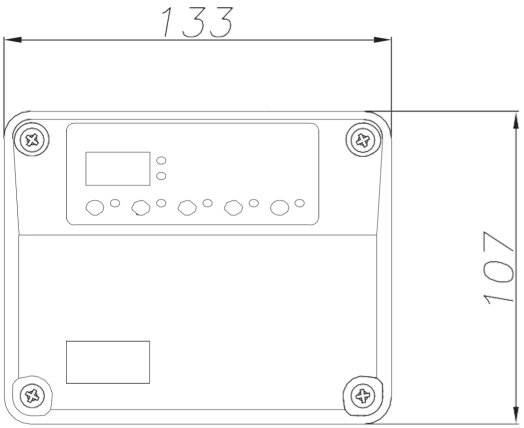
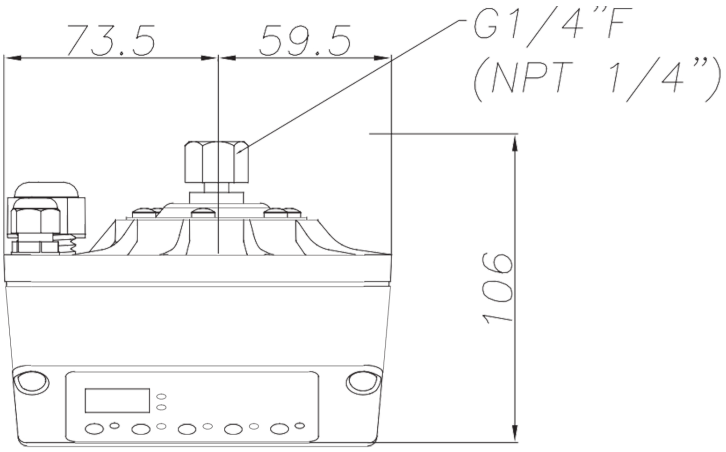


DIMENSIONS:





WARRANTY

2 Year Warranty applies **

**All warranties subject to the current version of the Ascento Standard Terms & Conditions of Warranty which can be found by navigating to www.reefe.au and searching “Warranty”

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