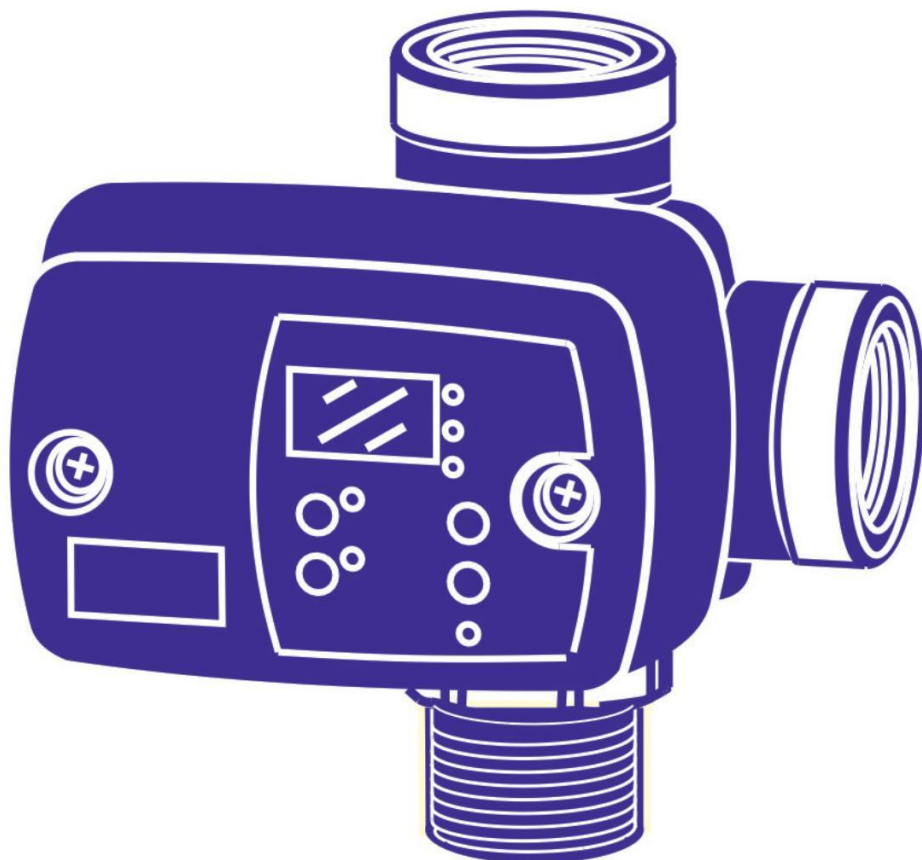


T-KIT SWITCHMATIC SWITCHMATIC 2



EN ADVANCED SETTINGS



Risk of damaging the pressure assemblies and/or the plant.



Risk by electric shock.



Risk for people and/or objects.



ENGLISH

1. GENERAL

Read carefully the instructions before installing this unit. Verify the technical characteristics of the motor in order to assure the compatibility with the device.

2. DESCRIPTION (diagram A)

T-Kit SWITCHMATIC is an electronic pressure switch with digital manometer integrated in a 3-ways fitting with inner non-return valve. It manages the start and stop of a single-phase pump up to 2.2kW (3 HP) (SW1-2). 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 T-Kit SWITCHMATIC 2 in addition to all the features of the basic T-Kit SWITCHMATIC includes instantaneous reading of current drawn. This patented system controls and manages the overcurrent, dry-run operation and fast-cycling.

Unit T-Kit SWITCHMATIC 2 in addition to all the features of individual assembly includes the option to be synchronized to another unit T-Kit SWITCHMATIC 2 managing and protecting 2 pumps operating in cascade with alternated starting sequence.

3. CLASSIFICATION AND TYPE

According to IEC 60730-1 and EN 60730-1 this unit is a control sensor device, electronic, independent assembly, programming type A with action type 1B (microdisconnection). Operating value: $I < 20\% I_{learned}$. Pollution degree 2 (clean environment). Rated impulse voltage: cat II / 2500V. Temperatures for ball test: enclosure (75) and PCB (125).

4. OPERATING CHARACTERISTICS (diagram C)

- Adjustable cut-in and cut-out pressures.
- Integrated digital pressure gauge with bar and psi indication.
- Inner pressure transmitter.
- Inner non-return valve.
- Dry-run protection:
 - Through minimum adjusted height for basic T-Kit SWITCHMATIC 1.
 - Through the instantaneous current consumption in case of T-Kit SWITCHMATIC 2.
- Overcurrent protection (only SW2).
- 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 6 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 delayed the start of the pump. Must be activated in the step 2 of the BASIC MENU (rc1).
- Manual start push-button (ENTER).
- 3 operation modes: differential, reverse and synchronized (only SW2).
- 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.

5. TECHNICAL CHARACTERISTICS

- | | |
|---------------------------------------|--|
| • Rated motor power: | 0,37-2,2 kW |
| • Power supply: | ~1 x 110-230 V |
| • Pressure max. | 0,8 MPa |
| • Frequency: | 50/60Hz |
| • Max. current: | 16 A $\cos \geq 0.6$ |
| • Protection degree: | IP55 |
| • Max water Temperature: | 50°C |
| • Max environment Temperature: | 60°C |
| • Cut-in range (start pressure) | 0,5÷7(*11)bar |
| • Cut-out range (stop pressure) | 1÷8(*12)bar |
| • Max. differential (Pstop-Pstart) | 7,5 (*11,5) bar |
| • Minimum differential (Pstop-Pstart) | T-SW2: 0,5 bar
T-SW2 synchro: 1 bar
T-SW1: 0,3 bar |
| • Factory setting (start/stop) | 3/4 bar |
| • Hydraulic inlet | G1" Male
G1" Female (2 u) |
| • Net weight (without cables) | 0,3 kg |

6. HYDRAULIC INSTALLATION (diagram A)



T-Kit SWITCHMATIC equipment must be threaded to the pump outlet G1".

There are 2 outlets G1" female for the hydropneumatic tank and the hydraulic net.

- If the tank is threaded to the outlet at 180 °, it should not be larger than 25 l.
- If the tank is threaded at the outlet at 90 °, it should not be larger than 5 liters.
- If a flexible pipe is used for an horizontal tank and, consequently, does not support weight, there is no dimensional limitation.

Before connecting the T-Kit SWITCHMATIC verify that the hydraulic system is properly installed, especially if the hydropneumatic tank is pressurized.

7. ELECTRIC CONNECTION (diagram B)



The electric connection must be performed by qualified personal in compliance with regulation of each country.

When carrying out the electrical connection it is compulsory to use a differential switch of high sensitivity: $I = 30 \text{ mA}$ (class A or AC). It is compulsory to use a magnetothermic switch adapted at the motor load.

Before doing manipulations 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.

Check if power supply is between 110-230V.

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

- Use cables type H07RN-F 3G1 or 3G1,5 with section enough to the power installed.
- Do the pump connection U, V and \ominus .
- Do the power supply connection L1, N and \ominus .
- 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!**


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8. 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 (only SW2).
ALARM MODE	Is displayed the alarm code
STAND-BY MODE	Are displayed 3 flashing dots
BASIC CONFIGURATION MODE	Is displayed the sequence of basic configuration parameters
ADVANCED CONFIGURATION MODE	Is displayed 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 (only SW1)
psi	O	It indicates the instantaneous pressure in psi
	((O))	It indicates the instantaneous pressure in psi + pump operating (only SW1)
A (only SW2)	O	It indicates the instantaneous current consumption in Ampere units
	((O))	Pump ON
START	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 performing any of the 4 restore attempts
	(((O)))	Fast-cycling alarm

P-BUTTON	TOUCH	ACTION
	click!	From state ON: unit OFF. From state OFF: the pump starts and keeps operating 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"	Pstop adjustment mode.
	click!	Is displayed on the screen instantaneous current consumption. If it is already displayed then we switch to instantaneous pressure view.
	3"	Rated current adjustment.

9. STARTUP (diagram C)

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






Follow next steps:

- Only for type SW2 set the pump rated current intensity value.
 - Press  during 3 seconds.
 - 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 1.
 - Press  for validation.
- Start the device by pressing .
- Set the cut-in (start) pressure:
 - Press  during 3 seconds.
 - The start pressure value is displayed on screen, LED START lights up and display is flashing.
 - By mean of  and  is adjusted the start pressure from 0.5 to 7 (*11) bar.
 - Press  for validation.
- Set the cut-out (stop) pressure:
 - Press  during 3 seconds.
 - The stop pressure value is displayed on screen, LED STOP lights up and display is flashing.
 - By mean of  and  is adjusted the stop pressure from 1 to 8 (*12) bar.
 - Press  for validation.
- 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 introduce exactly the rated current specified on the nameplate of the pump.







*+version

10. BASIC MENU + (diagram C)

- Press simultaneously  +  during 5 seconds.
- By mean of  or  the values can be changed.
- Press  for validation.
- The parameters sequence is:

it	TYPE	SYSTEM REACTION	FAC- TORY SET- TING
1	BAR P	We can select the pressure units displayed between bar and psi.	bar
2	rc0 rc2	Fast-cycling alarm: - rc0: alarm unabled. - rc1: activated, when hammering is detected it is delayed the start in order to protect the pump. - rc2: alarm is activated and the pump is stopped upon detection.	rc0
3	r.01 r.99	Only if fast-cycling alarm has been activated in the previous step (rc1). It can be choosed the maximum time period between 3 consecutive starts that will be considered fast cycling (between 1 sec. and 99 sec.)	5 se- conds
4	Sb0 Sb1	Stand-by mode activated (Sb1), for low power consumption, or unabled (Sb0).	Sb0

11. ADVANCED MENU + +

- Press simultaneously  +  +  during 5 seconds.
- By mean of  or  the values can be changed.
- Press  for validation.
- The parameters sequence is:

it	TYPE	SYSTEM REACTION	FAC- TORY SET- TING
1	nc no	Select the operation MODE as a conventional pressure switch (nc = normally closed) or reverse (no = normally open). *ver nota 3	nc
2	E00 E01/02	(Only T-Kit Switchmatic2). 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	(Only T-Kit Switchmatic 2). Sets the minimum gap between Pstart 1 and Pstart 2 and/or Pstop 1 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 in Switchmatic 2) Select AE0 to dissable 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 with 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.
6	Ar0	Ar1	Activation of the automatic restore system ART (Ar1) o disable (Ar0).
7	P0.0	Px.x	It allows setting a minimum operating pressure under which the device would determine dry-running operation. It is very usefull in the basic model T-Kit Switchmatic where there is no reading of current intensity drawn. See Note 2.
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.
8	c10	c30	It allows setting a % of nominal current above which the device will activate the overcurrent protection.
9	H00	H99	Anti-flooding configuration. If activated, it stops the pump after programmed time (in hours) of continuous operation. Disabled (H00), 1 hour (H01) ... 24 hours (H24).
10	rS0	rS1	If we change rS0 to rS1 and push ENTER default values are restored.

Remark 2:

Basic T-Kit Switchmatic 1 can only detect dry-running operation through the minimum pressure. This means that plumber must determine the water column of the installation, the start pressure of the pump and place the minimum pressure below the start pressure. It can also occur that pumping system is running out of its curve so that the pump is unable to provide the minimum pressure because the flow requirement is excessive. In this case T-Kit Switchmatic 1 would activate a false dry-running alarm. If these concepts are not clear, it is preferable not configure this protection or install the T-Kit Switchmatic 2 with accurate and easy setting of dry-run detection.

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

12. SYNCHRONISATION (ONLY FOR SWITCHMATIC 2)

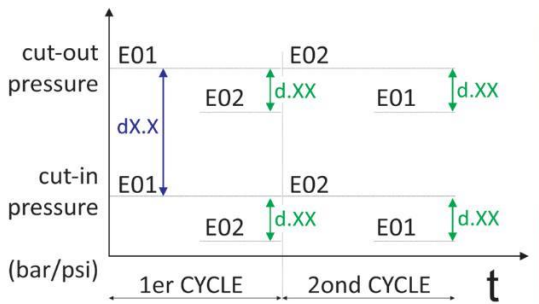
T-Kit Switchmatic 2 can be synchronized to another unit T-Kit Switchmatic 2 managing and protecting 2 pumps operating in cascade with alternated starting sequence. Next steps must be followed:

1. GO TO ADVANCED MENU: $\uparrow + \downarrow + \text{ENTER}$

- 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 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.

$$\text{Differential (dX.X)} = P_{\text{stop}} - P_{\text{start}} \geq 1 \text{ bar}$$

$$\text{Gap (d.XX)} = P_{\text{stop1}} - P_{\text{stop2}} = P_{\text{start1}} - P_{\text{start2}}$$



2. Press ENTER 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 ENTER in order to disable the units. Is displayed "OFF".
5. Press ENTER again in both units in order to activate the synchronization.

Remark 3: after 10 cycles the unit configured E01 will display pressure and the unit configured E02 will display current in Amps.

13. PRESSURE SENSOR CALIBRATION

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

ZERO REGULATION

1. Open the taps living the hydraulic net without pressure.
2. Press simultaneously the buttons ENTER and \uparrow until the display show 0.0 flashing.
3. Press ENTER to validate.

FULL SCALE

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

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


14. REGISTER OPERATION DATA AND ALARMS

$\uparrow + \downarrow + \text{ENTER}$

- Press simultaneously $\uparrow + \downarrow + \text{ENTER}$ during 5 seconds.
- Press ENTER 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
A11 xxx	Number of A11 alarms.	0-999
APM xxx	Number of over-pressure alarms (---).	0-999
rPM x.x	Maximum registered pressure.	
rSt	ENTER -> EXIT.	
	$\uparrow + \downarrow$ -> All the alarms are restored except the opera- tion data.	

15. WARNINGS AND ALARMS

COD.		DESCRIP-TION	SYSTEM REACTION
A01	O <hr/> ((O))	DRY-RUN-NING (Only for T-Kit Switchmatic 2)	When is detected a dry-run operation the pump is automatically stopped. By mean of ENTER the normal operation can be manually restored. <hr/> 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 in order 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-RUN-NING (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 <hr/> ((O))	OVER-LOAD (Sólo SW2)	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.
A04	(((O)))	FAST CYCLING (Hammering)	This alarm can be unabled or activated in the BASIC MENU. The alarm is activated when 3 consecutive cycles occur in a range lower than the set time (between cycles). 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.

16. EC STAMENT OF COMPLIANCE

COELBO CONTROL SYSTEM, S.L. States, on our own responsibility, that all materials here with related comply with the following European Directives:

- 2014/35/EU.
- 2014/30/EU.
- 2011/65/EU+2015/863/EU.

Name:

- T-Kit Switchmatic 1 / 1+
- T-Kit Switchmatic 2 / 2+

Standards: EN-60730-2-6, EN-60730-1, EN-61000-6-1, EN-61000-6-3, IEC-60730-1, IEC-60730-2-6

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