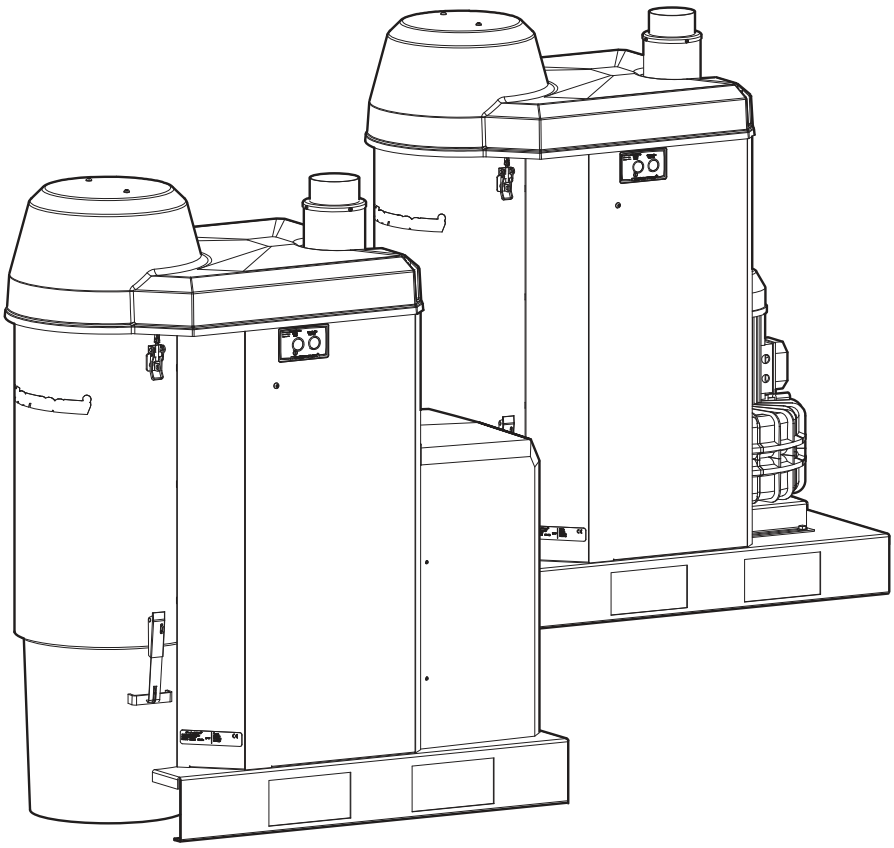
Nederman

PLC Manual

L-PAK Series

L-PAK 150/250 Advanced

50Hz, 60Hz



Original PLC manual
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2016-12-09

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Figures

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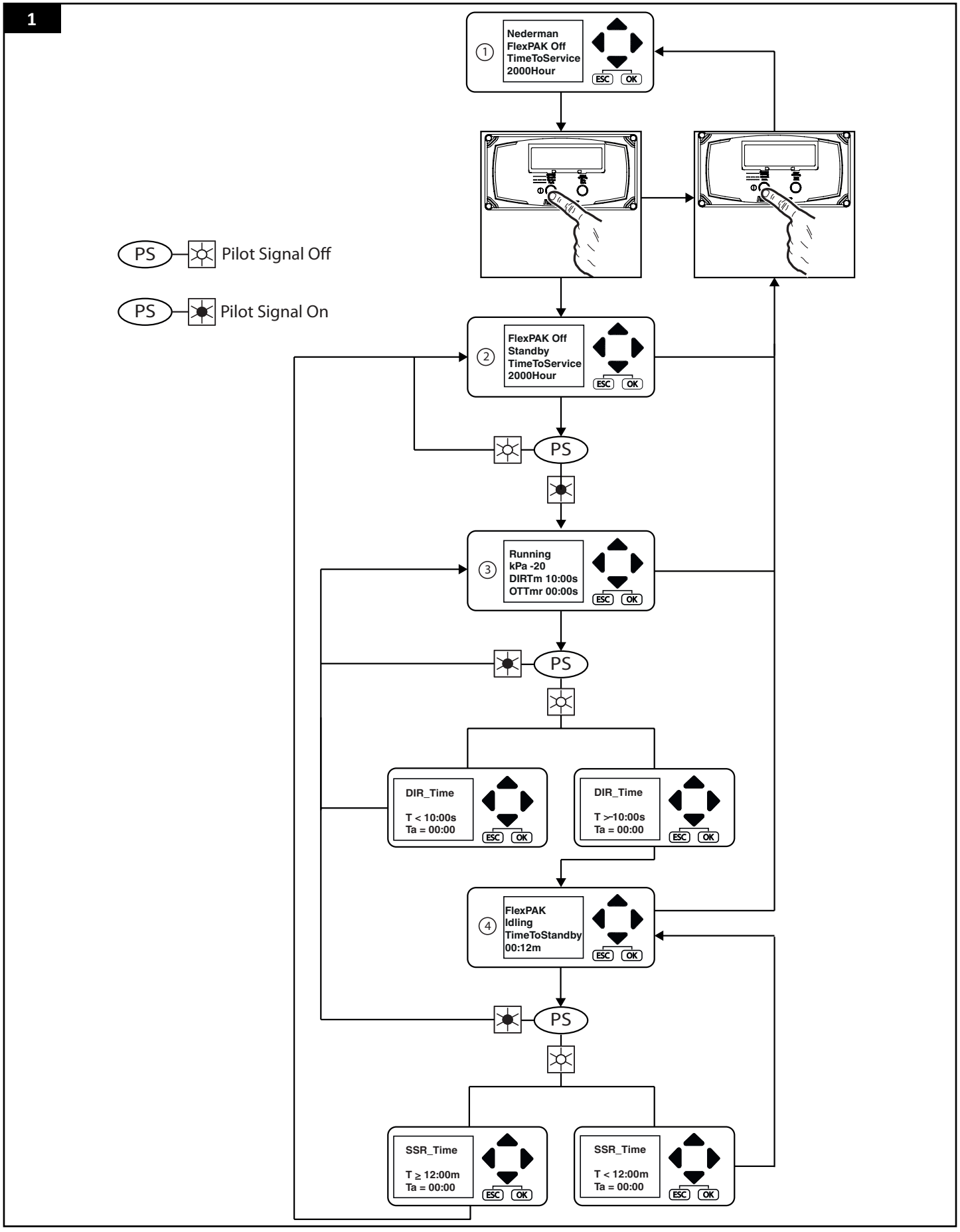
PS
Pilot Signal Off
PS
Pilot Signal On
1
Nederman
FlexPAK Off
TimeToService
2000Hour
ESC
OK
2
FlexPAK Off
Standby
TimeToService
2000Hour
PS
3
Running
kPa -20
DIRTm 10:00s
OTTmr 00:00s
PS
DIR_Time
T < 10:00s
Ta = 00:00
DIR_Time
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4
FlexPAK
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TimeToStandby
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Ta = 00:00
SSR_Time
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Ta = 00:00

English
PLC Manual

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1 Preface

Read this manual carefully before installation, use and service of this product. Replace the manual immediately if lost. Nederman reserves the right, without previous notice, to modify and improve its products including documentation.

This product is designed to meet the requirements of relevant EC directives. To maintain this status, all installation, maintenance and repair is to be done by qualified personnel using only Nederman original spare parts and accessories. Contact the nearest authorized distributor or Nederman for advice on technical service and obtaining spare parts. If there are any damaged or missing parts when the product is delivered, notify the carrier and the local Nederman representative immediately.

2 Safety

This document contains important information that is presented as either a warning, caution or note. See the following examples:

WARNING! Risk of personal injury.
Warnings indicate a potential hazard to the health and safety of personnel, and how that hazard may be avoided.

CAUTION! Risk of equipment damage.
Cautions indicate a potential hazard to the product but not to personnel, and how that hazard may be avoided.

NOTE! Notes contain other information that is important for personnel.

3 Description

WARNING! Risk of personal injury.
See the User manual

4 Unit operation

4.1 Software with extended functionality

L-PAK 150/250 Advanced comes with special software that works with or without the Logo! display that is included.

NOTE! If the software is used in a logo without a display, it is not possible to change parameter settings.

4.2 Unit operation modes

L-PAK 150/250 Advanced has the following four operation modes:

1. Off mode
2. Standby mode
3. Running mode
4. Idling mode

See Section *5.1. Status messages* for more information about each mode. How the unit moves from one operation mode to another is explained below. See also Figure 1 for a flow chart showing how the unit goes through its four different operation modes.

When the unit is in Off mode, the unit can be put into Standby mode (the unit is ready) with its motor off and the Filter Cleaning Valve (FCV) closed by pressing the Standby/Running button. While the unit is in Standby mode, the unit can be put back into Off mode again by pressing the Standby/Running button.

NOTE! If power is lost to the unit, for example if there is a power outage, and Zero voltage detection is set to OFF see page *16*, the unit goes immediately back into Standby mode once power is resumed without having to push the Standby/Running button.

The unit goes from Standby mode into Running mode when it receives a pilot signal by a valve being opened at one or more work stations (in other words, someone starts to work). The unit's motor is now on and the FCV is closed. The DIR_Time and SSR_Time timers are not started, see Sections *6.2.4. DIR_Time* and *6.2.5. SSR_Time*.

The unit stays in Running mode as long as there is an active pilot signal. However, the unit can still be put into Off mode by pressing the Standby/ Running button.

Note that if only one workstation is connected to the unit, or if only one work station is in use and work stops at that one station, the pilot signal stops. If there is more than one work station connected to the unit, and more than one work station is in use, the pilot signal only stops if work stops at all workstations (in other words, all valves close).

When the pilot signal stops, the DIR and SSR timers start. If work resumes at one or more work stations within 10 seconds, the unit stays in Running mode. The DIR and SSR timers are reset back to zero and are stopped.

If DIR_Time is set for 10 seconds (default), and the pause in work is longer than 10 seconds, DIR_Time elapses. The unit then goes into Idling mode with its motor on and the FCV open.

If a new pilot signal is sent within 12 minutes, the unit goes back into Running mode. The DIR and SSR timers are again reset to zero and are stopped. However, if SSR_Time is set for 12 minutes, which is the default setting, and there is no new pilot signal within 12 minutes, SSR_Time also elapses.

The unit then goes into Standby mode until it either receives a new pilot signal that puts the unit back into Running mode, or the unit is turned off (in other words, put into Off mode) by the weekly timer, see *6.2.2. Weekly timer*, or by pressing the Standby/Running button.

5 PLC messages

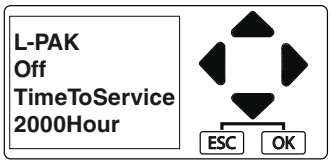
The following sections show the different status, warning and alarm messages that can be seen in the PLC display.

5.1 Status messages

The following status messages give information about what mode the unit is in or what routine service is being performed.

5.1.1 L-PAK Off (Off mode)

The unit is in Off mode, which is also the unit's start menu. The unit can also go into Off mode if something is wrong, such as if an alarm is activated. The pump motor is off, there is no vacuum, the FCV is closed, and the unit cannot be activated by a pilot signal.



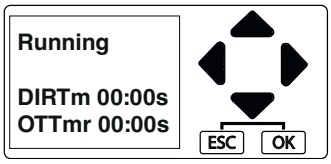
TimeToService: The amount of time until next scheduled service. The default setting is 2000 hours. See Section *6.2.3. H-Meter 1*.

5.1.2 L-PAK Standby (Standby mode)

The unit is in Standby mode and is ready. The pump motor is off, there is no vacuum, the FCV is closed, and the unit is waiting for a pilot signal to go into Running mode.

5.1.3 Running (Running mode)

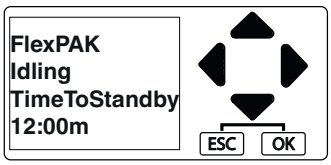
The unit in Running mode. The pump motor is on and the unit generates a vacuum. The FCV is closed.



DIRTm: The amount of time before the unit goes into Idling mode. The default is 10 seconds. See also Section *6.2.4. DIR_Time*.
OTTmr: If the Overtime timer has been activated, OTTmr shows the elapsed time since the overtime timer started.

5.1.4 Idling (Idling mode)

The unit in Idling mode. The pump motor is on, there is no vacuum, and the FCV is open. The unit goes into Idling mode when there has been no pilot signal for the time set in DIR_Time, see Section *6.2.4. DIR_Time*.



Time to Standby: The amount of time until the unit goes into Standby mode. The default setting is 12 minutes. See Section *6.2.5. SSR_Time.*

5.1.5 Filter Cleaning

The unit is cleaning its filter.

Clean: How long the filter cleaning valve is open.

Charge: Vacuum charge time.

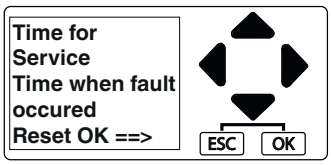
5.2 Warning messages

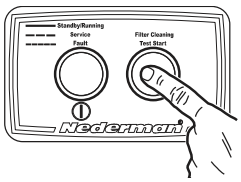
If a warning is activated, there is a problem that needs to be corrected, but the unit continues to work.

5.2.1 Time for service

The time interval set in the 'Service Interval Setting' menu has expired. If this alarm is activated, the light in the Standby/Running button is lit one second and then again in 7 seconds. This 1/7 on/off sequence continues until the warning is reset.

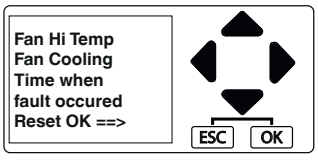
Reset the alarm by first putting the unit into Off mode. Restart the unit. In Standby mode, press the manual filter cleaning button for 10 seconds.





5.2.2 Fan Hi Temp

The fan is overheated. The temperature is greater than 125°C, and the filter cleaning valve is open to cool the fan. When the Fan-temperature is below 90°C, the filter cleaning valve closes and vacuum is reestablished again.



5.3 Alarms

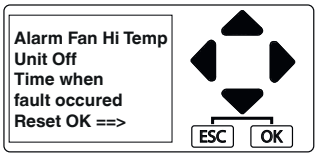
If an alarm is activated, the unit goes into Off mode until the problem is corrected. The alarm needs to be reset by pressing 'OK'.

5.3.1 Alarm Fan Hi Temp

The fan temperature has been too high for more than 8 minutes. The filter cleaning valve has been open to cool the fan more than 8 minutes, and the

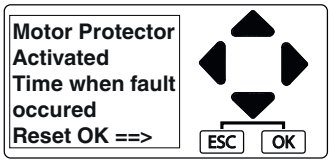
temperature has not gone below 90°C. The unit goes into Off mode. Correct the problem and press 'OK' to reset the alarm.

NOTE! When Alarm Fan Hi Temp is activated, Alarm output is also activated until the temperature has gone below 90°C, see section *6.7. Alarm output*..



5.3.2 Motor Protector Activated

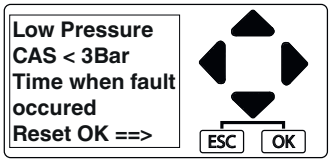
The motor is overheated. Correct the problem, and press 'OK' to reset the warning.



5.3.3 Low Pressure CAS

The compressed air level is low. When the accurate pressure is established, press 'OK' to reset the warning.

This warning is only shown when the Compressed Air Switch (CAS) is installed.

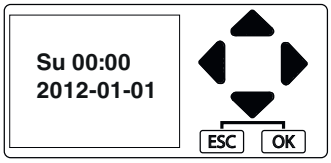


6 PLC settings

6.1 Find a parameter and set its value

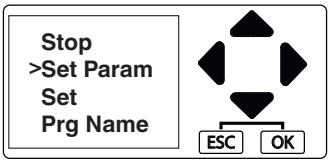
Do the following to find a parameter and set its value:

1. From the PLC status screen, press ▼ to go to the unit's date and time screen.



NOTE! There are several other input menus on the same level as the date and time screen. If pressing ▼ takes the PLC to one of those menus, use ◀ to get to the date and time screen.

2. Press ESC to get to the main menu.



3. Press ▼ to go to **>Set Param**.
4. Press OK to confirm.
5. Use ▲ or ▼ to find the parameter.
6. Press OK to confirm.
7. Use ▶ and ◀ to select a value.

NOTE! The blinking cursor shows the current value that can be changed.

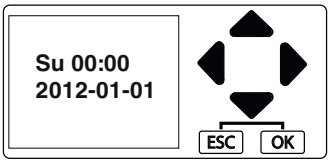
8. Use ▲ or ▼ to set the value.
9. Press OK to confirm.
10. Press ESC to go to the main menu.
11. Press ESC to go to the date and time screen.
12. Press ▲ to exit.

6.2 Parameter settings

The following PLC displays show the different settings that can be configured for the unit.

6.2.1 Adjust the time and date

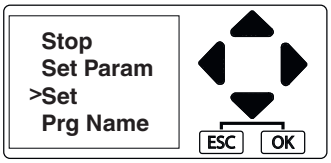
1. From a PLC status screen, press ▼ to go to the unit's date and time screen.



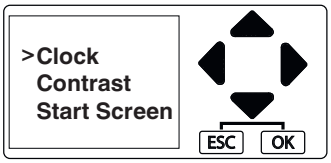
NOTE! There are several other input menus on the same level as the clock start screen. If the pressing ▼ takes the PLC to one of those menus, use ◀ to get to the clock start screen..

2. Press ESC to get to the main menu.

3. Press ▼ to go to **>Set**.

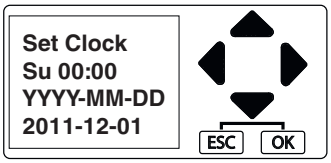


4. Press OK to confirm.



5. Press OK to confirm.

6. Press OK to confirm.



7. The cursor shows the day of the week, which flashes since it is the first value that is selected.
8. Change the weekday with ▲ or ▼.
9. Move the cursor to the next position with ▶ or ◀.
10. Make any other necessary setting as shown in items 2 and 3 above.
11. Press OK to confirm.
12. Press ESC to go to the main menu.
13. Press ESC to go to the date and time screen.
14. Press ▲ to exit.

6.2.2 Weekly timer

There are four different timers:

- WeekTim 1
- WeekTim 2
- WeekTim 3
- WeekTim 4.

WeekTim 1 and WeekTim 2 have the following default settings:

- WeekTim 1: The unit switches to standby on Monday, Tuesday, Wednesday, Thursday and Friday at 07:00 and switches off at 12:00.
- WeekTim 2: The unit switches to standby Monday, Tuesday, Wednesday, Thursday and Friday at 13:00 and switches off at 16:00.

WeekTim 3 and WeekTim 4 have the following default settings:

- WeekTim 3 is suitable when you need to start/stop on Saturdays and Sundays.
- WeekTim 4 is always off.

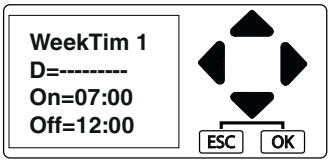
The settings can be changed to accommodate a suitable time schedule.

NOTE! When the timer stops the unit and a valve at a workstation is in its open position, the unit will start immediately once the timer puts the unit in standby mode.

It is not necessary to use the timer function. The function can be switched off by setting the display to show only dashes. However, it is recommended that the timer function is used, as this ensures that the unit is switched off even when a valve remains open, for example, over night.

NOTE! If the weekly timer has been activated, the amount of time the unit can be used during the day before it automatically goes into Off mode can be extended if the optional external standby button accessory is used, see Section Section *6.3.1. OTTmr.*

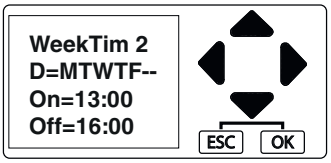
Below is how to make adjustments to the default settings for the weekly timer.
WeekTim 1, Monday–Friday mornings



1. Press ▼ to go to the unit's date and time screen.
2. Press ESC to get to the main menu.
3. Press ▼ to go to **>Set Param**.
4. Press OK to confirm.
5. Use ▲ or ▼ to find the parameter 'WeekTim1'.
6. Press OK to confirm.
7. D = ------- denotes the weekdays (MTWTFSS) to which the setting applies. Move the cursor to the weekday to be changed with ▶ or ◀.
8. Activate the appropriate weekday with ▲ or ▼.
9. Step forward with ▶ to the next day to be changed.
10. Select an appropriate value with ▲ or ▼ .
11. Step forward with ▶ to the time character to be changed, to set the ON time.
12. Select an appropriate value with ▲ or ▼.
13. Proceed until the required time is shown.
14. Repeat the same procedure for the OFF time.

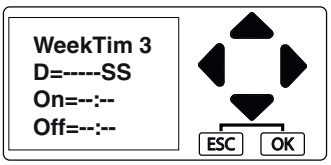
15. Press OK to confirm.
16. Press ESC to go to the main menu.
17. Press ESC to go to the date and time screen.
18. Press ▲ to exit.

Setting WeekTim 2, Monday–Friday afternoons



Make the settings according to the previous section.

Setting WeekTim 3, Saturday–Sunday afternoons

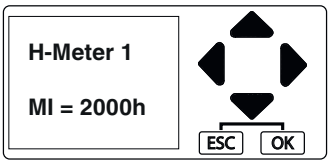


Make the settings according to the previous section.

Setting WeekTim 4
WeekTim 4 is to be set to off at all times.

6.2.3 H-Meter 1

Menu for setting the service interval. The default value is 2000 hours.



MI =2000h: The amount of time between service intervals.

6.2.4 DIR_Time

Menu for setting the DIR timer. The DIR timer is the amount of time before the unit goes from Running mode into Idling mode when the pilot signal disappears.

T=10:00s: Time before DIR_Time is activated. The default setting is 10 seconds The minimum setting is 5 seconds.
Ta=00:00: The elapsed time since the pilot signal disappeared.

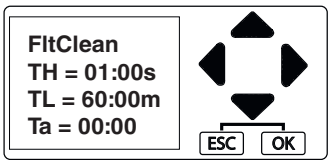
6.2.5 SSR_Time

Menu for setting the SSR timer. The SSR timer is for the amount of time before the unit goes from Idling mode to Standby mode when the pilot signal disappears.

T=12:00m: Time before SSR_Time is activated. The default setting is 12 minutes. The minimum setting is 5 minutes.
Ta=00:00: The elapsed time since the pilot signal disappeared.

6.2.6 FltClean

Menu for setting time between automatic filter cleanings. If TH = 0, no filter cleaning is performed. TH may not be set to 0 if PSIFC is set to 'On'.



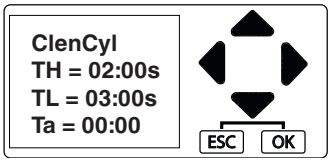
TH=01:00s: Do not change the default setting of 1 second.
TL=60:00m: Time between automatic filter cleanings. The default setting is 60 minutes.
Ta=00:00: The elapsed time since the last automatic cleaning was activated.

6.2.7 ClenCyl

Menu for setting the opening and closing times for the FCV cleaning cycle. The FCV cleaning cycle is repeated 3 times when filter cleaning is activated for both manual and automatic filter cleaning. If TH is set to 0, no filter cleaning is performed.

NOTE! If PSIFC is activated, 'Switch=On', TH cannot be set to 0. See Section *6.2.5. SSR_Time*.

The default time for a complete cleaning cycle is 15 seconds. 3(TH+TL)=3*5=15 where TH=02:00s and TL=03:00s.



TH=02:00s: The default time for the FCV to be open.
TL=03:00s: The default time for the FCV to be closed. The minimum setting is 3 seconds.
Ta=00:00: The elapsed time since the FCV cleaning cycle was activated.

6.3 Parameter settings: Accessories, customer connections

6.3.1 OTTmr

Menu for setting the overtime timer. If the unit needs to be used after the weekly timer has expired, the unit can be turned on for a set number of hours by pressing the external standby button. When the OTTmr expires, the machine goes back into Off mode.

If the unit is in Off mode and the weekly timer is not used, quickly pressing the external standby button (less than 2 seconds) puts the unit into Standby mode for the time set in 'T', for example two hours. See the figure below.

If the unit is in Standby mode and the weekly timer is not used, quickly pressing the external standby button (less than 2 seconds) puts the unit into Off mode after the time set in 'T',for example two hours. See the figure below.

If the weekly timer is being used, quickly pressing the external standby button (less than 2 seconds) keeps the unit into Standby mode for an additional two

hours after the closing time set in the weekly timer, see Section *6.2.2. Weekly timer*.

To reset OTTmr so that the time is not extended, press the external standby button longer than 2 seconds and then release.

T=02:00h: Extra time before the unit goes into Off mode. The default setting is 2 hours.
Ta=00:00: The elapsed time since the overtime timer started.

6.4 Standard Cleaning process

The filter cleaning process is always activated after the pilot signal (PS) or (PSIFC) has disappeared and DIR Time has elapsed. The filter cleaning valve opens and the filter cleaning process generates three cleaning pulses. The unit then goes into Idle mode.

6.5 Standard Pilot Signal (PS) input

Input 2, terminals 13 and 14 is for the standard pilot signal input were the filter cleaning process can be activated by the filter cleaning sequence timer and the manual cleaning button .

6.6 PSIFC (Pilot Signal Interlock Filter Cleaning)

Input 8, terminals 13 and 17 is a pilot signal input for the PSIFC filter cleaning process. When this input is used, filter cleaning is not activated until this input is deactivated. If this input is activated during a filter cleaning sequence, the filter sequence stops immediately, and the unit establishes a vacuum.

6.7 Alarm output

Alarm output is ON or activated when:

- The motor is overheated see section *5.3.2. Motor Protector Activated*,
- The compressed air level is low see section *5.3.3. Low Pressure CAS*,
- Or the fan temperature is over 125°C see section *5.2.2. Fan Hi Temp* and section *5.3.1. Alarm Fan Hi Temp*.

If the fan temperature is over 125°C but it has gone less than eight minutes, the unit is still in Running mode and tries to cool the fan by opening the filter cleaning valve. If the temperature becomes lower than 90°C within eight minutes, Alarm output is deactivated.

But, if Alarm Fan Hi Temp, Motor Protector Activated or Low Pressure CAS are activated, the unit goes into Stop Mode until the problem is corrected and the alarm is reset by pressing OK.

The default setting for Alarm output is OFF.

6.8 Zero voltage detection (ZV-Detect)

The default setting for ZV-Detect is ON. When ZV-Detect is ON or activated, and power is lost to the unit, for example if there is a power outage, the unit must be restarted and put into Standby (ready) mode by pressing the Standby/ Running button.

But, if ZV-Detect is OFF or activated,the unit does not need to be restarted by pressing the Standby/Running button. This feature is useful if L-PAK Advanced is located at some distance from the workplace; there is no need to go all the way to L-PAK Advanced to restart it.

6.9 Standby (Ready) indicator

The H1 lamp/Output DO1 acts as a Standby (unit ready) indicator. When the unit is in Standby mode or the fan is running, the H1 Lamp/DO1 is activated. The H1 lamp/Output DO1 is available on terminal 13.

6.10 FCTmr

If this soft key is deactivated (FltClean), the interval timer will not activate any filter cleaning sequence. Default is Switch=On.

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