

Microprocessor Control

(for Compressed Air Dryers)

User Instructions

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Caution

It is recommended that:

- the manual is retained for the entire service life of the machine;
- the user reads the manual carefully before carrying out any operations on the machine;
- the control is used exclusively for the purpose for which it is intended; incorrect use of the control shall release the manufacturer from any liability.

Operations on the Microprocessor Control which are not password protected may be carried out by the final user.

To modify the parameter settings (within the ranges defined by the factory) it is necessary to enter the service password given on the last page of this manual. This page should be detached and retained by those persons authorised to service the machine.

To identify the model and serial number of the control for the purposes of ordering spare parts or requesting assistance, see the nameplate on the rear of the Microprocessor Control. To identify the software version, switch the power to the unit off and then on again; the EPROM identification will be displayed for a few seconds.

ATTENTION: This manual may be subject to modification; for this reason, to obtain updated and complete information, the operator should consult the manual on board the machine.

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1 – Introduction

The Microprocessor Control is positioned on the front of the dryer.

The front of the dryer control panel is made of a transparent polycarbonate film (see Fig. 2) which covers (and protect) the control.

On the back of the control is the:

- INTERFACE.

Unit operation can be displayed and programmed within menus; menu terminology is indicated in Fig. 1.

IMPORTANT: In this manual the dryers are identified by numbers: **1, 2, 3, and 4**. For the corresponding models see separate dryer manuals.

Fig. 1 – Menu terminology

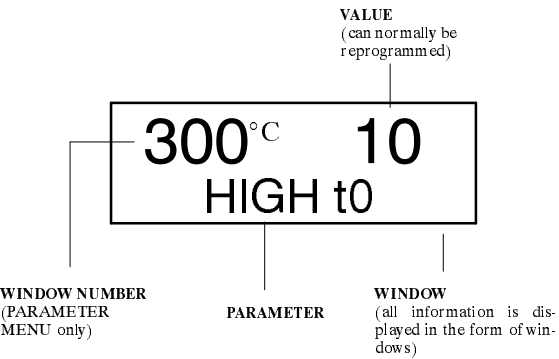
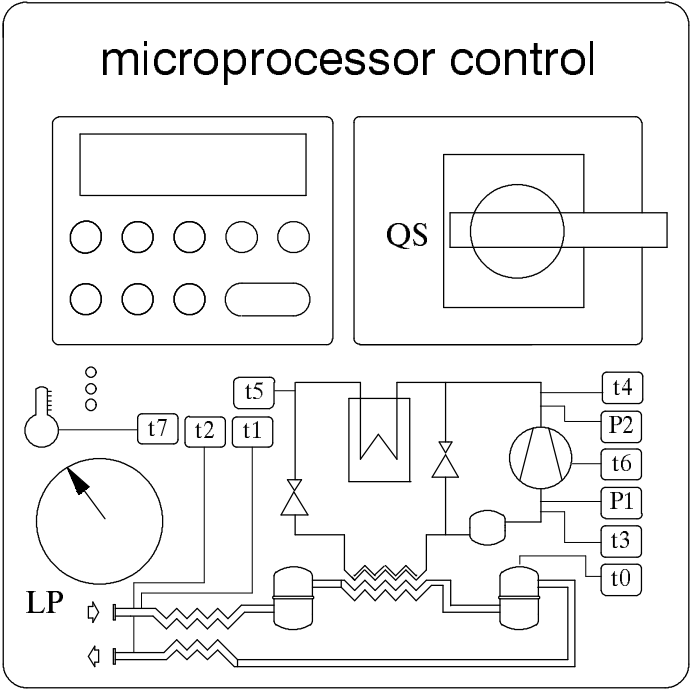


Fig. 2 – Process and instrumentation panel



POS.	DESCRIPTION
t0	Dew point temperature
t1	Air inlet temperature
t2	Air outlet temperature
t3	Freon suction temperature
t4	Freon delivery temperature
t5	Freon condensation temperature
t6	Crankcase temperature
t7	Ambient temperature
P1	Freon suction pressure
P2	Freon delivery pressure
P3	Oil pressure (not operative)
QS	General disconnect switch
LP	Low pressure manometer

2 – Front panel

All operations are controlled from and displayed on the front panel of the Microprocessor Control, as below:

DISPLAY

When the user is not in the **Microprocessor Control** **MENUS** (see CHAP. 3) or **STATUS REPORT** (see CHAP. 6), the **OPERATING DISPLAY** is shown, giving the following information:

Condensate discharge (▼ = condensate discharge phase in progress). If the cylinder is permanently displayed permanently this indicates an alarm condition.

Temperature values or pressure references (P1, P2, P3).

Temperature references (t1...t8) which are replaced after 3" by the dew point temperature.

OPERATION:

- 1st δ indicates that the dryer is in operation.
- 2nd, 3rd, 4th δ indicate the capacity control steps.

HEATING:

- 1st Ψ indicates that the compressor crankcase heater is on.
- 2nd, 3rd, 4th Ψ indicate the degree to which the hot gas valve is open (when fitted).

Field showing the following information:

- When power is switched on, the dryer type and EPROM type are displayed.
- During normal operation, **PdP** – pressurised dew point is displayed (in the **OPERATING DISPLAY**) and the description of the parameter; in the case of pressure, the value and unit of measurement are displayed.
- When the unit is off, displays the message **UNIT OFF** or **REM OFF** (units with remote control).
- When there is alarm condition, the alarm message is displayed.

KEYBOARD

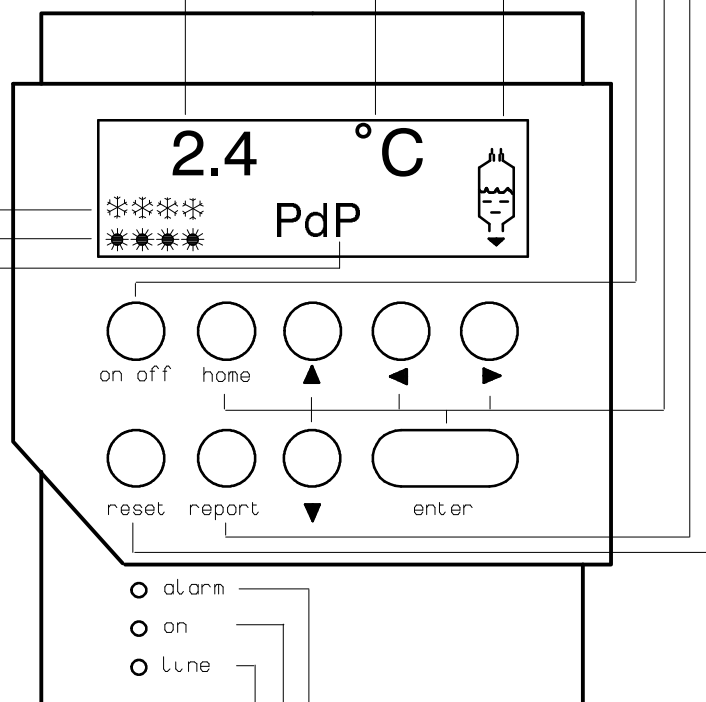
Alarm reset (see CHAP. 4).

Serves to access **STATUS REPORT** (see CHAP. 6).

Used when in the **Microprocessor Control** **MENUS** (see CHAP. 3) or in **STATUS REPORT** (see CHAP. 6).

N.B.: Press **ENTER** twice (from the **FIRST LEVEL MENU**) to command manual discharge (see para. 5.7)

Dryer on/off.



LEDs

ALARM (red LED): one or more alarms are active.

ON (green LED): dryer is on.

LINE (orange LED): dryer is under power.

3 – Microprocessor Control menus

Tab. 1 – Microprocessor Control menus

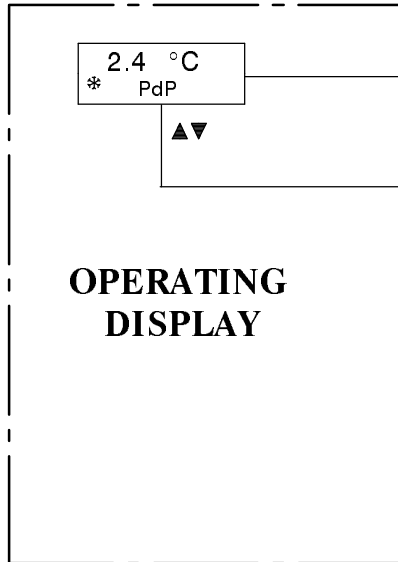
Window NO.	PARAMETER		RANGE	FACTORY SETTINGS	USER CHOICE
HOURS	Compressor ON	hours	0 – 99999	*	
HOURS	Compressor ON at full capacity	hours	0 – 99999	*	
HOURS	Maintenance warning	hours	0 – 59.999	59.999	
100	Language	–	S, PO, OL, dAN, ESP, POL, NO, ItA, FrA, dEU, EN	*	
101	Standard settings	–	YES, NO	NO	
102	Temperature readings	–	°C, °F	°C	
103	Pressure readings	–	bars, PSI	bar	
104	Automatic restart	secs.	NO, 1 – 300	6	
105	Remote On/off	–	YES, NO, LOC	NO	
106	Unit identification no.	no.	1 – 99	1	
200	Condensate discharge 1 closing	secs.	40 – 990	300	+
201	Condensate discharge 1 opening	secs.	1 – 30	3	+
202	Condensate discharge 2 closing	secs.	40 – 990	170	+
203	Condensate discharge 2 opening	secs.	1 – 30	4	+
204	Temperature diff. t6–t7 (403–404)	°C/°F	0 – 30 (0 – 54)	5(9)	+
205	Filter – evaporation pressure P1	secs.	1 – 10	5	+
206	Hot gas set point	bar (PSI)	–2.37 / +7 (–34.30 / +101.5)	4.07 (59)	+
207	Hot gas frequency	secs.	2 – 20	6	+
208	Set point – evaporation pressure P1	bar (PSI)	–2.37 / +7 (–34.30 / +101.5)	4.30 (62.3)	+
209	Proportional band P1	bar (PSI)	0.05 – 0.5 (0.725 – 7.25)	0.20 (02.90)	+
210	Partialisation delay	mins.	1 – 15	10	+
211	Capacity delay	mins.	0 – 5	1	+
212	Set point – condensation pressure P2	bar (PSI)	–7.5 / +30.0 (–108.7 / +435)	14.5 (210)	
213	Proportional band P2	bar (PSI)	00.8 – 06.0 (1.16 – 87)	3.0 (43.5)	
214	Integration time P2	secs.	NO, 1 – 30	10	
215	Forced full capacity compressor operation	ore	NO, 1 – 8	4	
300	High dew point temperature t0 warning	°C/°F	–30 / +30 (–22 / +86)	30 (+86)	
301	Low dew point temperature t0 warning	°C/°F	–30 / +40 (–22 / +104)	–1 (30.2)	
302	High air inlet temperature t1 warning	°C/°F	10 – 99 (50 – 210)	50 (122)	
303	Low suction temperature t3 warning	°C/°F	–30 / +40 (–22 / +104)	–1 (30.2)	
304	Low suction temperature t3 alarm	°C/°F	–30 / +40 (–22 / +104)	–2 (28.4)	
305	High suction temperature t3 alarm	°C/°F	–30 / +40 (–22 / +104)	25 (77)	
306	Low discharge temperature t4 warning	°C/°F	30 – 140 (86 – 284)	45 (113)	
307	High discharge temperature t4 alarm	°C/°F	30 – 140 (86 – 284)	120 (248)	
308	Low condensation temperature t5 warning	°C/°F	0 – 70 (32 – 158)	25 (77)	
309	High condensation temperature t5 warning	°C/°F	0 – 70 (32 – 158)	58 (136.4)	
310	P1 low pressure warning	bar (PSI)	–2.37 / +7 (–34.30 / +101.5)	3.9 (57)	+
311	P1 low pressure alarm	bar (PSI)	–2.37 / +7 (–34.30 / +101.5)	3.8 (55)	+
312	Low pressure delay	mins.	1 – 10	3	
313	P2 high pressure warning	bar (PSI)	–7.5 / +30.0 (–108.7 / +435)	21.0 (304.5)	
314	P2 high pressure alarm	bar (PSI)	–7.5 / +30.0 (–108.7 / +435)	22.7 (329.1)	
315	P3 oil differential pressure alarm (P3–P1)	bar (PSI)	0.01–5.0 (0.14–72.5)	0.8 (11.6)	
400	Model	–	1, 2, 3, 4	*+	
401	Number of capacity control steps	n.	1 – 4	+	
402	Air outlet temperature t2 sensor	–	YES, NO	+	
403	Compressor crankcase temperature t6 sensor	–	YES, NO	+	
404	Ambient temperature t7 sensor	–	YES, NO	+	
405	P1 low pressure sensor	–	YES, NO	+	
406	P2 high pressure sensor	–	YES, NO	+	
407	Hot gas valve	–	YES, NO	+	
408	User 1 sensor	–	YES, NO	+	
409	User 2 sensor	–	YES, NO	+	

cont.

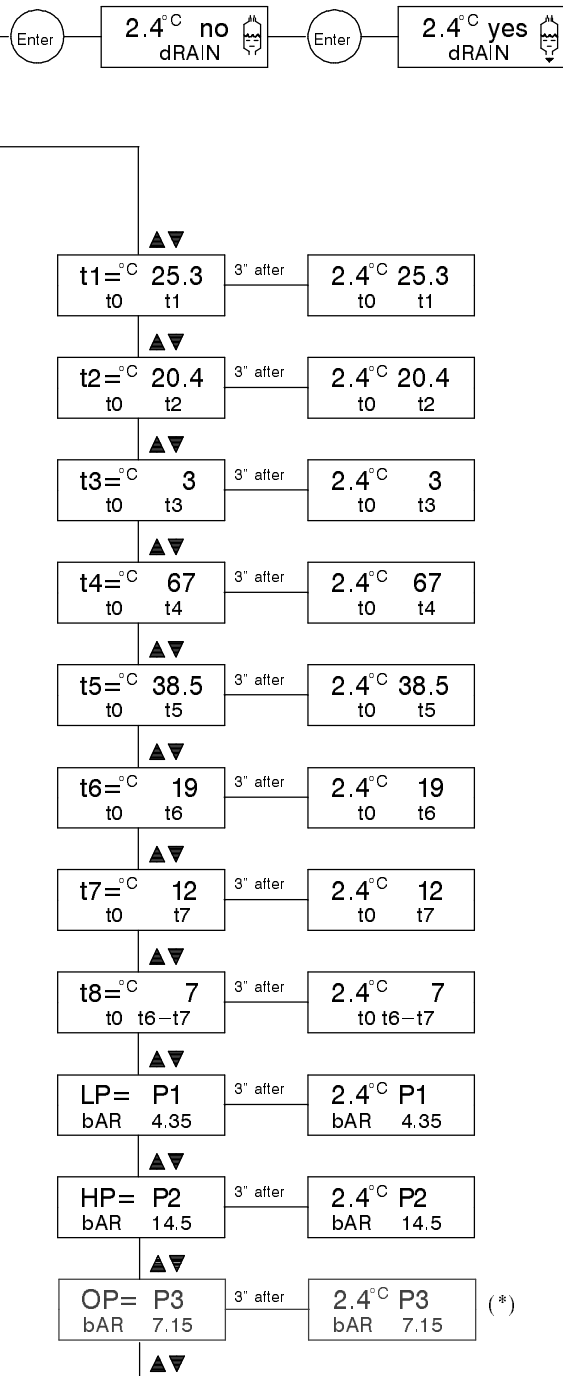
Window NO.	PARAMETER	RANGE	FACTORY SETTINGS	USER CHOICE
410	P1 zero scale/User 1 bar (PSI)	0V = -9.99 / +9.99 bar (-144.8 / +144.8 PSI)	0V = -2.37 bar (-34.4 PSI)	
411	P1 full scale/User 1 bar (PSI)	10V = 0 - 9.99 bar (0.00 - 144.8 PSI)	10V = 7.00 bar (101.5 PSI)	
412	P2 zero scale/User 2 bar (PSI)	0V = -9.99 / +9.99 bar (-144.8 / +144.8 PSI)	0V = -7.5 bar (-108.7 PSI)	
413	P2 full scale/User 2 bar (PSI)	10V = 0 - 99.9 bar (0.00 - 1448 PSI)	10V = 30 bar (435 PSI)	
414	P3 oil pressure sensor bar (PSI)	YES, NO	+	
415	P3 zero scale bar (PSI)	0V = -9.99 / +9.99 bar (-144.8 / +144.8 PSI)	0V = -2.37 bar (-34.4 PSI)	
416	P3 full scale bar (PSI)	10V = 0 - 9.99 bar (0.00 - 144.8 PSI)	10V = 7.00 bar (101.5 PSI)	

*, + see separate Microprocessor Service Manual

N.B.: If no key is pressed for a period of 2 minutes, the display will, if in any SUB-MENU of the **PARAMETER MENU**, return to the relevant **ACCESS WINDOW** or, if in any other window, return to the **OPERATING DISPLAY**.



**N.B.: THE VALUES SHOWN
IN THE WINDOWS ARE
GUIDELINE ONLY.**

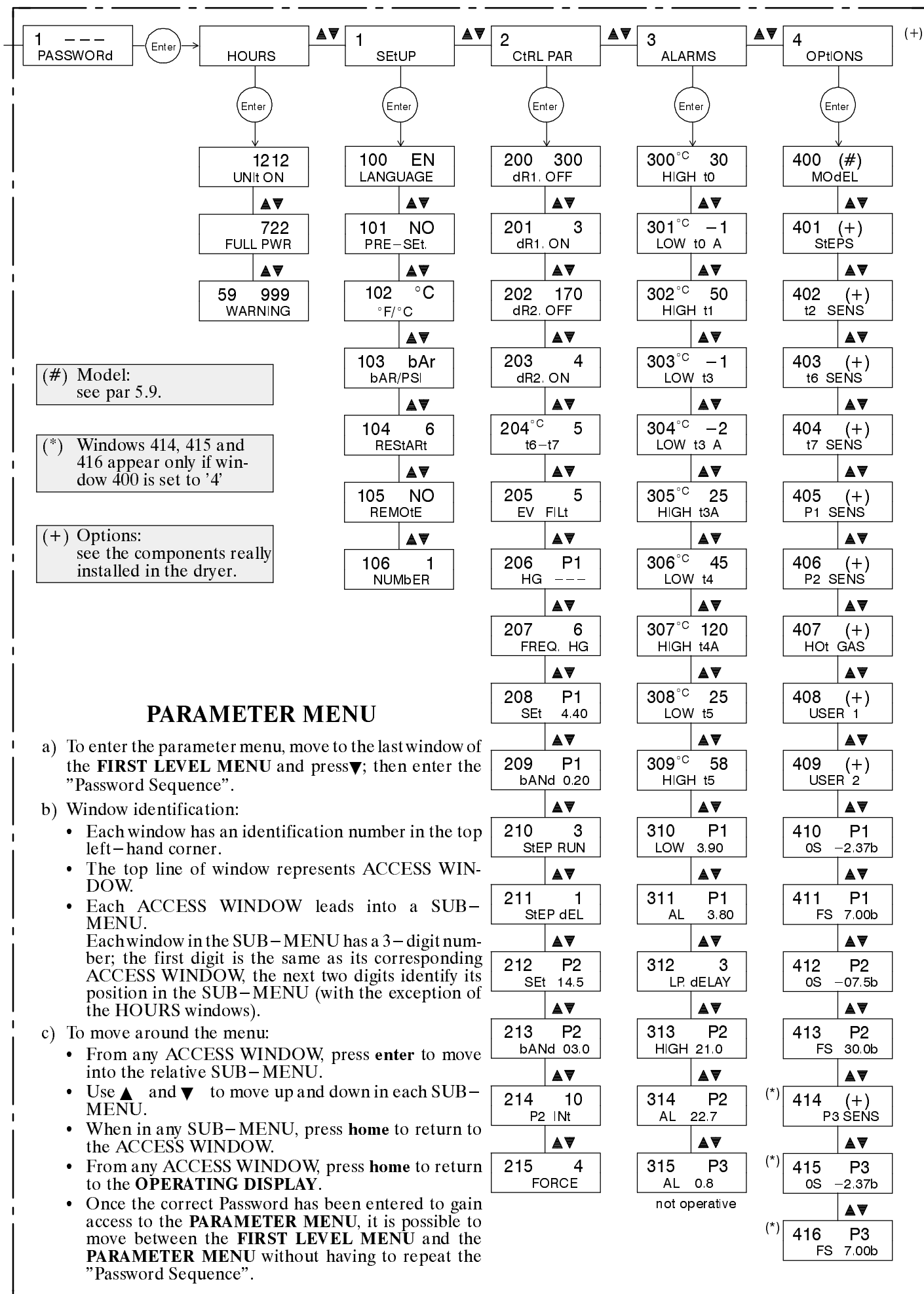


FIRST LEVEL MENU

- Use ▲ / ▼ to enter the **FIRST LEVEL MENU** (from the **OPERATING DISPLAY**) and also to move within the menu.
- Press **home** to return to the **OPERATING DISPLAY**.

N.B.: If sensors T2, T6 and T7 are not connected their corresponding windows will show '---'.

(*) Appear only if the window 400 is set to 4 and if the pressure transducer is fitted.



4 – Warnings and Alarms

The Microprocessor Control features numerous **WARNINGS** (Tab. 2) and **ALARMS** (Tab. 3). These are read and reset as described in Fig. 3.

N.B.1: The **warnings** give an audio and visual report only (a pre – warning of a possible problem) but do not stop the dryer.

N.B.2: The **alarms** also give an audio and visual report but do stop the dryer.

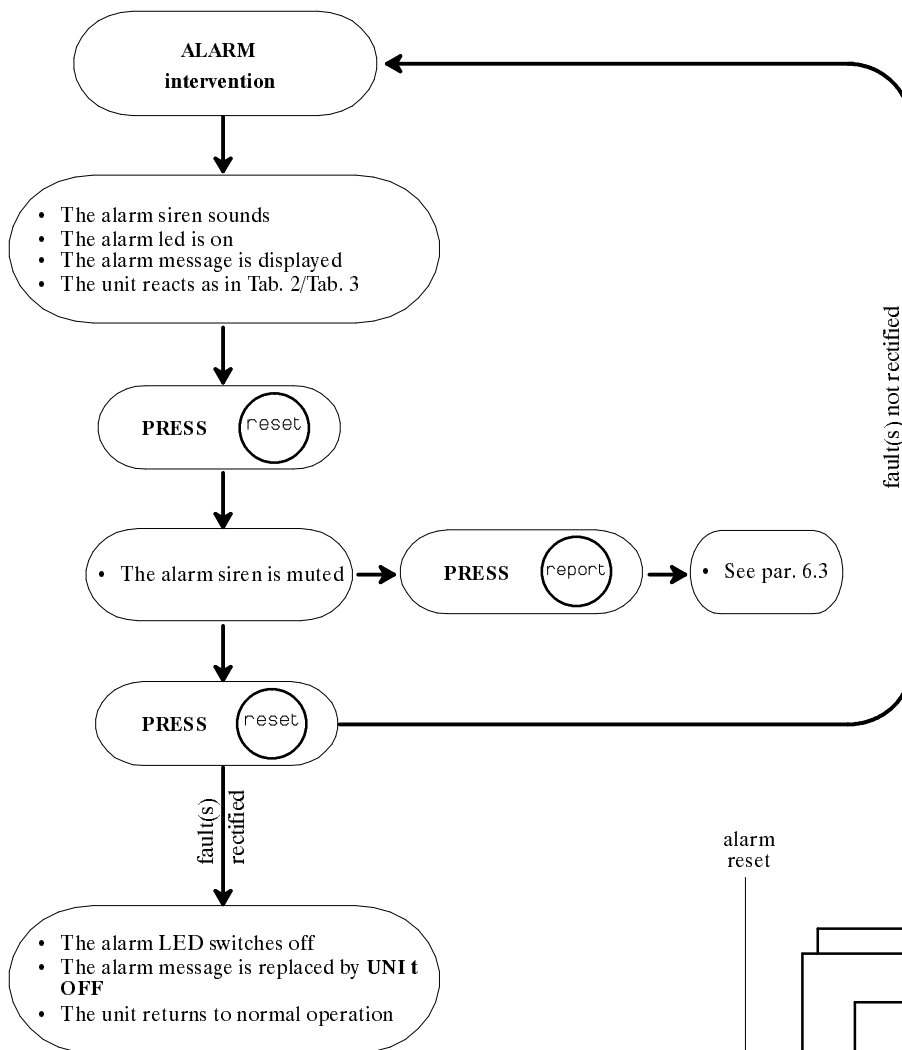
Tab. 2 – Microprocessor Control WARNINGS (see also Tab. 3)

FAULT CODE	MESSAGE ON DISPLAY	Window	WARNING DESCRIPTION	INTERVENTION DELAY	NOTES
t0	HIGH t0	300	HIGH DEW POINT TEMPERATURE	5 min. delay from dryer start – up.	Signal only.
t1	HIGH t1	302	HIGH AIR INLET TEMPERATURE	Immediate	Signal only.
t3.0	LOW t3	303	LOW FREON SUCTION TEMPERATURE	Immediate	Signal only.
t4.0	LOW t4	306	LOW FREON DELIVERY TEMPERATURE	5 min. delay from dryer start – up.	Signal only.
t5.1	LOW t5	308	LOW FREON CONDENSATION TEMPERATURE.	5 min. delay from dryer start – up.	Signal only.
t5.2	HIGH t5	309	HIGH FREON CONDENSATION TEMPERATURE	Immediate	Signal only.
P1.0	LOW P1	310	LOW FREON SUCTION PRESSURE	3 min. delay	Signal only (<i>standard for 3 and 4 models; optional for 1 and 2 models</i>).
P2.0	HIGH P2	313	HIGH FREON DELIVERY PRESSURE	Immediate	Signal only (<i>standard for 3 and 4 models; optional for 1 and 2 models</i>).
A20	DRAIN 1		HIGH LEVEL OF CONDENSATE 1	Immediate	Signal only (<i>for 3 and 4 models only</i>).
A21	DRAIN 2		HIGH LEVEL OF CONDENSATE 2	Immediate	Signal only (<i>for 3 and 4 models only</i>).
A22	USR – ALP		USER	Immediate	Signal only (<i>for 1, 2 and 3 models only</i>).
A41	HI.HOURS	HOURS	PROGRAMMED MAINTENANCE	Immediate	Signal only
A57	AL ACK		ALARM ACKNOWLEDGED	Immediate	Signal only
A70	t0 ERROR		SENSOR t0 ERROR (dew point)	Immediate	Signal only
A71	t1 ERROR		SENSOR t1 ERROR (air inlet)	Immediate	Signal only
A72	t2 ERROR		SENSOR t2 ERROR (air outlet)	Immediate	Signal only (if fitted only)
A73	t7 ERROR		SENSOR t7 ERROR (ambient)	Immediate	Signal only
A74	t6 ERROR		SENSOR t6 ERROR (crankcase heater)	Immediate	Signal only
A75	t3 ERROR		SENSOR t3 ERROR (freon suction)	Immediate	Signal only
A77	t5 ERROR		SENSOR t5 ERROR (freon condensation)	Immediate	Signal only

Tab. 3 – Microprocessor Control ALARMS (see also Tab. 2)

FAULT CODE	MESSAGE ON DISPLAY	Window	ALARM DESCRIPTION	INTERVENTION DELAY	NOTES
t0.1	LOW t0 A	301	LOW DEW POINT TEMPERATURE	Immediate	Dryer off.
t3.2	LOW t3 A	304	LOW SUCTION FREON TEMPERATURE	Immediate	Dryer off.
t3.1	HIGH t3 A	305	HIGH SUCTION FREON TEMPERATURE	2 min. delay from dryer start – up.	Dryer off.
t4.1	HIGH t4 A	307	HIGH DELIVERY FREON TEMPERATURE	Immediate	Dryer off.
P1.1	LOW P1 A	311	LOW SUCTION FREON PRESSURE	3 min. delay	Dryer off (<i>standard for 3 and 4 models; optional for 1 and 2 models</i>).
P2.1	HIGH P2 A	314	HIGH DELIVERY FREON PRESSURE	Immediate	Dryer off (<i>standard for 3 and 4 models; optional for 1 and 2 models</i>).
P3	LOW P3A	315	LOW OIL PRESSURE	Immediate	Dryer off (<i>for 4 model only</i>).
A3	tH COMP		COMPRESSOR INTEGRAL PROTECTION	Immediate	Dryer off (<i>standard for 3 and 4 models; optional for 1 and 2 models</i>).
A23	USR – ALP		EVAPORATOR ANTI – ICING	Immediate	Dryer off (<i>for 4 model only</i>).
A50 – A51 – A52 – A53 – A54 – A55 – A56: see CHAP. 6, Fig. 4.					
A61	EPROM.ERR		EPROM ERROR please replace eprom	Immediate.	Dryer off.
A62	PAR.ERROR		EEPROM ERROR replace display board	Immediate.	Dryer off.
A63	DISP.FAIL		DISPLAY BOARD FAILURE replace display board	Immediate.	Dryer off.
A76	t4 ERROR		SENSOR t4 ERROR (freon delivery)	Immediate	Dryer off.

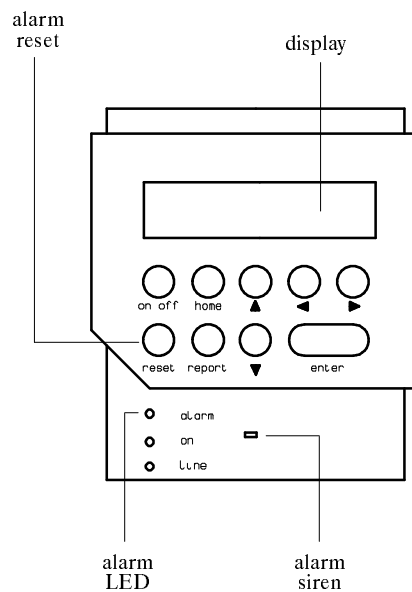
Fig. 3 – ALARM procedure / resetting



N.B.1: For multiple alarms, all alarms are reset immediately; only the last to intervene is displayed.

N.B.2: The alarm message(s) can be displayed whenever requested in the **STATUS REPORT** (see **CHAP. 6**).

N.B.3: Even in alarm conditions, all the information of the **OPERATING DISPLAY** continue to be displayed.



5 – Operation

5.1 – Starting and stopping

If the dryer is powered up (orange 'LINE' LED on), the unit can be started and stopped simply by pressing the **on off** switch. Start-up is delayed by 6 seconds. During this delay the first δ flashes.

5.2 – Automatic restart

The dryer is factory set with Autorestart set to '6' (window 104 of the **PARAMETER MENU**).

If desired, Autorestart can be set to '1–300 secs.', so that the dryer will restart automatically (after an interruption in the power supply) with a delay of 1–300 secs.

IMPORTANT: If Autorestart is set to '1–300 secs.', or if remote On/off is set to 'LOC', the user will assume the responsibility of providing both an on–off keyswitch and affixing a clearly visible warning sticker.

5.3 – Remote control

The remote On/off function (window 105 of the **PARAMETER MENU**, can be set to one of the following states:

- 'NO': Remote On/off disable.
 - 'YES': The unit can be switched on or off by way of a remote switch installed by the customer (Microprocessor Control must be **ON** for the remote control to function)
- N.B.:** If the **OFF** push button on the Microprocessor Control is pressed, the unit will assume **UNIT OFF** status (regardless of the remote control signal).
- 'LOC': The unit can be switched on and off by means of a customer installed remote switch. The Microprocessor Control's **on off** button is completely disabled; if it is pressed the siren will sound (the unit will return to normal when **on off** is released).

IMPORTANT: For safety reasons an emergency stop switch must be installed by user on board the unit.

5.4 – Operating hours

The **HOURS** window of the **PARAMETER MENU** displays the hours of operation in 'UNIT ON' status, the hours of compressor operation at 'FULL PWR' (*dryers with partialization only*): a 'WARNING' threshold level above which the warning **A41** (**HI.HOURS**) will be activated.

5.5 – Temperature readings in °C or °F

The unit is factory set for temperature readings in °C. If desired, readings can be changed to °F in window 102 of the **PARAMETER READINGS**.

5.6 – Pressure readings in bar or PSI

The unit is factory set for pressure readings in bar. If desired, readings can be changed to PSI in window 103 of the **PARAMETER MENU**.

5.7 – Timed condensate discharge

Two timed condensate discharges are available which can be regulated independently.

The opening and closing times for each discharge outlet are factory set.

Condensate discharge can be performed manually by pressing **ENTER** twice in the **OPERATING DISPLAY**; the open time will be that set in window 201–203 of the **PARAMETER MENU**.

When the cylinder symbol is permanently displayed this indicates that the discharge is in alarm condition.

5.8 – Low pressure alarm delay

During dryer operation, the intervention of the low pressure alarm (standard) is delayed by 3 mins.; this function is selected in window 312 of the **PARAMETER MENU**.

5.9 – Model selection

The dryer model can be selected in window 400 of the **PARAMETER MENU** with the following numbers: 1, 2, 3 and 4 (for the model numbers see separate dryer manual).

6 – Status Report

STATUS REPORT is a 18 page memory of the most recent events on the dryer unit.

6.1 – Accessing the STATUS REPORT

It is possible to access the **STATUS REPORT** at any time simply by pressing the **report** key.

6.2 – Working within the STATUS REPORT

Fig. 4 explains how to operate within the **STATUS REPORT** and how the information is laid out.

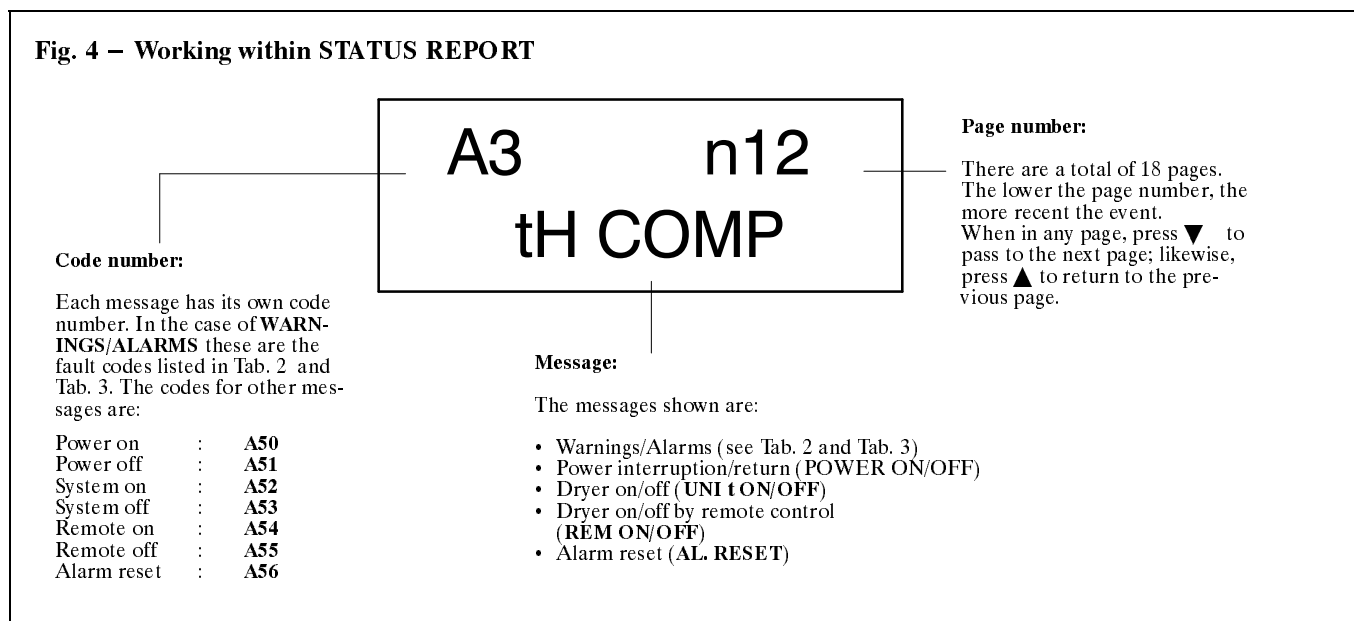
6.3 – Verifying the causes of alarms

When in the **STATUS REPORT**, pressing ► will display the last alarm to stop the dryer; pressing ▼ will display the **FIRST LEVEL MENU** (temperatures and pressures) and the operating hours (**UNI t ON**) accumulated up to the moment the dryer was stopped.

6.4 – Exiting the STATUS REPORT

- Pressing **home** from any page, the status report will return to the window which was displayed when **report** was initially pressed.
- When in **STATUS REPORT**, if no key is pressed, after one minute the Microprocessor Control will return to the **OPERATING DISPLAY**.

Fig. 4 – Working within STATUS REPORT



7 – Status Report

We recommend the use of original spare parts. When ordering parts, quote the part code, as well as the unit's model number and serial number.

CODE	DESCRIPTION	QUANTITY INSTALLED	Notes
275052	Microprocessor Control (without EPROM) with make	1	
275057	Microprocessor Control (without EPROM) without make	1	
275440	EPROM for Microprocessor Control CDR	1	(+)
275142	DRYER FACE INTERFACE	1	
275618	Set of connectors for INTERFACE	1	
275627	Set of connectors for INTERFACE (standard on 3 and 4 models)	1	O
482992	BUS CARD RS422 kit	1	O
275303	Pressure transducer –0.5 ÷ 7 bar (LP) (0.5 ÷ 8 bar absolute)	1	(+)
275306	Pressure transducer 0 ÷ 30 bar (HP)	1	(+)

O = Optional

(+) = Stockage of spare part recommended