EWDB 221/231

electronic controller for refrigerating units

THE USER INTERFACE

Fig. 1 Frontlet of instrument

USE OF THE KEYS

The keys of the instrument permit both the utilisation of the menu and the direct activation of a function.

Table 1 Keys and menu

KEY	DESCRIPTION	FUNCTION
∧	UP key	Scrolls through the menu items Increases the values
∨	DOWN key	Scrolls through the menu items Decreases the values
>	ESC key	Returns to the previous level
<	ENTER key	Accesses the menus Confirms the commands

Table 2 Keys and functions set directly

KEY	DESCRIPTION	FUNCTION
∧	UP	Activates manual defrost function
>	ESC	Accesses the setpoint
∨	DOWN	No function
<	ENTER	Accesses the programming menu

USE OF THE MENUS

ACCESS TO THE MAIN MENU

The programming of the instrument is organised by menu (see Fig. 2, Menu flowchart), which can be accessed by keeping the key < pressed down

for 5 sec.

NAVIGATION OF THE MENUS

In order to access the contents of each folder, just press the key < once.

Table 3 Icons

ICON	INDICATION	DETAILS
	alarm active	Permanently lit up in the event of an alarm, flashing in the event of a silenced alarm
°C	temperature range (°F if icon turn-off)	Flashing in parameters programming
	defrost active	Permanently lit up in the event of defrosting in progress, flashing in the event of manual defrost
	compressor	Permanently lit up in the event of compressor valve working, flashing in the event of delay in activating and for the presence of external alarm

If called for, a password will be required. There are two different passwords. The first password (PA1) is for access to the parameters in the PL1 folder. The second password (PA2) is for access to the parameters in the PL2 folder. (see Fig. 2, Menu flowchart).
At this point in the proceedings it is possible to scroll through the contents of each folder, amend them or use the functions provided in each of the latter.
If you do not use the keyboard or hit the > key within 15 seconds, the last value displayed on the screen is confirmed and you return to the previous screen.

DESCRIPTION OF FOLDERS

PL1 = user parameters (level 1)
This folders contains the parameters required by the end user in order to make any minimum amendments to the programming parameters (see Table 6 and Table 7).

PL2 = machine parameters (level 2)
This folders contains the parameters required by the manufacturer and the assembler for the optimum configuration of the controlling machine (see Table 6 and Table 7).

St = machine status
In this folder the status of the input 2 (see Table 4).

Tab. 4 Machine status table

PARAMETER	VALUE
Pb2 sensor 2	sensor 2 value

RAPID ACTIVATION

Certain specific functions (SePoint, defrost) are associated with keys on the frontlet. see Table 2, Keys and functions set directly).

DISPLAY AND DEFINITION OF THE SETPOINT VALUE

In order to view the Setpoint value, keep the key > pressed down for five sec.

The Setpoint value will appear on the display and the temperature gauge icon will begin to flash. In order to vary the Setpoint value operate, within 15 seconds, on the keys ∧ and ∨

If the parameter LOC = y is not possible to modify the Setpoint.

MANUAL ACTIVATION OF THE DEFROST CYCLE

Manual activation of the defrost cycle is achieved by keeping the key ∧ pressed down for five seconds.

KEYPAD LOCK

The instrument anticipates, by means of appropriately programming the “Loc” parameter (see Table 6, “Miscellaneous” parameters), the possibility of disabling the functioning of the keypad.
In the event the keypad is locked, the user can always access the programming MENU by pressing the key <

PARAMETERS

The parameters can be viewed in two different tables: the first (see Table 6) describes the function of the parameter, while the second (see Table 7) lists the characteristics of each parameter.

DIAGNOSTICS

The alarm icon indicates an alarm condition. Breakdowns are indicated on the screen (see Table 5).
When an alarm status occurs, it is possible to silence the buzzer and/or relay configured as an alarm, by pressing any key.
The buzzer is optional and is present on the EWDB 231/331 B model.

Table 5 Error table

DISPLAY	ERROR
E1	Cold cell sensor fault
E2	defrost sensor fault

BREAKDOWNS

When the sensor detects an error condition:

• the code E1 is displayed

• the compressor is activated as indicated by the "On" and "Off" parameters if programmed for the duty cycle or:

Ont	Oft	Compressor output
0	0	OFF
0	>0	OFF
>0	0	ON
<0	>0	Duty Cycle

Otherwise, when the defrost sensor detects an error condition:

• the code E2 is displayed

• the defrost process is terminated.

MINIMUM AND MAXIMUM TEMPERATURE ALARMS

Regulation of the minimum and maximum temperature alarms refers to the cold cell and/or sensor n. 3.

The temperature limits defined by the "HAL" (maximum temperature alarm) and "LAL" parameters (minimum temperature alarm) are characterised by the "Att" parameter which specifies if they represent the absolute temperature value or a differential with respect to the setpoint.

When an alarm status occurs, if no alarm exclusion phases are underway (see alarm exclusion parameters), the alarm set icon is lit up and the buzzer, and/or the relay configured as an alarm, is activated. The occurrence of this alarm does not in anyway effect the control activities in progress.

FITTER ASSEMBLY

The instruments belonging to the DIGIFROST series range have been conceived for panel mounting purposes.

Cut a hole and insert the instrument fastening it with the supplied bracket. The distance between two coupled devices is 79 mm.

With the appropriate adapter, the instruments can also be assembled on holes for the standard ELIWELL 32x74 mm. The panel thickness must be between 0.5 mm and 7 mm.

The room temperature range admitted for correct operation is between -5 e 60 °C. Furthermore, avoid mounting the instruments in locations subject to high levels of humidity and/or dirt: said instruments are in fact suitable for use in environments with an ordinary or normal level of pollution.

Table 6 Description parameters table

PARAMETER	DESCRIPTION
	COMPRESSOR CONTROLLER
SEt	Setpoint: value ranging between the set minimum (LSE) and the set maximum (HSE).
diF	Operating differential of the setpoint. For applications in the refrigeration sector the compressor will cut off on reaching the Setpoint value set (on indication of the control sensor), only to restart at a temperature value equal to the Setpoint plus the differential value. Note: It will not accept a 0 value.
HSE	Maximum value attributable to the setpoint.
LSE	Minimum value attributable to the setpoint; normally set at the lowest value measurable by the sensor.
	COMPRESSOR PROTECTION CONTROLLER
Ont	ON time of the compressor due to sensor failure.
OFt	OFF time of the compressor due to sensor failure.
dOn	Start-up delay. The parameter indicates that a protection is active on the realisation of the compressor/general relay.
dOF	Delay after shut-down. The parameter indicates that a protection is active on the realisation of the compressor/general relay. At the very minimum, the time indicated must elapse between shut-down of the compressor relay and the subsequent start-up.
dbi	Delay between start-ups. The parameter indicates that a protection is active on the realisation of the compressor/general relay. At the very minimum, the time indicated must elapse between two subsequent start-ups of the compressor relay.
OdO	Activation delay of the instrument start-up outputs or after a lack of voltage; expressed in minutes.
	DEFROST CONTROLLER
dty	Execution mode of defrost process: 0 = electric defrosting; 1 = defrosting by inversion of cycle (hot gas); 2 = free (the compressor relay is disengaged from the defrosting functions; continue in this way to regulate on the setpoint).
dit	Interval between one defrost cycle and the subsequent one; expressed in hours and in minutes in relation to the "dtU".
dtU	Time measurement unit for intervals/length of defrosting. 0 = interval between two defrost cycles in hours, duration of defrost cycle in minutes; 1 = interval between two defrost cycles in minutes; duration of defrost cycle in seconds.
dCt	Defrost interval reckoning mode. 0 = only the running time of the compressor is counted; 1 = the running time of the instrument is counted; 2 = defrosting takes place every time the compressor shuts down.
dOH	Delay in commencement of defrost cycle; expressed in minutes.
dEt	Defrost cycle Time out; expressed in minutes or seconds in relation to the "dtU".
dSt	Defrost cycle conclusion temperature.
dPO	Request for activation of the defrost controller on start-up. y = yes; n = no.
dri	By means of this parameter it is possible to decide if, on request of a manual defrost cycle, the reckoning for the defrost interval must be set to zero or not. y = yes; n = no.
	FAN CONTROLLER
FSt (1)	Fan temperature lock: a value read by the defrost sensor which exceeds that set causes the halting of the fans.
FPt (1)	It characterises the "FSt" parameter which can be expressed as an absolute temperature value (FPt = 0) or as a relative value with respect to the setpoint (FPt = 1).
Fdt (1)	Delay in activating the fans; expressed in minutes.
dt	Drainage time; expressed in minutes.
dFd (1)	Permits the user to select, or otherwise, the exclusion of the evaporator fans during defrosting. n = no; y = yes
FCO (1)	Permits the user to select, or otherwise, the blocking of the compressor fans in OFF mode. n = fans switched off; y = fans thermostated.
	ALARMS
Afd	Alarm/fan set differential: temperature difference between the setting off and disconnection of the minimum or maximum alarm or of the fans.
Att	Mode of interpreting the value of the HAL and LAL parameters. 0 = interprets the values as absolutes (not referring to the setpoint); 1 = interprets the values as relative with respect to the setpoint.
HAL	Maximum temperature alarm. Temperature value whose excess upwards will determine the activation of the alarm signal. NOTE: To obtain the alarm as relative with respect to the setpoint in case of Att=1 set "LAL" to a positive value
LAL	Minimum temperature alarm. Temperature value whose excess downwards will determine the activation of the alarm signal. NOTE: To obtain the alarm as relative with respect to the setpoint in case of Att=1 set "HAL" to a negative value
PAO	Exclusion of the alarms on start-up of the instrument, both with key on/off or after a failure in the power supply. In the event of reactivation of additional delay times the highest among these will be valid.
dAO	Exclusion of alarm after defrosting.
tAO	Delay time for signalling of temperature alarm.
AOP	Alarm signal for defrost concluded due to time-out. n = activate alarm; y = do not activate alarm.
	MISCELLANEOUS
LOC	Keypad lock (blocks the activation of the primary functions). With the keypad disabled, viewing of the Setpoint is only permitted by means of the key associated with direct functions. However it remains possible to enter parameter programming and modify the status of the parameter so as to enable the unlocking of the keypad. n = do not lock; y = lock.
PA1	Password 1 (blocks PL1).
PA2	Password 2 (blocks PL2).
	DISPLAY
ndt	Display mode of the temperature on the display. n = full number; y = decimal number.
CAL	Gauging. Positive or negative temperature offset which is added to the value read by the thermostating sensor before being displayed and used for control purposes.

PARAMETER	DESCRIPTION
LdL	Minimum value of the sensor which can be viewed on the display.
HdL	Maximum value of the sensor which can be viewed on the display.
dLc	Display mode during the defrost cycle. 0 = displays the temperature read by the cold cell sensor; 1 = displays the temperature read by the cold cell sensor at the time of commencement of defrosting; 2 = displays the "dEF" label during defrosting. Once defrosting and de-tearing has finished, the device will continue to display the information anticipated until the cold cell sensor reaches the setpoint value. If set at zero, the display does not entail the reaching of the setpoint.
dro	°C or °F selection. 0 = °C; 1 = °F.
	MACHINE SETTINGS
H02	Key activation time.
H21	Configuration capacity of digital output 1. 0= dIsabled 1 = compressor; 2 = defrost; 3 = fans; 4 = alarm;
H22	Configuration capacity of digital output 2. 0...4 same as H21
H23 (1)	Configuration capacity of digital output 3. 0...4 same as H21
H42	Evaporator sensor presence. y = sensor present; n = sensor not present.
reL	Release firmware
tAb	Table of parameters

(1) PLEASE NOTE: only for EWDB 231

Make sure that the area near to the cooling slits is left aerated.

ELECTRICAL CONNECTIONS

The instrument is provided with screw terminal boards for the connection of wires with a maximum 2.5 mm^2 section (one wire only per terminal for power connections).
Always turn the machine off before operating on electrical connections.
Relay outputs are voltage free. Do not exceed the maximum allowed voltage; in case of heavier loads use a suitable power contactor.
Make sure the power supply voltage match the instrument requirements.
In 12 V powered versions that do not require probe with reinforced insulation the power can be supplied through a safety transformer protected by a delayed 250 mA fuse.
Probes require no insertion polarity and can be lengthened using standard bipolar cable (please note that longer probes may cause worse instrument performance in terms of electro-magnetic compatibility: maximum care shall be put in cabling).
Probe, digital input and supply cables shall be kept far from power cables.
In versions requiring probes with reinforced insulation (refer to label on the rear of the instrument) probe contacts are not insulated from power supply. Therefore probes shall provided reinforced insulation when they are easily accessible. Moreover, when such models are installed on a metal panel, such panel shall be grounded.
In versions not requiring probes with reinforced insulation probe and power supply contacts feature a reinforced insulation from relay contacts. Therefore such contacts (power supply and probe) can be accessible with no risk provided that power supply is SELV.
A reinforced insulation shall be provided between relay contacts and accessible sections.

CONDITIONS OF USE

PERMITTED USE
For safety reasons the instrument must be installed and used according to the instruction provided and in particular, under normal conditions, parts bearing dangerous voltage levels must not be accessible.
The device must be adequately protected from water and dust as per the application and must also only be accessible via the use of tools (with the exception of the frontlet).
The device is ideally suited for use on household appliances and/or similar refrigeration equipment and has been tested with regard to the aspects concerning European reference standards on safety. It is classified as follows:
• according to its manufacture: as an automatic electronic control device to be incorporated by independent mounting;
• according to its automatic operating features: as a 1 B-type operated control type;
• as a Class A device in relation to the category and structure of the software.

USE NOT PERMITTED
Any other use other than that permitted is de facto prohibited.
It should be noted that the relay contacts provided are of a practical type and therefore subject to fault. Any protection devices required by product standards or dictated by common sense due to obvious safety reasons should be applied externally.

LIABILITY AND RESIDUAL RISKS

Invensys Controls Italy S.r.L. shall not be liable for any damages deriving from:
- installation/use other than that prescribed and, in particular, that which does not comply with safety standards anticipated by regulations and/or those given herein;
- use on boards which do not guarantee adequate protection against electric shock, water or dust under the conditions of assembly applied;
- use on boards which allow access to dangerous parts without the use of tools;
- tampering with and/or alteration of the products;
- installation/use on boards not complying with the standards and provisions of current legislation.

TECHNICAL DATA

Frontlet protection: IP65.
Casing: plastic in PC+ABS resin.
Dimensions: frontlet 72x30 mm, depth 60 mm.
Mounting: panel mounted, with drill holes of 58x25,4 mm (+0,2/–0,1 mm) in diameter.
Room temperature: –5...60 °C.
Storage temperature: –30...75 °C.
Display range: –50...110 °C without decimal point, –50.0...99.9 with decimal point, on a 3 digit + sign display.
Analog inputs: two standard NTC type supplied or PTC (according to availability).
Digital outputs EWDB 231: 1 SPDT output

and 2 SPST outputs on 8(3)A 250V~ relay, configurable.
Digital outputs EWDB 231: 1 SPDT output

and 1 SPST output on 8(3)A 250V~ relay, configurable.
Temperature range: from -50 to 110 °C (from –40 to 230 °F).
Accuracy: the best of 0.5% at bottom of scale.
Definition: 1 or 0.1 °C.
Power consumption: depending on the model
Power supply: depending on the model. See label on the instrument.

NOTE: for the optionals, see label on the instrument.

Table 7 Complete parameters table

PARAMETER	DESCRIPTION	LEVEL	RANGE	DEFAULT	U.M.
SEt	SEtpoint	1	LSE...HSE	0	°C/°F
diF	diFFerential	1	0.3...30.0	2	°C/°F
HSE	High SEt	1	LSE..302	50	°C/°F
LSE	Low SEt	1	-67...HSE	-50	°C/°F
Ont	Compressor (min) On time	1	-30.0...30.0	10	min
OFt	Compressor (max) OFF time	1	0...250	10	min
dOn	delay On compressor	1	0...250	0	sec
dOF	delay OFF compressor	1	0...250	0	min
dbi	delay between interval	1	0...250	0	min
OdO	Output delay at On	1	0...250	0	min
dty	defrost type selection	1	0/1/2	0	num
dit	defrost interval time	1	0...250	6	h
dtU	defrost time unit	1	0/1	0	num
dCt	defrost count type	1	0/1/2	1	num
dOH	defrost Offset	1	0...250	0	min
dEt	defrost Endurance time	1	1...250	30	min/sec
dSt	defrost stop temperature	1	-67...302	8	°C/°F
dPO	defrost at Power ON	1	n/y	n	flag
dri	defrost reset interval	1	n/y	y	flag
FSt	Fan Stop temperature	1	-67...302	2	°C/°F
FPt	Fan Parameter “FSt” type	1	0/1	0	num
Fdt	Fan delay time	1	0...250	0	min
dt	drainage time	1	0...250	0	min
dFd	defrost Fan disable	1	n/y	y	flag
Afd	Alarm fan differential	1	0.3...50.0	2	°C/°F
FCO	Fan Compressor OFF	1	n/y	y	flag
Att	Alarm temperature type	1	0/1	1	num
HAL	High ALarm	1	LAL...302	50	°C/°F
LAL	Low ALarm	1	-67...HAL	-50	°C/°F
PAO	Power on Alarm Override	1	0...10	2	h
dAO	defrost Alarm Override	1	0..999	60	min
tAO	tiemperature Alarm Override	1			min
AOP	Alarm Output Polarity	1	0/1	1	num
LOC	keyboard LOCK	2	n/y	n	flag
PA1	Password 1	1	0...255	0	num
PA2	Password 2	2	0...255	0	num
ndt	number display type	2	n/y	n	flag
CAL	CALibration	2	-30.0...30.0	0	°C/°F
LdL	Low display	2	-67...302	-50	°C/°F
HdL	High display	2	-67...302	110	°C/°F
dLc	display Lock	2	0/1/2	1	num
dro	display read-out	2	0/1	0	num
H02	Key activation time	2	0...250	5	sec
H21	Configuration capacity of digital output 1	2	0...4	1	num
H22	Configuration capacity of digital output 2	2	0...4	2	num
H23	Configuration capacity of digital output 3	2	0...4	3	num
H42	Evaporator sensor presence	2	n/y	y	flag
reL	reLease Firmware	/	/	/	/
tAb	tAble of parameters	/	/	/	/

DISCLAIMER

Invensys Controls Italy s.r.l
via dell'Industria, 15 Zona Industriale Paludi
32010 Pieve d'Alpago (BL) ITALY
Telephone +39 0437 986111
Facsimile +39 0437 989066
Email info@climate-eu.invensys.com
Internet http:/www.climate-eu.invensys.com

6/2001 ing
cod. 9IS20176

Fig. 2 Menù flowchart

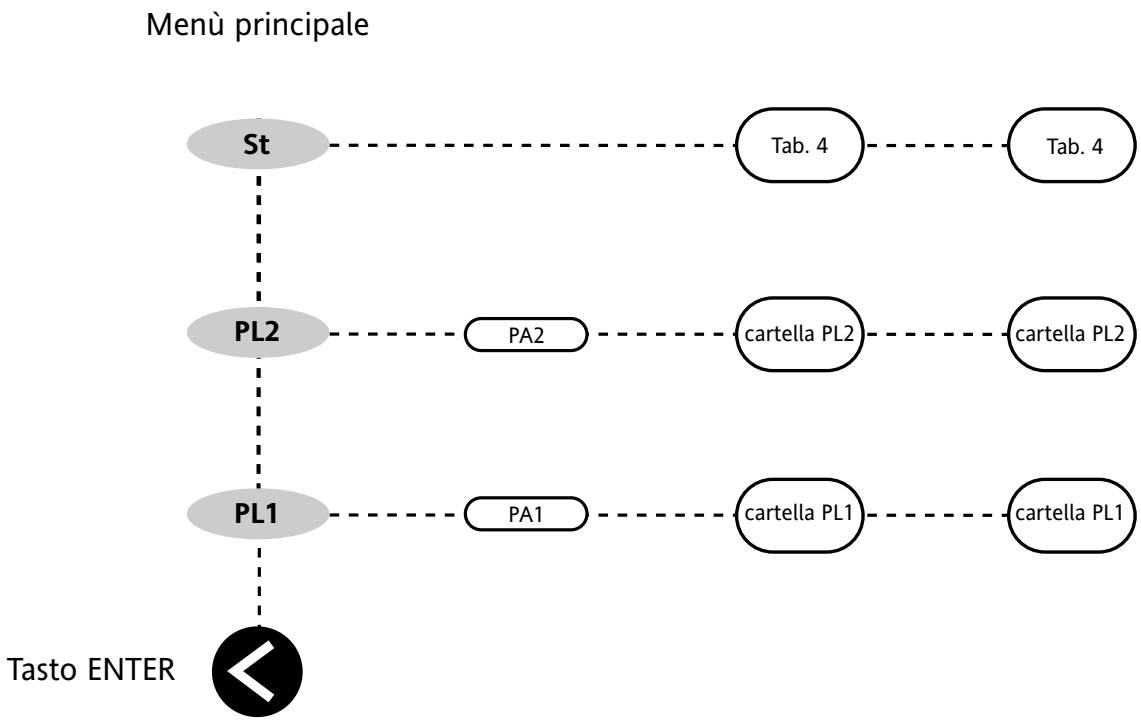
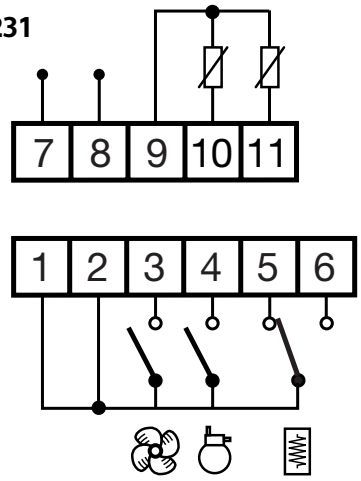


Fig. 3 Wiring

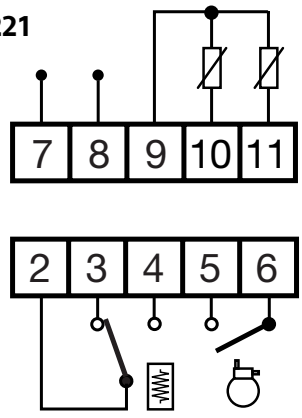
EWDB 231



WIRING EWDB 231

1 - 2	common relay output
3	fan relay output
4	compressor relay output
5	N.C. defrost relay output
6	N.A. defrost relay output
7 - 8	power supply
9	common analogic input
10	input thermostatic probe
11	input defrost probe

EWDB 221



WIRING EWDB 221

2	common defrost relay output
3	N.C. defrost relay output
4	N.A. defrost relay output
5 - 6	compressor relay output
7 - 8	power supply
9	common analogic input
10	input thermostatic probe
11	input defrost probe