



EWPC 1000(/C,/S)

freezer controls

WHAT IT IS

The EWPC 1000, EWPC 1000/C (Clock) and EWPC 1000/S (Serial) are microprocessor based digital instruments used for refrigerator and freezer control; they are designed specifically for "forced draft" units, either medium or low temperature.

HOW IT IS MADE

- **Dimensions:** front 215.5x72 mm (8.5x2.84"), depth 110 mm (4.33")
- **Mounting:** flush panel mount with two mounting studs provided
- **Relay output:** one (1) SPST relay 15(7)A 250V AC for compressor, one (1) SPDT relay 8(3)A 250V AC for defrost, four (4) SPST relays 8(3)A 250V AC for evaporator fan control, auxiliary functions, light and ON/OFF switch
- **Remote alarm output:** one (1) output 12 Vdc/50 mA to remote alarm buzzer or relay
- **Analog inputs:** two (2) PTC probes for temperature control and defrost termination
- **Digital inputs:** three (3) digital inputs for door switch, pressure switch (only for EWPC 1000/C and EWPC 1000/S) and crankcase heater (only for EWPC 1000/C and EWPC 1000/S)
- **Serial connection:** RS-485 port for connection to the TELEVIS system (EWPC 1000/S only)
- **Televis system compatibility:** software rel 1.0.0 or greater (EWPC 1000/S only)
- **Resolution:** 1 °C (°F)
- **Accuracy:** better than 0.5% of full scale
- **Power supply (depending on model):** 220, 110, 24 Vac; 12 Vdc (only EWPC 1000)

GENERAL DESCRIPTION

The EWPC 1000, EWPC 1000/C (Clock) and EWPC 1000/S (Serial) are microprocessor based digital instruments used for refrigerator and freezer control; they are designed specifically for "forced draft" units, either medium or low temperature. These instruments provide six (6) relay outputs for the control of: compressor, defrost system, evaporator fan, cabinet light, system switch ("ON/OFF" button) and auxiliary output; they also have a 12 Vdc/50 mA output for remote alarm buzzer or relay. All three versions have 2 analog inputs from PTC temperature sensors (for temperature and defrost control), as well as an "ON/OFF" input for a door switch. The "/C" and "/S" versions have two additional "ON/OFF" inputs for crankcase heater and pressure switch. Finally, the EWPC 1000/S has a RS-485 port which makes it suitable for connection to a TELEVIS system. The EWPC 1000/C and EWPC 1000/S have an on-board time clock for the defrost management. An on-board back-up device makes it possible for the time count to continue during a power failure. A number of parameters are displayed alphanumerically to set up the EWPC 1000(/C, /S) for each specific application. These instruments are supplied in a 215.5x72 mm housing.

OPERATION

The temperature control is always subject to a positive temperature differential (make on rise): the compressor stops when setpoint is reached and starts again upon reaching the setpoint temperature plus the differential.

A choice of two defrost types is available: electric defrost (during which the compressor stops) or hot gas defrost (during which the compressor is running).

The defrost start frequency, as well as the time count mode are programmable. As

an alternative however, via the time clock option (see the sections "DESCRIPTION OF PARAMETERS" and "REAL TIME PROGRAMMING") up to 6 different real time hours can be programmed to start the defrost. Other programming options include: defrost frequency time, time count mode, defrost termination temperature, and a defrost safety limit (time-out).

The evaporator probe is used to control the defrost cycle as well as the evaporator fan: a selection can be made of the temperature above which the fan is OFF, the post-defrost fan delay time and the link between fan, compressor and door-switch.

The instrument provides comprehensive control of high and low temperature alarms, continuous cycle (quick chill), crankcase heater and pressure switch errors. A number of compressor short-cycle protection solutions (i.e., delay on start, delay at switching off, delay between two successive starts) are incorporated in the system. Thanks to a wide selection of other available parameters the controller can be adapted to virtually any application requirement.

This instrument (/S version) is compatible with TELEVIS software rel 2.4 or greater.

In case its use with different software releases is required contact your supplier or Eliwell Customers' Service.

FRONT KEYPAD

Note: in order to avoid tampering (accidental or unauthorised use), all button functions require a 2-step action: the relevant function button must be held down, followed by pushing the "SET" button. The "MANUAL DEFROST", "CLOCK" and programming access buttons must be held down for 1 second (in addition to pushing "SET"); the "SILENCE ALARM" button activates immediately when pushed.

ON/OFF: this button turns the instrument on and off.



By using the corresponding on-board output relay, this button can also be used to turn the entire system on and off. The turning off of the instrument always causes the reset of the following time and alarm functions: defrost interval, fan delay, continuous cycle, pressure error timing, temp. and pressure alarms.

This button is deactivated during the programming of the setpoint, the parameters and the time. The led status light located above this switch indicates whether the instrument is on or off.

Note: The instrument remains under power even when it is turned off.

SET: push and release to display the setpoint.

To change, operate the "UP" or "DOWN" button within 5 seconds. Upon selecting the required setpoint, wait 5 seconds, after which the new setting will be stored in memory.

When in this setpoint display/change mode, the led status light above this button will be on.

UP: to increase a setting; used to change either the setpoint or the parameter. Hold this button down for a faster change rate.

DOWN: to decrease a setting; used to change either the setpoint or the parameter. Hold this button down for a faster change rate.

MANUAL DEFROST: this button starts a manual defrost, thus overriding a scheduled automatic defrost; it must be held down for at least 1 second along with the "SET" button (see previous note).

Note: defrost will not start however if, at the moment when this button is activated, the evaporator probe temperature is higher than the defrost termination temperature setting.

CONTINUOUS CYCLE: a manual continuous cycle can be activated with this button (the compressor will start and continue running for the time limit set with parameter "cct" and independent from the temperature control).

Pushing this button during a continuous cycle will stop this cycle and return the system to normal.

The led status light above this button indicates whether the system is in continuous cycle or not.

CLOCK: button for the setting of the real time (only for EWPC 1000/C and EWPC 1000/S); see the section "REAL TIME PROGRAMMING".

SILENCE ALARM: with this button the 12 Vdc/50 mA remote alarm output signal can be deactivated (see the "ERROR ANNUNCIATION" section).

This button does not require simultaneous activation of the "SET" button.

LIGHTS: to turn the cabinet light on and off manually.

This light is also controlled automatically through the door switch, connected to the corresponding digital input of the instrument.

This button works only with the door closed (see "DIGITAL INPUTS" section).

It is possible to choose whether or not this button is to function when the instrument is off; see the programming of parameter "ltd".

When the light has been switched on manually, the led above this button will be on as well.

AUXILIARY: this button energises the auxiliary output relay.

A led light above this button indicates the status of this relay.

COMPRESSOR Led: status light for the compressor relay.

On when the compressor is running; flashing to indicate a time delay (see parameters "odo", "PS" and "Pt") or an interruption in the digital inputs (see "DIGITAL INPUTS" section).

DEFROST Led: status light for the defroster relay.

On to indicate an automatic timed defrost; flashing during a manual defrost.

FAN Led: status light for the fan relay.

On when the fan is running; flashing during a coil drainage delay or a delay before start (see parameter "Fdt"), or when interrupted by the door switch.

ALARM Led: status light for the 12 Vdc/50 mA remote alarm signal.

This led stays steady during an alarm caused by a probe, pressure switch, high or low temperature. It will flash in case the alarm has been silenced manually (as long as the alarm cause has not been corrected or the instrument turned off); see "ERROR ANNUNCIATION" section.

REAL TIME PROGRAMMING

Both the EWPC 1000/C and EWPC 1000/S are equipped with an internal clock for the defrost management.

To check the time setting, push simultaneously the "CLOCK" button, then "SET" and hold them down for at least 1 second. The display will alternate between the time in hours (preceded by "h") and in minutes (followed by ":"). To change the time, use the "UP" or "DOWN" button within 5 seconds. The display will become steady and show either the hour or the minutes; use "SET" to switch from one to the other.

The time setting can now be changed with the "UP" or "DOWN" button. After the hour and minutes have been set, simply wait; after 15 seconds the system will automatically exit the time setting mode. The new time setting stays in memory.

The EWPC 1000/C and EWPC 1000/S has an on-board back-up device which enables the continuation of the clock in case of a power failure for up to approximately 6 hours. After this time, the instrument will lose its time memory. Upon return of power the time clock will start at "h00-00" and at the same time display alternately "dtE" (defrost time Error) and the box temperature (only if the clock option was activated - see parameter "dit").

This serves as a warning that the time memory has been lost and needs to be re-set.

PARAMETER PROGRAMMING

To enter the programming, push simultaneously the concealed button located at the right top corner of the front panel, then "SET" and hold them down for at least 1 second; the first parameter is displayed while the status light "SET" remains blinking during the programming period.

Other parameters are accessed with the "UP" and "DOWN" button. With the "SET" button, the actual setting of each parameter is displayed. To change a parameter setting, push the "UP" (or "DOWN").

The system will automatically return to its normal operating mode a few seconds after the programming procedure is completed or interrupted.

DESCRIPTION OF PARAMETERS

diF: differential.

Switching differential (hysteresis); it will always be set with positive value (make on rise).

LSE: Lower SET.

This is the lower limit below which the user cannot change the setpoint.

HSE: Higher SET.

Similar to "LSE", however setting an upper limit for the setpoint.

dtY: defrost type selection.

EL = Electric defrost;

in = hot gas (reverse cycle) defrost.

dit: defrost interval time.

Defrost initiation frequency in hours. A setting of "0" must be selected to activate the real time option for the defrost initiation (see further parameters "dt1...dt6").

dct: defrost count type.

dF = digiFrost®; defrost starting time ("dit") is calculated based on accumulative compressor running time.

rt = real time; defrost initiation frequency is based on real time. Time between defrost starts is always the same.

SC = Stop Compressor; a defrost cycle is activated each time the compressor stops.

Fr = Free (the compressor relay has no relation with the defrost functions and continues to regulate on Setpoint).

dt1...dt6: defrost time 1 to 6.

These apply to EWPC 1000/C and EWPC 1000/S versions only; setting of the real time for each defrost start (up to 6 within 24 hours). These parameters can be used only if "dit" is set at "0".

0...23 = real time;

oF = Off (disabled).

Note: it is not necessary that the settings of each of the 6 parameters "dt1...dt6" are performed in the exact corresponding time sequence.

doh: defrost offset.

Time delay of defrost start, expressed in minutes.

dEt: defrost Endurance time-out.

Defrost safety limit, expressed in minutes.

Defrost cycle is terminated, regardless whether fully completed.

dSt: defrost Stop temperature.

Adjustable defrost termination temperature.

POS: POStpone defrost.

This provides for a postponement of a scheduled defrost cycle until such a moment that the condition which prevented the defrost to start (i.e. evaporator temperature higher than the defrost termination temperature) has corrected itself.

n = the prevailing defrost cycle is cancelled;

y = the defrost cycle is not cancelled, however is postponed.

FSt: Fan Stop temperature.

Setting of temperature (measured by the evaporator defrost probe) above which the fan is always OFF.

Fdt: Fan delay time.

Selection of post-defrost fan delay, in minutes.

dt: drainage time.

Upon defrost completion, evaporator fan and compressor remain "OFF" for this amount of time to allow coil drainage; expressed in minutes.

dPo: defrost (at) Power on.

Selects whether the system should go through a defrost cycle at start-up (or after a power failure).

n = no; y = yes.

ddL: defrost display Lock.

Select whether or not to lock in the actual box temperature display during a defrost. n = no; during defrost the actual box temperature is displayed.

y = yes; the temperature displayed at the start of a defrost is locked in and does not change during this cycle.

Lb = Label; during the defrost the label "dEF" is displayed to indicate a defrost is in progress.

Note: with the "y" and "Lb" selection, the display remains locked until the box temperature is pulled down again and reaches setpoint value.

dFd: defrost Fan disable.

Fan OFF during defrost.

n = no; y = yes.

HAL: High ALarm.

This sets the deviation above the setpoint at which the led "ALARM" will activate, as well as the 12 Vdc/50 mA remote alarm output signal.

LAL: Low ALarm.

This sets the deviation below the setpoint at which the led "ALARM" will activate, as well as the 12 Vdc/50 mA remote alarm output signal.

AFd: Alarm (and) Fan differential.

The allowable temperature swing between ON and OFF of the alarms and fan functions (see parameters "FSt", "HAL" and "LAL").

PAO: Power-on Alarm Override.

Time delay after start-up during which the alarm will not activate; expressed in hours.

dAo: defrost Alarm override.

DEFAULT SETTINGS

Parameter	Description	Range	Default	Unit
diF	diFferential	1...15	2	°C / °F
LSE	Low SEt	-99...HSE	-55	°C / °F
HSE	High SEt	LSE...99	40	°C / °F
dtY	defrost type selection	EL / in	EL	flag
diT	defrost interval time	0...31	6	hours
dCT	defrost count type	dF / rt / SC / Fr	dF	flag
dt1...dt6 *	defrost time 1...6	0...23 / oF	0	hours
dOH	defrost offset	0...59	0	minutes
dEt	def. Endurance time-out	1...99	30	minutes
dSt	def. Stop temperature	-70...99	8	°C / °F
POS	POStpone defrost	n / y	n	flag
FSt	Fan Stop temperature	-70...99	2	°C / °F
Fdt	Fan delay time	0...99	10	minutes
dt	drainage time	0...99	0	minutes
dPo	defrost (at) Power on	n / y	n	flag
ddL	defrost display Lock	n / y / lb	y	flag
dFd	defrost Fan disable	n / y	y	flag
HAL	High ALarm	1...50	5	°C / °F
LAL	Low ALarm	1...50	5	°C / °F
AFd	Alarm (and) Fan differential	1...50	2	°C / °F
PAO	Power-on Alarm Override	0...10	2	hours
dAo	defrost Alarm override	0...10	1	hours
oAo	output (door) Alarm override	0...10	1	hours
cAo	cont. cycle Alarm override	0...10	2	hours
cct	continuous cycle time	0...10	4	hours
Fco	Fan compressor off	oF / on	on	flag
Fod	Fan off (with opened) door	oF / on	oF	flag
cPP	comp. Probe Protection	oF / on	oF	flag
ctP	comp. type Protection	nP / don / doF / dbi	doF	flag
cdP	comp. delay Protection	0...15	0	minutes
PEn	Pressurestats Errors number	0...15	15	number
PEI	Pressurestats Errors Interval	0...99	99	minutes
odo	output delay (at) on	0...99	0	minutes
dod	disable (with) opened door	n / y	y	flag
dSd	diSable (light) with opened door	n / y	y	flag
ldd	light door disable	n / y	y	flag
EPr	Evaporator Probe read-out	/	/	°C / °F
CAL	CALibration	-20...20	0	°C / °F
dEA **	dEvice Address	0...14	0	number
FAA **	FAMily Address	0...14	0	number
tAb	tAble of parameters	/	/	/

* these apply to EWPC 1000/C e EWPC 1000/S version only

** this apply to EWPC 1000/S only

Period after defrost during which the alarm will not activate, expressed in hours.

oAo: output (door) Alarm override.

Time delay after door opening during which the alarm will not activate; expressed in hours.

cAo: continuous (cycle) Alarm override.

Alarm override time after a continuous cycle, in hours.

cct: continuous cycle time.

Duration of the continuous cycle, in hours; compressor runs continuously, regardless of thermostat.

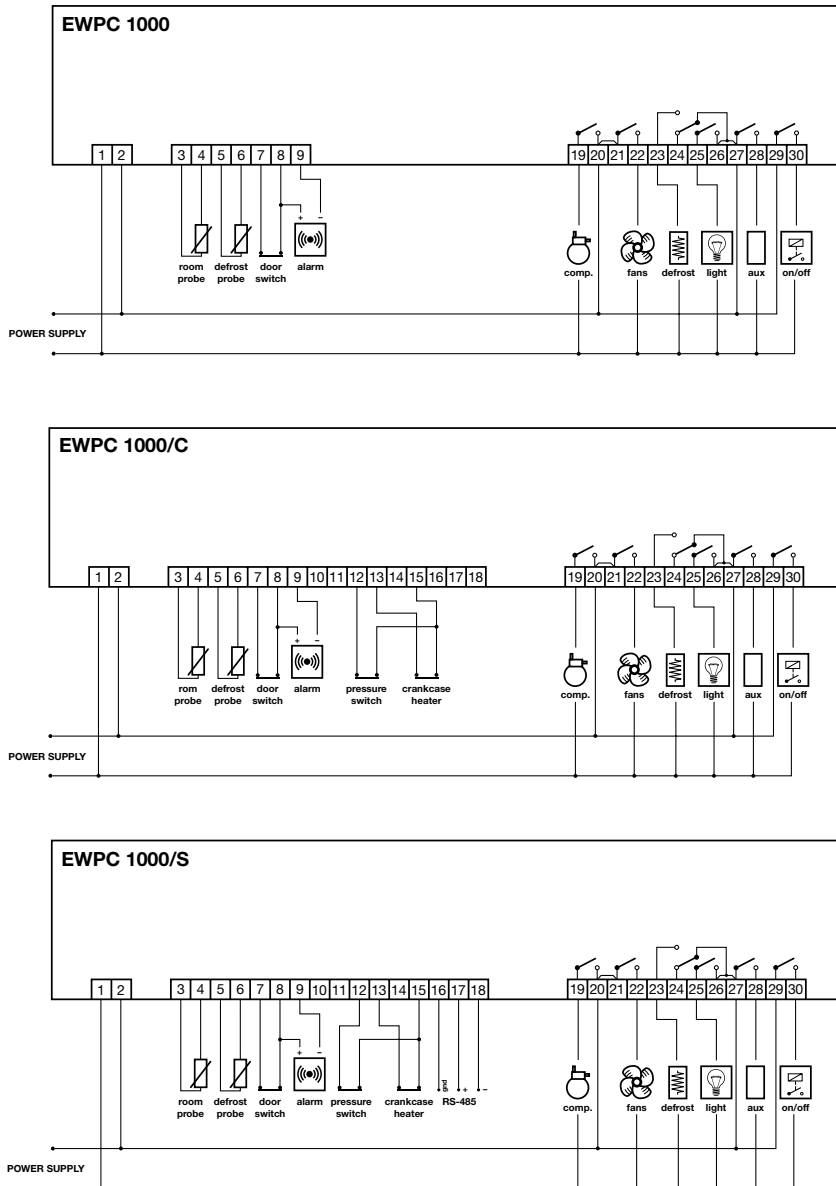
Fco: Fan compressor off.

The evaporator fan is OFF whenever the compressor is cycled OFF.

oF = yes; on = no.

Fod: Fan off (with opened) door.

CONNECTIONS



Select whether the fan should go off when the door is opened.

oF = yes (fan off);

on = no (fan continues to run).

cPP: compressor Probe Protection.

Select compressor relay status in case of room probe defect.

oF = compressor OFF in case of probe defect;

on = compressor ON in case of probe defect.

ctP: compressor type Protection.

Select the type of (short-cycle) protection best suited for the compressor; the actual delay time is programmed with the next parameter.

nP = no Protection.

don = delay on start; delay applies when relay is energized.

doF = delay at switching oF. Delay after stop, i.e. time between stop and subsequent start.

dbi = delay between two successive

starts. Limits the number of start-ups per hour.

cdP: compressor delay Protection.

The time delay - in minutes - applicable to the previous parameter "ctP".

PEn: Pressure Error number.

Number of pressure switch errors allowed within a period defined with parameter "PEI" without triggering the alarm (see "ERROR ANNUNCIATION" section).

PEI: Pressure Error Interval.

Time period during which a number of pressure switch errors are allowed as defined by parameter "PEn", without triggering the alarm (see "ERROR ANNUNCIATION" section).

odo: output delay (at) on.

Time delay in minutes applied to activation of the relays after start-up.

dod: disable with opened door.

Compressor and fan to be off when door is opened.

n = no; y = yes.

dSd: diSable light with open door.

The light will automatically come on when the door is opened.

n = no; y = yes.

ldd: light button and door switch disable (with instrument off).

The "LIGHT" button and the digital door switch input remain operative when the instrument is off (but under power).

n = no; y = yes.

EPr: Evaporator Probe read-out.

With this parameter the evaporator temperature can be displayed, even during normal operation.

CAL: CALibration.

Temperature read-out offset to allow for a fixed adjustment up or down due to probe location, if desired.

dEA: dEvice Address.

To select the (address) label of the device in relation to the supervisory system; this applies to the TELEVIS compatible EWPC 1000/S version only.

FAA: Family Address.

To select the (family) label of the device in relation to the supervisory system; further as "dEA".

tAb: tAble of parameters.

This shows the configuration of the parameters as set in the factory; can not be modified (for factory identification and diagnostic purposes only).

DIGITAL INPUTS

The EWPC 1000(/C, /S) can accommodate up to three input signals, dry contact and voltage free.

The door switch input controls the cabinet light: light on when input open, off when contact is closed. If the light has already been switched on with the (manual) button, then this input has no further effect (see "FRONT KEYPAD" section).

Through the "ldd" parameter a choice can be made whether or not to enable this function when the instrument is off.

The crankcase heater input, if interrupted, cuts off the compressor output (versions /C and /S only); this input should be shorted if not used. The pressure switch input, if interrupted, cuts off the compressor output (versions /C and /S only); this input should be shorted if not used.

As soon as the number of pressure errors (as set with parameter "PEn") is reached within the time period (as set with parameter "PEI"), the compressor will be cut-off and remain off until the instrument is turned off, then on again; see also the "ERROR ANNUNCIATION" section.

INSTALLATION

The EWPC 1000(/C, /S) is designed for flush panel mounting. Insert the unit through a 209.5x65.5 mm and affix with the brackets supplied. The ambient temperature around the instrument should be kept between -5 and 65 °C (23...149 °F). Select a location which will not be subject to high humidity or condensation.

ELECTRICAL WIRING

The EWPC 1000/(C, /S) is equipped with Faston spade connectors 6.3 mm. It has an "ON/OFF" button which, aside from turning the instrument on and off, controls an on-board output relay to which (via the terminal block) an external device can be connected.

Make sure that the available voltage corresponds to the nameplate rating of the instrument.

Power remains connected even if the instrument is turned off; a main switch should therefore be installed between the instrument and the mains.

The two PTC-type sensors do not require polarity and can be extended in the field by using common 2-lead wire. It is strongly recommended that the probe wiring is kept away from power leads.

Also, it is good practice to install the sensor tip facing up, in order to avoid moist from entering the sensor housing. the digital inputs should be dry contacts, voltage free.

The compressor output relay is voltage free and can handle up to 1.5 HP; use a suitable external contactor for larger compressors.

ERROR ANNUNCIATION

The EWPC 1000/(C, /S) displays "E1" in the event of a box sensor error, i.e. open, shorted or not-connected probe, "under range" (temperature below the low display limit of -55 °C), or "over range" (temperature above the high display limit of 99 °C). A message "E2" indicates a similar faulty condition, however for the evaporator sensor. A push on the "SILENCE ALARM" button will break the 12 Vdc/50 mA remote alarm output signal; the error code is displayed and the "ALARM" led status light will keep flashing as long as the cause for the alarm continues (automatic reset). Before diagnosing a probe as defective and replacing it, make sure to doublecheck whether the wires are connected properly.

Another error message can be displayed:

"EO". This indicates that the maximum number of pressure errors (as defined with parameter "PEn") has taken place within the time period as defined with parameter "PEI"; such error message also means that the compressor output has been de-activated. Also in this case, when the "SILENCE ALARM" button is activated, the 12 Vdc/50 mA remote alarm output signal will be de-energised; the error code is displayed and the "ALARM" led status light will keep flashing (and the compressor will remain off) until the instrument is turned off, then on again (manual reset).

Finally, the EWPC 1000/C and EWPC 1000/S have a "dtE" error message (defrost time Error) to warn that the real time memory has been lost (see "REAL TIME PROGRAMMING" section).

TECHNICAL DATA

Housing: black ABS plastic, self-extinguishing.

Dimensions: front 215.5x72 mm (8.5x2.84"), depth 110 mm (4.33").

Mounting: flush panel mount with two mounting studs provided.

Connections: Faston connectors 6.3 mm (1/4" male spade).

Display: 12.5 mm LED (0.50").

Push buttons: located on front panel.

Data storage: non-volatile EEPROM memory.

Real time clock memory retention: approximately 6 hours.

Operating temperature: -5...65 °C (23...149 °F).

Storage temperature: -30...75 °C (-22...167 °F).

Relay outputs: one (1) SPST relay 15(7)A 250V AC for compressor, one (1) SPDT relay 8(3)A 250V AC for defrost, four (4) SPST relays 8(3)A 250V AC for evaporator fan control, auxiliary functions, light and ON/OFF switch.

Remote alarm output: one (1) output 12 Vdc/50 mA to remote alarm buzzer or relay.

Analog inputs: two (2) PTC probes for temperature control and defrost termination.

Digital inputs: three (3) digital inputs for door switch (all models), pressure switch and crankcase heater (only for EWPC 1000/C and EWPC 1000/S).

Serial connection: RS-485 port for connection to the TELEVIS system (EWPC 1000/S only).

Televis system compatibility: software rel 1.0.0 or greater (EWPC 1000/S only).

Resolution: 1 °C (°F).

Accuracy: better than 0.5% of full scale.

Power supply (depending on model): 220, 110, 24 Vac $\pm 10\%$, 50/60 Hz (specify when ordering); 12 Vdc $\pm 15\%$ (only EWPC 1000).

DISCLAIMER

This manual and its contents remain the sole property of Invensys Climate Controls s.p.a., and shall not be reproduced or distributed without authorization. Although great care has been exercised in the preparation of this document, Invensys Climate Controls s.p.a., its employees or its vendors, cannot accept any liability whatsoever connected with its use. Invensys Climate Controls s.p.a. reserves the right to make any changes or improvements without prior notice.



Invensys Climate Controls s.p.a.

via dell'Industria, 15
Zona Industriale Paludi
32010 Pieve d'Alpago (BL)
ITALY

Telephone +39 0437 986111

Facsimile +39 0437 986066

Email eliwell@invensysclimate.com

Internet <http://www.climate-eu.invensys.com>

7/2000 ing
cod. 9FT41084