

# EWPX 173 rel. 6/97 ing

## controller for "forced air" refrigerating units

### WHAT IT IS

**EWPX 173 is a digital microprocessor based device designed to control refrigerating units; it is particularly suitable for applications on "forced air" units operating at low or normal temperature. The instrument is provided with three low voltage outputs to control three auxiliary relays devoted to users control: compressor, defrost system and evaporator fans.**

### HOW IT IS MADE

- **Housing:** plastic resin PC+ABS extinguishing grade V0
- **Size:** front panel 76x34 mm, depth 58 mm
- **Mount:** panel mount on 71x29 mm hole
- **Protection:** front IP65
- **Connections:** telephone connector for the connection to the EWDR SLAVE module
- **Serial connection:** TTL port for the connection to the EWRS 485 interface for TELEVIS system linking
- **Commands:** all located on front panel
- **Autonomy for real time clock data:** 5 hours approx.
- **Outputs:** three 12 Vdc/40 mA outputs to control the auxiliary relays in the EWDR SLAVE Din module (compressor, defrost system and fans)
- **Analogue inputs:** two NTC probe for temperature control and defrost management in the EWDR SLAVE Din module; 1 ON/OFF input for a door switch
- **Resolution:** 1 °C
- **Accuracy:** better than 0.5% end of scale
- **Power supply:** 12 Vca/cc or 230, 110, 24 Vca (supplied by the EWDR SLAVE 973)

### GENERAL DESCRIPTION

EWPX 173 is a digital microprocessor based device designed to control refrigerating units; it is particularly suitable for applications on "forced air" units operating at low or normal temperature.

The instrument is provided with three low voltage outputs to control three auxiliary relays devoted to users control: compressor, defrost system and evaporator fans. Relays are installed in the EWDR SLAVE Din module (version 973), which also powers the instrument. The module is connected to the instrument through a MULTIPOLAR CABLE provided with polarised, disconnectable telephone connectors at both ends.

The instrument provides two input probes connected to the Din module for temperature control and defrost management.

The MULTIPOLAR CABLE conveys the input signals from the NTC probes, the control signals for the module relays, and the power supply voltage for EWPX 173.

EWPX 173 can be connected to the TELEVIS system (through the special interface module EWRS 485).

All versions include an internal clock to control defrosts and a led for alarm signalling. An internal back up device guarantees time counting also in case of power failure.

EWPX 173 is available in the two key front panel 32x74 (ELIWELL standard); EWDR SLAVE (version 973) is supplied in the 70x85 (4 modules) format for din rail (Omega 3) or wall mount.

### OPERATION

When operating in the field of refrigeration the temperature control is performed with a positive differential; the compressor stops when the Setpoint temperature is reached and restarts when the temperature reaches Setpoint plus the differential. Two different defrost types can be selected: electrical (the compressor is stopped) or at cycle inversion (warm gas; the compressor keeps working); it is also possible to select the interval between defrosts (and the interval count type; alternatively, through the clock option up to six different real times for defrost start can be set), the stop temperature and a maximum time (time-out) after which defrost is interrupted.

The same probe which controls the defrost cycle is used to control the evaporator fans; it is possible to set the stop temperature, the delay time after a defrost and the

relation of fans with the compressor and the micro gate contact.

A series of "safety controls" (delay at start-up, minimum disable time, minimum time between activations) protects the compressors from close starts.

In case of probe error or temperature alarm the instrument signals the event through the alarm led on the front panel.

The minimum and maximum temperature alarms can be excluded for a certain time from start-up and/or after a defrost.

These functions can be easily customised by setting some programming parameters. Other parameters allow to suite the instrument to various applications.

### COMMANDS ON FRONT PANEL

The instrument is provided with two keys: "UP" and "SET/DOWN".

**SET/DOWN:** by pressing and releasing it the Setpoint is displayed, the "SET" led is turned on.

To change the Setpoint value use the "UP" and "SET/DOWN" keys within 5 seconds. If no operation is performed for more than 5 seconds normal mode is restored and the new value is automatically acquired.

The same button is used to increase values during Setpoint change or parameters programming. When held pressed a fast increase is performed.

**UP:** button used to increase values. It is used to change both the Setpoint and the parameters. When held pressed a fast increase is performed.

When held pressed for more than 7 seconds, this key also allows manual activation of the defrost cycle (the function is not enabled during Setpoint or parameter programming), and to display the real time (by pressing and releasing it immediately).

The "DEFROST" led blinks during manual defrost.

**Led "COMPRESSOR":** led related to the compressor relay. On when the compressor is operating.

**Led "SET":** on during Setpoint setting and displaying, blinking during parameters programming.

**Led "DEFROST":** led related to defrost. On when defrost is in progress, blinking in case of manual defrost.

**Led "ALARM":** on in case of probe alarm or high/low temperature alarm.

### DISPLAYING AND SETTING THE SETPOINT

To display the Setpoint value press and release key "SET/DOWN"; the Setpoint is

displayed and the "SET" led turns on. To change the Setpoint use the "UP" and "SET/DOWN" keys within 5 seconds. If no operation is performed for more than 10 seconds normal mode is restored.

### MANUAL ACTIVATION OF THE DEFROST CYCLE

The manual activation of the defrost cycle is performed by holding the "UP" key pressed for more than 7 seconds (the key is not enabled during Setpoint or parameters programming). In case the conditions are not suitable for defrost (e.g. when the temperature of the evaporator probe exceeds the defrost end temperature) the "dFu" (deFrost unable) label is displayed. Led "DEFROST" blinks during the manual defrost cycle.

### DISPLAYING PROBE VALUES

The instrument provides two input ports for probes to regulate the temperature and control defrost.

By pressing and releasing keys "UP" and "SET/DOWN" simultaneously, the label "CPr" (Compressor Probe) is displayed; by pressing and releasing the "SET/DOWN" key the display shows the value of the regulation probe. When the "UP" key is pressed the label "Epr" (Evaporator Probe) is displayed; by pressing and releasing key "SET/DOWN" again the display shows the value of the defrost probe.

### KEYBOARD LOCKING

Through a special programming of the "Loc" parameter, the keyboard can be disabled to prevent undesired operation or changes in the instrument settings.

When the keyboard is locked only display (no changes) is allowed both for Setpoint and all parameters but the "Loc" parameter to allow keyboard unlock. When the keyboard is locked no manual activation of the defrost cycle is permitted.

### PASSWORD TO ACCESS PARAMETERS PROGRAMMING

The instrument allows to set an access password to enter parameters programming mode.

To set (or change) the password enter parameter "PAS" and input a value from 1 to 15 (when 0 is input the password is disabled). The password is activated when the parameters programming phase is quitted.

In case a password is enabled, when access to the parameters programming phase is requested, the "PAS" label is displayed. Press the "SET/DOWN" key to enter password setting, use the "UP" and "SET/DOWN" keys to change the password. If the password is correct by pressing "SET/DOWN" and then "UP" programming mode shall be entered, otherwise it shall be automatically quitted.

### PARAMETERS PROGRAMMING

Parameters programming mode can be accessed by holding keys "UP" and "SET/DOWN" pressed for more than 7 seconds. The first label is displayed and the "SET" led keeps blinking as long as parameters programming mode is enabled.

To access other parameters press "UP" or "SET/DOWN".

To display the value of the parameter indicated by the label press "UP" and "SET/DOWN" simultaneously.

To change its value press "UP" or "SET/DOWN". The new values are automatically stored when programming mode is exited (after no key is pressed for some seconds).

### PROGRAMMING THE REAL TIME

EWPX 173 includes an internal clock to control defrost. To display the real set time press and release the "UP" (clock) key: the display will alternatively show hours (preceded by letter "h") and minutes (preceded by " ' ").

To change the time, press and release the "UP" (clock) key, then hold the "SET/DOWN" key pressed for about 7 seconds; when the hours or the minutes are displayed (press the keys simultaneously to skip from one display mode to the other), use the "UP" and "SET/DOWN" keys to set the required value.

The new values are automatically stored exiting the programming mode, after no key is pressed for about 10 seconds.

EWPX 173 includes an internal back-up device which allows time counting also in case of power failure. The autonomy is about 5 hours, after which the real time memory is lost and shall be reprogrammed (in such case the count restarts from "h00"- "00" at power up).

The loss of the memory information is shown at restart after a power failure only when the clock option is enabled (see parameter "dit") by displaying label "dte" (defrost time error) and the room value alternatively.

### PARAMETERS DESCRIPTION

**diF:** diFferential.

Setpoint intervention differential.

For applications in the field of refrigeration the differential shall be set to positive values: the compressor stops when the Setpoint is reached (according to data detected by the regulation probe) and restarts when the temperature reaches Setpoint plus the differential.

**LSE:** Lower SET.

Minimum value allowed for Setpoint.

Usually set to the minimum value that can be measured by the probe.

**HSE:** Higher SET.

Maximum value allowed for Setpoint.

**dtY:** defrost type.

Type of defrost.

EL = Electrical defrost;

in = inversion cycle defrost (warm gas).

**dit:** defrost interval time.

Defrost interval time in hours.

**dct:** defrost counting type.

Counting mode for the defrost interval.

dF = digifrost Feature (DIGIFROST®) method; only the operation time of the compressor is counted;

rt = real time (the instrument operation time is counted);

SC = Stop Compressor (defrost is performed whenever the compressor stops);  
Fr = Free (the compressor relay is freed from defrost functions, thus continuing to regulate according to the Setpoint).

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

Parameters to set the time (real) for defrost starts (accessible only when "dit" is set to 0).

0...23 = real hours; oF = OFF (disabled).

Note: it is not necessary to input parameters' values (dt1...dt6) in the exact time sequence.

**doh:** defrost offset hour.

Delay time for defrost start; in minutes.

**dEt:** defrost Endurance time.

Defrost time-out; in minutes.

**dSt:** defrost Stop temperature.

Temperature causing defrost end.

**FSt:** Fan Stop temperature.

Fan stop temperature; a value read by the defrost probe exceeding the set value causes fans to stop.

**Fdt:** Fan delay time.

Delay time for fans activation after a defrost; in minutes.

**dt:** drainage time.

Dripping time; in minutes.

**dPo:** defrost (at) Power-on.

Defrost at power on.

y = yes; n = no.

**ddl:** defrost display Lock.

Display lock during defrost.

n = no; during defrost the display shows the value read by the room probe.

y = yes; during defrost the display shows the last value read before defrost by the room probe.

Lb = Label ("defrost"); during defrost the display shows label "dEF" (dEFrost), indicating defrost is in progress.

Lg = Label ("dégivrage"); during defrost the display shows the label "dEg" ("dEgivrage"), indicating defrost in progress.

NOTE: in case "y", "Lb" or "Lg" are selected the display will be locked until the Setpoint temperature is reached in the room probe.

**dFd:** defrost Fan disable.

Allows to select or deselect the exclusion of evaporator fans during defrost.

n = no; y = yes.

**Att:** Alarm temperature type.

Interpretation mode for parameters "HAL" and "LAL".

Ab = absolute;

re = relative (referred to Set).

**HAL:** High ALarm.

Maximum temperature alarm. When this value is exceeded the Televis alarm signal

## DEFAULT SETTINGS - STANDARD MODELS

Parameter	Description	Range	Default	Unit
diF	differential	-12...12	2	°C / °F
LSE	Lower SEt	-999...HSE	-50	°C / °F
HSE	Higher SEt	LSE...999	40	°C / °F
dtY	defrost type	EL / in	EL	flag
dit	defrost interval time	0...31	6	hours
dct	defrost counting type	dF / rt / SC / Fr	dF	flag
dt1...dt6	defrost time 1...6	0...23 / oF	0	ore / flag
doh	defrost offset hour	0...59	0	minutes
dEt	defrost Endurance time	1...250	30	minutes
dSt	defrost Stop temperature	-999...999	8	°C / °F
FSt	Fan Stop temperature	-999...999	2	°C / °F
Fdt	Fan delay time	0...250	0	minutes
dt	drainage time	0...250	0	minutes
dPo	defrost (at) Power-on	n / y	n	flag
ddL	defrost display Lock	n / y / Lb / Lg	n	flag
dFd	defrost Fan disable	n / y	y	flag
Att	Alarm temperature type	Ab / re	re	flag
HAL	High ALarm	-999...999	50	°C / °F
LAL	Low ALarm	-999...999	-50	°C / °F
AFd	Alarm (Fan) differential	1...50	2	°C / °F
PAO	Power-on Alarm Override	0...10	2	hours
dAo	defrost Alarm override	0...999	60	minutes
oAo	output Alarm override	0...10	10	hours
tAo	temperat. Alarm override	0...250	0	minutes
Fco	Fan compressor off	oF / on	oF	flag
Fod	Fan off door	oF / on	oF	flag
cPP	compressor Probe Prot.	oF / on / dc	on	flag
Ont	On time (compressor)	0...250	10	minutes
OFt	OFF time (compressor)	0...250	10	minutes
ctP	compr. type Protection	nP/don/doF/dbi	doF	flag
cdP	compr. delay Protection	0...15	0	minutes
odo	output delay (at) on	0...99	0	minutes
dod	disable opened door	n / y	n	flag
PrP	Presence Probe	nP / EP / AP / EAP	EP	flag
CAL	CALibration	-12...12	0	°C / °F
dEA	dEvice Address	0...14	0	number
FAA	FAMily Address	0...14	0	number
diP	door input Polarity	OP / CL	OP	flag
CLO	CLOCK frequency	/	/	Hertz
Loc	(keyboard) Lock	n / y	n	flag
PAS	PASsword	0...15	0	number
rEL	rELease firmware	/	/	/
Hdc	Hardware code	/	/	/
tAb	tAbles of parameters	/	/	/

is triggered.

**LAL:** Low ALarm.

Minimum temperature alarm. When the temperature is below this value the Televis alarm signal is triggered.

**AFd:** Alarm (Fan) differential.

Operating differential for temperature alarms.

**PAO:** Power-on Alarm Override.

Alarm exclusion after instrument power on; in hours.

**dAo:** defrost Alarm override.

Temperature alarm exclusion after defrost; in minutes.

**oAo:** output (door) Alarm override.

Exclusion time for temperature alarms after the door is opened; in hours.

**tAo:** temperature Alarm override.

Temperature alarm signal delay; in minutes.

**Fco:** Fan compressor on.

Allows to select or deselect fan stop when the compressor is OFF.

oF = yes; on = no.

**Fod:** Fan off (with opened) door.

Allows to select or deselect the fan block when the door is opened.

oF = yes; on = no.

**cPP:** compressor Probe Protection.

Allows the selection of the compressor state in case of faulty probe.

oF = relay OFF for faulty probe.

on = relay ON for faulty probe.

dc = duty cycle; the ON and OFF times of the relay are set by parameters "Ont" and "OFt".

**Ont:** On time (compressor).

ON time for the compressor (when CPP = dc); in minutes.

**OFt:** OFF time (compressor).

OFF time for the compressor (when CPP = dc); in minutes.

**ctP:** compressor type Protection.

Allows to select the protection type against close starts of the compressor the time is set through the following parameter).

nP = no Protection.

don = delay on start. Delay in the activation of the relay.

doF = delay at switching oFf. Minimum time for delay switching off.

dbi = delay between two successive starts. Minimum time between two subsequent relay starts.

**cdP:** compressor delay Protection.

Time referred to the previous parameter; in minutes.

**odo:** output delay (at) on.

Output activation delay after instrument power on; in minutes.

**dod:** disable (with) opened door.

Allows to select or deselect the option to turn users (compressor and evaporator fans) off when the door is open.

n = no; y = yes.

**PrP:** Presence Probe.

Allows to select the presence of the Evaporator probe.

nP = Evaporator probe not present;

EP = Evaporator probe present;

AP = not usable;

EAP = not usable.

**CAL:** CALibration.

Allows calibration of the displayed value (measured by the display probe) in case it is different from a known value. Usually set to "0".

**dEA:** dEvice Address.

Allows to select the device address within a remote control network.

**FAA:** FAMily Address.

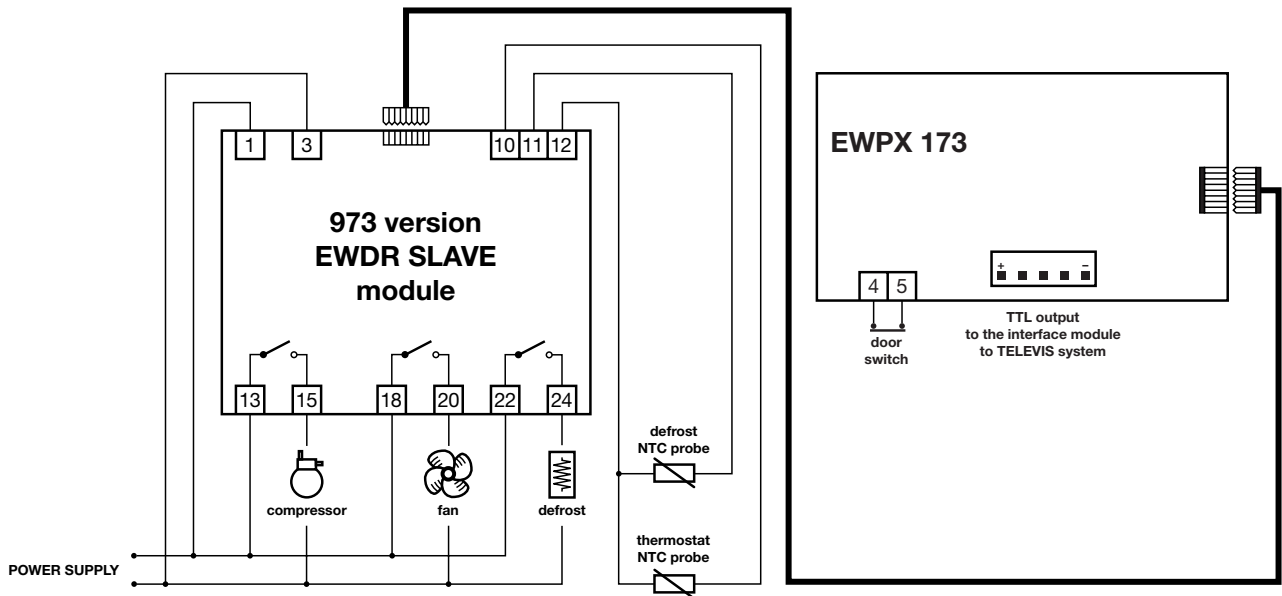
Allows to select the device family within a remote control network.

**diP:** door input Polarity.

Allows to select polarity for the micro-door input.

OP = open; CL = closed.

**CLO:** CLOCK frequency.



Reading double the mains frequency.

**Loc:** keyboard Lock.

Allows to disable keyboard operation to prevent undesired operation or changes in the instrument settings.

When the keyboard is locked only display (no changes) is allowed both for Setpoint and all parameters but the “Loc” parameter to allow keyboard unlock.

y = yes; n = no.

**PAS:** PASsword.

Allows to select the password value (refer to section “Password to access parameters programming”).

0 = no password is required to enter parameters programming.

1...15 = values allowed for the password.

**rEL:** rELease firmware.

Read only parameter showing the release code of the device.

**Hdc:** Hardware code.

Configuration index for factory set parameters; cannot be changed by the user.

**tAb:** tAbLe of parameters.

Configuration index for factory set parameters; cannot be changed by the user.

**MECHANICAL MOUNT**

EWPX 173 is designed for panel mount. Drill a 29x71 mm hole and introduce the instrument, then fix it with the special bracket (included).

The EWDR SLAVE module (version 973) is designed for wall (extractable brackets) or Din rail (Omega 3) mount.

The operating temperature range for correct operation is from -5 to 65 °C. Do not install the instrument in moist and/or dirty places; it is suitable for operation in environments with an ordinary pollution level. Leave enough room for air circulation by the cooling holes of the instrument.

**ELECTRICAL CONNECTIONS**

EWPX 173 is provided with a telephone connector for the connection to the Din module, a serial output for the connection to the Televis system (through the special EWRS 485 interface module), and screw terminal blocks for the connection of electrical cables with a maximum section of 2.5 mm<sup>2</sup> (one wire only for terminal in compliance with VDE regulations) for other connections.

EWDR SLAVE (versions 973) includes, beside a telephone connector for the connection to EWPX 173, a screw terminal block for the connection of electrical cables with a maximum 2.5 mm<sup>2</sup> section (one wire only for each block, according to VDE regulations). Relay outputs are free from voltage.

The MULTIPOLAR CABLE connection between the EWPX 173 and the Din module shall be installed before powering the system.

The EWDR SLAVE is provided with three relay outputs: compressor, fan and defrost system. Do not exceed the maximum contact capacity: 15(6)A 250V AC for the compressor, 8(3)A 250V AC for the defrost system and fans. In case of heavier loads use a suitable contactor.

Check the power voltage for the EWDR SLAVE complies with requirements.

The two NTC probes have no insertion polarity and can be lengthened using a common bipolar cable (bearing in mind that very long probes imply worse instrument performances referred to the EMC electromagnetic compatibility).

Output for the EWRS 485 interface module of the TELEVIS system require connections according to the indicated polarity.

The probe cables, the connection cable for

the EWRS 485 interface module and the MULTIPOLAR CABLE shall be kept far from the relay cables both for EMC and safety reasons.

The coordinated European safety regulations state that the relay contacts (and generally speaking, all parts subject to dangerous voltage) shall be kept away from the very low safety voltage connections (probe, Televis serial, MULTIPOLAR CABLE) using insulation systems and distances providing at least a double or reinforced insulation.

However EMC requirements for correct operation suggest/impose better accuracy in such separation by using separated insulating pipes and special cable fixing systems.

**ERROR MESSAGES**

Error message “dtE” (defrost time Error) is displayed in case the datum for the real time is lost (see section “programming the real time”).

Moreover EWPX 173 displays error message “E1” in case of shorted, interrupted or disconnected probe. The message is also displayed in case of “under range”, i.e. when the lower display limit (-55 °C) is exceeded, or in case of “over range”, i.e. when the upper display limit (125 °C) is exceeded.

Error message “E2” refers to the evaporator probe (defrost end) for the same reasons as above.

In case of error the Televis system alarm is immediately activated.

Before replacing the probe check its connections.

**EWPX 173 TECHNICAL DATA**

**Housing:** plastic resin PC+ABS extin-

guishing grade V0.

**Size:** front panel 76x34 mm, depth 58 mm.

**Mount:** panel mount on 71x29 mm hole.

**Protection:** front IP65.

**Connections:** telephone connector for the connection to the EWDR SLAVE module (versions 973), screw terminal block for wires with a maximum 2.5 mm<sup>2</sup> diameter (one wire only per terminal in compliance with VDE regulations) for other connections.

**Serial connection:** TTL port for the connection to the EWRS 485 interface for TELEVIS system linking.

**Display:** on 3 digit display (digit height 12.5 mm).

**Commands:** all located on front panel.

**Data storage:** on non-volatile memory (EEPROM).

**Autonomy for real time clock data:** 5 hours approx.

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

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

**Outputs:** 3 low voltage outputs to control the auxiliary relays in the EWDR SLAVE Din module (compressor, defrost system and fans).

**Analogue inputs:** two NTC probe for temperature control and defrost management (in the EWDR SLAVE Din module).

**Digital input:** 1 ON/OFF input for a door switch.

**Range:** -50...100 °C (-58...212 °F).

**Resolution:** 1 °C.

**Accuracy:** better than 0.5% end of scale.

#### **EWDR SLAVE 973 TECHNICAL DATA**

**Housing:** ABS plastic, V0 extinguish grade.

**Size:** 70x85 mm Din modules, depth 61 mm.

**Mount:** on Din (Omega 3) rail or wall.

**Connections:** telephone connector for the connection with EWPX 173, screw terminal blocks for wires max 2.5 mm<sup>2</sup> for other connections (one wire only per contact and grounded Din rail in compliance with VDE regulations).

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

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

**Outputs:** 3 outputs on N.O. relays for compressor 15(6)A 250V AC, defrost system and fans 8(3)A 250V AC.

**Analogue inputs:** two NTC probe for temperature control and defrost management.

**Consumption:** 6 VA.

**Power supply** (according to model): 12 Vca/cc ±15%; 230, 110, 24 Vca ±10%. Others on request.

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