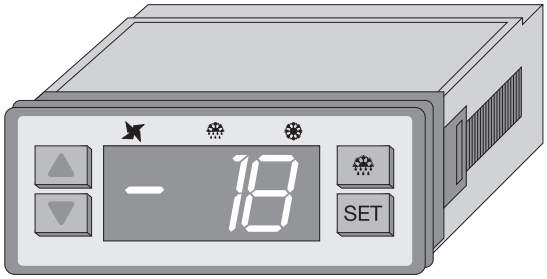


1 SAFETY INSTRUCTIONS

A)Keep these Operating Instructions in a place where they can always be easily consulted by the operator or by maintenance personnel.
B)Before making an intervention or connection of any kind, make sure that the mains are disconnected both from the instrument and from any device connected to it.
C)Caution, there may be hot components inside the plastic instrument container.
D)No user-serviceable parts are inside the plastic instrument container.
E)DTI products and any other device connected to them must be installed in compliance with the safety regulations in force.
F)Make sure that, whenever a transformer for instrument power supply is required, it complies with the safety regulations in force.
G)DTI products are designed and manufactured in compliance with the safety regulations in force. Nevertheless, if our products are not installed in accordance with the Safety Instructions, as well as the indications given in these Operating Instructions, then this may cause a reduction of the safety level of our products. Furthermore, the ambient operating conditions given in our technical data must be complied by, and in any case absolutely avoid:
water condensation or excessive humidity; exposure to steam, corrosive - or toxic gases, contact with any type of liquid, and exposure to shocks or to extreme vibrations. Not respecting the above indications could cause malfunctioning and unpredictable consequences, e.g., in the worst cases malfunctions that could cause dangerous electrical discharges on probes or other parts.
H)DTI products are guaranteed for a specific level of immunity against electromagnetic disturbances in compliance with EC regulations. We would like to call to mind that electromagnetic disturbances can be either irradiated and/or conducted. By irradiated electromagnetic disturbances we recommend to screen the instruments with a metallic screen connected to ground. To eliminate, or at least reduce conducted electromagnetic disturbances, that do not only propagate through the power supply, but also through probes or connected loads, we recommend to carry out the electrical wiring according to the indications given in these Operating Instructions. If necessary, use filters suitable for specific applications and for the type of disturbances detected.
I)If probes are to be used in contact with foodstuffs, make sure that the employed type of probe is in compliance with the local sanitary / health regulations.
J)DTI products do not provide any type of protection for the connected loads against: short-circuits, overcurrent or overvoltage, excessive temperature etc., that must therefore be protected by suitable means (such as fuses, thermo-magnetic circuit breakers, thermal protections,etc.). At any rate the electrical power lines that (directly or through a transformer) supply an DTI product and any other device connected to it, must be manufactured in compliance with theregulations in force.
K)When incorporating an DTI product in other devices, where any malfunction whatsoever of the DTI product could cause a form of risk to persons, animals or things, it is ABSOLUTELY MANDATORY to provide a suitable safety device, other than the DTI product, that automatically starts operating in case of a failure.
L)DTI products cannot be used as critical components in life supportdevices or systems without an expressly written approval of the Managing Director of DTI.

2 GENERAL DESCRIPTION

The microprocessor-based electronic controllers of the RED series were designed to measure, visualize, and control the temperature of refrigeration systems. The more elaborate models can also control a defrost cycle and the evaporator fan through a relay output. With regard to the control of the alarm output, model RED43 is supplied with either an “open collector” transistor or a built-in relay , depending on which option was requested; this model also has a digital input, with a normally open contact, the function of which can be programmed through the related parameters. All models are completely configurable through specific parameters, that permit the controller to be adapted to any particular operative requirements. Access to the configuration parameters menu is achieved through the front panel keyboard by following a very simple security procedure, after which the required parameter values can be set quickly and easily. Each controller model can execute a Self-T est routine, which allows to quickly verify the correct functioning of the controller and connected loads, as well as to review the set parameter configurations. The big three-digit display visualizes the detected temperature or the configuration parameter codes and values or, by irregular functioning, the related error messages(HtA: high temperature alarm; LtA: low temperature alarm; PF1:thermostat probe failure; PF2:defrost-end probe failure; HLAhigh t.limit alarm; LLA: low t.limit alarm; OFF; CAL: compressor alarm; dAL: digital alarm). The temperature is detected through a semiconductor PTC type probe with a measuring range of - 55 ...+ 130 °C (-67...+266° F), that can be installed up to 10 meters (30 ft) from the controller without requiring instrument recalibration. The compressor output of the controller is deactivated when the temperature decreases and reaches the main setpoint and is activated when the temperature increases and exceeds the(main setpoint + differential) value. All programming data is stored in a non-volatile memory (FLASH), where it also remains during a power failure. Whenever a temperature probe failure occurs the controller activates and/or deactivates the compressor according to the settings made in parameters #23, #24, #25, (# =, d depending on the controller model referred to) while the defrost cycles are executed according to the settings made in parameters #8 and #9. The last temperature value detected before defrosting is visualized on the display during and after the defrost cycle for a length of time set in parameter #12.

3 TECHNICAL DATA

	RED 31	RED 32	RED 33	RED 43
DISPLAY				
3-digit, 14.2 mm high, red LEDs	•	•	•	•
PTC PROBE (-50...+95°C)				
Thermostat probe	•	•	•	•
Evaporator probe		•	•	•
DIGITAL INPUT				
Normally open external contact				•
POWER SUPPLY				
AC 230 V ± 10%, 50/60 Hz	•	•	•	•
AC 115 V ± 10%, 50/60 Hz	•	•	•	•
AC 24 V ± 10%, 50/60 Hz		•	•	•
AC 12 V ± 10%, 50/60 Hz		•	•	•
COMPRESSOR OUTPUT				
SPDT Relay, AC 250 V 10 A (res.)	•			
SPDT Relay, AC 250 V 8A (res.)		•	•	•
SPST Relay, AC 250 V 15 A (res.)	optional	optional	optional	
SPST Relay, AC 250 V 5 A (res.)				optional
DEFROST OUTPUT				
SPST Relay, AC 250 V 8 A (res.)		•	•	
SPST Relay, AC 250 V 5 A (res.)				•
FAN OUTPUT				
SPST Relay, AC 250 V 5 A (res.)				•
ALARM OUTPUT				
SPST Relay, AC 250 V 8 A (res.)		optional	optional	
SPST Relay, AC 250 V 5 A (res.)				optional
Transistor open collector, DC 30, V 50 mA				•
RESOLUTION				
1 unit	•	•	•	•
ACCURACY				
± 0,7% f.s.	•	•	•	•
SAMPLING TIME				
1 second	•	•	•	•
OPERATING CONDITIONS				
operating ambient temperature: (0...+50°C)	•	•	•	•
storage ambient temperature: (-20...+80°C)	•	•	•	•
relative ambient humidity: +30...+85%, non condensing	•	•	•	•
MECHANICAL FEATURES				
Panel mount	•	•	•	
DIN rail mount (on omega rail)				•
ABS, self-extinguishing plastic container (U.L.94 VO)	•	•	•	•
3mm diameter screw terminal block for 14 AWG 2.5mm² gauge wire	•	•	•	•

4 INSTALLATION

4.1 First things

The controller must be installed in a place where it is protected from extreme vibrations, impacts, water, corrosive gases, steam etc. and where temperature and humidity do not exceed the values given in the technical data sheet. The same instructions are also valid for the probes.

4.1.1 Thermostat probe

The thermostat probe must be installed in a place where it is protected from direct air flow (i.e., away from fans or doors), so that the average cold-room temperature can be measured.

4.1.2 Evaporator probe

The evaporator probe (also called defrost-end probe) must be installed in the coldest area between the evaporator fins, i.e., there where the most ice will form, and not near the resistances or near the area that warms up first during defrosting, in order to avoid anticipating termination of the defrost cycle. If the probe used is not water-proof, we recommend to place it with its head upwards so that water drops, that form due to condensation, cannot penetrate into the bulb and damage the sensor. For low temperature refrigerators we advise the use of silicon probe cables, due to the frequent and ample temperature oscillations. This, since the PVC cables tend to become porous after a relatively short period and therefore allow humidity to enter which, when reaching the sensor, may cause faulty temperature value readings that could entail not easily controllable consequences.

4.1.3 Electrical wiring

We recommend to protect the controller power supply from electromagnetical disturbances, voltage peaks, etc. This can be easily done while wiring by following the instructions below:

a) separate the power supply cables of the compressor, motors, etc. from those of the controller;

b) keep the probe cables, the controller power supply cables, and the load power supply cables separate and sufficiently far from each other, so they do not cross or form spirals.

4.1.4 Applications in critical environments

When used in particularly critical industrial environments, the following solutions can also be useful:

a) use mains network filters to reduce disturbances at the controller power supply, as well as filters for the loads in order to attenuate disturbances at the controller relay outputs;

b) use screened probe cables connected to the grounding system, if the previous indications are not sufficient;

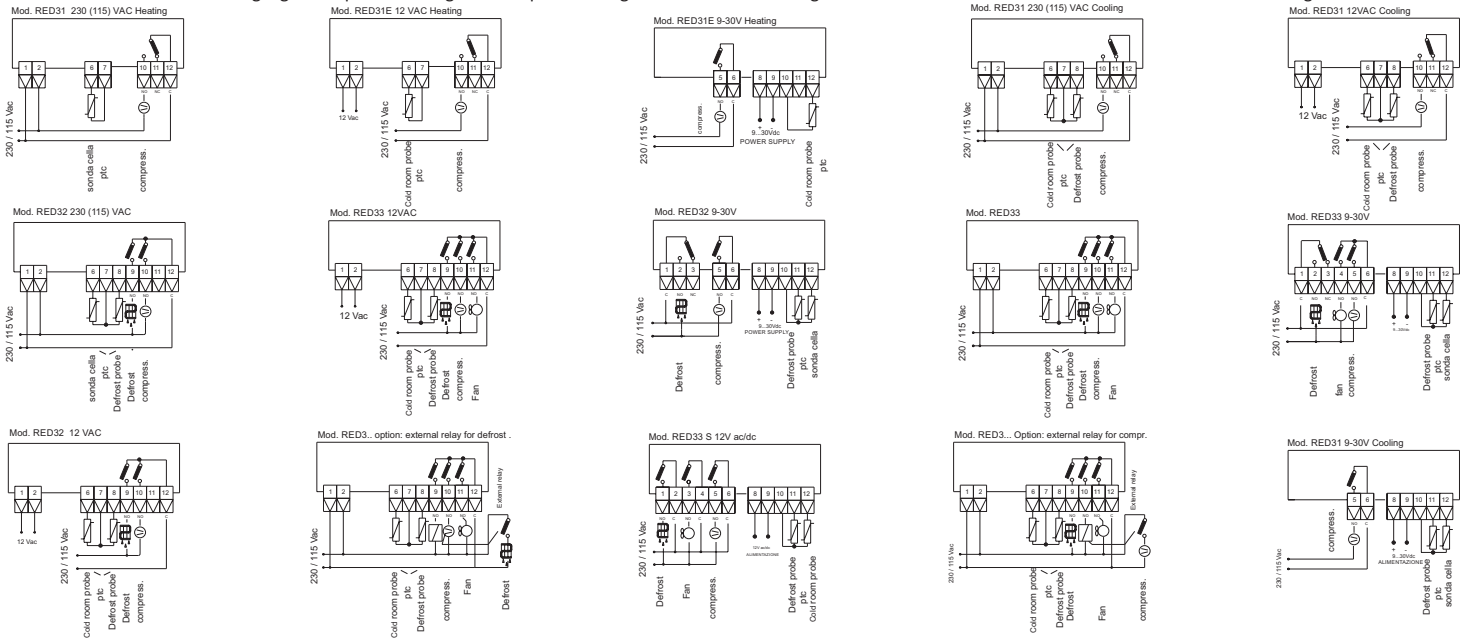
c) by strong radio disturbances screen the entire device with a metallic screen and connect it the grounding system.

4.2 Fitting

Models RED31, RED32 e RED33 are only supplied in the panel-mount version. The RED43 model can be mounted both on a panel and on a DIN omega rail. While fitting the instruments, we recommend to leave enough room at their back side in order to avoid squeezing or excessively bending the cables. By models RED31, RED32 e RED33 we also recommend to use a terminal block cover. Overall instrument size and panel cutout dimensions are given in the figures below according to each specific model.

4.3 Connections

We recommend the use of wire gauges adequate for the given load power rating in order to avoid damage to the screw connector. The connections for each model are given in the schemes



5.1 Key functions

When depressed, while programming either the main setpoint or the parameter configurations, will increase the value visualized on the display; When depressed during temperature, detected by the defrost-end probe, will be normal controller operations the evaporator visualized on the display (except RED31).

When depressed, while programming either the main setpoint or the parameter configurations, will decrease the value visualized on the display; Depressing this key for 5 seconds, during normai controller functioning, will start the self-test routine;

Depressing these keys simultaneously for 5 seconds will lock or unlock access to the parameter configuration menu.

When depressed and then released, during normal controller functioning, will visualize the main setpoint; Depressing this key for 5 seconds will allow to enter the configuration menu, through which one can change the parameters listed in the Table of Configuration Parameters; When depressed, after having programmed the main setpoint or a configuration parameter value, will confirm said value.

Depressing this key for 3 seconds during normal controller operations will start the manual defrost cycle.

5.2 Display functions

Besides the temperature value, detected during normal functioning, the display also visualizes the value of the main setpoint and the configuration parameter values, as well as the codes of the latter and possible error messages.

5.3 LED indications

DP1 blinking: indicates that one is either in the parameter programming mode or the main setpoint is being set; **DP1 ON:** indicates that the compressor output is activated; **DP2 ON:** indicates that the defrost output is activated; **DP3 ON:** indicates that the fan output is activated (only models RED33 and RED43).

5.4 Display of main setpoint

When depressing the SET key, the display will visualize the main setpoint for 10 seconds.

5.5 Display of the evaporator temperature

When keeping the UP key depressed, the evaporator temperature, detected by the defrost-end probe, will be visualized on the display. When releasing the key the detected cold room temperature will again be visualized on the display (except RED31).

5.6 Changing the main setpoint

Depress the SET key (the display will visualize the previously set main setpoint value; DP1 will start to blink); Change the main setpoint value visualized on the display by either using the UP or the DOWN key (the change must be made within 10 seconds after the SET key was depressed otherwise the controller will switch back to the normal operating mode and visualizes the coldroom temperature). The main setpoint cannot be programmed outside the limit values fixed through parameters #3 and #4; Confirm the newly set value by depressing the SET key (the key must be depressed within 10 seconds from completion of the previous operation, otherwise the controller will switch back to the normal operating mode and visualize the coldroom temperature without modifying the main setpoint; when the newly fixed main setpoint value blinks for 2 seconds, this means that the acceptance and storage of this new data is confirmed).

5.7 Changing the configuration parameters

Depress the SET key for 5 seconds, (the display will visualize the code of the first parameter and, after two seconds, its value; DP 1 will start to blink); Modify the visualized value of the first parameter using the UP or DOWN keys (the modification must be made within 10 seconds after the SET key was released, otherwise the controller will switch back to the normal operating mode and visualize the coldroom temperature); Confirm the newly set value by depressing the SET key (the key must be depressed within 10 seconds from completion of the previous operation, otherwise the controller will switch back to the normal operating mode and visualize the coldroom temperature without modifying the parameter; when the newly set value blinks for 2 seconds this means that the acceptance of this new data is confirmed; after the new value is confirmed the controller will display the second parameter code and, after 2 seconds, the related value). Change the displayed value of the second parameter and confirm its new value by repeating the previously described procedure, and so on for all other parameters. Once the last parameter has been confirmed, the display will again show the code of the first parameter and, after 2 seconds, its value.

Note: In order to leave a configuration parameter unchanged during the modification procedure, depress the SET key when, after having stored the modified value of the previous parameter, the controller visualizes the code of the parameter one would like to leave unchanged. In this manner the controller proceeds and visualizes the code and then the value of the parameter following the unchanged one. **The changes made related to time values are only effective after the, currently running timed cycles end, while changes regarding other variabies are effective immediately**. To save the changed values, one must wait for 15 seconds until the controller automatically exits the programming mode. **Warning:** the modified parameter values are only saved if the above indications are followed."

5.8 Locking/unlocking the keyboard

Keeping the UP and DOWN keys simultaneously depressed for 10 seconds makes it possible to lock/unlock access to the configuration parameters menu. The controller will signal this respectively by either visualizing the blinking message “POF” (push-button OFF) or “POn” (push-button ON). It is very useful to lock the keyboard in order to avoid tampering with the configuration parameter values by non-authorized personnel.

6. PARAMETERS - PROGRAMMING - CONFIGURATION

RED 31	RED 32	RED 33	RED 43	PARAMETER	LIMITS / OPTIONS
1	1	1	1	Main Setpoint	(#3) .... (#4)RED:-50° +100°
2	2	2	2	Differential (hysteresis)	0...+20 °C (°F)
	3	3	3	Lower limit of main setpoint	- 55... (#4) °C- 67... (#4) °F
	4	4	4	Upper limit of main setpoint	(#3) ....+ 130 °C(#3) ....+ 266 °F
3	5	5	5	Minimun time interval between the disactivation and successive activation on the compressor	0....999 s
	6	6	6	Max. temperature alarm differential	0...+50 °C (°F)
	7	7	7	Maximum or minimum temperature alarm delay	0...99 min
	8	8	8	Time interval between defrost cycles	1...999 h
5	9	9	9	Max. defrost cicle time	1...999 min
7	10	10	10	Defrost-end temperature	- 55....+50 °C, -67....+122 °C
6	11	11	11	Time interval for supplementary defrost cycles	0...99 min
	12	12	12	Real temperature display delay at defrost-end	0...99 min
	13	13	13	Compressor function during defrosting	0 = always OFF
					1 = always ON
	14	14	14	Dripping time	0...99 min
		15	15	Fan operating mode during normal controller function	0 = linked to the compressor operating mode 1 = always ON
		16	16	Fan activation delay at controller startup and after defrosting	0...99 min
		17	17	Fan activation temperature at controller startup and after defrosting	-55....+50 °C; -67....+122 °F
	18	18	18	Evaporator probe offset	- 20 ... + 20 °C (°F)
4	19	19	19	Cold-Room probe offset	- 20....+20 °C (°F)
	20	20	20	Probe type	0 = PTC ;1 = NTC
10	22	22	22	Unit of measure	0 = ° Celsius; 1 = ° Fahrenheit
	23	23	23	Compressor function during a probe failure	0 = always OFF; 1 = always ON 2 = timed ON and OFF
	24	24	24	Compressor ON-time during a probe failure	1...99 min
	25	25	25	Compressor OFF-time by probe failure	1...99 min
		27	27	Serial line address	0...99
		28	28	Serial line address	0...99
		29	29	Off line / On line	0 = Off-Line; 1 = On-Line
		31	31	Compressor function with closed digital input contact	0=activates the alarm output, deactivates the other outputs, interrupts the regulation process, visualizes “OFF” in the blinking mode.
					1=activates the alarm output, alternately visualizes “CAL” and the coldroom temperature on the display.
					2=disables the minimum or maximum temperature alarms.
					3=disables the minimum or maximum temperature alarms, disactivates the fan output; after d32 minutes activates the alarm output, and alternately visualizes “dAL” and the coldroom temperature on the display
		32	32	Delay for visualizing the “dAL” messageController	0....99 min
		33	33	function start delay related to d31* when closing the digital input contact	0....999 s
	34	34	34	First defrost cycle after controller startup	0 = after 10 minutes; 1 = after #8 (hours)
	38	38	38	Minimum temperature alarm differential	0...+50 °C (°F)
9				decimal point activation	0= not included; 1= included
11				choosing cooling / heating	0= cooling; 1= heating
8				choosing defrost sensor	0=OFF; 1= ON

7 PARAMETER DESCRIPTION

#1 Main setpoint: When the compressor is activated to decrease the refrigeration room temperature, this parameter fixes the temperature value of said refrigeration room, that must be fixed within the limits set in parameters #3 and #4, and which, when reached, deactivates the compressor.

#2 Differential (hysteresis): When the compressor is OFF and the coldroom temperature increases, this parameter fixes the maximum increase for said coldroom temperature, with respect to the main setpoint, which, when reached, activates the compressor to decrease the temperature. A very small differential range determines a very accurate control of the temperature, but also causes the compressor to turn ON and OFF too often.

#3, #4 Lower and upper limit of main setpoint: These parameters respectively fix the minimum (#3) and maximum (#4) limits of the main setpoints. The main setpoint cannot be programmed outside said limit values.

#5 Minimum time interval between the disactivatIon and successive activation of the compressor: #5 fixes the time interval which starts when the compressor is turned OFF and during which it is not possible to reactivate it, in order to allow the internal refrigeration circuit pressures to stabilize.

#6 Maximum temperature allarm differential: This parameter fixes the increase of the coldroom temperature with respect to the main setpoint, which, when exceeded, causes the controller to activate the alarm output after #7 minutes and visualizes “HtA” (=tA by RED31) on the display in the blinking mode that alternates with the blinking temperature value, provided that during time interval #7 the coldroom temperature always remains above #1+#6-2.

#7 Maximum or minimum temperature alarm delay: #7 fixes the time interval in minutes between the moment in which the process variable exceeds value #1+#6 and the moment the “HtA” (=tA by RED31) alarm signal is given, provided that during this time interval the temperature always remains above #1+#6-2. Likewise it fixes the time interval in minutes between the moment in which the coldroom temperature drops below value #1+#38 and the moment the “LtA” (-tA by RED31) alarm signal is given, provided that during this time interval the temperature always remains below #1+#38+2.

#8 Intervals between defrost cycles: This parameter fixes the time interval between the beginning of a defrost cycle and the beginning of the following one. When starting a manual defrost cycle, time interval counting restarts from zero. The beginning of the first defrost cycle is regulated by parameter #34.

#9 Maximum defrost cycle time: By time-controlled defrosting (models RED31), this parameter fixes the duration of a defrost cycle; by evaporator probe temperature-controlled defrosting (models RED31, RED32, RED33 and RED43), this parameter fixes the maximum defrost cycle time, provided that the evaporator defrost-end temperature, set in #10, is not reached, or that an evaporator probe failure does not occur.

#10 Defrost-end temperature: This parameter fixes the evaporator temperature, which, when reached, ends the defrost cycle or starts the optimization of the same. At any rate, for security purposes, defrosting ends after the time set in #9 ends. This parameter (#10) is not foreseen for models RED31 in which defrosting is only time-controlled.

#11 Supplementary defrosting time intervals: During defrosting this parameter fixes the time interval starting the moment the evaporator temperature, exceeds #10 for the first time and during which supplementary defrosting cycles are activated every time the evaporator temperature drops below (#10-2), to bring it to the value set in parameter #10 (except RED31). At any rate, defrosting ends when the time set in #9 ends.

#12 Delayed display of the real temperature at defrost cycle end: This parameter serves to set the time interval, that starts at the end of a defrost cycle, and during which the controller displays the last temperature value visualized before the defrost cycle started, provided the coldroom temperature is higher than said value. If not, and in any case at the end of the above mentioned time interval, the controller will again display the real coldroom temperature.

#13 Compressor function during the defrost cycle: This parameter indicates the compressor function mode during a defrost cycle, i.e., always OFF when #13=0, always ON when #13=1 (not for models RED31).

#14 Dripping time: This parameter serves to set the time interval that starts at the end of a defrost cycle and during which the compressor remains OFF to allow optimum drying of the evaporator.

#15 Fan function mode during normal controller operations: This parameter indicates the fan function mode during normal controller operations, i.e., synchronized with the compressor when #15=0, always ON when #15=1 (only for models RED33). In both cases the fan remains OFF during defrosting and then for the time set in parameter #16.

#16 Fan activation delay at controller startup and defrost-end: This parameter serves to set the time interval that starts at controller startup or at the end of a defrost cycle, during which the fan must remain deactivated in order to not introduce warm and humid air into the coldroom (only for models REK30 and REK33). At the end of said time interval the fan will be activated when the evaporator temperature drops and reaches the value set in parameter #17.

#17 Fan activation temperature at controller startup and defrost-end: This parameter serves to set the evaporator temperature value, detected by the defrost-end temperature probe, and below which the fan will be activated when the time set in parameter #16 ends (only for models RED33).

#18 Offset of the evaporator temperature probe: This parameter fixes the positive or negative correction to be applied to the value detected by the evaporator temperature probe in order to compensate measurement errors. The (temperature + #18) value is that used by the controller for regulating and visualizing the evaporator temperature.

#19 Offset of the cold-room temperature probe: This parameter fixes the positive or negative correction to be applied to the value detected by the cold-room temperature probe in order to compensate measurement errors. The (temperature + # 19) value is that used by the controller for regulating and visualizing the cold-room temperature.

#20 Probe type: This parameter fixes the required type of probe, i.e., PTC probe if 0 is selected, and NTC probe if 1 is selected.

#22 Unit of measure: This parameter fixes the unit of measure regarding the temperature, i.e., °C if #22=O or °F if #22=1.

#23 Compressor function during a probe fallure: This parameter fixes the compressor operating

mode during a coldroom temperature probe failure. Lf #23=0, the compressor is deactivated and remains that way until the failure is repaired. If #23=1, the compressor is activated and remains that way until the failure is repaired. Whenever a failure occurs, if #23=2, the compressor alternates a time interval set in parameter #25, during which it remains deactivated, with a time interval set in parameter #24, during which it remains activated and so on.

#24 Compressor ON-time during a probe failure: This parameter serves to set the time interval, that alternates with the time interval set in parameter #25, during which the compressor must remain activated during a probe failure and if parameter #23=2.

#25 Compressor OFF-time during a probe failure: This parameter serves to set the time interval, that alternates with the time interval set in parameter #24, during which the compressor must remain deactivated during a probe failure and if parameter #23=2.

#27 Serial line address: This parameter indicates the address of the controller's serial channel connected to the RS485 serial communications line (only by model RED43).

#28 Group address: this parameter indicates the group the controller is linked to with regard to the serial COM.

#29 Connection to the network: 0 = indicates that the controller is NOT connected with the network, 1 = indicates that the controller IS connected with the network

#31 Controller function when the digital input contact is closed: This parameter indicates the controller function in the normal operating mode, once the time interval set in parameter #33 ends, and that starts the moment the digital input contact is closed, assuming that during this time interval the digital input contact always remains closed. If #31=0, the controller stops regulating, activates the alarm output, deactivates all the other outputs and visualizes “OFF” in the blinking mode on the display. If #31=1, the controller continues to regulate, activates the alarm output, and visualizes “CAL” in the blinking mode on the display alternated with the blinking coldroom temperature value. If #31=2, the controller deactivates the maximum and minimum temperature alarms. If #31=3, the controller disables the maximum and minimum temperature alarms, disactivates the fan output, and once an additional time interval set in #32 ends, after the end of the interval set in #33, activates the alarm output and visualizes “dAL” in the blinking mode on the display alternated with the blinking coldroom temperature value, assuming that during said additional time interval #32 the digital input always remains closed. In whichever mode parameter #31 may be set, the controller will switch back to the normal operating mode once the digital input contact is opened (only by model RED43).

#32 Delay in visualizing the “dAL” on the display: This parameter fixes a further time interval in minutes following time interval #33, after which the alarm output is activated and the “dAL” message is visualized on the display in the blinking mode, alternated with the blinking coldroom temperature value, assuming that during said additional time interval set in #32, the digital input contact always remains closed. Parameter #32 is applied to control the coldroom door switch in order to verify that the door doesn't remain open for too long (only model RED43).

#33 Controller function start delay related to #31 when closing the digital Input contact: This parameter fixes the time interval in seconds which starts the moment the digital input contact is closed and continues to the moment the function, that was selected through parameter #31, is activated, assuming that during this time interval the digital input contact remains closed (only model RED43).

#34 First defrost cycle after controller startup: This parameter fixes the time interval, starting at controller startup, after which the first defrost cycle is activated. If #34=0, the first defrost cycle starts 10 minutes after controller startup, the following cycles according to the time set in #8. If #34=1, the first defrost cycle starts after the time set in #8 (except by models RED31).

#38 Minimum temperature alarm differential: This parameter fixes the decrease of the coldroom temperature with respect to the main setpoint, which, when exceeded, causes the controller to activate the alarm output after #7 minutes and visualizes “LtA” on the display in the blinking mode that alternates with the blinking temperature value, assuming that during time interval #7 the cold room temperature always remains below #1-#38+2.

#39 decimal point activation: it Fixes a decimal point function. This feature is present only in RED31. Once it is activated all the parameters of temperature will have the decimal number. NB: The number is expressed in tenths of a degree and it is activated the point below the initials DP (= decimal point)

#40 Cooling/ heating choosing: This parameter is only active in RED31 and fixes the cooling or heating mode.

#41 choosing defrost sensor: This parameter is only active in RED31 and it allows you to activate the defrost probe

8 RS485 SERIAL LINE

The RS485 serial line is available on request.

In order to connect the RED.. series controllers to the RS485 serial communication line (see Fig. below), we recommend the use of a screened duplex cable, with a minimum cable wire gauge of 26 AWG (telephone cable type wire gauge) and stranding pitch of < 30 mm. Cable impedance must be 120 Ohm. We recommend to connect the cable screen to the grounding system of the controller or computer. It is good practice to ground the cable screen (resistance < 10 Ohm) near one of the two terminal devices. If the above instructions are carefully followed, then the cable may have a length of up to 300 m (900 ft). For further details concerning the serial communication line, please contact the technical offices at DTI

9 TROUBLESHOOTING

Error messages are given in the table below. If both alarms related to probe failures occur simultaneously, the controller will visualize PF1 in the blinking mode and, only when the UP key is depressed, the PF2 message also in the blinking mode. The alarms related to probe failures have priority over all the other alarms (except by model RED43). In the RED3. series controllers all alarm messages automatically disappear when there is no longer the cause that started them; this does not include the PF1 and PF2 messages, that also require the controller to be turned OFF and then ON again. Should more than one alarm occur simultaneously, then the alarm with the highest priority will be visualized first (in model RED43) according to the following order:

a) PF1 alternated with OFF;
b) PF2 alternated with CAL or dAL;
c) LtA or HtA, LLA or HLA.

MESSAGE (blinking)

RED31	MESSAGE (blinking)	CAUSE OUTPUTS	CAUSE OUTPUTS
= tA	HtA	The coldroom temperature exceeds #1+#6 and therefore always remains above #1+#6-2 for a time set in #7	Active alarm output Other outputs not modified
- tA	LtA	The coldroom temperature is lower than #1-#38 and therefore always remains below #1-#38+2 for a time set in #7	Active alarm output Other outputs not modified
= F1	PF1	Short circuit or interruption of the thermostat probe input line	Active alarm output Compressor output according to parameter #23 Other outputs not modified
= F2*	PF2	Short circuit or interruption of the evaporator probe input line	Active alarm output Defrost output according to parameter #8 and #9 Fan activation delay according to parameter #16 Other outputs not modified
= LA	HLA	Coldroom temperature greater than + 90 °C (+ 194 °F)	Active alarm output Other outputs not modified
- LA	LLA	Coldroom temperature lower than - 45 °C (- 49 °F)	Active alarm output Other outputs not modified
	OFF(RED43 con d31=0)	Digital input contact closed for a time longer than #33	Active alarm output Other outputs not modified
	CAL(RED43 con d31=1)	Digital input contact closed for a time longer than #33	Active alarm output Other outputs not modified
	dAL(RED43 con d31=3)	Digital input contact closed for a time longer than #32+#33	Active alarm output Deactived fan output Other outputs not modified

10 MAINTENANCE

10.1 Cleaning

Clean the front panel of the instrument with a soft cloth, dampened with soapy water. We recommend to not use abrasive detergents or detergents that contain solvents, since they could damage the instrument; also, do not splash water or any other liquid directly on the instrument.

10.2 Repairs

All repairs must be carried out by authorized personnel. Opening the instrument container or tampering with the controller automatically annuls the warranty. If necessary, consult the nearest DTI customer assistance.

11 CALIBRATION

All controllers are automatically computer calibrated at the DTI production facilities. If the indicated temperature value is not correct, check the connections, as well as the probe cables, especially when different cables are connected to each other. If it is not possible to eliminate the failure, then set the value to be added or subtracted in parameter #19, in order to reach a correct indication of the process variable.

12 ABOUT THE OPERATING INSTRUCTIONS

These operating instructions are to be considered part of our product and are therefore to be kept with proper care until the product itself is disposed of. The user can directly request new operating instructions from DTI, should those supplied have been damaged or lost. These operating instructions include the technical state-of-the-art at the moment the product was sold and, as such, cannot be considered inadequate only because they were successively up-dated on the basis of new experiences. DTI reserves itself the right to modify product features and/or to up-date the operating instructions at any time, without giving prior notice and without the obligation to up-date previously issued versions. The user can request possible up-dates or integrations directly from DTI; he/she may also request further information about the product and in turn make proposals on how to improve these operating instructions. The information included in these operating instructions shall serve to illustrate the use of the product as foreseen in the project, to list its technical features,

to supply information about instrument installation and regulation, to prescribe maintenance procedures, to list residual risks, etc. Hence DTI assumes no responsibility deriving from the improper use of its products or use by incompetent personnel, incorrect installation, faulty power supply, serious lack of prescribed maintenance, non-authorized modifications or interventions, the use of spare parts that are either not original or not specific for this series of models, not fully complying with the operating instructions, force majeure, etc.