

*MCDU11 will be replaced by CDC11

DESCRIPTION

- It is fitted with three outputs for compressor, evaporator fan, defrost control. It has got two probes: one for the thermostat, the other, placed on the evaporator, terminates defrost phase and delays fan re-start.
- Possibility to start manual defrost.
- Configurable parameters: thermostat hysteresis; minimum and maximum setpoint limits; compressor relay minimum Off time; compressor output On or Off status in case of probe failure; defrost at regular intervals or on demand, executed by electric heater or hot gas; defrost end temperature and maximum duration; minimum and maximum interval between defrosts; dripping time; "dEF" or air temperature on display during defrost; fan delay after defrost; probe offset.

TECHNICAL DATA

Dimensions	75Wx35Hx70D mm
Panel cut-out	71Wx29H mm
Range	-50°...+150°C
Accuracy	±1°K
Resolution	1°C
Sensors	2 x PTC 1000; 2 wires and screen
Operating temperature	-10°...+60°C
Relay power rating	3 x 5 Amp. 240 Vac
Connections	screw terminal blocks Ø 2 mm ²
Consumption	2 VA
Supply voltage	12 Vac/dc ±10%
Panel mount	by means of brackets
Front panel protection	IP40; opt. IP54
Enclosure inflammability	fire-retardant

HOW TO ORDER

MCDU11	Defrost controller, 75x35x70 mm
T1	PTC 1000 input, -50°...+150°C
R	relay output
D	12 Vac/dc supply voltage
S	IP54 front protection

Ex. MCDU11T1RDS: intelligent defrost controller; dim. 75x35x70 mm; with 2 PTC 1000 probes; -50°...+150°C range; 3 relay outputs; 12 Vac/dc supply voltage; IP54 front protection. 55



power lines.

1c Probe, power supply and output must be connected strictly following the diagram on the enclosure, where the maximum switching power and supply voltage are indicated, too.





1d The probe, which is the measuring element of the thermostat, must be located in the air in a place where temperature variations of the object to be controlled can be measured quickly and correctly. The probe screen must not be connected to any other leads. If the external transformer is needed, the instrument must be powered by the suitable transformer supplied by LAE (mod. TR...).




1e Should the instrument be recalibrated, in consequence of probe replacement or considerable cable lengthening, then proceed as follows: use an accurate thermometer, make sure that the two probes are at the same temperature immersing them in a liquid if necessary. By means of a screwdriver turn the trimmer located close to the inscription "O ADJ. - A probe".


Caution: where delicate or valuable products have to be maintained in special conditions, the same instrument should not be used for both control and limit functions. In such cases a separate instrument for each function is recommended.



2 FUNCTIONING DESCRIPTION

The display, during the basic functioning of **MCDU**, shows the temperature measured by the probe but, when programming, is used to indicate the values chosen for the control parameters and their respective symbols, useful to simplify identification. Display and programming of the parameters is obtained with four keys:

2a  if pressed when **MCDU** is in the basic functioning, "SEt" appears on display, followed by the value previously programmed. It represents the On/Off switching temperature of the cooler. Press key  or  to change the value. If pressed when programming a parameter, key  allows immediate storage and **MCDU** switchover to normal functioning. The same sequence takes place automatically if no key is pressed within 5 sec.

2b  if pressed when **MCDU** is in the basic functioning, "dEF" is displayed for 2 sec. and immediately after the hours elapsing between one defrost and the next one. Parameter change is made with key  or .

2c  pressed during programming, allows to increase the displayed value.

2d  if pressed simultaneously with key , allows manual start of defrost.








2e The On status of the cooler and defrost phase are shown on display through the lighting up of the LEDs placed close to the relative symbols.

2f As a result of probe failure, its connection breakdown or overrange (-50°...+150°C) "PFA" is displayed. The output will permanently operate as programmed in the SETUP via "PF" parameter.

3 SETUP

MCDU configuration is made through

programming of the control parameters; access to it is possible through a sequence of operations preventing accidental activation.

3a Switch off the unit, press key  and  and, by keeping them pressed, switch on the unit again; "tHS" is displayed. To select the desired sub-menu (tHS, dEF, Adj) use key . Access to all parameters and their corresponding programmed value is obtained by pressing key  repeatedly. Parameter change is made by means of key  and , storage with . It's also possible to select a specific parameter and change its value by following the diagram attached.

3b Parameter description.

dt: switching hysteresis of the thermostat (001°...030°).

uSP: minimum set point limit (-50°...+150°).

^SP: maximum set point limit (uSP...+150°).

rt: minimum Off time for the cooler (000...010 minutes).

PF: permanent status of the COOLER in case of probe failure (on, off). Defrost is however inhibited.

Et: **don't change** (030°).

^dd: maximum defrost duration (001...099 minutes).

uds: minimum time between defrosts (001...024 hours).

^ds: maximum time between defrosts (uds...024 hours).

dr: **don't change** (001).

ti: **don't change** (Con).


dH: **don't change** (ELE).

Cd: display selection during defrost: tA=A probe temp.; dEF=dEF.

Fd: **don't change** (010°).

PA: A probe offset (-20°...020°).

Pb: **don't change** (+14°).

After programming, press key  to return to the main menu and switch off the unit.

WARRANTY

LAE electronic Srl warrant that their products are free of any defects in workmanship and materials for a period of one (1) year from date of production shown on the enclosure. LAE electronic Srl shall only repair or replace those products of which defects are due to LAE electronic Srl and recognised by LAE technicians.

Defects due to exceptional operating conditions, misapplication and/or tampering will void the warranty.

All transport charges for returning the product to the manufacturer, after prior authorization by LAE electronic Srl, and for the return to the purchaser are always for the account of the purchaser.

MCDU 1/1-27/1-70/1

MCDU integrates in the various versions the functions of THERMOSTAT and TIMER FOR DEFROST CYCLES which make it the ideal instrument for static refrigerator control. To get best performance, before installing and using it, read this instruction sheet carefully.

1 INSTALLATION

1a The instrument is secured directly to the DIN-rail or to the panel by means of the suitable brackets. If using the rubber gasket ("S" version), available for the 11 series only, this must be interposed between the panel and the instrument bezel, checking the perfect adhesion carefully.

1b For proper functioning the instrument needs an ambient temperature between -10°...+50°C and 15%...80% relative Humidity. To improve protection of the probe against electro-magnetic interference, which might compromise its function, place its cable and the controller away from

MCDU integrates in the various versions the functions of THERMOSTAT, OPTIMIZER OF DEFROST CYCLES and FAN CONTROL which make it a powerful instrument dedicated to the refrigeration field.

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1 INSTALLATION

1a The instrument is secured directly to the DIN-rail or to the panel by means of the suitable brackets. If using the rubber gasket ("S" version), available for the 11 series only, this must be interposed between the panel and the instrument bezel, checking the perfect adhesion carefully.

1b For proper functioning the instrument needs an ambient temperature between -10°C ... $+50^{\circ}\text{C}$ and 15%...80% relative Humidity. To improve protection of the probes against electro-magnetic interference, which might compromise their function, place their cables and the controller away from power lines.

1c A and B probe, power supply and outputs (including those of the PU2) must be connected strictly following the diagram on the enclosure, where the maximum switching powers and supply voltage are indicated, too. The connection between **MCDU 27/2** and **PU 2** power module is made by means of the suitable cable with connectors.

1d The A probe, which is the measuring element of the thermostat, must be located in the air in a place where temperature variations of the object to be controlled can be measured quickly and correctly. The B probe must be secured to the evaporator in a place where the maximum formation of frost occurs. The probe screen must not be connected to any other leads. If the external transformer is needed, the instruments must be powered by the suitable transformer supplied by LAE (mod. TR...).





1e Should the instrument be recalibrated, in consequence of probe replacement or considerable cable lengthening, then proceed as follows: use an accurate thermometer, make sure that the two probes are at the same temperature immersing them in a liquid if necessary. For the A probe, by means of a screwdriver, turn the trimmer located close to the inscription "O ADJ. - A probe"; for the B probe, change parameter 'Pb' in the SETUP.




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2 FUNCTIONING DESCRIPTION



The display, during the basic functioning of **MCDU**, shows the temperature measured by the A probe but, when programming, is used to indicate the

values chosen for the control parameters and their respective symbols, useful to simplify identification. Display and programming of the parameters is obtained with four keys:

2a  if pressed when **MCDU** is in the basic functioning, "SEI" appears on display, followed by the value previously programmed. It represents the On/Off switching temperature of the cooler. Press key  or  to change the value. If pressed when programming a parameter, key  allows immediate storage and **MCDU** switchover to normal functioning. The same sequence takes place automatically if no key is pressed within 5 sec.

2b  if pressed when **MCDU** is in the basic functioning, "dEF" is displayed for 2 sec. and immediately after the hours elapsing between one defrost and the next one. Parameter change is made with key  or .

2c  pressed during the basic functioning, allows display of the temperature of the B probe.








2d  if pressed simultaneously with key , allows manual start of defrost.

2e The On status of the outputs is shown on display through the lighting up of the LEDs placed close to the relative symbols.

2f As a result of probe failure, its connection breakdown or overrange (-50°C ... $+150^{\circ}\text{C}$) "PFA" or "PFb" is displayed to show the cause of the damage. The outputs will permanently operate as programmed in the SETUP via "PF" parameter.

3 SETUP

MCDU configuration is made through programming of the control parameters; access to it is possible through a sequence of operations preventing accidental activation.

3a Switch off the unit, press key  and  and, by keeping them pressed, switch on the unit again; "IHS" is displayed. To select the desired sub-menu (IHS, dEF, Adj) use key . Access to all parameters and their corresponding programmed value is obtained by pressing key  repeatedly. Parameter change is made by means of key  and , storage with . It's also possible to select a specific parameter and change its value by following the diagram attached.

3b Parameter description.

dt: switching hysteresis of the thermostat (001° ... 030°).

uSP: minimum set point limit (-50° ... $+150^{\circ}$).

^SP: maximum set point limit (uSP ... $+150^{\circ}$).

rt: minimum Off time for the cooler (000 ... 010 minutes).

PF: permanent status of the COOLER and FANS in case of probe failure (on, off). Defrost is however inhibited.

Et: temperature of defrost end (001° ... 030°).

^dd: maximum defrost duration (001 ... 099 minutes).

uds: minimum time between defrosts (001 ... 024 hours).

^ds: maximum time between defrosts (uds ... 024 hours).

dr: dripping time (001 ... 010 minutes);

ti: defrost timer increment;

Con=continuous; Fro=optimised.

dH: defrost heater: ELE=electr.

GAS=hot gas.


Cd: display selection during defro.

tA=A probe temp.; DEF='DEF'.

Fd: differential between probes for re-start after defrost (001° ... 010°).

PA: A probe offset (-20° ... 020°).

Pb: B probe offset (-20° ... 020°).

After programming, press key  return to the main menu and switch the unit.

WARRANTY

LAE electronic Srl warrant that the products are free of any defects workmanship and materials for a period of one (1) year from date of product shown on the enclosure. LAE electro Srl shall only repair or replace the products of which defects are due to LAE electronic Srl and recognised by LAE technicians.

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1b For proper functioning the instrument needs an ambient temperature between -10°C ... $+50^{\circ}\text{C}$ and 15%...80% relative Humidity. To improve protection of the probe against electro-magnetic interference which might compromise its function, place its cable and the controller away from

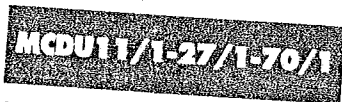
- ...: stripping time (001...010 minutes).
 - ti**: defrost timer increment:
Con=continuous; Fro=optimised.
 - dH**: defrost heater: ELE=electric;
GAS=hot gas.
 - Cd**: display selection during defrost:
tA=A probe temp.; dEF='dEF'.
 - Fd**: differential between probes for fan
re-start after defrost (001...010°).
 - PA**: A probe offset (-20°...020°).
 - Pb**: B probe offset (-20°...020°).
- After programming, press key to return to the main menu and switch off the unit.

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- 1b** For proper functioning the instrument needs an ambient temperature between -10°...+50°C and 15%...80% relative Humidity. To improve protection of the probe against electro-magnetic interference, which might compromise its function, place its cable and the controller away from

power lines.

1c Probe, power supply and output must be connected strictly following the diagram on the enclosure, where the maximum switching power and supply voltage are indicated, too.

1d The probe, which is the measuring element of the thermostat, must be located in the air in a place where temperature variations of the object to be controlled can be measured quickly and correctly. The probe screen must not be connected to any other leads. If the external transformer is needed, the instrument must be powered by the suitable transformer supplied by LAE (mod. TR...).

1e Should the instrument be recalibrated, in consequence of probe replacement or considerable cable lengthening, then proceed as follows: use an accurate thermometer, make sure that the two probes are at the same temperature immersing them in a liquid if necessary. By means of a screwdriver turn the trimmer located close to the inscription "O ADJ. - A probe".

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2a if pressed when **MCDU** is in the basic functioning, "SEt" appears on display, followed by the value previously programmed. It represents the On/Off switching temperature of the cooler. Press key or to change the value. If pressed when programming a parameter, key allows immediate storage and **MCDU** switchover to normal functioning. The same sequence takes place automatically if no key is pressed within 5 sec.

2b if pressed when **MCDU** is in the basic functioning, "dEF" is displayed for 2 sec. and immediately after the hours elapsing between one defrost and the next one. Parameter change is made with key or .

2c pressed during programming, allows to increase the displayed value.

2d if pressed simultaneously with key , allows manual start of defrost.

2e The On status of the cooler and defrost phase are shown on display through the lighting up of the LEDs placed close to the relative symbols.

2f As a result of probe failure, its connection breakdown or overrange (-50°...+150°C) "PFA" is displayed. The output will permanently operate as programmed in the SETUP via "PF" parameter.

3 SETUP

MCDU configuration is made through

programming of the control parameters; access to it is possible through a sequence of operations preventing accidental activation.

3a Switch off the unit, press key and and, by keeping them pressed, switch on the unit again; "tHS" is displayed. To select the desired sub-menu (tHS, dEF, Adj) use key . Access to all parameters and their corresponding programmed value is obtained by pressing key repeatedly. Parameter change is made by means of key and , storage with . It's also possible to select a specific parameter and change its value by following the diagram attached.

3b Parameter description.

dt: switching hysteresis of the thermostat (001°...030°).

uSP: minimum set point limit (-50°...+150°).

^dSP: maximum set point limit (uSP...+150°).

rt: minimum Off time for the cooler (000...010 minutes).

PF: permanent status of the COOLER in case of probe failure (on, off). Defrost is however inhibited.

Et: **don't change** (030°).

^dd: maximum defrost duration (001...099 minutes).

udS: minimum time between defrosts (001...024 hours).

^dS: maximum time between defrosts (udS...024 hours).

dr: **don't change** (001).

ti: **don't change** (Con).

dH: **don't change** (ELE).

Cd: display selection during defrost:
tA=A probe temp.; dEF='dEF'.

Fd: **don't change** (010°).

PA: A probe offset (-20°...020°).

Pb: **don't change** (+14°).

After programming, press key to return to the main menu and switch off the unit.

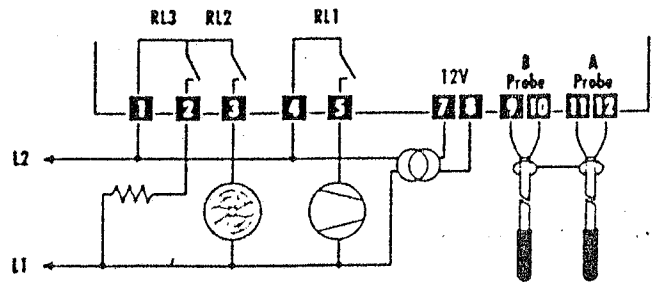
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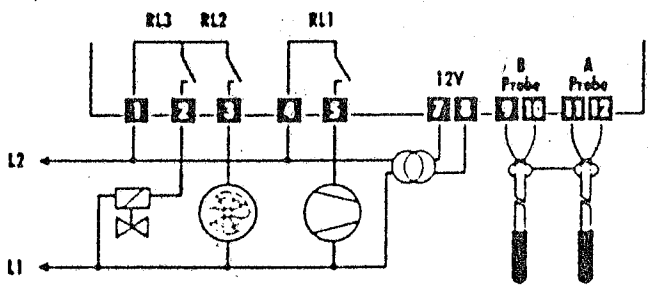
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MCDU 11



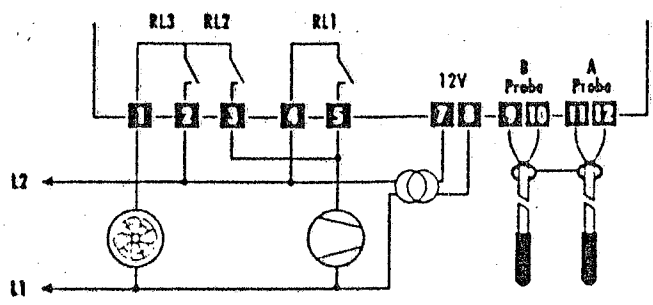
Electric defrost

MCDU 11



Hot gas defrost

MCDU 11



air defrost