Programmable Controllers

MultiNet

| Model	Description
MT-NET-BD1	Base with display
MT-NET-ES1	CANBus I/O expansion 27 points
MT-NET-ES2	CANBus I/O expansion 14 points
MT-NET-TS1	Local keyboard
MT-NET-PRT	Fondello protettivo per tastiera locale
MT-NET-232	Plug-in RS232
MT-NET-ETH	Plug-in Ethernet
MT-NET-CAN	Plug-in CanOpen
MT-NET-485	Plug-in RS485

INTRODUCTION

Multinet is the best solution in Controlli programmable controllers platform suitable for different solutions in HVAC/R market. Multinet guarantee high performances in terms of memory, connectivity and user's interface maintenance and use. To make wiring easier, the models are available for 8 DIN rail mounting.

APPLICATION AND USE

MultiNet supports 5 different programming languages (IEC61131-3), it is equipped with an integrated wide I/O which can also be extended and it includes in fact the most common communication protocols thanks to different Plug-In for ModBus, CanOpen and Ethernet. The system can be remote-controlled through MicroNet View software or Touch Screen GT series e trova applicazione per:

- AHU especially if a lot of analogue outputs are required;
- heating and cooling plants;
- Big plants where the direct data exchange is required;
- remote control.

MT-NET-BD1 is equipped with a CANOpen and a ModBus (RS485) integrated connection without the use of any Plug-In module; the expansions (12 max.) and the remote keyboards (2 max.) are connected on the CANOpen bus; bases with display can be connected to each other on the 485 bus with a supervisory system.
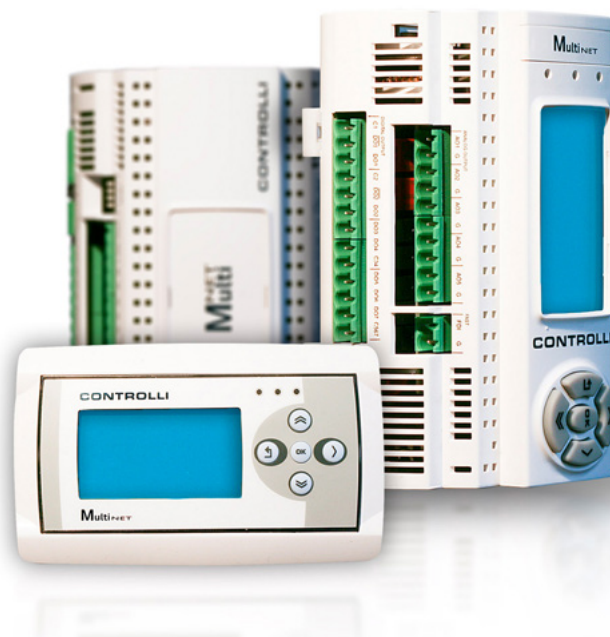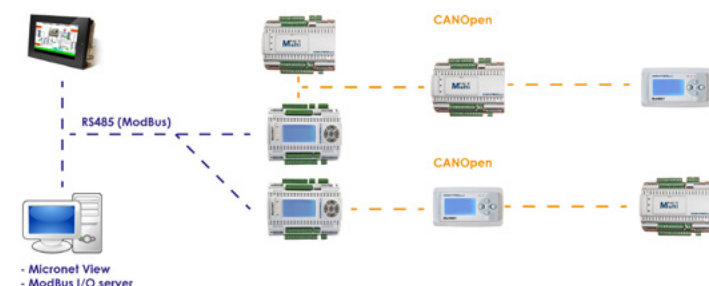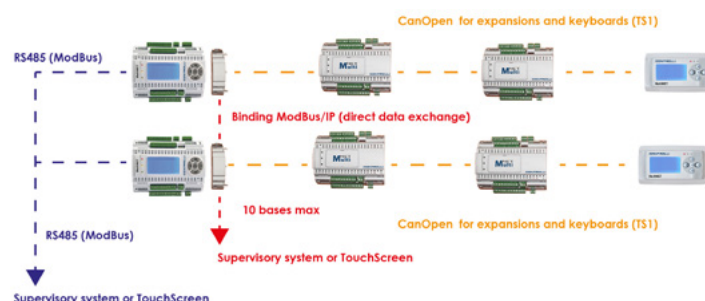

Through the use of the Plug-In MT-NET-CAN and MT-NET-ETH it is possible to have a further CANOpen or Ethernet line thanks to which you can make a direct data exchange among the MT-NET-BD1 (10 max) maintaining however the possibility to supervise the system through ModBus (485).

Direct data exchange CANOpen with MT-NET-CAN
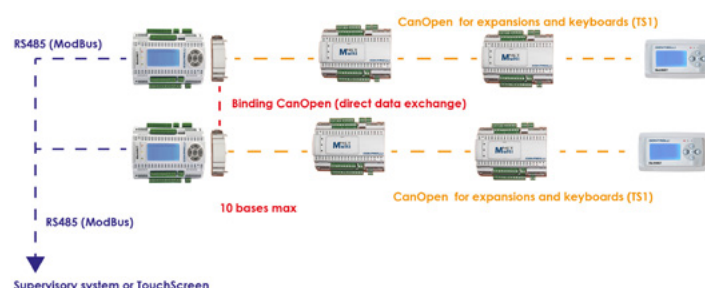
Direct data exchange Ethernet MT-NET-ETH

TECHNICAL FEATURES

Power supply(*)	24Vac/dc ± 20% or 48Vdc ± 20% 50Hz/60Hz
Consumption (base)	18W
Power Supply MT-NET-ES2 (*)	24Vac/dc ± 10% NOT ISOLATED 50/60 Hz
Consumption (panel)	5W
Consumption MT-NET-ES2	7W
Insulation class	2
Base operation temperature	-10T55°C
Panel operation temperature	-5T55°C
Panel storage temperature	-20T85°C
Operation/storage relative humidity (non -condensing)	10-90%
User's interface (base)	LED backlit display + 3LEDs
User's interface (local keyboard)	graphic LCD 128x64px monochrome LED backlit
Serials	CAN and RS485 integrated (**) (only for MT-NET-BD1 and MT-NET-ES1)
Directives	Directive 2006/95/EC, Directive 89/108/EC and in compliance with the following harmonised standards: EN60730-2-6/EN60730-2-9/EN60730-1

(*)The device must be powered with an appropriate transformer having the following characteristics:
primary voltage: on the basis of the plant or the country where installation is carried out.

(**) suggested shielded cable:
For CanOpen: Belden 3105A or Belden 3106A for po-tentially noisy installations; alternative Belden 9842 ;
For RS485 Modbus: Belden 3106A; alternative Belden 9842.

Inputs/outputs MT-NET BD1 and MT-NET-ES1

MT-NET-BD1\ MT-NET-ES1 is equipped with 27 inputs /outputs including: 5 analogue outputs, 6 analogue inputs, 7 digital outputs on relay and 9 digital inputs.

| Model	N.	Description
low voltage Digital Inputs SELV DGSRMV **DI1..DI8**	8	8 digital voltage inputs optoisolated. Operating voltage 24Vac/dc ±20% or 48Vdc ±20%; consumption max 5mA
Digital Input **FAST DI**	1	Free digital input (pulses calculation + frequency reading)
high voltage relays Digital Outputs **DO1, DO2**	7	relays digital outputs 8A - 250Vac
high voltage relays Digital Outputs **DO3...DO7**		relays Digital Outputs 5A - 250Vac
Low voltage Analogue Outputs SELV DGSRMV **AO1…AO5**	5	5 configurable outputs 0-10V/4-20mA / ON-OFF: • 0-10V: 2% f.s. min load 500Ω; 1% f.s. if load is higher that 5KΩ • 4-20mA: 2% f.s. max load 400Ω • ON/OFF max load 400Ω
Analogue inputs **AI1, AI2**	2	2 configurable inputs: • a) temperature NTC 103@ 10KΩ, reading range -50T110°C; • b) temperature NTC NK103 10 kΩ, reading range - 40°CT150°C; • c) free digital input.
Analogue inputs **AI3, AI4 AI5, AI6**	4	4 configurable inputs: • a) temperature NTC 103AT 10kΩ, reading range -50T110°C; • b) temperature NTC NK103 10kΩ, reading range -40T150°C; • c) free digital input; • d) temperature Pt1000 reading range -200T800°C; • e) current input 4-20mA/voltage input 0-10V, 0-5V; • f) hΩ(NTC); • g) daΩ (PT1000); Accurancy: (a) (b) (d) 0.5% full scale + 1 digit (e) 1% full scale + 1 digit Resolution: (a) (b) (d) 0.1°C (e) 1 digit Impedance input (e): • 0-10V e 0-5V: 21kOhm; • 4-20mA: 100Ohm.

Input/Output MT-NET-ES2

TIPO	NO.	DESCRIZIONE.
Digital Input DI1…DI4	4	4 digital voltage inputs optoisolated. Operating voltage 24Vac/dc ±20% or 48Vdc ±20%; consumption max 5mA
high voltage relays Digital Outputs DO1...DO4	4	1 relays digital outputs 8A - 250Vac 3 rrelays Digital Outputs 5A - 250Va
Analogue Outputs AO1…AO2	2	2 configurable outputs 0-10V/4-20mA / ON-OFF: • 0-10V: 2% f.s. min load 500Ω; 1% f.s. if load is higher that 5KΩ
Analogue inputs AI1 AI2 AI3 AI4	4	4 configurable inputs: • a) temperature NTC 103AT 10kΩ, reading range -50T110°C; • b) temperature NTC NK103 10kΩ, reading range -40T150°C; • c) free digital input; • d) temperature Pt1000 reading range -200T800°C; • e) current input 4-20mA/ voltage input 0-10V, 0-5V; • f) hΩ(NTC); • g) daΩ (PT1000); Accurancy: (a) (b) (d) 0.5% full scale + 1 digit (e) 1% full scale + 1 digit Resolution: (a) (b) (d) 0.1°C (e) 1 digit Impedance input (e): • 0-10V e 0-5V: 21kOhm; • 4-20mA: 100Ohm.

MOUNTING

The base with display and the expansion (MT-NET-BD1 and MT-NET-ES1) are designed for installation on 8DIN rail mounting. Follow the instructions below to install the BASE on DIN RAIL:
• Move the two spring docking devices to their standby position (use a screwdriver).
• Install the "BASE" on the DIN RAIL, then press the "spring docking devices" which will go to the closing position.

N.B.: Once the "BASE" is mounted on the DIN RAIL, the "Spring docking devices" must be turned downwards.
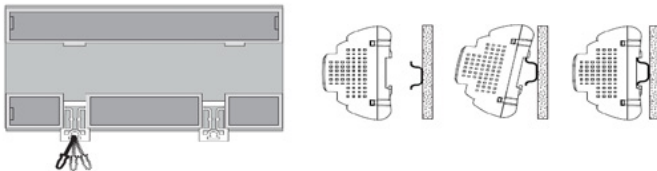
The local keyboard MT-NET-TS1 is designed for panel-mounting. Make a 138x68mm hole. Remove the front panel (figure 1) and make 6 holes in the panel (figure 2 points A/B/C/D/E/F) of diameter 2.7 mm at the specified spacing (figure 2). Insert the device, fixing it with the screws. Close the front of the keyboard by pressing with fingers.

Plug-in are 2DIN modules connected to a controller MT-NET-BD1. Follow the instructions below to install:
• remove the cover (if necessary) on the left side of the base using fingers or a screwdriver;
• clasp the plug-in module using the comb connector (plug-in connector) you find behind the removable cover and through the fastening hooks.

For installation on DIN rail proceed as indicated in the installation of the base with display.

Mounting of the protective back plate
Make 4 holes in the wall of diameter 4.2 mm at the specified spacing: to fix the back-plate M3 screw are suggested. Use the two side slits, one on the upper- one on the lower side under its removable doors to break, preventing the opening of holes in the wall with recessed-wall wiring.
Make all necessary connections , then insert MT-NET-TS1 terminal (without front) in the back-plate, which serves as a panel, which should be set as an 'panel mounted' device (see Panel Mounting paragraph).
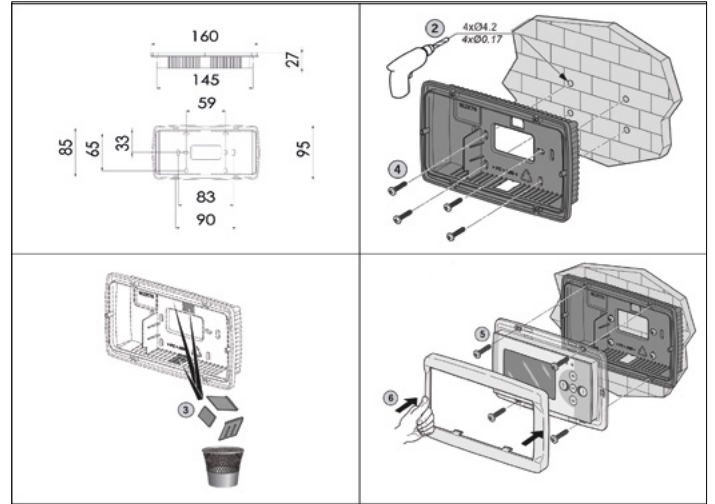

WIRING DIAGRAMS

ATTENTION!
Be sure the device is powered with a suitable external transformer before proceeding with any operation. During connection of the boards between each other and application must be followed these indications:

• Do not exceed the maximum load allowed at outputs;
• Carefully follow the wiring diagrams;
• To avoid electrical coupling, wire the devices with SELV low voltage apart from the ones with high voltage.

Always switch off machine before working on electrical connections. Operations must be carried out by qualified personnel. To have a right connection follow these indications:

• Power supply with different characteristics from the one specified can damage the system.
• Use cable whose section is suitable for the used terminals.

Separate the cables of the sensors and of the digital inputs from inductive loads and from high voltage connections to avoid electromagnetic interferences. Avoid to place the cables of the sensors next to other electrical devices (switches, counters, etc.). Reduce as much as possible the connections length and avoid to envelope them spiral on parts electrically connected. Avoid to touch electronic components integrated in order not to cause electrostatic discharges.
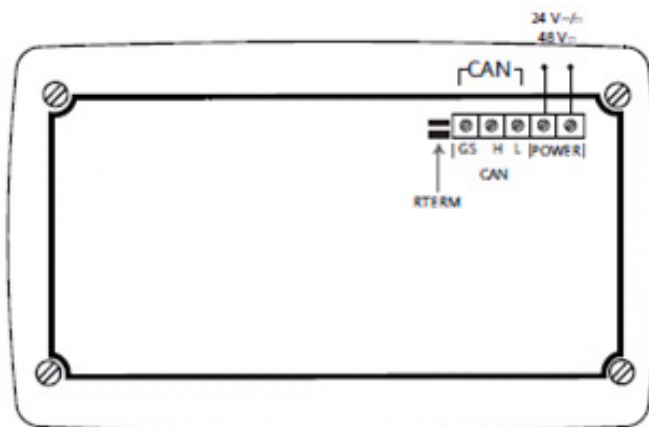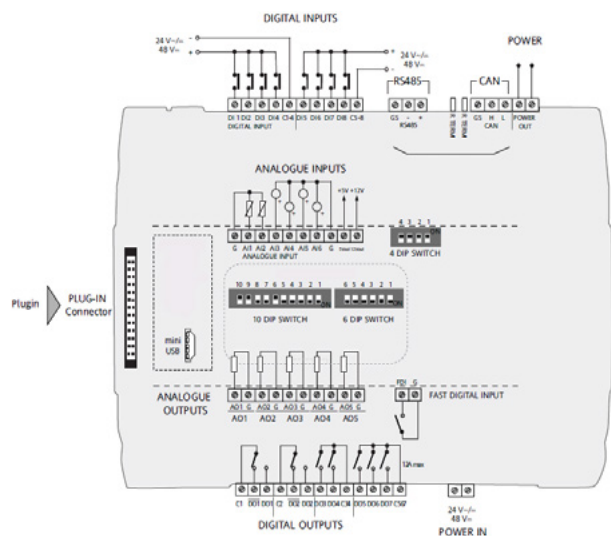
Input/output terminal table

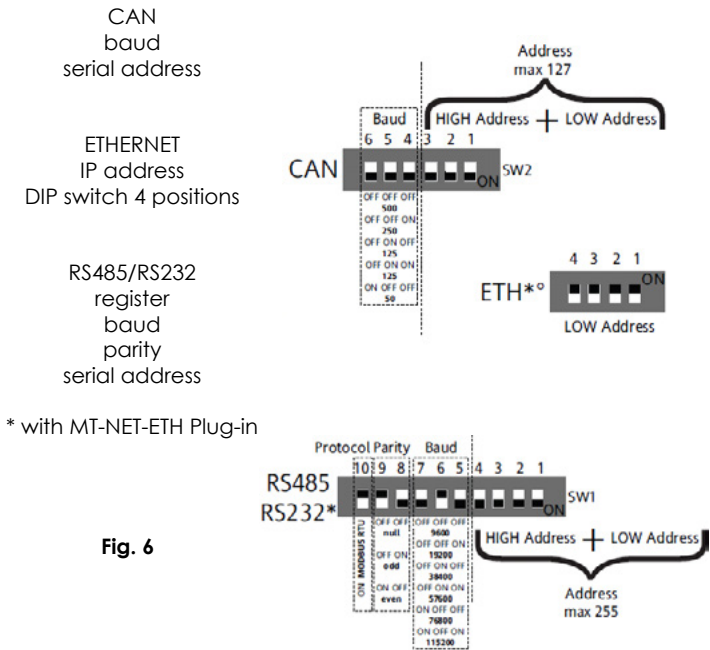I/O terminal: extractable, screw type, pitch 5, insertion at 90°for cables with 2.5mm^2 cross-section
Serial terminal: extractable, screw type, pitch 3.81, insertion at 90°for cables with 2.5mm^2 cross-section

Label		Description	Note
4 DIP SWITCH		DIP Switch 4 positions	default OFF
6 DIP SWITCH		DIP Switch 6 positions	MT-NET-ES1 ONLY
10 DIP SWITCH		DIP Switch 10 positions	
POWER IN		24Vac - 48Vdc	
POWER OUT			POWER exit for remote keyboard
ANALOGUE OUTPUTS	AO1…AO5	analogue outputs 1…5	
	G	ground	
	12Vdc	output 12Vdc for analogue inputs	
	5Vdc	output 5Vdc for ratiometric analogue inputs	
DIGITAL OUTPUTS	C1 DO1 DO1	output on relay 1	<u>DO1</u>: normally open DO1: normally closed
	C2 DO2 DO2	output on relay 2	<u>DO2</u>: normally open DO2: normally closed
	DO3 DO4	output on relay 3-4	
	C34	digital outputs 3-4 common	
	DO5 DO6 DO7	output on relay 5-6-7	
	C5 6 7	digital outputs 5-6-7 common	12Amp max
CAN	GS H L	insulated CAN serial GS serial ground insulated by G	R TERM terminating resistors for CAN
RS485	GS - +	insulated RS485 insulated GS serial ground insulated by G	Use120Ohm terminating resistors
DIGITAL INPUTS	DI1…DI4	digital input 1…4	
	C1-4	digital inputs 1…4 common	
	DI5…DI8	digital input 5…8	
	C5-8	digital inputs 5…8 common	
FAST D.I.	FDI	FAST digital input	pulse/frequency counter (up to 1kHz)
	G	ground (GND)	
ANALOGUE INPUTS	AI…AI6	analogue outputs	
	G	ground (GND)	

DIP SWITCH configuration

MT-NT-BD1 and MT-NT-ES1 are equipped with an external 4 ways DIP switch in order address the device. You get the address adding the value of a parameter defined through software to the value represented by the position of the 4 DIP switches (16 addresses). For the expansion the default parameter is set at 1.

MT-NT-ES1 is equipped with 2 further DIP switch series (one with 6 position and one with 10 positions) placed under the cover on the front part of the device (removable using a crew driver). These DIP switches allow to configure the parameters of the CAN, RS485/RS432 or Ethernet protocols (if plug-in modules are present). The configuration parameters of the protocol and the part on the top of the address are configured through DIP switches under the cover, while the par at the bottom of the address is anyway defined through the 4 external DIP switches.

CAN
baud
serial address

ETHERNET
IP address
DIP switch 4 positions

RS485/RS232
register
baud
parity
serial address

* with MT-NET-ETH Plug-in

Fig. 6

CONDITIONS OF USE

Allowed use

For safety reasons the instrument must be installed and used in accordance with the instructions supplied. Users must not be able to access parts with dangerous voltage levels under normal operating conditions. The device must be suitably protected from water and dust according to the specific application and only be accessible using special tools (except for the front keypad). The device can be fitted to HVAC equipment for household and/or similar use. It has been tested and in safety terms, conforms to applicable harmonized European standards.

Unintended use

The use of the unit for applications other than those described above is forbidden. It should be noted that the relay contacts supplied with the device are functional and therefore may be subject to fault.
Any protection devices required to comply with product requirements or dictated by common sense due for obvious safety reasons should be installed externally.

Liability and residual risks

Controlli S.p.A. is not liable for any damage resulting from:

* installation/uses other than those expressly specified and, in particular, failure to comply with the safety requirements of established standards and/or instructions specified in this document;
* use on panels that do not provide adequate protection against electric shocks, water or dust when assembled;
* use on panels allowing access to dangerous parts without having to use tools;
* tampering with and/or modification of the product;
* installation/use on panels which are not compliant with current standards and regulations.

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DIMENSIONS [mm]
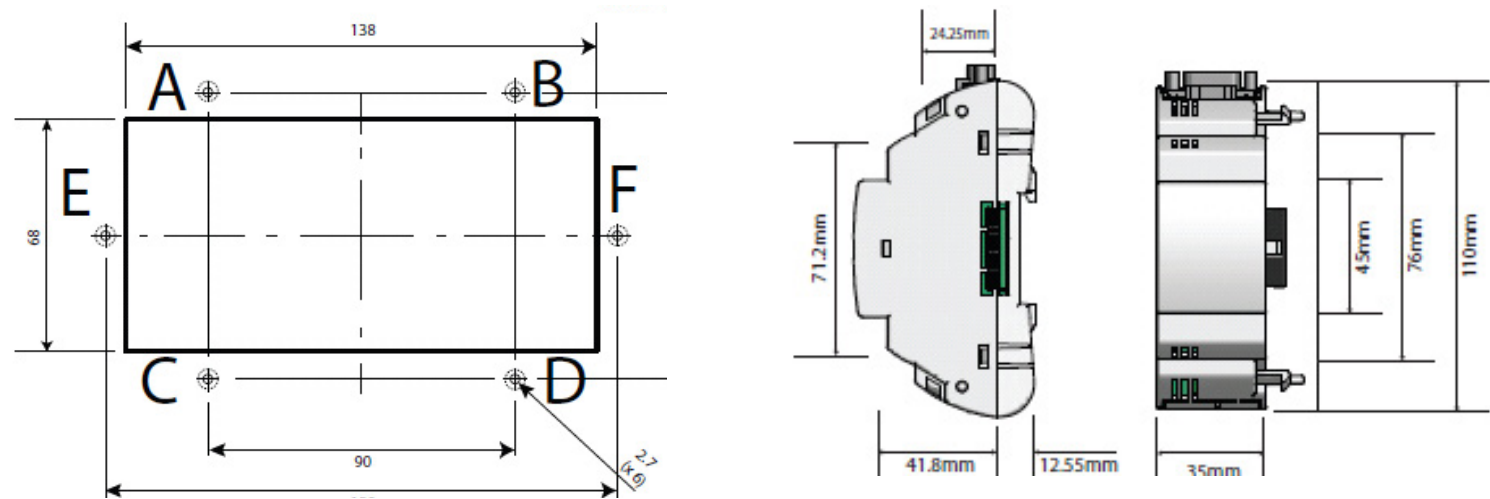
MT-NET-232\MT-NET-ETH\MT-NET-CAN\MT-NET-485
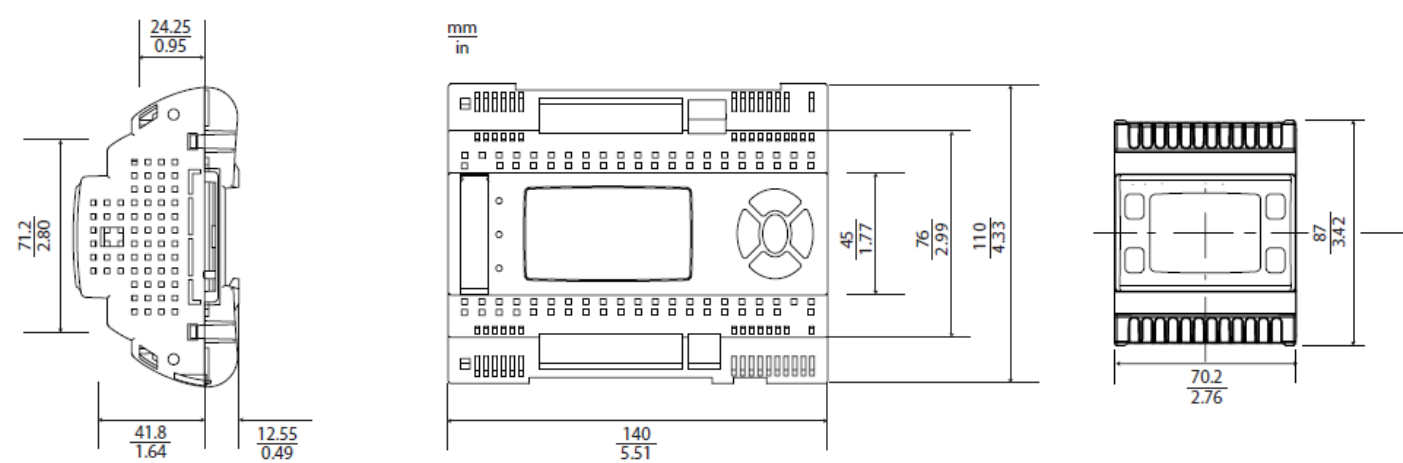
MT-NT-BD1\MT-NT-ES1

MT-NT-ES2

MODEL	LEIGHT (L) mm / inches	DEPTH (D) mm / inches	HEIGHT (H) mm / inches
MT-NET-DB1 /MT-NET-ES1	140 / 5,51	61,6 / 2,42	110 / 4,33
MT-NET-ES2	70 / 2,75	61,6 / 2,42	87 / 3,42

The performances stated in this sheet can be modified without any prior notice