200NDINFSC

Electronic regulator on DIN bar to manage condenser fans

User and maintenance manual

ENGLISH

READ AND KEEP

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CHAPTER 1: INTRODUCTION

GENERAL INFORMATION 1.1

DESCRIPTION:

The DIN NANO FSC is a DIN rail electronic regulator which optimizes the management of the condenser fans. It helps reduce energy consumption by regulating the condensation temperature according to the external temperature. It can also reduce the sound emissions from the condensing fans during the night, slowing down the fans if the external temperature drops.

APPLICATIONS:

- Control for electronic fans used on condensing units.
- Control for phase-cutting voltage regulators used to manage the condensation fan speed.

MAIN FEATURES.

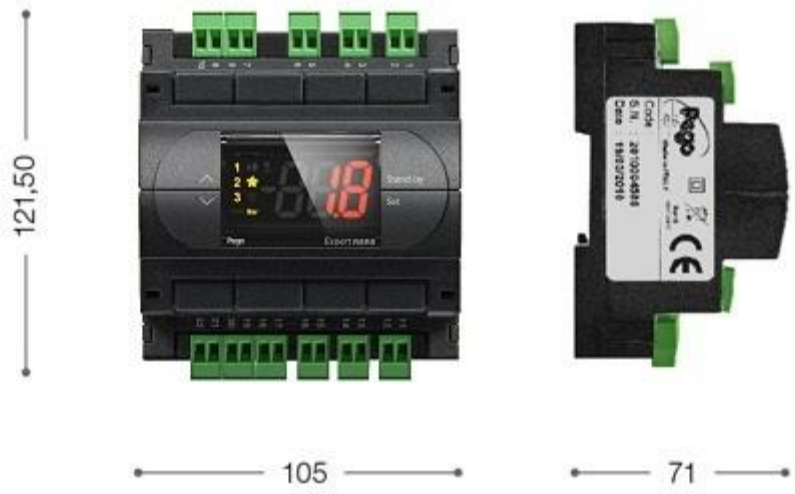
- 0-10 V analog output for speed control of the condenser fans
- Regulation with pressure or temperature probe
- Acquisition of outside temperature to optimize the control
- 4 operating modes:
    - normal mode.
    - energy saving.
    - low noise of fans.
    - constant speed (adjustable).
- Night / day function (change of condensation setpoint).
- View of the pressure transducer reading in Bar or in °C (depending on the type of selected refrigerant gas).
- 3-digit LED display with sign, decimal point and system status icons.
- RS485 serial connection with Modbus-RTU or Telenet protocol.
- PEGO programming criteria that guarantees immediate start-up.
- Supply voltage 230Vac.

PRODUCT IDENTIFICATION CODES 1.2

200NDINFSC01	Electronic regulator on DIN bar for the optimized management of the fans of the condensing group

1.3 OVERALL DIMENSIONS

Dimensions in mm.



1.4 IDENTIFICATION DATA

The device described in this manual has a plate on one side bearing the identification data:

- Name of Manufacturer
- Code and model of the device
- Serial number
- Date of manufacture

CHAPTER 2: INSTALLATION

GENERAL RULES FOR THE INSTALLER 2.1

1. Install the device in an area that ensures the correct degree of protection, and take all due care when drilling holes in the box for the cable glands and/or hoses;

2. Avoid using multi-pole cables with conductors connected to inductive and power conductors and signal conductors like probes and digital inputs;

3. Avoid inserting ducts and power cables with signal cables (sensors and digital inputs) in these.

4. Minimize the length of the connecting cables to prevent these from coiling up and adversely affecting the electronics through induction;

5. All the conductors of the cables must be of an appropriate size to withstand the required load;

6. When extensions are needed for the sensors, it is necessary to use conductors of a suitable size measuring no less than 1mm². Extension or shortening of the probes may alter the factory settings; use an external thermometer, therefore, for testing and calibration.

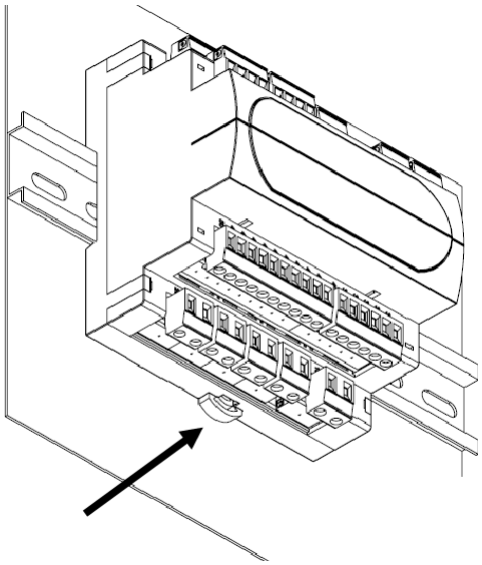
STANDARD EQUIPMENT FOR ASSEMBLY AND USE 2.2

The DIN NANO FSC electronic controller is provided with the following for assembly and use:

• Nr 1 User manual.

2.3 INSTALLATION OF BOARD

Fig. 1: Install the module on the DIN guide and close the bottom clamp to hold it in place.



Make all the electrical connections with reference to the diagrams of the relative model (see the relative tables in the ANNEXES). During the cabling process, it is advisable to keep the power conductors isolated from the signal conductors.

CHAPTER 3: TECHNICAL CHARACTERISTICS

TECHNICAL CHARACTERISTICS 3.1

Power supply		
Voltage		230 V~ ± 10% 50/60Hz
Max power consumption (electronic controller only)		~ 5 VA
Climatic conditions		
Operating temperature		-5 ÷ +50 °C
Storage temperature		-10 ÷ +70 °C
Relative ambient humidity		Less than 90% RH
General features		
Compatible type of pressure sensor:		pressure sensor: 4/20mA
Compatible type of temperature sensor:		NTC 10Kohm 1% @ 25°C
Output features (voltage-free contact)		
Description	**Relay installed**	**Features of output board**
Fans enable	(Relay 16A AC1)	16(6)A 250V~
Not used	(Relay 16A AC1)	16(6)A 250V~
Not used	(Relay 8A AC1)	8(3)A 250V~
Alarm	(Relay 8A AC1)	8(3)A 250V~
Dimensional features		
Dimensions		12.15cm x 7.1cm x 10.5cm (HxPxL)
Insulation and mechanical properties		
Degree of protection of front console (remote-controlled by the power section if assembled on front of board)		IP65
Material of boxes		PC+ABS self-extinguishing UL94 V-0
Type of insulation		Classe II

CHAPTER 4: WARRANTY

4.1 *WARRANTY*

The electronic controls of the **DIN NANO** series are covered by a 24-months warranty against all manufacturing defects as from the date indicated on the product ID code.

In case of defect the product must be appropriately packaged and sent to our production plant or to any authorized Service Center with the prior request of the Return Authorization Number.

Customers are entitled to have defective products repaired, spare parts and labour included. The costs and the risks of transport are at the total charge of the Customer.
Any warranty action does not extend or renew its expiration.

The Warranty does not cover:

- Damages resulting from tampering, impact or improper installation of the product and its accessories.
- Installation, use or maintenance that does not comply with the instructions provided with the product.
- Repair work carried out by unauthorized personnel.
- Damage due to natural phenomena such as lightning, natural disasters, etc…

In all these cases the costs for repair will be charged to the customer.

The intervention service in warranty can be refused when the equipment is modified or transformed.

Under no circumstances **Pego S.r.l.** will be liable for any loss of data and information, costs of goods or substitute services, damage to property, people or animals, loss of sales or earnings, business interruption, any direct, indirect, incidental, consequential, damaging, punitive, special or consequential damages, in any way whatsoever caused, whether they are contractual, extra contractual or due to negligence or other liability arising from the use of the product or its installation.

Malfunction caused by tampering, bumps, inadequate installation automatically declines the warranty. It is compulsory to observe all the instructions in this manual and the operating conditions of the product.

Pego S.r.l. disclaims any liability for possible inaccuracies contained in this manual if due to errors in printing or transcription.

Pego S.r.l. reserves the right to make changes to its products which it deems necessary or useful without affecting its essential characteristics.

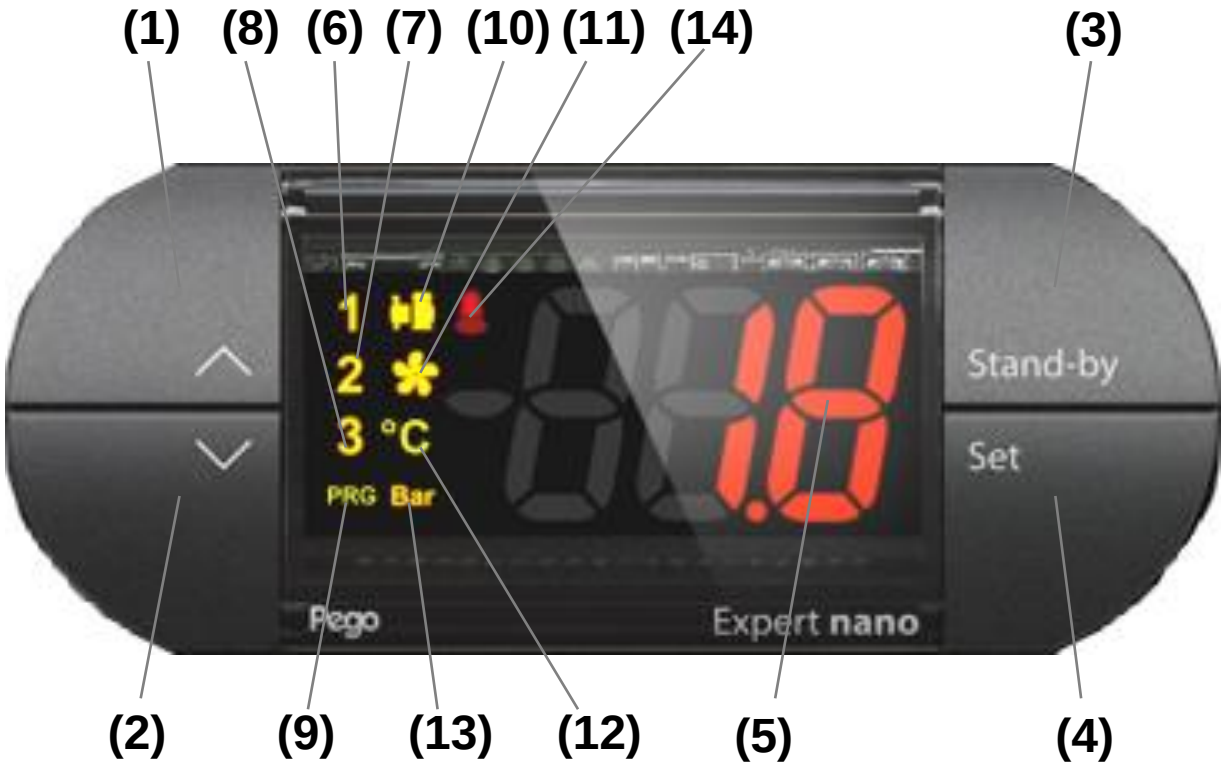
Each new release of the Pego product user manual replaces all the previous ones.

As far as not expressly indicated, is applicable the Law and in particular the art. 1512 C.C. (Italian Civil Code).

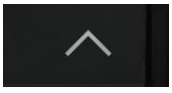
For any controversy is elected and recognized by the parties the jurisdiction of the Court of Rovigo.

CHAPTER 5: DATA PROGRAMMING

CONTROL PANEL 5.1



FRONT KEYPAD 5.2

(1) 

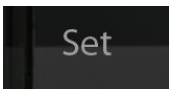
UP KEY
Increases value / Scrolls up through parameters
Acquires an alarm.

(2) 

DOWN KEY
Decreases value / Scrolls down through parameters.

(3) 

STAND-BY
If pressed for more than 1 second, the Stand-by state will alternate with the normal operating status, and vice versa. In the stand-by state, the system stops and the display will change the writing OFF with the current view.
If pressed, it switches the display view from °C to Bar and vice versa.

(4) 

SET
Shows the set point
Enables configuration of the set point when pressed together with the Down or UP key.

5.3 DISPLAY LED

(5)		Shows the values / parameters
(6)		**"OUTPUT Nr.1" ICON** ON=analogue output between 0.1 and 3.3V.
(7)		**"OUTPUT Nr.2" ICON** ON=analogue output between 3.4 and 6.6V.
(8)		**"OUTPUT Nr.3" ICON** ON = analogue output > 6.6V.
(9)		**"PRG" ICON** Flashing LED = Programming (or SET POINT change)
(10)		**---**
(11)		**"CONDENSER FAN CONTROL" ICON** LED ON = Condenser Fan Control ENABLED
(12)		**"UNIT OF MEASURE IN DEGREES CELSIUS" ICON** LED ON = Unit of measure in degrees Celsius of the viewed value.
(13)		**"UNIT OF MEASUREMENT IN BAR" ICON** LED ON = Unit of measure in Bar of the viewed value.
(14)		**ALARM IN PROGRESS ICON** LED OFF = No alarm triggered LED ON = Alarm triggered and then cancelled Blinking LED = Alarm in progress

COMBINATION OF KEYS
5.4

LEVEL 1 PROGRAMMING
Pressing both keys together for more than 3 seconds enables access to the Level 1 programming menu.

EXIT PROGRAMMING
Pressing both keys together for more than 3 seconds in any programming menu exits the menu concerned.

LEVEL 2 PROGRAMMING

Pressing all keys together for more than 3 seconds enables access to the Level 2 programming menu.
To exit the menu, press the up and down arrow keys together.

LEVEL 3 PROGRAMMING

Pressing both keys together for more than 3 seconds enables access to the Level 3 programming menu.
To exit the menu, press the up and down arrow keys together.

SWITCHING FROM Bar to °C WHILE VIEWING THE VALUE OF THE FOLLOWING VARIABLES IN Bar, if Pt=0.
The variables involved with this kind of view are:
SET POINT, r0, LSE, HSE, A1, A2, iOv, nSC.
When displaying the value contained in one of the variables listed above, pressing the stand-by key switches the view from Bar to °C according to the table of the gas type selected until the keys are released.

5.5 VIEWING AND CONFIGURATION OF SET POINT

The SETPOINT is set in Bar if the adjustment is made by a pressure sensor (if Pt = 0). In the case in which the adjustment is made by means of temperature sensor (NTC) SETPOINT is expressed in ° C (if Pt = 1). The procedure for changing the SET is the following:
1. Press the SET key to view the current Bar/°C SET POINT value.
2. Pressing and holding the SET key and pressing one of the keys (▲) or (▼) alters the value of the Bar/°C SETPOINT.
Release the SET key to return to the value of the adjustment sensor. Any changes made are saved automatically.

While viewing the SET POINT value in Bar (then with Pt=0 and SET button pressed), if you press the standby key at the same time, you will view the value changed to °C depending on the type of Gas set.
While viewing the value in °C, it will not be possible to change the set through the arrows.

5.6 LEVEL 1 PROGRAMMING (User level)

To access Level 1 programming, press and hold the UP key (▲) and DOWN key (▼) for over 3 seconds.
When the first programming variable appears:
1. Select the variable you want to change with the key (▲) or with the key (▼). After selecting the required variable, it is possible to:
2. View its configuration by pressing the SET key.
3. Edit configuration by pressing and holding the SET key and pressing either the (▲) or (▼) key.
4. After setting the configuration values, press and hold both the (▲) key and the (▼) key for a few seconds until the cell temperature value appears and exit the menu. The system closes the menu when the keypad is not used for over 30 seconds.
5. Any changes made to the variables are saved automatically when the system closes the configuration menu.

5.7 LIST OF LEVEL 1 VARIABLES (User Level)

LABEL	MEANING	VALUES	DEFAULT	default Pt
r0	**SET** differential Value always greater than (iOv) value	with Pt=0 (regulation with pressure probe) 0,6 ÷ 5,0 Bar	(with Pt=0) 2,0 Bar	*
		with Pt=1 or (Pt=0 and mOd=1) (regulation with temperature probe) 1,0 ÷ 50,0 °C	with Pt=1 or (Pt=0 and mOd=1) 15,0 °C	
t1	**The minimum time that must elapse between two successive insertions of the fans.** (SECONDS)	0 ÷ 500 step 2 sec	10	
t2	**The minimum time that must elapse between one shutdown and the next insertion of the fans.** (SECONDS)	0 ÷ 500 step 2 sec	0	

Fty	**Type of refrigerant GAS in use.** The setting of this parameter is essential for correct operation.	0 = R404 11 = R449A 1 = R134 12 = R290 2 = R22 13 = R32 3 = R407A 14 = R448A 4 = R407F 15 = R452A 5 = R407H 16 = R600 6 = R410A 17 = R600A 7 = R450A 18 = R1270 8 = R507 19 = R1234ze 9 = R513A 20 = R23 10=R744(CO2) 21=R717(NH3)	0	
UM	**View unit of measurement** If Pt = 0 it is possible to choose the unit of measurement. if Pt = 1 the control temperature is always displayed in ° C.	0 = bar 1 = °C	0	
AO1	**Display of the 0-10V analogue output for condenser fans**	0,0 – 10,0V	read-only	
tA	**Display ambient temperature** *(if mOd = 1 or 2)*	-45.0 – 99.0 °C if mOd=1 or 2	read-only	
ALL	**View of the last alarm triggered**	Alarm code	read-only	
A1	**Minimum pressure/temperature alarm** The absolute pressure/temperature referring to the regulation probe below which, once the Ald delay time is activated, the LOW pressure alarm is triggered showing **EL** alternating with the pressure/temperature on the display and the flashing of the alarm icon. When the alarm turns off, the "alarm presence" icon will remain lit to indicate which operation has occurred until the UP button is pressed	with Pt=0 -0,6 ÷ (A2-0,2) Bar step 0,2 Bar	-0,6 Bar	*
		with Pt=1 or (Pt=0 and mOd=1) -45,0 ÷ (A2-0,2) °C step 0,2 °C	-45,0 °C	
A2	**Maximum pressure/temperature alarm** The absolute pressure/temperature referring to the regulation probe above which, once the Ald delay time is activated, the HIGH pressure/temperature alarm is triggered showing **EH** alternating with the pressure on the display and the flashing of the alarm icon. When the alarm turns off, the "alarm presence" icon will remain lit to indicate which operation has occurred until the UP button is pressed	with Pt=0 (A1+0,2) ÷ +90,0 Bar step 0,2 Bar	+30,0 Bar	*
		with Pt=1 or (Pt=0 and mOd=1) (A1+0,2) ÷ +99,0 °C step 0,2 °C	99,0 °C	
tdS	**Day start time**	00,0 ÷ 23,5	6,0	
tdE	**Day end time**	00,0 ÷ 23,5	22,0	

5.8 LEVEL 2 PROGRAMMING (Installer level)

To access Level 2 programming, press and hold the UP key (▲), DOWN key (▼) and STAND-BY key for over 3 seconds.
When the first programming variable appears:
1. Select the variable you want to change with the key (▲) or with the key (▼). After selecting the required variable, it is possible to:
2. View its configuration by pressing the SET key.
3. Edit configuration by pressing and holding the SET key and pressing either the (▲) or (▼) key.
4. After setting the configuration values, press and hold both the (▲) key and the (▼) key for a few seconds until the cell temperature value appears and exit the menu.
5. Any changes made to the variables are saved automatically when the system closes the configuration menu.

5.9 LIST OF LEVEL 2 VARIABLES (Installer Level)

LABEL	MEANING	VALUES	DEFAULT	default Pt
In1	**Settings of nr.1 Digital input**	4 = High pressure (fans 100%) (with DI=1) 3 = Fans alarm (fans 0%) (with DI=1) 2 = Energy saving active (night) (with DI=1) 1 = Fans enabling (fans 0%) (with DI=1) 0 = Disabled -1= Fans enabling (fans 0%) (with DI=0) -2= Energy saving active (night) (with DI=0) -3= Fans alarm (fans 0%) (with DI=0) -4= High pressure (fans 100%) (with DI=0)	1	
In2	**Settings of nr.2 Digital input**	4 = High pressure (fans 100%) (with DI=1) 3 = Fans alarm (fans 0%) (with DI=1) 2 = Energy saving active (night) (with DI=1) 1 = Fans enabling (fans 0%) (with DI=1) 0 = Disabled -1= Fans enabling (fans 0%) (with DI=0) -2= Energy saving active (night) (with DI=0) -3= Fans alarm (fans 0%) (with DI=0) -4= High pressure (fans 100%) (with DI=0)	3	
In3	**Settings of nr.3 Digital input**	4 = High pressure (fans 100%) (with DI=1) 3 = Fans alarm (fans 0%) (with DI=1) 2 = Energy saving active (night) (with DI=1) 1 = Fans enabling (fans 0%) (with DI=1) 0 = Disabled -1= Fans enabling (fans 0%) (with DI=0) -2= Energy saving active (night) (with DI=0) -3= Fans alarm (fans 0%) (with DI=0) -4= High pressure (fans 100%) (with DI=0) **Valid if EXTERNAL PROBE absent (mOd = 0 or mOd = 3)**	4	
DO5	General alarm output settings	1 = DO5 relay enabled in presence of alarm 0 = DO5 relay disabled -1 = DO5 relay disabled in presence of alarm	1	
EP4	Pressure (bar) equal to 4mA. Referring to the adjustment sensor.	with Pt=0 : -1,0…(EP2-0,1) Bar	(with Pt=0) 0,0 Bar	*
		with Pt=1 : Not used	(with Pt=1) - - -	
EP2	Pressure (bar) equal to 20mA. Referring to the adjustment sensor.	with Pt=0 : (EP4+0,1)…90,0 Bar	(with Pt=0) 30,0 Bar	*
		with Pt=1 : Not used	(with Pt=1) - - -	

iOv	Offset Inverter fans Value always less than the (r0) value	0,5 … 2,5 bar if Pt=0 always < r0	0,5 Bar	*
		0,9 … 10,0 °C if Pt=1 or (Pt=0 and mOd=1) always < r0	0,9 °C	
iLv	Inverter fans: minimum 0-10V output value setting	0,0 … 10,0 V	3,0 V	
iHv	Inverter fans: maximum 0-10V output value setting	0,0 … 10,0 V	10,0 V	
bOv	Boost fans: Time for which the 0-10V output of the fans is pushed to 100%. This is used to win the breakaway at their start. (SECONDS)	0 ÷ 240 sec	2 sec	
LSE	Minimum value that can be attributed to set point	with Pt=0 0…(HSE-0,2) Bar, step 0,2 Bar	(with Pt=0) 10,0 Bar	*
		with Pt=1 or (Pt=0 and mOd=1) -45,0…(HSE-0,2) °C, step 0,2 °C	(with Pt=1) -45,0 °C	
HSE	Maximum value that can be attributed to set point	with Pt=0 (LSE+0,2)…90,0 Bar, step 0,2 Bar	(with Pt=0) 25,0 Bar	*
		with Pt=1 or (Pt=0 and mOd=1) (LSE+0,2)…99,0 °C, step 0,2 °C	(with Pt=1) 99,0 °C	
AId	**Minimum or maximum pressure/temperature alarm signalling and display delay time**.	0…240 min	120 min	
CL1	Adjustment sensor calibration	-10,0…+10,0 Bar or °C	0,0	
CL2	Ambient sensor calibration	-10,0…+10,0 °C	0,0 °C	
tAM	Minimum ambient temperature	-45,0 … 99,0 °C	0,0 °C	
dAt	Differential ambient temperature	1,0 … 99,0 °C	50,0 °C	
iMv	If mOd = 2: Maximum value that can take the minimum voltage 0-10 V in the case of ambient temperature compensation If mOd=3: 0-10V output fixed value	iLv … iHv	5,0 V	
dnE	**Night mode enable (energy saving)** At night operation decimal point flashes. ***(dnE forced to 0 if mOd=1)***	0 = disabled 1 = enabled	0	

nSC	**Correction for the compressor SET during night operation (energy saving)** During night operation the Compressor set is: *Compressor Set = Set + NSC*	-5,0 … 5,0 Bar	0,0 Bar	
		-20,0 … 20,0 °C	0,0 °C	
Ad	Network address for connection to the TeleNET or Modbus supervision system	0 ÷ 31 (with SEr=0) 1 ÷ 247 (with SEr=1)	1	
Ser	RS-485 communication protocol	0 = TeleNET protocol 1 = Modbus-RTU protocol	0	
Bdr	**Modbus baudrate.**	0 = 300 baud 1 = 600 baud 2 = 1200 baud 3 = 2400 baud 4 = 4800 baud 5 = 9600 baud 6 = 14400 baud 7 = 19200 baud 8 = 38400 baud	5	
Prt	**Modbus parity checking.**	0 = no parity bit 1 = even parity bit 2 = odd parity bit	0	
P1	Password: type of protection (Active when PA is not 0)	0 = shows only the set point and permits deactivation of the alarms. 1 = disables access to level 1, 2 and 3 programming (access permitted to all other functions). 2 = disables access to level 2 and 3 programming (access permitted to all other functions). 3 = disables access to level 3 programming (access permitted to all other functions).	3	
PA	Password (see P1 for the type of protection)	0...999 0 = function disabled	0	
Yr	Set year	0 … 99	14	
Mo	Set month	1 … 12	1	
dy	Set day	1 … 31	1	
Hr	Set hour	0 … 23	12	
min	Set minutes	0 … 59	30	
dEF	Reserved parameter		read-only	
reL	Software release		read-only	

LEVEL 3 PROGRAMMING (Installer level) 5.10

To access Level 3 programming, press and hold the UP key (▲) and STAND-BY key for over 3 seconds.
When the first programming variable appears:
1. Select the variable you want to change with the key (▲) or with the key (▼). After selecting the required variable, it is possible to:
2. View its configuration by pressing the SET key.
3. Edit configuration by pressing and holding the SET key and pressing either the (▲) or (▼) key.
4. After setting the configuration values, press and hold both the (▲) key and the (▼) key for a few seconds until the cell temperature value appears and exit the menu.
5. Any changes made to the variables are saved automatically when the system closes the configuration menu.

LIST OF LEVEL 3 VARIABLES (Installer Level) 5.11

LABEL	MEANING	VALUES	DEFAULT	default Pt
Pt	Adjustment probe type: *PLEASE NOTE:* *the Pt Exchange involves loading default settings dedicated on the variables marked with an asterisk in the "default Pt" column. Modify the internal jumpers as described in section "A.2 Connection diagram", consistent with the type of probe connected.*	0 = Pressure. The control probe is a 4-20 mA pressure sensor connected to terminals 23-24 (see connection diagram) 1 = Temperature. The control probe is a NTC 10K temperature sensor connected to terminals 23-24 (see connection diagram)	0	
mOd	Operating mode **If mOd = 1 or mOd = 2 you need to connect an external temperature sensor (term. 21-22)**	0 = normal mode 1 = energy saving 2 = low noise 3 = Fixed speed (0-10V output equal to iMv)	0	
SP1	Speed of reaction to changes of regulating probe (terminals 23-24)	0 = fast 1 = normal 2 = slow 3 = very slow	1	
SP2	Speed of reaction to changes of External ambient probe (terminals 21-22)	0 = fast 1 = normal 2 = slow 3 = very slow	1	

5.12 OPERATING MODE

The condenser fans are controlled via a 0-10V analogue output and sideband-type adjustment.
The LED icon (11) turns on to identify the fan condenser control.
The regulation probe (terminal 23 /24) can be of two types:

- Flow pressure probe 4-20mA (parameter Pt = 0).
- Condensing temperature probe NTC 10KΩ (parameter Pt = 1).

The setting of parameter Pt according to the type of probe connected must be combined with the correct setting of the jumpers on the NDINFSC board (see connection diagram). Changing the Pt involves loading the relevant default parameters on the variables marked with an asterisk in the “default Pt” column and changing the unit of measure of some parameters (Bar if the probe connected is a pressure probe, °C if the probe connected is a temperature probe). There are various fan control modes available.

CONTROL IN THE EVENT OF ALARMS

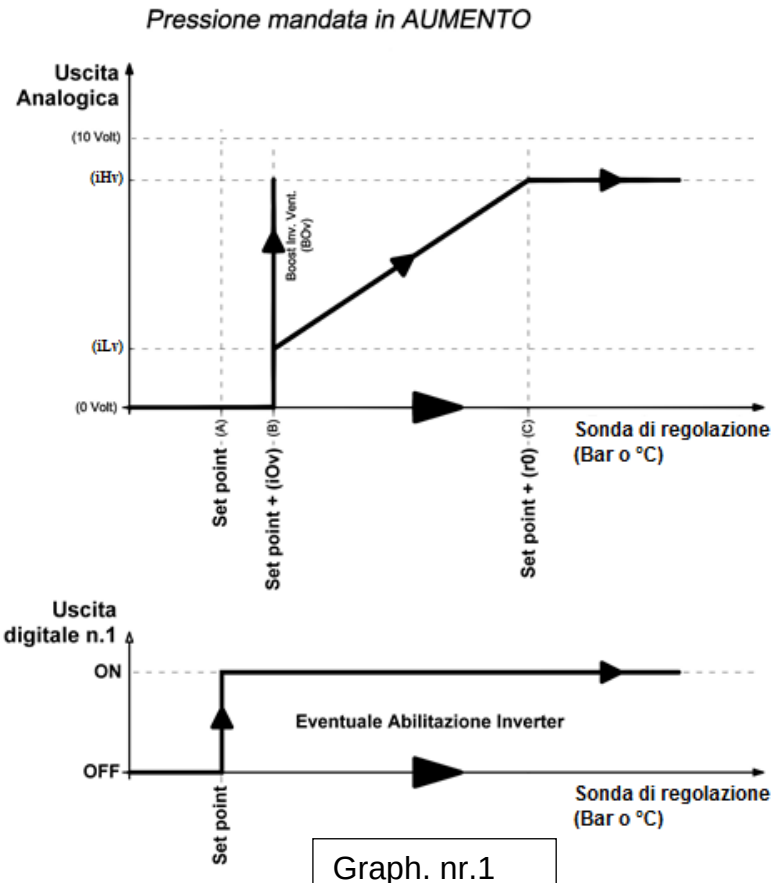
With the presence of ‘fans alarm’, the analog output is immediately brought to 0V and then open the digital output 1 (inverter off). In addition, the display shows alarm (Ev).

5.12.1 *NORMAL MODE (mOd = 0)*

The adjustment follows the operation of graph nr.1 with the increase of the output pressure/condensing temperature and the decrease of graph nr.2. For simplicity, we define the value of the probe pressure / temperature as adjustment probe.

Adjustment probe value INCREASE (Graph nr.1):

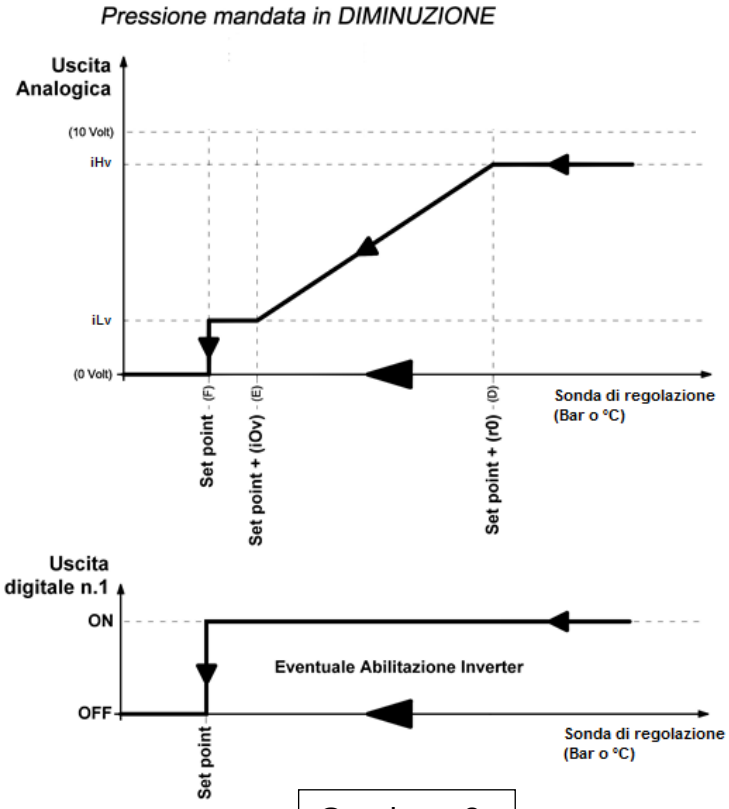
The analogue output of the adjuster will be 0V for output pressure probe less or equal to point (B) representing the "SET point + iOv offset" value.
If the adjustment probe value is higher than point (B), you will have the analogue output at (iHv) for the maximum BOv time. BOv is the Fans Boost times for which the adjuster output is increased by 100% in order to help the start-up of the fans.
Between points (B) and (C), the analogue output will have a value proportional to the value of the adjustment probe starting from the minimum value of the parameter (iLv) up to the maximum value of the parameter (iHv).
With adjustment probe value equal or higher than point (C), you will have a (iHv) analogue output.
Digital output nr.1 represents "the condenser fans inverter activation" and is ON for adjustment probe value higher than or equal to the set point and OFF for lower values.



Graph. nr.1

Adjustment probe value DECREASING (Graph nr.2):
With adjustment probe values equal or higher than point (D), you will have a (iHv) analogue output.
Between points (D) and (E), the analogue output will have a value proportional to the value of the adjustment probe starting from the maximum value of (iHv) up to the minimum value of the (iLv) parameter.
With values of the adjustment probe lower than point (E) and higher than point (F), you will have an analogue output equal to the minimum value of the (iLv) parameter.
The analogue output of the adjuster will be 0V for adjustment probe less or equal to point (F) representing the "SET point" value.

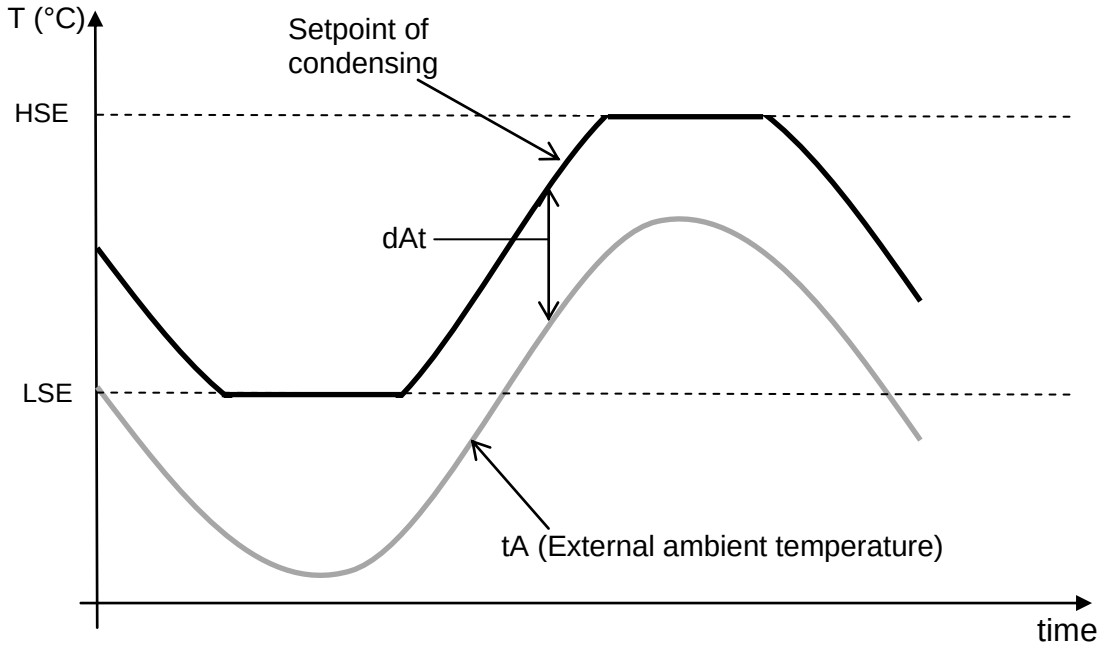
Digital output nr.1 represents "the condenser fans inverter activation" and is ON for adjustment probe value higher than or equal to the set point and OFF for lower values.



Graph. nr.2

ENERGY SAVING MODE (mOd = 1) **5.12.2**

In this mode the control modifies the Set-point according to the external temperature. When the external temperature drops, so does the set-point. This ensures that a fixed differential is maintained between the condensing temperature and the external temperature, therefore if the external temperature drops, so does the reference for the condensing temperature and as a result the compressor efficiency improves.
In this mode the set-point is therefore set automatically and the parameters (LSE) and (HSE) set become the adjustment limits. In this configuration the type of gas used must be set, in order to adjust the fans properly.
In the "Energy saving" mode it is recommended to use a temperature probe as an adjustment probe, in order to facilitate the correct configuration of the parameters and anticipate the external temperature variations more effectively.



5.12.3 LOW NOISE MODE *(mOd = 2)*

By connecting a room temperature probe it is possible to anticipate and counteract the effects of the variation of the external climatic conditions on the setting (system pressure / condensing temperature). This function can be particularly useful because, if configured appropriately, it can reduce the speed of the condenser fans (and therefore their noise and their consumption) if the external temperature drops, such as at night or during the winter season.

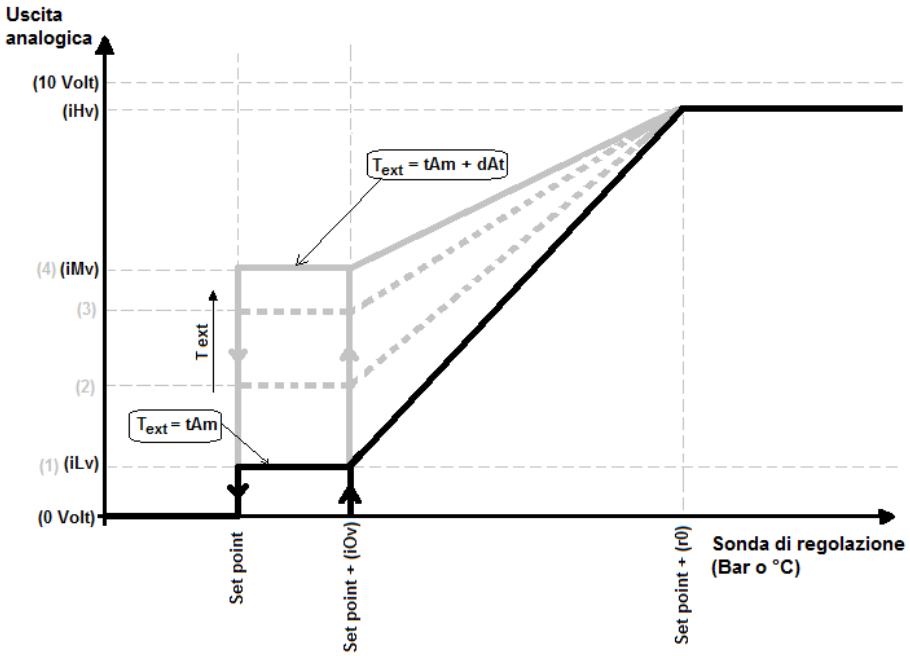
Operation

The minimum speed of the fans increases as the external temperature by combining a variation of the external temperature equal to dAt with a variation of the minimum control voltage equal to (iMV - iLV).
To take advantage of the external temperature compensation it is therefore advisable to set the parameter (tAm) at the minimum external temperature estimated throughout the course of the year and the parameter (dAt) at the maximum temperature excursion. The compensation algorithm varies the fan speed so that the temperature (tAm) is associated with the minimum speed iLv, while the temperature (tAm + dAt) is associated with the maximum speed iMv.

The minimum fan speed at a certain external temperature is calculated as:

$$V_{min} = \left(\frac{t_{ext} - t_{AM}}{dA_t}\right)(iMv - iLv) + iLv$$

Graph. nr.3



As you can see in Chart 3, the variation of the output follows the same trend shown in the previous sections (for simplicity's sake, the fan initial start-up BOv boost is not shown in the chart): however, it is possible to see that varying the minimum fan speed actually changes the entire operating curve, according to the external temperature.

FIXED SPEED MODE (mOd = 3) **5.12.4**

In this mode, the 0-10 V fan control output takes on a fixed value, equal to parameter iMv. The enabling analogue output and digital output are active only if the NDINFSC controller is enabled. When the enabling is received, the fans go to full speed (iHv) for a BOv time period (fan boost), then the fans go to the value set in iMv.
In this mode the alarms EH, EL, E0 and E1 are disabled, and it is not necessary to connect the temperature or pressure probes to the analogue inputs.

5.13 NIGHT / DAY FUNCTION

The day/night mode is activated by setting parameter dnE = 1. During the night the pressure Set-point is therefore modified as:

Set-point (night) = Set-point (day) + nSC

Night operation may be activated:
- from the digital input, setting (In1)=±1, (In2)=±1 or (In3)=±1);
- via the internal clock, when the current time is greater than (tdE) and less than (tdS).

If a digital input is configured as a day/night input, the internal clock is ignored.

5.14 PASSWORD FUNCTION

The password function is enabled by setting a value other than 0 in the PA parameter. See parameter P1 for the various levels of protection.
Protection is enabled automatically when the keypad is not used for 30 seconds.
The digits 000 appear on the display. Use the up/down arrow keys to edit the number and press the SET key to confirm.
The 000 password window disappears if the keypad is not used for 30 seconds.
If you forget the password, use the universal number 100.

5.15 TEMPERATURE TABLE FOR REFRIGERANT FLUIDS

The following table shows the limits for the converted temperature based on kind of gas set.

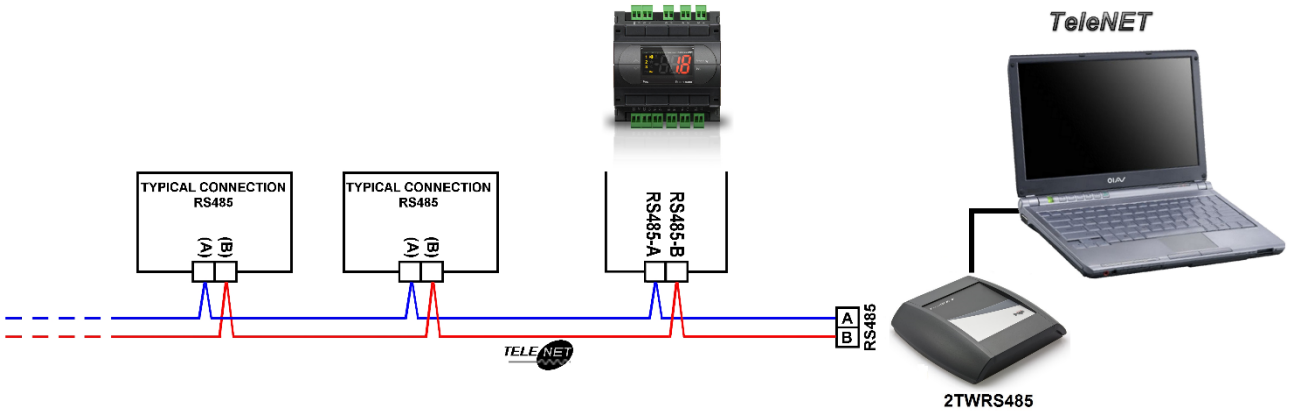
Parameter Fty	Code	Temperature range	Parameter Fty	Code	Temperature range
0	R404	-50 ÷ 70 °C	11	R449A	-50 ÷ 70 °C
1	R134A	-50 ÷ 70 °C	12	R290	-50 ÷ 70 °C
2	R22	-50 ÷ 70 °C	13	R32	-50 ÷ 70 °C
3	R407A	-50 ÷ 70 °C	14	R448A	-50 ÷ 70 °C
4	R407F	-50 ÷ 70 °C	15	R452A	-50 ÷ 70 °C
5	R407H	-50 ÷ 70 °C	16	R600	-20 ÷ 70 °C
6	R410A	-50 ÷ 70 °C	17	R600A	-30 ÷ 70 °C
7	R450A	-40 ÷ 70 °C	18	R1270	-50 ÷ 70 °C
8	R507	-50 ÷ 70 °C	19	R1234ZE	-30 ÷ 70 °C
9	R513A	-45 ÷ 70 °C	20	R23	-50 ÷ 25 °C
10	R744 (CO2)	-50 ÷ 40 °C	21	R717 (NH3)	-50 ÷ 70 °C

CHAPTER 6: OPTIONS

TELENET MONITORING/SUPERVISION SYSTEM 6.1

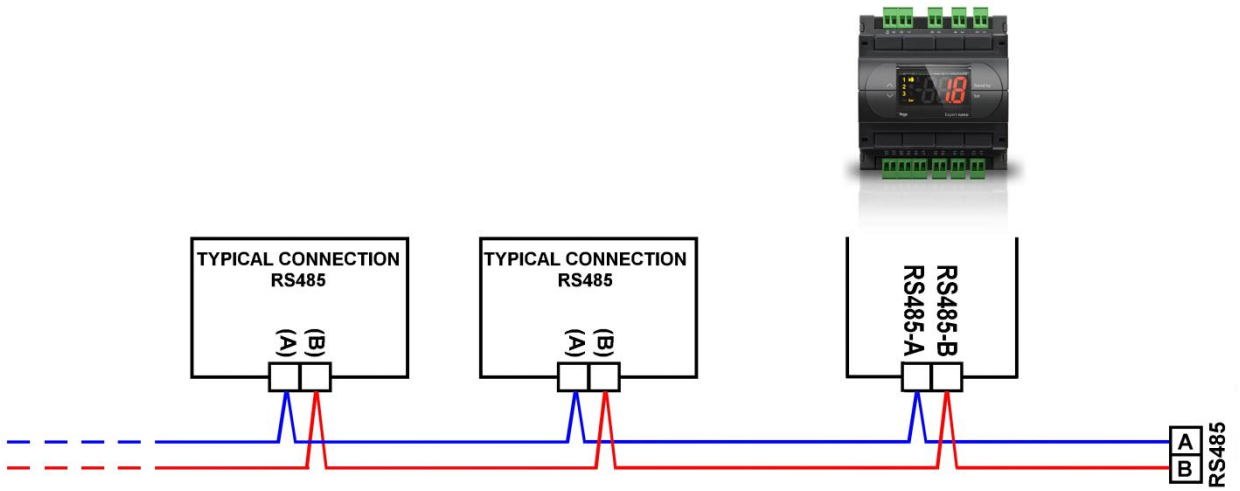
In order to connect the board to the ***TeleNET*** network, follow the diagram below. Configure the instrument with reference to the ***TeleNET*** manual.
IMPORTANT: During configuration of the “Module”, select "*TWMT instrument* " or "*TWMP instrument* ". In detail:

- Ad address: shows regulation temperature probe value (TWMT) / regulation pressure probe value (TWMP) / converted regulation temperature probe value (TWMT)
- Ad + 1 address: shows external ambient temperature probe value (TWMT)



CONFIGURATION OF NETWORK WITH MODBUS-RTU PROTOCOL 6.2

Connect the board to a RS485 network with ***Modbus-RTU*** protocol with reference to the diagram below. Refer to the MODBUS-RTU_DIN_NANO_FSC manual (available on our website) for the specifications of the MODBUS-RTU communication protocol.



CHAPTER 7: DIAGNOSTICS

7.1 DIAGNOSTICS

The controller **DIN NANO FSC**, in the case of any anomalies, will warn the operator through alarm codes shown on the display.
The code of the last alarm triggered will be stored and can be displayed as only-read within the first level ALL variable. The view of this variable at the first commissioning (with empty memory) will display - - -.
One of the following messages appears on the screen when an alarm condition occurs:

CODE	POSSIBLE CAUSE / DESCRITPION	ACTION TO BE TAKEN	RESET
E0	Operation anomalies of the adjustment probe (terminals 23-24) (The outputs are all disabled apart from the alarm outputs) *Disabled if mOd = 3*	• Check the probe status.	automatic
E1	Operation anomalies of the External ambient NTC probe (terminals 21-22) (The regulation goes on but turns off the outdoor temperature compensation) *Disabled if mOd = 3*	• Check the probe status.	automatic
E3	EEPROM ALARM An error was found in the EEPROM memory. (The outputs are all disabled apart from the alarm outputs)	• Switch the appliance off and back on • If the problem persists, replace the Control Circuit Board	manual Requires shut-down
Ev	**Condenser fans protection** (i.e. thermal protection) It is activated if there is an alarm input fans. The 0-10V output is set to 0V.	• Check the status of the fans • Check the absorption of the fans • Check the status of the digital input	automatic
EHI	**High pressure alarm (DI)** High pressure alarm from digital input. The fans are forced to 100% (iHv) in order to reduce the circuit pressure.	• Check the refrigerant circuit • If the problem persists contact the technical assistance service	automatic
EH	**High pressure/temperature alarm** (fans 100% of iHv) *Disabled if mOd = 3*	• Check the refrigerant circuit • If the problem persists contact the technical assistance service	automatic
EL	**Low pressure/temperature alarm** (fans 0% of iHv) *Disabled if mOd = 3*	• Check the refrigerant circuit • If the problem persists contact the technical assistance service	automatic
iEn	**No enabling consent**	• Check enabling consent	automatic

ANNEXES

EU DECLARATION OF CONFORMITY **A.1**

LA PRESENTE DICHIARAZIONE DI CONFORMITA' E' RILASCIATA SOTTO LA RESPONSABILITA' ESCLUSIVA DEL FABBRICANTE:
THIS DECLARATION OF CONFORMITY IS ISSUED UNDER THE EXCLUSIVE RESPONSIBILITY OF THE MANUFACTURER:

PEGO S.r.l. Via Piacentina 6/b, 45030 Occhiobello (RO) – Italy –

DENOMINAZIONE DEL PRODOTTO IN OGGETTO / DENOMINATION OF THE PRODUCT IN OBJECT

MOD.: **200NDINFSC01**

IL PRODOTTO DI CUI SOPRA E' CONFORME ALLA PERTINENTE NORMATIVA DI ARMONIZZAZIONE DELL'UNIONE EUROPEA:
THE PRODUCT IS IN CONFORMITY WITH THE RELEVANT EUROPEAN HARMONIZATION LEGISLATION:

Direttiva Bassa Tensione (LVD):	**2014/35/UE**
Low voltage directive (LVD):	***2014/35/EU***
Direttiva EMC:	**2014/30/UE**
Electromagnetic compatibility (EMC):	***2014/30/EU***

LA CONFORMITA' PRESCRITTA DALLA DIRETTIVA E' GARANTITA DALL'ADEMPIMENTO A TUTTI GLI EFFETTI DELLE SEGUENTI NORME:
THE CONFORMITY REQUIRED BY THE DIRECTIVE IS GUARANTEED BY THE FULFILLMENT TO THE FOLLOWING STANDARDS:

Norme armonizzate: **EN 60730-1:2016, EN 60730-2-9:2010, EN 61000-6–1:2007, EN 61000-6–3:2007**
European standards: **EN 60730-1:2016, EN 60730-2-9:2010, EN 61000-6–1:2007, EN 61000-6–3:2007**

IL PRODOTTO E' COSTITUITO PER ESSERE INCORPORATO IN UNA MACCHINA O PER ESSERE ASSEMBLATO CON ALTRI MACCHINARI PER COSTITUIRE UNA MACCHINA CONSIDERATE DALLA DIRETTIVA: 2006/42/CE "Direttiva Macchine".
THE PRODUCT HAS BEEN MANUFACTURED TO BE INCLUDED IN A MACHINE OR TO BE ASSEMBLED TOGHETER WITH OTHER MACHINERY TO COMPLETE A MACHINE ACCORDING TO DIRECTIVE: EC/2006/42 "Machinery Directive".

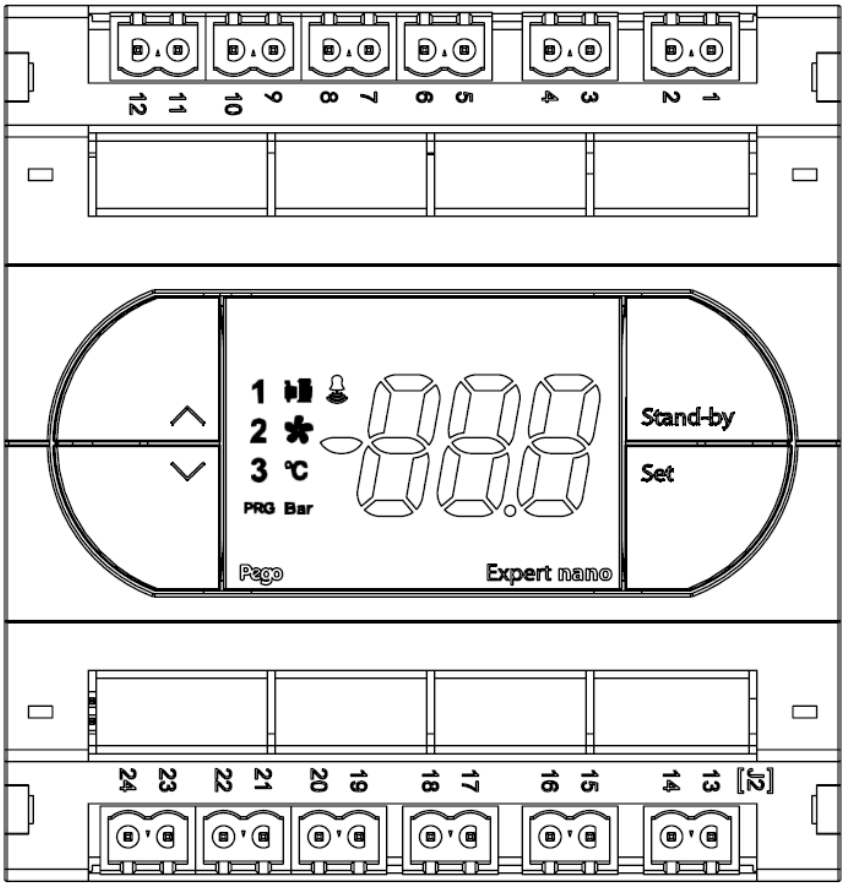
Firmato per nome e per conto di:
Signed for and on behalf of:

Pego S.r.l.
Lisa Zampini
Procuratore Generale

Luogo e Data del rilascio:
Place and Date of Release:

Occhiobello (RO), 08/01/2018

A.2 CONNECTION DIAGRAM



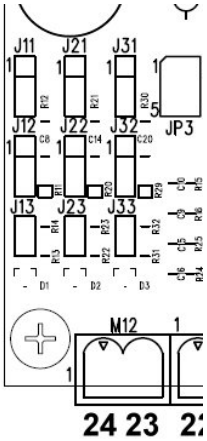
NOTE:
Inside the circuit board, there are bridges already configured for the correct reading of the digital and analogue inputs of the board. Their setting must not be changed under any circumstances.

Manufacturer settings of the bridges for the 200NDINFSC:

J31=1-2
J32=1-2
J21=1-2
J22=1-2

If 4-20mA:
J11=2-3
J12=2-3

Se NTC:
J11=1-2
J12=1-2

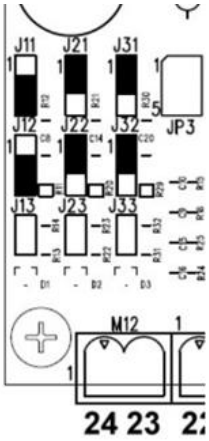


Manufacturer settings:

J31=1-2
J32=1-2
J33=open

J21=1-2
J22=1-2
J23=open

J11=2-3
J12=2-3
J13=open



Power supply section

1-2:		power supply 230 Vac 50/60Hz

Section of digital outputs (voltage-free contacts)

3-4:	(RL5)	General alarm	(Relay 8A AC1 250V contact N.O.)
5-6:	(RL1)	N.1 output	(Relay 16A AC1 250V contact N.O.)
7-8:	NOT USED		
9-10:	NOT USED		
11-12:	NOT USED		

Analogue Output Section

13:	(COM_OUT_AO1)	Common analogue output	(Rif 0) - (gnd)
14:	(OUT_AO1)	Condenser fans	(Analogue output 0-10V)

Master interface section - Slave - Console

15:	(RS485-B)	RS485-B Lan for Telenet / ModBus
16:	(RS485-A)	RS485-A Lan forTelenet / ModBus

Section of digital inputs

17:	(DI1)	Digital input nr.1
18:	(COM DI1)	Common (GND) digital input n.1

Section of analogue inputs

19:	(COM DI2)	Common (GND) digital input nr.2
20:	(DI2)	Digital input nr.2
If mOd = 0 or mOd = 3:		
21:	(COM DI3)	Common (GND) digital input nr.3
22:	(DI3)	Digital input nr.3
If mOd = 1 or mOd = 2:		
21:	(COM DI3)	Common (GND) analog input AI2
22:	(DI3)	Analog input NTC (10KΩ 1% a 25°C) external ambient probe
If Pt=0:		
23:	(COM AI1)	Common(+12Vdc) Analogue input AI1
24:	(AI1)	Analogue input (4-20mA) for Adjustment pressure probe
If Pt=1:		
23:	(COM AI1)	Common (GND) analog input AI1
24:	(AI1)	Analog input NTC (10KΩ 1% a 25°C) for Adjustment temperature probe

REMARKS

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