EC NANO CONTROLLER

Dinamic Control Technology

WARRANTY 3 YEARS

PLUG& PLAY

FULL GUARD SYSTEM

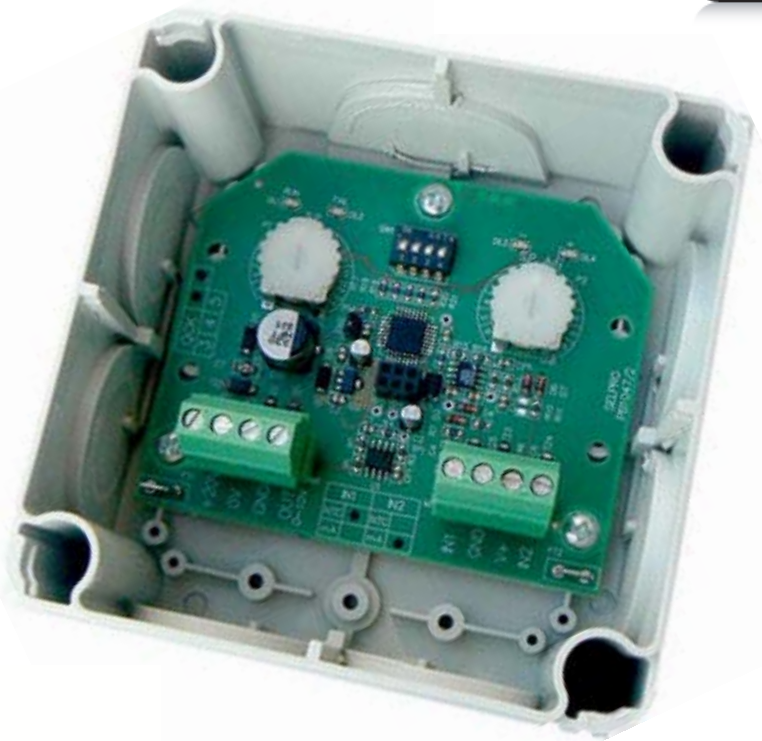
QUICK START-UP

INTELLIGENT ENERGY SAVING IES

EMC CIVIL LIMIT

THD FREE

EXTRA dB FREE



SELPRO

selpro.it

ECN series selection codes

The following table shows the rule for creating the ordering code and the admissible variants for each feature or function

ZD ECN	a	bbb	c	d	e	f	g	h	i

a	Phase supply	1	Single phase	
bbb	Supply voltage	020	20 (-10%/+25%)	
c	Voltage type	D	Vdc	
d	set-point number	1	SP1 (SP +SPadj.)	
e	Inputs types		INPUT 1	INPUT 2
		D	0..70°C	4-20mA
		M	4-20mA	4-20mA
		T	0..70°C	0..70°C
f	Protection box	B	IP00 din rail	
		S	IP66	
g	Not used	0	Not used	
h	Reserved	0	Reserved for special customized version	
i	Revision index	0	Last coded revision or personalization for the customer	

Code	Description
ZDECN1020D1DB000	EC NANO 0-10V CONTROLLER 20VDC -10%/+25% 1 ING. 0/70°C NTC 1 ING. 4-20mA - IP00 DIN RAIL
ZDECN1020D1MB000	EC NANO 0-10V CONTROLLER 20VDC -10%/+25% 2 ING. 4-20mA - IP00 DIN RAIL
ZDECN1020D1TB000	EC NANO 0-10V CONTROLLER 20VDC -10%/+25% 2 ING. 0/70°C NTC - IP00 DIN RAIL
ZDECN1020D1DS000	EC NANO 0-10V CONTROLLER 20VDC -10%/+25% 1 ING. 0/70°C NTC 1 ING. 4-20mA - IP66
ZDECN1020D1TS000	EC NANO 0-10V CONTROLLER 20VDC -10%/+25% 2 ING. 0/70°C NTC - IP66
ZDECN1020D1MS000	EC NANO 0-10V CONTROLLER 20VDC -10%/+25% 2 ING. 4-20mA - IP66

You must follow very carefully the safety prescription specified below, every time you interact with the device.

- Read carefully and follow the instructions in this manual; keep a copy with the device.
- Before starting the device, the user must determine it suitability for the use he/she intends to make of it, taking all risk and liabilities arising from improper use of the device.
- The installation, commissioning, and use of this device should only be performed by qualified personnel with knowledge of the product technical standards, in accordance with safety and personal protection standards.
- The device contains no user-serviceable parts: do not tamper with or disassemble the internal parts of the device. Doing so will void the warranty, and may cause serious injury to persons and property.
- The user must be protected from the power supply, and the motor must be equipped with protection against overvoltage, in accordance with the applicable standards.
- Do not power the device without the protective cover in place.
- Never touch any parts of the electrical circuit when power is on.
- Do not alter or damage the equipment identification tags.

Allowed Use

The device is aimed at regulating motorized actuators, through the 0-10Vdc control signal command; in particular the software is projected for the regulation of temperature or pressure of ventilated heat exchangers, by the control of the rotation speed of single and three-phase synchronous (EC) motors applied to axial and centrifugal fans used in air conditioning, refrigeration or air handling and treatment.

Any use other than that allowed ones is prohibited.

INTRODUCTION

This manual contains all the information necessary for the installation, operation, and maintenance of the EC-nano device.

Its smooth operation and duration depend on proper maintenance and attention during use.

Do not proceed in any way to install or use of the product without first becoming familiar with the safety instructions contained in this manual.

This manual is an integral part of the device and must accompany it throughout its entire life cycle, until demolition.

In order to provide an effective consultation, the notes of particular significance are highlighted as follows:

The notes marked with this symbol aim at ensuring maximum uptime for maximum machine performance.

The notes marked with this symbol are particularly significant for safety purposes, and must be strictly adhered to by anyone working on the machine.

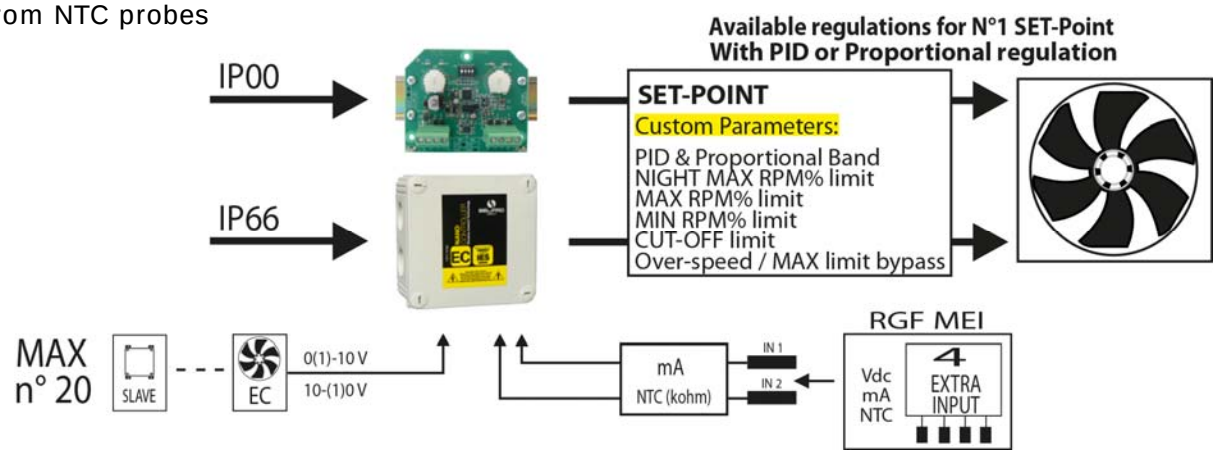
Before and during installation, you must follow very carefully the safety prescription specified below.

- For the control of delicate products, or high value products that need to be kept within specific limits, we recommend installing a separate monitoring device, equipped with alarm contacts.
- The installation must be done by a qualified technician who carefully connects the electrical system, fixes the cables in their definitive position, and turns it on. Incorrect installation can cause serious injury to persons and serious damage property.
- As entries for the connection cables, you must use only the holes provided, in order to prevent infiltration of external agents (water, dust, etc.), and maintain the device **IP65** protection by using the supplied cable gland and the quality sheaths and cables that properly fit.
- Reassemble and make sure the outer protective cover closes perfectly.

EC-NANO Controller

The **EC-nano** device is a digital regulator, simple and practical, suitable for the management of motorized actuators with input from the remote control 0-10V.
Embedded software is specialized for the dynamic management of ventilated heat exchangers.

The controller can manage the temperature or pressure of work, working in either (PID algorithm IES: Intelligent Energy Saving) Proportional that, to maintain the desired value of pressure or temperature of the fluid in output.
FRIENDLY Setting of the set point (SP+SPadj), allows rapid commissioning of the system
The device supports two types of inputs: (1) signals from 4-20mA transducers; (2) signals from NTC probes



It can therefore operate in: **MASTER mode**: the output 0(1)-10 voltage varies as a function of one or more signals, maintaining the prevalent input within a given proportional band;

The device is designed to manage 2 inputs. In case more inputs are needed, one or more input expansion modules of the **MEI-4** model (max 6) must be used, each of which allows to connect up to four signals in mA/NTC for each device.

If you connect multiple inputs, you can select whether to use the greater or lesser in value. The system compares all incoming signals, and the regulation is performed by using the prevalent signal.

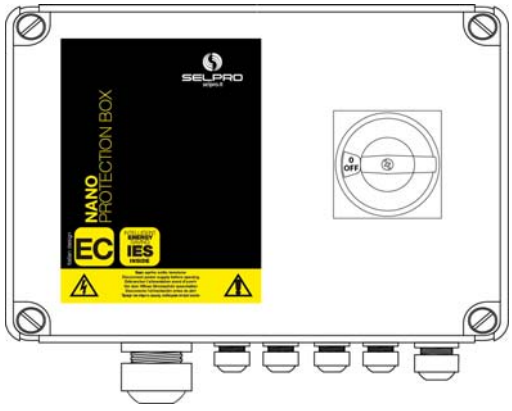
The system is available in three (3) different versions:
- DIN rail mounting (IP00)
- For outdoor mounting (IP66)
- In cabinet for outdoors mounting (IP65), complete with ON-OFF power-switch, three-phase protection against short circuits and direct connection from 1 to 9 SINGLE or three-phase EC fans.

The features in place and selected via DIP-switch, complete the proposed control technology.

EC-nano Available cabinet protection

IP00

IP66



IP65

Technical Characteristics:

• Power supply 20Vdc (not insulated) -10/+25%, supplied directly by the EC motor or an external power supply;

absorption of the electronic circuit: (max 18 mA), plus the transducer/s (4-20mA).

• Available in:

- **IP00** (DIN rail) for electric cabinet
- **IP66** (110x110x58) for outdoor applications (-20T50)
- **IP65** (240x253x125) complete protection electric box.

• **Three (3)** models are available, with two (2) inputs, with automatic selection of greater value, designed for the connection of:

- 1 temperature sensor NTC 10K @ 25 ° C + 1 pressure transducer 4-20mA (standard)
- 1 or 2 (4-20mA) pressure transducers ((attantion to the available mA on power supply),
- 1 or 2 temperature sensors (NTC 10K @ 25 ° C),

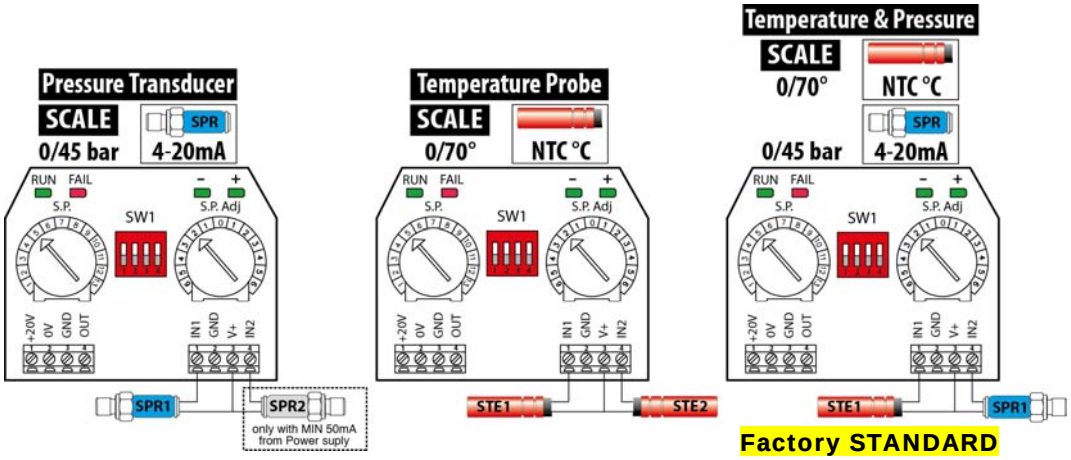
to control the EC fans through the command 0(1)-10Vdc, for to maintain the controlled °C or Bar to the projected value (Set-Point).

Standard functions:

- **2 inputs**: 4-20mA or NTC 10K @ 25°C or mixed (1xNTC & 1x4-20mA=factory setting)
- **1** analog **output** 0-10Vdc short-circuit protected, for motorized actuators, specialized for the control of EC fans (MAX n. 30 with input impedance from 100kohm) or motorized actuators (valves, dampers, ...)
- Led **DL1** (RUN) flashing CPU runs at a frequency of 1Hz OK
- Led **DL2** (FAIL) for alarms:
  - No. 1 flash for input/s UNDER scale(sensor disconnected)
  - No. 2 flashes for input/s OVER scale (sensor short circuit)
  - No. 3 flashes for error in the input connection (ex. : in the standard configuration with NTC input for IN 1 and 4-20mA pressure transducer for IN2)

N.B.: to reset the alarm condition no. 3, it is necessary to switch off the controller

- Led **DL3** (-) flashing: input value below the set point
- Led **DL4** (+) flashing: input value above the set point
- **2 switches** 13 positions for the friendly setting of:
  - (SP) main Set-Point + (SP-Adj) Set-Point adjustment
- **4 Dip Swicht** (SW1) for changing the default functionality:
  - PID or Proportional control (all parameters loaded in the factory)
  - Direct or Reverse regulation,
  - activation of surveillance control command (exit 1-10Vdc), to by pass the controller with the emergency speed
    (System "Cable break" function to be activated on the EC fan software)

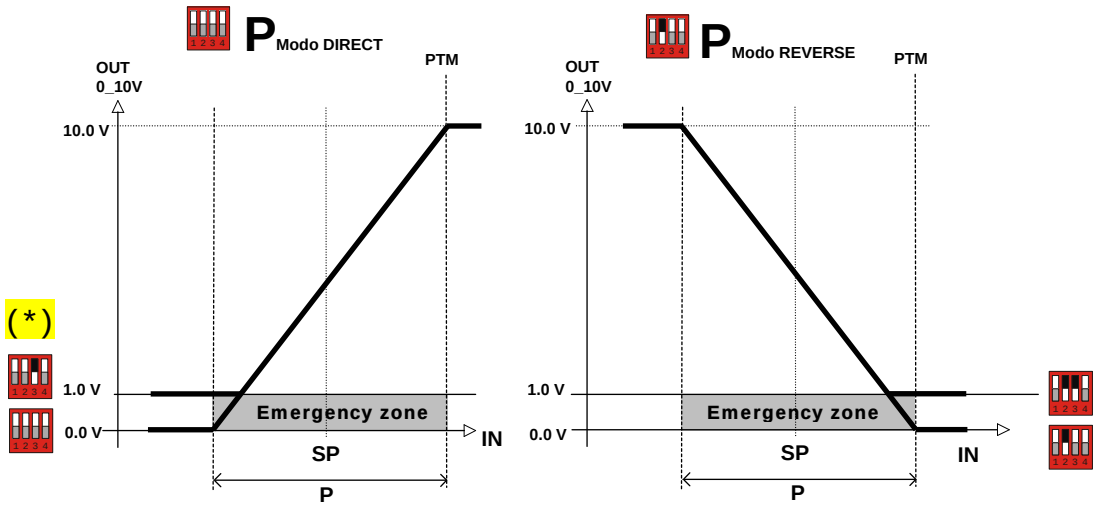


Factory STANDARD

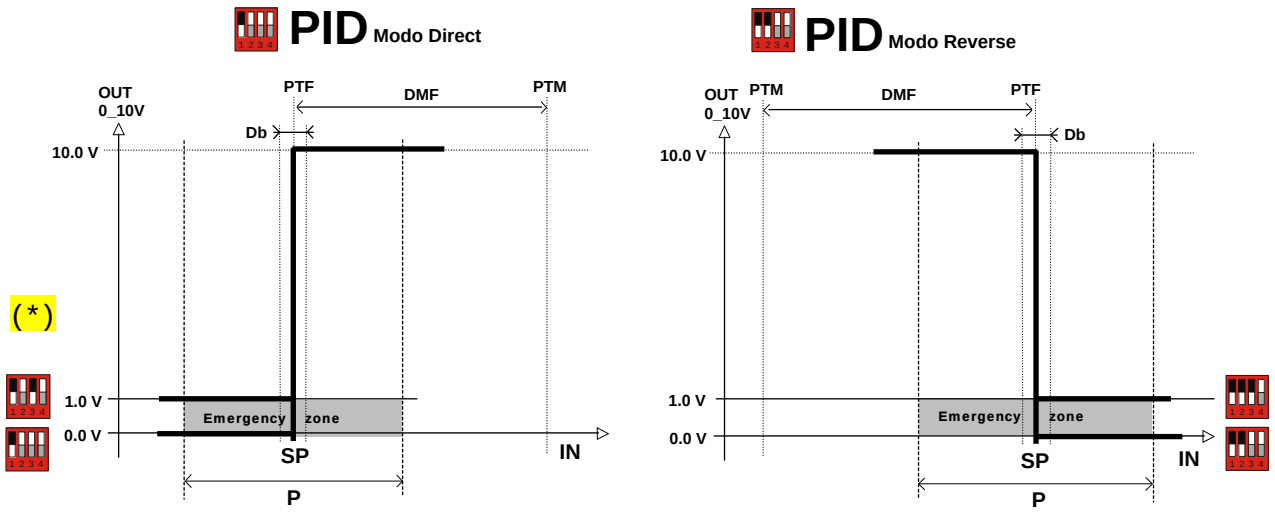
Functionality:

- PID (algorithm IES) or Proportional, for single or double input, with the automatic selection of the greater value / active channel
- Regulation of EC Motors or motorized actuators, through 0 (1)-10Vdc analog output, in MASTER mode (Proportional or PID), with 1 or 2 sensors, 4-20mA or NTC 10K @ 25°C

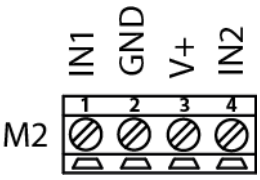
(*)You can select the Cable-Break function, that in case of failure of the control signal (control signal @0V) activates the emergency speed on EC fan (programmable with EC-Manager)



OUT	Output command value 0(1)-10Vdc
IN	Selected/ on work Input signal value
SP	Set point value (SP +/-SP adj)
P	Proportional Band (factory defult)
PTF	MIN projected Pressure or Temperature: system conditions set the project value to achieve the compressors best Energy Saving
PTM	MAX projected Pressure or Temperature: system conditions reached by power exchange at design conditions
DMF	Difference of temperature or pressure (PTM-PTF); the displacement from PTF to PTM occurs by the increase of ambient temperature.
Db	Area of "Dead-Band" of SP: is +/-2.5% of P (Proportional Band). When activated, stabilizes the control if the value of IN is inside.

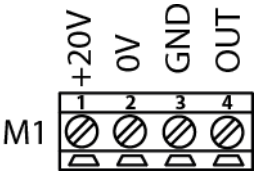


Transducer & Probe terminal block



1. Transducer input N°1 (IN1)
2. GND - Ground (per NTC)
3. Transducer supply +V (20Vdc)
4. Transducer input N°2 (IN2)

Power supply & output Command terminal block



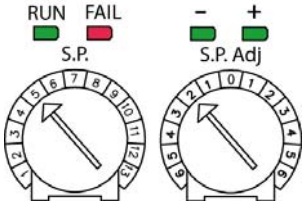
1. Ingresso tensione alimentazione da +20Vdc (min 50mA) da EC Motor
2. Massa Alimentazione (solo con TS aux. esterno)
3. Massa comando EC Motor
4. Segnale 0-10V comando EC Motor

Available Dip Swicth selections

Dip	OFF	ON
1	**Proportional** regulation	**PID** Regulation
2	Mode " **Direct**"	Mode " **REVERSE**"
3	Output 0-10V (standard)	Output 1-10V (Cable-break)
4	Free customizable	Free customizable

The "Cable break" system, directly programmable with EC-Manager, automatically activates the EC fan Emergency speed.

SP setting (Set-Point & Set adjust))



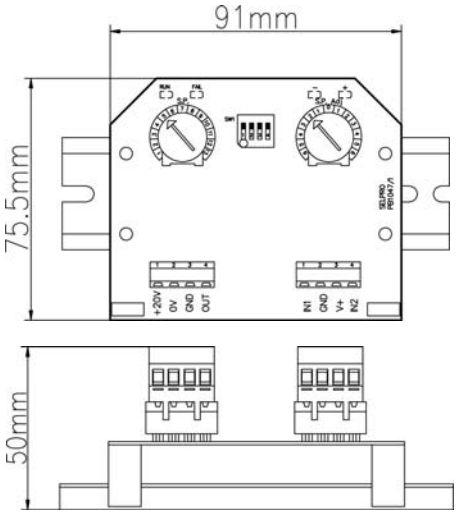
1. **SP** 13 positions switch to set the working point
2. **SP adj.** 13 positions switch to set the adjustment working point
3. **Led** di visualizzazione:
   - **DL1** external supply **O.K.**
   - **DL2** for **Alarms**
   - **DL3 & DL4** for differences between **SP** and working input

   Attention: when the two values (SP & IN) are matching, the LEDs are flashing together

The drawing below shows the available enclosure for the EC nano controller

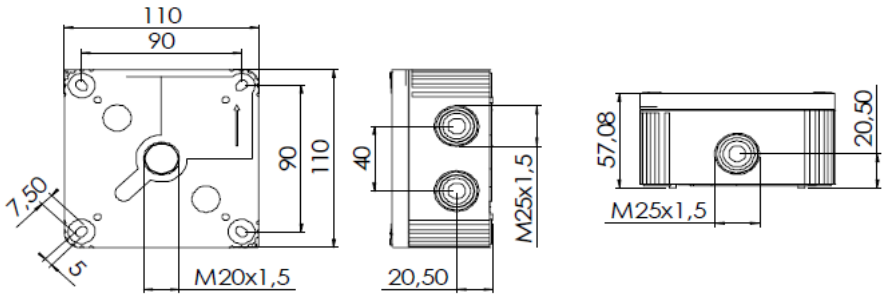
IP00 DIN rail

The EC nano controller is available for DIN rail application



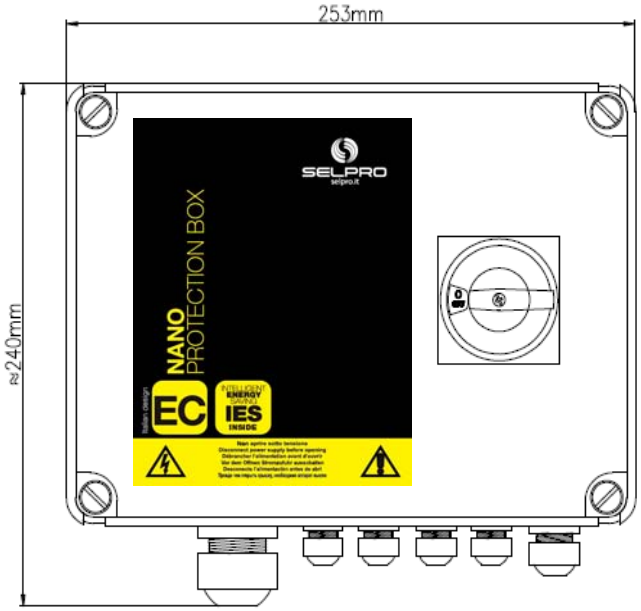
IP66 cabinet

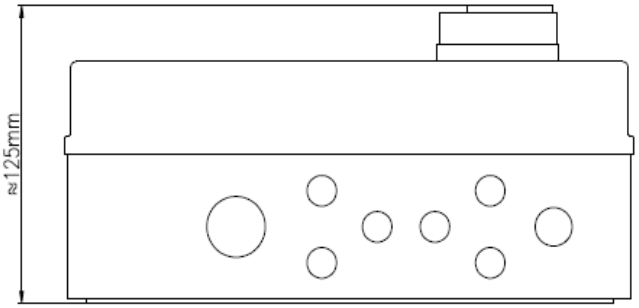
The IP66 enclosure for the EC nano controller, is complete with rubber gland IP68



IP65 cabinet

The IP65 electric board for EC nano controller, is completed by the cable glands kit





EC fans Connection:

To connect single and three-phase EC fans: ebm-papst and Ziehl-Abegg, for the terminals connection refer to the following drawings.

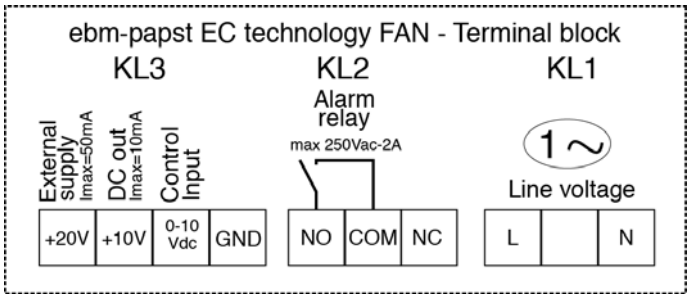
NB: with ebm-papst EC fan, check the maximum available current (mA)

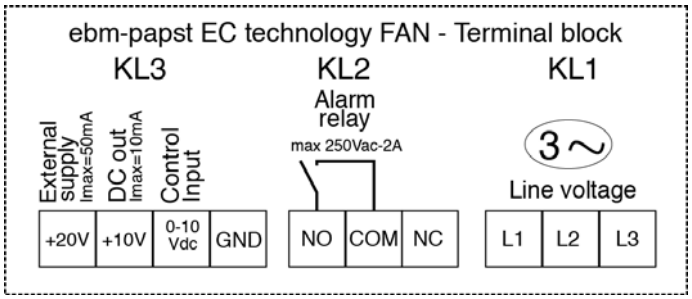
On single phase ebm-papst terminal block, are available:

- KL1 : L/N for motor power supply
- KL2 : contacts of fan warning/alarm relay
- KL3 :
  - Output power supply **+20V** (**min 50mA**)
  - Input for 0-10Vdc from remote command

On three phase ebm-papst terminal block, are available:

- KL1 : L1/L2/L3 for motor power supply
- KL2 : contacts of fan warning/alarm relay
- KL3 :
  - Output power supply **+20V** (**min 50mA**)
  - Input for 0-10Vdc from remote command



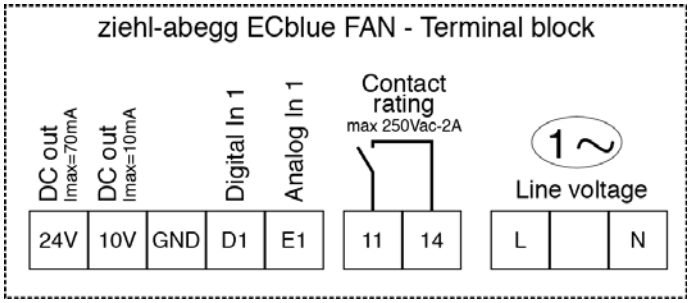


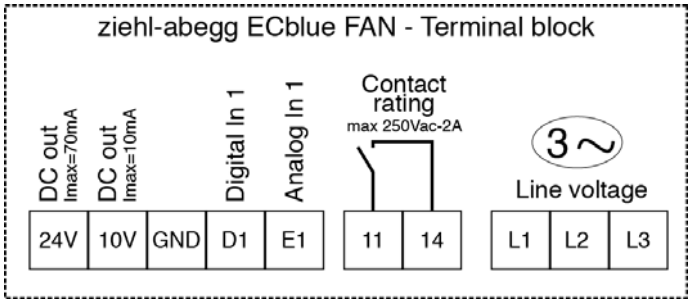
On single phase ziehl-abegg terminal block, are available:

- L/N for motor power supply
- contact of fan warning/alarm relay
- Output power supply **+20V** (**70mA** for the supply of two transducers)
- Input for 0-10Vdc from remote command

On three phase ziehl-abegg terminal block, are available:

- L1/L2/L3 for motor power supply
- contact of fan warning/alarm relay
- Output power supply **+20V** (**70mA** for the supply of two transducers)
- Input for 0-10Vdc from remote command

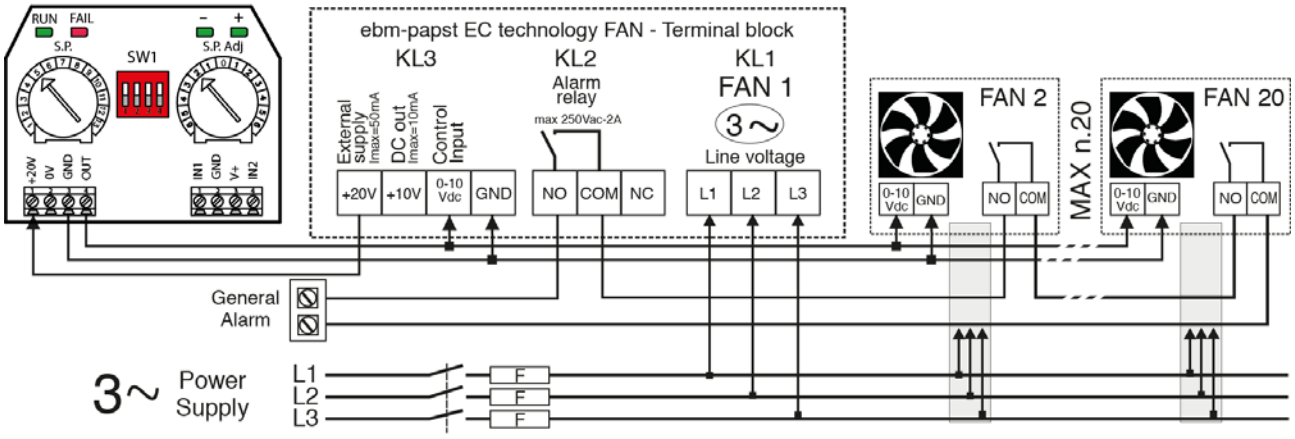




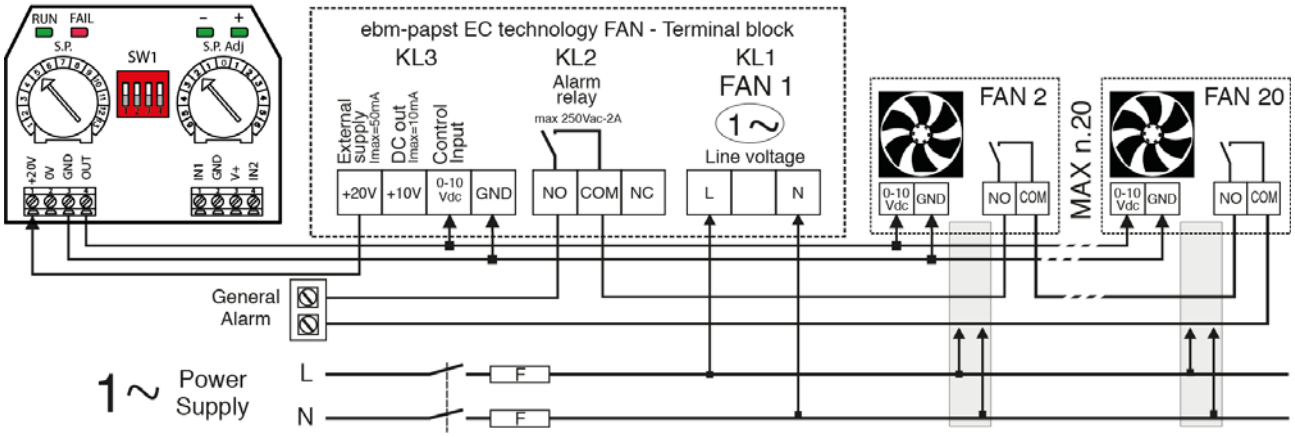
EC-nano with ebm-papst EC fans

Below are shown the connections of EC-nano controller with ebm-papst single and three phase EC fans

EC-nano supplied by three-phase EC fan ebmpapst



EC-nano supplied by single-phase EC fan ebmpapst

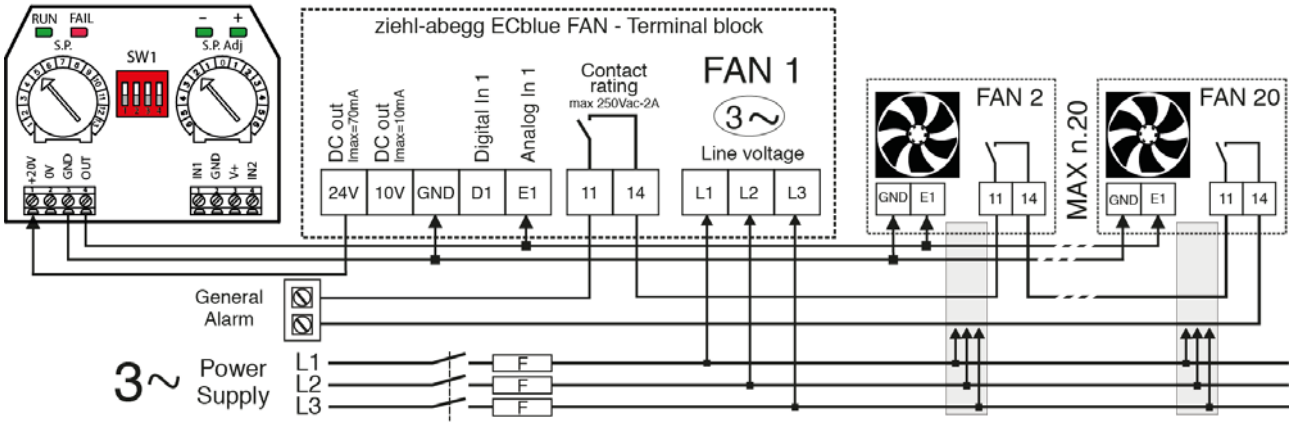


- **Remote Alarm signal:** connect the relays contacts of each fan as shown; in case of failure you have a remote malfunction signal

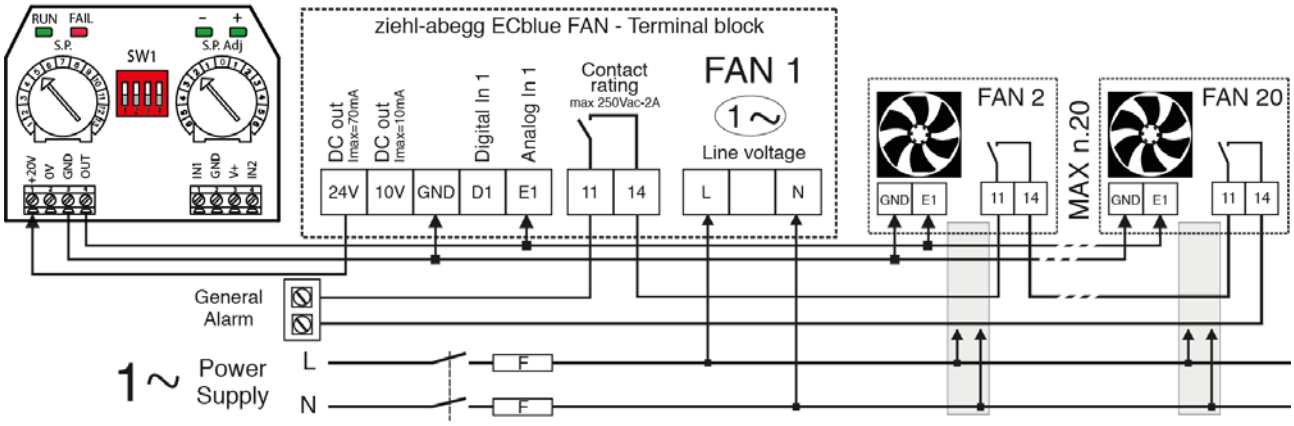
EC-nano with ziehl-abegg EC fans

Below are shown the connections of EC-nano controller with ziehl-abegg single and three phase EC fans

EC-nano supplied by three-phase EC fan ZIEHL-ABEGG



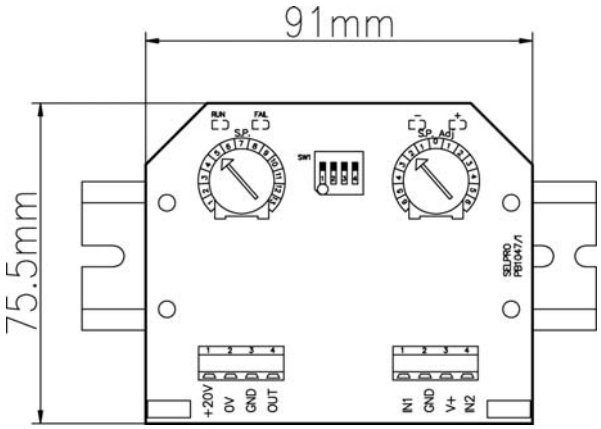
EC-nano supplied by single-phase EC fan ZIEHL-ABEGG

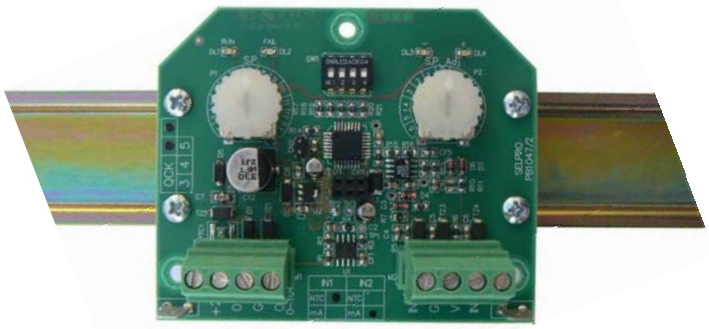


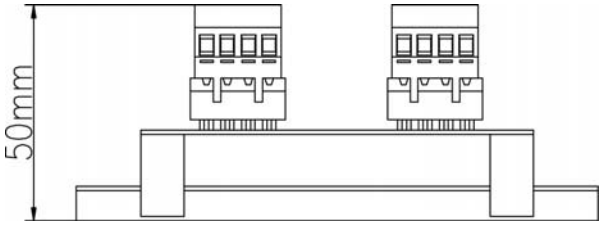
- **Remote Alarm signal:** connect the relays contacts of each fan as shown; in case of failure you have a remote malfunction signal

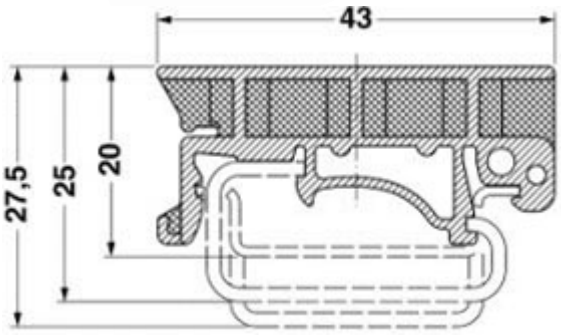
EC-nano supplied by external

For electric board application, the EC-nano is available for DIN rail application.
In this case it's possible to supply the controller with a transformer with 20V (-10/+25%) and 50mA min (70mA with 2 4-20mA transducers).

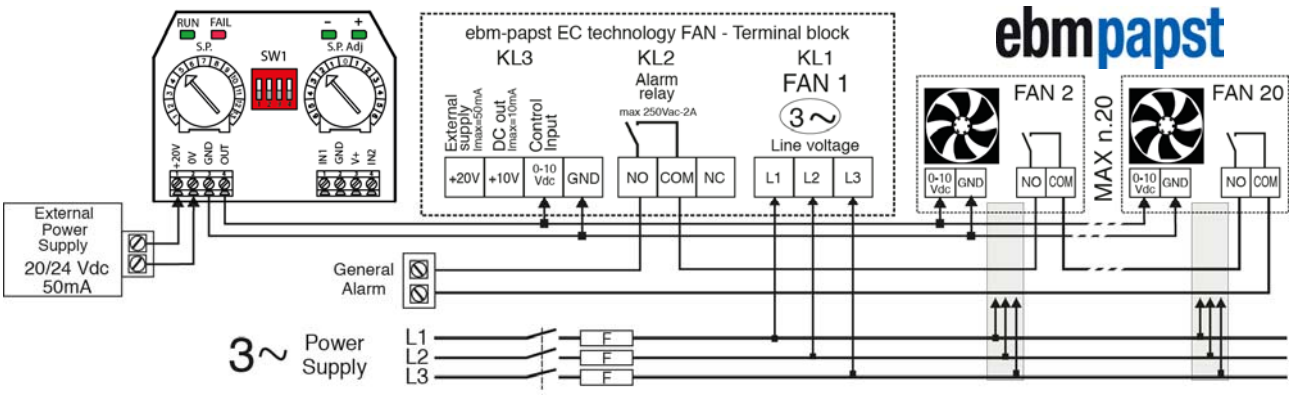






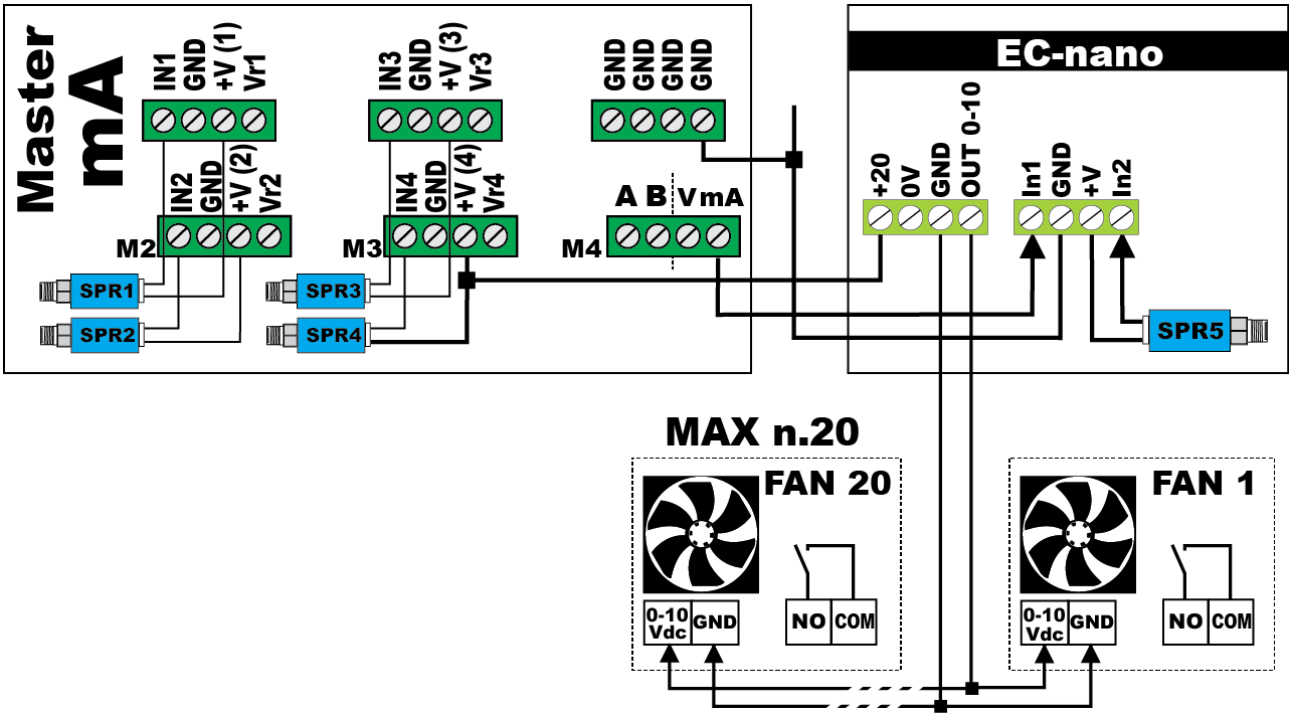


The following is the example of the EC-nano, powered by external transformer, and connected with three-phase ebm-papst EC fans.



EC-nano supplied from the Expansion Inputs Command (MEI-4)

In the case of applications with multiple pressure sensors in current (4-20mA), you can use the expansion module MEI-4, which also can directly supply the EC-nano.
In this case it is necessary to establish the connection as in the drawing below.



Above shows the connection up to a maximum of n.5 transducers (design for EC-nano code version ZD-ECN-120-D1M-BS000).
From the expansion module MEI-4 is supplied (from one of the terminals +V) also the regulator, which provides the regulation of EC fans (max n.20) with the output signal 0(1)-10Vdc.

The ease of installation and use of expansion modules MEI, facilitates the application in machines and circuits that require simultaneous detection of multiple control signals.
Being also individually powered, can be used up to 4 expansion cards MEI, connected in parallel, for a total of 16 inputs.

Attention:

- *To supply the EC-nano, use one of the available n.4 terminals labeled +V*

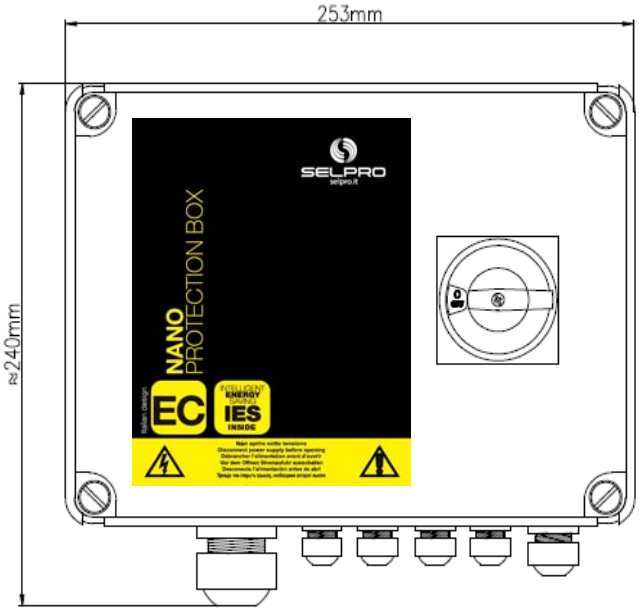
CONNECTION	**Use a shielded flexible cable, nominal section 1,5 mmq / 22-14 AWG Cu**

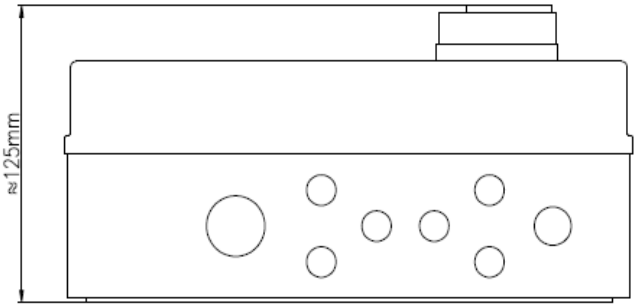
EC-nano inside a complete protection cabinet IP65

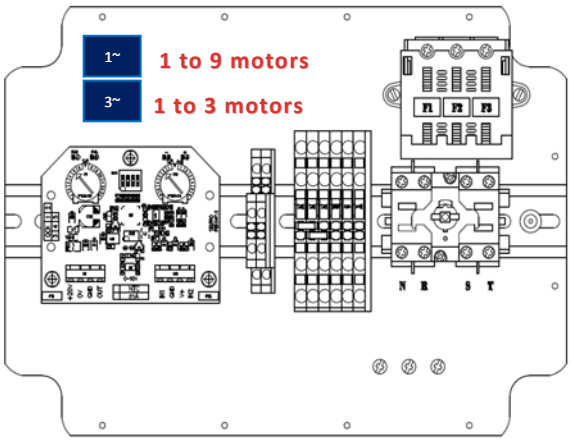
The controller can be supplied into a basic cabinet, complete with:

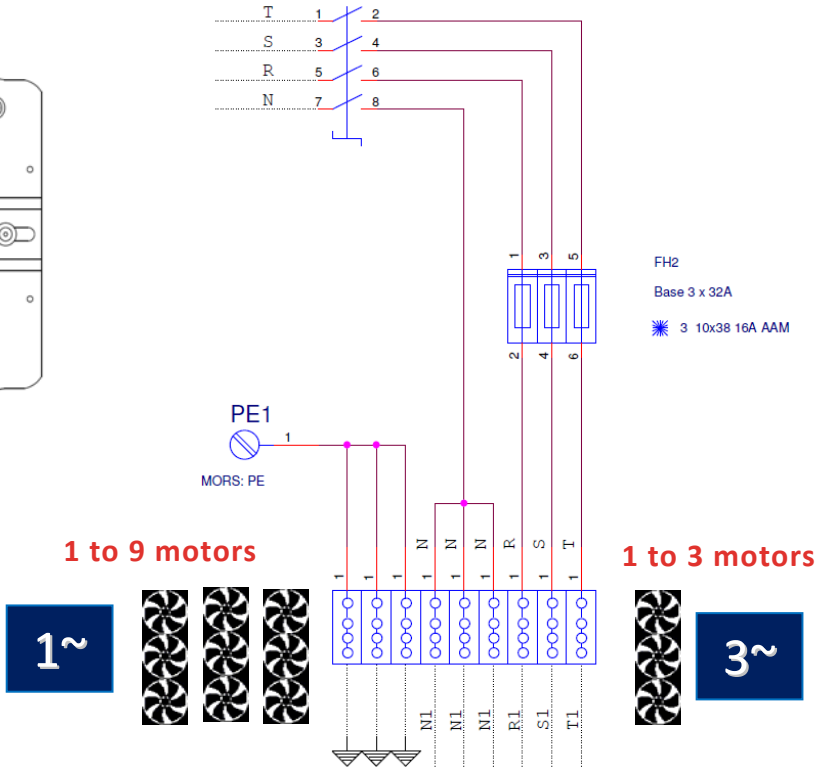
- Power supply switch
- Three-phase protection
- Terminals for the direct connection of:
    - Three-phase EC motors (max. n.3)
    - Single-phase EC motors (max. n.9)

In this cabinet, complete and ready for use, can be used in all solutions for managing pressure (Condensers) and temperature (Dry-Coolers).









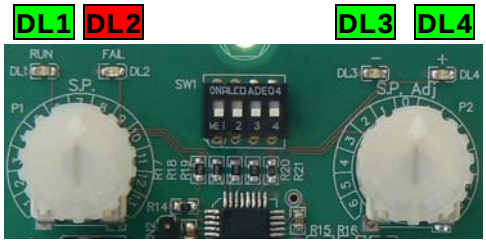
Settings & Controls Tables

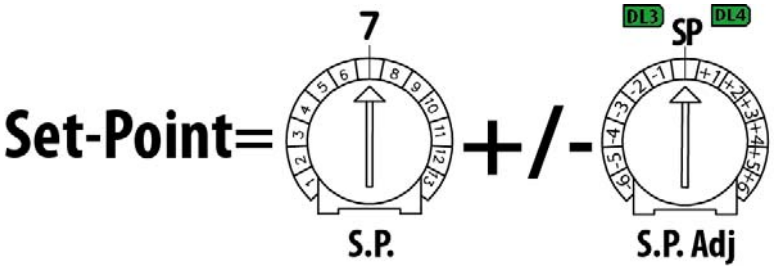
After selecting the operating mode with the DIP switch, you must set the SP (Set-Point) according to the scale of the connected sensor (*).
With transducers 4-20mA, the value of the scale depends on the transducer used; at each step of SP corresponds displacement of 1 mA and the value depends on the conversion (see table).
The value is adjusted by the deviation + / - SP adj.
With the NTC sensor, each step of SP corresponds to 5.0 ° C, while the deviation SP adj is 0.5 ° C.
The Set-Point is therefore sets with the **pair of 13 positions switches**, indicated by:

- **SP** (main point of reference for the adjustment),
- **SP adj.** (fine adjustment of the set-point)

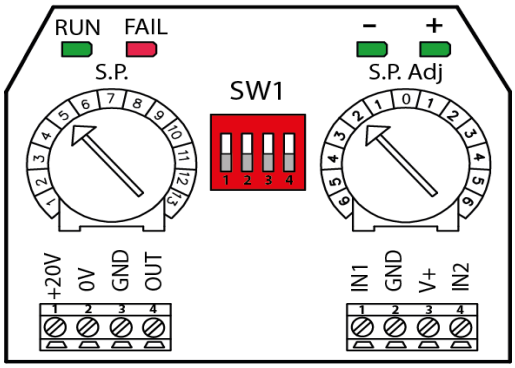
using the tables below for the types of sensors provided.

The two LEDs: **DL3 & DL4**, with proportional flashing indicate whether the input signal is smaller than (DL3) or Superior (DL4) to the SP value.
When the SP and IN values ARE MATCHING, the two LEDs flashing together.



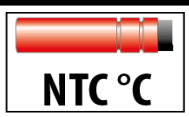


						SCALA (*)					
											
						From SP to -6			From SP to +6		
-6	-5	-4	-3	-2	-1	S.P.	+1	+2	+3	+4	+5	+6



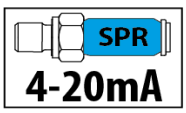
Temperature Transducer

SCALE
0/70°



Pressure Transducer

SCALE
0/45 bar



The following tables are for THE Set-Point setting.
Choose the 4-20mA transducer scale or NTC sensors scale.
Choose the required value in the table: the result of the sum of the position of SP and SP adj.

Scale for mA : 4 – 20 mA
Proportional Band : 2,5 mA (Factory setting)

-SP adj.						4 – 20 mA		+SP adj.					
-6	-5	-4	-3	-2	-1	SP		+1	+2	+3	+4	+5	+6
5,4	5,5	5,6	5,7	5,8	5,9	**1**	6	6,1	6,2	6,3	6,4	6,5	6,6
6,4	6,5	6,6	6,7	6,8	6,9	**2**	7	7,1	7,2	7,3	7,4	7,5	7,6
7,4	7,5	7,6	7,7	7,8	7,9	**3**	8	8,1	8,2	8,3	8,4	8,5	8,6
8,4	8,5	8,6	8,7	8,8	8,9	**4**	9	9,1	9,2	9,3	9,4	9,5	9,6
9,4	9,5	9,6	9,7	9,8	9,9	**5**	10	10,1	10,2	10,3	10,4	10,5	10,6
10,4	10,5	10,6	10,7	10,8	10,9	**6**	11	11,1	11,2	11,3	11,4	11,5	11,6
11,4	11,5	11,6	11,7	11,8	11,9	**7**	**12**	12,1	12,2	12,3	12,4	12,5	12,6
12,4	12,5	12,6	12,7	12,8	12,9	**8**	13	13,1	13,2	13,3	13,4	13,5	13,6
13,4	13,5	13,6	13,7	13,8	13,9	**9**	14	14,1	14,2	14,3	14,4	14,5	14,6
14,4	14,5	14,6	14,7	14,8	14,9	**10**	15	15,1	15,2	15,3	15,4	15,5	15,6
15,4	15,5	15,6	15,7	15,8	15,9	**11**	16	16,1	16,2	16,3	16,4	16,5	16,6
16,4	16,5	16,6	16,7	16,8	16,9	**12**	17	17,1	17,2	17,3	17,4	17,5	17,6
17,4	17,5	17,6	17,7	17,8	17,9	**13**	18	18,1	18,2	18,3	18,4	18,5	18,6

Scale for bar (4-20mA) : 0 – 15 bar (conversion 1,0 mA= 0,937 bar)
Proportional Band : 2,4 bar (Factory setting)

-SP adj.						0 – 15 bar		+SP adj.					
-6	-5	-4	-3	-2	-1	SP		+1	+2	+3	+4	+5	+6
1,28	1,38	1,48	1,58	1,68	1,78	**1**	1,88	1,98	2,08	2,18	2,28	2,38	2,48
2,21	2,31	2,41	2,51	2,61	2,71	**2**	2,81	2,91	3,01	3,11	3,21	3,31	3,41
3,15	3,25	3,35	3,45	3,55	3,65	**3**	3,75	3,85	3,95	4,05	4,15	4,25	4,35
4,09	4,19	4,29	4,39	4,49	4,59	**4**	4,69	4,79	4,89	4,99	5,09	5,19	5,29
5,03	5,13	5,23	5,33	5,43	5,53	**5**	5,63	5,73	5,83	5,93	6,03	6,13	6,23
5,96	6,06	6,16	6,26	6,36	6,46	**6**	6,56	6,66	6,76	6,86	6,96	7,06	7,16
6,90	7,00	7,10	7,20	7,30	7,40	**7**	**7,50**	7,60	7,70	7,80	7,90	8,00	8,10
7,84	7,94	8,04	8,14	8,24	8,34	**8**	8,44	8,54	8,64	8,74	8,84	8,94	9,04
8,78	8,88	8,98	9,08	9,18	9,28	**9**	9,38	9,48	9,58	9,68	9,78	9,88	9,98
9,71	9,81	9,91	10,01	10,11	10,21	**10**	10,31	10,41	10,51	10,61	10,71	10,81	10,91
10,65	10,75	10,85	10,95	11,05	11,15	**11**	11,25	11,35	11,45	11,55	11,65	11,75	11,85
11,59	11,69	11,79	11,89	11,99	12,09	**12**	12,19	12,29	12,39	12,49	12,59	12,69	12,79
12,53	12,63	12,73	12,83	12,93	13,03	**13**	13,13	13,23	13,33	13,43	13,53	13,63	13,73

Scale for bar (4-20mA) : 0 – 25 bar (conversion 1,0 mA= 1,562 bar)
Proportional Band : 3,9 bar (Factory setting)

-SP adj.						0 – 25 bar		+SP adj.					
-6	-5	-4	-3	-2	-1	SP		+1	+2	+3	+4	+5	+6
2,53	2,63	2,73	2,83	2,93	3,03	1	3,13	3,23	3,33	3,43	3,53	3,63	3,73
4,09	4,19	4,29	4,39	4,49	4,59	2	4,69	4,79	4,89	4,99	5,09	5,19	5,29
5,65	5,75	5,85	5,95	6,05	6,15	3	6,25	6,35	6,45	6,55	6,65	6,75	6,85
7,21	7,31	7,41	7,51	7,61	7,71	4	7,81	7,91	8,01	8,11	8,21	8,31	8,41
8,78	8,88	8,98	9,08	9,18	9,28	5	9,38	9,48	9,58	9,68	9,78	9,88	9,98
10,34	10,44	10,54	10,64	10,74	10,84	6	10,94	11,04	11,14	11,24	11,34	11,44	11,54
11,90	12,00	12,10	12,20	12,30	12,40	**7**	**12,50**	12,60	12,70	12,80	12,90	13,00	13,10
13,46	13,56	13,66	13,76	13,86	13,96	8	14,06	14,16	14,26	14,36	14,46	14,56	14,66
15,03	15,13	15,23	15,33	15,43	15,53	9	15,63	15,73	15,83	15,93	16,03	16,13	16,23
16,59	16,69	16,79	16,89	16,99	17,09	10	17,19	17,29	17,39	17,49	17,59	17,69	17,79
18,15	18,25	18,35	18,45	18,55	18,65	11	18,75	18,85	18,95	19,05	19,15	19,25	19,35
19,71	19,81	19,91	20,01	20,11	20,21	12	20,31	20,41	20,51	20,61	20,71	20,81	20,91
21,28	21,38	21,48	21,58	21,68	21,78	13	21,88	21,98	22,08	22,18	22,28	22,38	22,48

Scala for bar (4-20mA): 0 – 30 bar (conversion 1,0 mA= 1,875 bar)
Proportional Band : 4,7 bar (Factory setting)

-SP adj.						0 – 30 bar		+SP adj.					
-6	-5	-4	-3	-2	-1	SP		+1	+2	+3	+4	+5	+6
3,15	3,25	3,35	3,45	3,55	3,65	1	3,75	3,85	3,95	4,05	4,15	4,25	4,35
5,03	5,13	5,23	5,33	5,43	5,53	2	5,63	5,73	5,83	5,93	6,03	6,13	6,23
6,90	7,00	7,10	7,20	7,30	7,40	3	7,50	7,60	7,70	7,80	7,90	8,00	8,10
8,78	8,88	8,98	9,08	9,18	9,28	4	9,38	9,48	9,58	9,68	9,78	9,88	9,98
10,65	10,75	10,85	10,95	11,05	11,15	5	11,25	11,35	11,45	11,55	11,65	11,75	11,85
12,53	12,63	12,73	12,83	12,93	13,03	6	13,13	13,23	13,33	13,43	13,53	13,63	13,73
14,40	14,50	14,60	14,70	14,80	14,90	**7**	**15,00**	15,10	15,20	15,30	15,40	15,50	15,60
16,28	16,38	16,48	16,58	16,68	16,78	8	16,88	16,98	17,08	17,18	17,28	17,38	17,48
18,15	18,25	18,35	18,45	18,55	18,65	9	18,75	18,85	18,95	19,05	19,15	19,25	19,35
20,03	20,13	20,23	20,33	20,43	20,53	10	20,63	20,73	20,83	20,93	21,03	21,13	21,23
21,90	22,00	22,10	22,20	22,30	22,40	11	22,50	22,60	22,70	22,80	22,90	23,00	23,10
23,78	23,88	23,98	24,08	24,18	24,28	12	24,38	24,48	24,58	24,68	24,78	24,88	24,98
25,65	25,75	25,85	25,95	26,05	26,15	13	26,25	26,35	26,45	26,55	26,65	26,75	26,85

Scala for bar (4-20mA) : 0 – 45 bar (conversion 1,0 mA= 2,812 bar)
Proportional Band : 7,0 bar (Factory setting)

-SP adj.						0 – 45 bar		+SP adj.					
-6	-5	-4	-3	-2	-1	SP		+1	+2	+3	+4	+5	+6
5,03	5,13	5,23	5,33	5,43	5,53	1	5,63	5,73	5,83	5,93	6,03	6,13	6,23
7,84	7,94	8,04	8,14	8,24	8,34	2	8,44	8,54	8,64	8,74	8,84	8,94	9,04
10,65	10,75	10,85	10,95	11,05	11,15	3	11,25	11,35	11,45	11,55	11,65	11,75	11,85
13,46	13,56	13,66	13,76	13,86	13,96	4	14,06	14,16	14,26	14,36	14,46	14,56	14,66
16,28	16,38	16,48	16,58	16,68	16,78	5	16,88	16,98	17,08	17,18	17,28	17,38	17,48
19,09	19,19	19,29	19,39	19,49	19,59	6	19,69	19,79	19,89	19,99	20,09	20,19	20,29
21,90	22,00	22,10	22,20	22,30	22,40	7	22,50	22,60	22,70	22,80	22,90	23,00	23,10
24,71	24,81	24,91	25,01	25,11	25,21	8	25,31	25,41	25,51	25,61	25,71	25,81	25,91
27,53	27,63	27,73	27,83	27,93	28,03	9	28,13	28,23	28,33	28,43	28,53	28,63	28,73
30,34	30,44	30,54	30,64	30,74	30,84	10	30,94	31,04	31,14	31,24	31,34	31,44	31,54
33,15	33,25	33,35	33,45	33,55	33,65	11	33,75	33,85	33,95	34,05	34,15	34,25	34,35
35,96	36,06	36,16	36,26	36,36	36,46	12	36,56	36,66	36,76	36,86	36,96	37,06	37,16
38,78	38,88	38,98	39,08	39,18	39,28	13	39,38	39,48	39,58	39,68	39,78	39,88	39,98

Scale for °C (NTC) : 5 – 65 °C
Proportional Band : 7,0 °C (Factory setting)

-SP adj.						5 – 65 °C		+SP adj.					
-6	-5	-4	-3	-2	-1	SP		+1	+2	+3	+4	+5	+6
2,0	2,5	3,0	3,5	4,0	4,5	1	5	5,5	6,0	6,5	7,0	7,5	8,0
7,0	7,5	8,0	8,5	9,0	9,5	2	10	10,5	11,0	11,5	12,0	12,5	13,0
12,0	12,5	13,0	13,5	14,0	14,5	3	15	15,5	16,0	16,5	17,0	17,5	18,0
17,0	17,5	18,0	18,5	19,0	19,5	4	20	20,5	21,0	21,5	22,0	22,5	23,0
22,0	22,5	23,0	23,5	24,0	24,5	5	25	25,5	26,0	26,5	27,0	27,5	28,0
27,0	27,5	28,0	28,5	29,0	29,5	6	30	30,5	31,0	31,5	32,0	32,5	33,0
32,0	32,5	33,0	33,5	34,0	34,5	7	35	35,5	36,0	36,5	37,0	37,5	38,0
37,0	37,5	38,0	38,5	39,0	39,5	8	40	40,5	41,0	41,5	42,0	42,5	43,0
42,0	42,5	43,0	43,5	44,0	44,5	9	45	45,5	46,0	46,5	47,0	47,5	48,0
47,0	47,5	48,0	48,5	49,0	49,5	10	50	50,5	51,0	51,5	52,0	52,5	53,0
52,0	52,5	53,0	53,5	54,0	54,5	11	55	55,5	56,0	56,5	57,0	57,5	58,0
57,0	57,5	58,0	58,5	59,0	59,5	12	60	60,5	61,0	61,5	62,0	62,5	63,0
62,0	62,5	63,0	63,5	64,0	64,5	13	65	65,5	66,0	66,5	67,0	67,5	68,0

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