

D1-15P Manual

Analog Module D1-15P
User Manual

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1 Installation

- 1.1 Checking the package
- 1.2 Dimensions
- 1.3 Method of attachment
- 1.4 Physical Description of the module
- 1.5 Supply
- 1.6 Inputs
 - 1.6.1 Analog inputs for Pt100 probes
- 1.7 Serial communication
 - 1.7.1 Serial link
 - 1.7.2 Communication Protocol
 - 1.7.3 Identification
 - 1.7.4 Connection cable
- 1.8 Earth wiring and shielding
 - 1.8.1 Grounding
 - 1.8.2 Connecting Pt100 probes

2 Operation

- 2.1 Application

A List of ports

1 Installation

1. 1 Check the Box

Before installing, verify that the contents of the package conforms to your requirement. Inside the package are:

- No. 1 D1-15P
- n ° 1 instruction manual

Check that the model number corresponds to the number ordered and the manual edition corresponding to the year of purchase.

The models are:

D1-15P 6 inputs Pt100 two-or three-wire with automatic compensation of cable resistance.

The inputs for Pt100 probes have the following characteristics:

- Temperature range: -199.9 to +500.0 ° C (standard model)
- Accuracy: ± 0.05% full scale
- Resolution: 15 bits
- Max resistance connection cables: 20 ohm

The D1 series modules are covered by a one year warranty except for damages caused by tampering or wrong wiring.

For the purchase date The label on the back of the modules.

1. 2 Dimensions

The dimensions of the modules D1-15P are shown in figure 1 .1.

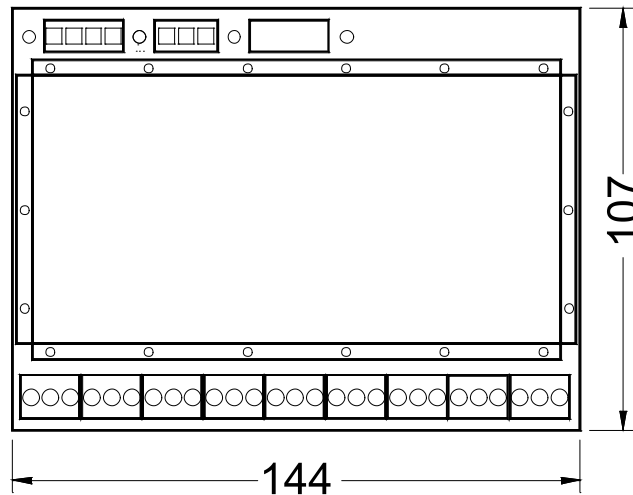


Figure 1. 1 - Size of D1-15P

1. 3 Method of attachment

All products in the D1 series are equipped with a plastic holder for fixing on rail DIN EN normalized by a shielding screen-printed.

On the cover there are schematic mounting indications; gray areas are shown in the interface circuits inside the module, in yellow the sensors and actuators used to be connected externally.

The cover serigraph provides only a general wiring diagram and can not show all the possible connection cases, it is therefore necessary, before activating the module, carefully read this manual.

Do not exert excessive pressure on the cover and remove the module from the rail. Also remember to do these operations with power off.

1. 4 Physical module description

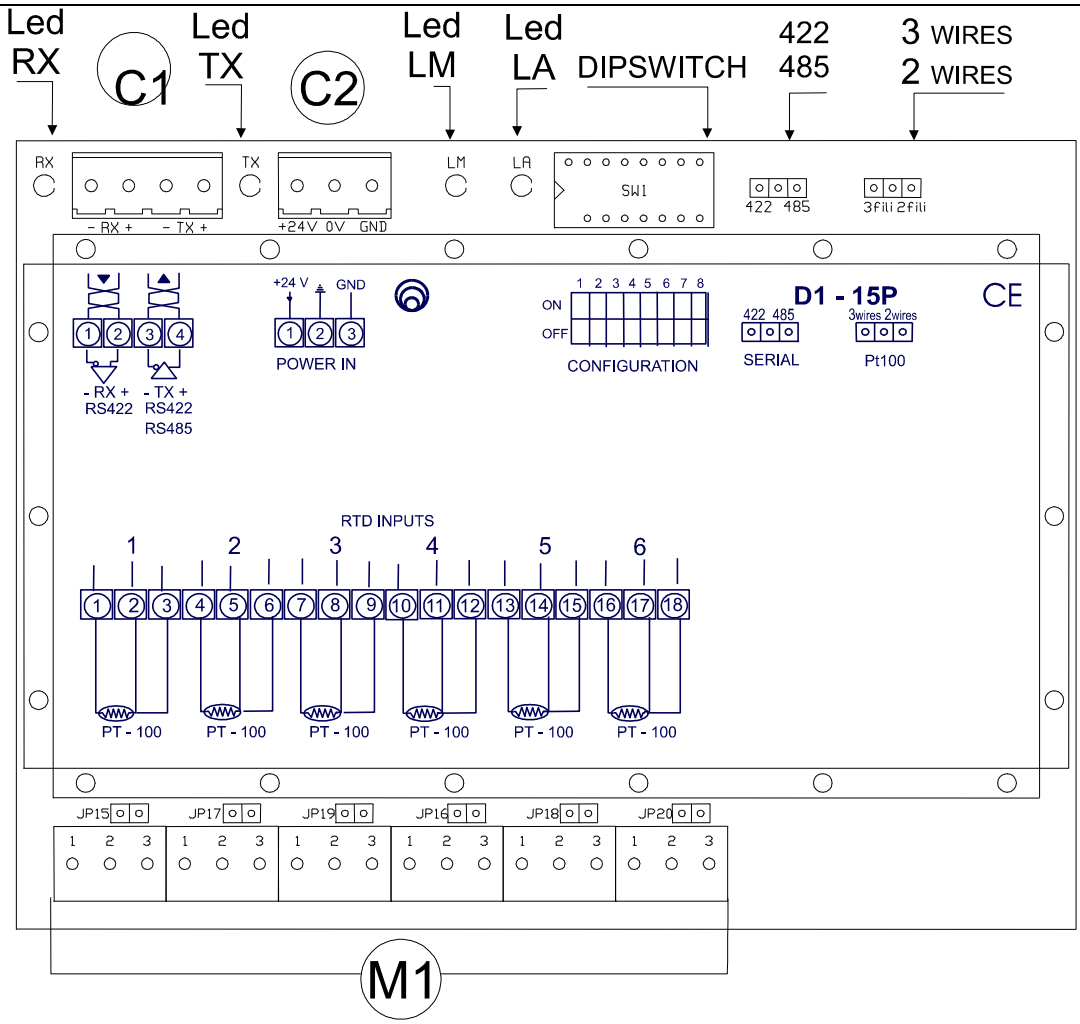


Figure 1.2 - Diagram D1-15P

	Description
[C1]	Connector for connecting serial RS422/485
[C2]	+24 Vdc power connector
[M1]	Terminal inputs Pt100 probes
DIPSW	Selection dipswitch and device address of the communication protocol
Led LA	Supply led
Led LM	Led by self-
Led TX	Led data transmitted over the serial
RX LED	Led Received data
422485	Jumper selection for RS422 or RS485 line
3/2	Jumper for Pt100 3 (with automatic compensation of line resistance) or 2-wire
WIRES	

[C1] - Connector for connecting serial RS422/485

	RS422		RS485
1	RX-	1	NC
2	RX +	2	NC
3	TX-	3	TX-/RX-
4	TX +	4	TX + / RX +

[C2] - Connector for power supply 24 VDC

	ALIM
1	+24 VDC
2	FIELD GND
3	MECH.GND

1. 5 Power Supply

The module must be supplied with a DC power supply 24 V DC (18V <Vcc<36V) via the [C2] and absorb a maximum current $I_{cc} = 70 \text{ mA}$ at 24 Vdc.

The negative power supply must be connected to pin 2 of [C2].

After supplying the power, check that the LA led is lit.

1. 6 Inputs

1. 6 .1 Analog inputs for Pt100 probes

For the D1-15P series modules can be connected sensors Pt100 2 or 3 wires.

CAUTION:Make sure that the sensors used correspond to IEC 751. In the choice of the sensor to verify that the wires that depart from the sensor is electrically isolated from the metal of the sensor itself. Leakage currents to the housing of the sensor may affect the accuracy of the reading. Pt100 sensors can be 2 or 3-wire, for connection see Figure 1 .3.

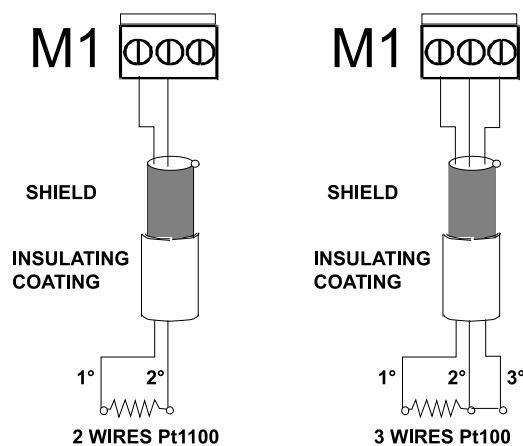
Figure 1 .3 - Connection 3-wire PT100

The choice of the type of sensor is performed by placing the appropriate jumper on the left (3-wire) or right (2-wire)

The total loop resistance of the connecting cable must be less than 20 ohm (measurement taken between terminal arrival and departure of the loop with the Pt100 short-circuited).

We recommend the use of a cable, twisted pair (the first wire must be twisted with the second) with shielding and insulation fire retardant.

Do not connect the wires Pt100 through individual not belonging to the same cable, the resistance of the wire round (first wire connected to the first terminal of the triad) must be equal to the resistance of the return wire (second wire connected to the second terminal of the triad).



1. 7 Serial communication

1. 7. 1 Serial connection

To connect to D1 modules, you must use the serial interface RS422/485 that usually are not standard equipment in personal computers. As an alternative to serial cards internal converters can be used for external serial interface.

SIELCO produces C1-25 model, a serial interface converter RS232-RS422/485 with triple optical isolation. To use it you simply connect it by cable to the RS232 serial port of the PC (COM) and connect it to the [C1] D1-15 according to Table 1 .1.

C1-25			D1-15P		
N^o	RS-422		RS-422	N^o	
1	GND	→ — ←	GND	2	C2
2	RX-	→ — ←	TX-	3	C1
3	RX +	→ — ←	TX +	4	C1
4	TX-	→ — ←	RX-	1	C1
5	TX +	→ — ←	RX +	2	C1
6	0 V				
7	+24 V				

C1-25			D1-15P		
N^o	RS-485		RS-485	N^o	
1	GND	→ — ←	GND	2	C2
2	nc		nc	1	C1
3	nc		nc	2	C1
4	TX-/RX-	→ — ←	TX-/RX-	3	C1
5	TX + / RX +	→ — ←	TX + / RX +	4	C1
6	0 V				
7	+24 V				

Table 1. 1 - Connecting C1-25 - D1-15 (RS 422/485)

The modules D1-15P are provided with configurable serial interface RS422/485, normally configured as RS485. To change the configuration, you simply move the jumper 422/485 in the top left corner on the card.

1. 7. 2 Communication Protocol

The communication protocol software is realized according to Modbus ASCII or RTU: protocol selection is via the selector of dipswitch n^o 2 (RTU = ON, OFF = ASCII).

The baud rate selection is made by the # 1 selector dip switch (ON = 19200, 9600 = OFF).

ASCII protocol

Baud rate	9600/19200
Data bits	7
Parity bit	even
Stop bit	1

RTU protocol features

Baud rate 9600/19200
 Data bits 8
 Parity bit none
 Stop bit 1

NOTE

Power on, the module waits for about 4 seconds to communicate.

1. 7. 3 Identification

The device may be assigned an identification address between 1 and 63, specified, according to the binary notation, using selector from 3 to 8 of dipswitch (Table 1 .2).

		ADDRESS							
		1	2	3	4	5	6	7	8
		<i>BAUD</i>	<i>PROT.</i>	2^5	2^4	2^3	2^2	2^1	2^0
ON	19200	RTU							
OFF	9600	ASCII							

Table 1. 2 - configuration using dipswitch

NOTES

The address 0 is reserved.

1. 7. 4 connection cable

Use a shielded cable with one (RS-485) or two (RS-422) twisted pair in compliance with EIA RS-485, EIA RS-422, using the shield for ground.

Cable Type: *Belden 9841 (RS-485), 9842 (RS-422)*

Maximum attenuation of line: *6 dB*

Maximum capacity of line: *100 nf*

Maximum length: *1200 m*

Line Impedance: *between 100 and 120 ohms*

1. 8 Earth wiring and shielding

1. 8. 1 Grounding

For correct operation it is advisable to make the following ground:

- the mechanical ground (pin # 3 of connector [C2]) goes directly to the ground;

- the negative power supply (pin # 2 of connector [C2]) must be connected to a local earth.

It is important that the masses are brought to the ground in an independent manner and in any case is to avoid the sharing of ground with power devices.

1. 8. 2 Connecting Pt100 probes

The temperature reading is entrusted to the detection of signals from Pt100, of low intensity. Eddy currents on the shields can induce disturbances that sensor reading.

Follow these shielding rules particularly in disturbed environments by power devices (driver for dc motors, power contact, etc.).

- use shielded and twisted cables for connection with Pt100;
- always keep the connection cables as short as possible;
- it is preferable to carry out a separate channel between Pt100 signals and signal conductors power;
- connect all cable metal shields connection with Pt100 upon arrival on the form, leaving disconnected departing on Pt100;
- Connect all shields to pin # 3 of connector [C2].
-

1.8.3 Choice of sensor PT-100

The D1-15P has a jumper for configuring the input channels 3-wire PT100 or 2 wires.

The configuration applies to all 6 channels.

- In the 3-wire configuration , The module autonomously performs two readings 1st - 2nd line and 1st - 3rd wire. Then calculates the resistance of the line (in the hypothesis that the resistance of the Wire way: 1st wire is equal to resistance of the return wire: 2nd wire), performs the compensation and returns the value of the temperature in numerical data Modbus to the supervisor.

- In the 2-wire configuration, the module reads $1^\circ - 2^\circ$ and returns the temperature to the supervisor increased of the share due to line resistance , The compensation must be carried out in software at supervisor or HMI level for each channel, knowing what is the error due to line resistance, (which is a constant and that will be subtracted from all measurements made).The

advantage of this last solution is that it is possible to employ a sensor PT 100 of lower cost for the same quality and that it simplifies the plant wiring ..

2 OPERATION

2. 1 Application

The D1-15P is equipped with 6 input channels for the detection of temperatures

The temperatures are measured by Pt100 2 or 3-wire with automatic compensation of the resistance of the connecting cable, the temperature values are recorded in tenths of a degree on a scale from -2000 to +4000, eg., The value 275 indicates a temperature of 27.5 ° C. The recorded values are made available through the doors numeric reading T1, T2, T3, T4, T5 and T6

The ports of error signal the presence of an alarm in the reading of the input signals and in case of error Pt100 proceed disconnecting the Pt100 and verifying that there is not some short to ground.

The door "number of restart" is only for diagnostic use and gives an indication of the presence of electrical noise.

A List of ports

A. 1 Numeric gates (Holding Registers)

FunctionalDoors

Address	Description	ID	Byte	Limits	R / W
00	Restartnumber	Rs	1	0: 255	R / W
01	Pt100 temperature 1	T1	2	-2000: +4000	R
02	Temperature Pt100 2	T2	2	-2000: +4000	R
03	Temperature Pt100 3	T3	2	-2000: +4000	R
04	Temperature Pt100 4	T4	2	-2000: +4000	R
05	Pt100 temperature 5	T5	2	-2000: +4000	R
06	Pt100 Temperature 6	T6	2	-2000: +4000	R
07	Errors Pt100	eT	2	00h: 1FFh	R

Diagnosticport (port 7, 2 bytes)

Errors Pt100 - eT	
(For each bit: 0 = OK / KO = 1)	
bit 0	low sample
bit 1	high sample
bit 2	numerical Pt100 resistance 1
bit 3	numerical line Pt100 1
bit 4	numericalstrength Pt100 2
bit 5	numerical line Pt100 2
bit 6	numericalstrength Pt100 3
bit 7	numerical line Pt100 3
8-bit	numericalstrength Pt100 4
bit 9	numerical line Pt100 4
10-bit	numericalstrength Pt100 # 5
11-bit	numerical line Pt100 # 5
12-bit	numerical Pt100 resistance 6
13-bit	numerical line 6 Pt100

Note: An error in the bit 0 or bit 1 indicates a fault in the device.
An error in bits 2 ... 13 may be due to failures of sensors PT100, or interconnection with sensors.