
Analog Module D1-15A

User Manual

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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 D1-15A
- 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:

D1-15A 6 analog inputs can be configured independently in current (0-20mA) or voltage (0-10V).

The analog inputs have the following characteristics:

- Accuracy: $\pm 0.05\%$ full scale
- Resolution: 15 bits
- Input impedance (0-20 mA): 249 ohms

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 D1-15A are shown in figure 1 .1.

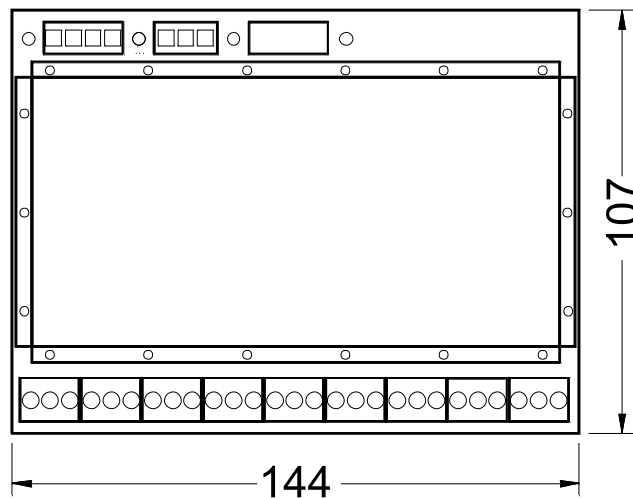


Figure 1. 1 - Size of module D1-15A

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

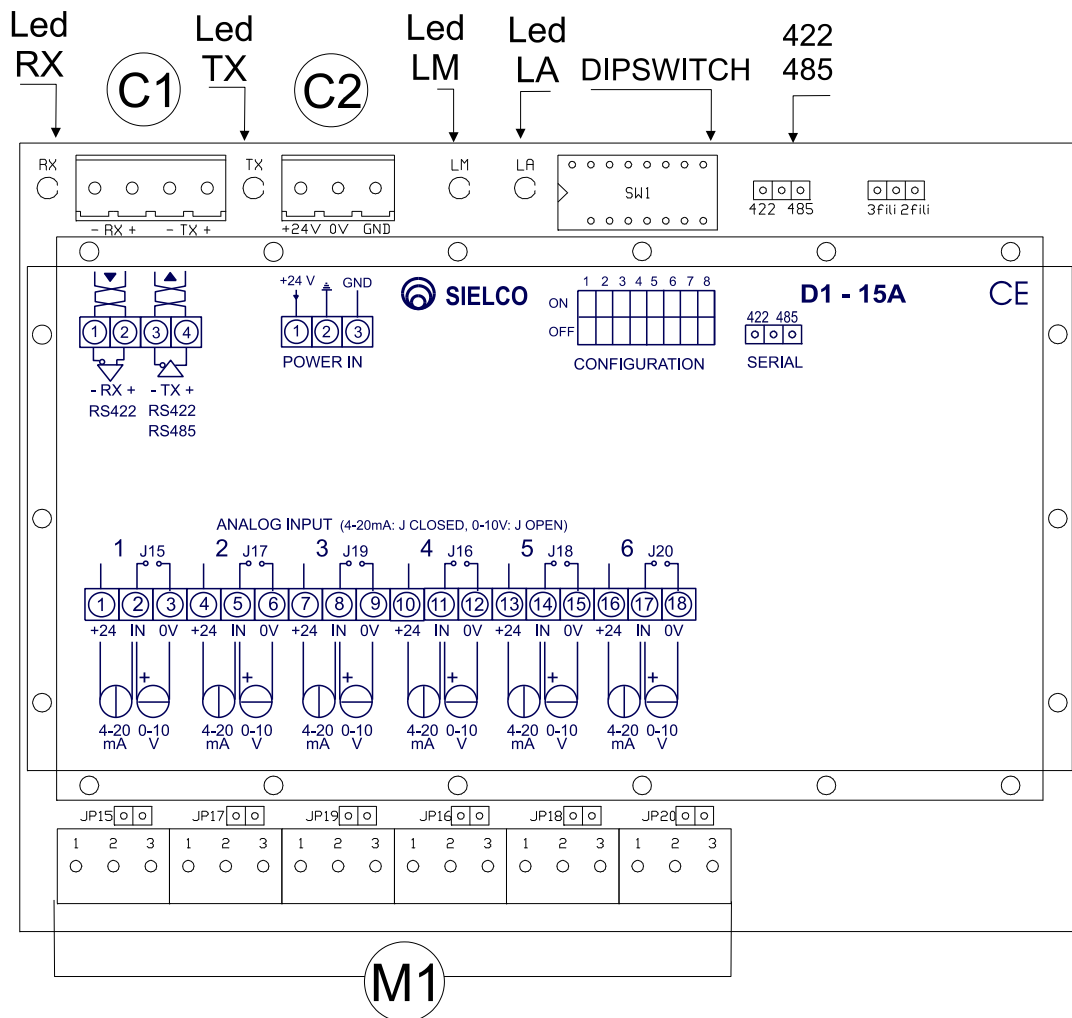


Figure 1. 2 - Diagram D1-15A

| | Description |
|---------------|--|
| [C1] | Connector for connecting serial RS422/485 |
| [C2] | +24 Vdc power connector |
| [M1] | Terminal analog inputs |
| 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 |

[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 <V_{cc} <36V) via the [C2] and absorb a maximum current I_{cc} = 70 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 a linear transducers

For the D1-15A Series modules can be connected sensors 0-10 V or 0-20mA/4-20mA. The inputs can be configured for voltage or current using independently jumper from J15 to J20 (closed in case of current input).

For a connection with transducers with 0-10 V output, connect the positive terminal of the sensor to pin named IN and the negative to the named 0V, as shown in Figure 1 .3.

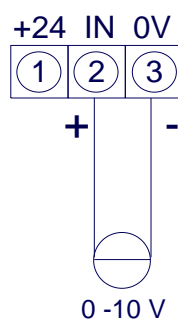


Figure 1. 3 - Connection with sensors linearized 0-10V

For connecting current transducers is necessary to distinguish two cases:

- A) sensors powered by D1-15A, power to the sensor via pin +24 V terminal and connect the signal to the IN pin (fig. 1 .4 A);
- B) powered sensors externally powering the sensor via an external power supply and connect its negative to pin the terminal marked 0V. Connect the signal to the IN pin (fig. 1 .4 B).

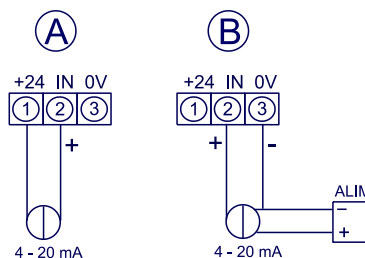


Figure 1. 4 - Connection with sensors linearized 0-20 mA / 4-20mA powered from the module D1-15A (case A) or from an external power supply (case B)

In case of complaints, it may be a good idea to use shielded cable and connect the shield to pin terminal called 0V.

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.

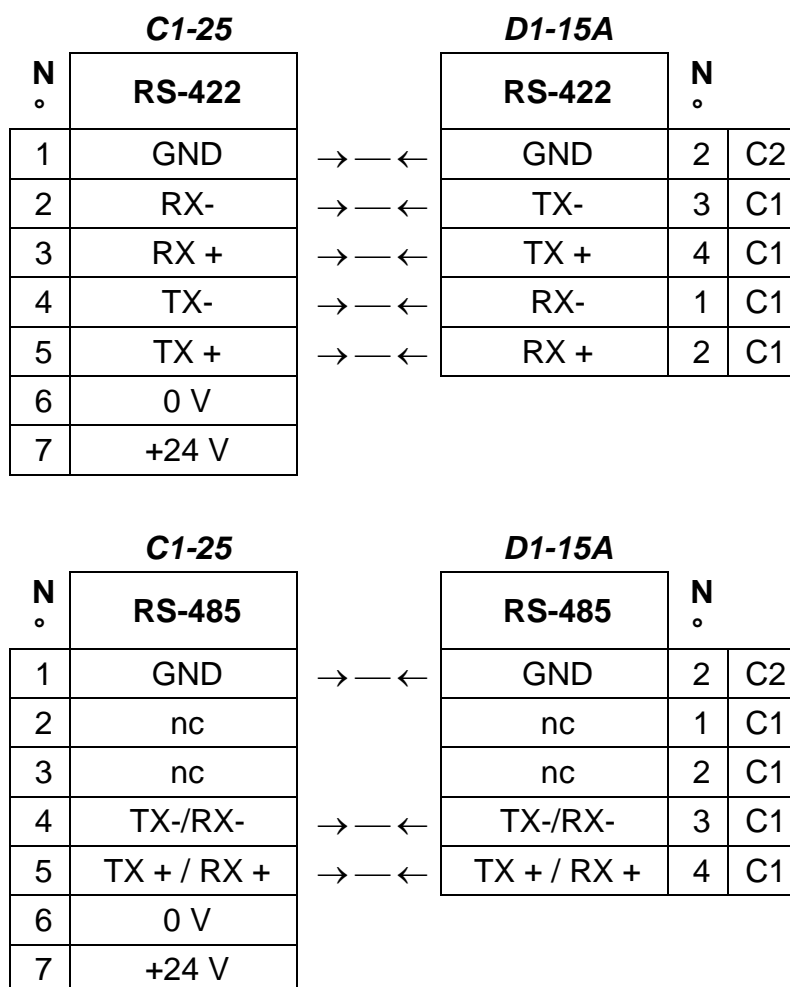


Table 1. 1 - Connecting C1-25 - D1-15 (RS 422/485)

The modules D1-15A 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 ° 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 'important that the masses are brought to the ground in an independent manner and in any case is to avoid the sharing of traits grounding with power devices.

1. 8. 2 Connecting transducers linearized

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 of the sensors;
- always keep the connection cables as short as possible;
- it is preferable to carry out a separate channel between analog signals and signal conductors power;
- connect all cable metal shields the sensor to pin # 3 of connector [C2]

2 Operation

2. 1 Application

The D1-15A is equipped with 6-channel analog

The analog signals may be in voltage (0-10 V) or current (0-20 mA), in the first case the value is recorded on a scale from 0 to 10000; eg. the value 7500 indicates 7,500 Volt (ports V1, ..., V6). In the case of the current input value is recorded on a scale from 0 to 20000 and eg. the value of 12000 indicates 12,000 mA (ports A1, ..., A6). The numerical values are available through the numeric reading gates N1, ..., N6. The ports of error signal the presence of an alarm in the reading of the input signals

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)

Functional doors

| Address | Description | ID | Byte | Limits | R / W |
|---------|--|----|------|----------|-------|
| 00 | Restart number | Rs | 1 | 0: 255 | R / W |
| 08 | Numerical value of channel n ° .1 | N1 | 2 | | R |
| 09 | Numerical value of channel n ° .2 | N2 | 2 | 0-32767 | R |
| 10 | Numerical value of channel n ° .3 | N3 | 2 | 0-32767 | R |
| 11 | Numerical value of channel n ° .4 | N4 | 2 | 0-32767 | R |
| 12 | Numerical value of channel n ° .5 | N5 | 2 | 0-32767 | R |
| 13 | Numerical value of channel n ° .6 | N6 | 2 | 0-32767 | R |
| 14 | Voltage value (mV) channel No. 1 | V1 | 2 | 0-10000 | R |
| 15 | Voltage value (mV) channel n ° 2 | V2 | 2 | 0-10000 | R |
| 16 | Voltage value (mV) channel n ° 3 | V3 | 2 | 0-10000 | R |
| 17 | Voltage value (mV) channel n ° 4 | V4 | 2 | 0-10000 | R |
| 18 | Voltage value (mV) channel n ° 5 | V5 | 2 | 0-10000 | R |
| 19 | Voltage value (mV) channel n ° 6 | V6 | 2 | 0-10000 | R |
| 20 | Current value μ (A) channel No. 1 | C1 | 2 | 0-20000 | R |
| 21 | Current value μ (A) channel n ° 2 | C2 | 2 | 0-20000 | R |
| 22 | Current value μ (A) channel n ° 3 | C3 | 2 | 0-20000 | R |
| 23 | Current value μ (A) channel n ° 4 | C4 | 2 | 0-20000 | R |
| 24 | Current value μ (A) channel n ° 5 | C5 | 2 | 0-20000 | R |
| 25 | Current value μ (A) channel n ° 6 | C6 | 2 | 0-20000 | R |
| 25 | Errors analog | eA | 1 | 00h: FFh | R |

Note: Port 0 indicates errors attributable to the environment disturbed.

Diagnostic port (port 25)

| Errors analog - eA (For each bit: 0 = OK / KO = 1) | |
|--|---------------|
| bit 0 | Reference 10V |
| bit 1 | Analog 1 |
| bit 2 | Analog 2 |
| bit 3 | Analog 3 |
| bit 4 | Analog 4 |
| bit 5 | Analog 5 |
| bit 6 | Analog 6 |
| bit 7 | Analog 7 |

Note: An error in bit 0 indicates failure of the device

Errors in bits 1 ... 7 indicate the most likely faulty sensors