



EX1608DD

- ✓ I/O interface - remotable on RS485 fieldbus
- ✓ 16 digital inputs, 24V PNP optoisolated
- ✓ 8 digital outputs, 24V / 2A PNP optoisolated
- ✓ RS485 serial port with high speed (1Mb/s max)
- ✓ Modbus RTU protocol, configurable over RS485
- ✓ Security timer for communication supervisory
- ✓ CoDeSys libraries for configuration and use
- ✓ PC tool for configuring and testing modules
- ✓ Compact dimension on 17.5mm of DIN rail

Digital I/O compact modules with Modbus RTU protocol

I/O interface modules with digital inputs and outputs controlled via Modbus RTU over RS485 serial bus at high speed. The modules can also be installed hundreds of meters away with simplifications and savings in wiring.

The input and output ports are galvanically isolated. The static outputs, designed with high-current MOSFET, are fully protected against permanent short-circuit, over-voltage and over-temperature.

High luminosity LEDs for visual signalling of all I/O status with power-on test function. Programmable timer for forcing outputs in the inactive state in case of the communication fault.

Configurable over fieldbus with Modbus direct commands, function block of CoDeSys library and PC software. Easy integration into "PLC Configuration" menu of CoDeSys using a configuration file. Extensions of the Modbus protocol for updating the I/O up to 1Mb/s in a single frames exchange.

SPECIFICATIONS	EX1608DD	EX1600DD	EX0008DD
Digital inputs	16	16	-
Voltage / Polarity	24Vdc / PNP	24Vdc / PNP	-
Impedance / Vmin	6.6kΩ / 10V	6.6kΩ / 10V	-
Isolation / Vmax	Optocoupled / 2000Vac	Optocoupled / 2000Vac	-
Filtering	0 ÷ 100ms (10ms step prog.)	0 ÷ 100ms (10ms step prog.)	-
Digital outputs	8	-	8
Voltage / Polarity	24Vdc / PNP	-	24Vdc / PNP
Max current	2A for channel (8A total)	-	2A for channel (8A total)
Power supply	20 ÷ 30Vdc	-	20 ÷ 30Vdc
Isolation / Vmax	Optocoupled / 2000Vac	-	Optocoupled / 2000Vac
Protection	Short / Over-voltage / Thermal	-	Short / Over-voltage / Thermal
Fieldbus	RS485 (fully compliant to TIA/EIA-485A)		
Max nodes / Termination	64 / insertable 120Ω load		
Protection	Thermal / ESD 15kV / EMI common mode filter (2.2kΩ @ 100Mhz)		
Baudrate	300b/s ÷ 1Mb/s (continuously prog.)		
Protocol	Modbus RTU, address 1 ÷ 247, parity None/Odd/Even		
Function codes	1, 2, 3, 4, 5, 6, 15, 16, 17, 23, 100, 101, 102, 109, 110		
Security timer	0 ÷ 600" (10ms step prog.)		
Max performance	Complete I/O update within 250μs (measured at 1Mb/s with OVERDIGIT master)		
Power supply	24Vdc ±15% / 50mA max		
Operative temp.	-20°C to 70°C		
Connections	Plug-in connectors with screw terminals for 28+12AWG / 2.5mm ² cables		
Box	ABS with 35mm DIN rail mount / IP20		
Max dimensions	113 x 17.5 x 119 mm (H x W x D)	113 x 17.5 x 119 mm (H x W x D)	107 x 17.5 x 119 mm (H x W x D)

EX1608DD series

Digital I/O modules with Modbus RTU protocol
Made in Italy

Digital inputs

IN+ (24Vdc)



Modbus configuration

The configuration of the protocol is done via commands sent over the fieldbus. The following parameters are available:

Parameter	Range	Default
Address	1 ÷ 247	1
Baudrate	300 ÷ 1000000	9600
Parity	0=No, 1=Odd, 2=Even, 3=No(1stop)	Even
Reset time	0 ÷ 60000 (x10ms, 0=No)	No

NOTE: to restore the default values the module must be powered on with PG button pressed until the LEDs light up for the initial test.

The “**Reset time**” sets the maximum time allowed between two successive and correct sequences of communication. In case of absence or error of the frames, automatically the watchdog timer turns off the outputs of the module.

To change the communication parameters is available on PC the **Modbus-Tool** software that allows the reading and writing of the configuration of modules connected to the network and performs other useful service functions.

The “**Test module**” function automatically detects the type of device to a specific network address and allows testing of all its I/O resources.

The “**Test function**” menu can send the individual codes of protocol to one of the connected modules, acting as a Modbus master simulator.

For the configuration can also be used a dedicated function block from **MODBUS_EX.lib** CoDeSys library. An IEC program, ready to be used as configuration utility, also indicates how to integrate this functionality into your application.

The EX series modules can be easily inserted into IEC application using CoDeSys development tool. The composition of “**PLC Configuration**” is made by loading consecutively all the modules connected, by selecting them from the menu listbox. The information on module resources are automatically readed from a specific file provided with the tool. For the Modbus communication management, a simple function block of library must be inserted in the application. This block extracts information from the PLC configuration to update all the I/O of modules.

For more information about configuring and using modules refer to the specific documentation.

Modbus data model

The resources available in the module are mapped to Modbus data areas using the following format:

Address	Fun. codes	Description
Discrete Inputs		
0 ÷ 15	2	Inputs bits IN00 ÷ IN15
Coils		
0 ÷ 7	1, 5, 15	Output bits OUT00 ÷ OUT07
Input Registers		
0	4	IN00 ÷ IN15 inputs word
Holding Registers		
0	3, 6, 16, 23	OUT00 ÷ OUT07 outputs word
1	3, 6, 16, 23	Inputs filter 0 ÷ 10 (x10ms) 0=No
2	3, 6, 16, 23	LEDs monitor 0=No, 1=Status, 2=Test, 3=Status/Test

The value of registers with address 1 and 2 are stored permanently in the module.

Order codes	
EX1608DD	Modbus slave, 16 In 24V PNP, 8 Out 24V 2A PNP
EX1600DD	Modbus slave, 16 In 24V PNP
EX0008DD	Modbus slave, 8 Out 24V 2A PNP

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