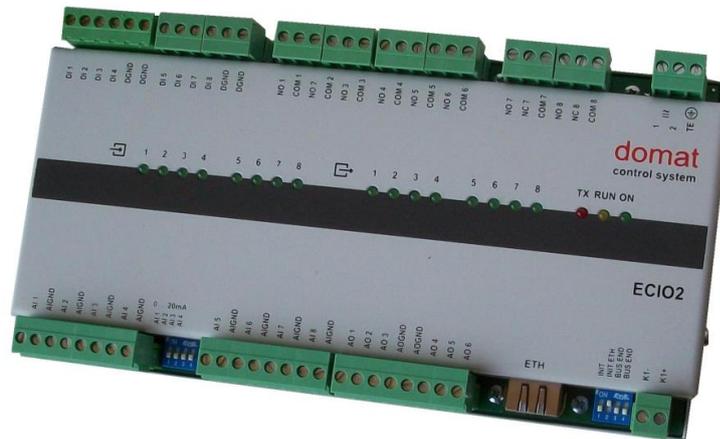# ECIO2   Multi I/O compact module, Ethernet

Summary

The ECIO2 multiple I/O compact module is a microprocessor-controlled, communicative module with the I/O mix optimized for HVAC and home control applications. The module uses Ethernet (Modbus TCP) for communication with PLC, and RS485 (Modbus RTU) bus as link to optional extension RS485 I/O modules, and can be easily integrated in a variety of supervision and control systems.

Application

- **Compact I/O module for data acquisition and HVAC control systems**

- **Remote inputs and outputs over Ethernet, optionally with extension Modbus RTU I/O modules**

- **Modbus TCP / RTU router with 30 additional I/O**

Function

The ECIO2 module is a multiple I/O module (8 AI, 6 AO, 8 DI, 8 DO). The module communicates

- as Modbus TCP station (slave) over the Ethernet interface
- as web server over the Ethernet interface for IP configuration and statistics
- as Modbus RTU router over the RS485 bus

The Modbus communication protocol ensures smooth and easy integration in a number of control and data acquisition systems. The Modbus register description is available in a separate document.

The communication circuits are protected against overvoltage. If the module is terminating the RS485 communication bus, i.e. it is the first in line, terminating resistors may be switched on by short-circuiting of the BUS END jumpers (right pack, No. 3 and 4). Green LEDs indicate states of the I/Os, red LED communication (TX), yellow LED system module cycle (RUN), and green LED power on.
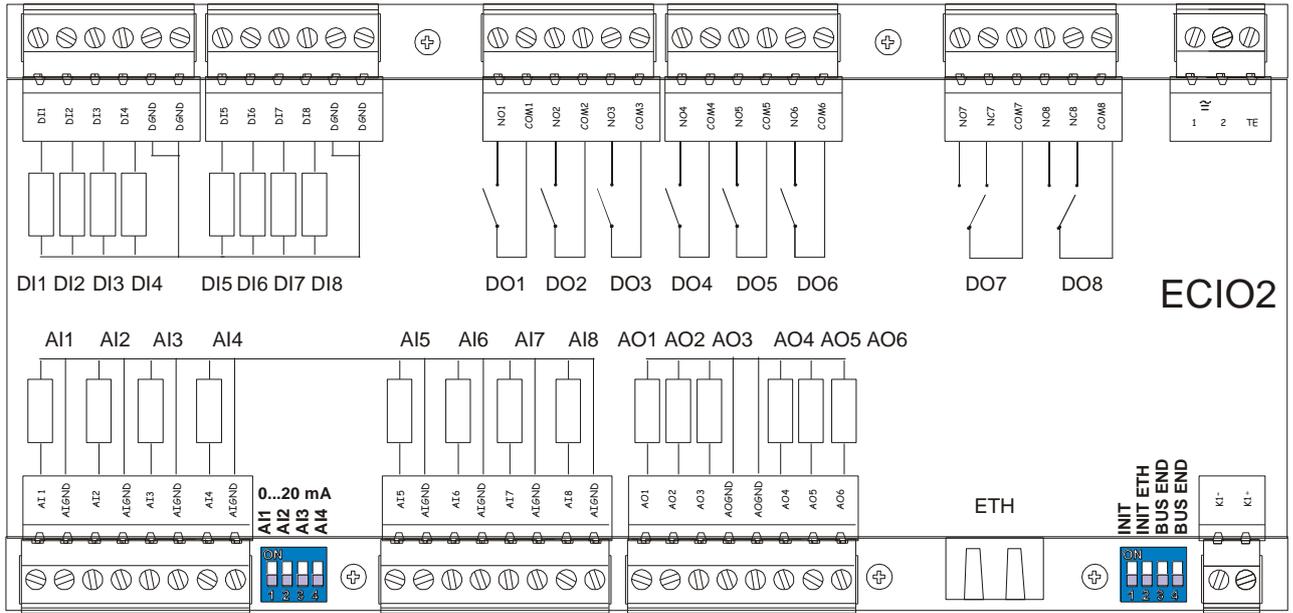
The module can be mounted on a standard DIN rail. To remove the modul, pull the plate at the upper part of the module which releases both DIN rail locks at the same time. Move the plate upwards with a screwdriver and remove the module.

See domat - Technical application notes for connection and function examples.

Technical data

Supply voltage	12 V ÷ 24 V AC/DC, +/- 10 %
Consumption	max. 7.5 VA
Working temperature of the module	0 ÷ 60°C, non-condensing
Communication	RS485, 1200 ... 19200 bit/s
	Ethernet, 10/100 Mbps, RJ45 (Modbus TCP, HTTP), max. 5 Modbus TCP conections
RS485 - K+, K- terminals	
Max. bus length	1200m
Max. number of modules on the bus	up to 256 addresses; the maximum number of modules depends on requested response time: for common HVAC applications, use max. 20 MCIO2
Analogue inputs	8x 0-10 V DC, Pt 1000, resistance 0..1600 Ohm, 0...5000 Ohm, 0(4)...20 mA – selected with jumpers and over the bus
	(the rest of ranges, for example Pt100, Ni1000, can be transformed from input by predefined transformation in SW of proces station)
Analogue outputs	6x 0-10 V DC
	2x common terminal AOGND
	galvanically separated 1 kV from the rest of the module
	10 bit resolution
	output impedance < 16 Ohm
Analogue outputs load	min. 10kOhm, max. current 50mA,
	short-circuit-proof outputs – current limitation to 80 mA
Digital inputs	8x 24V AC/DC – input current 4 mA, voltage must be
	applied e.g. from module powering terminals (no dry contacts)
	log. 0 ... U < 8 V AC/DC
	log. 1 ... U > 20 V AC/DC
Digital outputs	6x relay, NO: 3A/250VAC, 3A/30VDC, 750VA, 90W
	2x relay, change-over: 8A/250VAC, 8A/24VDC, 2000VA, 192W
Dimensions	217 x 115 x 40 mm (incl. terminals)
CE marking	CE

Terminals

Switches

DIP switch left:

To use AI1...AI4 as 0(4)...20 mA set the corresponding switch 1...4 to ON. This connects an internal resistor which changes the voltage input to current input. No external resistors are required at these inputs.

DIP switches right

1 INIT: if ON before power-up the module is in the INIT mode - address 1, communication speed 9600 bps

2: INIT ETH – if ON before power-up the Ethernet communication part is in the INIT mode – IP address is 192.168.1.99

3, 4 BUS END: if ON the bus is terminated, if OFF the bus is not terminated.

LEDs

Input and output states are indicated by green LEDs at the front panel.
The status LEDs have following functions:

LED	colour	function
TX	red	blinking – module is transmitting at RS485
RUN	yellow	blinking – module OK, on or off – module not working
ON	green	on – power OK, off – no power or power supply damaged

Addressing

The Modbus address **is fixed and set to 2**. All I/O point parameters (AI ranges, relay comm fail states etc.) can be set through ModComTool, a configuration software which is free to dowload at http://domat-int.com/en/downloads/software. Default communication parameters are 9600, 8, N, 1. Use the TCP Gate function and locate the ECIO module at Modbus address 2. Of course, all modules connected to the RS485 interface can be accessed and configured over the Ethernet / RS485 Modbus routing function.

Change the IP address and other network properties by accessing the module over a web browser at its IP address.
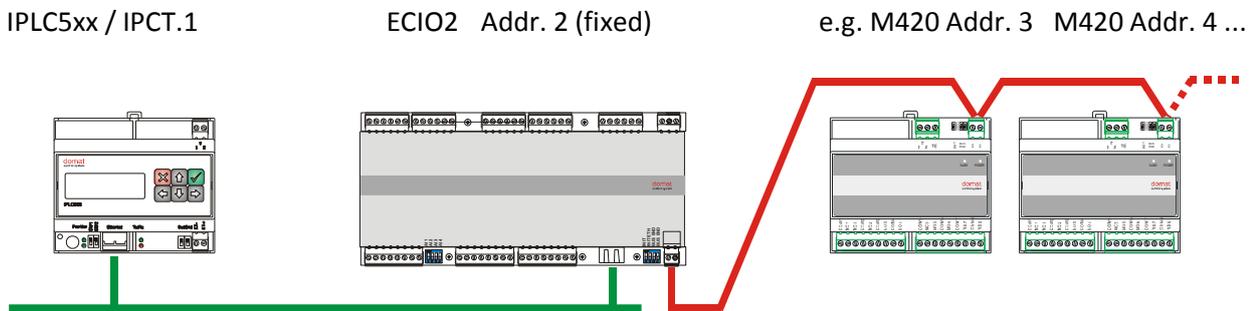
The default IP settings are:
IP address   192.168.1.99
subnet mask   255.255.255.0
default gateway   192.168.1.1

4 tis recommended to note the IP address on the module label.

Modbus routing

It is possible to use ECIO2 as a Modbus TCP/RTU router. Attach other modules to the RS485 interface; the ECIO2 will be routing their Modbus RTU telegrams so that the modules are accessible over the Ethernet interface (Modbus TCP). This is how islands of remote I/O modules may be created. Note that the I/O functionality depends on the correct functionality of the Ethernet network.

IPLC5xx / IPCT.1   ECIO2   Addr. 2 (fixed)   e.g. M420 Addr. 3   M420 Addr. 4 ...

Galvanic separation

Analogue input grounds (AIGND), analogue output grounds (AOGND), power source (terminals 1 and 2), digital inputs and digital outputs are separated from each other. This increases EMC significantly and prevents from damaging the module by overvoltage.

For three-wire (power, ground, signal) connection of active output peripherials, such as valves and damper actuators, define power ground (G0), e.g. terminal 2, and connect it to AOGND analogue outputs ground.

For three-wire connection of active input peripherials (pressure, air quality, and humidity sensors etc.) define power ground (G0), e.g. terminal 2, and connect it to AIGND analogue inputs ground.

Digital inputs (DI) are optically separated from all other parts of the module, however, they all have common ground DGND (see image).

All digital outputs (DO) are based on relays and thus galvanically separated from all other parts of the module as well as from each other.

The communication part is optically separated from all other parts of the module.

It is possible to use the same transformer for powering of modules and peripherials.
The TE terminal may be connected to the ground potential (PES, shielding terminal).

Copmatibility with ECIO	When changing ECIO for ECIO2 please note the following:

- hardware I/O signals are 100% compatible except for relay load of 3 A instead of 5 A
- it may be necessary to connect the AGND and AOGND terminals if active sensors are used!
- ECIO2 is about 20 mm shorter, the terminals are located +/- 15...20 mm in the same position
- it is necessary to rewire the connectors, the new module has connectors heading up and thus better fixed in the sockets
- mind the RS485 connector polarity, K+ is on the right
- the ECIO2 contains one extra analog output
- the module communicates with a process station **over Ethernet** rather than RS485
- **it is necessary to change the application software** (use a Modbus / TCP channel, insert new MCIO2 module, delete the MCIO and reconnect inputs and outputs), because old and new modules have different Modbus maps! Use IDE 0.9.10.0805 and later, available at http://domat-int.com/en/downloads/software.

Related products	**M...**	I/O modules
	IPLC201, 301	MiniPLC process station
	IPCT.1	Process station with touchscreen
	M012	RS485/RS232 converter
	ECIO2	Compact I/O module with Ethernet interface

Changes in versions

04/2015 — Change of AI definition, and resistence range, additional info about transformatino for the rest of measuring elements was added