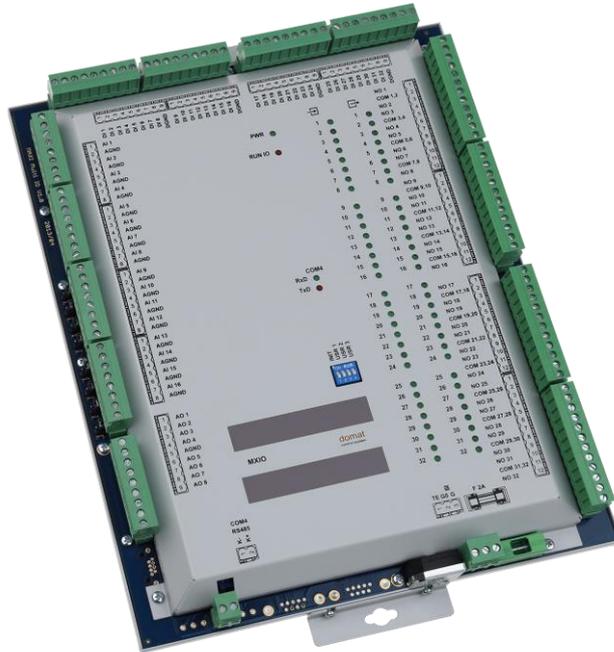# MXIO   Compact I/O module

Summary   **The MXIO multiple I/O compact module is a microprocessor-controlled, communicative module with the I/O mix optimized for larger HVAC control applications. The module uses a RS485 bus for communication, 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**

Function   The MXIO module is a multiple I/O module (16 AI, 8 AO, 32 DI, 32 DO). The module communicates by means of a RS485 data bus. It is fully integrated into the SoftPLC environment, however, the Modbus RTU 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 communication bus, i.e. it is the last in line, terminating resistors may be switched on by short-circuiting of the BUS END DIP switches (close to the K+, K-terminals). LEDs indicate states of the binary I/Os, red LED flashes for outgoing communication (TX), system module cycle (RUN), and green LED (ON) indicates supply voltage.

The module can be mounted on the base plate of the switchboard, or on another flat and smooth surface by two screws.

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

Technical data

Supply voltage	18 V ÷ 35 V DC, 14 V ÷ 24 V AC
Consumption	max. 13 VA
Working temperature of the module	0 ÷ 70°C
Communication	RS485, 1200 ... 19200 bit/s
RS485 - K+, K- terminals	
Max. bus length	1200m
Max. number of modules on the bus	256 addresses, maximum number of modules depends on requested response time: for common HVAC applications with IPLCx01 or IPCT.1 use about 4 MXIO (about 300...400 data points on the bus)
Analogue inputs	8x Pt 1000, resistance 0..1600 Ohm, 0...5000 Ohm
	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	8x 0-10 V DC, resolution 10 bit
Analogue outputs load	min. 10kΩ, max. current 10mA each output;
	outputs are short-circuit protected by current limitation to 20 mA
Digital inputs	32x 24V AC/DC – voltage must be applied (no dry contacts)
Input voltage for log. „0"	max. 5 V AC/DC
Input voltage for log. „1"	18 ... 30 V DC, 18... 26V AC @ 7mA
Digital outputs	32x relay, normally open: 5A/250 V AC, 5A/30 V DC, 750 VA, 90 W
Dimensions	292,3 (h) x 237 (w) x 40 (d) mm (module) 324,3 (h) x 237 (w) x 40 (d) mm (incl. fixtures)

Analogue inputs

AI1 to AI8 are designed as **passive only**. The range (0...1600 Ω or 0...5000 Ω) can be set over the configuration software ModComTool or over SoftPLC IDE.
AI9 to AI16 can be set so as to measure
-   **resistance** (same as AI1 to AI8),
-   **voltage** 0...10V or
-   **current** 0...20 mA.
The AI9 to AI16 0...20 mA ranges are set over a jumper **for each input independently**. The jumpers are accessible from outside of the module.

Switch settings:

Range	jumper

resistance, passive temperature sensors	OFF (default)
voltage 0...10 V	OFF (default)
current 0...20 mA	ON

All analogue inputs AI1 to AI16 have common ground AGND. The inputs are optically separated from the other parts of the I/O module.

For three-wire connection (active sensors, e.g. pressure, humidity), the analogue input ground AGND must be connected with the peripherial 24 V AC power ground. As all I/O types are mutually separated in the module, it is possible to use one common transformer to power both the active peripherials and the MXIO module.

Analogue outputs
The 0..10V analogue outputs maximum load is 10 mA, however, they are permanently short-circuit proof and the output current is limited to 20 mA. The outputs are optically separated from the other circuits in the module, and their ground (AGND) is not connected to the analogue inputs ground.

For three-wire connection (dampers, valves), the analogue output ground AGND must be connected with the peripherial 24 V AC power ground. As all I/O types are mutually separated in the module, it is possible to use one common transformer to power both the active peripherials and the MXIO module.

Digital inputs
Digital inputs operate with 24 V AC/DC. Each set of eight digital inputs have own common DGND terminals. The inputs are optically separated from the other circuits in the module, and they may be linked to the same transformer or power supply which supplies the MXIO module.

The statuses of the inputs are indicated by LEDs at the front panel of the module.

Digital outputs
Digital outputs are normally open relays with maximum voltage 250 V, 5 A. Each pair of outputs has one common terminal (COM X, Y).
The statuses of the outputs are indicated by LEDs at the front panel of the module.

Others
DIP switch BUS END for K+, K-
If set to ON the bus is terminated, in the OFF position the terminating resistors are disconnected. NB. the first and the last module on the bus should have the BUS END on. The K+ and K- terminals link the module with the I/O bus.
The DIP switch is accessible through a small aperture close to the K+, K- terminals.

Fuse F 2 A
Replace only with the same type if fuse broken.

TE terminal
The TE terminal should be connected to the ground potential (PES, shielding terminal).

N.C. connectors
The communication connectors marked as N.C. are not used and do not provide any functionality.
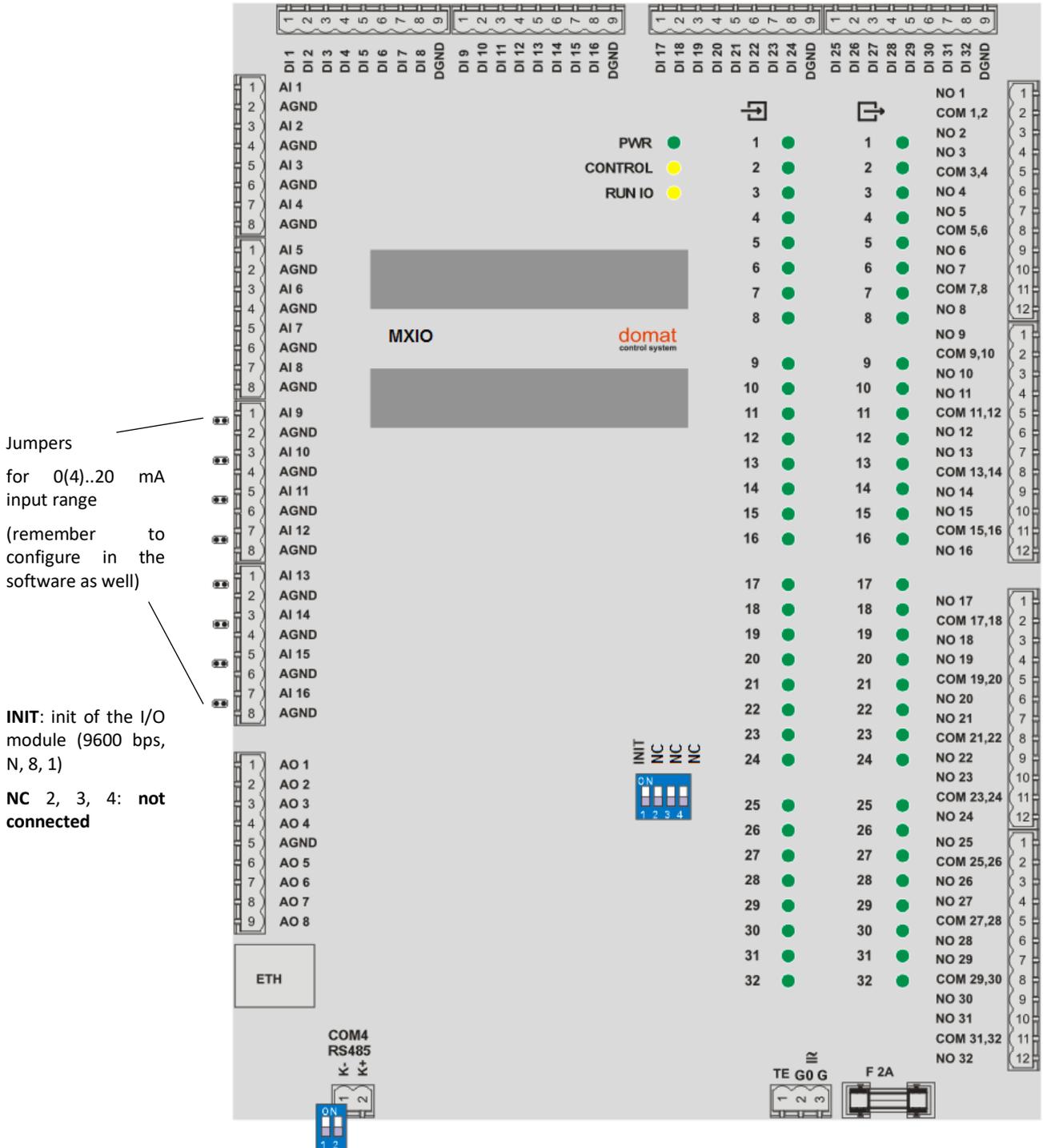
Addressing

The Modbus address is set with the configuration software, **ModComTool**, which is free to download at http://domat-int.com/en/downloads/software. The default address is 1, default communication parameters are 9600, 8, N, 1.

Safety note   The device is designed for monitoring and control of heating, ventilation, and air conditioning systems. It must not be used for protection of persons against health risks or death, as a safety element, or in applications where its failure could lead to physical or property damage or environmental damage. All risks related to device operation must be considered together with design, installation, and operation of the entire control system which the device is part of.

Terminals

Jumpers

for 0(4)..20 mA input range

(remember to configure in the software as well)

INIT: init of the I/O module (9600 bps, N, 8, 1)

NC 2, 3, 4: **not connected**

Bus End COM4

Changes in versions

04/2015 – Change of AI definition, and resistence range, additional info about transformation for the rest of measuring elements was added.
08/2015 – Change of power supply parameters.
12/2017 – Max. communication speed correction.
02/2018 — Added Safety note, added AO resolution, change image.