

MMIO

Small compact I/O module



Summary

Small compact I/O module MMIO is a microprocesso-controlled input and output module with its I/O mix optimized for control of small HVAC units, fancoils, and floor heating. It communicates over a RS485 bus with Modbus RTU (slave) and thus can be easily integrated in a range of control systems.

Application

- Compact I/O module for small heat exchange stations, fancoils and IRC applications, add-on module for larger systems, data acquisition.

Function

MMIO contains inputs and outputs (4 AI, 2AO, 4 DI, 7 DO). The inputs and outputs are controlled over RS485 with Modbus RTU. Find the Modbus register table in a separate document.

Communication is separated from the power part as well as from the I/O circuits. If the module is installed as the first or the last on the bus, set the BUS END DIP switches to ON and terminate the bus. The module is installed to a standard DIN rail.

Typical application for room control:

Relay outputs DO1, DO2 a DO3: three-stage fancoil

Relay outputs DO4, DO5: auxilliary outputs – relays for light switching or main contactor of the hotel room

SSR, outputs DO6, DO7: 3-point or thermic valves, damper actuators

Analogue outputs, AO1, AO2: valves 0..10V, VAV systems

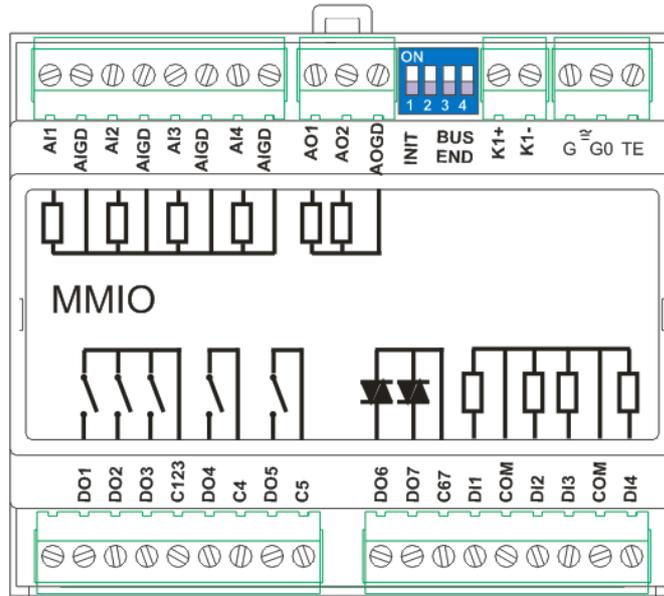
Analogue inputs, AI1, AI2, AI3, AI4: room and supply temperature, setpoint correction, manual fan switch

Digital inputs, DI1, DI2, DI3, DI4: presence signal, window contacts

Technical data

Supply voltage	18 V ÷ 35 V DC (G..+, G0..-), 14 V ÷ 24 V AC
Consumption	nominal 5 VA, maximum 7 VA (all relays on)
Operating temperature	0 ÷ 70°C
Communication	RS485, 1200 ... 19200 bit/s Modbus RTU slave
RS485 - terminals K1+, K1-	
Max. bus length	1200m
Max. number of MMIO on the bus	depends on required response time, for HVAC applications about 50, physical addressing up to 250
Analogue inputs	4x Pt 1000, resistance 0..1600 Ohm, 0...5000Ohm AI1 a AI2 configurable with jumpers as 0..10 V DC or (with an external resistor of 125 Ohm) as 0..20 mA, 16-bit depth (the rest of ranges, for example Pt100, Ni1000, can be transformed from input by predefined transformation in SW of proces station) Measuring current in the passive mode (0..1600 Ohm): 200 uA at 12,5% of the time
Analogue outputs	2x 0-10 V DC, resolution 10 bit
Load on analogue outputs	typical 10kOhm, max. current 10mA, outputs are short-circuit proof – limited to 20 mA.
Digital inputs	4x 24V AC/DC; voltage must be applied, e.g. from G and G0, input current 4 mA. Max. admissible voltage 60 V DC, 40 V AC. The inputs are optically insulated up to 3,5 kV.
Digital outputs	5x relay, NO: 5A/250 V AC 1250 VA, 5A/30 V DC, 150W 2x solid state relay, zero switching, for AC load, 24 V AC, maximum current 0,4 A. Recommended thermic actuators are STA71 (Siemens), TWA (the 24V types, Danfoss). The outputs are optically insulated up to 1,5 kV.
Dimensions	105 (l) x 90 (w) x 58 (h) mm

Terminals



Jumpers at AI1, AI2:

0..10 V

temp, R

0(4)..20 mA

The AI1 and AI2 inputs have 4 pins each for input range setting.

AI1: 0..10 V, AI2: temp, R

Default input settings:

AI1 0..10V
 AI2 temp, R
 AI3 temp, R (can not be changed)
 AI4 temp, R (can not be changed)

Old MMIO hardware

At older hardware versions, there are 5 pins at each input. **Ground of analogue inputs and outputs (GND) is galvanically connected with the power ground G0 at the old hardware.** If using 3-wire peripherals (active sensors, 0..10V dampers) please mind the correct polarity of the power supply. The communication circuits are galvanically separated from the rest of the module. Digital signals (DI, DO) are galvanically separated from the rest of the module.

Jumpers at AI1, AI2:

0..10 V

temp, R

0(4)..20 mA

The AI1 and AI2 inputs have 5 pins each for input range setting.

Default input settings:

AI1 0..10V
 AI2 temp, R
 AI3 temp, R (can not be changed)
 AI4 temp, R (can not be changed)

AI1: 0..10V AI2: temp, R

General

DIP switch next to the K1+, K1- terminals, accessible from the outside

- 1: if ON, after restart the module is in the INIT mode - address 1, comm speed 9600 bps
- 2: reserved
- 3, 4: if ON the bus termination is on, OFF switches the bus end off

NB. If the module operates with RcWare SoftPLC and uses Pt1000 passive temperature sensors, set the input ranges with domat.exe to *0...1600 Ohm*, not *Pt1000*. The *Pt1000* range delivers already linearized temperature in °C. The SoftPLC environment which expects resistance value and performs the linearisation automatically would read incorrect values.

NB. Ground of analogue inputs AIGN and outputs AOGN is galvanically separated from the power ground G0. If using active peripherals (active sensors, 0..10V dampers) please connect the AIGN and / or AOGN to the G0 terminal (2). The communication circuits are galvanically separated from the rest of the module. Digital signals (DI, DO) are galvanically separated from the rest of the module.

The same transformer may be used for powering of the MMIO module and peripherals.

Address setting in the INIT mode:

The INIT mode is used when the address and/or communication speed have been set to an unknown value and need to be set back to defaults.

- remove the module cover
- set the INIT switch (blue DIP switch close to the relays, No.1) to ON
- connect power and communication
- the module responds at the address 1
- set new address and/or comm speed with ModComTool or IDE
- disconnect power
- set the INIT switch back to OFF
- put back the cover
- power the module on: it responds at the new address and comm speed.

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.

**Changes in
versions**

04/2015 — Change of AI definition, range 0..5000 Ohm was added, additional info about transformation for the rest of measuring elements.

08/2016 — Corrected information about DO6 and DO7. They are suitable only for AC load.

02/2018 — Added Safety note, added AO resolution, change image.