

CANopen IO-X7 – Fact sheet

Overview

The CANopen IO-X7 is a very compact and cost-effective CANopen IO module featuring a high-density of industrial proven IO's.

The module includes a CPU-core including the pre-programmed firmware for CANopen communication and peripherals for the industrial inputs and outputs. Extensive diagnostic routines are implemented to ensure a most reliable and safe operation. All inputs and outputs as well as device configuration parameters are accessible via the CANopen protocol. The CANopen IO-X7 is a CANopen slave device according CANopen device profile **CiA 404 DS V1.2** and CANopen communication profile **CiA 301 DS V4.02**. Two LEDs indicate the device state according to **CiA 303-3 DR V1.0**.



I/O configuration:

- 8 inputs Thermocouple sensors
Each channel separately configurable for type E, J, K, L, R, S, T
Accuracy <0,5% at 12-bit resolution
Each channel state is indicated via LEDs separately
Variable temperature thresholds including LED indicators

CANopen features:

- Communication profile CiA 301 DS V4.02
- Device profile CiA 404 DS V1.2
- State indicator profile CiA 303-3 DR V1.0
- Layer Setting Service (LSS)
CiA 305 DS V1.1
- 4 TPDO
- Dynamic PDO-Linking and PDO-Mapping
- SDO-Server
- Lifeguarding, Nodeguarding, Heartbeat
Producer
- Emergency Producer
- Minimum Boot-up capability (Slave)
- Minimum NMT boot-up master (Manufacturer extension)

Communication and device configuration:

- Galvanic decoupled CAN-bus
- CAN-bus driver hardware supports up to 110 CAN-nodes connected to the bus
- 120Ω CAN-bus termination via jumper
- Hex-encoding switches for setting node-ID and baud rate
- CAN-bus baud rate: 10kBit/s to 1Mbit/s
- High-quality connectors included in scope of delivery:
Power-Supply: 2-pin plug connector
CAN-bus: 5-pin plug connector
I/O: single 24-pin plug connector, lockable
- Non-volatile memory for storage of configuration data
- Internal monitoring and self-diagnostics of:
onboard temperature,
power supply,
memory and other controller peripherals
- Emergency Messages sent out in case of failure

Power Supply, Environmental Conditions:

- Operating voltage: 24V ±20%
- Current consumption: <70mA
- Operating temperature: 0°C to +70°C
- Storage temperature: -20°C to +90°C
- Dimensions (LxWxH in mm): 95x70x58
- Installation method: DIN-rail mounting
- Enclosure protection class: IP20
- Weight: ca. 130g

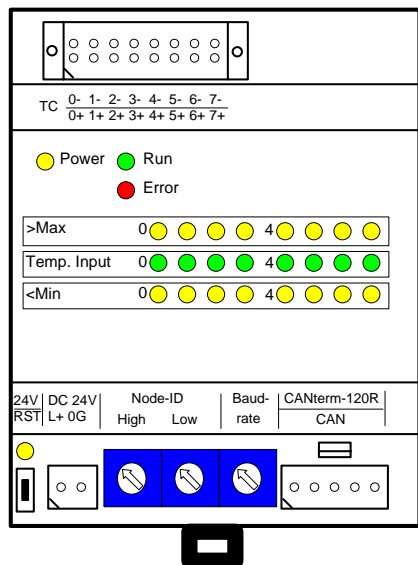
Delivery contents / Order number

Assembled and tested module,
Manual and corresponding EDS-file.

Order number:

- | | |
|---------|---|
| 3001006 | CANopen IO-X7,
standard version |
| 3001008 | CANopen IO-X7,
14 bit ADC resolution |

Device pinout



Hex-encoding Switches:

Node ID:

Allows for configuration of node ID from 0x1 ... 0x7F (1..127 dec).

When node-ID is set to value 0xFF, the device is reset to factory settings after power-on or reset. The node-ID is also configurable via LSS.

Baud rate:

Selectable via Hex-switch:

- 0 = 1 Mbit/s
- 1 = 800 kbit/s
- 2 = 500 kbit/s
- 3 = 250 kbit/s
- 4 = 125 kbit/s
- 5 = 100 kbit/s
- 6 = 50 kbit/s
- 7 = 20 kbit/s
- 8 = 10 kbit/s

The baud rate is also configurable via LSS.

Connector pinout description:

Pin	Name	Description
Power Connector		
1*	L+	+24VDC ±20%
2	0G	Ground 0
CAN Connector		
1*		CAN ground
2		CAN low
3		n.c.
4		CAN high
5		+24VDC (optional used)
I/O Connector		
1*	0+	TC Ch0 + Input
2	0-	TC Ch0 - Input
3	1+	TC Ch1 + Input
4	1-	TC Ch1 - Input
5	2+	TC Ch2 + Input
6	2-	TC Ch2 - Input
7	3+	TC Ch3 + Input
8	3-	TC Ch3 - Input
9	4+	TC Ch4 + Input
10	4-	TC Ch4 - Input
11	5+	TC Ch5 + Input
12	5-	TC Ch5 - Input
13	6+	TC Ch6 + Input
14	6-	TC Ch6 - Input
15	7+	TC Ch7 + Input
16	7-	TC Ch7 - Input

* in picture pin 1 is marked with slash

Effective range

TC-type	max. temperature
J	1200°C
K	1372°C
L	900°C
R	1768°C
S	1768°C
T	400°C
E	1000°C

The minimum possible temperature is equal the operating temperature of IO-X7 !

PDO Mapping

In standard configuration (factory settings) the thermo couple inputs CH0..7 are mapped to the following PDO's.

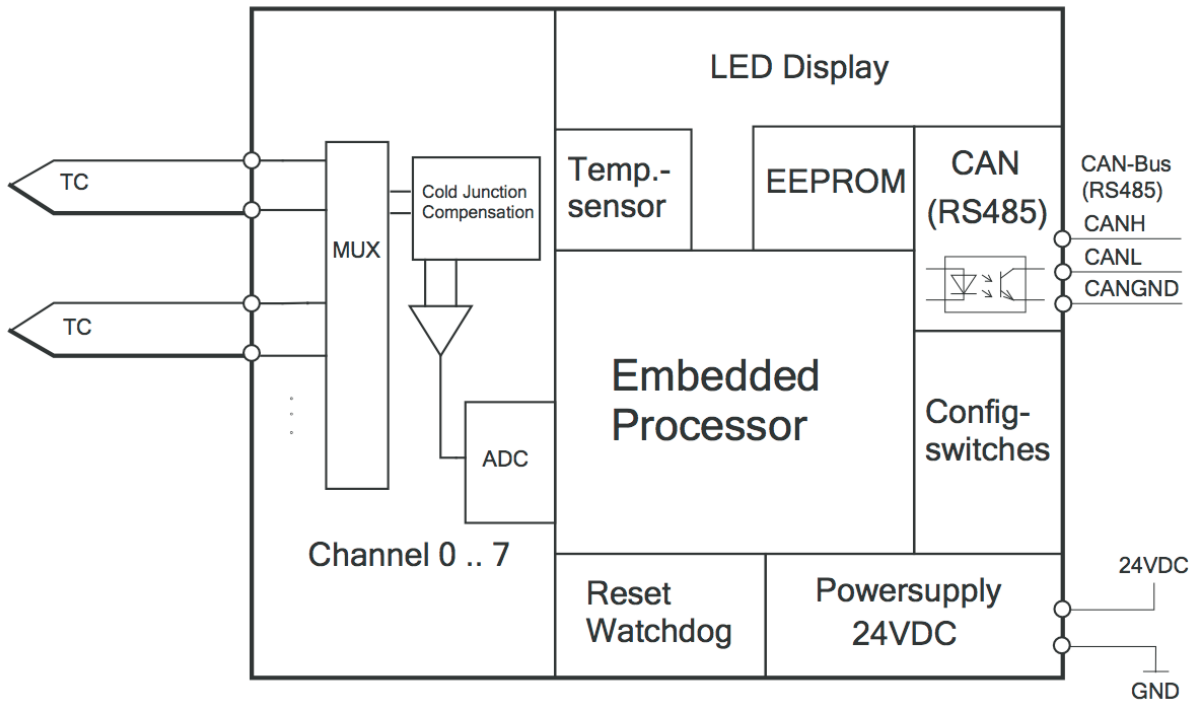
	ID	Length	BYTE 0	BYTE 1	BYTE 2	BYTE 3	BYTE 4	BYTE 5
1. TPDO	180H +Node ID	6	AI0 7130H/1	AI0 State 6150H/1	AI1 7130H/2	AI1 State 6150H/2		
2. TPDO	280H +Node ID	6	AI2 7130H/3	AI2 State 6150H/3	AI3 7130H/4	AI3 State 6150H/4		
3. TPDO	380H +Node ID	6	AI4 7130H/5	AI4 State 6150H/5	AI5 7130H/6	AI5 State 6150H/6		
4. TPDO	480H +Node ID	6	AI6 7130H/7	AI6 State 6150H/7	AI7 7130H/8	AI7 State 6150H/8		

The PDO-mapping and linking can be changed dynamically by use of a standard CANopen configuration tool. The configuration can be saved to non-volatile memory and thus is available after restart.

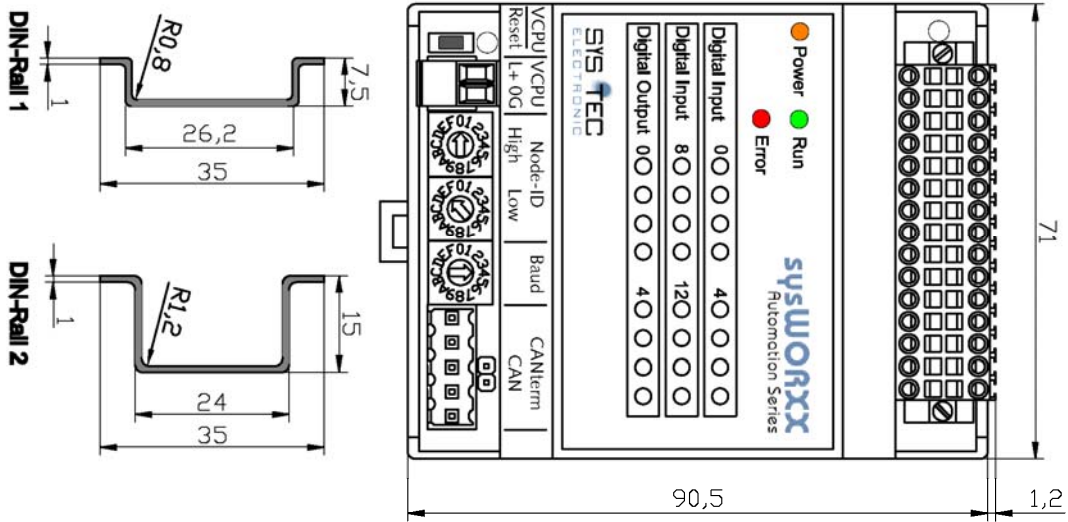
Object Dictionary

Index	Object	Name	Data type	Object is mappable	Object gets saved via 1010H	Object gets Restored via 1011H
1000H	Var	Device type	Unsigned32	-	-	-
1001H	Var	Error register	Unsigned8	-	-	-
1003H	Array	Pre-defined error field	Unsigned32	-	-	-
1005H	Var	COB-ID SYNC message	Unsigned32	-	x	x
1007H	Var	Synchronous window length	Unsigned32	-	x	x
1008H	Var	Manufacturer device name	String	-	-	-
1009H	Var	Manufacturer hardware version	String	-	-	-
100AH	Var	Manufacturer software version	String	-	-	-
100CH	Var	Guard Time	Unsigned16	-	x	x
100DH	Var	Life Time Factor	Unsigned8	-	x	x
1010H	Array	Store parameters	Unsigned32	-	-	-
1011H	Array	Restore default parameters	Unsigned32	-	-	-
1014H	Var	COB-ID EMCY	Unsigned32	-	x	x
1017H	Var	Producer Heartbeat Time	Unsigned16	-	x	x
1018H	Record	Identity Object	Identity	-	-	-
1029H	Array	Error behavior object	Unsigned8	-	x	x
1200H	Record	1st SDO Server Parameter	SDO Parameter	-	-	-
1400H	Record	RPDO1 Communication parameter	PDOComPar	-	x	x
1401H	Record	RPDO2 Communication parameter	PDOComPar	-	x	x
1600H	Record	RPDO1 Mapping parameter	PDOMapPar	-	x	x
1601H	Record	RPDO2 Mapping parameter	PDOMapPar	-	x	x
1F51H	Var	ProgramControl	Unsigned8	-	-	-
2000H	Var	NMT Boot Configuration	Unsigned8	-	-	-
2001H	Array	Device Features	Integer16	-	-	-
2002H	Var	Power Fail Configuration	Unsigned8	-	x	x
2500H	Record	for production only	Production	-	-	-
6110H	Array	AI Sensor Type	Unsigned16	-	x	x
6112H	Array	AI Operation Mode	Unsigned8	-	x	x
6126H	Array	AI Scaling Factor	Real32	-	x	x
6127H	Array	AI Scaling Offset	Real32	-	x	x
6131H	Array	AI Physical Unit PV	Unsigned32	-	x	x
6132H	Array	AI Decimal Digits PV	Unsigned8	-	x	x
6150H	Array	AI Status	Unsigned8	x	-	-
7100H	Array	AI Input FV	Integer16	x	-	-
7130H	Array	AI Input PV	Integer16	x	-	-
7133H	Array	AI Interrupt Delta Input PV	Integer16	-	x	x
7134H	Array	AI Interrupt Lower Limit Input PV	Integer16	-	x	x
7135H	Array	AI Interrupt Upper Limit Input PV	Integer16	-	x	x

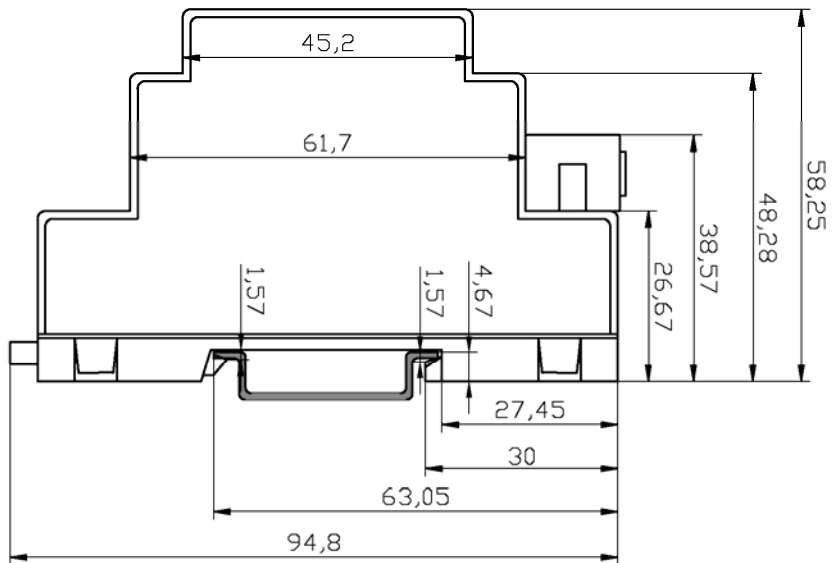
IO circuitry



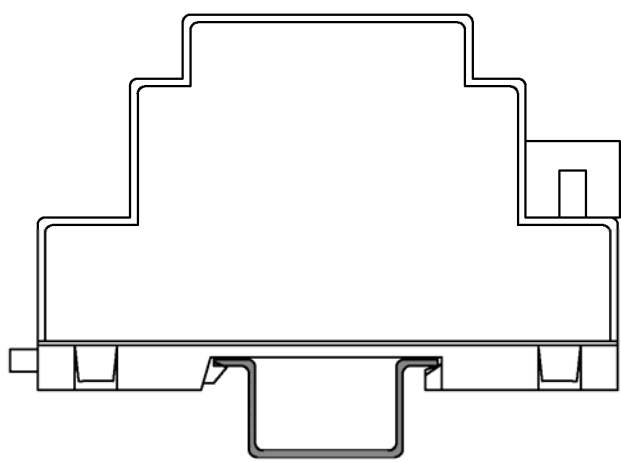
Device dimensions



With DIN-Rail 1



With DIN-Rail 2



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