

## 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

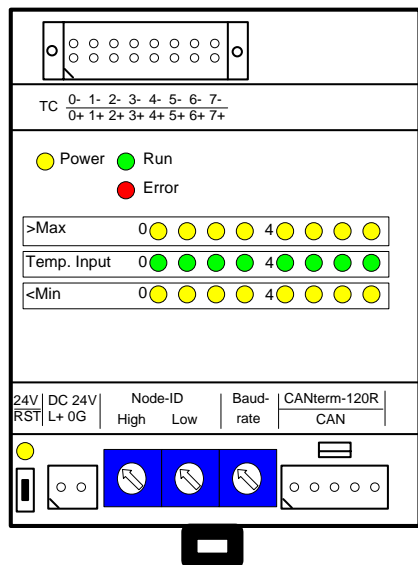
### Delivery contents / Order number

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

Order number:

- |         |   |
|---------|---|
| 3001006 | CANopen IO-X7,<br>standard version      |
| 3001008 | CANopen IO-X7,<br>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
<b>Power Connector</b>		
1*	L+	+24VDC ±20%
2	0G	Ground 0
<b>CAN Connector</b>		
1*		CAN ground
2		CAN low
3		n.c.
4		CAN high
5		+24VDC (optional used)
<b>I/O Connector</b>		
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.

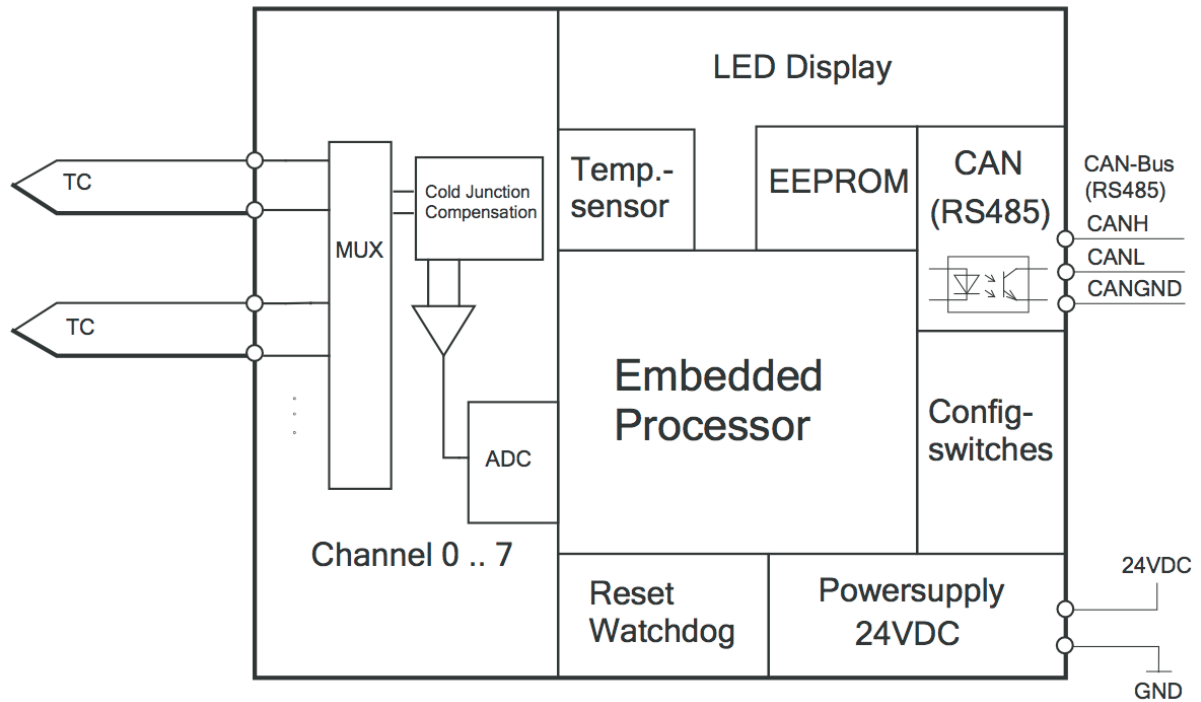
	ID	Length	BYTE 0	BYTE 1	BYTE 2	BYTE 3	BYTE 4	BYTE 5
1. TPDO	180H +Node ID	6	AI0 7130H/1	AI0 State 6150H/1	AI1 7130H/2	AI1 State 6150H/2		
2. TPDO	280H +Node ID	6	AI2 7130H/3	AI2 State 6150H/3	AI3 7130H/4	AI3 State 6150H/4		
3. TPDO	380H +Node ID	6	AI4 7130H/5	AI4 State 6150H/5	AI5 7130H/6	AI5 State 6150H/6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

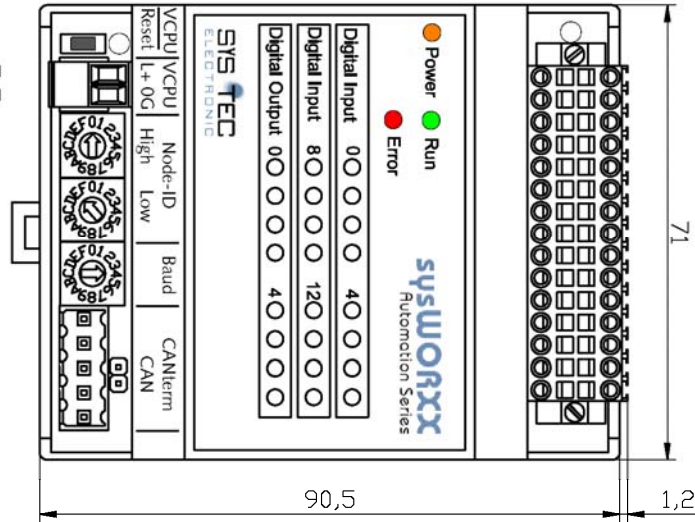
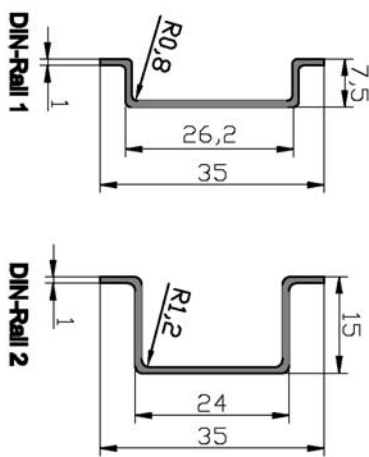
### Object Dictionary

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

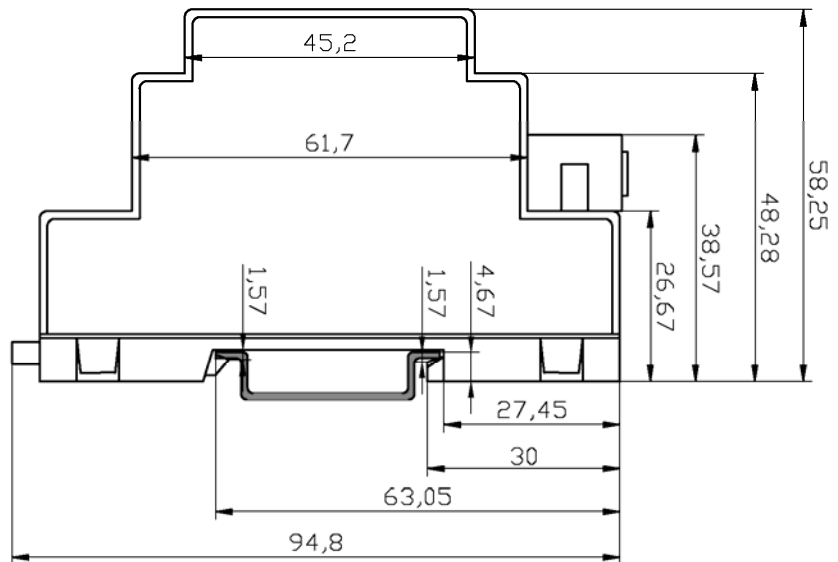
*IO circuitry*



**Device dimensions**



**With DIN-Rail 1**



**With DIN-Rail 2**

