

CBI-11/12, SBI-11/12



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- CBI-11/12 for CANopen interface
- SBI-11/12 for RS-485 interface, miscellaneous protocols
- 16 galvanic isolated input circuits
- DC and AC input signals allowed
- 2 isolated sections
- Removable screw terminal boxes
- Indication input LEDs, digital input filters
- Input circuits according to EN 61131-2 type 1
- Easy DIN rail assembly

General information

CBI-11/12 is a CANopen interface peripheral unit with 16 galvanic isolated inputs.

SBI-11/12 is a serial RS485 interface peripheral unit with 16 galvanic isolated inputs. Default firmware supports Profibus/EpsNet, Modbus and Profibus DP (under development) communication protocols.

There are universal bipolar inputs in CBI/SBI-11. These can be individually wired with common plus or minus. Electronic divider develops a half of supply voltage as a virtual common wire for all inputs. Thus an input signal can be switched to plus or minus pole of supply and sensors with npn or pnp outputs are applicable even within the same input section.

There are universal bipolar inputs in CBI/SBI-12 too. But these have one common wire for the whole input section. Thus a common plus or minus should be selected for section depending on sensor type (npn or pnp) connected. Input circuits are designed according to an EN 61131-2 directive (type 1 input). Two-wire or three wire sensors can be wired to. Unit configuration (input signal filter setting) enables AC input voltages too.

There are bus connectors and bus address switches on the front panel. InCo bridge connectors (see) or 10-wire flat cables utilize bus interconnection including communication signals and supply voltage. LEDs indicate input states.

The unit is encapsulated in a compact DIN rail box. It has removable input screw terminal boxes.

INPUT SIGNAL CONNECTION

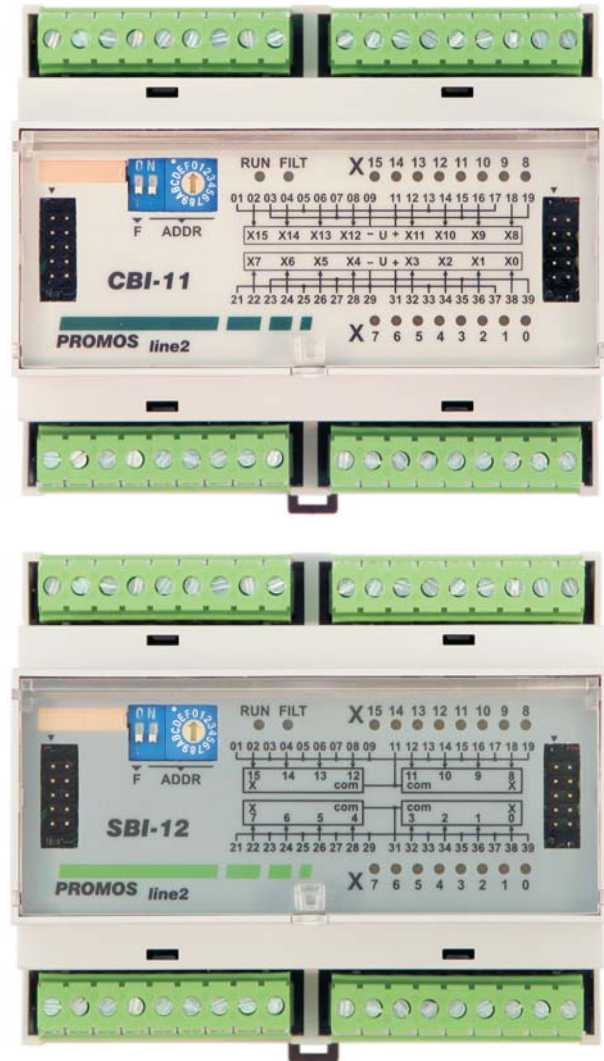
Reference potential for CBI/SBI-11 bipolar inputs is derived from external 24V supply by electronic divider. Thus positive and negative potential related inputs are allowed. Pnp or npn open collector output type sensors can be used individually observing the right polarity.

CBI/SBI-12 bipolar input circuits have one common wire for the whole section. Common plus or minus potentials are selected as needed. Increased 8mA input current allows two-wire 24V sensor use. Sensors can have 0,5mA max. load current.

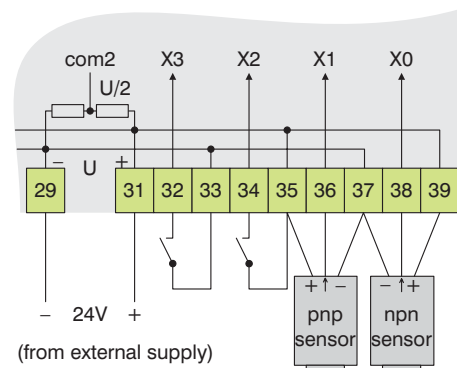
ORDER INFORMATION

Type	Order nr.	Version
CBI-11	EI5831.21	universal inputs 24 V=, CANopen interface
CBI-12	EI5832.11	bipolar inputs 12 V=, 12 V~, CANopen interface
CBI-12	EI5832.21	bipolar inputs 24 V=, 24 V~, CANopen interface
SBI-11	EI5531.21	universal inputs 24 V=, RS-485 interface, EpsNet, Modbus protocols
SBI-12	EI5532.11	bipolar inputs 12 V=, 12 V~, RS-485 interface, EpsNet, Modbus protocols
SBI-12	EI5532.21	bipolar inputs 24 V=, 24 V~, RS-485 interface, EpsNet, Modbus protocols

Accessories: InCo-xx, ICM-11 – bridge connectors
SMI-11/13 – galvanic RS-485 isolation / RS-232 to RS-485 converter
Unit type labels

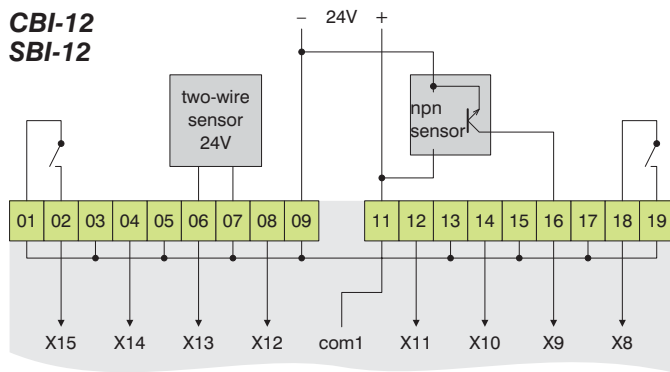


CBI-11
SBI-11



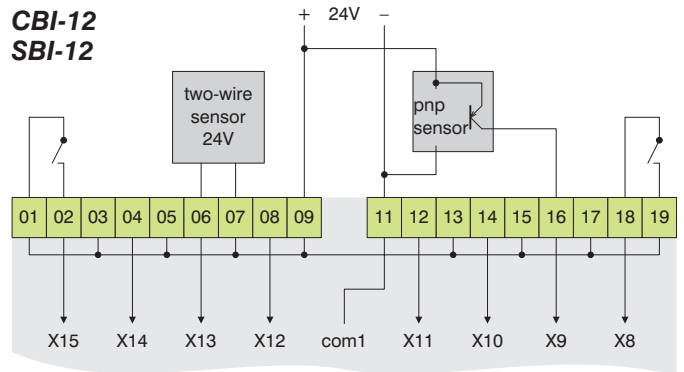
CANopen/serial module 16 logic inputs

**CBI-12
SBI-12**



Common minus potential CBI/SBI-12 input wiring

**CBI-12
SBI-12**



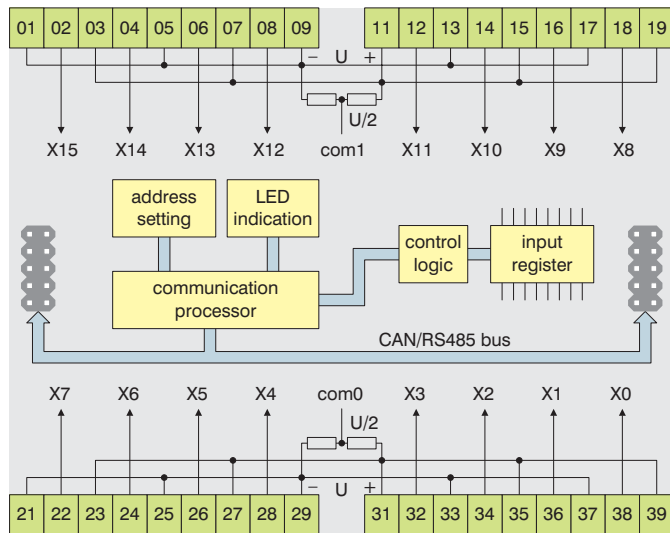
Common plus potential CBI/SBI-12 input wiring

SPECIFICATIONS

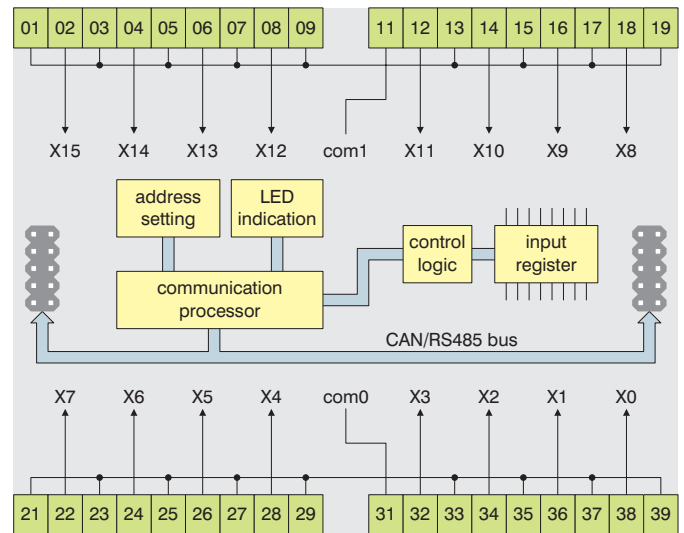
CBI-11/12	Communication protocol	CAN 2.0A / CANopen
	Transfer rate	typ. 500 kb/s
SBI-11/12	Communication protocol	Profibus/EpsNet, Modbus
	Transfer rate	300 ÷ 115200 Bd
	Total input count	16
	Section input count	8
	Input isolation	2500 V AC / 1 min
	Supply voltage/power	10 ÷ 30 V / 1,5 W
	Module outline w × h × d	106 × 90 × 73 mm
	Operation temperature range	-10 °C ÷ 50 °C
	Input signal filter	digital, 1 ÷ 255 ms

CBI-12/SBI-12	EI5x32.11	EI5x32.21
Inputs according to EN 61131-2	type 1	type 1
Input voltages	log. 0 max 2,4 V=	5 V=
	log. 1 min 5,6 V=	15 V=
	log. 1 typ 12 V=	24 V=
	log. 1 max 15 V=	30 V=
Input voltage	max. (1 s) 26 V=	40 V=
Input current	log. 1, typ 10 mA	8 mA
Max. input current	log. 0 0,5 mA	0,5 mA
CBI-11/SBI-11	EI5x31.21	
Supply voltage for inputs U_{in}	24 V, -15 % +20 %	
Max. switch voltage loss	6 V for $U_{in} = 24 V$ 2 V for $U_{in} = 20 V$	
Short circuit current	8 mA for $U_{in} = 24 V$	

BLOCK DIAGRAM AND SCREW TERMINAL POSITION



CBI/SBI-11 block diagram



CBI/SBI-12 block diagram

CBO-11/12, SBO-11/12



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- CBO-11/12 for CANopen interface
- SBO-11/12 for RS-485 interface, miscellaneous protocols
- 12 relays with 250 VAC / 8 A switches
- Removable screw terminal boxes
- CBO/SBO-11 has fast fuse for every section
- CBO/SBO-12 has separate screw terminals for all switch terminals.
- Output indication LEDs
- Easy DIN rail assembly

GENERAL INFORMATION

CBO-11/12 is a CANopen interface peripheral unit with 12 galvanic isolated outputs.

SBO-11/12 is a RS485 serial interface peripheral unit with 12 galvanic isolated outputs. Default firmware supports Profibus/EpsNet, Modbus and Profibus DP (under development) communication protocols.

There are relays used as switch elements. 250VAC relay switches utilize direct power-line load driving. For CBO/SBO-11 these switches are divided into 4 sections. Single phase loads, e.g. contactors, solenoid valves, servo-drives can be driven. Every section contains safety fuse. CBO/SBO-12 has separate screw terminals for all switch terminals. Switches utilize single phase power line load driving, e.g. contactors, solenoid valves, servo-drives etc. Output circuits are designed for reliable relay switch-off when communication with controller breaks.

There are bus connectors and bus address switches on the front panel. InCo bridge connectors (see) or 10-wire flat cables utilize bus interconnection including communication signals and supply voltage. LEDs indicate output states.

The unit is encapsulated in a compact DIN rail box. It has removable input screw terminal boxes.



SPECIFICATIONS

CBO-11/12

Communication protocol	CAN 2.0A / CANopen
Transfer rate	typ. 500 kb/s

SBO-11/12

Communication protocol	Profibus/EpsNet, Modbus
Transfer rate	300 ÷ 115200 Bd

Total output count	12, relay contact
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Relay contact parameters	250 V AC / 8 A 24 V DC / 8 A
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Switch-on contact resistivity	max. 30 mΩ
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Max. screw terminal current allowed	4 A
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Max voltage switched	250 V AC, 24 V DC=
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Max. power switched	1000 VA / 100 W
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Switch-on / off time	8 ms / 6 ms
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Contact lifetime	
– mechanical	5 × 10 ⁶ operations
– electrical (for 4 A current)	2 × 10 ⁵ operations

Isolation	4000 V AC / 1 min
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Supply voltage / current	10 ÷ 30 V / max 4 W
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Module outline w × h × d	106 × 90 × 73 mm
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Operation temperature range	–10 °C ÷ 50 °C
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ORDER INFORMATION

Typ	Order nr.	Version
CBO-11	EI5821.00	standard, CANopen interface
CBO-12	EI5822.00	standard, CANopen interface
SBO-11	EI5521.00	standard, RS-485 interface, EpsNet, Modbus protocols
SBO-12	EI5522.00	standard, RS-485 interface, EpsNet, Modbus protocols

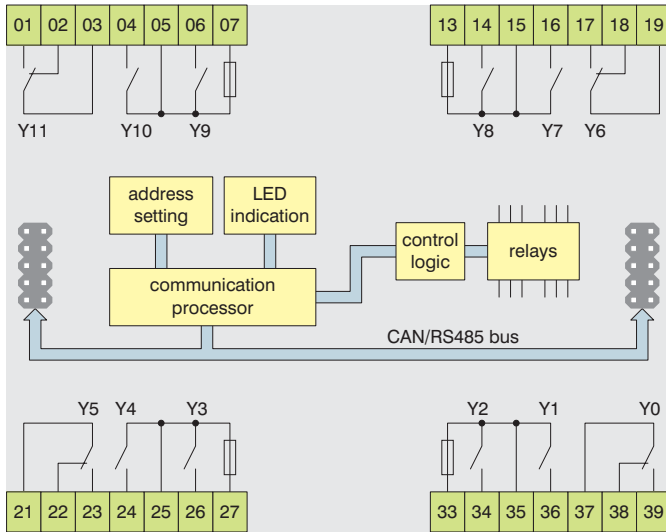
Accessories: InCo-xx, ICM-11 – bridge connectors
SMI-11/13 – galvanic RS-485 isolation / RS-232 to RS-485 converter
Unit type labels



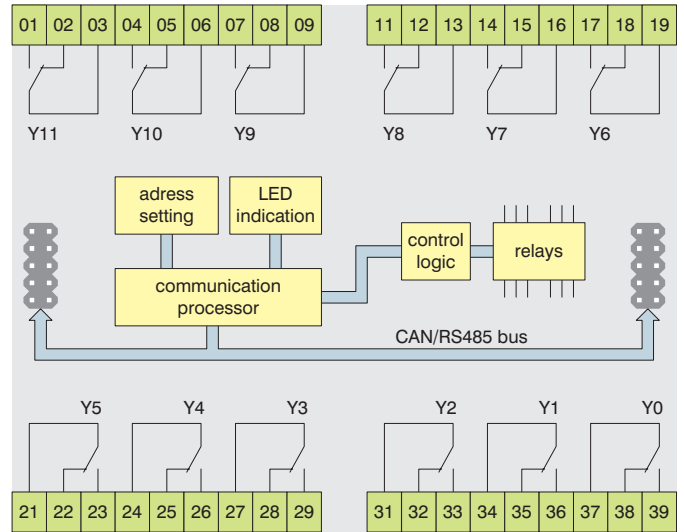
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CANopen/serial module 12 relay outputs

BLOCK DIAGRAM AND SCREW TERMINAL POSITION



Block diagram and screw terminal position CBO/SBO-11

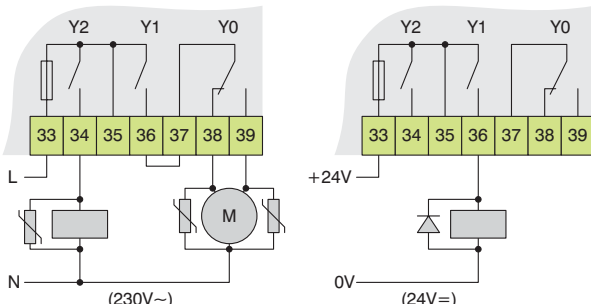


Block diagram and screw terminal position CBO/SBO-12

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CBO/SBO-11 INDUCTIVE LOAD CONNECTION

While switching inductive loads transient pulses are generated. These must be blocked by varistors (for AC loads, 24V~, 220V~) or diodes (for DC loads).

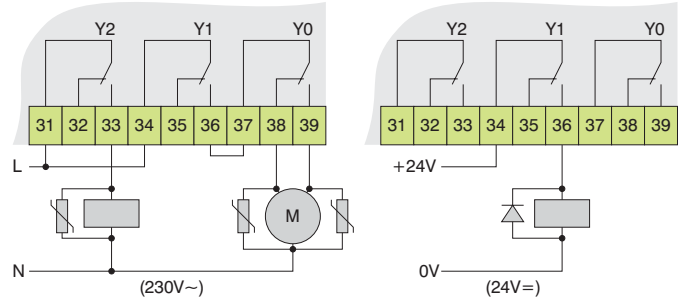


Varistor blocks AC inductive load transients. Varistor and load should be as closed as possible.

Diode blocks DC inductive load transients.

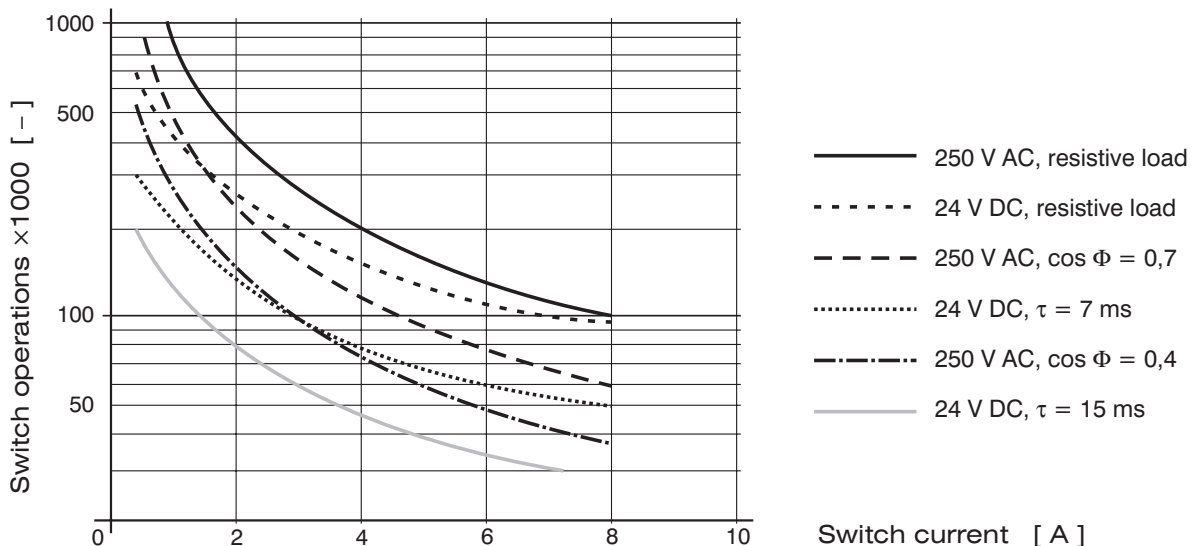
CBO/SBO-12 INDUCTIVE LOAD CONNECTION

While switching inductive loads transient pulses are generated. These must be blocked by varistors (for AC loads, 24V~, 220V~) or diodes (for DC loads).



Varistor blocks AC inductive load transients. Varistor and load should be as closed as possible.

Diode blocks DC inductive load transients.



Switch lifetime (switch operation total count) as a function of switched current (applicable for all relay modules)

CBIO-11/12, SBIO-11/12



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- **CBIO-11/12 for CANopen interface**
- **SBIO-11/12 for RS-485 serial interface, miscellaneous protocols**
- **8 galvanic isolated 12 / 24 V inputs**
- **DC and AC input signals allowed**
- **Digital input filters**
- **8 relays with 250 V AC / 8 A switches**
- **Removable screw terminal boxes**
- **CBIO/SBIO-11 has fast fuse for every section**
- **CBIO/SBIO-12 has separate screw terminals for all switch terminals**
- **Input and output indication LEDs**
- **Easy DIN rail assembly**

GENERAL INFORMATION

CBIO-11/12 is an input/output peripheral unit for CANopen interface.

SBIO-11/12 is an input/output peripheral unit for RS485 serial interface. Default firmware supports Profibus/EpsNet, Modbus and Profibus DP (under development) communication protocols.

The unit contains 8 logic inputs and 8 relay outputs. These galvanic isolated inputs accept 12V bipolar input voltage range or 24V range related to one common wire. Common plus or minus wiring is possible depending on sensor type (npn or pnp) used. Microcontroller unit features digital input signal filtering. Unit configuration (input signal filter setting) enables AC input voltage too.

There are relays used as switch elements. 250VAC relay switches utilize direct power-line load driving. Output circuits are designed for reliable relay switch-off when communication with controller breaks.

CBIO-SBIO-11 switches are divided into 3 sections. Single phase loads, e.g. contactors, solenoid valves, servo-drives can be driven. There is a safety fuse in every section.

CBIO/SBIO-12 has separate screw terminals for all switch terminals. Switches utilize single phase power line load driving, e.g. contactors, solenoid valves, servo-drives etc.

There are bus connectors and bus address switches on the front panel. InCo bridge connectors (see) or 10-wire flat cables



utilize bus interconnection including communication signals and supply voltage. LEDs indicate input and output states.

The unit is encapsulated in a compact DIN rail box. It has removable input screw terminal boxes.

ORDER INFORMATION

Typ	Order nr.	Version
CBIO-11	EI5851.10	bipolar inputs 12 V =/~, CANopen interface
	EI5851.20	bipolar inputs 24 V =/~, CANopen interface
CBIO-12	EI5852.10	bipolar inputs 12 V =/~, CANopen interface
	EI5852.20	bipolar inputs 24 V =/~, CANopen interface
SBIO-11	EI5551.10	bipolar inputs 12 V =/~, RS-485 interface, EpsNet, Modbus protocols
	EI5551.20	bipolar inputs 24 V =/~, RS-485 interface, EpsNet, Modbus protocols
SBIO-12	EI5552.10	bipolar inputs 12 V =/~, RS-485 interface, EpsNet, Modbus protocols
	EI5552.20	bipolar inputs 24 V =/~, RS-485 interface, EpsNet, Modbus protocols

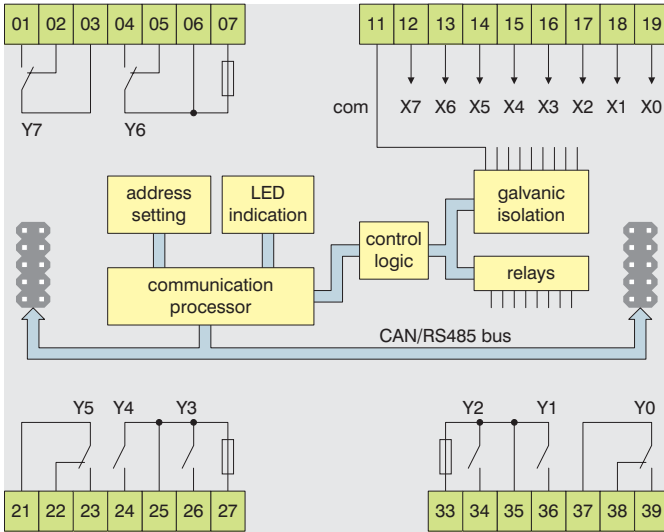
Accessories: InCo-xx, ICM-11 – bridge connectors
SMI-11/13 – galvanic RS-485 isolation / RS-232 to RS-485 converter
Unit type labels



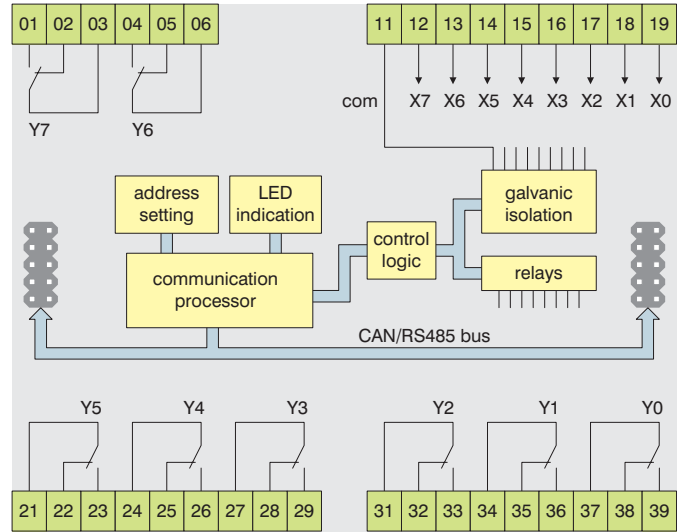
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CANopen/serial module 8 logic inputs + 8 relay outputs

BLOCK DIAGRAM AND SCREW TERMINAL POSITION



Block diagram and screw terminal position CBIO/SBIO-11



Block diagram and screw terminal position CBIO/SBIO-12

SPECIFICATIONS

CBIO-11/12

Communication protocol CAN 2.0A / CANopen
 Transfer rate typ. 500 kb/s

SBIO-11/12

Communication protocol Profibus/EpsNet, Modbus
 Transfer rate 300 ÷ 115200 Bd

Inputs

		EI5x52.10	EI5x52.20
Input voltage	log. 0 max	2,4 V=	5 V=
	log. 1 min	5,6 V=	15 V=
	log. 1 typ	12 V=	24 V=
	log. 1 max	15 V=	30 V=
	max. (1 s)	26 V=	40 V=
Input current	log. 1, typ	10 mA	16 mA
	log. 0	0,5 mA	2 mA

Input signal filter digital, 1 ÷ 255 ms
 Input isolation 2500 V AC/1 min

Relay contact parameters 250 V AC / 8 A
 24 V DC / 8 A

Switch on contact resistivity max. 30 mΩ
 Max. screw terminal current allowed 4 A

Max. switched voltage 250 V AC, 24 V DC
 Max. switched power 1000 VA / 100 W

Switch on / off time 8 ms / 6 ms
 Contact lifetime

- mechanical 5×10^6 operations
- electrical^{*)} (proud 4 A) 2×10^5 operations

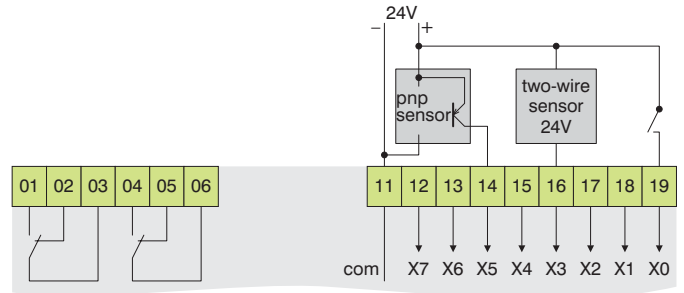
Isolation 4000 V AC/1 min
 Supply voltage/power 10 ÷ 30 V / max. 3,5 W

Module outline w × h × d 106 × 90 × 73 mm
 Operation temperature range -10 °C ÷ 50 °C

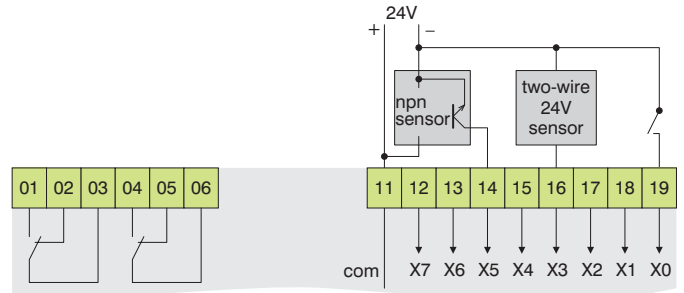
^{*)} See 2-9 for CBO/SBO figure of switch lifetime as a function of switched current.

INPUT AND OUTPUT SIGNAL CONNECTION

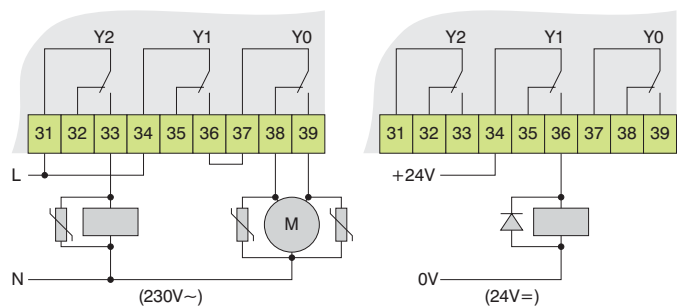
CBIO-11/12 and SBIO-11/12 have bipolar input circuits. Positive and negative potential related inputs are allowed.



Common plus potential input wiring



Common minus potential input wiring



Varistor blocks AC inductive load transients. Varistor and load should be as closed as possible.

Diode blocks DC inductive load transients.

While switching inductive loads transient pulses are generated. These must be blocked by varistors (for AC loads, 24V~, 220V~) or diodes (for DC loads).

CAIO-12 SAIO-12



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- CAIO-12 for CANopen interface
- SAIO-12 for RS-485 serial interface, miscellaneous protocols
- Max. 12 universal analog (AD) inputs
- Miscellaneous measure ranges, 16-bit AD
- Temperature sensor linearization, digital filter
- Two binary for one analog input substitution
- Max. 6 U, I analog (DA) outputs
- Auto identification of plug-in module type
- Easy DIN rail assembly

GENERAL INFORMATION

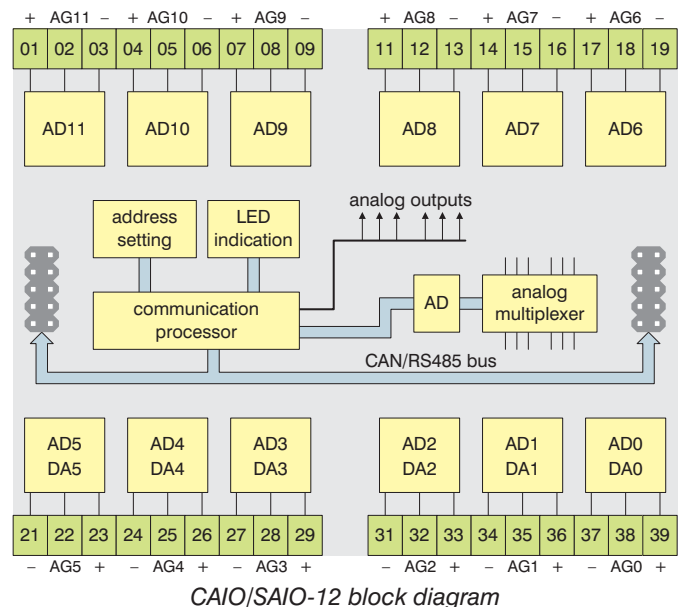
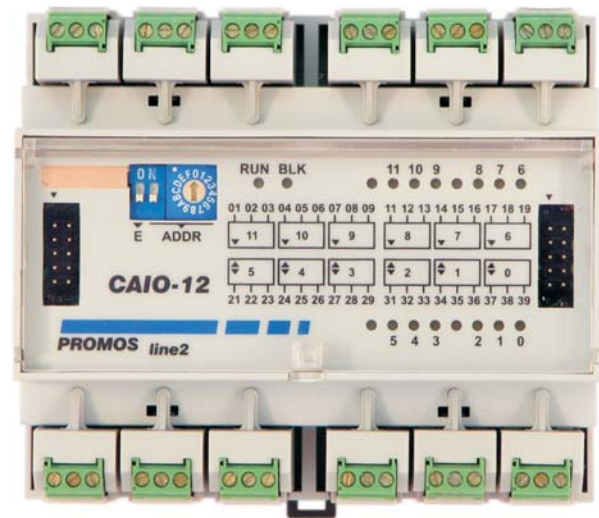
CAIO-11/12 is a peripheral unit with CANopen interface. It contains 12 universal slots for plug-in input/output modules. SAIO-11/12 is a peripheral unit with serial RS485 interface. Default firmware supports Profibus/EpsNet, Modbus and Profibus DP (under development) communication protocols. The unit contains 12 universal slots for plug-in input/output modules.

Built-in microcontroller utilizes function and interface control. There are bus address and enable switches on the front panel. InCo bridge connectors (see ..) or 10-wire flat cables utilize bus interconnection including communication signals and supply voltage. The unit is encapsulated in a compact DIN rail box.

There are analog multiplexer, AD converter and 12 universal slots for plug-in configure I/O modules on unit main board. Module exchange doesn't require unit disassembly. Only power must be switched off. Main board utilizes plug-in module type auto identification and appropriate linearization and scaling.

Analog input modules can be plugged into any slot of unit. Its operational amplifier and resistor network modifications feature voltage, current and resistance measurements and Pt100, Ni1000 or KTY resistive sensors direct connection. Module with two binary inputs can substitute one analog input. Plug-in module is encapsulated in plastic box. Unused slots can be left open.

There are six slots featuring analog output module plug-in. These modules contain filter and output amplifier and utilizes PWM of microprocessor outputs.



CAIO/SAIO-12 block diagram

SPECIFICATIONS

CAIO-11/12		
Communication protocol	CAN 2.0A / CANopen	
Transfer rate	typ. 500 kb/s	
SAIO-11/12		
Communication protocol	Profibus/EpsNet, Modbus	
Transfer rate	300 ÷ 115200 Bd	
Analog inputs , resolution		16 bits
Max. input amplifier gain		100
Measure ranges ^{1) 2)}		
voltage (unipolar)	50 mV ÷ 10 V	
current (unipolar)	1 ÷ 40 mA	
resistance (direct measurement)	5 ÷ 100 kΩ	
resistance transmitters	105, 130, 600 Ω	

	temperature sensors	Pt100, Ni1000, KTY...
Binary inputs		2 inputs / slot
Inputs according to EN 61131-2		type 1
Isolation		2500 V AC / 1 min
Analog outputs , resolution		8 bits
Output range		U / I module type options EPOU, EPOI
Supply voltage / power		10 ÷ 30 V / max. 4 W
Module outline w × h × d		106 × 90 × 73 mm
Operation temperature range		-10 °C ÷ 50 °C
¹⁾ Limits only, individual measure ranges depends on EAI..		
²⁾ Other sensors connection possible on special order.		

ORDER INFORMATION

Typ	Order nr.	Version
CAIO-12	EI5842.00	standard, CANopen interface
SAIO-12	EI5542.00	standard, RS-485 serial interface, EpsNet, Modbus protocols

Accessories: EAIx..., EPOx..., EBI plug-in modules for universal slots – ordered individually (see 2-13)
InCo-xx, ICM-11 – bridge connectors
SMI-11/13 – galvanic RS-485 isolation / RS-232 to RS-485 converter
Unit type labels



EAIU, EAIV – plug-in analog voltage input

Type	Order nr.	Voltage range	$U_{INMax}^{1)}$
EAIU-02	EI5950.02	20 V	± 40 V
✓ EAIU-12	EI5950.12	10 V	± 25 V
EAIU-22	EI5950.22	5 V	± 15 V
EAIU-32	EI5950.32	2 V	± 10 V
✓ EAIU-42	EI5950.42	1 V	± 10 V
EAIU-52	EI5950.52	500 mV	± 10 V
EAIU-62	EI5950.62	200 mV	± 10 V
EAIU-72	EI5950.72	100 mV	± 10 V
EAIU-9..	EI5950.9..	other	–
EAIV-02	EI5951.02	20 V	± 100 V
✓ EAIV-12	EI5951.12	10 V	± 150 V
EAIV-22	EI5951.22	5 V	± 80 V
✓ EAIV-92	EI5951.92	35 V	± 200 V
EAIV-9..	EI5951.9..	other	–

EAI – plug-in analog current input

Type	Order nr.	Current range	$U_{INMax}^{1)}$
EAI-02	EI5952.02	40 mA	± 10 V
✓ EAI-12	EI5952.12	20 mA	± 10 V
EAI-22	EI5952.22	10 mA	± 10 V
EAI-32	EI5952.32	5 mA	± 10 V
EAI-9..	EI5952.9..	other	–

EAIR – plug-in for direct resistance measurement

Type	Order nr.	Range	Current
EAIR-01	EI5953.01	5 k Ω	1 mA
EAIR-11	EI5953.11	10 k Ω	500 μ A
✓ EAIR-21	EI5953.21	20 k Ω	250 μ A
EAIR-31	EI5953.31	50 k Ω	100 μ A
✓ EAIR-41	EI5953.41	100 k Ω	50 μ A
EAIR-9..	EI5953.9..	other	–

EAIB – plug-in for bridge resistance measurement

Type	Order nr.	Signal source	Range
EAIB-00	EI5954.00	resistor detector	105 Ω
✓ EAIB-01	EI5954.01	resistor detector	130 Ω
EAIB-02	EI5954.02	resistor detector	600 Ω
✓ EAIB-03	EI5954.03	resistor detector	1000 Ω

EAIS – plug-in for KTY thermometer

Type	Order nr.	Signal source	Range
EAIS-01	EI5958.01	KTY10-6	$-50 \div 50$ °C
✓ EAIS-02	EI5958.02	KTY10-6	$-50 \div 100$ °C
EAIS-03	EI5958.03	KTY10-6	$0 \div 100$ °C
EAIS-11	EI5958.11	KTY81-110	$-50 \div 50$ °C
✓ EAIS-12	EI5958.12	KTY81-110	$-50 \div 100$ °C
EAIS-13	EI5958.13	KTY81-110	$0 \div 100$ °C
EAIS-21	EI5958.21	KTY81-210	$-50 \div 50$ °C
✓ EAIS-22	EI5958.22	KTY81-210	$-50 \div 100$ °C
EAIS-23	EI5958.23	KTY81-210	$0 \div 100$ °C

EAIN – plug-in for Ni1000 thermometer

Type	Order nr.	Signal source	Range aprox.
✓ EAIN-610	EI5956.610	Ni1000/5000 ppm	$-50 \div 150$ °C
✓ EAIN-611	EI5956.611	Ni1000/6180 ppm	$-50 \div 150$ °C
✓ EAIN-612	EI5956.612	Ni891/6371 ppm	$-50 \div 150$ °C
EAIN-620	EI5956.620	Ni1000/5000 ppm	$-50 \div 250$ °C
EAIN-621	EI5956.621	Ni1000/6180 ppm	$-50 \div 250$ °C
EAIN-622	EI5956.622	Ni891/6371 ppm	$-50 \div 250$ °C
EAIN-9..	EI5956.9..	other	

Eaip – plug-in for Pt100, Pt500, Pt1000 thermometer

Type	Order nr.	Signal source	Range aprox.
EAIp-600	EI5957.600	Pt100	$-200 \div 50$ °C
✓ EAIp-610	EI5957.610	Pt100	$-50 \div 150$ °C
✓ EAIp-620	EI5957.620	Pt100	$0 \div 300$ °C
EAIp-630	EI5957.630	Pt100	$0 \div 600$ °C
EAIp-601	EI5957.601	Pt500	$-200 \div 50$ °C
✓ EAIp-611	EI5957.611	Pt500	$-50 \div 150$ °C
✓ EAIp-621	EI5957.621	Pt500	$0 \div 300$ °C
EAIp-631	EI5957.631	Pt500	$0 \div 600$ °C
EAIp-602	EI5957.602	Pt1000	$-200 \div 50$ °C
✓ EAIp-612	EI5957.612	Pt1000	$-50 \div 150$ °C
✓ EAIp-622	EI5957.622	Pt1000	$0 \div 300$ °C
EAIp-632	EI5957.632	Pt1000	$0 \div 600$ °C
EAIp-9..	EI5957.9..	other	

EPOU – plug-in analog voltage output

Type	Order nr.	Output range
✓ EPOU-00	EI5981.00	$0 \div 10$ V
EPOU-10	EI5981.10	$0 \div 5$ V
EPOU-20	EI5981.20	$0 \div 2$ V
EPOU-30	EI5981.30	$0 \div 1$ V
EPOU-9..	EI5981.9..	other

EPOI – plug-in analog current output

Type	Order nr.	Output range
✓ EPOI-00	EI5983.00	$0 \div 20$ mA
EPOI-10	EI5983.10	$0 \div 10$ mA
EPOI-20	EI5983.20	$0 \div 5$ mA
EPOI-30	EI5983.30	$0 \div 2$ mA
EPOI-40	EI5983.40	$0 \div 1$ mA
EPOI-9..	EI5983.9..	other

EBI – plug in for two binary inputs

Type	Order nr.	Output parameters			
		$U_{in H}$ min/typ/max	$U_{in max}$ / 1s	$U_{in L}$ max.	I_{in} typ.
EBI-10	EI5971.00	4,5 / 5 / 6,5 V	8 V	1,5 V	8 mA
✓ EBI-11	EI5971.10	5,6 / 12 / 15 V	26 V	2,4 V	10 mA
✓ EBI-12	EI5971.20	11 / 24 / 30 V	40 V	5 V	8 mA

¹⁾ max. input voltage related to AGND

✓ These items are preferred types. Other types have additional charge and longer delivery time.