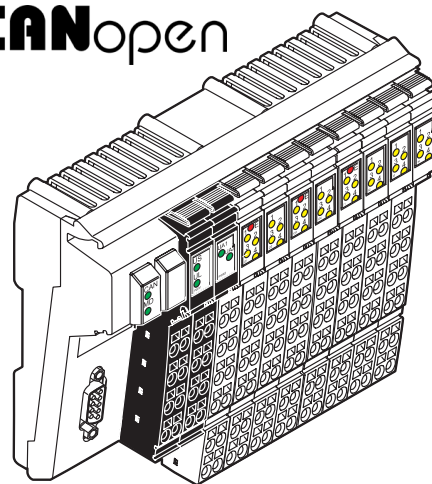


CANopen

ILB CO 24 DI16 DO16

Inline Block IO module for CANopen
with 16 digital inputs and 16 digital outputs



AUTOMATION

Data sheet
6884_en_05

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1 Description

The ILB CO 24 DI16 DO16 module is designed for use within a CANopen network. It is used to acquire and output digital signals.

1.1 CANopen features

- Direct peer-to-peer communication
- Alarm messages
- Error states and values
- Configurable baud rates: 10 kbaud to 1 Mbaud
- Trigger modes: event, timer, remote request
- Node guarding and heartbeat

1.2 Input features

- Connections for 16 digital sensors
- Connection of sensors in 2 and 3-wire technology
- Maximum permissible load current per sensor: 125 mA
- Maximum permissible load current from the sensor supply: 2.0 A
- Diagnostic and status indicators

1.3 Output features

- Connections for 16 digital actuators
- Connection of actuators in 2 and 3-wire technology
- Nominal current per output: 0.5 A
- Total current of all outputs: 8 A
- Short-circuit and overload protected outputs
- Diagnostic and status indicators



This data sheet applies to modules with firmware version 3.06 or later.
Modifications from firmware version 3.09 onwards are also indicated.



Please refer to the "Assembly and Removal of Inline Block IO Modules" application note (see "Ordering data" on page 2).



Make sure you always use the latest documentation.
It can be downloaded at www.download.phoenixcontact.com.
Here you will also find the current EDS file.
A conversion table is available on the Internet at www.download.phoenixcontact.com/general/7000_en_00.pdf.

2 Ordering data

Products

Description	Type	Order No.	Pcs./Pkt.
Inline Block IO module for CANopen with 16 digital inputs and 16 digital outputs	ILB CO 24 DI16 DO16	2862592	1

Accessories: Connector

Description	Type	Order No.	Pcs./Pkt.
9-pos. D-SUB connector with screw-cage terminal connection for CAN systems according to ISO/DIN 11 898	SUBCON-PLUS-CAN	2744694	1

Accessories: Connectors as replacement item

Description	Type	Order No.	Pcs./Pkt.
Connector for the supply (color print)	IB IL SCN-PWR IN-CP	2727637	5
Connector, with color print, for digital 4-channel or 16-channel Inline input terminals	IB IL SCN-12-ICP	2727611	10
Connector, with color print, for digital 4-channel or 16-channel Inline output terminals	IB IL SCN-12-OPC	2727624	10

Accessories: Other

Description	Type	Order No.	Pcs./Pkt.
Recommended end clamp; placed both to the right and left of the module to secure it on the DIN rail	CLIPFIX 35-5	3022276	50

Documentation

Description	Type	Order No.	Pcs./Pkt.
"Assembly and Removal of Inline Block IO Modules" application note	AH ILB INSTALLATION	9014931	1
"Addressing of 16-Channel ILB Modules" application note	AH ILB 24 DI/DO 16 ADDRESS	9014962	1
Configuring a CANopen System Using Devices of the Fieldline Product Range" user manual	UM EN FLS CO SYS PRO	-	-

3 Technical data

General data

Housing dimensions with connectors (width x height x depth)	156 mm x 55 mm x 141 mm
Weight	500 g (with connectors)
Operating mode	Process data mode with 4 bytes
Transmission speed	10 kbaud to 1Mbaud
Connection method for sensors and actuators	2 and 3-wire technology

Housing dimensions

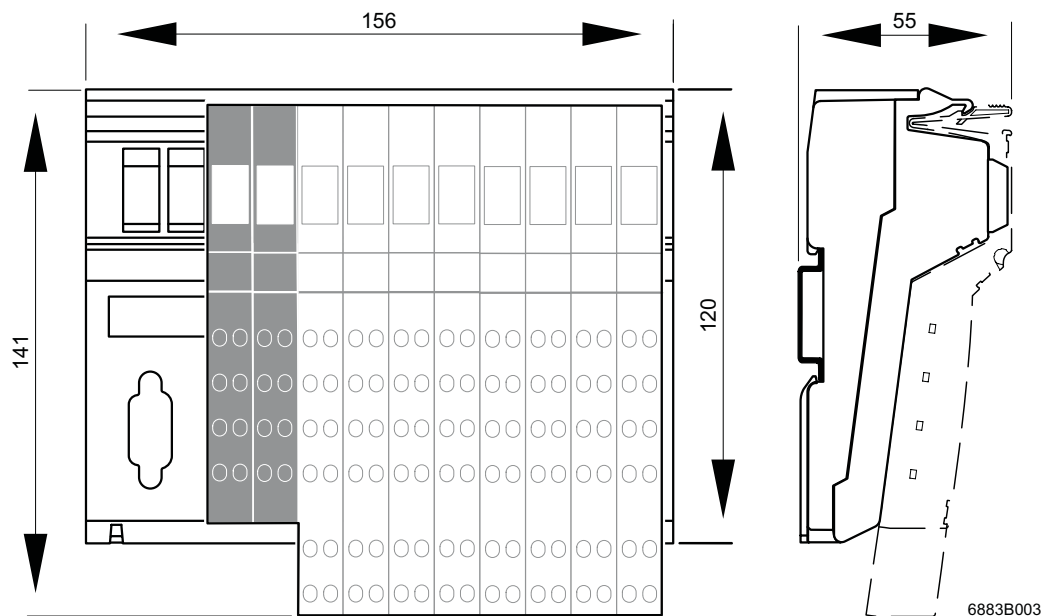


Figure 1 Module housing dimensions (in mm)

Ambient conditions

Regulations	Developed according to VDE 0160/EN 50178/IEC 62103, UL 508
Ambient temperature (operation)	-25°C to +60°C
Ambient temperature (storage/transport)	-25°C to +85°C
Humidity (operation/storage/transport)	10% to 95% according to EN 61131-2
Air pressure (operation)	80 kPa to 108 kPa (up to 2000 m above sea level)
Air pressure (storage/transport)	66 kPa to 108 kPa (up to 3500 m above sea level)
Degree of protection according to IEC 60529	IP20
Class of protection	Class 3 according to VDE 0106/IEC 60536
Air and creepage distances	According to DIN VDE 0110/IEC 60664, IEC 60664A, DIN VDE 0160/EN 50178/IEC 62103
Housing material	Plastic, PVC-free, PBT, self-extinguishing (V0)
Pollution degree according to EN 60664-1/IEC 60664-1, EN 61131-2/IEC 61131-2	2; condensation not permitted during operation
Surge voltage class	II

Electrical isolation/isolation of the voltage areas**Test distance**

CANopen / I/O	500 V AC, 50 Hz, 1 min
CANopen / functional earth ground	500 V AC, 50 Hz, 1 min
I/O / functional earth ground	500 V AC, 50 Hz, 1 min

Test voltage**Mechanical requirements**

Vibration test, sinusoidal vibrations according to EN 60068-2-6/IEC 60068-2-6	5g load, 2.5 hours in each direction
Shock test according to EN 60068-2-27/IEC 60068-2-27	25g load for 11 ms, half sinusoidal wave, 3 shocks in each direction and orientation
Broadband noise according to EN 60068-2-64/IEC 60068-2-64	0.78g load, 2.5 hours in each direction

Conformance with EMC directive 2004/108/EC**Noise immunity test according to EN 61000-6-2**

Electrostatic discharge (ESD)	EN 61000-4-2 IEC 61000-4-2	Criterion B 6 kV contact discharge 8 kV air discharge
Electromagnetic fields	EN 61000-4-3 IEC 61000-4-3	Criterion A Field strength: 10 V/m
Fast transients (burst)	EN 61000-4-4/ IEC 61000-4-4	Criterion B Remote bus: 2 kV Power supply: 2 kV I/O cables: 2 kV Criterion A All interfaces: 1 kV
Surge voltage	EN 61000-4-5 IEC 61000-4-5	Criterion B DC supply lines: ± 0.5 kV/ ± 1.0 kV (symmetrical/asymmetrical) Signal lines: ± 0.5 kV/ ± 0.5 kV (symmetrical/asymmetrical)
Conducted interference	EN 61000-4-6 IEC 61000-4-6	Criterion A Test voltage 10 V

Noise emission test according to EN 61000-6-4

Noise emission of housing	EN 55011	Class A
---------------------------	----------	---------

Interface

CANopen interface	RS-485; D-SUB connector; shielding directly connected with functional earth ground
-------------------	--

24 V module supply (communications power, sensor supply, and actuator supply; U_L , U_S , and U_A)

Nominal value	24 V DC
Tolerance	-15%/+20% according to EN 61131-2
Ripple	$\pm 5\%$ according to EN 61131-2
Permissible range	19.2 V DC to 30.0 V DC
Current consumption at U_L	25 mA
Current consumption at U_S	2 A
Current consumption at U_{A1} and U_{A2}	4 A each
Safety equipment for communications power	Surge protection and protection against polarity reversal
Safety equipment for sensor supply	Surge, overload and short-circuit protection
Safety equipment for actuator supply	Surge protection
Connection	Via power connectors

Digital outputs

Number	16
Connection method for actuators	2 and 3-wire technology
Nominal output voltage U_{OUT}	24 V DC

Digital outputs (continued)	
Differential voltage at I_{nom}	≤ 1 V
Nominal current I_{nom} per channel	0.5 A
Total current	2 x 4 A
Protection	Short-circuit and overload protection
Nominal load	
Ohmic	48 Ω /12 W
Lamp	12 W
Inductive	12 VA (1.2 H, 50 Ω)
Switching frequency with nominal inductive load	0.5 Hz, maximum (1.2 H, 50 Ω)
Overload response	Auto restart
Response with inductive overload	Output may be damaged
Reverse voltage protection against short pulses	Protected against reverse voltages
Resistance to permanently applied reverse voltages	Protected against reverse voltages, permissible current 2 A, maximum
Validity of output data after connecting the 24 V supply voltage (power up)	5 ms, typical
Response upon power down	The output follows the supply voltage without delay.
Limitation of the voltage induced on circuit interruption	-41.0 V
One-time maximum energy in free running	1 J, maximum
Protective circuit type	Integrated free running circuit in the output chip
Overcurrent shutdown	0.7 A, minimum
Maximum output current when switched off	10 μ A



When not loaded, a voltage can be measured even at an output that is not set.

Digital inputs	
Number	16
Connection method for sensors	2 and 3-wire technology
Input design	According to EN 61131-2 Type 1
Definition of switching thresholds	
Maximum low-level voltage	$U_{Lmax} < 5$ V
Minimum high-level voltage	$U_{Hmin} > 15$ V
Common potentials	Sensor supply U_S , ground
Nominal input voltage U_{IN}	24 V DC
Permissible range	-30 V < U_{IN} < +30 V DC
Nominal input current for U_{IN}	5 mA, typical
Current flow	Linear in the range 1 V < U_{IN} < 30 V
Delay time	≤ 500 μ s
Response time to status change	7 ms, maximum
Permissible cable length to the sensor	100 m
Use of AC sensors	AC sensors in the voltage range < U_{IN} are limited in application

Typical power dissipation with 24 V supply voltage

Formula to calculate the power dissipation of the electronics

$$P_{TOT} = 1.92 \text{ W} + I_S^2 \times 0.06 \Omega + \sum_{i=1}^n (0.04 \text{ W} + I_{Li}^2 \times 0.28 \Omega) + \sum_{j=1}^m 0.125 \text{ W}$$

Where
 P_{TOT} Total power dissipation of the module
 I_S Current from the sensor supply
i Index
n Number of set outputs ($n = 1$ to 16)
 I_{Li} Load current of output *i*
j Index
m Number of set inputs ($n = 1$ to 16)

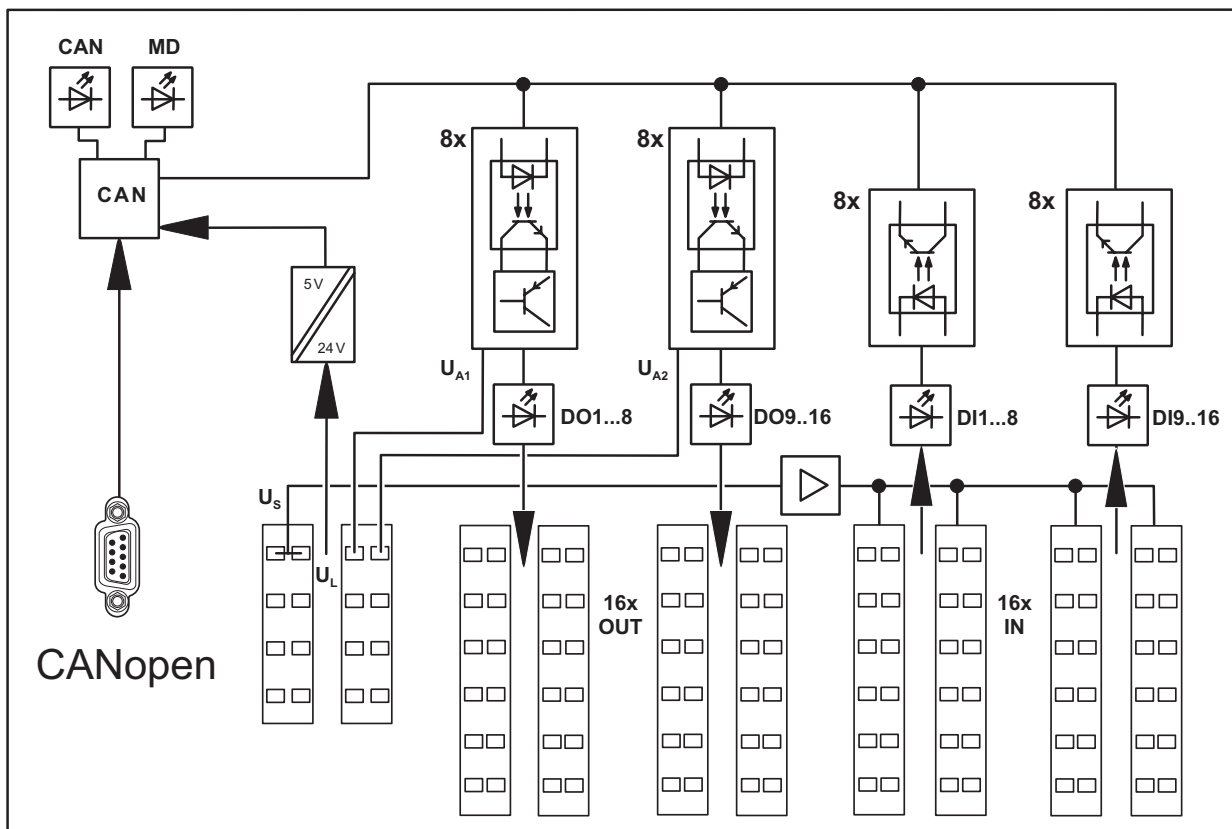
Limitation of simultaneity, derating

No limitation of simultaneity, no derating

Approvals

For the latest approvals, please visit www.download.phoenixcontact.com or www.eshop.phoenixcontact.com.







4 Internal circuit diagram



6884A002

Figure 2 Internal wiring of the terminal points

Key:

-  LED
-  CANopen protocol chip (bus logic)
-  Power supply unit with electrical isolation
-  Optocoupler
-  Short-circuit-proof output
-  Short-circuit-proof sensor supply

5 Local diagnostic and status indicators

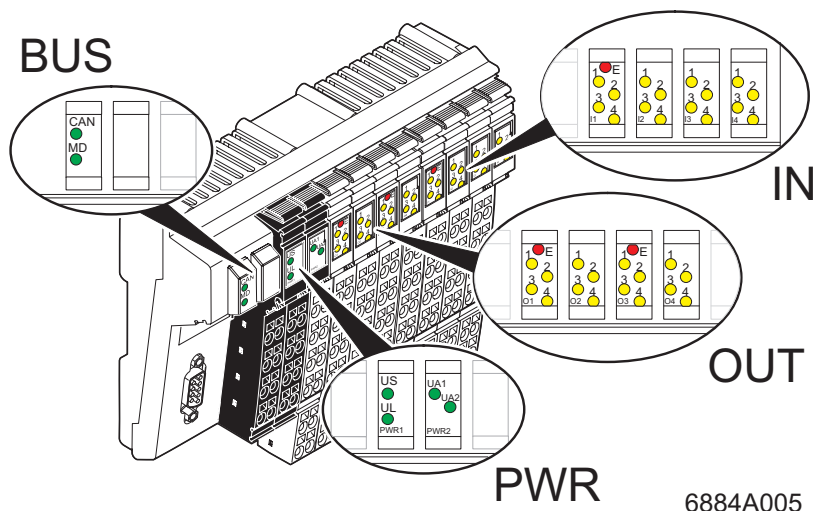


Figure 3 Diagnostic and status indicators of the ILB CO 24 DI16 DO16 module

Designation	Color	Meaning
BUS		
CAN	Red/green LED	CANopen status <div style="border: 1px solid black; padding: 5px; display: inline-block;"> The "CAN" LED may flash green and red at the same time. </div>
	ON (green)	"Operational" status: Device is ready to operate.
	2 Hz (medium) Flashing (green)	"Pre-Operational" status: PDO transmission not possible
	0.5 Hz (slow) Flashing (green)	"Stopped" status: Failsafe status, no PDO transmission possible
	Flashing (green/red)	Automatic baud rate detection or LSS service running
	ON (red)	CAN controller is not connected to the bus.
	One flash (red)	At least one error counter has reached the warning level.
	Two flashes (red)	A guard event or heartbeat event has been triggered.
	Three flashes (red)	Sync timeout error
	OFF	Supply voltage U_L is missing or module in reset state
MD	ON (green)	Device is ready to operate.
	ON (red)	Serious error, replace device.
	Flashing (red)	Minor error (e.g., DO short circuit)
	Flashing (red/green)	Module in selftest state
	OFF	Supply voltage U_L is missing or module in reset state
PWR		
US	Green	Sensor supply
UL	Green	24 V communications power
UA1	Green	Actuator supply 1 (connector 3 and connector 4 for actuators)

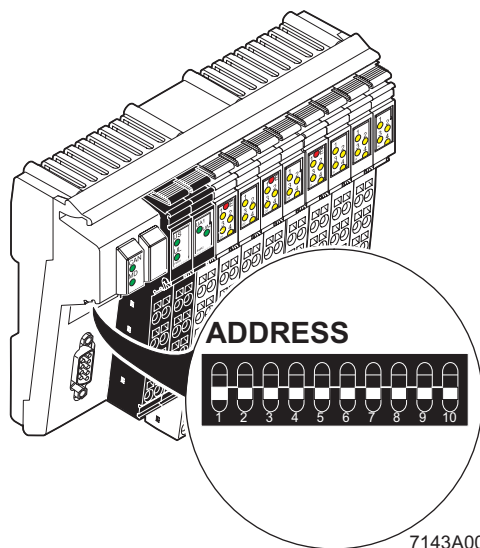
Designation	Color	Meaning
UA2	Green	Actuator supply 2 (connector 5 and connector 6 for actuators)
OUT		
E	Red	Short circuit or overload at one of the outputs
1 to 4	Yellow	Status indicators of the outputs
IN		
E	Red	Short circuit or overload of the sensor supply
1 to 4	Yellow	Status indicators of the inputs



If the error LED (E) of a group of eight outputs lights up, this indicates that a short circuit or overload is present at one or more of the outputs in this group.

6 Address and baud rate settings

Configure the hardware on the module using the 10-pos. DIP switch. This switch can be used to set the CANopen address and baud rate. For the meaning of the switches, please refer to the following tables.



7143A005

Figure 4 DIP switches of the module

DIP switch 1 is the LSB (least significant bit) of the node ID and DIP switch 8 is the MSB 7 (most significant bit). Valid node ID settings range from 1 to 127.



Switch the power off and back on to accept address changes.

Address DIP switch settings							
SW1	SW2	SW3	SW4	SW5	SW6	SW7	
1	2	4	8	16	32	64	ON
0	0	0	0	0	0	0	OFF

The CANopen transmission speed is set using DIP switches 8 to 10. The following table shows the switch settings for different baud rates.

Baud rate DIP switch settings			
SW8	SW9	SW10	Baud
ON	ON	ON	1 M
ON	ON	OFF	500 k
ON	OFF	ON	250 k
ON	OFF	OFF	125 k
OFF	ON	ON	50 k
OFF	ON	OFF	20 k
OFF	OFF	ON	10 k
OFF	OFF	OFF	Autobaud

7 Connecting CANopen, the supply, actuators, and sensors

7.2 Connecting the supply, actuators, and sensors

7.1 Connecting CANopen

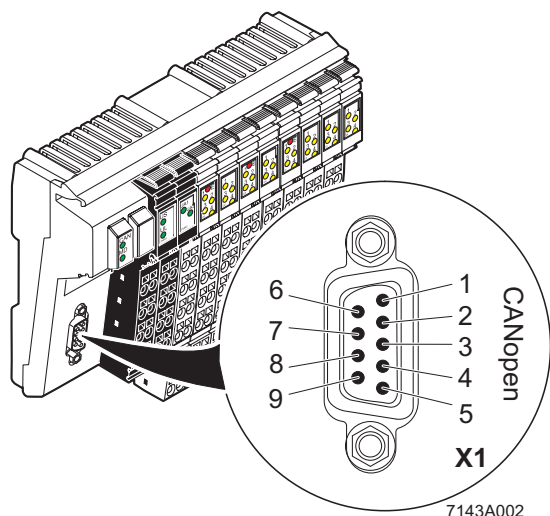


Figure 5 D-SUB connection on the module (male)

Connect CANopen to the module via a 9-pos. D-SUB connector (female). For the pin assignment, please refer to the following table:

PIN	Signal	Description
1	Not used	Reserved
2	CAN_L	CAN_L bus line (dominant low)
3	CAN_GND	CAN ground
4	Not used	Reserved
5	(CAN_SHLD)	Optional CAN shield
6	(GND)	Optional CAN ground
7	CAN_H	CAN_H bus line (dominant high)
8	Not used	Reserved
9	(CAN_V+)	Optional CAN external positive supply

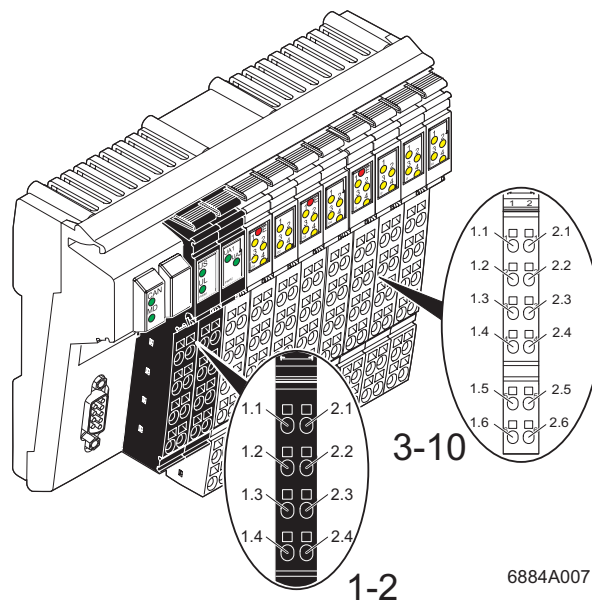


Figure 6 Terminal point assignment of Inline connectors

Terminal point assignment of power connectors (connectors 1 and 2 in Figure 6)

Terminal point	Assignment
Connector 1 (PWR 1)	
1.1, 2.1	24 V sensor supply U_S
1.2, 2.2	24 V communications power U_L
1.3, 2.3	GND
1.4, 2.4	FE
Connector 2 (PWR 2)	
1.1, 2.1	24 V actuator supply U_{A1}/U_{A2}
1.2, 2.2	24 V communications power U_L
1.3, 2.3	GND
1.4, 2.4	FE



NOTE: Damage to connectors in the event of overload

The terminal points can have a total current of 8 A per terminal point. The maximum current carrying capacity of 8 A must not be exceeded. If the total output current in your application is > 8 A, supply the module via a minimum of two terminal points connected in parallel.



The supply points have the same ground potential. All ground supplies on a module are electrically connected with one another. The communications power is also electrically connected via all contacts. In this way, it can supply all potentials with just one supply without the need for additional terminals, see "Connection example" on page 11.

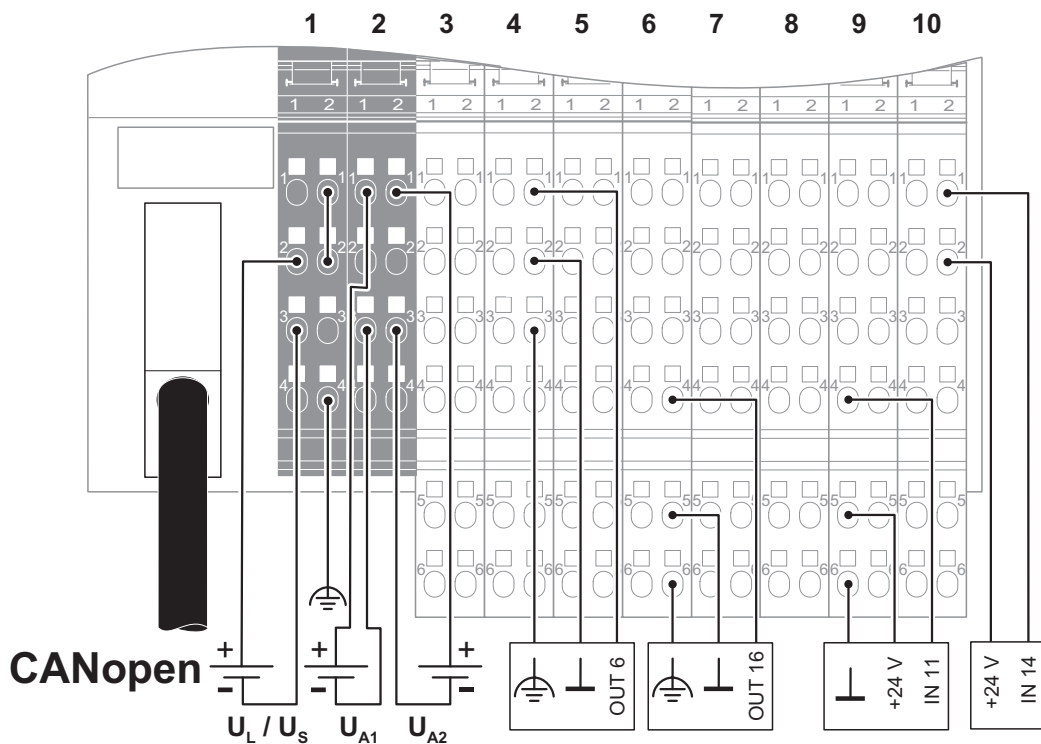
Terminal point assignment of output connectors (connectors 3 to 6 in Figure 6 on page 9)

Terminal point				Assignment
Connector 3 (O1)	Connector 4 (O2)	Connector 5 (O3)	Connector 6 (O4)	
1.1, 2.1	1.1, 2.1	1.1, 2.1	1.1, 2.1	Signal output (OUT)
1.2, 2.2	1.2, 2.2	1.2, 2.2	1.2, 2.2	Ground contact (GND) for 2 and 3-wire termination
1.3, 2.3	1.3, 2.3	1.3, 2.3	1.3, 2.3	FE connection for 3-wire termination
1.4, 2.4	1.4, 2.4	1.4, 2.4	1.4, 2.4	Signal output (OUT)
1.5, 2.5	1.5, 2.5	1.5, 2.5	1.5, 2.5	Ground contact (GND) for 2 and 3-wire termination
1.6, 2.6	1.6, 2.6	1.6, 2.6	1.6, 2.6	FE connection for 3-wire termination

Terminal point assignment of input connectors (connectors 7 to 10 in Figure 6 on page 9)

Terminal point				Assignment
Connector 7 (I1)	Connector 8 (I2)	Connector 9 (I3)	Connector 10 (I4)	
1.1, 2.1	1.1, 2.1	1.1, 2.1	1.1, 2.1	Signal input (IN)
1.2, 2.2	1.2, 2.2	1.2, 2.2	1.2, 2.2	Sensor voltage U_S for 2 and 3-wire termination
1.3, 2.3	1.3, 2.3	1.3, 2.3	1.3, 2.3	Ground contact (GND) for 3-wire termination
1.4, 2.4	1.4, 2.4	1.4, 2.4	1.4, 2.4	Signal input (IN)
1.5, 2.5	1.5, 2.5	1.5, 2.5	1.5, 2.5	Sensor voltage U_S for 2 and 3-wire termination
1.6, 2.6	1.6, 2.6	1.6, 2.6	1.6, 2.6	Ground contact (GND) for 3-wire termination

8 Connection example



6884A010

Figure 7 Connection example

The numbers above the module illustration indicate the connector slots.



When connecting the sensors and actuators, observe the assignment of the terminal points to the process data (see "Process data" on page 12).



The module has an FE spring (metal clip) on the bottom of the electronics base. This spring establishes an electrical connection to the DIN rail. Use grounding terminals to connect the DIN rail to protective earth ground. The module is grounded when snapped onto the DIN rail. To ensure reliable functional earth grounding of the module even when the DIN rail is dirty or the metal clip is damaged, Phoenix Contact also recommends grounding the module via one of the FE terminal points.

9 Device data

ID number	02 00 00 30 _{hex}
Input address area	2 bytes
Output address area	2 bytes

10 Process data



Please refer to the application note for addressing 16-channel ILB modules.

The current EDS file can be downloaded at www.download.phoenixcontact.com.

10.1 Assignment of terminal points to the process data output word (slots 3 to 6)

(Word.bit) view	Word	Word 0															
	Bit	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
(Byte.Bit) view	Byte	Byte 0								Byte 1							
	Bit	7	6	5	4	3	2	1	0	7	6	5	4	3	2	1	0
Module	Slot	4 (O2)				3 (O1)				6 (O4)				5 (O3)			
	Terminal point (signal)	2.4	1.4	2.1	1.1	2.4	1.4	2.1	1.1	2.4	1.4	2.1	1.1	2.4	1.4	2.1	1.1
	Terminal point (GND)	2.5	1.5	2.2	1.2	2.5	1.5	2.2	1.2	2.5	1.5	2.2	1.2	2.5	1.5	2.2	1.2
	Terminal point (FE)	2.6	1.6	2.3	1.3	2.6	1.6	2.3	1.3	2.6	1.6	2.3	1.3	2.6	1.6	2.3	1.3
Status indicators	Slot	4 (O2)				3 (O1)				6 (O4)				5 (O3)			
	LED	4	3	2	1	4	3	2	1	4	3	2	1	4	3	2	1

10.2 Assignment of terminal points to the process data input word (slots 7 to 10)

(Word.bit) view	Word	Word 0															
	Bit	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
(Byte.Bit) view	Byte	Byte 0								Byte 1							
	Bit	7	6	5	4	3	2	1	0	7	6	5	4	3	2	1	0
Module	Slot	8 (I2)				7 (I1)				10 (I4)				9 (I3)			
	Terminal point (signal)	2.4	1.4	2.1	1.1	2.4	1.4	2.1	1.1	2.4	1.4	2.1	1.1	2.4	1.4	2.1	1.1
	Terminal point (24 V)	2.5	1.5	2.2	1.2	2.5	1.5	2.2	1.2	2.5	1.5	2.2	1.2	2.5	1.5	2.2	1.2
	Terminal point (GND)	2.6	1.6	2.3	1.3	2.6	1.6	2.3	1.3	2.6	1.6	2.3	1.3	2.6	1.6	2.3	1.3
Status indicators	Slot	8 (I2)				7 (I1)				10 (I4)				9 (I3)			
	LED	4	3	2	1	4	3	2	1	4	3	2	1	4	3	2	1

11 Object dictionaries

The device supports PDOs (Process Data Objects) and SDOs (Service Data Objects) according to CiA DS 301 and DS 401.

11.1 OD index 6000_{hex}, subindex 1 (reading input data)

(Byte.Bit) view	Byte	Byte 0							
	Bit	7	6	5	4	3	2	1	0
Device	Input	IN8	IN7	IN6	IN5	IN4	IN3	IN2	IN1

11.2 OD index 6000_{hex}, subindex 2 (reading input data)

(Byte.Bit) view	Byte	Byte 1							
	Bit	7	6	5	4	3	2	1	0
Device	Input	IN16	IN15	IN14	IN13	IN12	IN11	IN10	IN9

11.3 OD index 6200_{hex}, subindex 1 (writing output data)

(Byte.Bit) view	Byte	Byte 0							
	Bit	7	6	5	4	3	2	1	0
Device	Output	OUT16	OUT15	OUT14	OUT13	OUT12	OUT11	OUT10	OUT9

11.4 OD index 6200_{hex}, subindex 2 (writing output data)

(Byte.Bit) view	Byte	Byte 1							
	Bit	7	6	5	4	3	2	1	0
Device	Output	OUT16	OUT15	OUT14	OUT13	OUT12	OUT11	OUT10	OUT9



For further information on the object dictionary for CANopen, please refer to the UM EN FLS CO SYS PRO user manual.

12 List of objects supported by firmware 3.06 or later

12.1 Standard objects

Index [hex]	Sub-indices	Designation	Standard
1000	–	Device Type (Mandatory)	DS 301
1001	–	Error Register (Mandatory)	DS 301
1005	–	COB-ID Sync	DS 301
1008	–	Device Name	DS 301
1009	–	Manufacturer Hardware Version	DS 301
100A	–	Manufacturer Software Version	DS 301
100C	–	Guard Time	DS 301
100D	–	Life Time Factor	DS 301
1010	1 and 9	Store Parameters	DS 301
1011	1 and 9	Restore Default Parameters	DS 301
1014	–	COB-ID Emergency	DS 301
1017	–	Producer Heartbeat Time	DS 301
1018	1 to 4	Identity Object (Mandatory)	DS 301
1200	1 and 2	1st Server SDO Parameter	DS 301
1400	1 and 2	1st Receive PDO Parameter	DS 301
1600	1 and 2	1st Receive PDO Mapping	DS 301
1800	1, 2, and 5	1st Transmit PDO Parameter	DS 301
1A00	1 and 2	1st Transmit PDO Mapping	DS 301

12.2 Input objects

Index [hex]	Sub-indices	Designation	Standard
6000	1 to 4	Read Input 8-Bit	DS 401
6020	1 to 16	Read Input 1-Bit	DS 401
6100	1 to 2	Read Input 16-Bit	DS 401
6120	1	Read Input 32-Bit	DS 401

12.3 Output objects

Index [hex]	Sub-indices	Designation	Standard
6200	1 to 4	Write Output 8-Bit	DS 401
6206	1 to 4	Error Mode Output 8-Bit	DS 401
6207	1 to 4	Error Value Output 8-Bit	DS 401
6220	1 to 16	Write Output 1-Bit	DS 401
6250	1 to 16	Error Mode Output 1-Bit	DS 401
6260	1 to 16	Error Value Output 1-Bit	DS 401
6300	1 to 2	Write Output 16-Bit	DS 401
6306	1 to 2	Error Mode Output 16-Bit	DS 401
6307	1 to 2	Error Value Output 16-Bit	DS 401
6320	1	Write Output 32-Bit	DS 401
6326	1	Error Mode Output 32-Bit	DS 401
6327	1	Error Value Output 32-Bit	DS 401

12.4 Manufacturer-specific diagnostic objects (Firmware 3.06)

Index [hex]	Sub-indices	Designation	Standard
2136	1 to 4	Fault Mode 8 Input	Manufacturer
2137	1 to 4	Fault State 8 Input	Manufacturer
2146	1 to 2	Fault Mode 16 Input	Manufacturer
2147	1 to 2	Fault State 16 Input	Manufacturer
2156	1 to 2	Fault Mode 1 Input	Manufacturer
2157	1 to 2	Fault State 1 Input	Manufacturer
2166	1	Fault Mode 32 Input	Manufacturer
2167	1	Fault State 32 Input	Manufacturer
2200	1	Diagnostic Info	Manufacturer

12.5 Manufacturer-specific diagnostic objects (Firmware 3.09)

Index [hex]	Sub-indices	Designation	Standard
2200	1	Diagnostic Info	Manufacturer



For additional information on the objects, please refer to the UM EN FLS CO SYS PRO user manual.

12.6 OD index 2200_{hex}, subindex 1 (diagnostic info, error information)

(Byte.Bit) view	Byte Bit	Byte 0							
		7	6	5	4	3	2	1	0
Device	Error	0: NMV has been re-initialized (possibly due to a hardware fault). 1: NMV has been initialized correctly with a corresponding parameterization at Phoenix Contact.	Supply voltage U_L and CAN V+ failure	U_S failure	U_S overload	Actuator supply failure	Overload of digital outputs	CAN V+ failure	Supply voltage U_L too low

In the error-free operating state (bits 0 to 7 = 1), the device maps the read input data and the output data transferred by the master.

In the event of an error (one of the bits 0 to 7 = 0), the device maps the error parameterization data for the inputs and outputs to the following, firmware-dependent OD indices.

Firm-ware	Inputs	Outputs
≥3.06	2136 _{hex} , 2137 _{hex} , 2146 _{hex} , 2147 _{hex} , 2156 _{hex} , 2157 _{hex}	6206 _{hex} , 6207 _{hex} , 6250 _{hex} , 6260 _{hex} , 6306 _{hex} , 6307 _{hex}
≥3.09	–	6206 _{hex} , 6207 _{hex} , 6250 _{hex} , 6260 _{hex} , 6306 _{hex} , 6307 _{hex}



The OD index 2200_{hex} is also mapped to bytes 4 and 5 of the emergency telegram.



For firmware 3.03 or later, the index 2200_{hex} is valid for the "Diagnostic Info" object, for firmware versions 3.02 or earlier, the index 6000_{hex} is valid.

13 Diagnostic data

Error table with diagnostic data and status indicators

Error type	Diagnostic data	Status indicators
Sensor voltage U_S too low	Index 2200 _{hex} , subindex 1 Bit 5 is set to "0".	US LED is off, MD LED flashes red twice.
Actuator supply U_{A1} or U_{A2} too low	Index 2200 _{hex} , subindex 1 Bit 3 is set to "0".	UA1 and UA2 LEDs are off, MD LED flashes red twice.
Short circuit of a sensor supply	Index 2200 _{hex} , subindex 1 Bit 4 is set to "0".	E LED of the sensor supply is red, MD LED flashes red twice.
Short circuit of a digital output	Index 2200 _{hex} , subindex 1 Bit 2 is set to "0".	E LED of the affected output group is red, MD LED flashes red twice.



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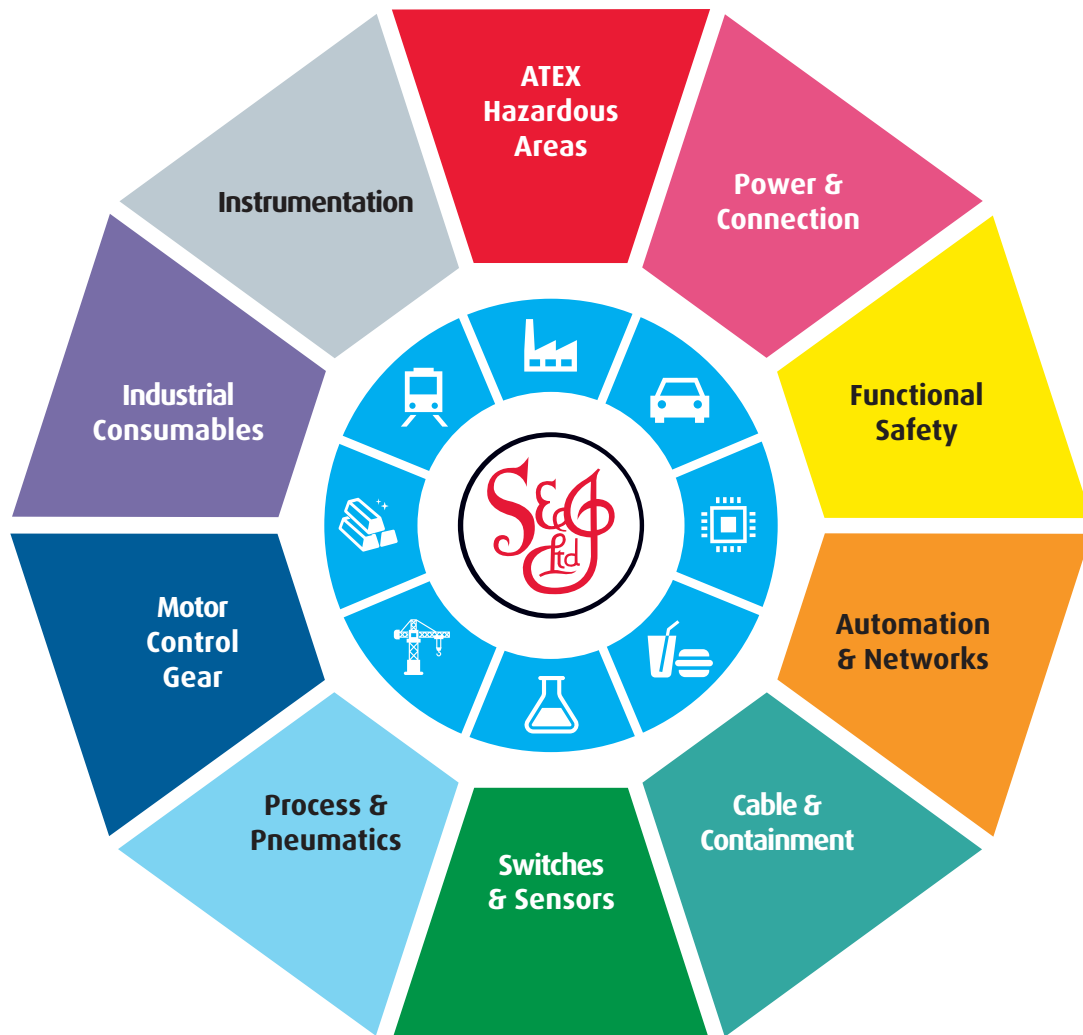
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