

ESX-IOXp

ESX control units

KEY FEATURES

- Control specially designed for use in harsh mobile applications
- Flexible programming in C and CODESYS V2.3 IEC61131
- Different hardware variants possible
- Predefined standard variants

TECHNICAL DATA

- Infineon XC2287 16 bit, 80 MHz (with watchdog supervisor)
- 1 MB SRAM
- 768 kB Flash internal
- 8 kB EEPROM
- 2 CAN interfaces, RS232 interface
- Option 1: 22 inputs / 4 outputs
Option 2: 18 inputs / 8 outputs
Option 3: 14 inputs / 12 outputs

ACCESSORIES

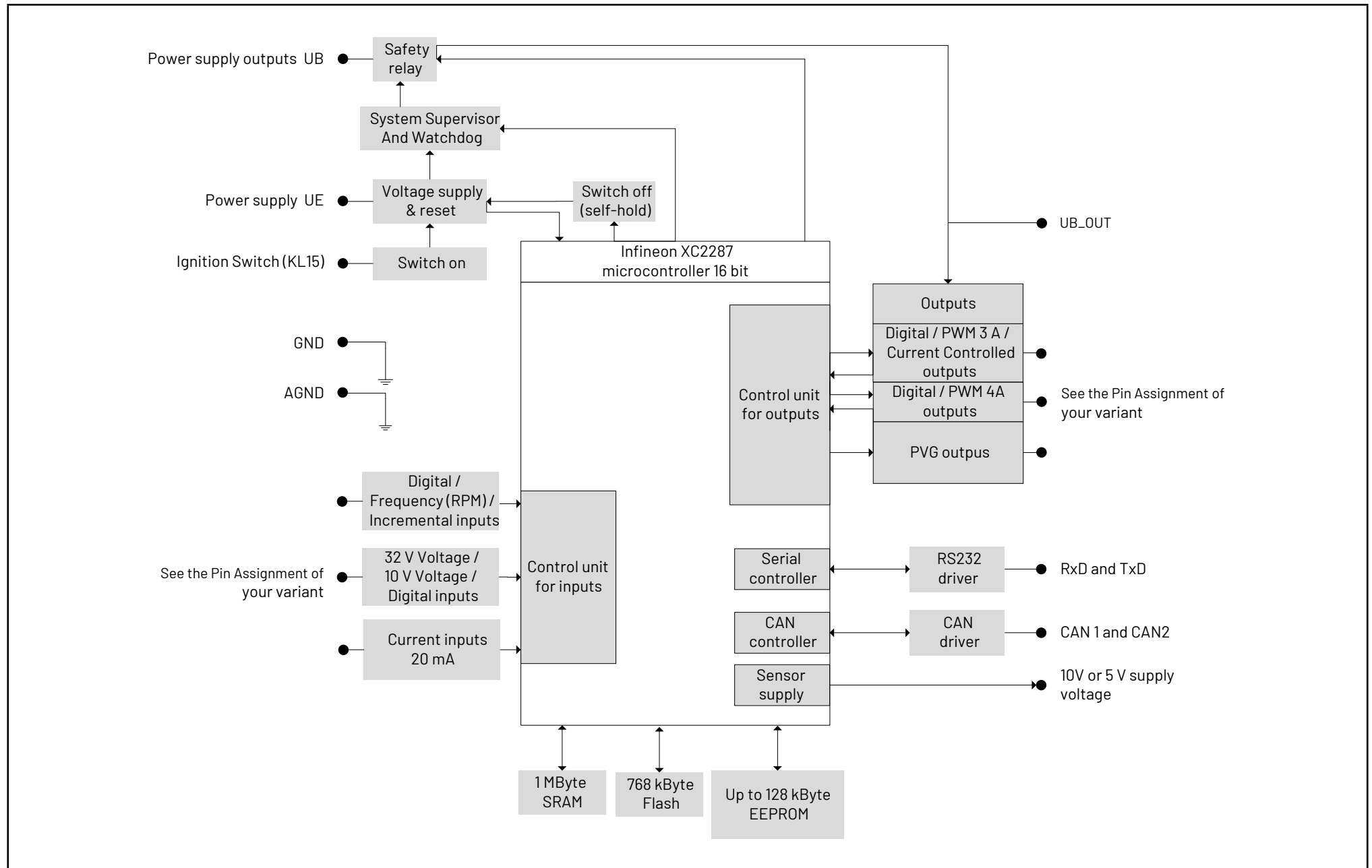
- Debug Adapter
- Debugger
- Compiler
- ESX-Testbox Adapter
- Component Deployment for C and CODESYS V2.3
- Mating Plug

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BLOCK DIAGRAM



TECHNICAL DATA

Processor and memory

Type	Properties	Features
Infineon XC2287	16 bit	fCPU = 80 MHz system supervisor with Watchdog
SRAM	1 MB	
Flash	768 kB internal	
FRAM/EEPROM	8 kB	

Communication Interfaces

Type	Max. Quantity	Configuration
CAN	2	2.0 B (11 bit and 29 bit identifier), Low- / High-Speed up to 1 Mbit/s
RS232	1	Programmable baud rate (max. 230400 baud)

Inputs (All inputs are short circuit protected)

Type	Max. Quantity	Configuration	Measurement	Options/Dependencies
Digital inputs	14	Digital	high-/low-active (software configurable)	threshold level free configurable
RPM inputs	6	RPM	fCutoff = 7 kHz	threshold level free configurable
Analog inputs	6	Analog	0 ... 10 V	10 bit
	8	Analog	4 ... 20 mA	10 bit

Outputs (All outputs are short circuit protected)

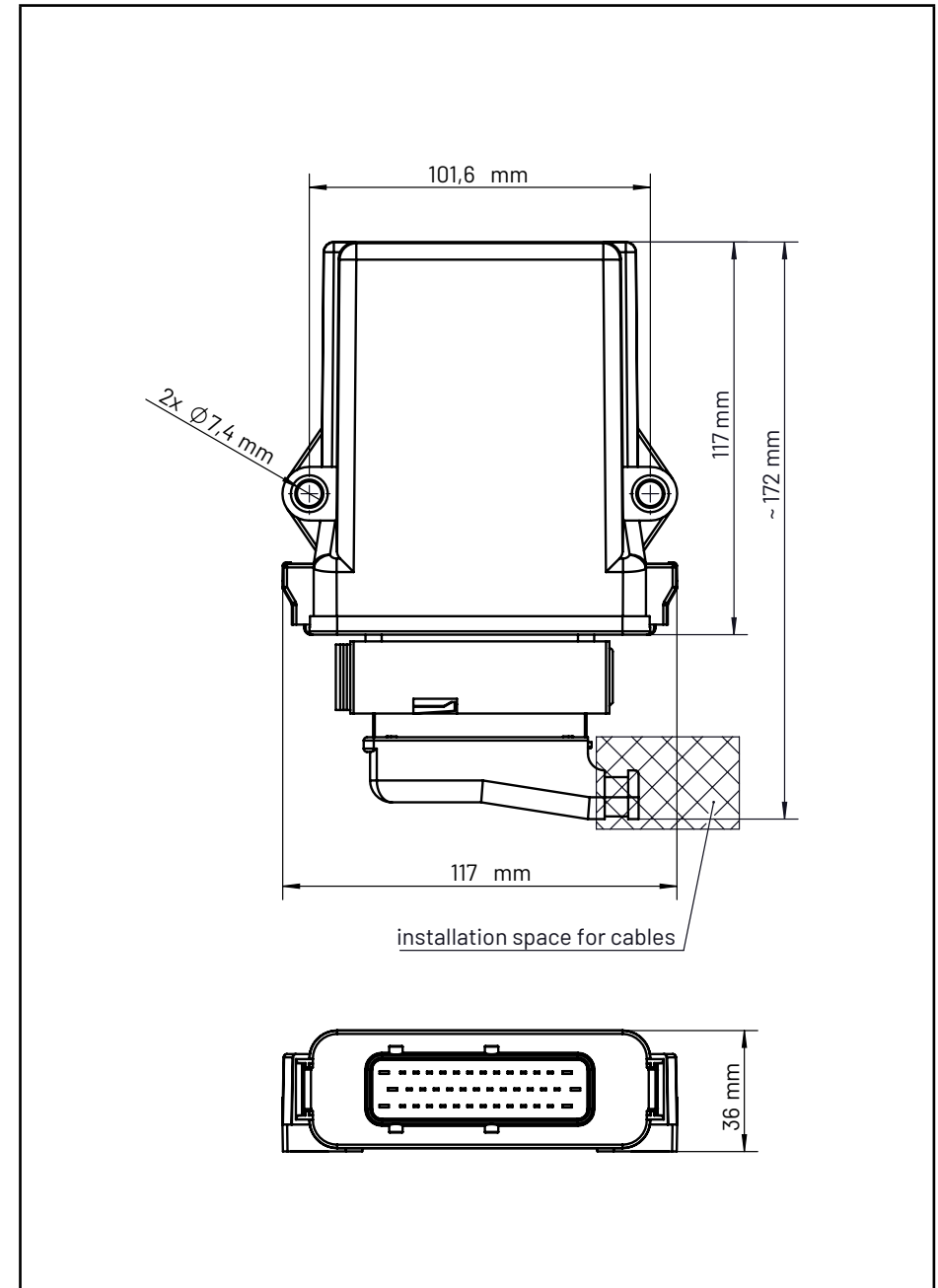
Type	Max. Quantity	Configuration	Range	Property	Features
Digital/PWM outputs with current measurement	4		3 A	high side switch, 0 ... 100 %	diagnosable
	opt. 4		4 A	additional low side switches	applicable as a motor bridge, diagnosable
Digital/PWM outputs with current read-back or PVG outputs	opt. 4 or 8		4 A	high side switch	Diagnosable
	opt. 4	PVG			used for Danfoss valves (20 % ... 80 % U_B)
Stabilized voltage output	1		5 V or 10 V		(max. load current 100 mA), stabilized supply voltage

TECHNICAL DATA

System Data

Type	Property	Values
Supply Voltage	Direct Current (DC)	9...32 V
Current Consumption	Without external load	100 mA
	Standby (ignition off)	1.5 mA
	Maximum load current	11 A
Temperature	Chassis Temperature	-40 °C ... +85 °C (-40 °F ... +185 °F)
Connector	Automotive Type (Tyco / AMP)	42 Pins
Housing	Plastic case	
Dimensions		134.5 mm x 117 mm x 36 mm
Weight		Ca. 0.4 kg (0.88 lbs)
Degree of Protection	IP65 and IP69k	
Certificates and Compliance	Qualified to the applicable standards for automotive, agricultural and construction industries	
	E1 - approval from Kraftfahrtbundesamt	

TECHNICAL DRAWING



PIN ASSIGNMENT Option 1

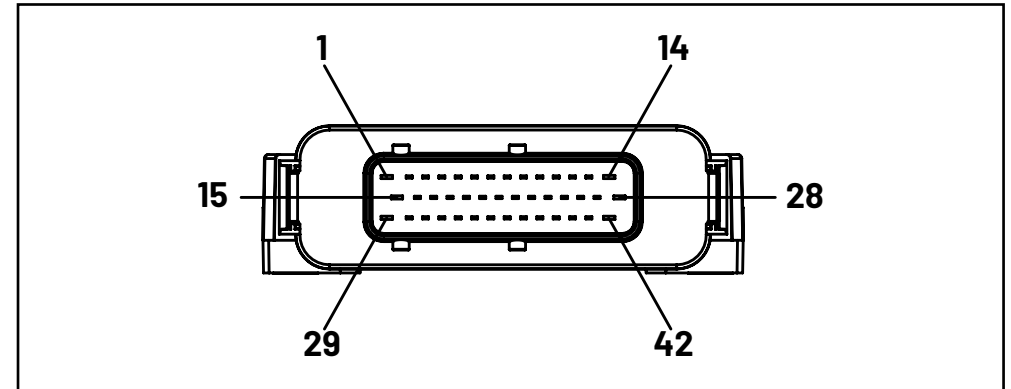
Pin assignment 42 pin connector:

Pin	Description and configuration possibilities
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1	GND
2	Digital Input or Frequency Input or Incremental Input
3	Digital Input or Frequency Input or Incremental Input
4	Digital Input or Frequency Input or Incremental Input
5	Digital Input
6	PWM Output (high), Digital Output (high), Current Controlled Output (high), Voltage Input (32 V), Digital Input
7	PWM Output (high), Digital Output (high), Current Controlled Output (high), Voltage Input (32 V), Digital Input
8	PWM Output (high), Digital Output (high), Current Controlled Output (high), Voltage Input (32 V), Digital Input
9	PWM Output (high), Digital Output (high), Current Controlled Output (high), Voltage Input (32 V), Digital Input
10	Digital Input
11	Digital Input, Frequency Input, Incremental Input
12	Digital Input, Frequency Input, Incremental Input
13	Digital Input, Frequency Input, Incremental Input

Pin	Description and configuration possibilities
-----	---

14	UB: Power supply pin for the hardware drivers of the outputs
15	Analog GND
16	Ignition (KL15)
17	CAN bus 1 low
18	RS232 (Tx)
19	UB_OUT
20	Voltage Input (10 V), Digital Input
21	Voltage Input (10 V), Digital Input
22	Voltage Input (10 V), Digital Input
23	CAN bus 2 high
24	Analog Input (20 mA)
25	Analog Input (20 mA)
26	Analog Input (20 mA)
27	Analog Input (20 mA)
28	UB: Power supply pin for the hardware drivers of the outputs
29	GND
30	UE: Power supply electronic
31	CAN bus 1 high
32	Sensor Supply: variant 49860: 10 V variant 60680: 5 V
33	RS232 (Rx)
34	Voltage Input (10 V), Digital Input
35	Voltage Input (10 V), Digital Input
36	Voltage Input (10 V), Digital Input
37	CAN bus 2 low



Pin	Description and configuration possibilities
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38	Analog Input (20 mA)
39	Analog Input (20 mA)
40	Analog Input (20 mA)
41	Analog Input (20 mA)
42	UB: Power supply pin for the hardware drivers of the outputs

PIN ASSIGNMENT Option 2

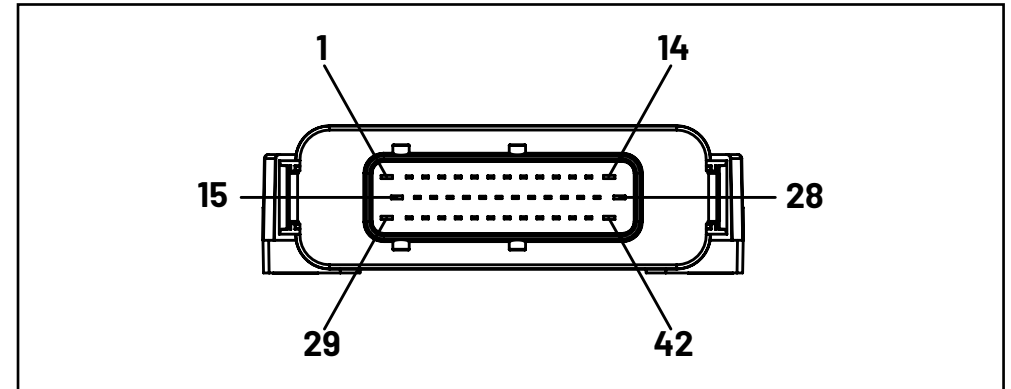
Pin assignment 42 pin connector:

Pin	Description and configuration possibilities
-----	---

1	GND
2	Digital Input, Frequency Input, Incremental Input
3	Digital Input, Frequency Input, Incremental Input
4	Digital Input, Frequency Input, Incremental Input
5	Digital Input
6	PWM Output (high), Digital Output (high), Current Controlled Output (high), Voltage Input (32 V), Digital Input
7	PWM Output (high), Digital Output (high), Current Controlled Output (high), Voltage Input (32 V), Digital Input
8	PWM Output (high), Digital Output (high), Current Controlled Output (high), Voltage Input (32 V), Digital Input
9	PWM Output (high), Digital Output (high), Current Controlled Output (high), Voltage Input (32 V), Digital Input
10	PWM Output (high), Digital Output (high), Digital Input
11	PWM Output (high), Digital Output (high), Digital Input
12	PWM Output (high), Digital Output (high), Digital Input
13	PWM Output (high), Digital Output (high), Digital Input

Pin	Description and configuration possibilities
-----	---

14	UB: Power supply pin for the hardware drivers of the outputs
15	Analog GND
16	Ignition (KL15)
17	CAN bus 1 low
18	RS232 (Tx)
19	UB_OUT
20	Voltage Input (10 V), Digital Input
21	Voltage Input (10 V), Digital Input
22	Voltage Input (10 V), Digital Input
23	CAN bus 2 high
24	Analog Input (20 mA)
25	Analog Input (20 mA)
26	Analog Input (20 mA)
27	Analog Input (20 mA)
28	UB: Power supply pin for the hardware drivers of the outputs
29	GND
30	UE: Power supply electronic
31	CAN bus 1 high
32	Sensor Supply: variant 49861: 10 V variant 57969: 5 V
33	RS232 (Rx)
34	Voltage Input (10 V), Digital Input
35	Voltage Input (10 V), Digital Input
36	Voltage Input (10 V), Digital Input
37	CAN bus 2 low



Pin	Description and configuration possibilities
-----	---

38	Analog Input (20 mA)
39	Analog Input (20 mA)
40	Analog Input (20 mA)
41	Analog Input (20 mA)
42	UB: Power supply pin for the hardware drivers of the outputs

PIN ASSIGNMENT Option 3

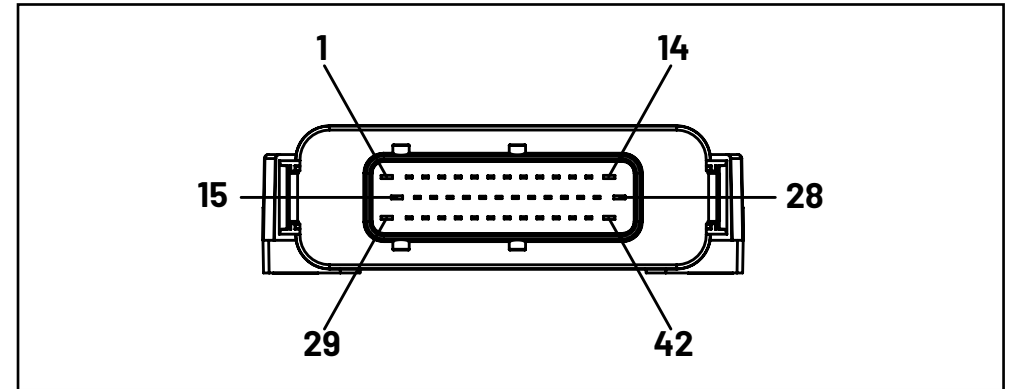
Pin assignment 42 pin connector:

Pin	Description and configuration possibilities
-----	---

1	GND
2	PWM Output (high), Digital Output (high), Digital Input
3	PWM Output (high), Digital Output (high), Digital Input
4	PWM Output (high), Digital Output (high), Digital Input
5	Digital Input
6	PWM Output (high / low), Digital Output (high / low), Current Controlled Output (high), Voltage Input (32 V), Digital Input
7	PWM Output (high / low), Digital Output (high / low), Current Controlled Output (high), Voltage Input (32 V), Digital Input
8	PWM Output (high / low), Digital Output (high / low), Current Controlled Output (high), Voltage Input (32 V), Digital Input
9	PWM Output (high / low), Digital Output (high / low), Current Controlled Output (high), Voltage Input (32 V), Digital Input
10	PWM Output (high), Digital Output (high), Digital Input
11	PWM Output (high), Digital Output (high), Digital Input
12	PWM Output (high), Digital Output (high), Digital Input
13	PWM Output (high), Digital Output (high), Digital Input

Pin	Description and configuration possibilities
-----	---



14	UB:Power supply pin for the hardware drivers of the outputs
15	Analog GND
16	Ignition (KL15)
17	CAN bus 1 low
18	RS232 (Tx)
19	UB_OUT
20	Voltage Input (10 V), Digital Input
21	Voltage Input (10 V), Digital Input
22	Voltage Input (10 V), Digital Input
23	CAN bus 2 high
24	Analog Input (20 mA)
25	Analog Input (20 mA)
26	Analog Input (20 mA)
27	Analog Input (20 mA)
28	UB:Power supply pin for the hardware drivers of the outputs
29	GND
30	UE: Power supply electronic
31	CAN bus 1 high
32	Sensor Supply: variant 49862: 10 V variant 60682: 5 V
33	RS232 (Rx)
34	Voltage Input (10 V), Digital Input
35	Voltage Input (10 V), Digital Input
36	Voltage Input (10 V), Digital Input
37	CAN bus 2 low



Pin	Description and configuration possibilities
-----	---

38	Analog Input (20 mA)
39	Analog Input (20 mA)
40	Analog Input (20 mA)
41	Analog Input (20 mA)
42	UB: Power supply pin for the hardware drivers of the outputs

QUALIFICATION

Norm	Description
ISO/IEC 17050-1	 Conformity
KBA (Kraftfahrt-Bundesamt)	 Certification This approved device can be used on any vehicle type with the following restrictions: All vehicle types with a 12 V respectively 24 V - electrical wiring and battery(-) at the body

DETAILED QUALIFICATIONS

EMC industrial (CE)	
Emission industrial area 150 kHz to 30 MHz conducted, 30 MHz to 1GHz antenna Group 1, passed class A	EN 61000-6-4
Electrostatic discharge 330 Ω / 150 pF, ± 4 kV / ± 8 kV	EN 61000-4-2
Radiofrequency 80 MHz to 1GHz: 10 V/m 1.4 GHz to 2.0 GHz: 3 V/m 2.0 GHz to 2.7 GHz: 1V/m 3 m, horizontal and vertical	EN 61000-4-3
Burst (Electrical fast transient / burst immunity test) ± 2 kV, 5/50 ns tr/th, repetition frequency 5 kHz Supply lines and ± 1kV data lines	EN 61000-4-4
Surge (Surge immunity test) ± 0.5 kV Supply lines	EN 61000-4-5
Conducted immunity (Conducted disturbances, induced by radio-frequency fields immunity test) 150 kHz to 80 MHz, 10 V, 80 % AM, sinus at 1kHz	EN 61000-4-6

DETAILED QUALIFICATIONS

EMC automotive

Emissions antenna 150 kHz to 3 GHz, 1 m, 120 kHz bandwidth passed class 4	2004/104/EG (2009/19/EG) (Cispr25)
Radiated immunity Stripline: 10 kHz to 400 MHz, 150 V/m, 80 % AM, antenna 400 MHz to 3 GHz, 145 V/m, PM	ISO 11452-5/-2
Electrical transient conduction along supply lines only (12 V/24 V Systems) Pulse 1 (12 V): -100 V, 5000 pulses, 10 Ω Pulse 1 (24 V): - 600 V, 5000 pulses, 50 Ω Pulse 2a (12 V + 24 V): 50 V, 5000 pulses, 2 Ω Pulse 2b (24 V): 20 V, 10 pulses Pulse 3a (12 V + 24 V): -200 V, 1 hr Pulse 3b (12 V + 24 V): +200 V, 1 hr Pulse 4 (12 V): -7 V, 2 pulses Pulse 4 (24 V): -16 V, 2 pulses Pulse 5a (12 V + 24 V): 70 V, 100 ms, 6 Ω 2 Pulse	ISO 7637-2
Faults on data lines; 12 V/24 V systems Pulse a: -80 V, 1 hr Pulse b: +80 V, 1 hr	ISO 7637-3
Conducted emission; power and signal lines 150 kHz to 108 MHz Current clamp passed class 3 Sup- ply lines passed class 5	CISPR25
ESD - Component immunity test method (powered-up test) 2000 Ω/330 pF 2000 Ω/150 pF ± 8 kV/± 15 kV	ISO 10605
ESD - Packaging and handling (unpowered test) ± 8 kV/± 25 kV	ISO 10605

Electrical tests

Electrical equipment of machines	DIN EN 60204-1
Overvoltage - Systems with 24 V nominal voltage 36 V for 60 min at 20 °C below maximum temperature	ISO 16750-2
Superimposed alternating voltage	ISO 16750-2
Slow decrease and increase of supply voltage	ISO 16750-2
Discontinuities in supply voltage - Momentary drop in supply voltage Voltage drop to 4.5 V (12 V) for a total drop time (tf + tp + tr) ≤ 25 ms, functional status shall be class B, otherwise class C	ISO 16750-2
Discontinuities in supply voltage - Momentary drop in supply voltage Voltage drop to 4.5 V (12 V) Voltage drop to 9 V (24 V)	ISO 16750-2
Discontinuities in supply voltage - Reset behavior voltage drop	ISO 16750-2
Discontinuities in supply voltage - Starting profile 12 V code C	ISO 16750-2
Reversed voltage - Case 2 Nominal voltage = 12 V -> test voltage = 14 V Nominal voltage = 24 V -> test voltage = 28 V reversed polarity every input for a duration of 60 sec	ISO 16750-2
Ground reference and supply offset	ISO 16750-2
Open circuit tests - Single line Interruption of each single Output for (10 ± 1)s	ISO 16750-2
Open circuit tests - Multiple line interruption	ISO 16750-2
Short circuit protection - signal circuits Connect every In- and Output to maximum supply voltage and Ground for 1 minute	ISO 16750-2
Short circuit protection - load circuits (supply lines) Duration: 5 min	ISO 16750-2

DETAILED QUALIFICATIONS

Climatic and mechanical tests

Tests at constant temperature: Low temperature - storage 24 hrs at -40 °C	ISO 16750-4
Tests at constant temperature: Low temperature - operation 24 hrs at -40 °C	ISO 16750-4
Tests at constant temperature: High temperature - storage 48 hrs at 85 °C	ISO 16750-4
Tests at constant temperature: High temperature - operation 48 hrs at 85 °C	ISO 16750-4
Temperature cycling test - Rapid change of temperature 10 cycles from -40 °C to 85 °C, dwell time 1 hr, change rate 3 K/ min (3x3 cycles with vibration)	IEC 60068-2-14, Test Na (Nb)
Temperature cycling test - Rapid change of Temperature 100 cycles from -40 °C to 85 °C, dwell time 1 hr, change time < 30 seconds	ISO 16750-4
Temperature step test From 20 °C to -40 °C to 85 °C in steps of 5 °C	ISO 16750-4
Temperature cycling test 30 cycles each 480 minutes from -40 °C to 85 °C	ISO 16750-4
IP protection IPx7 and IP69k	EN 60529 / DIN 40050-9
Condensed water	ISO 6270-2
Damp heat - steady state test 21 days at 40 °C and 93 % relative humidity	EN 60068-2-78
Vibration sinusoidal 46 cycles from 5 Hz to 500 Hz, 1 octave/min, 6g, with tempera- ture superimposition	EN 60068-2-6
Bump 3 shocks each axis, 25 g/11 ms	EN 60068-2-27
Shock 1000 shocks each axis, 25 g/6 ms	EN 60068-2-27

Climatic and mechanical tests

Humid heat cyclic - Test 1: Damp heat cyclic 6 cycles each 24 hrs from 25 °C to 55 °C, 96 % relative humidity	IEC60068-2-30, Db, Var 1
Humid heat cyclic - Test 2: Composite temperature / humidity cyclic test 10 cycles, maximum temperature 65 °C 93 % relative humidity, 5 cycles with freeze phase (-10 °C)	EC60068-2-38, -Z/AD
Free fall Drop height: 1m to concrete ground or steel plate	EN 60068-2-32
Salt spray test - Corrosion	EN 60068-2-52
Chemical resistance Gasoline, Diesel, Cold cleaning solvent, antifreeze agent Urea, Break fluid, Motor oil, Hydraulic fluid, Battery acid (acid sulfur)	ISO 16750-5
Solar radiation DIN EN 60068-2-5 Test method B	ISO 16750-4
Corrosive gas Method 4, duration: 10 days, SO2, H2S, NO2, CL2	IEC 60068-2-60