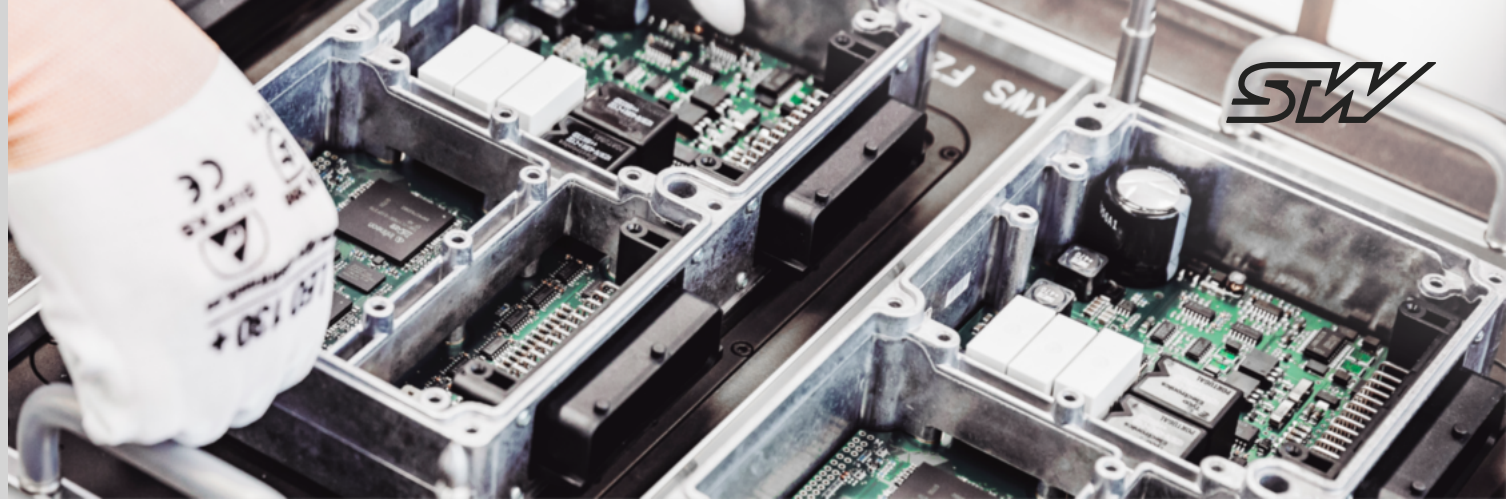




ESX.mbc

ESX I/O modules

KEY FEATURES

- Control specially designed for use in harsh mobile applications
- J1939/ CANopen
- 200 W power outputs

TECHNICAL DATA

- STM32F205 32 bit, 120 MHz
- 128 kB SRAM
- 1 MB Flash
- 32 kB EEPROM
- 1 CAN interface
- 4 half bridges 10 A (combinable to 2 full bridges)
- 4 inputs
- 3 outputs

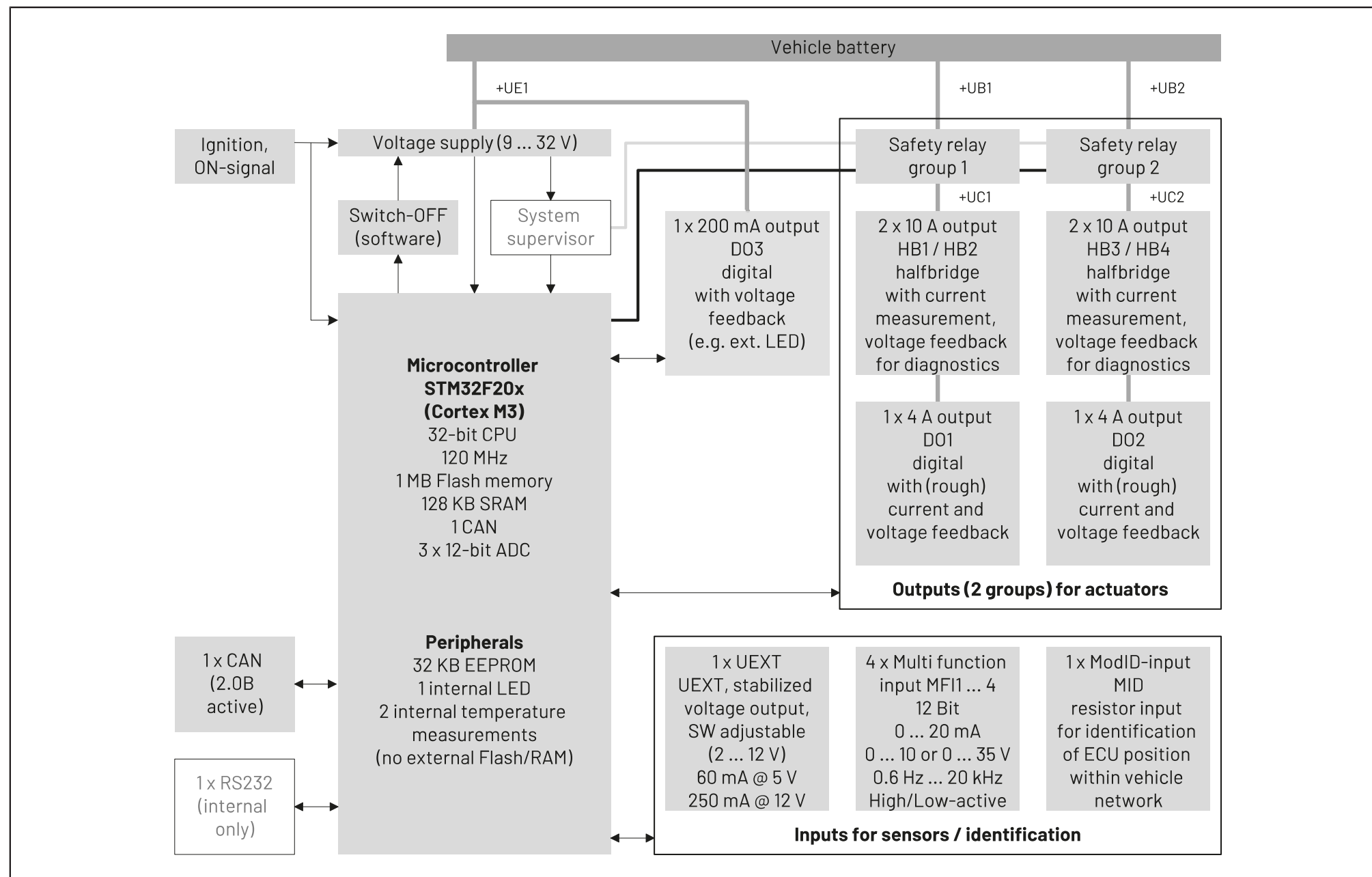
ACCESSORIES

- Mating plug

Sensor-Technik Wiedemann GmbH

Am Bärenwald 6
87600 Kaufbeuren
+49 8341 9505-0
info.stw@wiedemann-group.com
www.stw-mm.com

BLOCK DIAGRAM



TECHNICAL DATA

Processor and Memory

Type	Properties	Description
STM32F205	32 bit	@120 MHz
SRAM	128 kB	
Flash	1 MB	
EEPROM	32 kB (8 kB reserved for internal use)	

Communication Interfaces

Type	Max. Quantity	Configuration
CAN	1	CAN 2.0 B, Low- / High-Speed up to 1 Mbit/s

Inputs

Type	Max. Quantity	Possible Configuration	Measurement	Options/Dependencies
Multi function inputs	4	Digital inputs	high / low active	
		Frequency inputs	0,6 Hz ... 1 kHz	
		Voltage input	0 ... 10 V or 0 ... 35 V	
		Current input	0 ... 20 mA	
Ident input	1			1 x Module identification

Outputs (All Outputs are Short Circuit Protected)

Type	Max. Quantity	Possible Configuration	Range	Characteristics	Feature
PWM outputs with current feedback	4	PWM half-bridges,	10 A	PWM - frequency up to 20 kHz	diagnosable
Digital outputs	2	digital	4 A		diagnosable, current feedback
	1	digital	200 mA		diagnosable
Stabilised voltage supply	1		2 ... 12 V		max. load 45 ... 250 mA

Mechanical Data

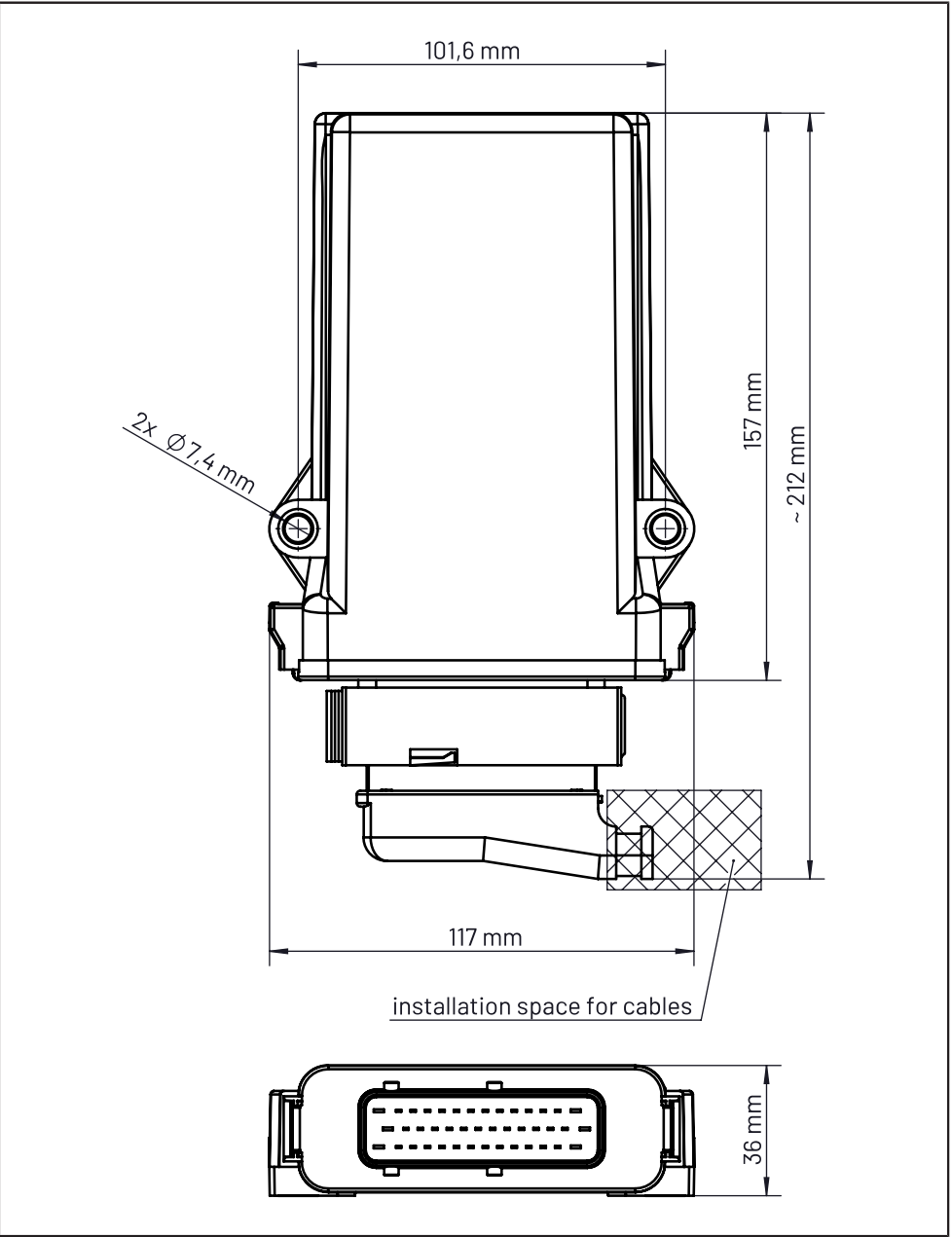
Component	Description	Value
Temperature	Chassis temperature	-40 °C ... +85 °C (-40 °F ... +185 °F) (derating depending on operating condition)
Connector	Automotive type (Tyco/AMP)	42 pin
Housing	Plastic case	
Dimensions	Standard variant	174 mm x 117 mm x 36 mm
Weight		0.33 kg (0.77 lbs)
Degree of protection	IP67	

TECHNICAL DATA

Power Supply

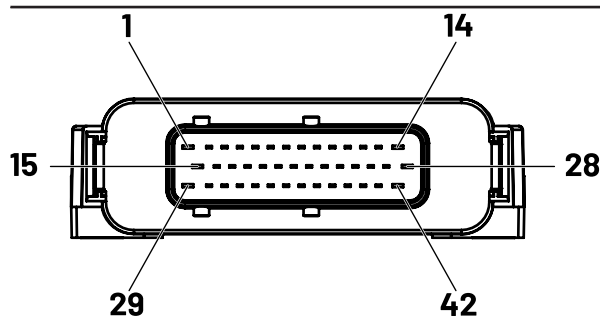
Component	Description	Range	
		Minimum Value	Maximum Value
Supply voltage	Direct current (DC)	9 V	32 V
Current consumption	Without external load		100 mA @ 12 V 50 mA @ 24 V
	Standby (ignition off)		< 1 mA
	Maximum load current		Up to 30 A max. current throughput (2 x 15 A power pins fully loaded)

TECHNICAL DRAWING



PIN ASSIGNMENT

Pin Assignment 42 Pin Connector:



Pin Description

- | | |
|----|---|
| 1 | Power supply domain, +UB1 |
| 2 | PWM output / half bridge output 10 A, HB2 ¹⁾ |
| 3 | PWM output / half bridge output 10 A, HB2 (GND) ¹⁾ |
| 4 | Digital output 4 A, DO1 |
| 5 | UE1: Power supply electronic |
| 6 | Sensor Supply UExt |
| 7 | Sensor Supply UExt |
| 8 | CAN bus 1 high |
| 9 | CAN bus 1 low |
| 10 | CAN bus 1 high |
| 11 | CAN bus 1 low |
| 12 | PWM output / half bridge output 10 A, HB4 (GND) ¹⁾ |
| 13 | PWM output / half bridge output 10 A, HB4 ¹⁾ |
| 14 | Power supply domain, +UB2 |

¹⁾ MicroTimer-II contacts (MT-II), max. 6 A, $\varnothing$ 1.0 mm²

²⁾ Junior power timer contacts (JPT), max. 15 A, $\varnothing$ 2.5 mm²

Pin Assignment 42 Pin Connector:

Pin Description

- | | |
|----|---|
| 15 | PWM output / half bridge output 10 A, HB1 ²⁾ |
| 16 | PWM output / half bridge output 10 A, HB2 ¹⁾ |
| 17 | PWM output / half bridge output 10 A, HB2 (GND) ¹⁾ |
| 18 | Ignition (KL15) |
| 19 | Digital output 200 mA, DO3 |
| 20 | Multi function input 1, MFI1 |
| 21 | Multi function input 2, MFI2 |
| 22 | Multi function input 3, MFI3 |
| 23 | Multi function input 4, MFI4 |
| 24 | Resistance input - Module identification input |
| 25 | Digital output 4 A, DO2 |
| 26 | PWM output / half bridge output 10 A, HB4 (GND) ¹⁾ |
| 27 | PWM output / half bridge output 10 A, HB4 ¹⁾ |
| 28 | PWM output / half bridge output 10 A, HB3 ²⁾ |
| 29 | Power supply domain, +UB1 (GND) |
| 30 | PWM output / half bridge output 10 A, HB1 (GND) ¹⁾ |
| 31 | PWM output / half bridge output 10 A, HB1 (GND) ¹⁾ |
| 32 | Digital output 4 A, DO1 (GND) |
| 33 | UE1: Power supply electronic (GND) |
| 34 | Multi function input 1, MFI1 (GND) |

Pin Assignment 42 Pin Connector:

Pin Description

- | | |
|----|---|
| 35 | Multi function input 2, MFI2 (GND) |
| 36 | Multi function input 3, MFI3 (GND) |
| 37 | Multi function input 4, MFI4 (GND) |
| 38 | Resistance input - Module identification input (GND) |
| 39 | Digital output 4 A, DO2 (GND) |
| 40 | PWM output / half bridge output 10 A, HB3 (GND) ¹⁾ |
| 41 | PWM output / half bridge output 10 A, HB3 (GND) ¹⁾ |
| 42 | Power supply domain, +UB2 (GND) |

QUALIFICATION

Compliance Information

Standard	Description	Parameter
ISO/IEC 17050-1	 Conformity	Detailed qualification data available on request.

DETAILED QUALIFICATION

Electrical Safety

Standard	Test Description	Test Parameter
STW Company Standard (Art.Nr.: 26688)	Supply voltage	Operation at maximum and minimum voltage Duration: 1 h each voltage
STW Company Standard (Art.Nr.: 26688)	Overvoltage	32 V for 5 min
STW Company Standard (Art.Nr.: 26688)	Undervoltage	6 V for 5 min
STW Company Standard (Art.Nr.: 26688)	Broken cable supply lines	Disconnected supply lines UB, UE, GND and VM each for a duration of 1 min
STW Company Standard (Art.Nr.: 26688)	Reverse polarity protection	Duration 5 min
STW Company Standard (Art.Nr.: 26688)	Start-up test	Duration 5 min
STW Company Standard (Art.Nr.: 26688)	Current Consumption	Without D+ < 1 mA with Ignition <= 1 mA
STW Company Standard (Art.Nr.: 26688)	Data retention	>20 Years
STW Company Standard (Art.Nr.: 26688)	Loadtest	Test at Tmin and Tmax with min. and max. load
ISO 16750-2 (2012-11)	Overvoltage Test	36 V for 60min at 20 °C below max. temperature
ISO 16750-2 (2012-11)	Superimposed alternating voltage	5 x 120 s Severity Level: 3 peak to peak Voltage (Upp)=10 V

DETAILED QUALIFICATION

Electrical Safety

Standard	Test Description	Test Parameter
ISO 16750-2 (2012-11)	Slow decrease and increase of supply voltage	Decrease supply voltage from 32 V to 0 V and increase it from 0 V to 32 V supply voltage Applying a change rate of (0.5 ±0.1) V/min
ISO 16750-2 (2012-11)	Monetary drop in supply voltage	Voltage drop to 4.5 V (12 V) Voltage drop to 9 V (24 V)
ISO 16750-2 (2012-11)	Reset behaviour at voltage drop	Decrease supply voltage in 5 % steps
ISO 16750-2 (2012-11)	Starting profile 24 V code E	Level I , II and III
ISO 16750-2 (2012-11)	Open circuit test - Single line interruption	Interruption of each single Output for (60±1) s
ISO 16750-2 (2012-11)	Open circuit test - multiple line interruption	Supply voltage completely removed from DUT for (60±1) s
ISO 16750-2 (2012-11)	Short circuit protection	Short circuits on signal and load circuits for 60 s

Electromagnetic Compatibility (e1/E1)

Standard	Test Description	Test Parameter
Cispr25 (2002-08)	Emissions antenna	150 kHz to 3 GHz, 1m, 120 kHz bandwidth passed class 2
ISO 11452-5/-2/-4 (2001-02 / 1995-12)	Radiated immunity	Stripline: 10 kHz to 400 MHz, 200 V/m, 80 % AM BCI: 150 kHz to 400 MHz 200 mA Antenna: 200 MHz to 3000 MHz, 150 V/m, Substitution method CW, AM, PM
ISO 7637-2 (2004-06)	Electrical transient conduction along supply lines only (12 V / 24 V System)	Pulse 1(24 V): -600 V, 5000 pulses Pulse 1(12 V): -300 V, 5000 pulses Pulse 2a(24 V): +50 V, 5000 pulses Pulse 2a(12 V): +50 V, 5000 pulses Pulse 2b(24 V): +20 V, 10 pulses Pulse 2b(12 V): +10 V, 10 pulses Pulse 3a(24 V): -200 V, 1 h Pulse 3a(12 V): -150 V, 1 h Pulse 3b(24 V): +200 V, 1 h Pulse 3b(12 V): +150 V, 1 h Pulse 4(24 V): -12 V, 2 pulses Pulse 4(12 V): -7 V, 2 pulses Pulse 5b(12 V): 87 V, 2 pulses Pulse 5b(24 V): 173 V, 2 pulses

DETAILED QUALIFICATION

Electromagnetic Compatibility (e1/E1)

Standard	Test Description	Test Parameter
ISO 16750-2 (2012-11)	Electrical transient conduction along supply lines only - Load dump (12 V / 24 V System)	Pulse 5b (12 V): 87 V, 2 pulses Pulse 5b (24 V): 173 V, 2 pulses
ISO 7637-3 (1995-07)	Faults on data lines	Test pulse a: -80 V, 1 h Test pulse b: +80 V, 1 h
CISPR25 (2002-08)	Conducted emission; power and signal lines	150 kHz to 108 MHz Supply lines Class 3 Power Lines Class 2
ISO 10605 (2001-12)	ESD-Component immunity test method (powered-up test)	2000 Ω / 330 pF ± 8 kV / ± 15 kV
ISO 10605 (2001-12)	ESD-Packaging and handling (unpowered test)	2000 Ω / 150 pF ± 8 kV / ± 25 kV

Electromagnetic Compatibility (CE)

Standard	Test Description	Test Parameter
EN 61000-6-4 (2007) (EN 61000-6-3)	Emission industrial area	Conducted: 150 kHz to 30 MHz, Class B Antenna: 30 MHz to 1 GHz, 3 m, Class B
EN 61000-4-2	Electrostatic discharge	330 Ω / 150 pF ± 4 kV / ± 8 kV
EN 61000-4-3	Radiofrequency	80 MHz to 1000 MHz: 10 V/m 1.4 GHz to 2 GHz: 3 V/m 2 GHz to 2.7 GHz: 1 V/m 3 m horizontal and vertical
EN 61000-4-4	Burst (Electrical fast transient / burst immunity test)	± 2 kV, 5/50 ns tr/th, repetition frequency 5 kHz Supply lines and ± 1 kV data lines
EN 61000-4-5	Surge (Surge immunity test)	± 0.5 kV Supply lines, ± 1 kV data lines
EN 61000-4-6	Conducted immunity (conducted disturbances, induced by radio-frequency fields immunity test)	150 kHz to 80 MHz 10 V 80 % Am sinus at 1 kHz

DETAILED QUALIFICATION

Environmental Qualification

Standard	Test Description	Test Parameter
ISO 16750-3 (2012)	Random vibration with temperature cycle (Test VII)	Acc. 60068-2-64 from 10 Hz to 2000 Hz for 32 h / axis, 8 h temperature cycle between -40 °C to 85 °C
EN 60068-2-27 (2008)	Mechanical shock	50 g / 11 ms, halfsinusoidal, 3 shocks / axis
ISO 16750-3 (2012)	Free fall	Drop height: 1 m to concrete ground or steel plate falling twice per DUT in the same direction but ones on the opposite
EN 60068-2-6 (2007)	Vibration sinusoidal	10 Hz to 2000 Hz 1 oct/min 5 g 10 Cycles bidirectional
EN 60068-2-27 (2008)	Continuous Shock (Bump)	30 g / 6 ms halfsinusoidal 1000 Shocks/axis
ISO 16750-4 (2010)	Test at constant temperature: Low temperature -storage	24 h at -40 °C
ISO 16750-4 (2010)	Test at constant temperature: Low temperature - operation	24 h at -40 °C
ISO 16750-4 (2010)	Test at constant temperature: High temperature -storage	48 h at 105 °C
ISO 16750-4 (2010)	Test at constant temperature: High temperature - operation	96 h at 85 °C

Environmental Qualification

Standard	Test Description	Test Parameter
ISO 16750-4 (2010)	Temperature cycling test	30 cycles each 480 min from -40 °C to 85 °C
ISO 16750-4 (2010)	Temperature cycling test - Rapid change of Temperature	100 cycles, -40 °C to 85 °C change time <30 s dwell time 1 h
ISO 16750-4 (2010)	Humid heat cyclic - Test 2 Composite temperature / humidity cyclic test	Acc. IEC 60068-2-38, Z/AD Cycles 10 Thigh = 65 °C at 93 % relative humidity 5 Cycles with freeze phase (-10 °C)
ISO 16750-4 (2010)	Damp heat-steady state test	Acc. IEC 60068-2-78 21 days at 40 °C and 93 % relative humidity
EN 60529 / ISO 20653 (2013)	IP protection	IP6K5, IP6K7, IPX9K
STW Company Standard (Art.Nr.: 26688)	Life test-high-temperature-endurance	Acc. IEC 60068-2-2:2007 Test BE: Dry heat 54 days at +105 °C in operation
ISO 16750-1	Thermal Shock test (Annex B)	form -40 °C to 125 °C dwell time = 1 h Cycles 355 Test duration = 710 h