

SMX.dms-a

应变传感器

主要特点

- 用于测量形变，例如：测量金属臂在不同方向上的细微形变，可以间接测量受力、重量或振动数据
- 优化的装配结构技术，可直接在运行生产中进行调试装配
- 也可选择预装在载板上
- 适用于恶劣工况的坚固设计
- 维护简单，配置参数可以传输到传感器
- 集成在STW软件工具链openSYDE
- 通过ECE认证
- Economically available in small quantities

技术参数

- 测量范围可调，步长从120 $\mu\text{m}/\text{m}$ 到2000 $\mu\text{m}/\text{m}$ ，在所选量程 \pm 范围内灵活配置偏移量
- 工作温度：-40 ... +85 °C (-40 ... +185 °F)
- 支持CAN通信
- 提供一路电流信号输出（可选）
- 高信噪比（SNR）的输出信号适用恶劣工况
- 防护等级 IP6K5 / IPX7 / IPX9K（安装后或带预装底板）

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技术参数

传感器

参数	值
测量范围	步长从 120 μm/m 到 2000 μm/m 可调
量程	在所选测量范围的±之间，可灵活配置偏移量
超载	50.000 μm/m
室温下的精度 ^{1) 2)}	±1.0 %FS @ +25 °C (+77 °F)
工作温度范围内的精度 ^{1) 2)}	±1.5 %FS @ -10 ... +50 °C (+14 ... +122 °F)
	±2.5 %FS @ -40 ... < -10 °C (-40 ... < +14 °F)
	±2.0 %FS @ > +50 ... +85 °C (> +122 ... +185 °F)
输出信号	CAN总线 2.0B, 输出ADC原始数据或伸长率 (μm/m), 波特率: 100 ...1000 kBit/s, 通信协议: 标准CAN 可选: 4 ...20 mA (3 线制)
带宽 (-3 dB)	200 Hz
工作温度范围 ¹⁾	-40 ... +85 °C (-40 ... +185 °F)
储存温度	-40 ... +100 °C (-40 ... +212 °F)

注意: 不包括粘合剂

电源

参数	值
电源电压	8 ... 32 V DC
电流损耗	< 150 mA (typ. < 100 mA)

- 1) 温度系数为 $10.8 \cdot 10^{-6} 1/K$ 的铁素体钢应变片的温度响应
- 2) 测量跨度为2000微米/米
- 3) 最长电缆: 30米

壳体

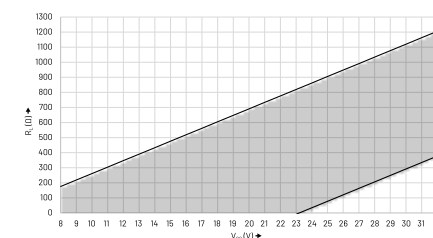
属性	参数
电气连接	1.35 m / 3 m 不带连接头的线缆, 可根据要求提供连接器和其他长度的先缆 ³⁾
重量	约. 80 g (不计底板和连接线缆的质量)
材料	铝, 阳极氧化处理
防护等级	IP6K5 / IPX7 / IPX9K (当安装或预先安装在承载板上时)

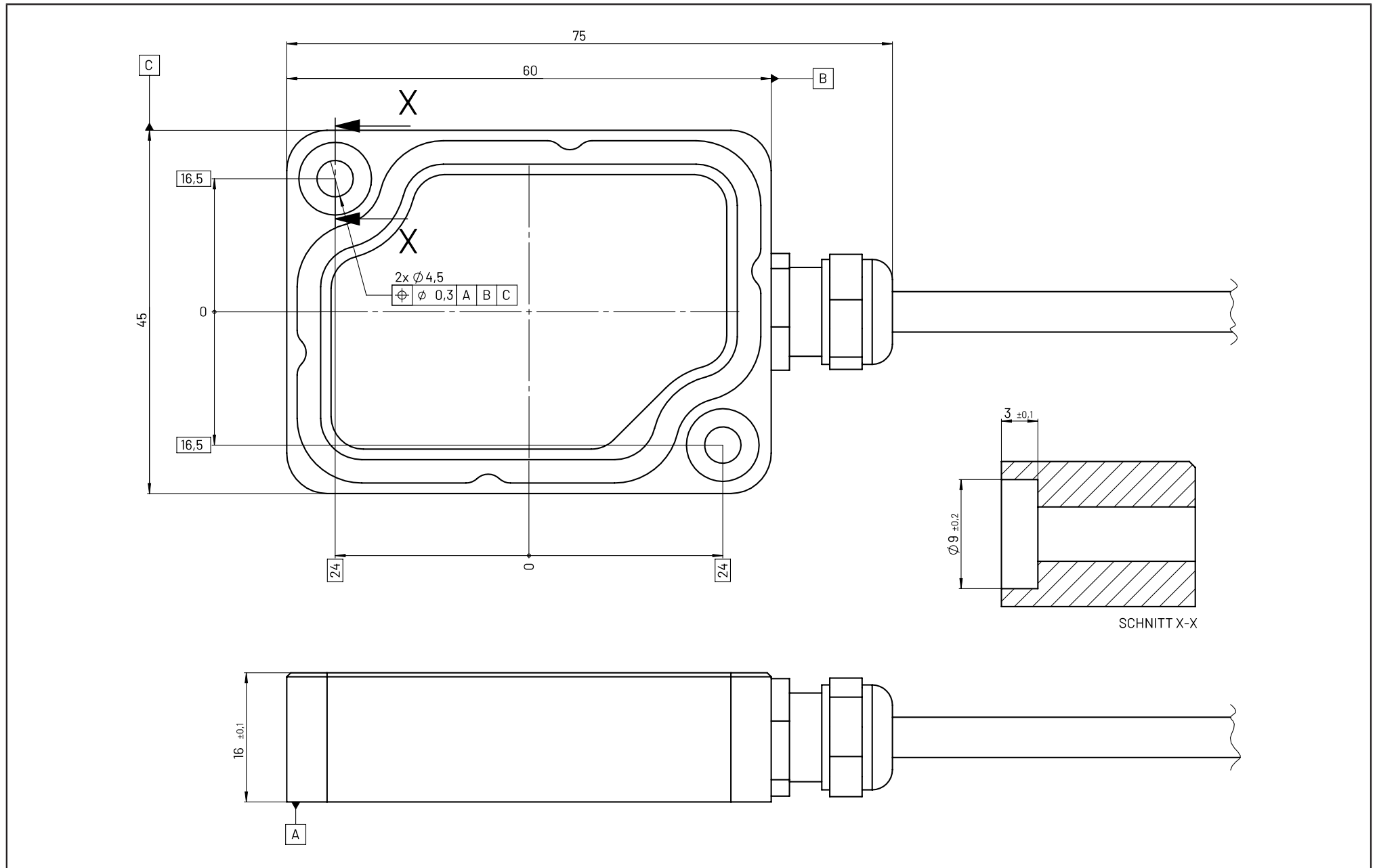
安全型

标准	描述
EN ISO 13849-1:2015	PL b / B 类 MTTF _D = 485.36年
MTTF (by using SN 29500)	242.68年

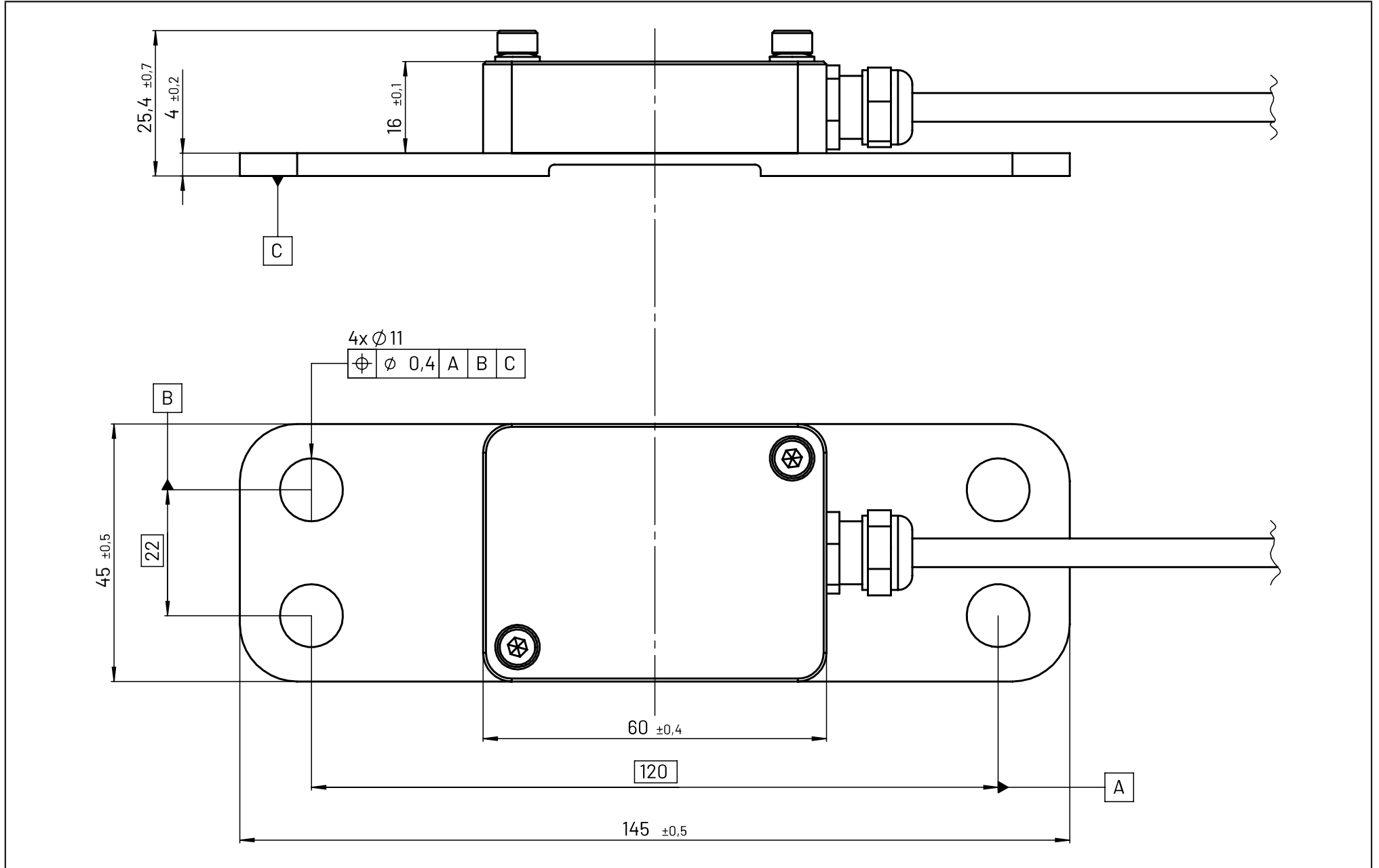
电流信号输出部分

参数	值
输出信号	4 ... 20 mA, 负载电阻对地
负载阻值	100 ... 500 Ω (指定范围)
允许范围	$R_{Lmin} = 42.918 \Omega/V \cdot V_{CC} - 995.857 \Omega$ $R_{Lmax} = 42.918 \Omega/V \cdot V_{CC} - 167.818 \Omega$

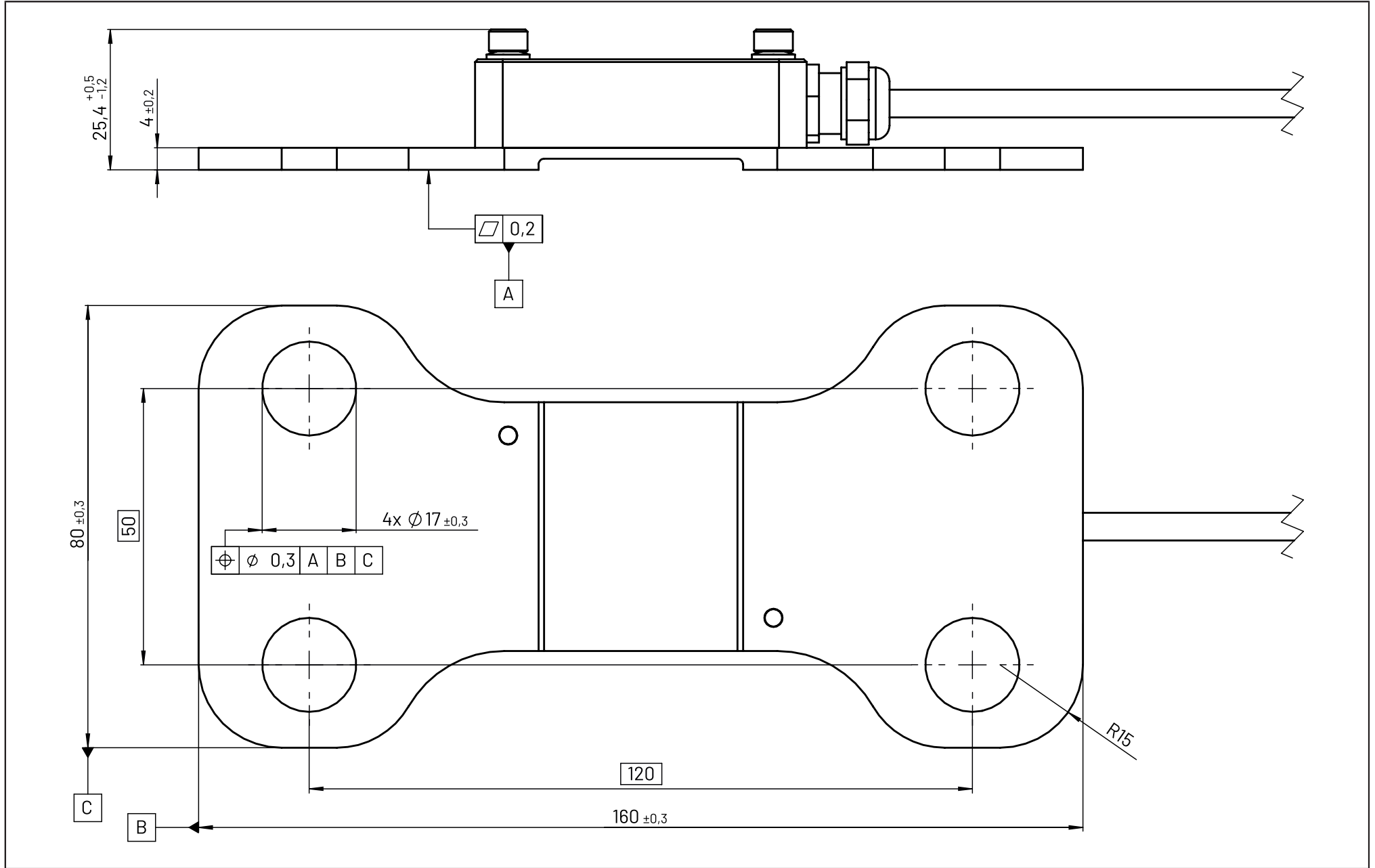




技术图纸



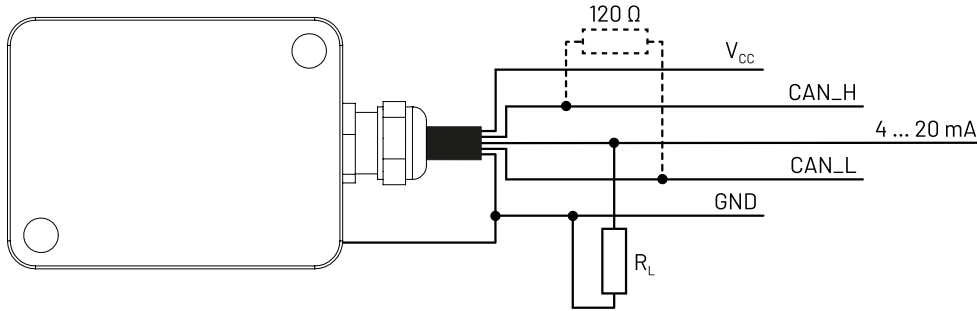
技术图纸



针脚分配

线缆连接⁴⁾

颜色	信号
橙色(OG)	CAN_H
绿色(GN)	CAN_L
红色(RD)	V_{CC} , 8 ... 32 V DC
黑色(BK)	GND
黄色(YE)	电流输出, 4 ... 20 mA



认证测试

测试标准

标准	描述	参数
ISO/IEC 17050-1	Conformity	
KBA (Kraftfahrt-Bundesamt)	Certification	According UN ECE Regulation No. 10

⁴⁾ 默认配置为：带开放电缆(屏蔽型电缆)，不带连接器

认证明细

电磁兼容性和电气测试-EMC(CE标准)

标准	测试内容	测试参数
EN 61000-6-3:2007 +A1:2011 EN 55016-2-1:2014 +A1:2017	Emissions (residential, commercial and light-industrial environments)	150 kHz to 30 MHz conducted
EN 61000-6-3:2007 +A1:2011 EN 12895:2015 EN 55016-2-3:2017	Emissions (residential, commercial and light-industrial environments)	Distance 10 meters, Antenna height 3 m, 30 MHz to 1000 MHz,
EN 61326-1:2013 EN 61000-6-2:2005 EN 61000-4-2	Immunity for industrial environments - electrostatic discharge immunity test	330 Ω / 150 pF, Contact discharge \pm 15 kV Air discharge \pm 2/4/8/15/25 kV
EN 61326-1:2013 EN 61000-6-2:2005 EN 61000-4-3:2006 +A1:2008 +A2:2010	Immunity for industrial environments - radiated, radio-frequency, electromagnetic field immunity test	27 MHz to 80 MHz -> 36 V/m 80 MHz to 1.0 GHz -> 20 V/m 1.0 GHz to 6.0 GHz -> 10 V/m 3 m, horizontal and vertical AM 80 %, 1 kHz
EN 61326-1:2013 EN 61000-6-2:2005 EN 61000-4-4:2012	Immunity for industrial environments - burst (electrical fast transient/ burst immunity test)	Supply lines \pm 2 kV, data lines \pm 1 kV, waveform: 5/50 ns tr/th, repetition frequency 5 kHz
EN 61326-1:2013 EN 61000-6-2:2005 EN 61000-4-5:2014 +A1:2017	Immunity for industrial environments - surge immunity test	\pm 0,5/1 kV Supply lines \pm 0,5/1/2 kV unbalanced (line against housing)
EN 61326-1:2013 EN 61000-6-2:2005 EN 61000-4-6:2014	Immunity for industrial environments - conducted immunity (immunity to conducted disturbances, induced by radio-frequency fields)	150 kHz to 80 MHz, 10 V, 80 % AM, sinus at 1 kHz 150 Ω source impedance

电磁兼容性和电气测试-EMC(CE标准)

标准	测试内容	测试参数
EN 12895:2015 EN 61000-4-8:2010	Protection against static magnetic field	Frequency: 0 Hz Duration: 3 sec Field strength: 1000 A/m
EN 61000-6-2:2005 EN 12895:2015 EN 61000-4-8:2010	Protection against dynamic magnetic field	Frequency: 50 Hz, 60 Hz Duration: 3 sec Field strength: 30 A/m

认证明细

电磁兼容性和电气测试-EMC (E1)

标准	测试内容	测试参数
UN ECE R10	Radiated emissions from components - ALSE method (RE test)	30 MHz to 1000 MHz
UN ECE R10 ISO 7637-2:2004	Voltage transient emissions test (CTE Test)	12 V: < +75/-100 V 24 V: < +150/-450 V
UN ECE R10 ISO 7637-2:2004	Electrical transient conduction along supply lines only (12 V/24 V systems) level 3 (TSUP test)	Pulse 1 (12 V) 75 V, 5000 pulses Pulse 1 (24 V) 450 V, 5000 pulses Pulse 2a (12 V + 24 V) 37 V, 5000 pulses Pulse 2b (12 V), 10 V, 10 pulses Pulse 2b (24 V), 20 V, 10 pulses Pulse 3a (12 V), -112 V, 1 hr Pulse 3a (24 V), -150 V, 1 hr Pulse 3b (12 V), +75 V, 1 hr Pulse 3b (24 V), +150 V, 1 hr Pulse 4 (12 V), -6 V, 1 pulses Pulse 4 (24 V), -12 V, 1 pulses
UN ECE R10 ISO 11452-2:2004 ISO 11452-5:2002	Immunity to electromagnetic energy	80 MHz - 2000 MHz ALSE 30 V/m Stripline 60 V/m

环境测试

标准	测试内容	测试参数
ISO 16750-4:2010	Tests at constant temperature: Low temperature - storage	- 40°C for 24 hrs
ISO 16750-4:2010	Tests at constant temperature: High temperature - storage	85°C for 48 hrs
ISO 16750-4:2010	Temperature step test	20°C to Tmin to Tmax, 5°C steps; Duration: 16 hrs (-40°C to +85°C) Perform functional tests (OM 3.2) when DUT has reached the new temperature
ISO 16750-3:2012 EN 60068-2-32:1993	Free fall	3 devices, 2 falls every device on the opposite side of the housing. drop height: 1 m to concrete ground or steel plate - 1m, 6 Achsen
ISO 16750-4:2010	Tests at constant temperature: Low temperature - operation	- 40°C for 24 hrs
ISO 16750-4:2010	Tests at constant temperature: High temperature - operation	85°C for 96 hrs max. output current, max. power
ISO 16750-4:2010	Temperature cycling test - Rapid change of Temperature	acc. to IEC 60068-2-14, Test Na 100 cycles, -40°C to 85°C Transfer time < 5 sec.

认证明细

环境测试

标准	测试内容	测试参数
		Dwell time: 60 min. Duration: 8 days 8 hrs
ISO 16750-4:2010	Temperature cycling test	acc to DIN EN 60068-2-14, Test Nb -40°C...85°C 240 cycles Dwell time: 0,5h
ISO 16750-4:2010	Salt spray test - Leakage and function	acc to IEC60068-2-11, Ka; 8h salt spray and 16h without spray, minimum 6 cycles á 24 hrs
ISO 16750-4:2010	Humid heat cyclic - Test 2: Composite temperature / humidity cyclic test	acc to IEC60068-2-38, -Z/AD 10 cycles, upper temperture +65°C 93% r.H. 5 cycles with frost phase (-10°C); Duration: 11 days OM 3.2 when the maximum cycle temperature is reached;
DIN EN 60068-2-6:2008-10	Vibration (sinusoidal)	10 Hz...2000 Hz, 1oct/min, 10g, 10 cycles, bidirectional Duration: 0.5 days
ISO 16750-3:2012-12 DIN EN 60068-2-27:2010-02	Shock	Half Sine Acceleration: 50 g Time: 11 ms 3 Shocks/axis Directions: 6 Duration: 0.5 days

环境测试

标准	测试内容	测试参数
ISO 16750-3:2012-12 DIN EN 60068-2-27:2010-02	Bump	Acceleration: 30 g Time: 6 ms sinus 1000 Shocks/axis 500 Schocks each direction / Directions: 6 Duration 1.5 days
ISO 16750-4:2010 DIN EN 60068-2-52:2018-08	Salt spray test - Corrosion test	Severity 4 Duration: 14 d
ISO 16750-4:2010 IEC60068-2-60, Test Ke	Corrosion test with flow of mixed gas	Method 4; Duration: 21 days SO2, H2S, NO2, CL214
DIN EN 60529:2000-09 ISO 20653:2013-02	IP Protection	IP6K5 / IPX7 / IPX9K
According to ISO 16750-5:2010	Chemical resistance	Exposure time 24 h, Exposure condition.20°C, 85% relative humidity, Gasoline, diesel fuel, STILL Highly effective quick cleaning spray, Spiritus Exposure time 24 h Exposure. 85°C, 85% rel. humidity STILL high load chains adhesive lubricant, Hydraulic oil, biological hydraulic oil, Coca Cola, cement, fertilizer, skin care products, sun milk, battery acid, radiator antifreeze, window cleaner,

认证明细

环境测试

标准	测试内容	测试参数
		washing lye, airport de-icing agent
ISO 16750-1:2018 Annex B	Life-time (Temperature cycling test - Rapid change of Temperature) Weibull	Weibull Test duration: 51 days Min. temperature: -40°C Max. temperature: 120°C Holding time: 45 min Cycles: 792 Operating status: 1.1
STW WN (26688)	Life-time (STW - Intern)	Test duration: 52 days Test temperature: 65°C Operating status: 2.2 Operating state: A
ISO 16750-4:2010-04 DIN EN 60068-2-78 (VDE 0468-2-78):2014-02	Damp heat, steady-state test	+40°C and 93% r.H. OM: 2.1 for 20 days 23 hrs OM: 3.2 for the last hour Duration: 21 days