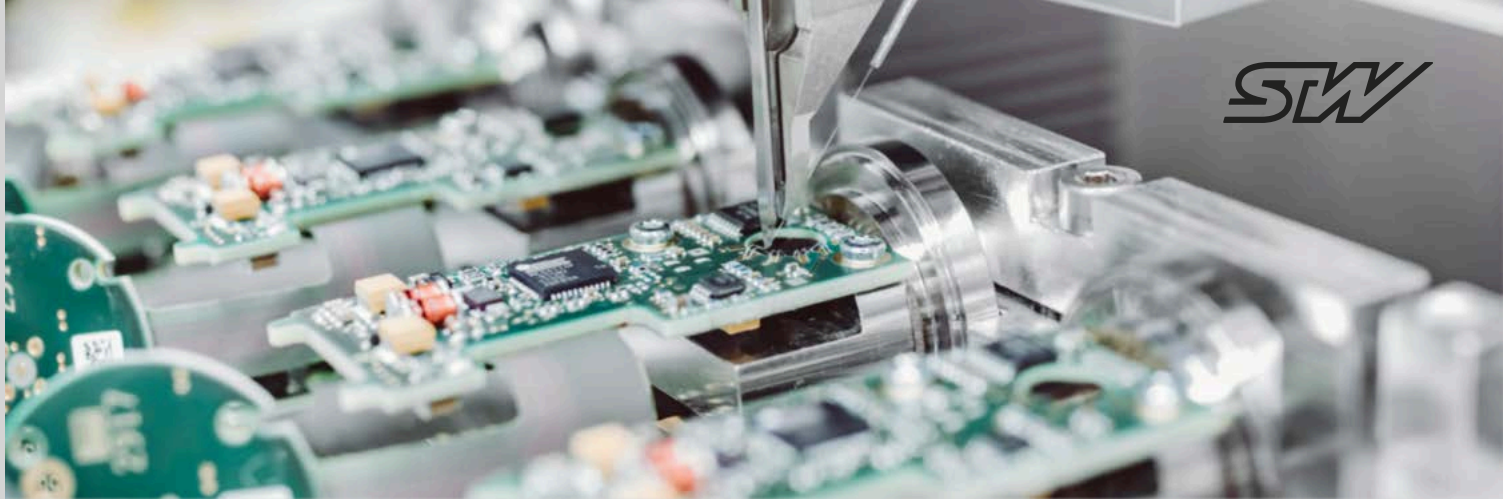


T01

Temperature sensors

KEY FEATURES

- CAN-Bus temperature sensor for measurement directly in medium
- Compact and robust design for use in harsh environments
- High media compatibility (with welded stainless steel measurement element)
- Measurement in unpressurized and pressurized media
- Designed for OEM needs
- With ECE type approval

TECHNICAL DATA

- Measuring range -40 ... +150 °C / -40 ... +302 °F
- Support of CANopen or SAE J1939 protocol
- Configurable digital filter (CANopen)
- Fast response times
- Protection class IP67/IPX9K

Sensor-Technik Wiedemann GmbH

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

TECHNICAL DATA

Sensor

Parameter	Value
Measuring range	-40 ... +150 °C / -40 ... +302 °F
Overall accuracy	0.6 %FS (-40 °C ... +150 °C / -40 °F ... +302 °F) 0.4 %FS (-40 °C ... +85 °C / -40 °F ... +185 °F)
Media temperature	-40 ... +150 °C / -40 ... +302 °F
Operating temperature / Storage temperature	-40 ... +125 °C (-25 ... +85 °C at cable output) -40 ... +257 °F (-13 ... +185 °F at cable output)
Reaction Time (guidance values)	$t_{0.5}$ = 4 s, in water 0.2 m/s $t_{0.9}$ = 9.6 s, in water 0.2 m/s $t_{0.5}$ = 45 s, in air 2 m/s $t_{0.9}$ = 160 s, in air 2 m/s

Available Outputs

Type	Component	Description/Value
CAN	Output protocol	CANopen, SAE J1939
	Bitrate	CANopen: 125 kbit/s, configurable SAE J1939: 250 kbit/s, 500 kbit/s
	Digital Filter	Average filter, configurable at CANopen
	Electrical connection	M12 connector (plastic or stainless steel), DIN Bayonet (per DIN 72585), DT04-4P, cable output Other connectors on request

Mechanical Data

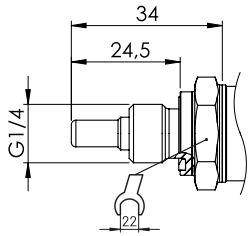
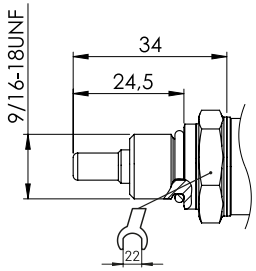
Features	Properties
Process connection	G 1/4", SAE06 (9/16-18UNF), other process connectors on request.
Diameter of measuring element	6 mm
Material with medium contact	Stainless Steel 17-4PH (EN 1.4548), AISI 316 Ti (EN 1.4571), FKM seal
Material housing	Stainless steel AISI 304 (EN 1.4301)
Material connector	Glass-fiber reinforced plastic (PBT) or AISI 304 (EN 1.4301)
Installation torque	Max. 35 Nm
Protection class	IP67 and IPX9K (depends on the electrical connection)

Power Supply, Cable Connection

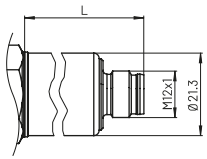
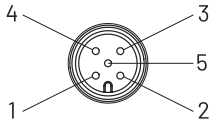
Features	Properties
Voltage supply (DC)	U_{VCC}: 9 ... 36 V
Electrical protection	Short circuit protected, signal on GND/VCC and inverse polarity protection
Maximum cable length	For CE conformity (EMC), the maximum overall cable length must not exceed 30 m

TECHNICAL DRAWINGS AND PIN ASSIGNMENTS

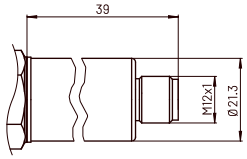
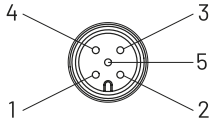
Available Standard Process Connections

Connection	Drawing
G1/4", DIN EN ISO 1179-2:2014-03 (formerly DIN 3869:1994-05)	
SAE06 (9/16-18UNF) - O-Ring	

Available Electrical Connections, Protection Class

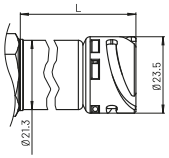
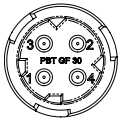
Connection	Drawing	Pins	Pin Assignment
Circular plug-in connector M12x1, 5-pole, IP67	 L = 24.4		

Pin	Function
1	PE, housing
2	VCC
3	GND
4	CAN_H
5	CAN_L

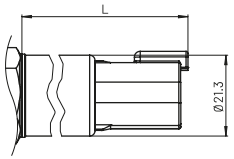
Connection	Drawing	Pins	Pin Assignment
Circular plug-in connector M12x1, 5-pole, IP67	 stainless steel		

Pin	Function
1	PE, housing
2	VCC
3	GND
4	CAN_H
5	CAN_L

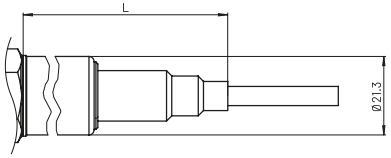
Available Electrical Connections, Protection Class

Connection	Drawing	Pins	Pin Assignment
Bayonet connector DIN 72585, 4-pole, IP67	 L = 29.2		

Pin	Function
1	VCC
2	GND
3	CAN_H
4	CAN_L

Connection	Drawing	Pins	Pin Assignment
Connector DT04-4P, 4-pole, IP67	 L = 37.3		

Pin	Function
1	CAN_L
2	VCC
3	GND
4	CAN_H

Connection	Drawing	Pins	Pin Assignment
Cable output IP67/IPX9K (Oil-resistant cable on request)	 L = 49.1		

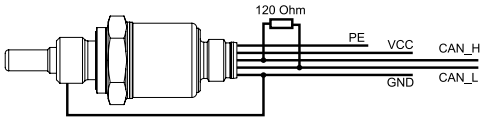
Litz wire	Function
brown	PE, housing
white	VCC
blue	GND
black	CAN_H
grey	CAN_L

STW standard pin assignments are shown, other pin assignments on request. The actual pin assignment is shown on the product label.

TERMINAL LAYOUTS

Recommended terminal layout

CAN



QUALIFICATION

Compliance Information

Standard		Description
ISO/IEC 17050-1	CE	Conformity
KBA (Kraftfahrt-Bundesamt)	E1	Certification According UN ECE Regulation No. 10

DETAILED QUALIFICATION

EMC industrial (CE)

Standard	Test Description	Test Parameter
DIN EN 61000-6-4:2007 DIN EN 55011:2007 + A2:2007	Emissions - Residential, commercial and light-industrial environments	Conducted emission 150 kHz to 30 MHz; Radiated emission 30 MHz to 1000 MHz, 10 m
DIN EN 61326-1:2013-07 DIN EN 61000-4-2:2009	Immunity - Electrical equipment for measurement, control and laboratory use - Electrostatic discharge immunity test	330 Ω / 150 pF Contact discharge ±2, ±4 kV Air discharge ±2, ±4, ±8 kV
DIN EN 61326-1:2013-07 DIN EN 61000-4-3:2006 + A1:2008 + A2:2010	Immunity - Electrical equipment for measurement, control and laboratory use - Radiated, radio-frequency, electromagnetic field immunity test	80 MHz to 2.7 GHz -> 10 V/m 3 m, horizontal and vertical AM 80 %, 1 kHz
DIN EN 61326-1:2013-07 DIN EN 61000-4-4:2012	Immunity - Electrical equipment for measurement, control and laboratory use - Electrical fast transient / burst immunity test	Supply lines ±2 kV data lines ±1 kV waveform: 5/50 ns tr/th repetition frequency 5 kHz
DIN EN 61326-1:2013-07 DIN EN 61000-4-6:2012-11	Immunity - Electrical equipment for measurement, control and laboratory use - Immunity to conducted disturbances, induced by radio-frequency fields	150 kHz to 80 MHz, 3V 80% AM, sine at 1 kHz

EMC automotive

Standard	Test Description	Test Parameter
UN ECE R10 DIN EN 55025:2003-11, IEC/CISPR 25:2002	Emissions - Radiated emissions from components - ALSE method	30 MHz to 1 GHz
UN ECE R10 ISO 11452-2:2004, ISO 11452-5:2002-04	Immunity - For components to electromagnetic Energy	ALSE - 80 MHz - 2000 MHz, 30 V/m Stripline - 20 MHz - 400 MHz, 60 V/m
ISO 7637-2:2004	Emissions - Voltage transient emissions	12 V: +75/-100 V
ISO 7637-2:2004	Emissions - Voltage transient emissions	24 V: +150/-450 V

DETAILED QUALIFICATION

EMC automotive

Standard	Test Description	Test Parameter
UN ECE R10 ISO 7637-2:2004-09	Immunity - Electrical transient conduction along supply lines only (12V System) - Level 4	Pulse 1 (12 V) -100 V, 5000 pulses Pulse 2a (12 V) +50 V, 5000 pulses Pulse 2b (12 V), +10 V, 10 pulses Pulse 3a (12 V), -150 V, 1 h Pulse 3b (12 V), +100 V, 1 h Pulse 4 (12 V), -7 V, 2 pulses
UN ECE R10 ISO 7637-2:2004-09	Immunity - Electrical transient conduction along supply lines only (24V System) - Level 4	Pulse 1 (24 V) -600 V, 5000 pulses Pulse 2a (24 V) +50 V, 5000 pulses Pulse 2b (24 V), +20 V, 10 pulses Pulse 3a (24 V), -200 V, 1 h Pulse 3b (24 V), +200 V, 1 h Pulse 4 (24 V), -16 V, 2 pulses

Climatic and mechanical tests

Standard	Test Description	Test Parameter
DIN EN 60068-2-1:1995-03	Tests at constant temperature: Low temperature - operation	-40 °C for 96 h
DIN EN 60068-2-2/A2 :1995-01	Tests at constant temperature: High temperature - operation	+125 °C for 96 h
DIN EN 60068-2-14:2000-08	Temperature cycling test - Rapid change of Temperature	10 cycles, -40 °C to +125 °C Transfer time < 30 s Dwell time: 60 min. In operation
ISO 16750-4:2010-04	Ice water shock test - Submersion test	number of cycles: 10 holding time(th) at Tmax +125 °C: 1 h water temperature: 0 °C to +4 °C immersion time: 5 min. In operation
DIN EN 60068-2-30: 2000-02, DIN EN 50016:1962-12	Humid heat - Damp heat cyclic test	+25 °C to +55 °C and 96% relative humidity 6 cycles á 24 h

DETAILED QUALIFICATION

Climatic and mechanical tests

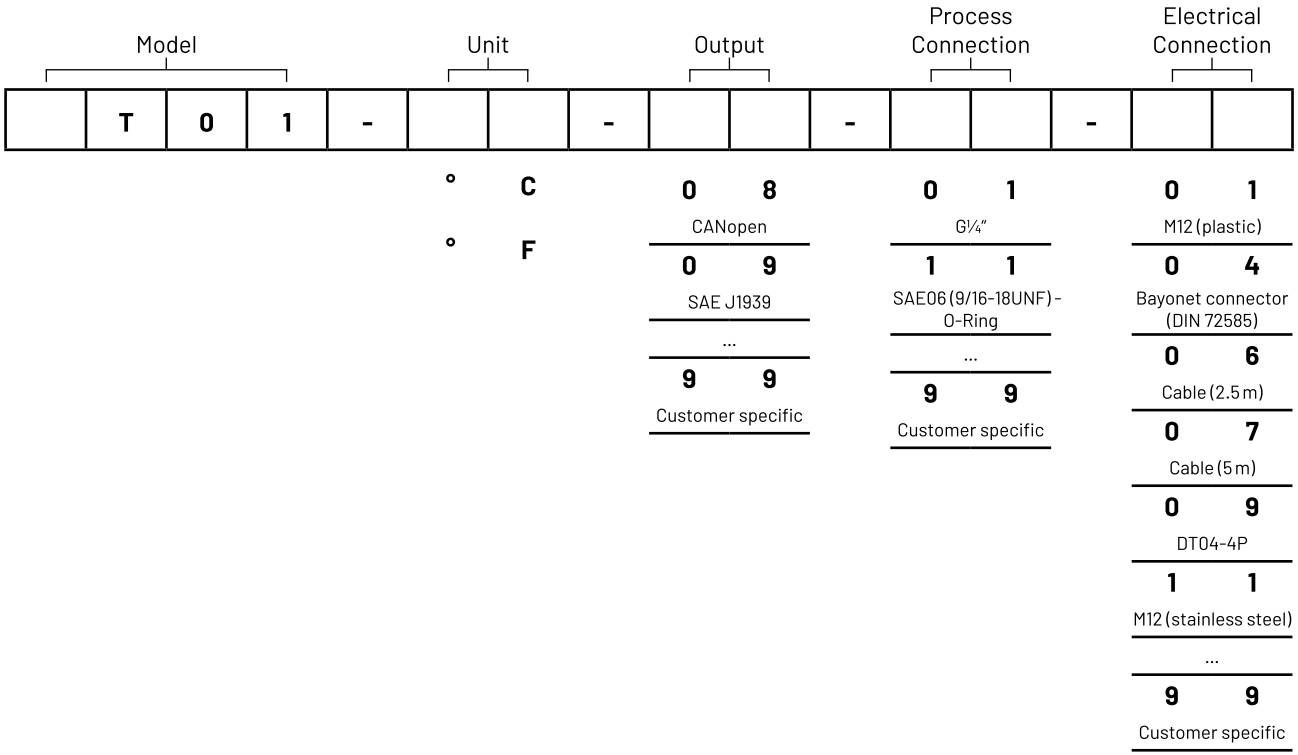
Standard	Test Description	Test Parameter
DIN EN 60068-2-78:2002-09	Damp heat, steady-state test	+40 °C and 96% relative humidity Not in operation for 20 days 23 h In operation for the last hour Duration: 21 days
ISO 16750-4:2010-04 IEC 60068-2-60	Corrosion test with flow of mixed gas	Test Ke, Method 4 Duration: 10 days SO_2, H_2S, NO_2, Cl_2
ISO 16750-1	Life-time Temperature cycling test - Rapid change of Temperature (Weibull)	Test duration: 30 days Min. temperature: -40 °C Max. temperature: +125 °C Holding time: 60 min. Cycles: 355
ISO 16750-3:2012 Test VII (IEC 60068-2-64)	Vibration (random) with temperature superimposition	10 - 2000 Hz, 32 h/axis, 3 axes, random vibration Temperature superimposition: -40 °C to +125 °C, 4 cycles
DIN EN 60068-2-27:2009	Mechanical shock	Acceleration: 50 g, half sine Time: 11 ms 10 Shocks/direction, 6 directions
DIN EN 60068-2-27:2009	Bump	Acceleration:30 g, half sine Time: 6 ms 1000 Shocks/direction, 6 directions
ISO 16750-3:2012 DIN EN 60068-2-31:2009-04	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
SAE J 1211 part 4.4:1978-11	Immersion and splash	Agents: gasoline, diesel, de-greaser, anti-freezing agent After test: drying at +125 °C, 48 h

DETAILED QUALIFICATION

Climatic and mechanical tests

Standard	Test Description	Test Parameter
ISO 16750-5:2010	Chemical resistance	Agents: diesel, motor oil, hydraulic oil, gear oil, bio-diesel, E10, urea "Caelo" After test: drying at +70 °C, 48 h
DIN EN 60529:1991	IP Protection grade	IP67 (depending on connector type)
DIN 40050-9:1993-05	IP Protection grade	IPX9K (depending on connector type)

ORDER CODES



Minimum order quantity and shipment lot sizes may apply.