AccTRANS Manual

Analog acceleration sensor to measure oscillation and vibration on train bogies

ANALOG

EN 50155

AccTRANS available at Micro-Hybrid-Shop
Filter products simply by selecting the desired properties and request your quotation.

microhybrid.com/shop

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Abbreviation	Meaning
RMS	Root mean square
MEMS	Micro-electromechanical system
MTBF	Meantime between failures
GND	Ground
RF	Radio frequency

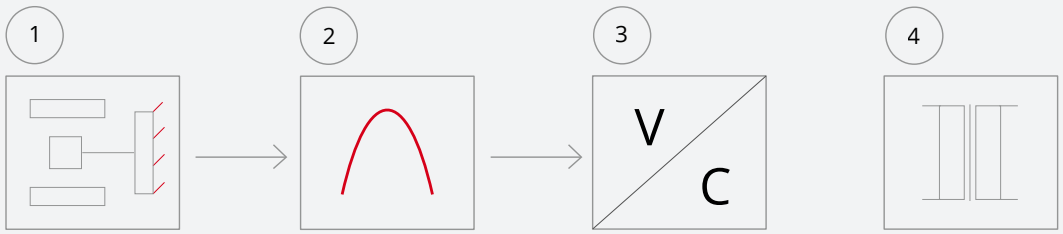
1. Technical parameters

Physical parameter		Unit
Sensitive axis	y-direction (additional x on request)	
Measurement range [1]	± 2 / ± 4 / ± 5	g
Sensitivity [2]	2	mA/g
Sensitivity error	± 2	%
Noise	0.1	% RMS of fullscale
Bandpass characteristic (-3dB) Bandwidth In-band tolerance Damping gradient	 0.5 ... 15 < ± 0.5 > 24	 Hz dB dB/octave
Current output Zero signal	4 ... 20 12	mA mA
Burden (current output)	≤ 200	Ω
Housing	Stainless steel (1.4301)	
Applied standard	DIN EN 50155	
Connector [1]	4 - wire cable	
Cable Diameter Length	RADOXTENUIS - TW 600 V 4 x 0.5 mm S SPEC 8.35 3	 mm m
Operating temperature range	-40 ... +70, Class OT4, H1	°C
Extended operating temperature at start-up	ST0	
IP-class	IP68	
Vibration & shock test	DIN EN 61373:2011 Cat. 2	
Altitude class	DIN EN 50125 Class AX	
Humidity class	DIN EN 50125 Class TX	
Pollution degree	DIN IEC 61010-c Class PD4	

All specifications at +25 °C, unless otherwise defined.
[1] customizable
[2] dependent on measurement range

Electrical parameters	Min.	Typ.	Max.	Unit
Supply voltage	77	110	137.5	V
	16.8	**24**	**30**	**V**
Supply current		10 (110 V) 50 (24 V)		mA mA
Consumption		≤ 3		W
Insulation		> 200		MΩ
Class of power supply interruption				S1

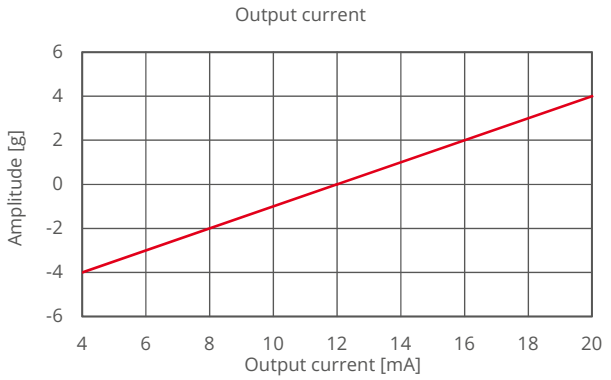
2. Functional block diagram



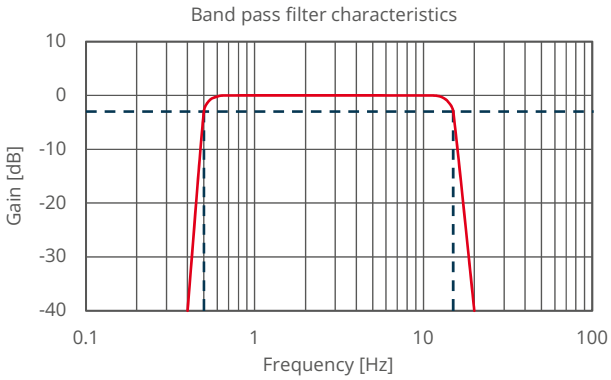
1	MEMS accelerometer
2	Band - pass filter (> 24 dB/octave)
3	Voltage to current converter
4	Isolated power supply

3. Output characteristics

Output signal			
Acceleration	-4 g	0 g	+4 g
Output current	4 mA	12 mA	20 mA

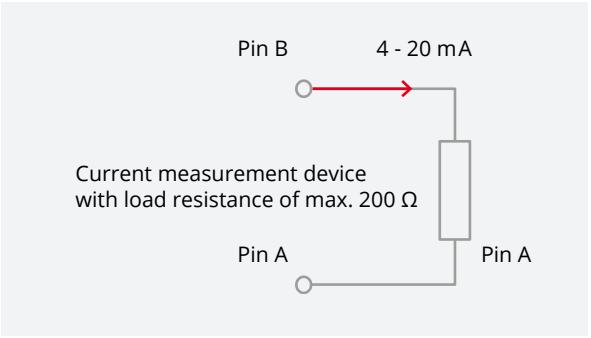


Filter characterisitcs	
Type and frequency range	bandpass 0.5 ... 15 Hz
Gradient	≥ 24 dB/octave



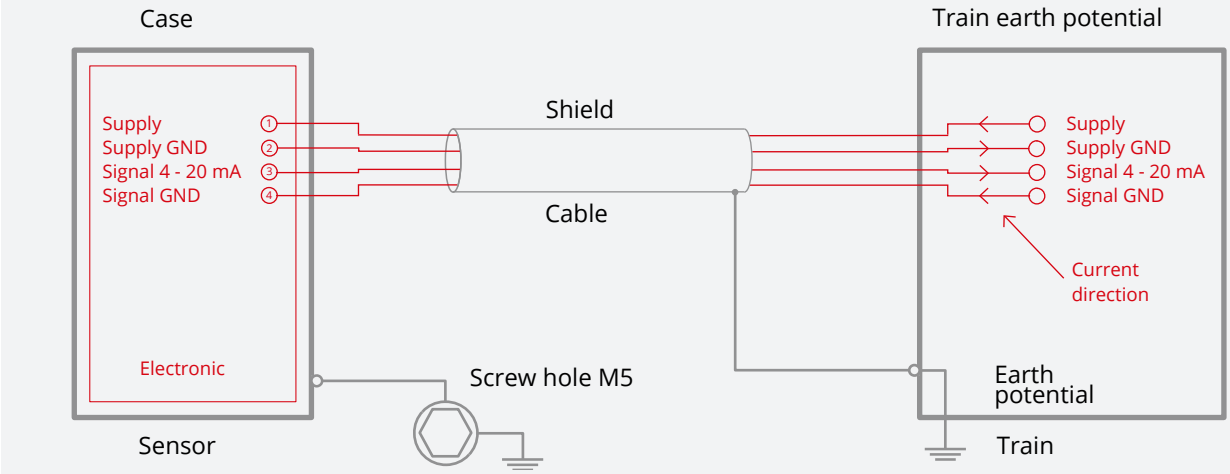
4. Current output connection

- Load resistance: max. 200 Ω



5. Shielding concept

- The shield is not connected to the housing of the sensor. Connect the housing to train earth potential.



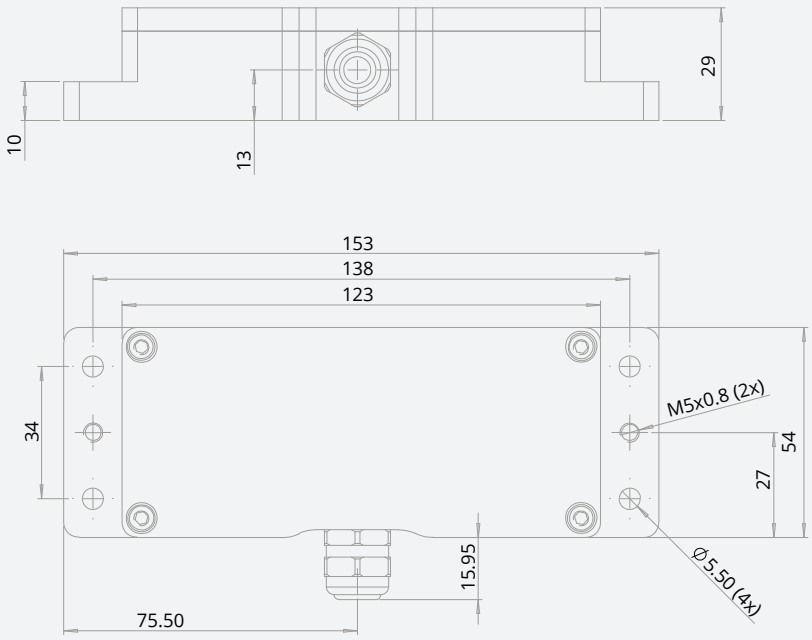
6. Wiring

Wire No.	Assignment
1	Supply voltage
2	Supply ground
3	Signal output y-axis
4	Signal ground y-axis

Connector on request

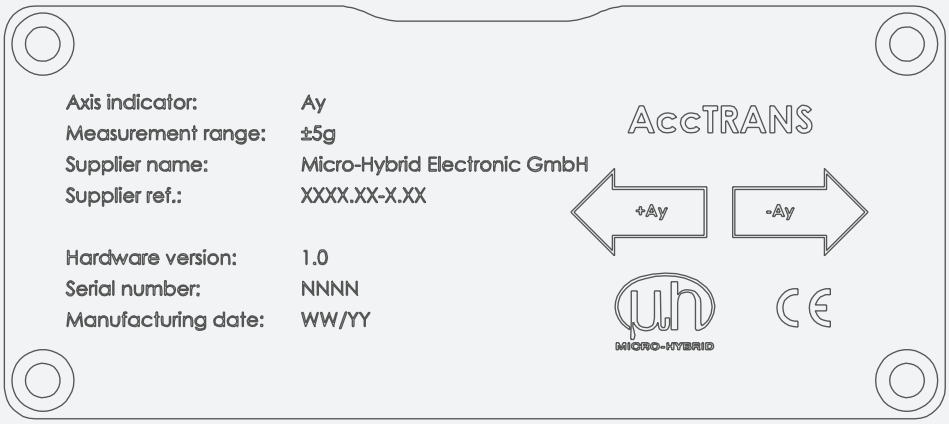
7. Mechanical dimensions

- Weight including 3 meters cable: ~ 1.3 kg



Dimensions in mm

8. Labeling



9. RAMS properties

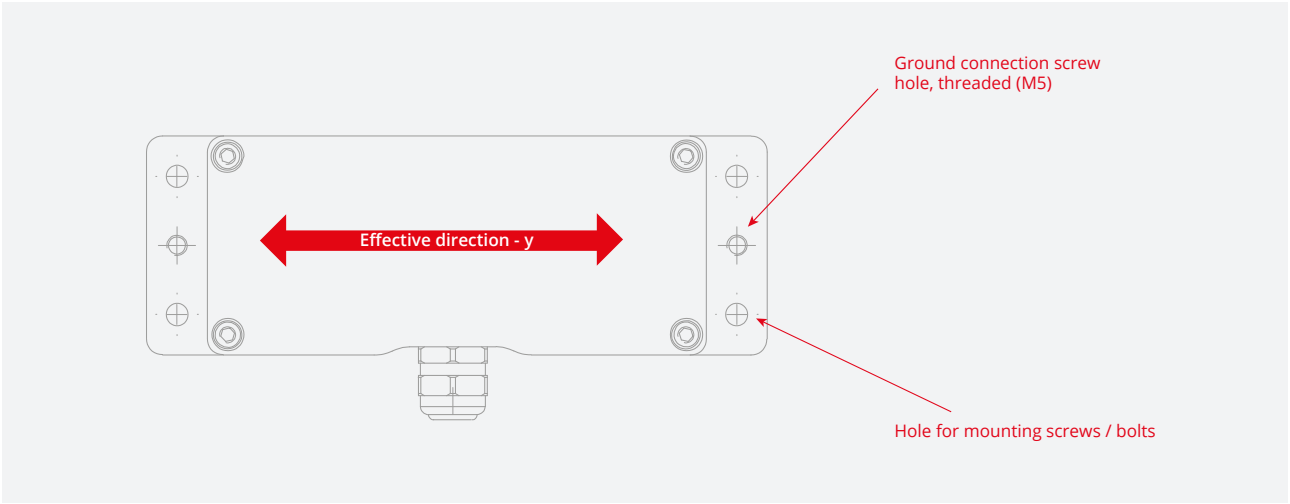
MTBF [1]	3000000	h
Failure rate λ [2]	330	FIT

[1] MTBF = 1/λ
[2] Failure rate calculated as the total sum of the failure rates of each component, with respect to operating temperature conditions.

10. Handling instructions

10.1. Assembly

The accelerometer AccTRANS is supposed to be mounted in the vicinity of the wheel axles in the outskirt area of the train. The housing of the sensor is designed as a flange with four holes for M5 screws (see subsequent drawing).



Mounting on given M4 thread rods
1. Align the device by putting the four given M4 thread rods through the corresponding long holes.
2. Tighten each rod with a matching flat washer and nut with a torque of max. 2.3 Nm (based upon strength category 8.8).
3. Take grounding cable and attach it to one of the ground connection screw holes with M5 bolt (max. shaft length 11 mm).
4. Connect the open wires at the end of the sensor's cable to the socket coming from the train side and make sure that the cable is routed along the predefined, secure way.

Mounting with M4 bolts
1. Place the device aligned along the four tapped holes in the mounting area.
2. Use four M4 bolts and matching flat washers to tighten the device in the supposed place with a torque of max. 2.3 Nm (based upon strength category 8.8).
3. Take grounding cable and attach it to one of the ground connection screw holes with M5 bolt (max. shaft length 11 mm).
4. Connect the open wires at the end of the sensor's cable to the socket coming from the train side and make sure that the cable is routed along the predefined, secure way.

10.2. Maintenance

The device is developed in a way that no maintenance actions are required during its lifetime.

10.3. Disassembly

1. Disconnect the sensor's cable from the train's connector.
2. Unscrew bolt in grounding screw hole and remove grounding cable.
3. Loosen either the four bolts or the nuts with which the device has been attached and lift off the sensor.

11. Troubleshooting

Basically two kinds of errors can occur, electrical and mechanical ones. One cause of a remediable mechanical error could be improper connection of the sensor, e.g. by contaminated connector pins or sockets. Always make sure that there is proper connection between device and train system.

In cases of any other errors it is always necessary to return the defective device to the supplier's facilities in order to investigate the cause. Therefore follow the disassembly instructions mentioned above and return the device to the address below together with a brief description of the observed error.

Shipping address and contact information:

Company	Micro-Hybrid Electronic GmbH
Street and No.	Heinrich-Hertz-Straße 8
Post code	07629
City	Hermsdorf
Country	Germany
Telephone	+49 36601 5920
E-Mail for support	contact@microhybrid.com

12. Applied standards

Applied standards according to DIN EN 50155	
DIN EN 55011	Conducted emission
DIN EN 55011	Radiated emission electromagnetic field
DIN EN 61000-4-3	Immunity to electromagnetic field
DIN EN 61000-4-4	Immunity to electrical fast transient/burst
DIN EN 61000-4-5	Immunity to electrical slow transient/surge
DIN EN 61000-4-6	Immunity to conducted RF voltage
DIN EN 50155	Overvoltage at power supplies
DIN EN 61373	Shock and vibration tests
IEC60068-2-1 (Bd)	Dry heat test
IEC60068-2-30 (Db)	Damp heat, cyclic (2 x 24h cycle)
IEC60068-2-1 (Ad)	Cold test
DIN EN 45545	Fire protection on railway vehicles
Other standards	
RoHS, REACH	Compliant

13. Product key

AccTRANS ### V#

Supply voltage:
110: 110 VDC
24: 24 VDC

Measurement range:
2: ± 2 g
4: ± 4 g
5: ± 5 g

Further options on request.

Disclaimer