MSV200 - Hall effect transducer

Datasheet

Description

The transducers are based on compensating the magnetic field by a closed loop system. The MSV200 is used for the measurement of AC and DC voltages with high galvanic isolation between the voltage carrying conductor and output of the sensor.

The voltage transducer can handle pulsed voltages. The MSV200 transducers are especially designed for secure measuring of a permanent voltage up to 5000 V.

Application

The Mors Smitt transducers are used to measure high voltages in rolling stock and track side applications. High voltages are converted linear to low power signals.

Features

- Specially designed for railway applications
- Closed loop (compensated)
- High dielectric strength
- Precise linearity
- Precise accuracy
- High dynamic response
- No foucault losses in the magnetic circuit
- EMC shielding (optional)
- Wide temperature range, -50ºC..+85ºC

Benefits

- Proven reliable
- Long term availability
- Low life cycle cost
- No maintenance

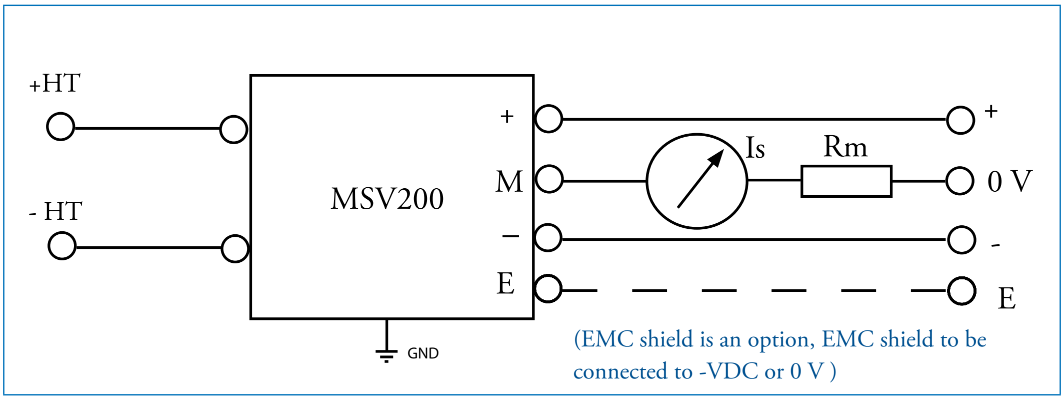
Railway compliancy

- EN 50155 - Railway application electronic equipment used in rolling stock
- IEC 61373 - Rolling stock equipment - Shock and vibration test
- NF F16-101/102 - Fire behaviour - Railway rolling stock
- IEC 60068-2-11 - Environmental testing: Salt mist - Test ka - 96 hours

MSV200
Technical specifications




Connection diagram



MSV200
Technical specifications

Electrical characteristics

Primary nominal r.m.s. voltage	V_{PN}	1000 V	2000 V	3000 V	4000 V	5000 V
Primary voltage measuring range	V_P	± 1500 V	± 3000 V	± 4500 V	± 6000 V	± 6000 V
Primary resistance @ 25 °C	R_P	100 KΩ	400 KΩ	900 KΩ	1.6 MΩ	2.5 MΩ
Primary windings	N_P	10000	20000	30000	40000	50000
Secondary windings	N_S	2000	2000	2000	2000	2000
Secondary nominal r.m.s. current	I_{SN}	50 mA for primary voltage				
Conversion ratio	K_N	Np/Ns				
Secondary coil resistance @ 70 °C	R_S	60 Ω ± 7 %				
Auxiliary supply voltage	V_C	± 15 VDC ...± 24 VDC (± 5 %)				
Current consumption	I_C	± 33 mA + I_C @ 24 VDC				
Dielectric strength between						
- primary circuit and secundary circuit	V_{D1}	6 kV / 10 kV / 12 kV (50 Hz - 1 min) *				
- shield and secondary circuit	V_{D2}	1.5 kV (50 Hz - 1 min)				
Output measuring resistance	R_M	Formule (see explanation below)				

* See ordering scheme

Legend:

- dV = Fixed value = 1.6 V
- V_N = Nominal auxiliary supply
- V_{NC} = Lower value of the auxiliary supply (V_N - 5 % typical)
- R_S = Secondary coil resistance at 70 °C
- I_{SN} = Secondary nominal current
- N_P = Primary windings
- N_S = Secondary windings
- R_P = Primary resistance
- V_{PN} = Primary nominal voltage

Example:

- dV = 1.6 V
- V_N = 24 V
- V_{NC} = ± 22.8 V
- V_{PN} = 1000 V
- R_P = 100 KΩ
- N_P = 10000 turns
- N_S = 2000 turns
- R_S = 60 Ω
- I_{SN} = V_{PN} / ((R_P x N_S) / N_P)
- I_{SN} = 1000 V / ((100.000 Ω x 2000)/10000) = 0. 05 A
- R_M = ((V_{NC}-dV) / I_{SN}) - R_S
- R_M = ((22.8 – 1.6) / 0.05) – 60) = 364Ω

Accuracy / dynamic performance

Overall accuracy @ I_{PN} - T_A= 25 °C	X_G	± 0.7 % / ± 1 % *
Linearity	$ε_L$	< 0.1 %
Offset current @ I_P= 0 - T_A= 25 °C	I_0	± 0.2 mA max.
(I_P : Internal primary current)		
Response time @ 90 % of V_{PN}	T_R	< 100 µs
Thermal drift of I_0 between (-25 °C...+70 °C))	I_{0T}	± 1 mA max

* See ordering scheme

General characteristics

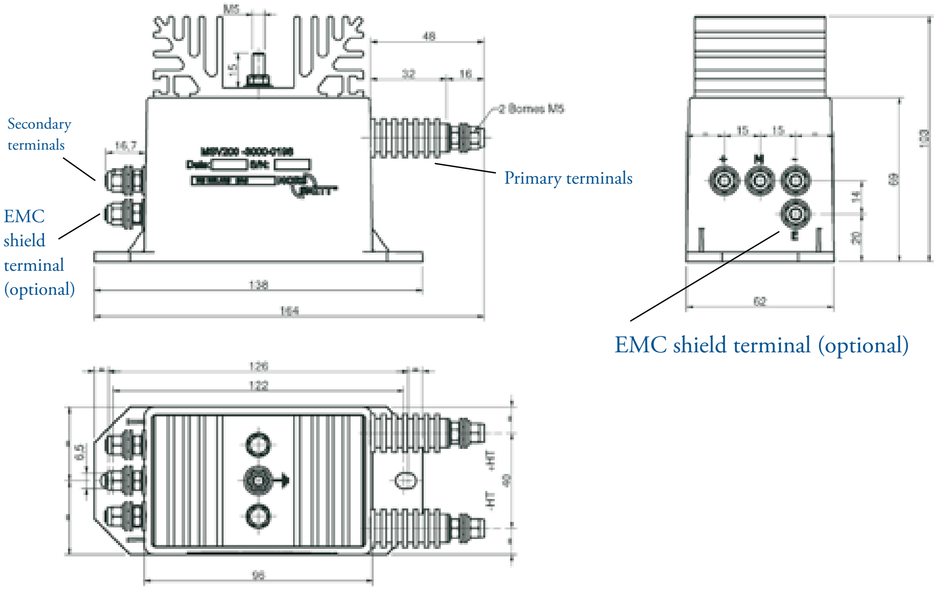
Operating temperature	T_A	-40 °C...+70 °C / -50 °C...+85 °C *
Storing temperature	T_S	-50 °C...+85 °C
Weight	m	800 g ± 10 %
Connection		M5 terminals

* See ordering scheme

MSV200
Technical specifications

Dimensions (mm)

M5 terminal with insulator for HV



Notes:

1. Connection: Primary 2 x M5 terminals (maximum torque value 2.2 Nm), secondary 3 x M5 terminals (maximum torque value 2.2 Nm), a 4th M5 terminal is placed when EMC is selected (maximum torque value 2.2 Nm), ground terminal 1 x M5 (maximum torque value 2.2 Nm)
2. Fastening: 2 holes Ø 6.5 mm
3. General tolerances are ± 0.3 mm, with exception of the input/output positions ± 1 mm, length ± 1 mm and on positions where the value is mentioned in the drawing
4. Drawing is according the European projection method

MSV200
Ordering scheme

Configuration:

MSV200	-	3	-	D	-	4	-	3	-	2	-	Y
1.		2.		3.		4.		5.		6.		7.

This example represents a **MSV200-3-D-4-3-2-Y**.
Description: MSV200 transducer, 3000 V, M5 terminals, dielectric strength 12 kV, 0.7 % accuracy, -50 °C...+85 °C temperature range, with EMC shield.

1. Transducer model

MSV200

2. Nominal voltages

1	1000 V
2	2000 V
3	3000 V
4	4000 V
5	5000 V

3. Secondary connection

D	M5 terminals

4. Dielectric strength

2	6 kV
3	10 kV
4	12 kV

5. Accuracy

1	1 %
3	0.7 %

6. Temperature range

1	-40 °C...+70 °C
2	-50 °C...+85 °C

7. EMC shield

N	Without EMC shield
Y	With EMC shield

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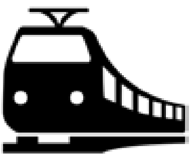
DS MSV200 V4.5 March 2013



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