# MSV100 - Hall effect transducer

## Datasheet


## Description

The transducers are based on compensating the magnetic field by a closed loop system. The MSV100 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 MSV100 transducers are especially designed for secure measuring of a permanent voltage up to 950 V. The voltage measuring range covers a bandwidth from -1400 V to 1400 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

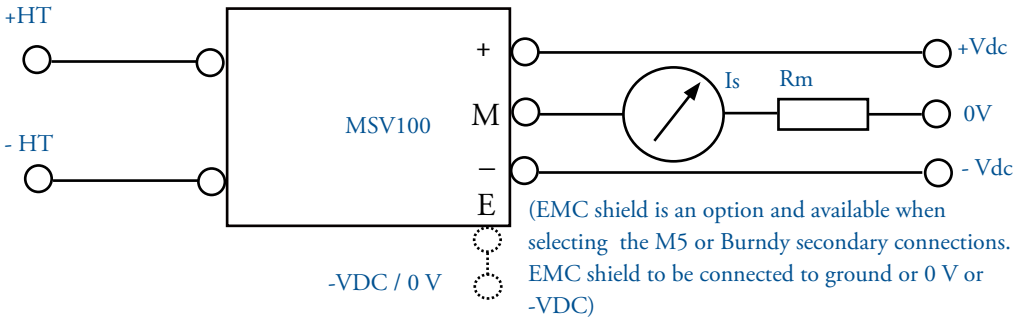
- EN 50155 - Railway application electronic equipment used in rolling stock
- IEC 61373 - Rolling stock equipment - Shock and vibration test
- NF F16-101/102 - Fire behaviour - Railway rolling stock
- IEC 60068-2-11 - Environmental testing: Salt mist - Test ka - 96 hours

# MSV100
## Technical specifications





## Connection diagram



# MSV100
# Technical specifications

## Electrical characteristics

| | | |
|---|---|---|
| Primary nominal r.m.s. voltage | $V_{PN}$ | 950 V |
| Primary voltage measuring range | $V_P$ | ± 1400 V |
| Secondary nominal r.m.s. current | $I_{SN}$ | 50 mA for primary voltage 1000 V |
| Conversion ratio | $K_N$ | 1000 V / 50 mA |
| Primary resistance @ 25 °C | $R_P$ | 250 KΩ |
| 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 (50 Hz - 1 min) / 8 kV (50 Hz - 1 min) * |
| - shield and secondary circuit | $V_{D2}$ | 1.5 kV (50 Hz - 1 min) |
| Output measuring resistance | $R_M$ | 220 Ω max for primary voltage 1400 V @ 24°C (see explanation below) |

* See ordering scheme

Legend:

dV = Fixed value

$V_N$ = 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

Example:

dV = 1.6 V

$V_N$ = 24 V

$V_{NC}$ = 22.8 V

$V_{PN}$ = 950 V

$R_P$ = 250 KΩ

$N_P$ = 25000 turns

$N_S$ = 2000 turns

$R_S$ = 60 Ω

$I_{SN} = V_{PN} / ((R_P \times N_S) / N_P)$

$I_{SN}$ = 950 V / ((250 KΩ x 2000)/25000) = 0. 0475 A

$R_M = ((V_{NC}-dV) / I_{SN}) - R_S$

$R_M$ = ((22.8 – 1.6) / 0.0475) – 60) = 386.32Ω

## Accuracy / dynamic performance

| | | |
|---|---|---|
| Overall accuracy @ $I_{PN}$ - $T_A$= 25 °C | $X_G$ | ± 0.7 % / ± 1 % * |
| Linearity | $\varepsilon_L$ | < 0.1 % |
| Offset current @ $I_P$= 0 - $T_A$= 25 °C ($I_P$ : Internal primary current) | $I_0$ | ± 0.2 mA max. |
| 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 |

## General characteristics

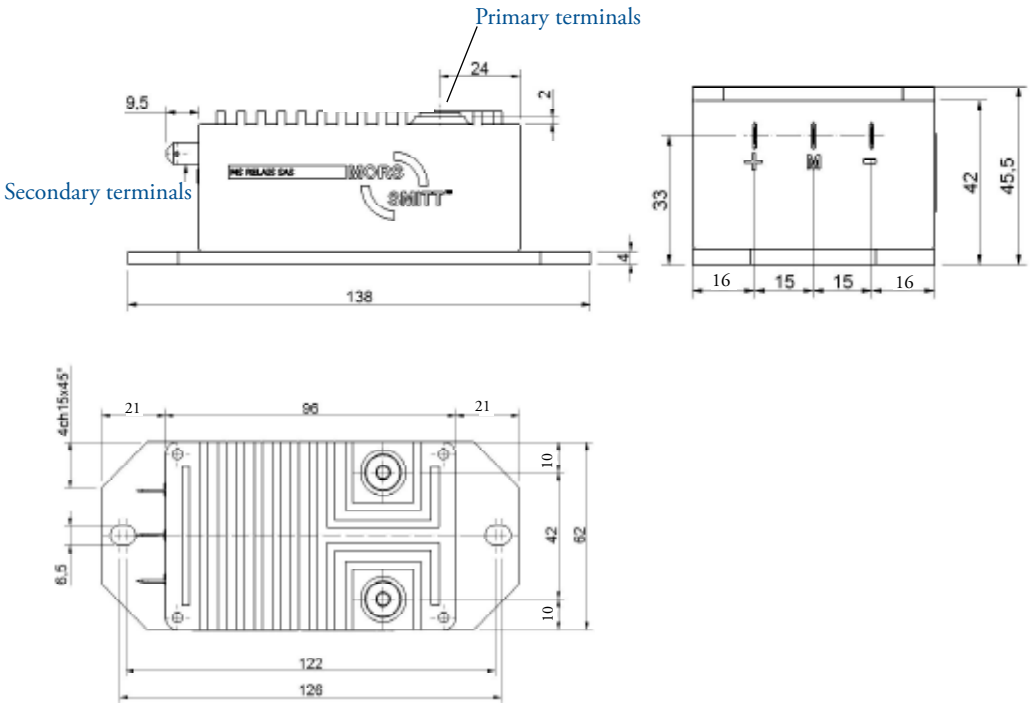
| | | |
|---|---|---|
| Operating temperature | $T_A$ | -40 °C...+70 °C / -50 °C...+85 °C * |
| Storing temperature | $T_S$ | -50 °C...+85 °C |
| Weight | m | 500 g ± 10 % |
| Connection | | Faston 6.35 mm - M5 terminals - Burndy connector * |

* See ordering scheme

# MSV100
## Technical specifications

### Dimensions (mm)

6.35 mm Faston



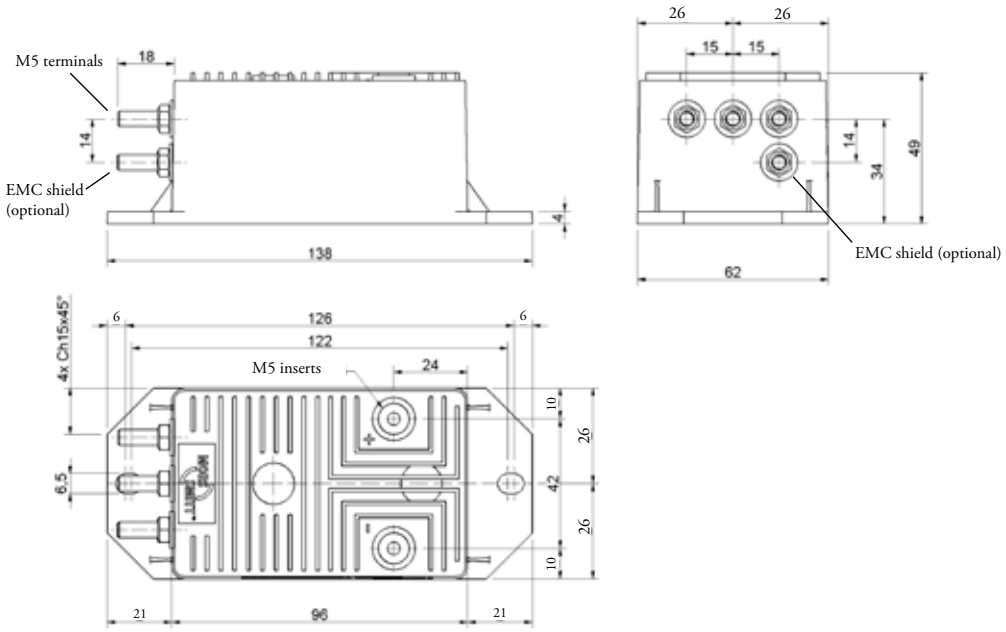

Notes:

1. Connection: Primary 2 x M5 insert (maximum torque value 2.2 Nm), secondary 3 x Faston 6.35 mm
2. Fastening: 2 slots Ø 6.5 mm
3. General tolerances are ± 0.5 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

# MSV100
# Technical specifications

## Dimensions (mm)

### M5 terminals



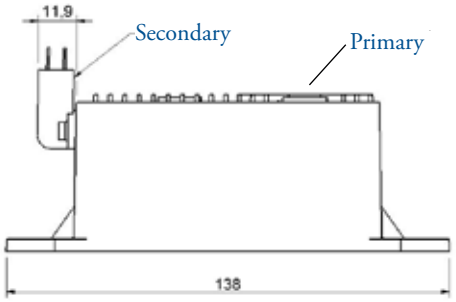

Notes:

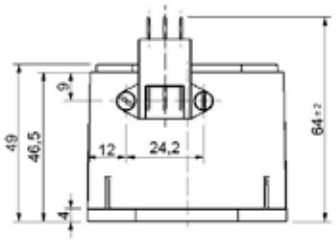
1. Connection: Primary 2 x M5 insert (maximum torque value 2.2 Nm), secondary 3 x M5 terminals (maximum torque value 2.2 Nm), a 4th M5 terminal is placed when EMC is selected (maximum torque value 2.2 Nm)
2. Fastening: 2 slots Ø 6.5 mm
3. General tolerances are ± 0.5 mm, with exception of the input/output 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

# MSV100
# Technical specifications

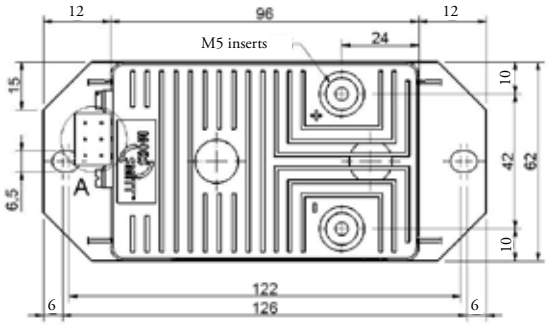
## Dimensions (mm)

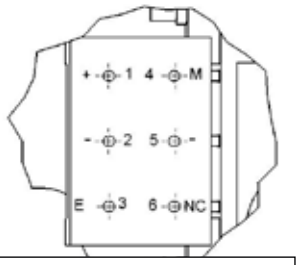
### Burndy connection




A
Burndy Connector SMS6GE6




Connection legend:

| | |
|---|---|
| Pin 1 | +VDC |
| Pin 2 | -VDC |
| Pin 3 | EMC shield (optional) (EMC is optional and not connected if not selected) |
| Pin 4 | M |
| Pin 5 | -VDC |
| Pin 6 | not connected |

Notes:

1. Connection: Primary 2 x M5 insert (maximum torque value 2.2 Nm), secondary burndy connector SMS 6 GE 6
2. Fastening: 2 slots Ø 6.5 mm
3. General tolerances are ± 0.5 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

# MV100
## Ordering scheme

Configuration:

| MSV100 | - | 1 | - | D | - | 5 | - | 3 | - | 2 | - | Y |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1. | | 2. | | 3. | | 4. | | 5. | | 6. | | 7. |

This example represents a **MSV100-1-D-5-2-Y**.
Description: MSV100 transducer, 950 V, M5 terminals, dielectric strength 8 kV, 0.7 % accuracy, -50 °C...+85 °C temperature range, with EMC shield.

### 1. Transducer model

| |
|---|
| **MSV100** |

### 2. Nominal voltage

| | |
|---|---|
| **1** | 950 V |

### 3. Secondary connection

| | |
|---|---|
| **B** | Faston 6.35 mm |
| **D** | M5 terminals |
| **I** | Burndy connection |

### 4. Dielectric strength

| | |
|---|---|
| **2** | 6 kV |
| **5** | 8 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 |
| | Note: EMC shield option only possible on M5 and 6 pole burndy connection |

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