MSA2000 - Hall effect transducer

Datasheet

Description

The transducers are based on compensating the magnetic field by a closed loop system. The MSA2000 is used for the measurement of AC and DC currents with high galvanic isolation between the current carrying conductor and output of the sensor. The current transducer can handle pulsed currents. The MSA2000 transducers are especially designed for secure measuring of a permanent current up to 2000 A. The current measuring range covers a bandwidth from -3000 A to 3000 A.

Application

The Mors Smitt transducers are used to measure high currents in rolling stock and track side applications. High currents 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

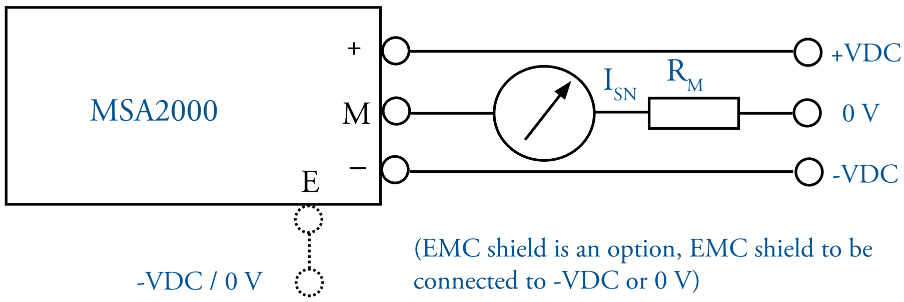
- Proven reliable
- Long term availability
- Low life cycle cost
- No maintenance

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

MSA2000
Technical specifications

Connection diagram



MSA2000
Technical specifications

Electrical characteristics

Primary nominal r.m.s. current	I_{PN}	2000 A
Primary current measuring range	I_P	± 3000 A
Secondary nominal r.m.s. current	I_{SN}	500 mA @ K_N = 1:4000 / 400 mA @ K_N = 1:5000*
Conversion ratio	K_N	1:4000 / 1:5000 *
Secondary coil resistance @ 70 °C	R_S	21 Ω @ K_N = 1:4000 / 27.6 Ω @ K_N = 1:5000 *
Auxiliary supply voltage	V_N	± 15 VDC... 24 VDC
Current consumption	I_C	33 mA + I_S @ 24 VDC (I_S : Secondary current)
Dielectric strength	V_D	6 kV / 10 kV / 12 kV (50 Hz - 1 min) *
Output measuring resistance	R_M	$R_M = ((V_{NC} – dV) / I_{SN}) – R_S$ (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 current

Example:

dV = 1.6 V
V_N = 15 V
V_{NC} = 14.25 V
I_{PN} = 2000 A
K_N = 5000 turns
R_S = 27.6 Ω
I_{SN} = I_{PN} / K_N
I_{SN} = 2000 / 5000 = 0.4 A

R_M = ((14.25 – 1.6) / 0.4) – 27.6) = 4.025 Ω

Accuracy / dynamic performance

Overall accuracy @ I_{PN} - T_A=25 °C	X_G	± 0.5% / ± 1% *
Linearity	ε_L	< 0.1%
Offset current @ I_P=0 - T_A=25 °C	I_0	± 0.7 mA max.
Thermal drift of I_0 between (-25 °C...+70 °C)	I_{0T}	± 1 mA max.
Resp. time @ 90% of I_{PN} and di/dt 100 A/ µs	T_R	< 1 µs
Di / dt accuracy followed	di/dt	> 50 A / µs
Frequency bandwidth (-3 dB)	f	DC to 100 kHz

* See ordering scheme

General characteristics

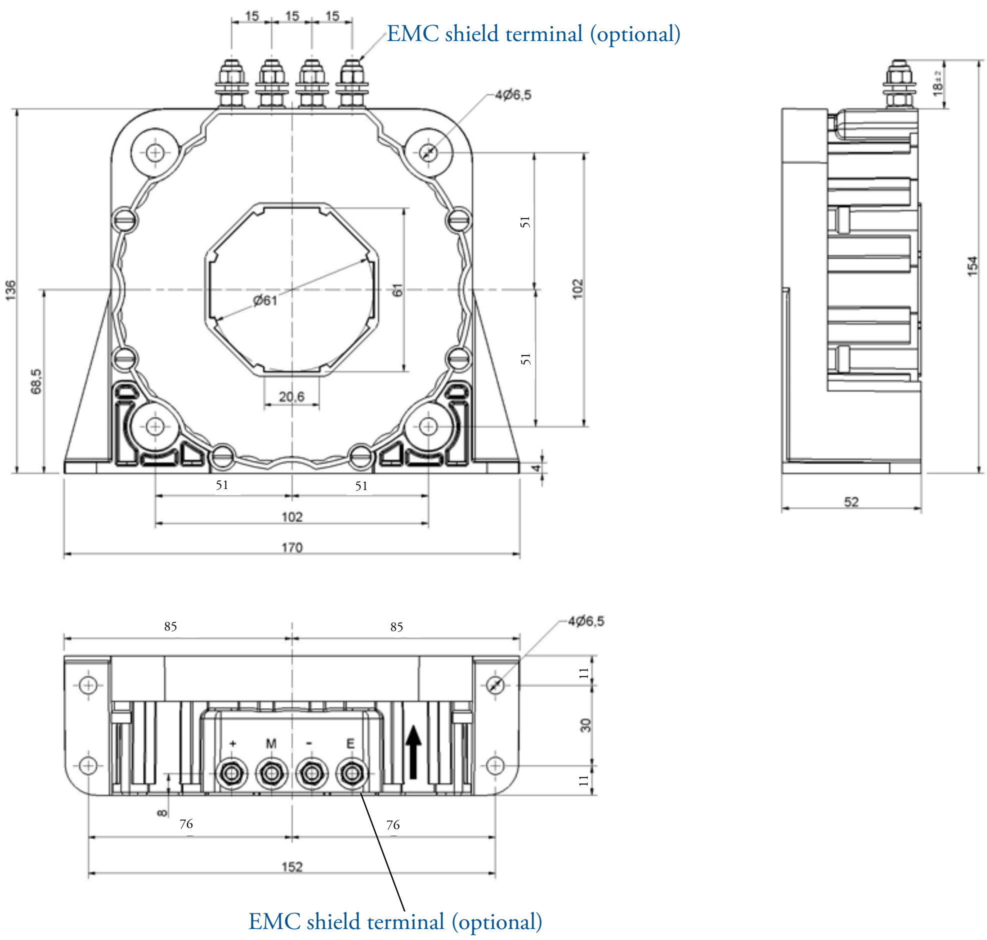
Operating temperature	T_A	-40 °C...+85 °C or -50 °C...+85 °C *
Storing temperature	T_S	-40 °C...+85 °C or -50 °C...+85 °C * Storing temperature will follow operating temperature
Weight	m	1400 g ± 10 % (without busbar, holding frame or mounting frame) 3600 g ± 10% (with primary busbar 210 x 60 x 20 mm)
Connection		M5 terminals typical - Trim trio SMS 6 PDH1 *

* See ordering scheme

MSA2000
Technical specifications

Dimensions (mm)

M5 terminals



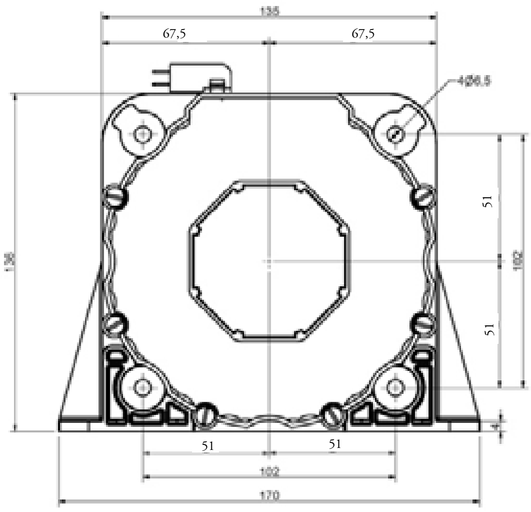
Notes:

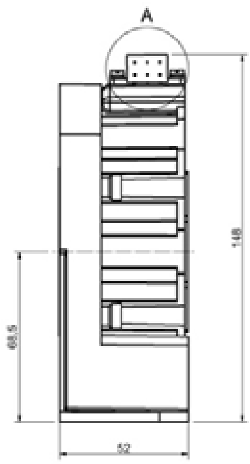
1. Connection: 3 x M5 terminals, maximum torque value 2.2 Nm
   A 4th M5 terminal is placed when the EMC shield option is selected (maximum torque value 2.2 Nm)
2. Fastening: 4 slots Ø 6.5 mm in the mounting frame base for regular mounting and 4 slots Ø 5.5 mm for vertical mounting frame section for panel mounting
3. To obtain a positive output on the terminal marked “M”, primary current must flow in the direction of the arrow (conventional flow)
4. Temperature of the primary conductor should not exceed 100 °C
5. 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

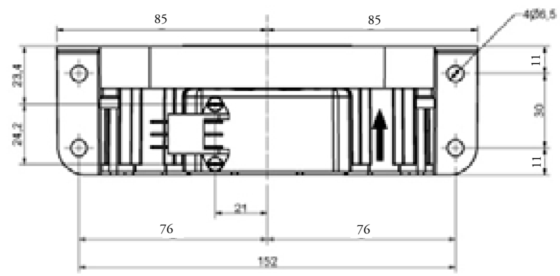
MSA2000
Technical specifications

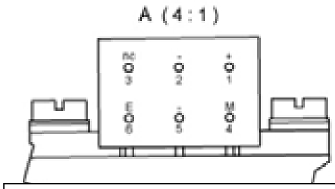
Dimensions (mm)

Trim trio SMS 6 PDH1 connector









Connection legend:

Pin 1	+VDC
Pin 2	-VDC
Pin 3	not connected
Pin 4	M
Pin 5	-VDC
Pin 6	EMC shield (optional)

Notes:
1. Connection Trim trio SMS 6 PDH1
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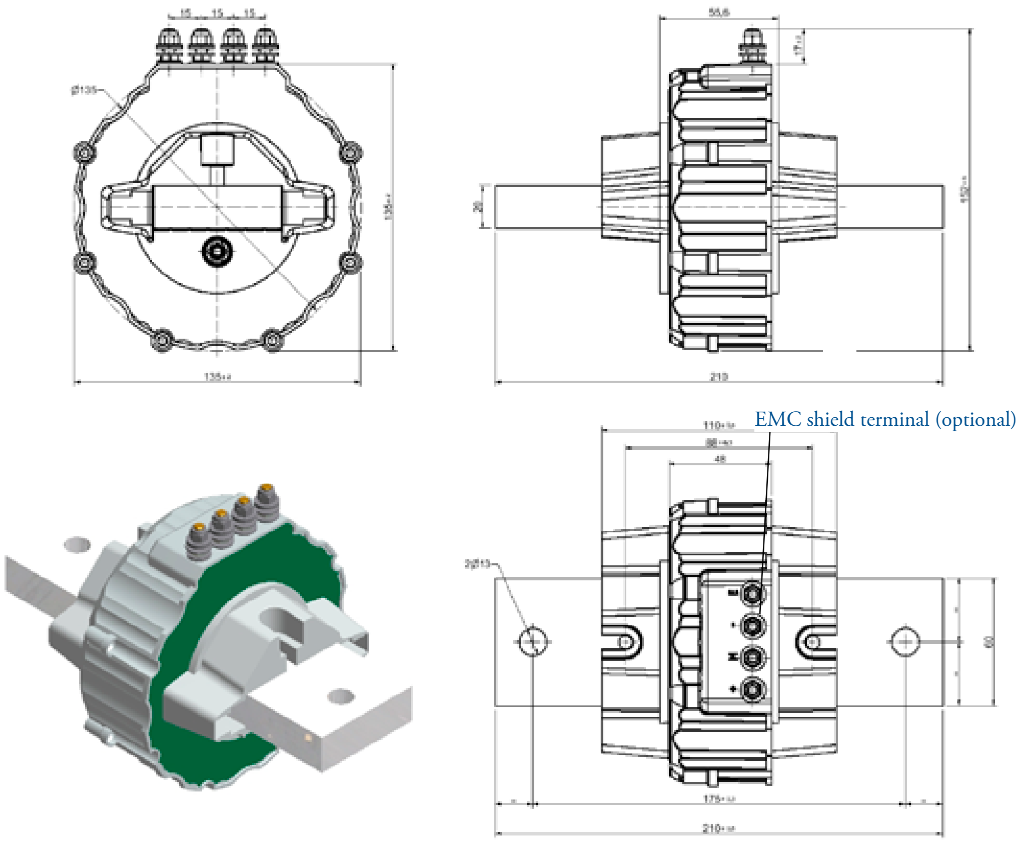
MSA2000
Technical specifications

Dimensions (mm)

Primary bus bar
(applicable for all types, drawing shows the combination M5 terminals)

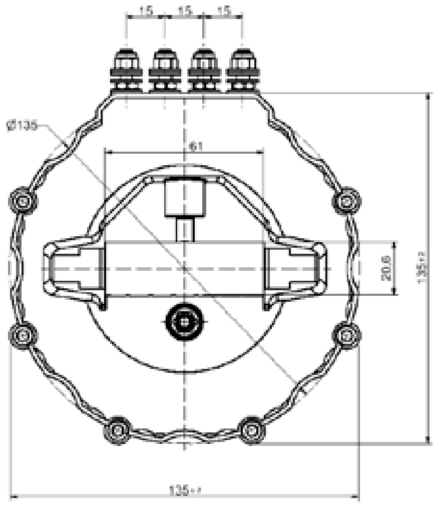


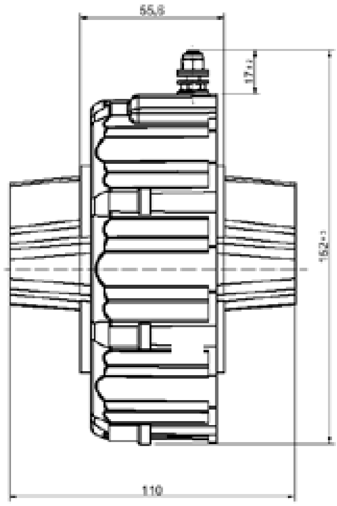
Notes:
1. Connection: 3 x M5 terminals, maximum torque value 2.2 Nm. A 4th M5 terminal is placed when the EMC shield option is selected (maximum torque value 2.2 Nm)
2. Fastening: 2 slots Ø 13 mm
3. To obtain a positive output on the terminal marked “M”, primary current must flow in the direction of the arrow (conventional flow)
4. Temperature of the primary conductor should not exceed 100 °C
5. 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
6. Material of bus bar: plated copper
7. Installation with a primary bus bar; the sensor must be mechanically fixed only by the bar not both bar and housing at the same time (this type of fixing would lead to mechanical stress that could lead to breaking of the sensor)

MSA2000
Technical specifications

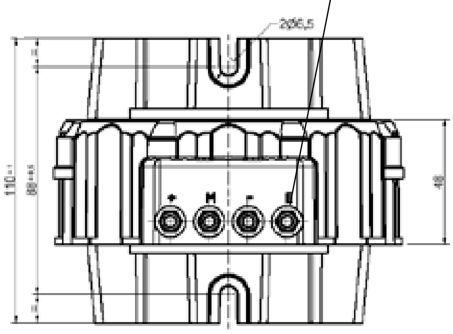
Dimensions (mm)

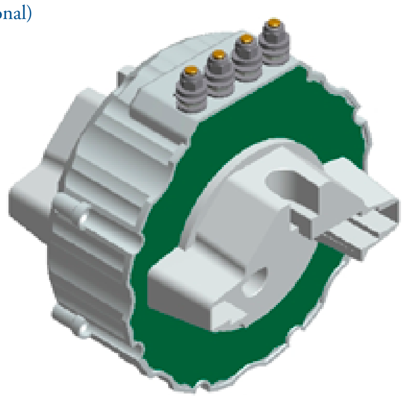
Bus bar holding frame
(applicable for all types, drawing shows the combination M5 terminals)





EMC shield terminal (optional)





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MSA2000
Notes

MSA2000
Ordering scheme

Configuration:

MSA2000	-	S	-	4	-	D	-	3	-	2	-	4	-	Y
1.		2.		3.		4.		5.		6.		7		8.

This example represents a **MSA2000-S-4-D-3-2-4-Y**.
Description: MSA2000 transducer, with hole for the primary, conversion ratio 1:4000, M5 terminals, dielectric strength 10 kV, 0.5% accuracy, -50 °C...+85 °C temperature range, with EMC shield.

1. Transducer model

MSA2000

2. Mounting

S	With hole for the primary
T	With primary busbar
F	With bus bar holding frame

3. Conversion ratio

4	1:4000
5	1:5000

4. Secondary connection

D	M5 terminals
I	Trim trio SMS 6 PDH1

5. Dielectric strength

2	6 kV
3	10 kV
4	12 kV

6. Accuracy

1	**1** %
2	0.5 %

7. Temperature range

3	-40 °C...+85 °C
4	-50 °C...+85 °C

8. EMC shield

N	Without EMC shield
Y	With EMC shield

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SERVING SAFETY

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