MSA2010 - Hall effect current transducer

Datasheet

Description

The transducers are based on compensating the magnetic field by a closed loop system. The MSA2010 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 MSA2010 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 and high voltages in rolling stock and track side applications. High currents or 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

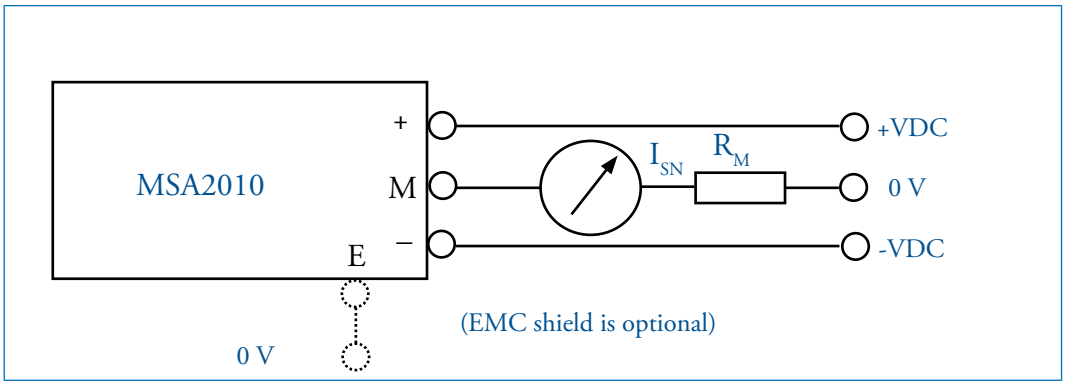
Railway compliancy

- 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

MSA2010
Technical specifications



Connection diagram



MSA2010
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
Conversion ratio	K_N	1:4000
Secondary coil resistance @ 70 °C	R_S	22 Ω
Auxiliary supply voltage	V_N	± 15 to ± 24 VDC ± 5%
Current consumption	I_C	± 33 mA + I_S @ 24 VDC
Dielectric strength between		
- primary circuit and secundary circuit	V_{D1}	10 kV (50 Hz - 1 min)
- shield and secondary circuit	V_{D2}	1.5 kV (50 Hz - 1 min)
Output measuring resistance	R_M	$R_M = ((V_{NC} – dV) / I_{SN}) – R_S$ (see explanation below)

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 85 °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 = 4000 turns
R_S = 22 Ω
I_{SN} = I_{PN} / K_N
I_{SN} = 2000 / 4000 = 0.5 A

R_M = ((14.25 – 1.6) / 0.5) – 22) = 3.3 Ω

Accuracy / dynamic performance

Overall accuracy @ I_{PN} - T_A= 25 °C	X_G	± 1 %
Overall accuracy @ I_{PN} - T_A= 25 °C...70 °C	X_G	± 1.5 %
Linearity	ε_L	< 0.1 %
Offset current @ I_P= 0 - T_A= 25 °C	I_0	± 0.5 mA max.
Thermal drift of I_0 between (-40 °C...+85 °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

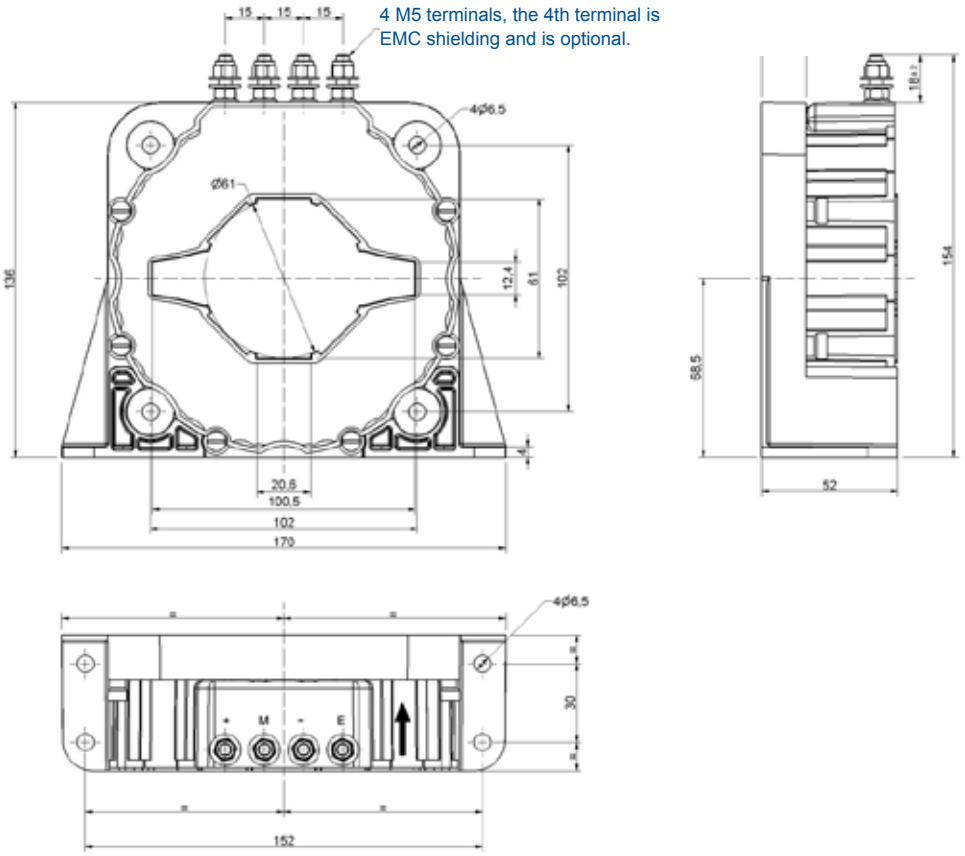
General characteristics

Operating temperature	T_A	-40 °C...+85 °C / -50 °C...+85 °C
Storing temperature	T_S	-40 °C...+85 °C / -50 °C...+85 °C
Weight	m	1400 g ± 10 % (without busbar)
		4400 g ± 10% (with primary busbar 350 x 100 x 10 mm)
Connection		M5 terminals - Burndy connector

MSA2010
Technical specifications

Dimensions (mm)

M5 terminals



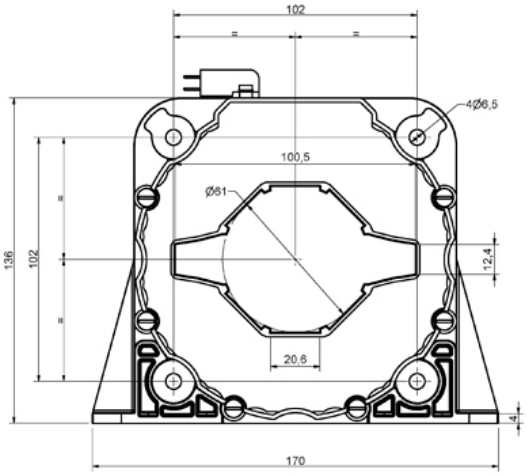
Notes:

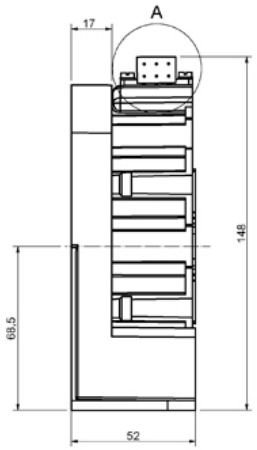
1. Connection: 4 x M5 terminals, torque 2.2 Nm
2. Fastening: 4 slots Ø 6.5 mm (M6 torque 5.5 Nm)
3. To obtain a positive output on the terminal marked “M”, primary current must flow in the direction of the arrow (conventional flow)
4. Temperature of the primary conductor should not exceed 100 °C
5. General tolerances are ± 0.5 mm, with exception of the input/output positions and length ± 1 mm

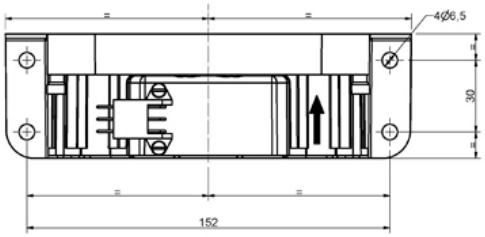
MSA2010
Technical specifications

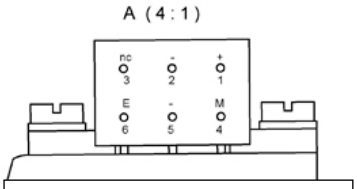
Dimensions (mm)

Burndy connection









Connection legend:

Pin 1	+ VDC
Pin 2	- VDC
Pin 3	Not connected
Pin 4	M
Pin 5	-VDC
Pin 6	EMC shield

Notes:

1. Connection Trim trio SMS 6 PDH1
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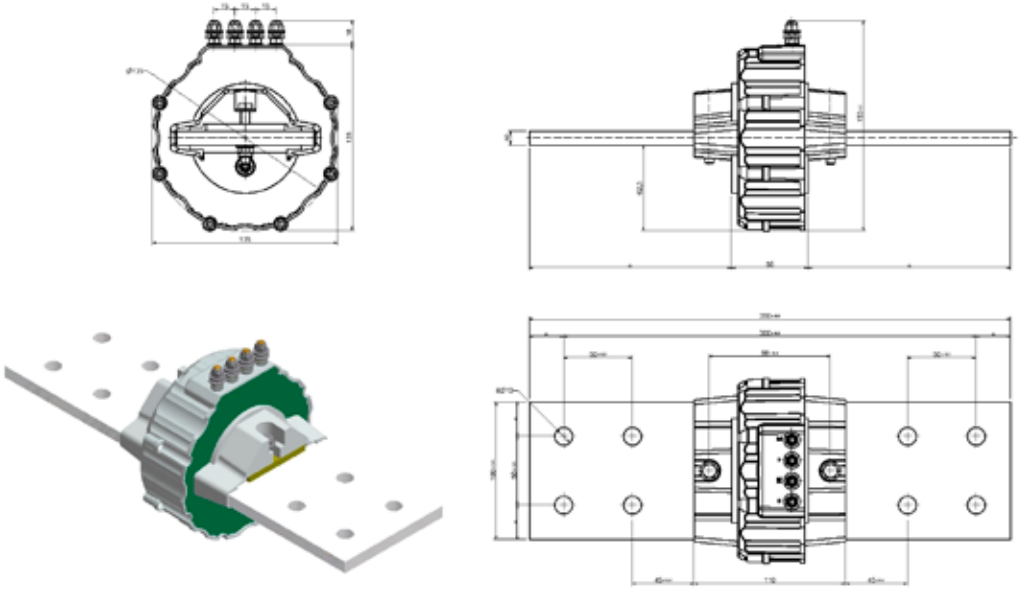
Technical specifications

Dimensions (mm)

Bus bar
(in combination with M5 terminals, possible with Burndy connection)



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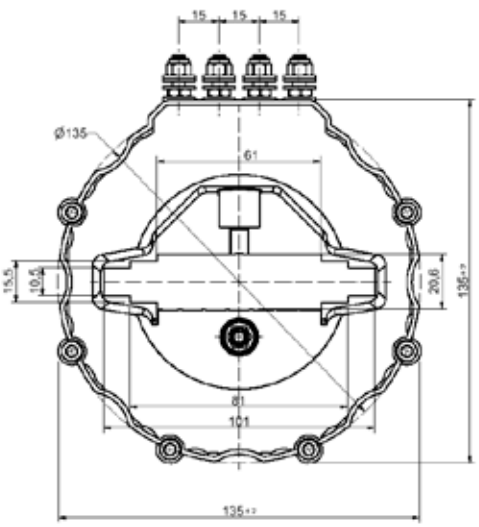
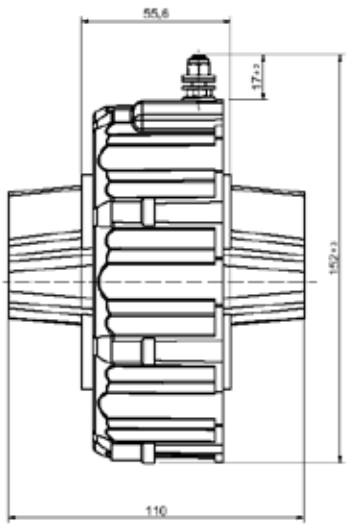
5. General tolerances are ± 0.5 mm, with exception of the input/output positions and length ± 1 mm
6. Installation with a primary bus bar; the sensor must be mechanically fixed only by the bar not both bar and housing at the same time (this type of fixing would lead to mechanical stress that could lead to breaking of the sensor)

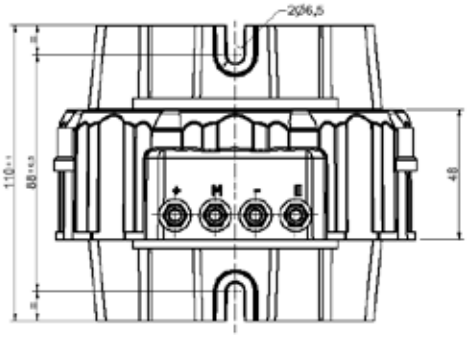
MSA2010
Technical specifications

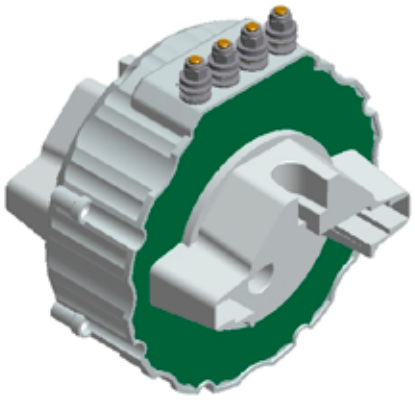
Dimensions (mm)

Bus bar frame
(in combination with M5 terminals, possible with Burndy connection)









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MSA2010
Notes

MSA2010
Ordering scheme

Configuration:

MSA2010	-	S	-	4	-	D	-	3	-	1	-	4	-	Y
1.		2.		3.		4.		5.		6.		7		8.

This example represents a **MSA2010-S-4-D-3-1-4-Y**.
Description: MSA2000 transducer, with hole for the primary, conversion ratio 1:4000, M5 terminals, dielectric strength 10 kV, 1 % accuracy, -50 °C...+85 °C temperature range, with EMC shield.

1. Transducer model

MSA2010

2. Mounting

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

3. Conversion ratio

4	1:4000

4. Secondary connection

D	M5 terminals
I	Burndy connection

5. Dielectric strength

3	10 kV

6. Accuracy

1	**1** %

7. Temperature range

3	-40 °C...+85 °C
4	-50 °C...+85 °C

8. EMC shield

N	Without EMC shield
Y	With EMC shield

Mors Smitt
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SERVING SAFETY

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