MSA500 - Hall effect transducer

Datasheet

Description

The transducers are based on compensating the magnetic field by a closed loop system. The MSA500 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 MSA500 transducers are especially designed for secure measuring of a permanent current up to 500 A. The current measuring range covers a bandwidth from -1000 A to 1000 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

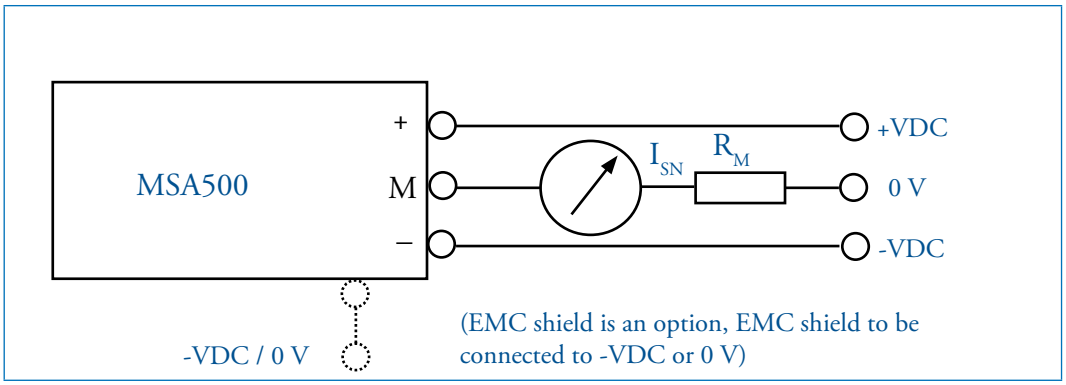
Railway compliancy

- 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

MSA500
Technical specifications



Connection diagram



MSA500
Technical specifications

Electrical characteristics

Primary nominal r.m.s. current	I_{PN}	500 A
Primary current measuring range	I_P	± 1000 A
Secondary nominal r.m.s. current	I_{SN}	100 mA @ K_N = 1:5000 / 125 mA @ K_N = 1:4000*
Conversion ratio	K_N	1:4000 / 1:5000 *
Secondary coil resistance @ 70 °C	R_S	35 Ω @ K_N = 1:4000 / 43 Ω @ K_N = 1:5000 *
Auxiliary supply voltage	V_N	± 15 VDC... 24 VDC
Current consumption	I_C	30 mA + I_S @ 24 VDC
Dielectric strength	V_D	6 kV / 10 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} = 500 A
K_N = 5000 turns
R_S = 43 Ω
I_{SN} = I_{PN} / K_N
I_{SN} = 500 / 5000 = 0.1 A

R_M = ((14.25 – 1.6) / 0.1) – 43) = 83.5 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	± 0.2 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 150 KHz

* See ordering scheme

General characteristics

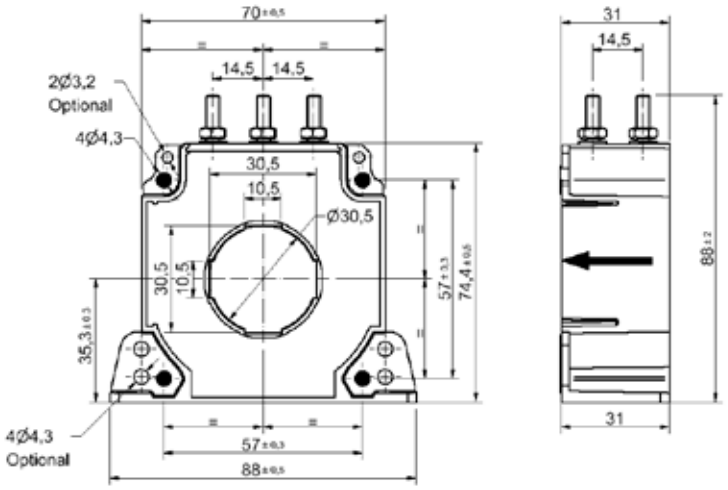
Operating temperature	T_A	-40 °C...+85 °C or -50 °C...+85 °C *
Storing temperature	T_S	-40 °C...+85 °C or -50 °C...+85 °C * Storing temperature will follow operating temperature
Weight	m	200 g ± 10 % (without busbar) 395 g ± 10 % (with primary busbar 155 x 25 x 6 mm)
Connection		M4 with Faston 6.35 mm terminals - Faston 6.35 mm - Flying leads - M5 with Faston 6.35 mm terminals - Trim trio SMS 6 PDH1 - M5 terminals *

* See ordering scheme

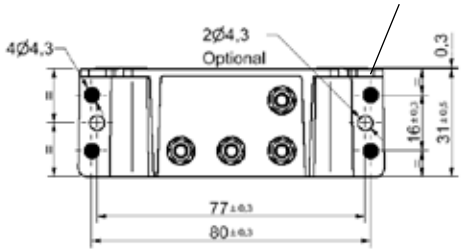
MSA500
Technical specifications

Dimensions (mm)

M4 terminals



EMC shield terminal (optional)



Notes:

1. Connection: 3 x M4 terminals, maximum torque value 2.2 Nm
   A 4th M4 terminal is placed when the EMC shield option is selected (maximum torque value 2.2 Nm)
2. Fastening: 4 slots black marked Ø 5.5 mm for horizontal mounting and 4 slots black marked Ø 4.3 mm for vertical 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
6. Drawing is according the European projection method

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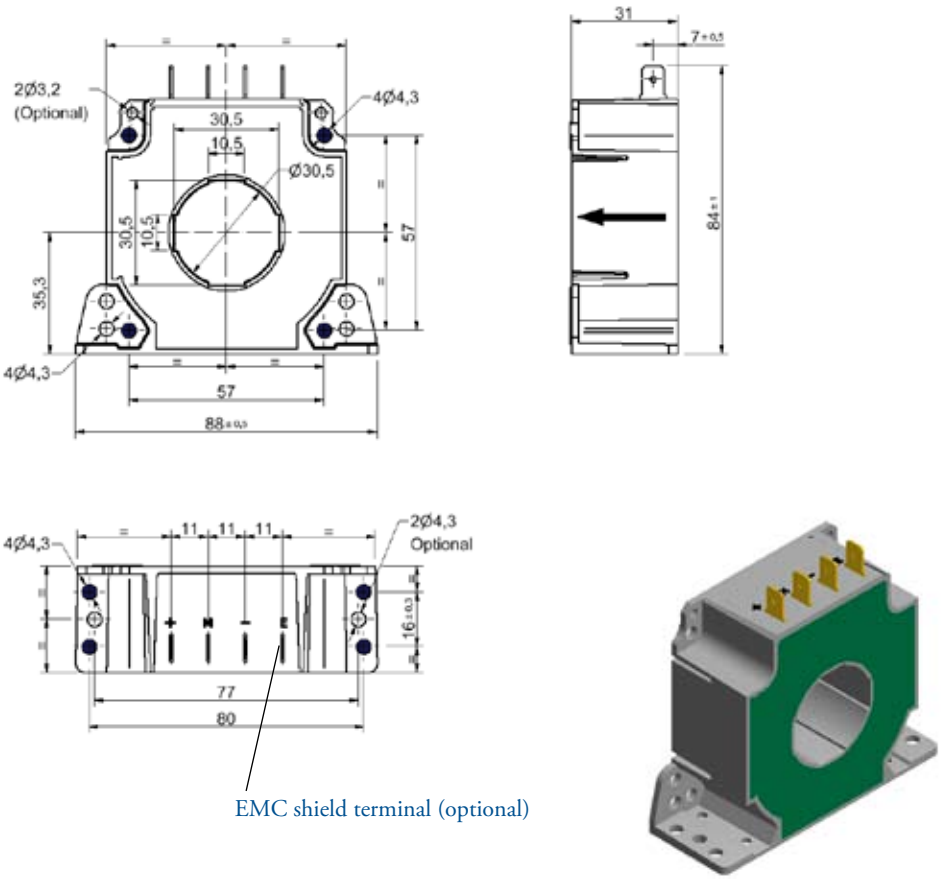
Dimensions (mm)

Faston 6.35 mm terminals



Notes:

1. Connection: 3 x Faston 6.35 mm terminals, a 4th Faston 6.35 mm terminal is placed when the EMC shield option is selected
2. Fastening: 4 slots black marked Ø 4.3 mm for horizontal mounting and 4 slots black marked Ø 4.3 mm for vertical 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
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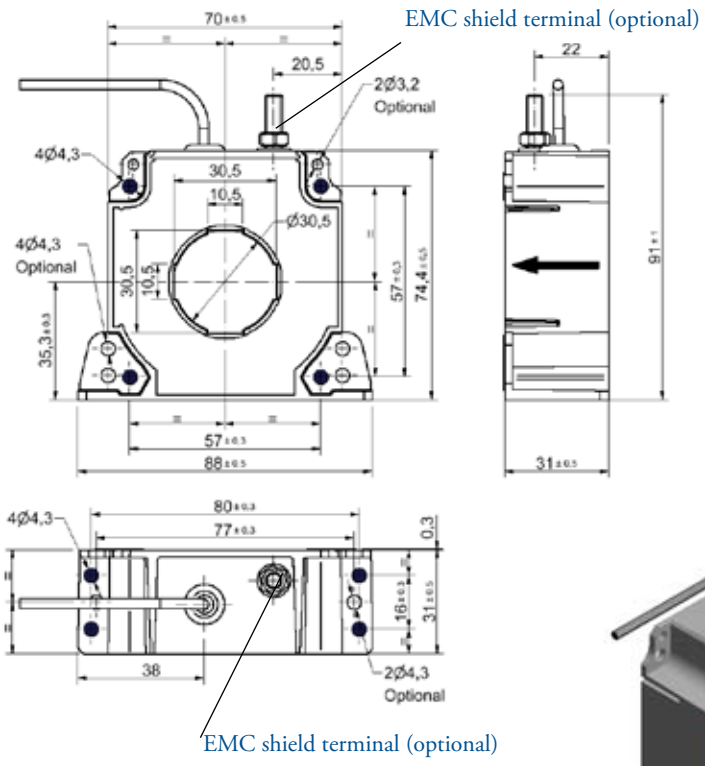
Technical specifications

Dimensions (mm)

Flying lead terminals



Notes:

1. Cable Ø 6 mm,
   Red = +24 V
   Green = 0 V
   Black = -24 V
2. An aditional M4 terminal is placed when the EMC shield option is selected (maximum torque value 2.2 Nm)
3. Fastening: 4 slots black marked Ø 4.3 mm for horizontal mounting and 4 slots black marked Ø 4.3 mm for vertical mounting
4. To obtain a positive output on the terminal marked “M”, primary current must flow in the direction of the arrow (conventional flow)
5. Temperature of the primary conductor should not exceed 100 °C
6. 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
7. Drawing is according the European projection method

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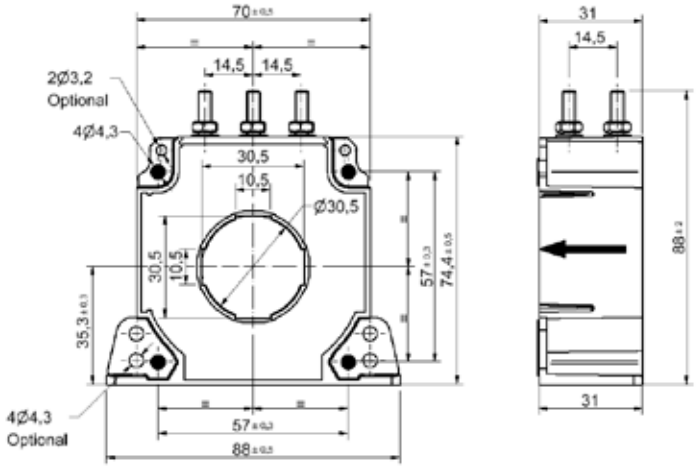
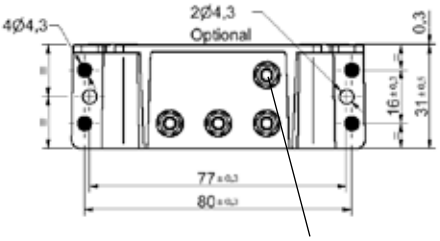
Technical specifications

Dimensions (mm)

M5 terminals





EMC shield terminal (optional)

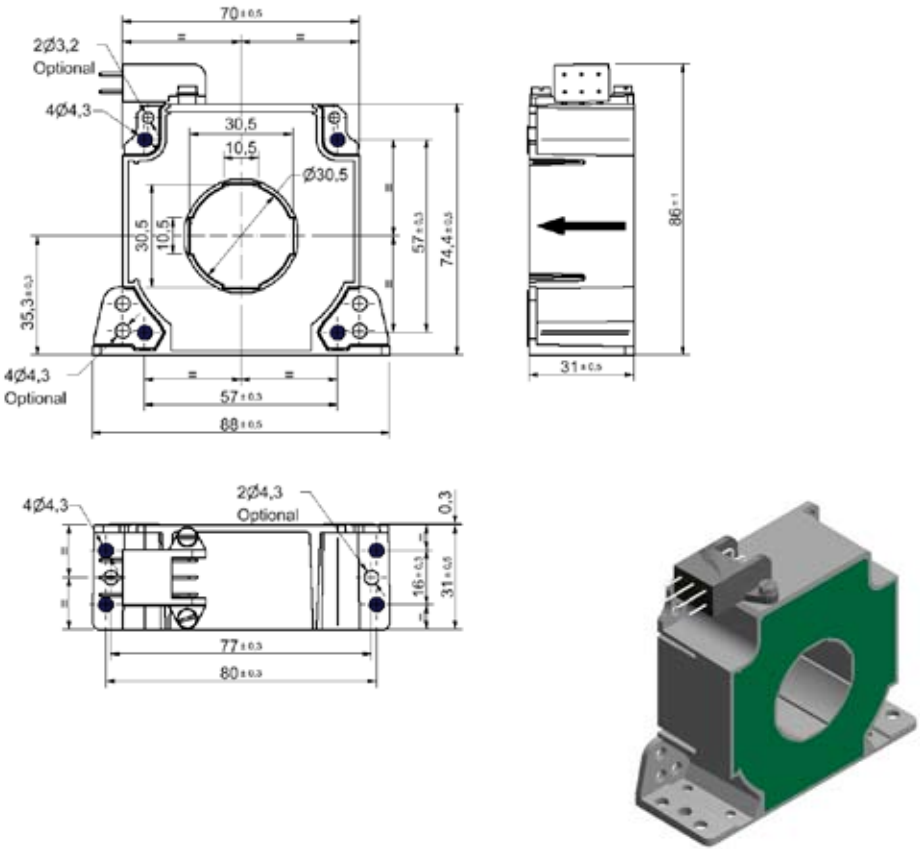
Notes:

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 black marked Ø 4.3 mm for horizontal mounting and 4 slots black marked Ø 4.3 mm for vertical 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
6. Drawing is according the European projection method

MSA500
Technical specifications

Dimensions (mm)

Trim trio SMS 6 PDH1 connector



Notes:

1. Connection trim trio SMS 6 PDH1
2. Fastening: 4 slots black marked Ø 4.3 mm for horizontal mounting and 4 slots black marked Ø 4.3 mm for vertical 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

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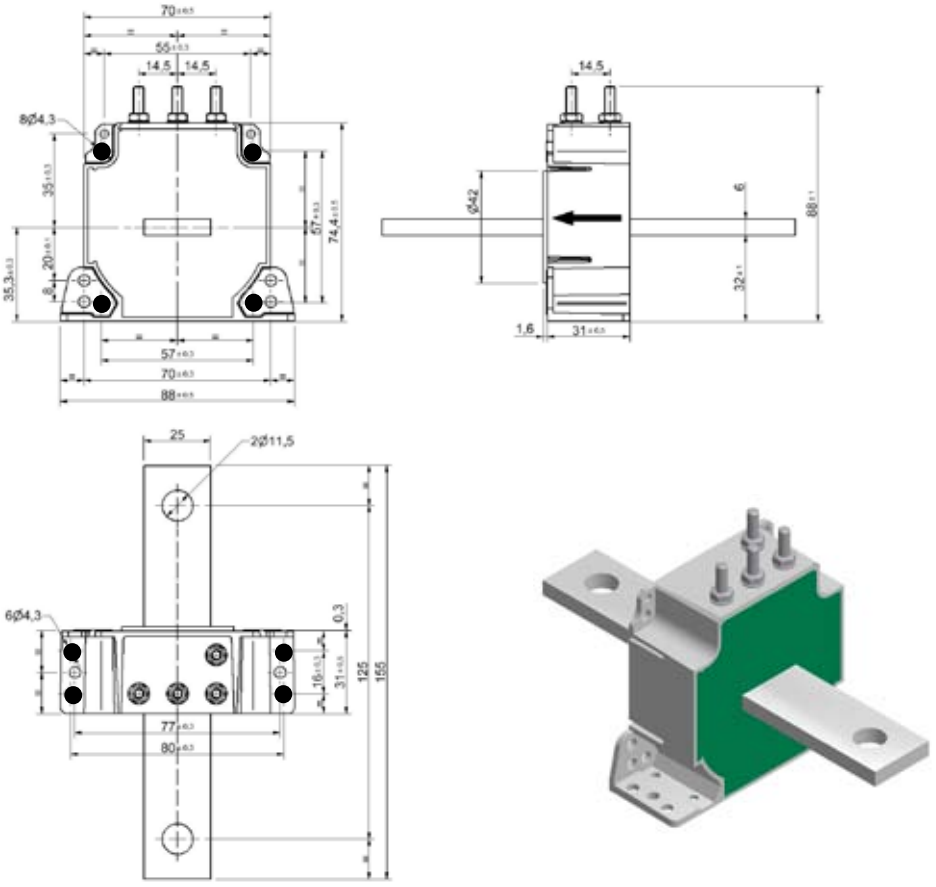
Dimensions (mm)

Primary bus bar



Notes:

1. Connection: 4 x M5 terminals, primary 6 x 25 mm busbar
2. Fastening: 2 slots of Ø 4.3 mm for horizontal mounting and 4 slots black marked Ø 4.3 mm for wall 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 ± 0.3 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. Installation with a primary busbar: the sensor must be mechanically fixed only by the bar but 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).

MSA500
Notes

MSA500
Ordering scheme

Configuration:

MSA500	-	S	-	4	-	D	-	3	-	2	-	4	-	Y
1.		2.		3.		4.		5.		6.		7		8.

This example represents a **MSA500-S-4-D-3-2-4-Y**.
Description: MSA500 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

MSA500

2. Mounting

S	With hole for the primary
T	With primary busbar

3. Conversion ratio

4	1:4000
5	1:5000

4. Secondary connection

A	M4 terminals
B	6.35 mm faston
C	Flying lead terminals
D	M5 terminals
I	Trim trio SMS 6 PDH1

5. Dielectric strength

2	6 kV
3	10 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

DS-MSA500 V4.9 March 2013

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