

CS300 ... CS2000 railway current sensors

Closed loop technology for rolling stock and infrastructure

100 to 2000 A



CS300BRE



CS300BRV



CS1000BRVE



CS2000BR



CS2000BRV

Ordering details*

Nominal primary current A r.m.s	Secondary current I_{s1} at $\pm I_{PN}$ mA	Supply voltage VDC	Secondary connection	Type	Order code
100	100	$\pm 15 \dots \pm 24V$	3 x M5 studs // 3 x 6.35 x 0.8 Faston	CS300-9877	1SBT170300R9877
300	150	$\pm 15 \dots \pm 24V$	3 x M5 studs // 3 x 6.35 x 0.8 Faston	CS300BR	1SBT170300R0001
300	150	$\pm 15 \dots \pm 24V$	3 x M5 studs // 3 x 6.35 x 0.8 Faston	CS300BRV	1SBT170300R0002
300	150	$\pm 15 \dots \pm 24V$	4 x M5 studs // 4 x 6.35 x 0.8 Faston	CS300BRE	1SBT170300R0003
300	150	$\pm 15 \dots \pm 24V$	4 x M5 studs // 4 x 6.35 x 0.8 Faston	CS300BRVE	1SBT170300R0004
500	142,86	$\pm 15 \dots \pm 24V$	3 x M5 studs // 3 x 6.35 x 0.8 Faston	CS503BR	1SBT170503R0001
500	142,86	$\pm 15 \dots \pm 24V$	4 x M5 studs // 4 x 6.35 x 0.8 Faston	CS503BRE	1SBT170503R0003
500	100	$\pm 15 \dots \pm 24V$	3 x M5 studs // 3 x 6.35 x 0.8 Faston	CS500BR	1SBT170500R0001
500	100	$\pm 15 \dots \pm 24V$	3 x M5 studs // 3 x 6.35 x 0.8 Faston	CS500BRV	1SBT170500R0002
500	100		4 x M5 studs // 4 x 6.35 x 0.8 Faston	CS500BRE	1SBT170500R0003
500	100	$\pm 15 \dots \pm 24V$	4 x M5 studs // 4 x 6.35 x 0.8 Faston	CS500BRVE	1SBT170500R0004
1000	200	$\pm 15 \dots \pm 24V$	3 x M5 studs // 3 x 6.35 x 0.8 Faston	CSI000BR	1SBT171000R0001
1000	200	$\pm 15 \dots \pm 24V$	3 x M5 studs // 3 x 6.35 x 0.8 Faston	CSI000BRV	1SBT171000R0002
1000	200	$\pm 15 \dots \pm 24V$	4 x M5 studs // 4 x 6.35 x 0.8 Faston	CSI000BRE	1SBT171000R0003
1000	200	$\pm 15 \dots \pm 24V$	4 x M5 studs // 4 x 6.35 x 0.8 Faston	CSI000BRVE	1SBT171000R0004
1000	250	$\pm 15 \dots \pm 24V$	3 x M5 studs // 3 x 6.35 x 0.8 Faston	CS1000-9940	1SBT171000R9940
1000	250	$\pm 15 \dots \pm 24V$	3 x M5 studs // 3 x 6.35 x 0.8 Faston	CS1000-9941	1SBT171000R9941
1000	250	$\pm 15 \dots \pm 24V$	4 x M5 studs // 4 x 6.35 x 0.8 Faston	CS1000-9942	1SBT171000R9942
1000	250	$\pm 15 \dots \pm 24V$	4 x M5 studs // 4 x 6.35 x 0.8 Faston	CS1000-9943	1SBT171000R9943
2000	400	$\pm 15 \dots \pm 24V$	4 x M5 studs //	CS200BR	1SBT172000R0003
2000	400	$\pm 15 \dots \pm 24V$	4 x M5 studs //	CS2000BRV	1SBT172000R0004
2000	500	$\pm 15 \dots \pm 24V$	4 x M5 studs //	CS2000-9944	1SBT172000R9944
2000	500	$\pm 15 \dots \pm 24V$	4 x M5 studs //	CS2000-9945	1SBT172000R9945

* CSxxxxBRE: with screen connection
 CSxxxxBRV: with side plates and without screen connection
 CSxxxxBRVE: with side plates and screen connection

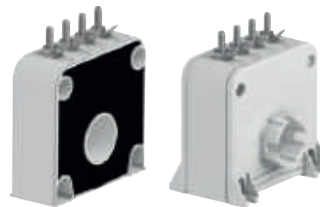
CS300 ... CS2000 railway current sensors

For rolling stock and infrastructure

Technical data

Application

Sensors to measure DC, AC or pulsating currents with a galvanic insulation between primary and secondary circuits.



3

		Horizontal mounting	CS300BR	CS503BR	CS500BR
		Vertical mounting	CS300BRV	–	CS500BRV
		horizontal + Screen	CS300BRE	CS503BRE	CS500BRE
		vertical + Screen	CS300BRVE	–	CS500BRVE
Nominal primary current		A r.m.s.	300	500	500
Measuring range	@ ±15 V (±5%)	A peak	±600	–	–
Measuring range	@ ±24 V (±5%)	A peak	±600	±750	±1000
Not measurable overload	10 ms/hour	A peak	3000	5000	5000
Max. measuring resistance	@ I _{PMAX} & ±15 V (±5%)	Ω	12	–	–
Max. measuring resistance	@ I _{PMAX} & ±24 V (±5%)	Ω	40	6	37
Min. measuring resistance	@ I _{PN} & ±15 V (±5%)	Ω	0	–	–
Min. measuring resistance	@ I _{PN} & ±24 V (±5%)	Ω	35	0	0
Turn number			2000	3500	5000
Secondary current at I _{PN}		mA	150	142.86	100
Accuracy at I _{PN}	@ +25 °C	%	≤±0.5	≤±0.5	≤±0.5
Accuracy at I _{PN}	-40 ... +85 °C	%	≤±1	≤±1	≤±1
Offset current	@ +25 °C & ±24 V (±5%)	mA	≤±0.5	≤±0.3	≤±0.25
Linearity		%	≤0.1	≤0.1	≤0.1
Thermal drift coefficient	-40 ... +85 °C	µA/°C	≤7.5	≤7	≤5
Delay time		µs	≤1	≤1	≤1
di/dt correctly followed		A / µs	≤100	≤100	≤100
Bandwidth	-1 dB	kHz	≤100	≤100	≤100
Max. no-load consumption current	@ ±24 V (±5%)	mA	≤15	≤15	≤15
Secondary resistance	@ +85 °C	Ω	≤27	≤88	≤64
Dielectric strength Primary/Secondary (or Primary/(Secondary+Screen) if relevant)	50 Hz, 1 min	kV	6.5	6.5	12
Dielectric strength Secondary/Screen (if relevant)	50 Hz, 1 min	kV	0.5	0.5	0.5
Supply voltage	±5%	V DC	±15 ... ±24	±15 ... ±24	±15 ... ±24
Voltage drop		V	≤2.5	≤2.5	≤2.5
Mass		kg	0.36	0.36	0.78
Mass with side plates		kg	0.45	0.45	0.910
Operating temperature		°C	-40 ... +85	-40 ... +85	-40 ... +85
Storage temperature		°C	-50 ... +90	-50 ... +90	-50 ... +90

General data

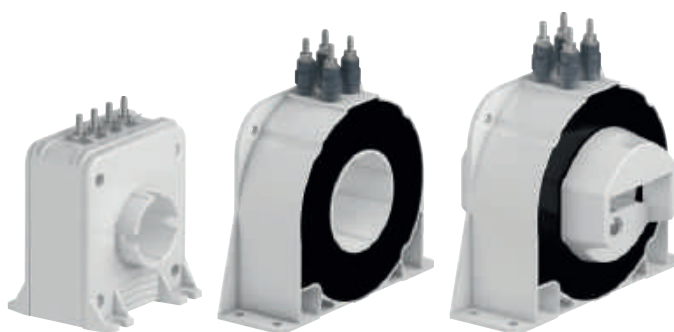
- Plastic case and insulating resin are self-extinguishing.
- Fixing holes in the case moulding for horizontal or vertical mounting, with side plates.
- Direction of the current: A primary current flowing in the direction of the arrow results in a positive secondary output current from terminal M.
- Internal electrostatic screen: All CS sensors have an electrostatic screen, this is connected to the screen terminal "E". Depending on the version, when this screen terminal "E" is not provided, the screen is connected to the (–) terminal of the sensor.

– Protections:

- of the measuring circuit against short-circuits.
- of the measuring circuit against opening.
- of the power supply against polarity reversal.
- Burn-in test in accordance with FPTC 404304 cycle.

Primary connection

Hole for primary conductor. The temperature of the primary conductor in contact with the case must not exceed 100 °C.



	Horizontal mounting	CS1000BR	CS1000-9940	CS2000BR*	CS2000-9944*
	Vertical mounting	CS1000BRV	CS1000-9941	CS2000BR*	CS2000-9944*
	Horizontal + Screen	CS1000BRE	CS1000-9942	CS2000BR*	CS2000-9944*
	Vertical + Screen	CS1000BRVE	CS1000-9943	CS2000BRV	CS2000-9945*
Nominal primary current		A r.m.s. 1000	1000	2000	2000
Measuring range	@ ±15 V (±5%)	A peak -	-	-	-
Measuring range	@ ±24 V (±5%)	A peak ±2000	±2000	±3000	±3000
Not measurable overload	10 ms/hour	A peak 10000	10000	20000	20000
Max. measuring resistance	@ I _{PMAX} & ±15 V (±5%)	Ω -	-	-	-
Max. measuring resistance	@ I _{PMAX} & ±24 V (±5%)	Ω 4	7	5	9
Min. measuring resistance	@ I _{PN} & ±15 V (±5%)	Ω -	-	-	-
Min. measuring resistance	@ I _{PN} & ±24 V (±5%)	Ω 0	0	0	0
Turn number		5000	4000	5000	4000
Secondary current at I _{PN}		mA 200	250	400	500
Accuracy at I _{PN}	@ +25 °C	% ≤±0.5	≤±0.5	≤±0.5	≤±0.5
Accuracy at I _{PN}	-40 ... +85 °C	% ≤±1	≤±1	≤±1	≤±1
Offset current	@ +25 °C & ±24 V (±5%)	mA ≤± 0.25	≤± 0.25	≤± 0.25	≤± 0.25
Linearity		% ≤0.1	≤0.1	≤0.1	≤0.1
Thermal drift coefficient	-40 ... +85 °C	µA/°C ≤10	≤12.5	≤20	≤25
Delay time		µs ≤1	≤1	≤1	≤1
di/dt correctly followed		A / µs ≤100	≤100	≤100	≤100
Bandwidth	-1 dB	kHz ≤100	≤100	≤100	≤100
Max. no-load consumption current	@ ±24 V (±5%)	mA ≤15	≤15	≤25	≤25
Secondary resistance	@ +85 °C	Ω ≤46	≤34	≤30	≤20
Dielectric strength Primary/Secondary (or Primary/(Secondary+Screen) if relevant)	50 Hz, 1 min	kV 12	12	12	12
Dielectric strength Secondary/Screen (if relevant)	50 Hz, 1 min	kV 0.5	0.5	1.5	1.5
Supply voltage	±5%	V DC ±15 ... ±24	±15 ... ±24	±15 ... ±24	±15 ... ±24
Voltage drop		V ≤2.5	≤2.5	≤1.5	≤1.5
Mass		kg 0.85	0.85	1.5	1.5
Mass with side plates		kg 1	1	1.66	1.66
Operating temperature		°C -40 ... +85	-40 ... +85	-40 ... +85	-40 ... +85
Storage temperature		°C -50 ... +90	-50 ... +90	-50 ... +90	-50 ... +90

* Horizontal or vertical mounting is possible.

Standard secondary connections

M5 studs and Faston 6.35 x 0.8: see "Accessories and options" for details.

Conformity

EN 50155
EN 50121-3-2
EN 50124-1

Accessories

– Side plate kits (including the fixing screws): set of 2 plates allowing for:

- Vertical or bar mounting for CS300 to CS1000 and HRS1000-T / HRS1500-T
- Bar mounting for CS2000, HRS2000-T and HRS2500-T (vertical mounting is possible without side plate)

– Mounting bar kits (including the fixing screws) for CS300 to CS2000 and HRS range. See "Accessories and options" for details.

Accessories and options

Closed loop technology for rolling stock and infrastructure

Accessories

Side plates

Side plate kits include all the necessary screws for fixing the plates to the sensor.

Type	Sensor concerned	Technical description	Order code
Side plate kit CST0	CS300 / CS503	set of 2 plates	1SBT170000R2001
Side plate kit CST1	CS500 / CS1000 / HRS1000-T / HRS1500-T	set of 2 plates	1SBT170000R2002
Side plate kit CST2	CS2000 / HRS2000-T / HRS2500-T	set of 2 plates	1SBT170000R2007

3

Bar kits

Bar kits include all the necessary screws for mounting the bar on the sensor (the sensor must already be fitted with side plates prior to mounting the bar).

Type	Sensor concerned	Technical description of the bar	Order code
Bar kit CST0	CS300 & CS503	6x25x155 mm ² , 0.280 kg	1SBT170000R2003
Bar kit CST1-6	CS500 & CS1000 / HRS1000-T / HRS1500-T	6x40x185 mm ² , 0.510 kg	1SBT170000R2004
Bar kit CST1-10	CS500 & CS1000 / HRS1000-T / HRS1500-T	10x40x185 mm ² , 0.760 kg	1SBT170000R2005
Bar kit CST1 special	CS500 & CS1000 / HRS1000-T / HRS1500-T	10x40x210 mm ² , 0.8 kg (for compatibility with TA600, TA800 et EA1000 sensors)	1SBT170000R2010
Bar kit CST2	CS2000 / HRS2000-T / HRS2500-T	20x60x240 mm ² , 2.5 kg	1SBT170000R2008
Bar kit CST2 special	CS2000 / HRS2000-T / HRS2500-T	20x60x370 mm ² , 3.8 kg (for compatibility with EA2000 sensors)	1SBT170000R2012

Options

Number of secondary turns Ns

Sensor	CS300	CS503	CS500
Ns	1000	4000	3500
	2500	5000	

Secondary connection variants

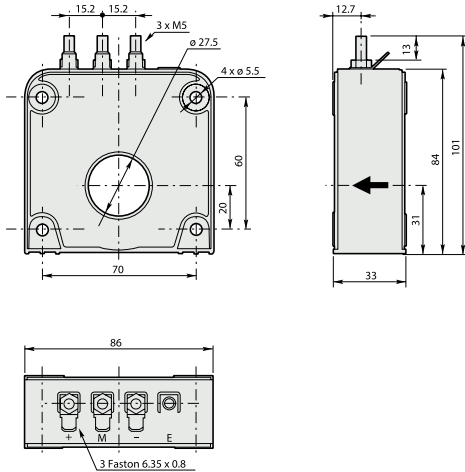
Sensor	CS300 & CS503	CS500 & CS1000	CS2000
Secondary connection	-	-	3 M5 studs
	3 M5 inserts	3 M5 inserts	3 M5 inserts
	4 M5 inserts	4 M5 inserts	4 M5 inserts
	3 pin Lemo connector	3 pin Lemo connector	3 pin Lemo connector
	4 pin Lemo connector	4 pin Lemo connector	4 pin Lemo connector
	Shielded cable (2 m)	Shielded cable (2 m)	Shielded cable (2 m)

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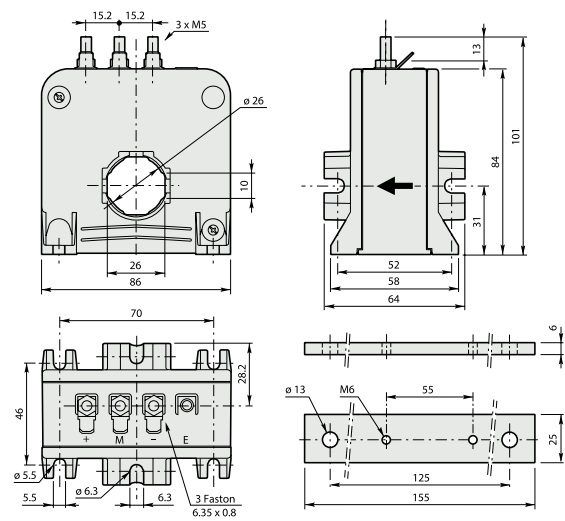
Dimensions (mm)

Horizontal mounting



Size 0 - CS300BR
and CS503BR

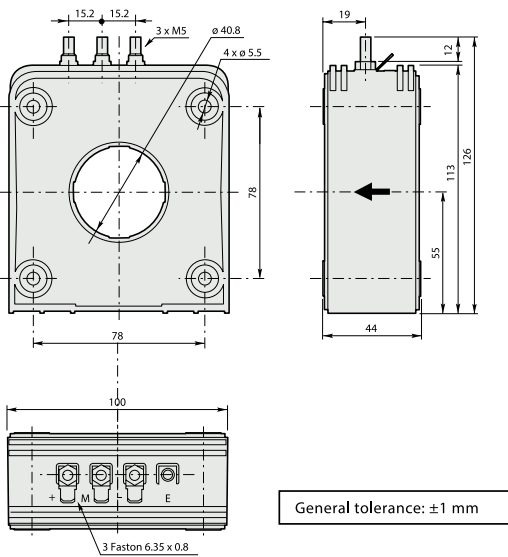
Vertical mounting



Size 0 - CS300BRV

Bar CST0

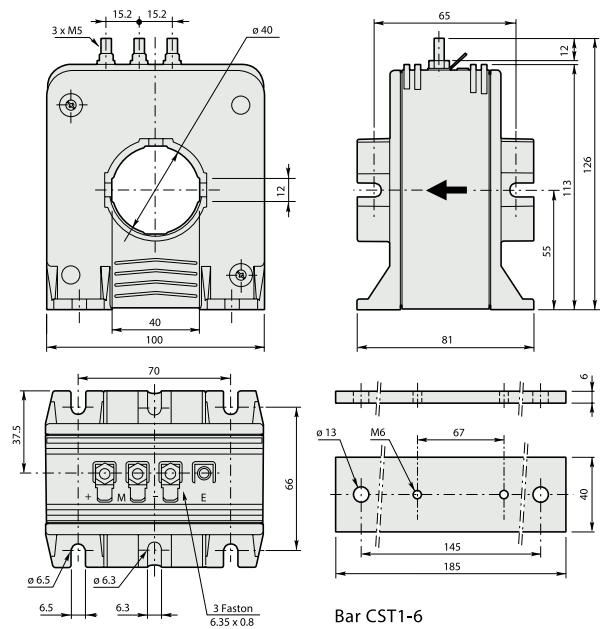
Horizontal mounting



Size 1 - CS500BR
and CS1000BR
and HRS1000-T-003/T-004
and HRS1500-T-003/T-004

General tolerance: ± 1 mm

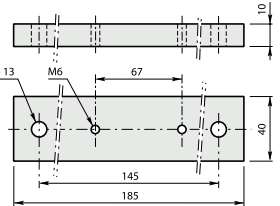
Vertical mounting



Size 1 - CS500BRV
and CS1000BRV
and HRS1000-T-013/T-014
and HRS1500-T-013/T-014

General tolerance: ± 1 mm

Bar CST1-6



Bar CST1-10

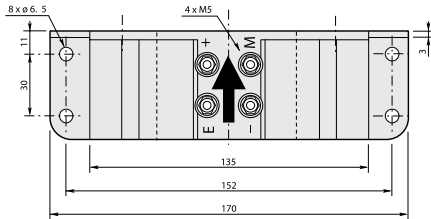
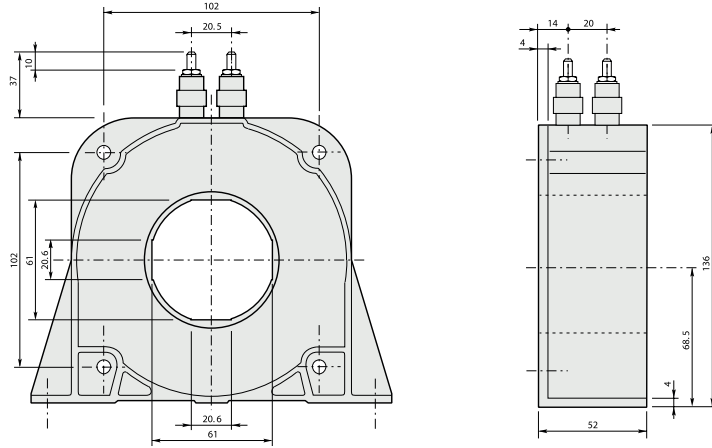
The primary bar kit is only available with the vertical mounting versions.
Tightening torque for M5 terminal studs (N.m) : 2

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Dimensions (mm)

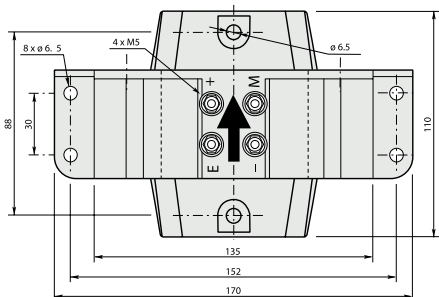
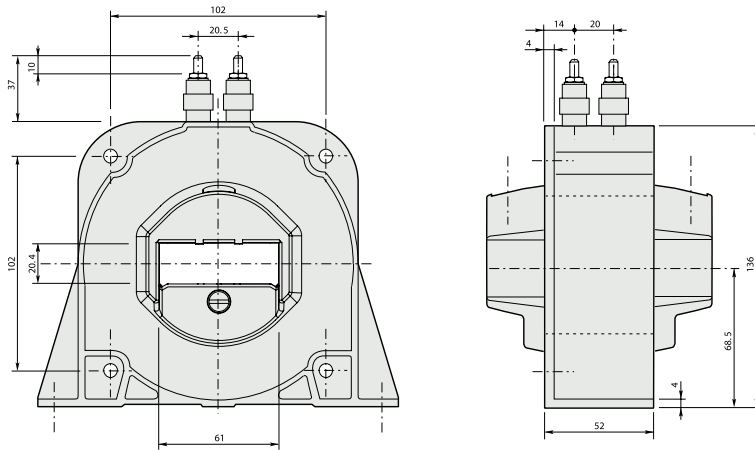
Horizontal and vertical mounting



General tolerance: ±1 mm

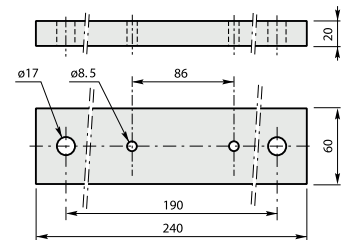
Size 2 - CS2000BR
and HRS2000-T-004 / HRS2500-T-004

Horizontal and vertical mounting

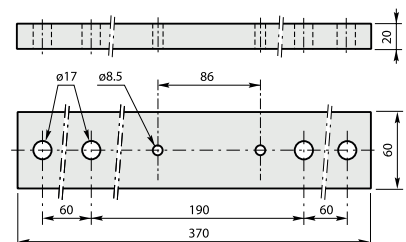


General tolerance: ±1 mm

Size 2 - CS2000BRV
and HRS2000-T-014 / HRS2500-T-014



Bar CST2



Bar CST2 special