Current Transducer FRS-Sxx

I_{PN} = 1000 A ... 3000 A

Ref: FRS 1000-Sxx, FRS 1500-Sxx, FRS 2000-Sxx, FRS 2500-Sxx, FRS 3000-Sxx

For the electronic measurement of current: DC, AC, pulsed..., with galvanic separation between the primary and the secondary circuit.

Provisional

Features

- Hall effect **O**pen **L**oop **C**oreless **I**ntegral current transducer
- Uni- or Bi-directional [1] measurement of primary current up to 9000 A
- Instantaneous 0.5 V voltage output
- Power supply +12 or +24 V DC
- Galvanic separation between primary and secondary circuit
- Factory calibrated
- High bandwidth > 1 MHz
- Very low delay time < 200 ns.

Advantages

- Wide measurement range
- No magnetic offset
- Low consumption and low losses
- Wide range of rectangular busbar dimensions
- Light weight design
- M12 field connector.

Applications

- Wind turbine power converter
- Electrolyser
- High power drives.

Standards

- IEC 62477-1: 2022
- IEC 61800-5-1: 2022
- IEC 62109-1: 2010
- IEC 61010-1: 2010
- EN 50155: 2021
- IEC 61992-7-2: 2006
- UL 61010-1: 3ED 2022.

Application Domains

- Industrial
- Traction
- Trackside.

Note: [1] see reference table on page 12.

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Safety

Caution

If the device is used in a way that is not specified by the manufacturer, the protection provided by the device may be compromised. Always inspect the electronics unit and connecting cable before using this product and do not use it if damaged.
Mounting assembly shall guarantee the maximum primary conductor temperature, fulfill clearance and creepage distance, minimize electric and magnetic coupling, and unless otherwise specified can be mounted in any orientation.

Caution, risk of electrical shock

This transducer must be used in limited-energy secondary circuits SELV according to IEC 61010-1, in electric/electronic equipment with respect to applicable standards and safety requirements in accordance with the manufacturer's operating specifications.

Use caution during installation and use of this product; certain parts of the module can carry hazardous voltages and high currents (e.g. power supply, primary conductor).
Ignoring this warning can lead to injury and or/or cause serious damage.
De-energize all circuits and hazardous live parts before installing the product.
All installations, maintenance, servicing operations and use must be carried out by trained and qualified personnel practicing applicable safety precautions.

This transducer is a build-in device, whose hazardous live parts must be inaccessible after installation.
This transducer must be mounted in a suitable end-enclosure.
Besides make sure to have a distance of minimum 30 mm between the primary terminals of the transducer and other neighboring components.

Main supply must be able to be disconnected.
Never connect or disconnect the external power supply while the primary circuit is connected to live parts.
Always wear protective clothing and gloves if hazardous live parts are present in the installation where the measurement is carried out.
This transducer is a built-in device, not intended to be cleaned with any product. Nevertheless if the user must implement cleaning or washing process, validation of the cleaning program has to be done by himself.

Do not dispose of this product as unsorted municipal waste.
Contact a qualified recycler for disposal.

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Absolute maximum ratings

Parameter	Symbol	Unit	Value
Maximum supply voltage (not destructive)	$\pm U_{C\ max}$	V	−0.3 ... 32 V DC
Maximum primary conductor temperature	$T_{B\ max}$	°C	105
Electrostatic discharge voltage (HBM - Human Body Model)	$U_{ESD\ HBM}$	kV	2

Stresses above these ratings may cause permanent damage.
Exposure to absolute maximum ratings for extended periods may degrade reliability.

Insulation coordination

Parameter	Symbol	Unit	Value	Comment
RMS voltage for AC insulation test, 50 Hz, 1 min	U_d	kV	12	
Impulse withstand voltage 1.2/50 µs	U_{Ni}	kV	44	Target, TBC
RMS voltage for AC insulation routine test, 50 Hz, 2"		kV	5.3	Industry application [1]
RMS voltage for AC insulation routine test, 50 Hz, 5"		kV	18.5	Traction application [1]
Partial discharge RMS type test voltage (q_m< 10 pC)	U_t	V	2480	Primary/Secondary Industry application [1] [2]
Partial discharge RMS type test voltage (q_m< 10 pC)	U_t	V	4840	Primary/Secondary Traction application [1] [2]
Minimum clearance (pri. - sec.)	d_{Cl}	mm	> 72	Shortest distance through air
Minimum creepage distance (pri. - sec.)	d_{Cp}	mm	> 100	Shortest path along device body
Case material	-	-	V0	According to UL 94
Comparative tracking index	CTI		600	
Application example Industry Working voltage		V	1500	Reinforced insulation non-uniform According to: IEC 61800-5-1, CAT III PD2 IEC 61010-1, CAT IV PD3 IEC 62477-1, CAT IV PD3
Application example Trackside/Traction Nominal voltage Rated insulation voltage	U_N U_{Nm}	V	3000 3600/3700	Reinforced insulation non-uniform According to: IEC 62497-1, CAT III PD3

Environmental and mechanical characteristics

Parameter	Symbol	Unit	Min	Typ	Max	Comment
Ambient operating temperature	T_A	°C	−40		+85	
Ambient storage temperature	$T_{A\ st}$	°C	−40		+90	
Mass	m	g		510		

Notes: [1] See reference table on page 12
[2] Garanteed with a centered busbar of 104 x 22 mm maximum dimension with an edge chamfer of 1.5 mm or any other shape and layout providing a minimum clearance of 3 mm between the bare metal and the inner wall of the transducer.

Electrical data FRS 1000-Sxx

At T_A = 25 °C, U_C = +24 V, R_L = 10 kΩ, unless otherwise noted (see Min, Max, typ, definition paragraph in page 9).

Parameter	Symbol	Unit	Min	Typ	Max	Comment
Primary nominal current	I_{PN}	A		1000		See [1]
Primary current, measuring range	I_{PM}	A	−3000 0		3000 3000	Sx version SUx version
Supply voltage	U_C	V	10	12 or 24	28	
Current consumption	I_C	mA		120 60	140 80	@ U_C = 12 V DC @ U_C = 24 V DC
Output reference voltage Sx version SUx version	U_{ref}	V	2.48 0.48	2.5 0.5	2.52 0.52	Internal reference
U_{ref} output resistance	R_{ref}	Ω	16	25	38	
U_{out} output resistance	R_{out}	Ω		10		
Output voltage range @ $\pm I_{PM}$ Sx version @ 0 ... I_{PM} SUx version	$U_{out} - U_{ref}$	V	−2 0		2 4	$U_{out} - U_{ref}$ = 0 V @ I_P = 0
Load capacitance	C_L	nF		10		
Electrical offset voltage @ $\pm I_P$ = 0 A Sx version SUx version	U_{OE}	mV	−2 −4		2 4	$U_{out} - U_{ref}$
Electrical offset current referred to primary	I_{OE}	A	−3		3	
Nominal sensitivity	S_N	mV/A		0.667 1.333		Sx version SUx version
Magnetic offset current (@ I_{PN}) referred to primary	I_{OM}	A		none		No magnetic core inside, OLCI technology
Sensitivity error @ I_{PN}	ε_S	%	−0.15		0.15	
Linearity error 0 … I_{PN}	ε_L	% of I_{PN}	−0.25		0.25	
Linearity error 0 … I_{PM}	ε_L	% of I_{PM}	−0.35		0.35	
Temperature coefficient of U_{ref}	TCU_{ref}	ppm/K	−80		80	−40 °C ... +85 °C
Temperature coefficient of U_{OE} Sx version SUx version	TCU_{OE}	mV/K	−0.18 −0.36		0.18 0.36	−40 °C ... +85 °C
Temperature coefficient of I_{OE}	TCI_{OE}	mA/K	−280		280	−40 °C ... +85 °C
Temperature coefficient of S	TCS	ppm/K	−160		160	−40 °C ... +85 °C
Sum of sensitivity & Linearity error 0 … I_{PN}	ε_{SL}	% of I_{PN}	−0.4		0.4	Primary busbar centered No return busbar considered [2]
Sum of sensitivity & Linearity error 0 … I_{PM}	ε_{SL}	% of I_{PM}	−0.5		0.5	Primary busbar centered No return busbar considered [2]
Delay time @ 10 % of the final output value I_{PN} step	$t_{D\,10}$	μs			0.2	@ 100 A/μs
Delay time @ 90 % of the final output value I_{PN} step	$t_{D\,90}$	μs			0.2	@ 100 A/μs
Frequency bandwidth (−3 dB)	BW	kHz		1000		
Noise current spectral density referred to primary 100 Hz ... 100 kHz 100 kHz ... 1 MHz	i_{no}	mA/√Hz		TBD		
RMS noise current spectral density referred to primary: up to 10 kHz up to 100 kHz up to 1 MHz	I_{no}	mA		TBD		

Notes: [1] See page 11 typical influence of the return busbar regarding its position
[2] This low power coreless transducer may accept up to $I_{P\,max}$ permanent current at the only condition of respecting the maximum primary conductor temperature (105 °C).

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Electrical data FRS 1500-Sxx

At T_A = 25 °C, U_C = +24 V, R_L = 10 kΩ, unless otherwise noted (see Min, Max, typ, definition paragraph in page 9).

Parameter	Symbol	Unit	Min	Typ	Max	Comment
Primary nominal current	I_{PN}	A		1500		See [1]
Primary current, measuring range	I_{PM}	A	−4500 0		4500 4500	Sx version SUx version
Supply voltage	U_C	V	10	12 or 24	28	
Current consumption	I_C	mA		120 60	140 80	@ U_C = 12 V DC @ U_C = 24 V DC
Output reference voltage Sx version SUx version	U_{ref}	V	2.48 0.48	2.5 0.5	2.52 0.52	Internal reference
U_{ref} output resistance	R_{ref}	Ω	16	25	38	
U_{out} output resistance	R_{out}	Ω		10		
Output voltage range @ ±I_{PM} Sx version @ 0 ... I_{PM} SUx version	$U_{out} - U_{ref}$	V	−2 0		2 4	$U_{out} - U_{ref}$ = 0 V @ I_P = 0
Load capacitance	C_L	nF		10		
Electrical offset voltage @ I_P = 0 A Sx version SUx version	U_{OE}	mV	−2 −4		2 4	$U_{out} - U_{ref}$
Electrical offset current referred to primary	I_{OE}	A	−4.5		4.5	
Nominal sensitivity	S_N	mV/A		0.444 0.889		Sx version SUx version
Magnetic offset current (@ I_{PN}) referred to primary	I_{OM}	A		none		No magnetic core inside, OLCI technology
Sensitivity error @ I_{PN}	ε_S	%	−0.15		0.15	Factory adjustment
Linearity error 0 … I_{PN}	ε_L	% of I_{PN}	−0.25		0.25	
Linearity error 0 … I_{PM}	ε_L	% of I_{PM}	−0.35		0.35	
Temperature coefficient of U_{ref}	TCU_{ref}	ppm/K	−80		80	−40 °C ... +85 °C
Temperature coefficient of U_{OE} Sx version SUx version	TCU_{OE}	mV/K	−0.12 −0.24		0.12 0.24	−40 °C ... +85 °C
Temperature coefficient of I_{OE}	TCI_{OE}	ppm/K	−280		280	−40 °C ... +85 °C
Temperature coefficient of S	TCS	ppm/K	−160		160	−40 °C ... +85 °C
Sum of sensitivity & Linearity error 0 … I_{PN}	ε_{SL}	% of I_{PN}	−0.4		0.4	Primary busbar centered No return busbar considered [2]
Sum of sensitivity & Linearity error 0 … I_{PM}	ε_{SL}	% of I_{PM}	−0.5		0.5	Primary busbar centered No return busbar considered [2]
Delay time @ 10 % of the final output value I_{PN} step	t_{D10}	µs			0.2	@ 100 A/µs
Delay time @ 90 % of the final output value I_{PN} step	t_{D90}	µs			0.2	@ 100 A/µs
Frequency bandwidth (−3 dB)	BW	kHz		1000		
Noise current spectral density referred to primary 100 Hz ... 100 kHz 100 kHz ... 1 MHz	i_{no}	mA/√Hz		TBD		
RMS noise current spectral density referred to primary: up to 10 kHz up to 100 kHz up to 1 MHz	I_{no}	mA		TBD		

Notes: [1] See page 11 typical influence of the return busbar regarding its position
[2] This low power coreless transducer may accept up to $I_{P\,max}$ permanent current at the only condition of respecting the maximum primary conductor temperature (105 °C).

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Electrical data FRS 2000-Sxx

At T_A = 25 °C, U_C = +24 V, R_L = 10 kΩ, unless otherwise noted (see Min, Max, typ, definition paragraph in page 9).

Parameter	Symbol	Unit	Min	Typ	Max	Comment
Primary nominal current	I_{PN}	A		2000		See [1]
Primary current, measuring range	I_{PM}	A	−6000 0		6000 6000	Sx version SUx version
Supply voltage	U_C	V	10	12 or 24	28	
Current consumption	I_C	mA		120 60	140 80	@ U_C = 12 V DC @ U_C = 24 V DC
Output reference voltage Sx version SUx version	U_{ref}	V	2.48 0.48	2.5 0.5	2.52 0.52	Internal reference
U_{ref} output resistance	R_{ref}	Ω	16	25	38	
U_{out} output resistance	R_{out}	Ω		10		
Output voltage range @ ±I_{PM} Sx version @ 0 ... I_{PM} SUx version	$U_{out} - U_{ref}$	V	−2 0		2 4	$U_{out} - U_{ref}$ = 0 V @ I_P = 0
Load capacitance	C_L	nF		10		
Electrical offset voltage @ I_P = 0 A Sx version SUx version	U_{OE}	mV	−2 −4		2 4	$U_{out} - U_{ref}$
Electrical offset current referred to primary	I_{OE}	A	−6		6	
Nominal sensitivity	S_N	mV/A		0.333 0.667		Sx version SUx version
Magnetic offset current (@ I_{PN}) referred to primary	I_{OM}	A		none		No magnetic core inside, OLCI technology
Sensitivity error @ I_{PN}	ε_S	%	−0.15		0.15	Factory adjustment
Linearity error 0 … I_{PN}	ε_L	% of I_{PN}	−0.25		0.25	
Linearity error 0 … I_{PM}	ε_L	% of I_{PM}	−0.35		0.35	
Temperature coefficient of U_{ref}	TCU_{ref}	ppm/K	−80		80	−40 °C ... +85 °C
Temperature coefficient of U_{OE} Sx version SUx version	TCU_{OE}	mV/K	−0.09 −0.18		0.09 0.18	−40 °C ... +85 °C
Temperature coefficient of I_{OE}	TCI_{OE}	ppm/K	−280		280	−40 °C ... +85 °C
Temperature coefficient of S	TCS	ppm/K	−160		160	−40 °C ... +85 °C
Sum of sensitivity & Linearity error 0 … I_{PN}	ε_{SL}	% of I_{PN}	−0.4		0.4	Primary busbar centered No return busbar considered [2]
Sum of sensitivity & Linearity error 0 … I_{PM}	ε_{SL}	% of I_{PM}	−0.5		0.5	Primary busbar centered No return busbar considered [2]
Delay time @ 10 % of the final output value I_{PN} step	$t_{D\,10}$	µs			0.2	@ 100 A/µs
Delay time @ 90 % of the final output value I_{PN} step	$t_{D\,90}$	µs			0.2	@ 100 A/µs
Frequency bandwidth (−3 dB)	BW	kHz		1000		
Noise current spectral density referred to primary 100 Hz ... 100 kHz 100 kHz ... 1 MHz	i_{no}	mA/√Hz		TBD		
RMS noise current spectral density referred to primary: up to 10 kHz up to 100 kHz up to 1 MHz	I_{no}	mA		TBD		

Notes: [1] See page 11 typical influence of the return busbar regarding its position
[2] This low power coreless transducer may accept up to $I_{P\,max}$ permanent current at the only condition of respecting the maximum primary conductor temperature (105 °C).

Electrical data FRS 2500-Sxx

At T_A = 25 °C, U_C = +24 V, R_L = 10 kΩ, unless otherwise noted (see Min, Max, typ, definition paragraph in page 9).

Parameter	Symbol	Unit	Min	Typ	Max	Comment
Primary nominal current	I_{PN}	A		2500		See [1]
Primary current, measuring range	I_{PM}	A	−7500 0		7500 7500	Sx version SUx version
Supply voltage	U_C	V	10	12 or 24	28	
Current consumption	I_C	mA		120 60	140 80	@ U_C = 12 V DC @ U_C = 24 V DC
Output reference voltage Sx version SUx version	U_{ref}	V	2.48 0.48	2.5 0.5	2.52 0.52	Internal reference
U_{ref} output resistance	R_{ref}	Ω	16	25	38	
U_{out} output resistance	R_{out}	Ω		10		
Output voltage range @ ±I_{PM} Sx version @ 0 ... I_{PM} SUx version	$U_{out} - U_{ref}$	V	−2 0		2 4	$U_{out} - U_{ref}$ = 0 V @ I_P = 0
Load capacitance	C_L	nF		10		
Electrical offset voltage @ I_P = 0 A Sx version SUx version	U_{OE}	mV	−2 −4		2 4	$U_{out} - U_{ref}$
Electrical offset current referred to primary	I_{OE}	A	−7.5		7.5	
Nominal sensitivity	S_N	mV/A		0.267 0.533		Sx version SUx version
Magnetic offset current (@ I_{PN}) referred to primary	I_{OM}	A		none		No magnetic core inside, OLCI technology
Sensitivity error @ I_{PN}	ε_S	%	−0.15		0.15	Factory adjustment
Linearity error 0 … I_{PN}	ε_L	% of I_{PN}	−0.25		0.25	
Linearity error 0 … I_{PM}	ε_L	% of I_{PM}	−0.35		0.35	
Temperature coefficient of U_{ref}	TCU_{ref}	ppm/K	−80		80	−40 °C ... +85 °C
Temperature coefficient of U_{OE} Sx version SUx version	TCU_{OE}	mV/K	−0.072 −0.144		0.072 0.144	−40 °C ... +85 °C
Temperature coefficient of I_{OE}	TCI_{OE}	ppm/K	−280		280	−40 °C ... +85 °C
Temperature coefficient of S	TCS	ppm/K	−160		160	−40 °C ... +85 °C
Sum of sensitivity & Linearity error 0 … I_{PN}	ε_{SL}	% of I_{PN}	−0.4		0.4	Primary busbar centered No return busbar considered [2]
Sum of sensitivity & Linearity error 0 … I_{PM}	ε_{SL}	% of I_{PM}	−0.5		0.5	Primary busbar centered No return busbar considered [2]
Delay time @ 10 % of the final output value I_{PN} step	t_{D10}	µs			0.2	@ 100 A/µs
Delay time @ 90 % of the final output value I_{PN} step	t_{D90}	µs			0.2	@ 100 A/µs
Frequency bandwidth (−3 dB)	BW	kHz		1000		
Noise current spectral density referred to primary 100 Hz ... 100 kHz 100 kHz ... 1 MHz	i_{no}	mA/√Hz		TBD		
RMS noise current spectral density referred to primary: up to 10 kHz up to 100 kHz up to 1 MHz	I_{no}	mA		TBD		

Notes: [1] See page 11 typical influence of the return busbar regarding its position
[2] This low power coreless transducer may accept up to $I_{P\,max}$ permanent current at the only condition of respecting the maximum primary conductor temperature (105 °C).

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Electrical data FRS 3000-Sxx

At T_A = 25 °C, U_C = +24 V, R_L = 10 kΩ, unless otherwise noted (see Min, Max, typ, definition paragraph in page 9).

Parameter	Symbol	Unit	Min	Typ	Max	Comment
Primary nominal current	I_{PN}	A		3000		See [1]
Primary current, measuring range	I_{PM}	A	−9000 0		9000 9000	Sx version SUx version
Supply voltage	U_C	V	10	12 or 24	28	
Current consumption	I_C	mA		120 60	140 80	@ U_C = 12 V DC @ U_C = 24 V DC
Output reference voltage Sx version SUx version	U_{ref}	V	2.48 0.48	2.5 0.5	2.52 0.52	Internal reference
U_{ref} output resistance	R_{ref}	Ω	16	25	38	
U_{out} output resistance	R_{out}	Ω		10		
Output voltage range @ ±I_{PM} Sx version @ 0 ... I_{PM} SUx version	$U_{out} - U_{ref}$	V	−2 0		2 4	$U_{out} - U_{ref}$ = 0 V @ I_P = 0
Load capacitance	C_L	nF		10		
Electrical offset voltage @ I_P = 0 A Sx version SUx version	U_{OE}	mV	−2 −4		2 4	$U_{out} - U_{ref}$
Electrical offset current referred to primary	I_{OE}	A	−9		9	
Nominal sensitivity	S_N	mV/A		0.222 0.444		Sx version SUx version
Magnetic offset current (@ I_{PN}) referred to primary	I_{OM}	A		none		No magnetic core inside, OLCI technology
Sensitivity error @ I_{PN}	ε_S	%	−0.15		0.15	Factory adjustment
Linearity error 0 … I_{PN}	ε_L	% of I_{PN}	−0.25		0.25	
Linearity error 0 … I_{PM}	ε_L	% of I_{PM}	−0.35		0.35	
Temperature coefficient of U_{ref}	TCU_{ref}	ppm/K	−80		80	−40 °C ... +85 °C
Temperature coefficient of U_{OE} Sx version SUx version	TCU_{OE}	mV/K	−0.06 −0.12		0.06 0.12	−40 °C ... +85 °C
Temperature coefficient of I_{OE}	TCI_{OE}	ppm/K	−280		280	−40 °C ... +85 °C
Temperature coefficient of S	TCS	ppm/K	−160		160	−40 °C ... +85 °C
Sum of sensitivity & Linearity error 0 … I_{PN}	ε_{SL}	% of I_{PN}	−0.4		0.4	Primary busbar centered No return busbar considered [2]
Sum of sensitivity & Linearity error 0 … I_{PM}	ε_{SL}	% of I_{PM}	−0.5		0.5	Primary busbar centered No return busbar considered [2]
Delay time @ 10 % of the final output value I_{PN} step	$t_{D\,10}$	µs			0.2	@ 100 A/µs
Delay time @ 90 % of the final output value I_{PN} step	$t_{D\,90}$	µs			0.2	@ 100 A/µs
Frequency bandwidth (−3 dB)	BW	kHz		1000		
Noise current spectral density referred to primary 100 Hz ... 100 kHz 100 kHz ... 1 MHz	i_{no}	mA/√Hz		TBD		
RMS noise current spectral density referred to primary: up to 10 kHz up to 100 kHz up to 1 MHz	I_{no}	mA		TBD		

Notes: [1] See page 11 typical influence of the return busbar regarding its position
[2] This low power coreless transducer may accept up to $I_{P\,max}$ permanent current at the only condition of respecting the maximum primary conductor temperature (105 °C).

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Definition of typical, minimum and maximum values

Minimum and maximum values for specified limiting and safety conditions have to be understood as such as well as values shown in “typical” graphs.
On the other hand, measured values are part of a statistical distribution that can be specified by an interval with upper and lower limits and a probability for measured values to lie within this interval.
Unless otherwise stated (e.g. “100 % tested”), the LEM definition for such intervals designated with “min” and “max” is that the probability for values of samples to lie in this interval is 99.73 %.
For a normal (Gaussian) distribution, this corresponds to an interval between −3 sigma and +3 sigma. If “typical” values are not obviously mean or average values, those values are defined to delimit intervals with a probability of 68.27 %, corresponding to an interval between −sigma and +sigma for a normal distribution.
Typical, maximal and minimal values are determined during the initial characterization of the product.

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Typical input/output characteristics

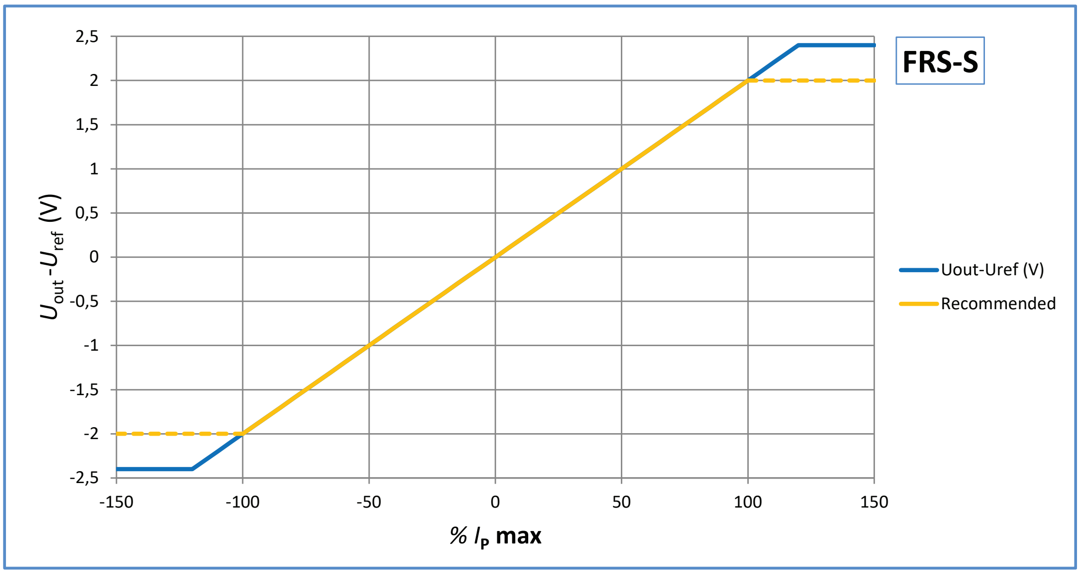


Figure 1: Bi-polar output current (U_{out} − U_{ref}) VS primary current I_P

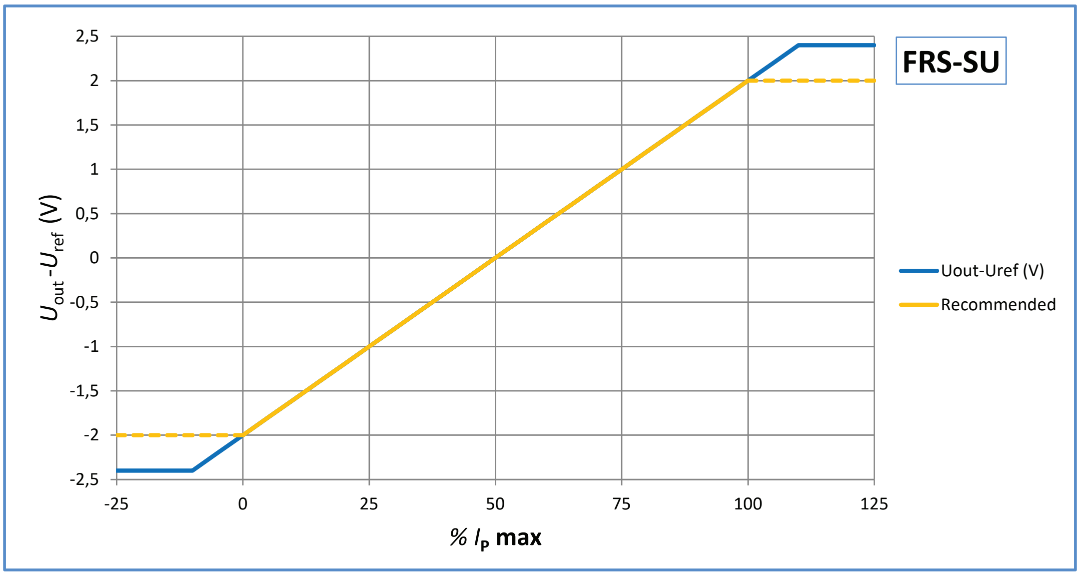
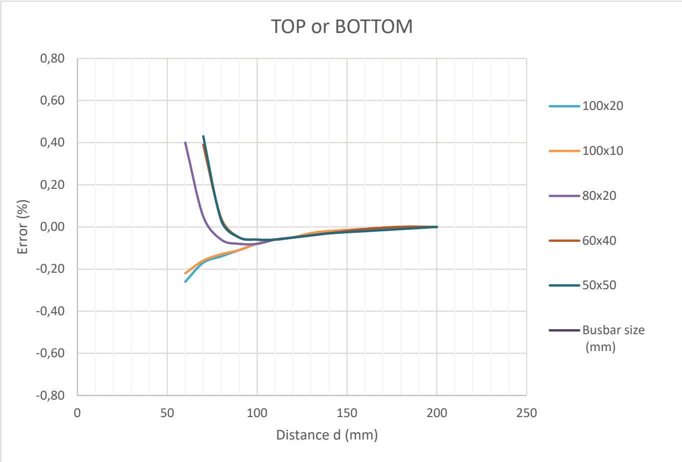
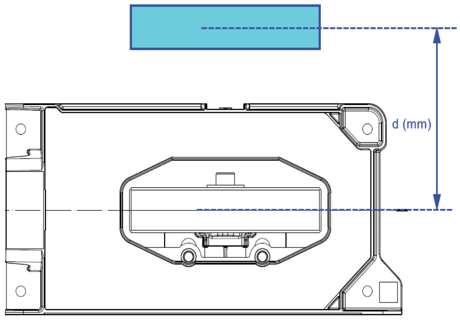


Figure 2: Uni-polar output current (U_{out} − U_{ref}) VS primary current I_P

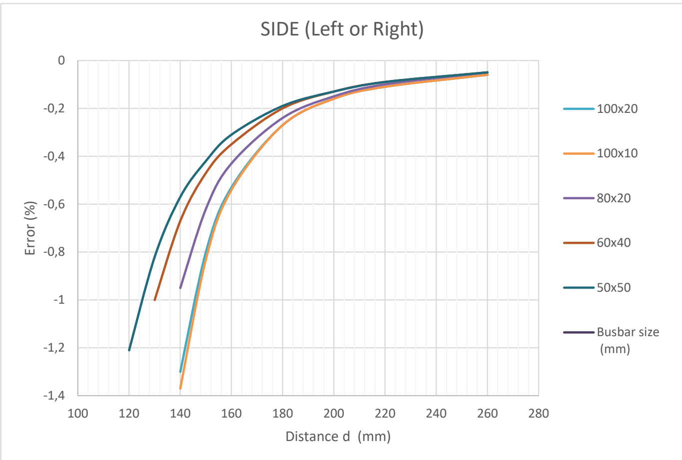
Typical additional error due to return busbar layout and distance

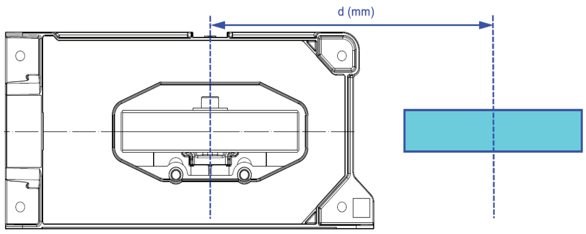
Busbar on TOP or BOTTOM





Busbar on the side (LEFT or RIGHT)





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FRS-SxIx series: name and codification

FRS xxxx-Sxx

I_{PN} Range (A)	***Output type***		***Insulation routine test***
1000	Left blank:	Bi-directional	Left blank: Industrial
1500	U:	Uni-directional	H: Traction/Trackside
2000			
2500			
3000			

FRS-SxIx series: ordering

Name	Part numbers
FRS 1000-S	90.Y9.60.501.0
FRS 1000-SU	90.Y9.60.502.0
FRS 1500-S	90.Y9.65.503.0
FRS 1500-SU	90.Y9.65.504.0
FRS 2000-S	90.Y9.69.505.0
FRS 2000-SU	90.Y9.69.506.0
FRS 2500-S	90.Y9.70.507.0
FRS 2500-SU	90.Y9.70.508.0
FRS 3000-S	90.Y9.71.509.0
FRS 3000-SU	90.Y9.71.510.0
FRS 1000-SH	90.Y9.60.511.0
FRS 1000-SUH	90.Y9.60.512.0
FRS 1500-SH	90.Y9.65.513.0
FRS 1500-SUH	90.Y9.65.514.0
FRS 2000-SH	90.Y9.69.515.0
FRS 2000-SUH	90.Y9.69.516.0
FRS 2500-SH	90.Y9.70.517.0
FRS 2500-SUH	90.Y9.70.518.0
FRS 3000-SH	90.Y9.71.519.0
FRS 3000-SUH	90.Y9.71.520.0

Note: [1)] This is an exhaustive list, to date some references may not yet exist, please contact your local LEM's sales support.

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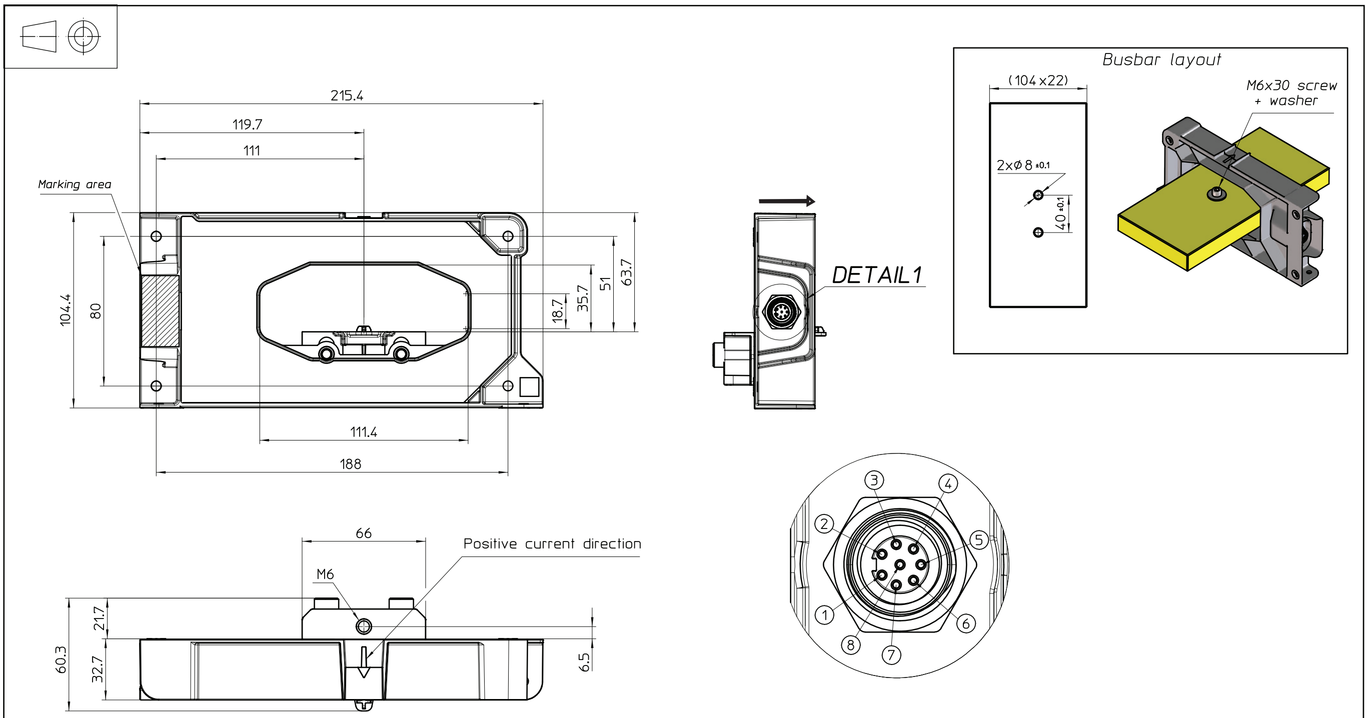
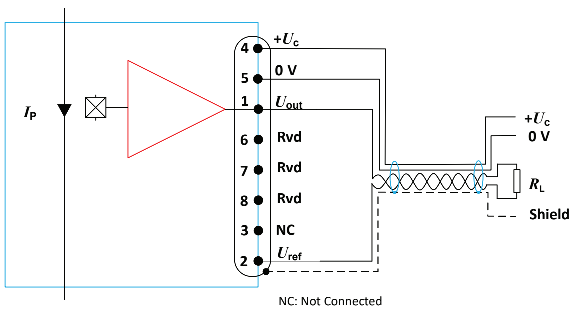
Dimensions (in mm)



Connection



NC: Not Connected
Rvd: Reserved
NC and Rvd pins must be left not connected otherwise it may cause irreversible damage on the device

Mechanical characteristics

● General tolerance	±1 mm
● Aperture for primary conductor	104 mm × 22 mm (max)
● Transducer fastening	
Bracket fastening	2 × M6 (supplied)
Busbar fastening	1 × M6 (not supplied)
Recommended fastening torque	6 N·m
● Connection of secondary	
Use	M12 Male/Male, coding A, 8 terminals, shielded

Remarks

- I_{out} is positive when positive I_P flows in direction of the arrow shown on the drawing above.
- Temperature of the primary conductor should not exceed 105 °C.
- Installation of the transducer must be done unless otherwise specified on the datasheet, according to LEM Transducer Generic Mounting Rules. Please refer to LEM document N°ANE120504 available on our Web site: https://www.lem.com/en/file/3137/download

Recommandation

When primary and return busbars carry high frequency current it is highly recommanded to use a twisted signal pair (pin number 1 & 2).

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