

Current Transducer FL-SDxxx series

$I_{PN} = 12000\text{ A} \dots 28000\text{ A}$

Ref: FL 12000-SDxxx, FL 16000-SDxxx, FL 20000-SDxxx, FL 24000-SDxxx,
FL 28000-SDxxx

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



Features

- Hall effect Open Loop Coreless Integral current transducer
- Uni- or Bi-polar ¹⁾ measurement of primary current up to 42 kA
- Instantaneous 0-5 V voltage output
- Power supply +12 or +24 V DC
- Galvanic separation between primary and secondary circuit
- Factory calibrated.

Advantages

- Wide measurement range
- 2 aperture widths: 200 and 300 mm
- 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
- IEC 61010-2-030: 2017
- UL 61010-1: 3ED 2022.

Application Domains

- Industrial
- Trackside.

Note: ¹⁾ see references on [page 11](#).

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 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.

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.



This product is intended to be powered by a Limited Power Source (see note ¹⁾) in accordance with clause 9.4 or IEC 61010-1.

The external power supply must comply with the LPS requirements to ensure safe operation.

Use of non-LPS power sources may void safety compliance.

- Note:**
- ¹⁾ Limited Power Source (LPS) is a power supply that is designed to limit output under both normal and fault conditions. It typically provides:
 - A maximum output of ≤ 100 VA
 - Safety Extra Low Voltage (SELV) levels (e.g., ≤ 60 V DC)
 - Current limiting to prevent hazardous energy levels.

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

Absolute maximum ratings apply at 25 °C unless otherwise noted.

Stresses above these ratings may cause permanent damage.

Exposure to absolute maximum ratings for extended periods may degrade reliability.

UL 61010: Standards and marking

File # E330077-D1008-1/A0/C0-UL

Standards

- UL 61010-1, 3rd Edition, May 11, 2012, Revised July 19, 2019, CAN/CSAC22.2
- IEC 61010-2-030: 2017 (Second Edition).

Marking

Only those products bearing the UL or UR Mark should be considered to be Listed or Recognized and covered under UL's Follow-Up Service. Always look for the Mark on the product.

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 μ s	U_{Ni}	kV	44	
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, 10"		kV	18.5	Traction application ¹⁾
Partial discharge RMS type test voltage ($q_m < 10$ pC)	$U_{PD\ t}$	V	2480	Primary/Secondary Industry application ^{1) 2)}
Partial discharge RMS type test voltage ($q_m < 10$ pC)	$U_{PD\ t}$	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 62477-1, CAT IV PD3
			1000	IEC 61010-1, 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		1177 1319		SDxIx200 SDxIx300

Notes: ¹⁾ See reference table on [page 11](#)

²⁾ Guaranteed with a centered busbar of 200 (300) x 100 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 FL 12000-SDxx200

FL 12000-SDxxx ... 28000-SDxxx series

At $T_A = 25\text{ °C}$, $U_C = +24\text{ V}$, $R_L = 10\text{ k}\Omega$, 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		12000		See ¹⁾
Primary current, measuring range		I_{PM}	A	-18000 0		18000 18000	SDx version SDUx version
Supply voltage		U_C	V	10		28	See ²⁾
Current consumption	SDxx200	I_C	mA		200 100	240 120	@ $U_C = 12\text{ V DC}$ @ $U_C = 24\text{ V DC}$
	SDxx300				240 120	280 140	@ $U_C = 12\text{ V DC}$ @ $U_C = 24\text{ V DC}$
Output reference voltage		$U_{ref} - 0\text{ V}$	V	2.57 2.53		2.64 2.57	@ $U_C = 12\text{ V DC}$ @ $U_C = 24\text{ V DC}$
U_{ref} output resistance		R_{ref}	Ω	16	25	38	
U_{out} output resistance		R_{out}	Ω		10		
Output voltage range ³⁾		$U_{out} - U_{ref}$	V	-2		2	SDx version: $U_{out} - U_{ref} = 0\text{ V @ } I_P = 0$ SDUx version: $U_{out} - U_{ref} = -2\text{ V @ } I_P = 0$
Load capacitance		C_L	nF		10		
Electrical offset current referred to primary		I_{OE}	A	-27		27	
Nominal sensitivity		S_N	mV/A		0.111 0.222		SDx version SDUx version
Magnetic offset current (@ I_{PN}) referred to primary		I_{OM}	A		none		No magnetic core inside, OLCI technology
Linearity error 0 ... I_{PM}		ε_L	% of I_{PM}	-0.35		0.35	
Temperature coefficient of U_{ref}		TCU_{ref}	ppm/K		± 100		-40 °C ... +85 °C
Temperature coefficient of I_{OE}		TCI_{OE}	A/K	-1.4		1.4	-40 °C ... +85 °C
Temperature coefficient of S		TCS	ppm/K	-120		120	-40 °C ... +85 °C
Sum of sensitivity & Linearity error 0 ... I_{PM}		ε_{SL}	% of I_{PM}		± 0.5		Primary busbar centered No return busbar considered ^{4) 5)}
Sensitivity over lifetime drift		$\Delta S/S_N$	%			1.7	Worst case after reliability tests ^{4) 5)}
Total error @ 25 °C @ $I_P = 0$ @ $I_P = \pm I_{PM}$		ε_{tot}	% of I_{PM}	-0.15 -0.65		0.15 0.65	Primary busbar centered No return busbar considered ^{4) 5)}
Total error @ -40 °C @ $I_P = 0$ @ $I_P = \pm I_{PM}$		ε_{tot}	% of I_{PM}	-0.54 -1.25		0.54 1.25	Primary busbar centered No return busbar considered ^{4) 5)}
Total error @ 85 °C @ $I_P = 0$ @ $I_P = \pm I_{PM}$		ε_{tot}	% of I_{PM}	-0.50 -1.19		0.50 1.19	Primary busbar centered No return busbar considered ^{4) 5)}
Delay time @ 90 % of the final output value I_{PN} step		t_{D90}	μs			4	@ 100 A/ μs
Frequency bandwidth (-3 dB)		BW	kHz		100		
RMS noise current spectral density referred to primary 100 Hz ... 100 kHz		i_{no}	A/ $\sqrt{\text{Hz}}$		0.029 0.057		SDx version SDUx version
Peak to peak noise current referred to primary: up to 10 kHz up to 100 kHz		$I_{no pp}$	A		7 & 14 21 & 42		SDx & SDUx version

Notes: ¹⁾ This low power coreless transducer may accept up to I_{Pmax} permanent current;
at the only condition of respecting the maximum primary conductor temperature (105 °C);

²⁾ Above 28 V, accuracy performance may change irremediably;

³⁾ Rounded, actual value is obtained by the following formula: $\pm I_{PM} \times S_N$;

⁴⁾ See [page 10](#) typical influence of the return busbar regarding its position;

⁵⁾ For more information contact LEM sales organization.

Electrical data FL 16000-SDxx200

FL 12000-SDxxx ... 28000-SDxxx series

At $T_A = 25\text{ °C}$, $U_C = +24\text{ V}$, $R_L = 10\text{ k}\Omega$, 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		16000		See ¹⁾
Primary current, measuring range		I_{PM}	A	-24000 0		24000 24000	SDx version SDUx version
Supply voltage		U_C	V	10		28	See ²⁾
Current consumption	SDxx200	I_C	mA		200 100	240 120	@ $U_C = 12\text{ V DC}$ @ $U_C = 24\text{ V DC}$
	SDxx300				240 120	280 140	@ $U_C = 12\text{ V DC}$ @ $U_C = 24\text{ V DC}$
Output reference voltage		$U_{ref} - 0\text{ V}$	V	2.57 2.53		2.64 2.57	@ $U_C = 12\text{ V DC}$ @ $U_C = 24\text{ V DC}$
U_{ref} output resistance		R_{ref}	Ω	16	25	38	
U_{out} output resistance		R_{out}	Ω		10		
Output voltage range ³⁾		$U_{out} - U_{ref}$	V	-2		2	SDx version: $U_{out} - U_{ref} = 0\text{ V @ } I_P = 0$ SDUx version: $U_{out} - U_{ref} = -2\text{ V @ } I_P = 0$
Load capacitance		C_L	nF		10		
Electrical offset current referred to primary		I_{OE}	A	-36		36	
Nominal sensitivity		S_N	mV/A		0.083 0.167		SDx version SDUx version
Magnetic offset current (@ I_{PN}) referred to primary		I_{OM}	A		none		No magnetic core inside, OLCI technology
Linearity error 0 ... I_{PM}		ε_L	% of I_{PM}	-0.35		0.35	
Temperature coefficient of U_{ref}		TCU_{ref}	ppm/K		± 100		-40 °C ... +85 °C
Temperature coefficient of I_{OE}		TCI_{OE}	A/K	-1.9		1.9	-40 °C ... +85 °C
Temperature coefficient of S		TCS	ppm/K	-120		120	-40 °C ... +85 °C
Sum of sensitivity & Linearity error 0 ... I_{PM}		ε_{SL}	% of I_{PM}		± 0.5		Primary busbar centered No return busbar considered ^{4) 5)}
Sensitivity over lifetime drift		$\Delta S/S_N$	%			1.7	Worst case after reliability tests ^{4) 5)}
Total error @ 25 °C @ $I_P = 0$ @ $I_P = \pm I_{PM}$		ε_{tot}	% of I_{PM}	-0.15 -0.65		0.15 0.65	Primary busbar centered No return busbar considered ^{4) 5)}
Total error @ -40 °C @ $I_P = 0$ @ $I_P = \pm I_{PM}$		ε_{tot}	% of I_{PM}	-0.54 -1.25		0.54 1.25	Primary busbar centered No return busbar considered ^{4) 5)}
Total error @ 85 °C @ $I_P = 0$ @ $I_P = \pm I_{PM}$		ε_{tot}	% of I_{PM}	-0.50 -1.19		0.50 1.19	Primary busbar centered No return busbar considered ^{4) 5)}
Delay time @ 90 % of the final output value I_{PN} step		t_{D90}	μs			4	@ 100 A/ μs
Frequency bandwidth (-3 dB)		BW	kHz		100		
RMS noise current spectral density referred to primary 100 Hz ... 100 kHz		i_{no}	A/ $\sqrt{\text{Hz}}$		0.032 0.064		SDx version SDUx version
Peak to peak noise current referred to primary: up to 10 kHz up to 100 kHz		$I_{no pp}$	A		9 & 18 23 & 46		SDx & SDUx version

- Notes:** ¹⁾ This low power coreless transducer may accept up to I_{Pmax} permanent current; at the only condition of respecting the maximum primary conductor temperature (105 °C);
²⁾ Above 28 V, accuracy performance may change irremediably;
³⁾ Rounded, actual value is obtained by the following formula: $\pm I_{PM} \times S_N$;
⁴⁾ See [page 10](#) typical influence of the return busbar regarding its position;
⁵⁾ For more information contact LEM sales organization.

Electrical data FL 20000-SDxx200

FL 12000-SDxxx ... 28000-SDxxx series

At $T_A = 25\text{ °C}$, $U_C = +24\text{ V}$, $R_L = 10\text{ k}\Omega$, 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		20000		See ¹⁾
Primary current, measuring range		I_{PM}	A	-30000 0		30000 30000	SDx version SDUx version
Supply voltage		U_C	V	10		28	See ²⁾
Current consumption	SDxx200	I_C	mA		200 100	240 120	@ $U_C = 12\text{ V DC}$ @ $U_C = 24\text{ V DC}$
	SDxx300				240 120	280 140	@ $U_C = 12\text{ V DC}$ @ $U_C = 24\text{ V DC}$
Output reference voltage		$U_{ref} - 0\text{ V}$	V	2.57 2.53		2.64 2.57	@ $U_C = 12\text{ V DC}$ @ $U_C = 24\text{ V DC}$
U_{ref} output resistance		R_{ref}	Ω	16	25	38	
U_{out} output resistance		R_{out}	Ω		10		
Output voltage range ³⁾		$U_{out} - U_{ref}$	V	-2		2	SDx version: $U_{out} - U_{ref} = 0\text{ V @ } I_P = 0$ SDUx version: $U_{out} - U_{ref} = -2\text{ V @ } I_P = 0$
Load capacitance		C_L	nF		10		
Electrical offset current referred to primary		I_{OE}	A	-45		45	
Nominal sensitivity		S_N	mV/A		0.067 0.133		SDx version SDUx version
Magnetic offset current (@ I_{PN}) referred to primary		I_{OM}	A		none		No magnetic core inside, OLCI technology
Linearity error 0 ... I_{PM}		ε_L	% of I_{PM}	-0.35		0.35	
Temperature coefficient of U_{ref}		TCU_{ref}	ppm/K		± 100		-40 °C ... +85 °C
Temperature coefficient of I_{OE}		TCI_{OE}	A/K	-2.4		2.4	-40 °C ... +85 °C
Temperature coefficient of S		TCS	ppm/K	-120		120	-40 °C ... +85 °C
Sum of sensitivity & Linearity error 0 ... I_{PM}		ε_{SL}	% of I_{PM}		± 0.5		Primary busbar centered No return busbar considered ^{4) 5)}
Sensitivity over lifetime drift		$\Delta S/S_N$	%			1.7	Worst case after reliability tests ^{4) 5)}
Total error @ 25 °C @ $I_P = 0$ @ $I_P = \pm I_{PM}$		ε_{tot}	% of I_{PM}	-0.15 -0.65		0.15 0.65	Primary busbar centered No return busbar considered ^{4) 5)}
Total error @ -40 °C @ $I_P = 0$ @ $I_P = \pm I_{PM}$		ε_{tot}	% of I_{PM}	-0.54 -1.25		0.54 1.25	Primary busbar centered No return busbar considered ^{4) 5)}
Total error @ 85 °C @ $I_P = 0$ @ $I_P = \pm I_{PM}$		ε_{tot}	% of I_{PM}	-0.50 -1.19		0.50 1.19	Primary busbar centered No return busbar considered ^{4) 5)}
Delay time @ 90 % of the final output value I_{PN} step		t_{D90}	μs			4	@ 100 A/ μs
Frequency bandwidth (-3 dB)		BW	kHz		100		
RMS noise current spectral density referred to primary 100 Hz ... 100 kHz		i_{no}	A/ $\sqrt{\text{Hz}}$		0.035 0.069		SDx version SDUx version
Peak to peak noise current referred to primary: up to 10 kHz up to 100 kHz		$I_{no pp}$	A		10 & 20 24 & 48		SDx & SDUx version

Notes: ¹⁾ This low power coreless transducer may accept up to I_{Pmax} permanent current;
at the only condition of respecting the maximum primary conductor temperature (105 °C);

²⁾ Above 28 V, accuracy performance may change irremediably;

³⁾ Rounded, actual value is obtained by the following formula: $\pm I_{PM} \times S_N$;

⁴⁾ See [page 10](#) typical influence of the return busbar regarding its position;

⁵⁾ For more information contact LEM sales organization.

Electrical data FL 24000-SDxx200

FL 12000-SDxxx ... 28000-SDxxx series

At $T_A = 25\text{ °C}$, $U_C = +24\text{ V}$, $R_L = 10\text{ k}\Omega$, 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		24000		See ¹⁾
Primary current, measuring range		I_{PM}	A	-36000 0		36000 36000	SDx version SDUx version
Supply voltage		U_C	V	10		28	See ²⁾
Current consumption	SDxx200	I_C	mA		200 100	240 120	@ $U_C = 12\text{ V DC}$ @ $U_C = 24\text{ V DC}$
	SDxx300				240 120	280 140	@ $U_C = 12\text{ V DC}$ @ $U_C = 24\text{ V DC}$
Output reference voltage		$U_{ref} - 0\text{ V}$	V	2.57 2.53		2.64 2.57	@ $U_C = 12\text{ V DC}$ @ $U_C = 24\text{ V DC}$
U_{ref} output resistance		R_{ref}	Ω	16	25	38	
U_{out} output resistance		R_{out}	Ω		10		
Output voltage range ³⁾		$U_{out} - U_{ref}$	V	-2		2	SDx version: $U_{out} - U_{ref} = 0\text{ V @ } I_P = 0$ SDUx version: $U_{out} - U_{ref} = -2\text{ V @ } I_P = 0$
Load capacitance		C_L	nF		10		
Electrical offset current referred to primary		I_{OE}	A	-54		54	
Nominal sensitivity		S_N	mV/A		0.056 0.111		SDx version SDUx version
Magnetic offset current (@ I_{PN}) referred to primary		I_{OM}	A		none		No magnetic core inside, OLCI technology
Linearity error 0 ... I_{PM}		ϵ_L	% of I_{PM}	-0.35		0.35	
Temperature coefficient of U_{ref}		TCU_{ref}	ppm/K		± 100		-40 °C ... +85 °C
Temperature coefficient of I_{OE}		TCI_{OE}	A/K	-2.9		2.9	-40 °C ... +85 °C
Temperature coefficient of S		TCS	ppm/K	-120		120	-40 °C ... +85 °C
Sum of sensitivity & Linearity error 0 ... I_{PM}		ϵ_{SL}	% of I_{PM}		± 0.5		Primary busbar centered No return busbar considered ^{4) 5)}
Sensitivity over lifetime drift		$\Delta S/S_N$	%			1.7	Worst case after reliability tests ^{4) 5)}
Total error @ 25 °C @ $I_P = 0$ @ $I_P = \pm I_{PM}$		ϵ_{tot}	% of I_{PM}	-0.15 -0.65		0.15 0.65	Primary busbar centered No return busbar considered ^{4) 5)}
Total error @ -40 °C @ $I_P = 0$ @ $I_P = \pm I_{PM}$		ϵ_{tot}	% of I_{PM}	-0.54 -1.25		0.54 1.25	Primary busbar centered No return busbar considered ^{4) 5)}
Total error @ 85 °C @ $I_P = 0$ @ $I_P = \pm I_{PM}$		ϵ_{tot}	% of I_{PM}	-0.50 -1.19		0.50 1.19	Primary busbar centered No return busbar considered ^{4) 5)}
Delay time @ 90 % of the final output value I_{PN} step		t_{D90}	μs			4	@ 100 A/ μs
Frequency bandwidth (-3 dB)		BW	kHz		100		
RMS noise current spectral density referred to primary 100 Hz ... 100 kHz		i_{no}	A/ $\sqrt{\text{Hz}}$		0.036 0.072		SDx version SDUx version
Peak to peak noise current referred to primary: up to 10 kHz up to 100 kHz		$I_{no\text{ pp}}$	A		10.5 & 21 25 & 50		SDx & SDUx version

Notes: ¹⁾ This low power coreless transducer may accept up to $I_{P\text{ max}}$ permanent current;
at the only condition of respecting the maximum primary conductor temperature (105 °C);

²⁾ Above 28 V, accuracy performance may change irremediably;

³⁾ Rounded, actual value is obtained by the following formula: $\pm I_{PM} \times S_N$;

⁴⁾ See [page 10](#) typical influence of the return busbar regarding its position;

⁵⁾ For more information contact LEM sales organization.

Electrical data FL 28000-SDxx200

FL 12000-SDxxx ... 28000-SDxxx series

At $T_A = 25\text{ °C}$, $U_C = +24\text{ V}$, $R_L = 10\text{ k}\Omega$, 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		28000		See ¹⁾
Primary current, measuring range		I_{PM}	A	-42000 0		42000 42000	SDx version SDUx version
Supply voltage		U_C	V	10		28	See ²⁾
Current consumption	SDxx200	I_C	mA		200 100	240 120	@ $U_C = 12\text{ V DC}$ @ $U_C = 24\text{ V DC}$
	SDxx300				240 120	280 140	@ $U_C = 12\text{ V DC}$ @ $U_C = 24\text{ V DC}$
Output reference voltage		$U_{ref} - 0\text{ V}$	V	2.57 2.53		2.64 2.57	@ $U_C = 12\text{ V DC}$ @ $U_C = 24\text{ V DC}$
U_{ref} output resistance		R_{ref}	Ω	16	25	38	
U_{out} output resistance		R_{out}	Ω		10		
Output voltage range ³⁾		$U_{out} - U_{ref}$	V	-2		2	SDx version: $U_{out} - U_{ref} = 0\text{ V @ } I_P = 0$ SDUx version: $U_{out} - U_{ref} = -2\text{ V @ } I_P = 0$
Load capacitance		C_L	nF		10		
Electrical offset current referred to primary		I_{OE}	A	-63		63	
Nominal sensitivity		S_N	mV/A		0.048 0.095		SDx version SDUx version
Magnetic offset current (@ I_{PN}) referred to primary		I_{OM}	A		none		No magnetic core inside, OLCI technology
Linearity error 0 ... I_{PM}		ϵ_L	% of I_{PM}	-0.35		0.35	
Temperature coefficient of U_{ref}		TCU_{ref}	ppm/K		± 100		-40 °C ... +85 °C
Temperature coefficient of I_{OE}		TCI_{OE}	A/K	-3.4		3.4	-40 °C ... +85 °C
Temperature coefficient of S		TCS	ppm/K	-120		120	-40 °C ... +85 °C
Sum of sensitivity & Linearity error 0 ... I_{PM}		ϵ_{SL}	% of I_{PM}		± 0.5		Primary busbar centered No return busbar considered ^{4) 5)}
Sensitivity over lifetime drift		$\Delta S/S_N$	%			1.7	Worst case after reliability tests ^{4) 5)}
Total error @ 25 °C @ $I_P = 0$ @ $I_P = \pm I_{PM}$		ϵ_{tot}	% of I_{PM}	-0.15 -0.65		0.15 0.65	Primary busbar centered No return busbar considered ^{4) 5)}
Total error @ -40 °C @ $I_P = 0$ @ $I_P = \pm I_{PM}$		ϵ_{tot}	% of I_{PM}	-0.54 -1.25		0.54 1.25	Primary busbar centered No return busbar considered ^{4) 5)}
Total error @ 85 °C @ $I_P = 0$ @ $I_P = \pm I_{PM}$		ϵ_{tot}	% of I_{PM}	-0.50 -1.19		0.50 1.19	Primary busbar centered No return busbar considered ^{4) 5)}
Delay time @ 90 % of the final output value I_{PN} step		t_{D90}	μs			4	@ 100 A/ μs
Frequency bandwidth (-3 dB)		BW	kHz		100		
RMS noise current spectral density referred to primary 100 Hz ... 100 kHz		i_{no}	A/ $\sqrt{\text{Hz}}$		0.037 0.074		SDx version SDUx version
Peak to peak noise current referred to primary: up to 10 kHz up to 100 kHz		$I_{no pp}$	A		11 & 22 26 & 52		SDx & SDUx version

Notes: ¹⁾ This low power coreless transducer may accept up to I_{Pmax} permanent current;
at the only condition of respecting the maximum primary conductor temperature (105 °C);

²⁾ Above 28 V, accuracy performance may change irremediably;

³⁾ Rounded, actual value is obtained by the following formula: $\pm I_{PM} \times S_N$;

⁴⁾ See [page 10](#) typical influence of the return busbar regarding its position;

⁵⁾ For more information contact LEM sales organization.

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 $-\text{sigma}$ and $+\text{sigma}$ for a normal distribution.

Typical, maximal and minimal values are determined during the initial characterization of the product.

Typical input/output characteristics

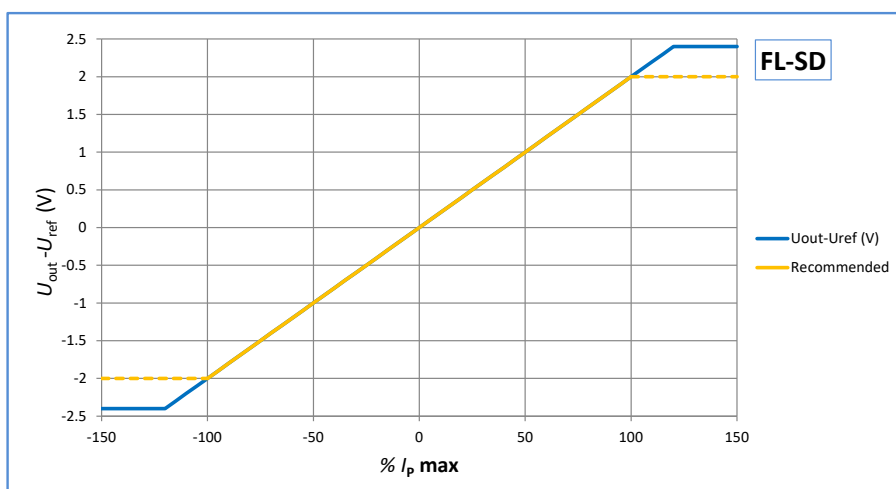


Figure 1: Bi-polar output voltage ($U_{\text{out}} - U_{\text{ref}}$) VS primary current I_p

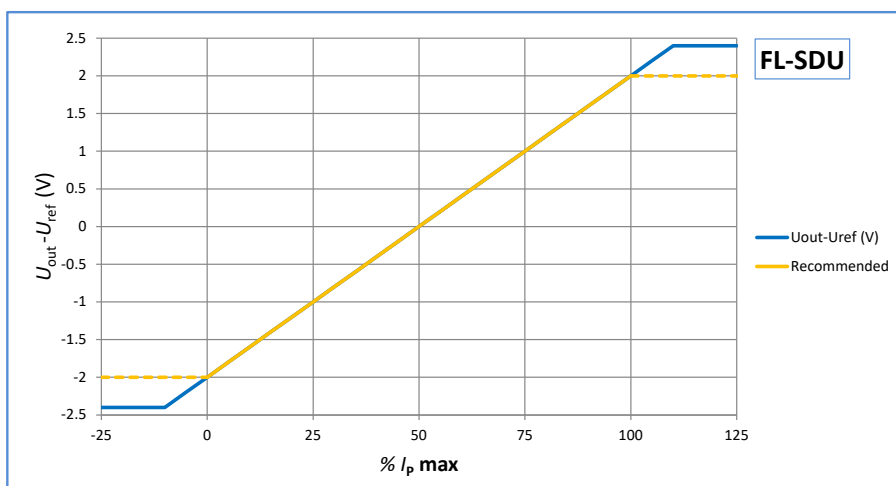
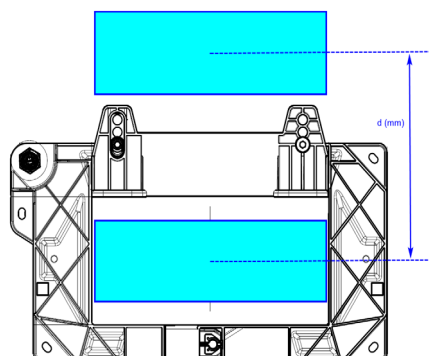
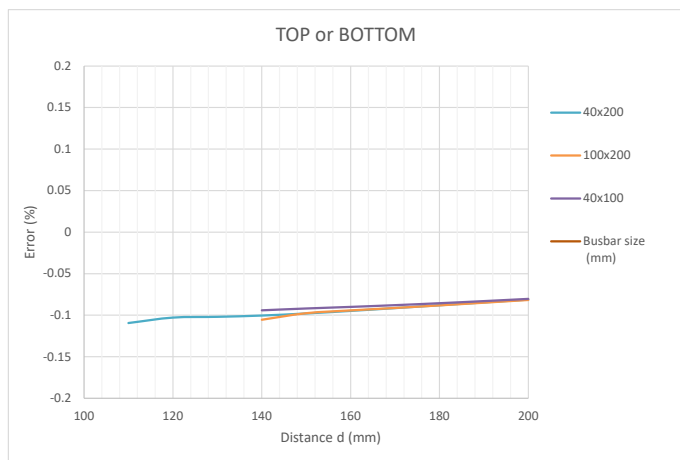
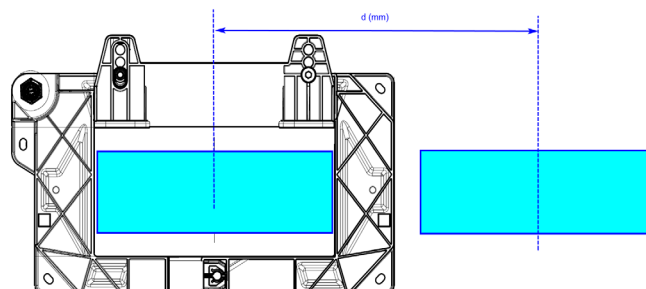
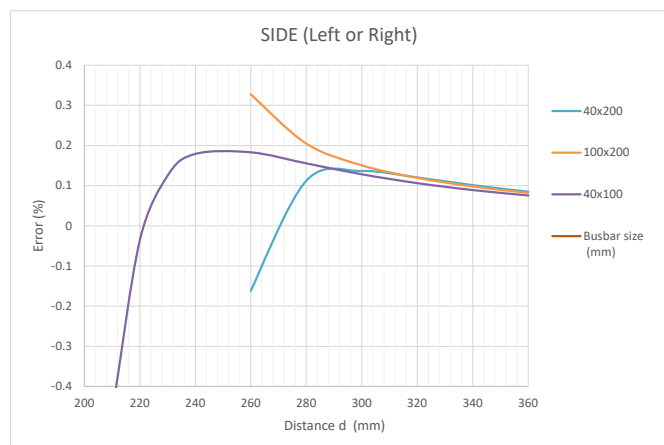


Figure 2: Uni-polar output voltage ($U_{\text{out}} - U_{\text{ref}}$) VS primary current I_p

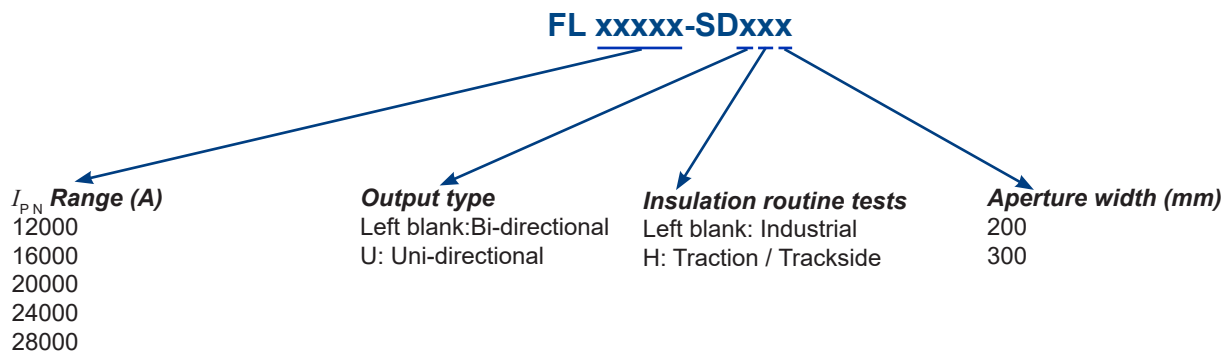
Typical additional error due to return busbar layout and distance



Busbar on TOP or BOTTOM



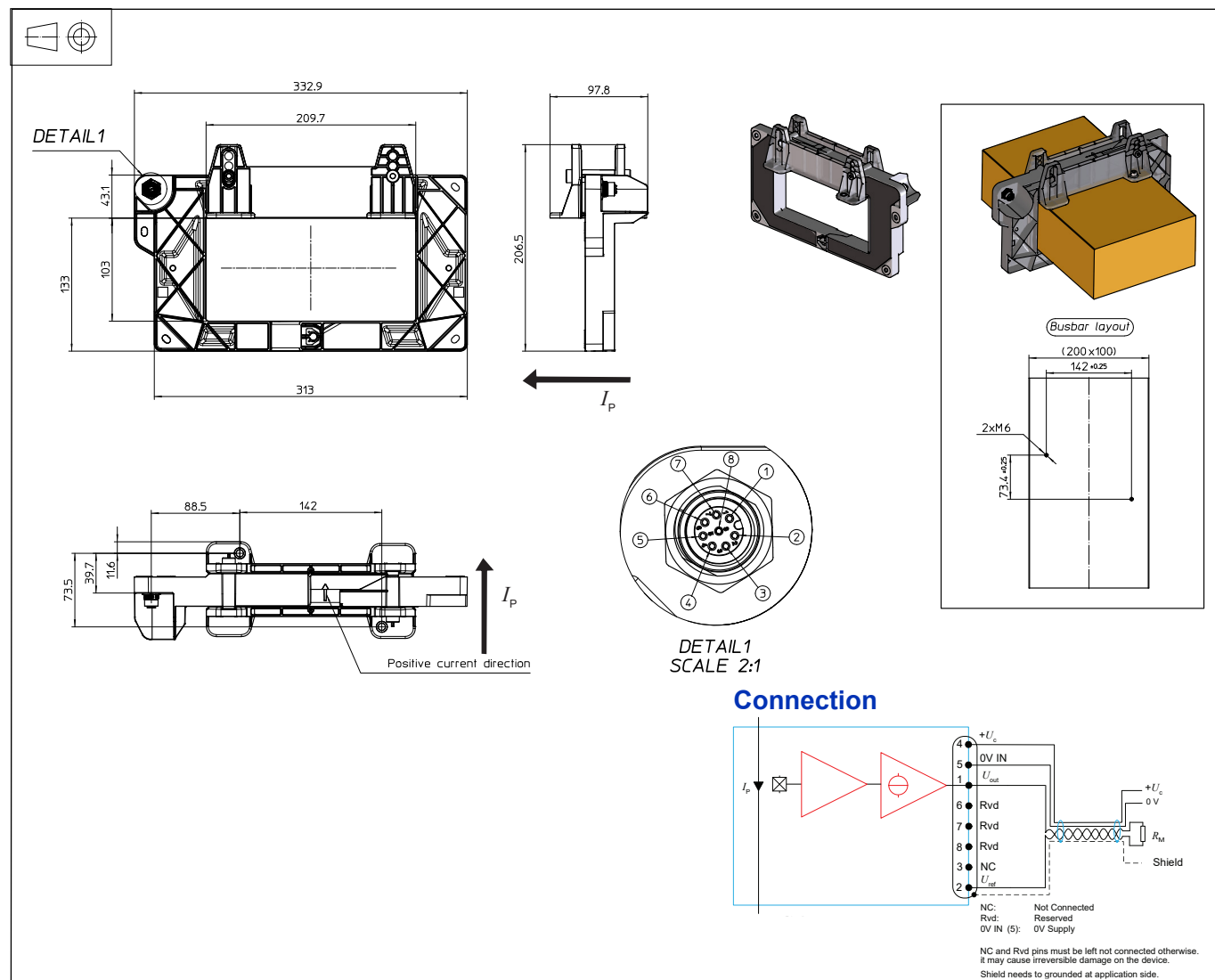
Busbar on the side (LEFT or RIGHT)

FL-SDxxx series: name and codification

FL-SDxxx series: ordering ¹⁾

Name	Part numbers
FL 12000-SD200	90.Z2.80.501.0
FL 12000-SDU200	90.Z2.80.502.0
FL 12000-SD300	90.Z2.80.521.0
FL 12000-SDU300	90.Z2.80.522.0
FL 12000-SDH200	90.Z2.80.531.0
FL 12000-SDUH200	90.Z2.80.532.0
FL 12000-SDH300	90.Z2.80.551.0
FL 12000-SDUH300	90.Z2.80.552.0
FL 16000-SD200	90.Z2.82.503.0
FL 16000-SDU200	90.Z2.82.504.0
FL 16000-SD300	90.Z2.82.523.0
FL 16000-SDU300	90.Z2.82.524.0
FL 16000-SDH200	90.Z2.82.533.0
FL 16000-SDUH200	90.Z2.82.534.0
FL 16000-SDH300	90.Z2.82.553.0
FL 16000-SDUH300	90.Z2.82.554.0
FL 20000-SD200	90.Z2.84.505.0
FL 20000-SDU200	90.Z2.84.506.0
FL 20000-SD300	90.Z2.84.525.0
FL 20000-SDU300	90.Z2.84.526.0
FL 20000-SDH200	90.Z2.84.535.0
FL 20000-SDUH200	90.Z2.84.536.0
FL 20000-SDH300	90.Z2.84.555.0
FL 20000-SDUH300	90.Z2.84.556.0

Name	Part numbers
FL 24000-SD200	90.Z2.H7.507.0
FL 24000-SDU200	90.Z2.H7.508.0
FL 24000-SD300	90.Z2.H7.527.0
FL 24000-SDU300	90.Z2.H7.528.0
FL 24000-SDH200	90.Z2.H7.537.0
FL 24000-SDUH200	90.Z2.H7.538.0
FL 24000-SDH300	90.Z2.H7.557.0
FL 24000-SDUH300	90.Z2.H7.558.0
FL 28000-SD200	90.Z2.R9.509.0
FL 28000-SDU200	90.Z2.R9.510.0
FL 28000-SD300	90.Z2.R9.529.0
FL 28000-SDU300	90.Z2.R9.530.0
FL 28000-SDH200	90.Z2.R9.539.0
FL 28000-SDUH200	90.Z2.R9.540.0
FL 28000-SDH300	90.Z2.R9.559.0
FL 28000-SDUH300	90.Z2.R9.560.0

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



Mechanical characteristics

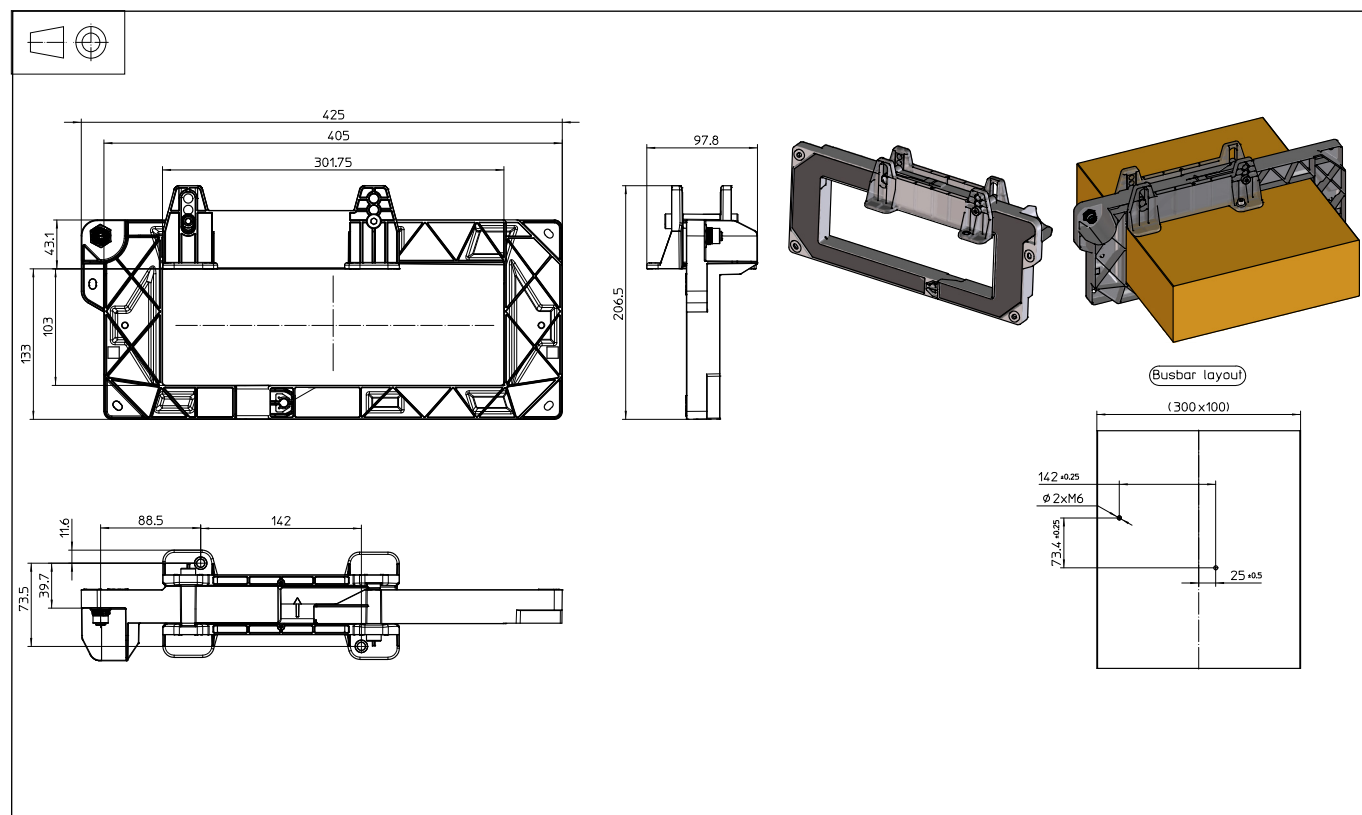
- General tolerance ± 1 mm
- Maximum primary conductor dimensions:
200 mm × 100 mm
300 mm × 100 mm
- Transducer fastening
Bracket fastening 2 × M6 (supplied)
Busbar fastening 2 × M6 (not supplied)
Recommended fastening torque 6 N·m ± 10 %
- Connection to secondary
Use M12 Male/Male, coding A, 8 terminals, shielded (example: 858-008-103RSS4 by NorComp Inc.)

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>

Dimensions FL-SDxxx series (in mm)

FL xxxxx-SDxxx300



Mechanical characteristics

- General tolerance ± 1 mm
- Maximum primary conductor dimensions:
200 mm × 100 mm
300 mm × 100 mm
- Transducer fastening
Bracket fastening 2 × M6 (supplied)
Busbar fastening 2 × M6 (not supplied)
Recommended fastening torque 6 N·m ± 10 %
- Connection to secondary
Use M12 Male/Male, coding A, 8 terminals, shielded
(example: 858-008-103RSS4 by NorComp Inc.)

Remarks

- I_{out} is positive when positive I_p flows in direction of the arrow shown on the drawing above.
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<https://www.lem.com/en/file/3137/download>

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