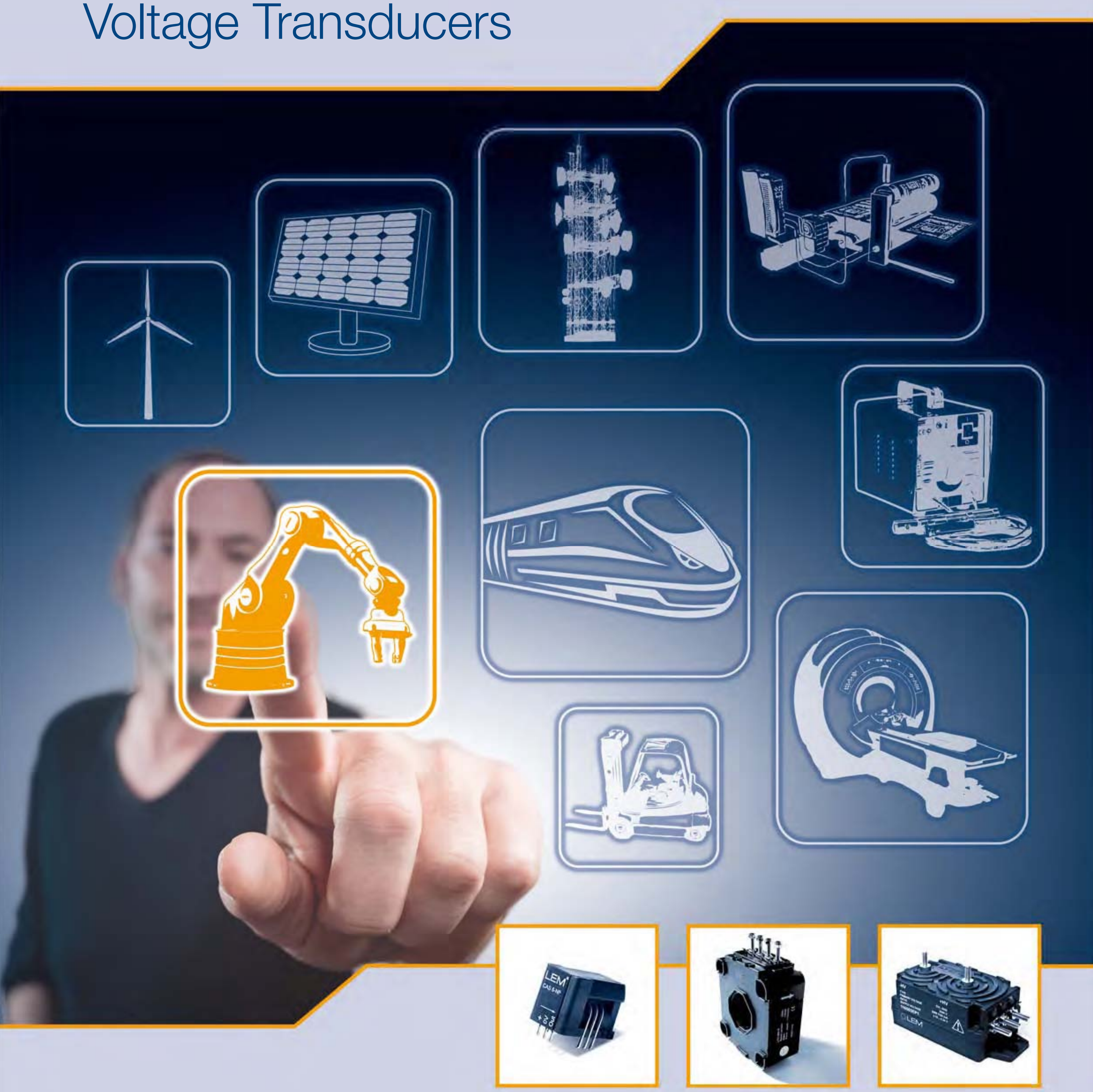
Industry Catalogue

Industry Current & Voltage Transducers



LEM

LEM solutions for electrical measurements

This catalogue summarizes the most common LEM product offerings for industrial, railway, high accuracy, and automotive measurements.

LEM is the market leader in providing innovative and high quality solutions for measuring electrical parameters. Its core products - current and voltage transducers - are used in a broad range of applications including drives & welding, renewable energies & power supplies, traction, high precision, conventional and green vehicle businesses.

With higher accuracy and speed, the feedback signal from LEM transducers enables smoother control and energy consumption reduction of many electrical systems.

At the heart of … ELEVATORS

In most lifts installed worldwide, LEM transducers prevent the doors closing on passengers. They keep the cabin stable when people enter, and ensure that the lift rides smoothly by adjusting the torque of the motor.

At the heart of … RENEWABLE ENERGIES

LEM transducers, specifically designed for renewable power systems, control the flow and waveform of energy sent to the grid from photovoltaic and other renewable energy systems. They measure the current to help the windmills and solar installations to work at their maximum efficiency.

At the heart of … TRACTION

Regardless of whether a train is powered by diesel or electricity, traction is provided by electric motors driven by inverters that are relying on LEM transducers to measure, optimize and adjust the power that is sent to the motors, improving both performance and reliability.

At the heart of … HIGH PRECISION APPLICATIONS

The quality of the image provided by MRI scanners is linked directly to the accuracy of the current measurement.
The current transducer used has a direct impact on the image and if the transducer is not precise enough this will lead to a blurred and illegible image. LEM current transducers set a standard for accuracy and are the most precise industrial products in the market today. The transducers provide levels of stability and precision, at about 1–3 parts per million, which makes them references in calibration test benches or in laboratories.

At the heart of … AUTOMOTIVE

In electric and hybrid vehicles, LEM transducers monitor energy levels to and from the battery and are critical in the control of the electric motors.

It is our business to support you with both standard and customized products to optimize your application.

DRIVES & WELDING MARKET
RENEWABLE ENERGIES & POWER SUPPLIES MARKETS

Today, the transducer market has two main technology drivers: first, the desire for a greater degree of comfort and finer regulation, and second, the need to save energy. This means that more and more applications that used to be mechanical are changing to fully electronic control which provides increased reliability, improved regulation and higher energy efficiency.
Today, about 15 % of all motors have an inverter control. This inverter can save 50 % of the total energy consumed, which is a huge potential for savings.
The inverter control used in these newer systems requires reliable, accurate current measurement to enable engineers to develop a system with isolated current measurement directly on the motor phases.
Energy savings is the key word today and this includes the exploitation of the wind and the sun as alternate energies. To use these renewable sources, in the most profitable way in terms of energy efficiency, the use of power electronics is a must and is essential to drive and control energy in industrial applications. Modern systems are becoming more complex and require precise coordination between the power semiconductors, the system controller, mechanics, and the feedback sensors. Transducers provide the necessary information from the load to fulfill that function. We can compare the use of transducers to adding “eyes” to the system.
They can supply the “brain” of the system, in real time, with information regarding the condition of the controller.
LEM products are already used among a broad spectrum of power electronics applications such as industrial motor drives, UPS, welding, robots, cranes, cable cars, ski lifts, elevators, ventilation, air-conditioning, power supplies for computer servers, and telecom.

This trend towards more involved power electronics happens in a general manner in the industrial world, for example, in lighting, domestic appliances, computers and telecom applications. Power electronics increases efficiency by delivering the correct type of power at the most efficient voltage, current and frequency.

TRACTION & TRACKSIDE MARKET

Today, high speed trains, city transit systems (metro, trams, and trolleybuses) and freight trains are the solutions against pollution and interstate traffic immobility, and provide a significant energy savings.
Power electronics is essential to drive and control energy in these transportation systems.
LEM has been the market leader in traction power electronics applications and development for the last 40 years and leverages this vast experience to supply solutions for isolated current and voltage measurements.
LEM transducers provide control and protection to power converters and inverters that regulate energy to the electric motors (for propulsion) and to the auxiliaries (for air conditioning, heating, lighting, electrical doors, ventilation, etc.). This includes the incoming monitoring of the voltage network (changing by crossing European borders) to make the power electronics work accordingly.
Although this is true for on-board applications, LEM has also provided the same control and protection signals for wayside substations.
The rail industry is under constant changes and evolution. As a recent example, the privatization of the rail networks raised new requirements for which LEM provides: the onboard monitoring of power consumption (EM4T II Energy Meter), solutions to trackside applications, rail maintenance and the monitoring of points (switches) machines or signaling conditions with some new transducers families.
LEM is always available to assist in adapting to these evolving technical applications.
Four decades of railway experience have contributed to establishing LEM as the market leader with worldwide presence to serve you and provide the efficient, safe and reliable operation of the railways.

HIGH PRECISION MARKET

Certain power-electronics applications require such high performance in accuracy, drift and/or response time that is necessary to switch to other technologies to achieve these goals. The validation of customer equipment is made through recognized laboratories using high-performance test benches supported by high-technology equipment including extremely accurate current transducers. These transducers are still in need today for such traditional applications but are more and more in demand in high-performance industrial applications, specifically medical equipment (scanners, MRI, etc.), precision motor controllers, and metering or accessories for measuring and test equipment. LEM has been the leader for years in producing transducers with high performance and competitive costs for these markets. The 2009 acquisition of the Danish company, Danfysik ACP A/S, as being the world’s leader in the development and manufacturing of very-high precision current transducers, reinforced this position.

To achieve this challenging target of accuracy and performance, LEM’s current transducers for the high precision market use an established and proven technology, the Fluxgate technology deployed in different alternatives.
Thanks to this technology, we can claim accuracies in the parts per million (PPMs) of the nominal magnitude and is representative of the performance achieved.

The high-accuracy product range covers transducers for nominal current measurements from 12.5 A to 24 kA while providing overall accuracies at ambient temperatures (25°C) of only a few PPM. Thermal offset drifts are extremely low, only a few PPM per Kelvin (K).

LEM has been the market leader in industrial, railway, high accuracy power electronics applications and development for the last 40 years and leverages this vast experience to supply solutions for isolated current and voltage measurements.
With more than 2 500 current and voltage transducers in its portfolio, LEM offers a complete range of accurate, reliable, and Galvanically isolated devices for the measurement of currents from 0.25 A to 24 000 A and voltages from 10 V to 4 200 V in various technologies: open loop, closed loop, fluxgate, insulating digital technology, Rogowski, current transformer etc.
LEM transducers are designed according to the most demanding international standards (EN50178, EN 50155, EN50124-1, NFF 16101, 16102, etc.) and carry CE marking. UL Recognition (UR) is also available on most models.

We have worldwide ISO 9001, ISO TS 16949 and IRIS (Geneva and Beijing LEM production and design centers) qualification and offer a 5-year warranty on all of our products.

At LEM, we find that our customers not only require an optimal solution to accurately measure the current in their applications, but that they are also looking for a current measurement solution which brings added value to the final application and gives an edge to their competitive environment.
Performance improvement: Customers demand the best solution for all the many applications in the industry worldwide and the transducer business needs to keep up or even anticipate this. LEM remains in close collaboration with its customers and their applications to be able to react quickly to the market requirements and to maintain market leadership position in the transducer industry.
LEM constantly strives to innovate and improve the performance, cost and size of its products.

LEM is a world-wide company with regional sales offices across the globe close to its clients' locations and production facilities in Switzerland, Europe (including Russia and Bulgaria) and Asia (China and Japan) for seamless service everywhere.

We hope you will find this catalogue a useful guide for the selection of our products.
Visit our website at www.lem.com and contact our sales network in your region for further assistance.
Detailed data sheets and application notes are available upon request.

Sincerely,

Hans-Dieter Huber
Vice President Industry

François Gabella
CEO LEM

LEM - At the heart of power electronics.

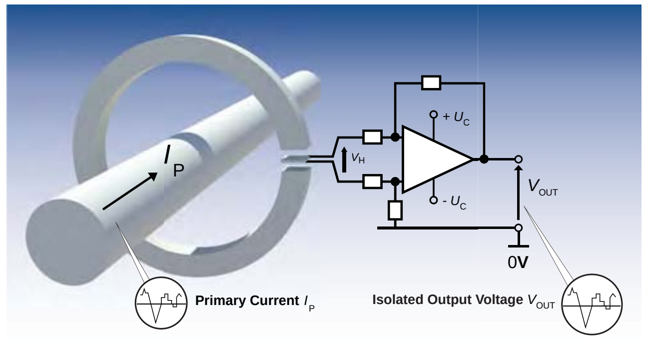
Contents

Open Loop Current Transducers (O/L)

Features

- Small package size
- Extended measuring range
- Reduced weight
- Low power consumption
- No insertion losses

Operation principle O/L



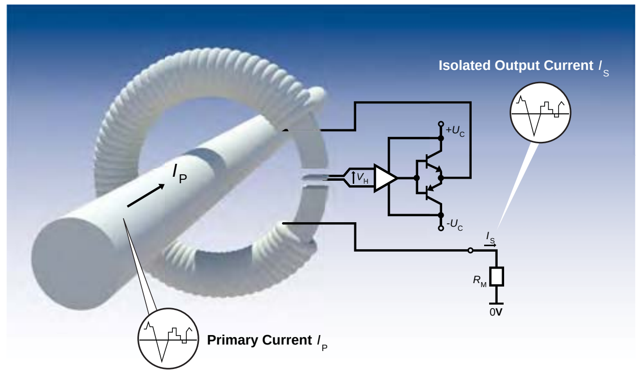
The magnetic flux created by the primary current I_P is concentrated in a magnetic circuit and measured in the air gap using a Hall device. The output from the Hall device is then signal conditioned to provide an exact representation of the primary current at the output.

Closed Loop Current Transducers (C/L)

Features

- Wide frequency range
- Good overall accuracy
- Fast response time
- Low temperature drift
- Excellent linearity
- No insertion losses

Operation principle C/L



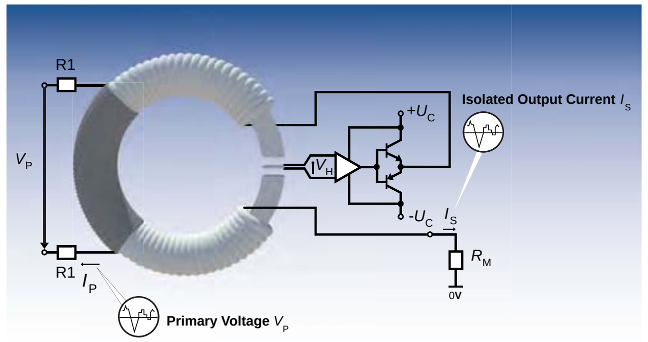
The magnetic flux created by the primary current I_P is balanced by a complementary flux produced by driving a current through the secondary windings. A hall device and associated electronic circuit are used to generate the secondary (compensating) current that is an exact representation of the primary current.

Closed Loop Voltage Transducers (C/L)

Features

- Measurement of high voltages
- Safety isolation
- Good overall accuracy
- Low temperature drift
- Excellent linearity

Operation principle C/L



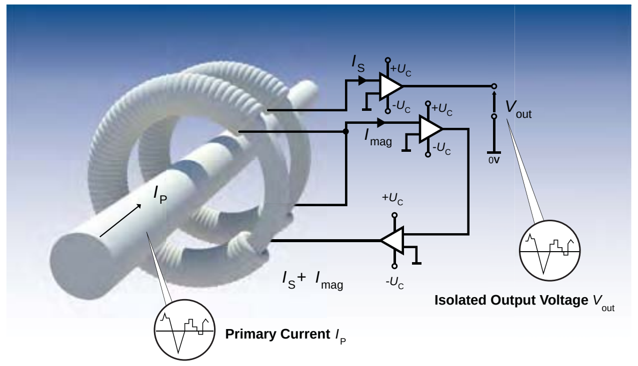
A very small current limited by a series resistor is taken from the voltage to be measured and is driven through the primary coil. The magnetic flux created by the primary current I_P is balanced by a complementary flux produced by driving a current through the secondary windings. A hall device and associated electronic circuit are used to generate the secondary (compensating) current that is an exact representation of the primary voltage. The primary resistor (R_1) can be incorporated or not in the transducer.

Closed Loop Fluxgate C Type

Features

- High accuracy
- Very wide frequency range
- Reduced temperature drift
- Excellent linearity
- Measurement of differential currents (CD)
- Safety isolation (CV)
- Reduced loading on the primary (CV)

Operation principle



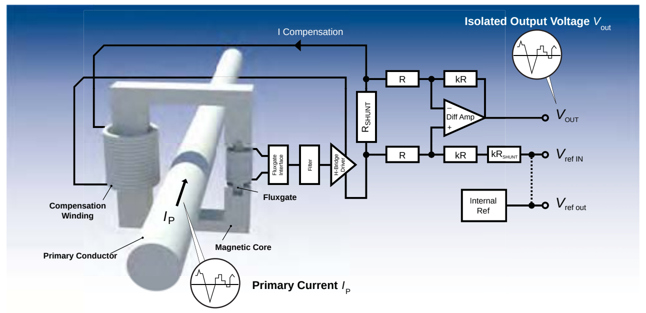
This technology uses two toroidal cores and two secondary windings and operates on a fluxgate principle of Ampere–turns compensation. For the voltage type a small (few mA) current is taken from the voltage line to be measured and is driven through the primary coil and the primary resistor.

Closed Loop Fluxgate CAS-CASR-CKSR type

Features

- Any kind of AC, DC, pulsed and complex signal
- High accuracy
- High accuracy in temperature
- Very low drift in temperature (gain and offset)
- Galvanic isolation
- Fast response time

Operation principle



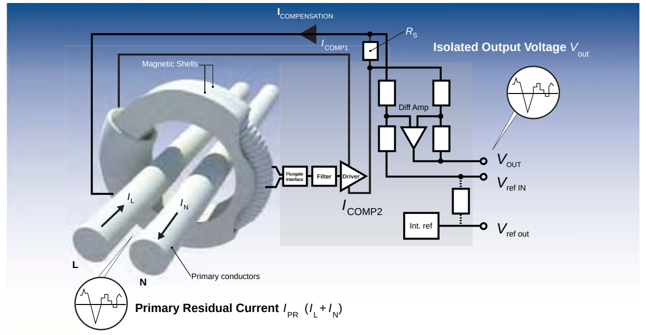
The operating principle is that of a current transformer, equipped with a magnetic sensing element, which senses the flux density in the core. The output of the field sensing element is used as the error signal in a control loop driving a compensating current through the secondary winding of the transformer. At low frequencies, the control loop maintains the flux through the core near zero. As the frequency rises, an increasingly large fraction of the compensating current is due to the operation in transformer mode. The secondary current is therefore the image of the primary current. In a voltage output transducer, the compensating current is converted to a voltage through a precision resistor, and made available at the output of a buffer amplifier.

Closed Loop Fluxgate CTSR type

Features

- Any kind of AC, DC, pulsed and complex signal
- Non-contact measurement of differential currents
- High accuracy for small residual currents
- Very low drift in temperature (gain and offset)
- Protection against parasitic magnetic field
- Galvanic isolation

Operation principle



No use of Hall generators. The magnetic flux created by the primary residual current I_{PR} (sum between I_L and I_N) is compensated by a secondary current. The zero–flux detector is a symmetry detector using a wound core connected to a square–wave generator. The secondary compensating current is an exact representation of the primary current.

In a voltage output transducer, the compensating current is converted to a voltage through a precision resistor, and made available at the output of a buffer amplifier.

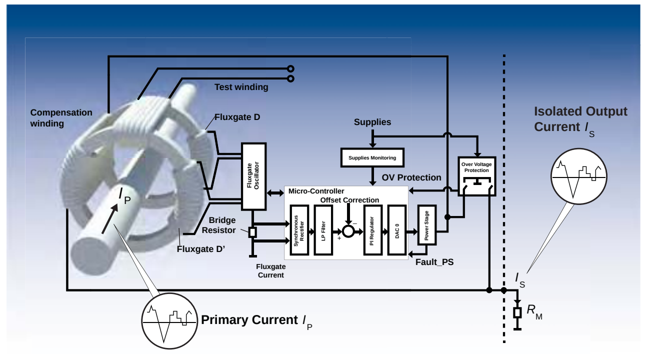
The magnetic core is actually made up of a pair of 2 magnetic shells inside which the detector is located.

Closed loop Fluxgate ITC type

Features

- Excellent linearity
- Better than Class 0.5R according to EN 50463
- Outstanding long-term stability
- Low residual noise
- Very low sensitivity to high external DC and AC fields
- High temperature stability

Operation principle



ITC current transducers are high accuracy transducers using fluxgate technology. This high sensitivity zero–flux detector uses a second wound core (D') for noise reduction. A difference between primary and secondary ampere turns creates an asymmetry in the fluxgate current.

This difference is detected by a microcontroller that controls the secondary current that compensates the primary ampere turns ($I_P \times N_P$).

This results in a very good accuracy and a very low temperature drift.

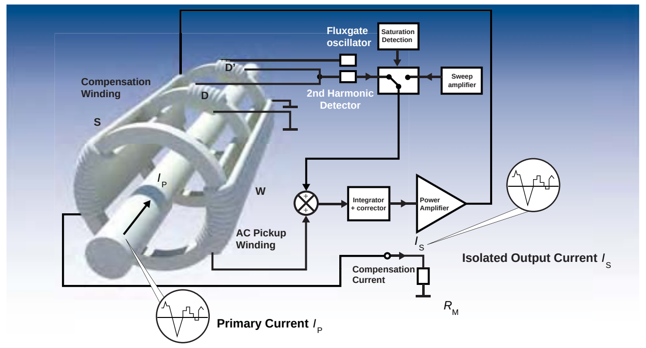
The secondary compensating current is an exact representation of the primary current.

Closed Loop Fluxgate IT type

Features

- Very high global accuracy
- Low residual noise
- Excellent linearity < 1 ppm
- Low cross-over distortion
- High temperature stability
- Wide frequency range

Operation principle



IT current transducers are high accuracy, large bandwidth transducers using fluxgate technology with no Hall generators. The magnetic flux created by the primary current I_P is compensated by a secondary current. The zero–flux detector is a symmetry detector using two wound cores connected to a square–wave generator. The secondary compensating current is an exact representation of the primary current.

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* For further information, refer to the brochure "Characteristics - Applications - Calculations" or www.lem.com

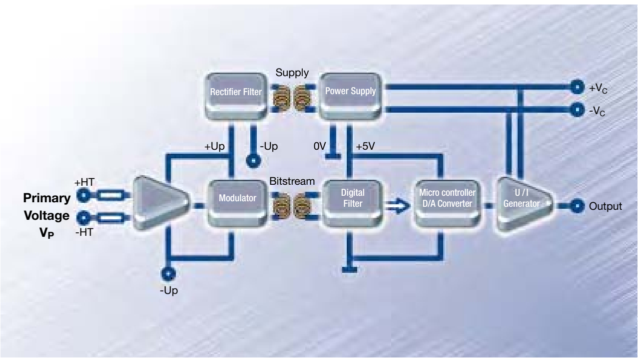
Transducer Technologies

DV & DVL Type Voltage transducers

Features

- Insulating digital technology
- Measurement of all types of signals: DC, AC, pulsed and complex
- Compact size, reduced volume
- High galvanic isolation
- Low consumption and losses
- Very high accuracy, Class 0.5R according to EN 50463 (DV Models)
- Low temperature drift

Operation principle



The measuring voltage, V_P , is applied directly to the transducer primary connections through a resistor network allowing the signal conditioning circuitry to feed a Sigma–Delta modulator that allows to transmit data via one single isolated channel.

The signal is then transmitted to the secondary over an insulating transformer ensuring the insulation between the high voltage side (primary) and the low voltage side (secondary).

The signal is reshaped on the secondary side, then decoded and filtered through a digital filter to feed a micro–controller using a Digital/Analog (D/A) converter and a voltage to current generator.

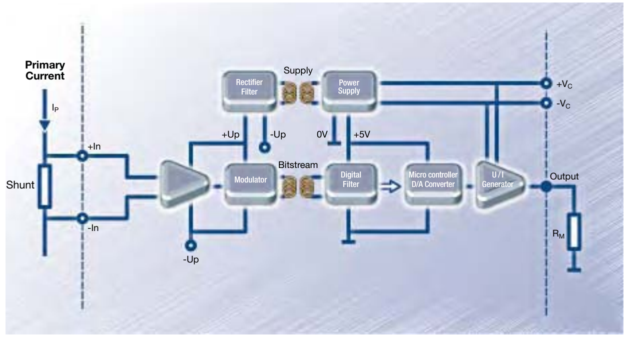
The recovered output signal is completely insulated against the primary and is an exact representation of the primary voltage.

DI Type Current transducers (Shunt isolator)

Features

- Insulating digital technology
- Measurement of all types of signals: DC, AC, pulsed and complex
- Compact size, reduced volume
- High galvanic isolation
- Low consumption and losses
- Very high accuracy, Class 1R according to EN 50463
- Low temperature drift

Operation principle



DI current transducers (Shunt isolator) must be used combined with an external Shunt.

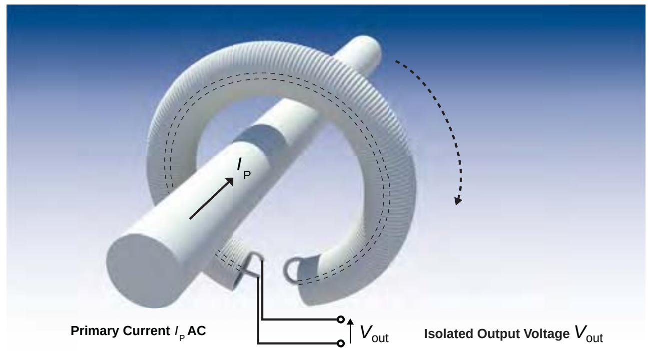
DI current transducers are working as DV voltage transducers except that the input resistor network used inside the DV is replaced by an external Shunt providing then the voltage input to feed the Sigma–Delta modulator that allows to transmit data via one single isolated channel.

Rogowski Current transducers RT type

Features

- Non-contact measurement of AC & pulsed signal
- Thin, lightweight & flexible measuring head
- Easy to use: Can be opened
- Sensitivity to external field disturbances minimized
- Wide frequency range
- Galvanic isolation

Operation principle



Rogowski technology is an Air–core technology (without magnetic circuit).

A pick–up coil is magnetically coupled with the flux created by the current to be measured I_P. A voltage V_{OUT} is induced on the pick–up coil proportional to the derivative of flux and thus proportional to the derivative of the current to be measured I_P. Because the derivative of DC is zero this technology is only useful for the measurement of AC or pulsed currents.

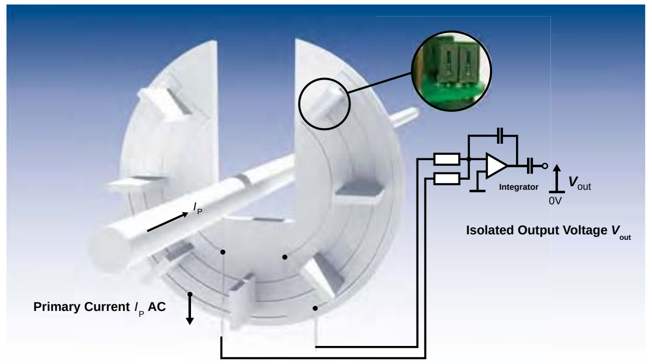
The waveform of the measured current requires the integration of the induced voltage V_{OUT}. Therefore, the current transducer may includes an integration function in the processing electronics (option).

PRiME Current Transducers

Features

- AC measurement with wide dynamic range
- No magnetic saturation
- High overload capacity
- Good linearity
- Accuracy independent of the position of the cable in the aperture and of external fields
- Light weight and small package
- Low thermal losses

Operation principle



PRiME operates on the basic Rogowski principle. Instead of a traditional wound coil, the measuring head is made of a number of sensor printed circuit boards (PCBs, each made of two separate air cored coils) mounted on a base–PCB. Each sensor PCB is connected in series to form two concentric loops. The induced voltage at their outputs is then integrated in order to obtain both amplitude and phase information for the current being measured.

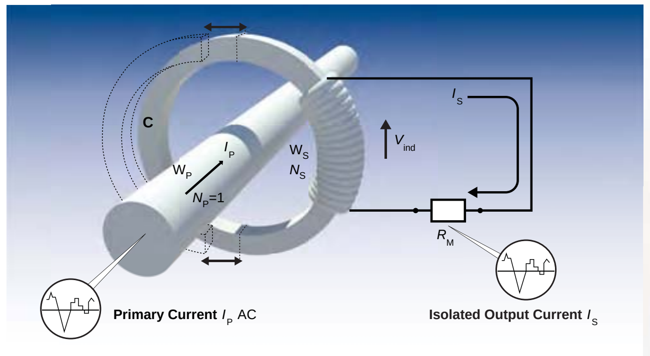
Transducer Technologies

Split Core Current transformers AT & TT type

Features

- Non-contact measurement
- AC & pulsed signal
- No power supply
- Easy to use: Can be opened
- Good overall accuracy
- Galvanic isolation

Operation principle



A transformer is a static electrical device transferring energy by inductive coupling between the windings making part of it. It is made with a primary coil (W_P) with N_P turns and a secondary coil (W_S) with N_S turns, wound around the same magnetic core (C).

A varying current I_P in the primary winding (assimilated here to the primary conductor crossing the aperture: $N_P = 1$) creates a varying magnetic flux in the transformer's core crossing the secondary winding. This varying magnetic flux induces a varying electromotive force or voltage V_{ind} in the secondary winding. Connecting a load to the secondary winding causes a current I_S to flow. This compensating secondary current I_S is substantially proportional to the primary current I_P to be measured so that $N_P.I_P = N_S.I_S$

DC currents are not measured and not suitable because they represent a risk of magnetic saturation. The relationship here above is respected only within the bandwidth of the current transformer. Warning!: Never let the output unloaded because there is a risk of safety for users.

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* For further information, refer to the brochure "Characteristics - Applications - Calculations" or www.lem.com

I_{PN} = 0.25 A ... 2 A

DRS / REU

Closed–loop

Fluxgate

I_{PN} A	I_P A	Technology	U_C V	V_{out} I_{out} @ I_{PN}	BW kHz	X @ I_{PN} T_A = 25°C %	T_A °C	Connection				UR or UL	Packaging No	Type	Features
								Primary		Secondary					
								PCB	Aperture, busbar, other	PCB	Other				
0.25	± 0.36	C/L	± 15	25 mA	DC-150 (-1dB)	0.5	-10...+70	●		●		●	1	LA 25-NP/SP14	
0.3	± 0.5	Fluxgate CTSR	+ 5/0	2.5V or V_{ref} ±1.2V	DC-3.5 (-1dB)	1	-40...+105		●	●		●	2	CTSR 0.3-P 5)	
0.3	± 0.85	Fluxgate CTSR	+ 5/0	2.5V or V_{ref} ±0.7428V	DC-9.5 (-1dB)	0.7	-40...+105		●	●		●	3	CTSR 0.3-P/SP1 5)	
0.3	± 0.5	Fluxgate CTSR	+ 5/0	2.5V or V_{ref} ±1.2V	DC-3.5 (-1dB)	1	-40...+105		●	●		●	4	CTSR 0.3-P/SP10 5)	TW
0.3	± 0.85	Fluxgate CTSR	+ 5/0	2.5V or V_{ref} ±0.7428V	DC-9.5 (-1dB)	0.7	-40...+105		●	●		●	5	CTSR 0.3-P/SP11 5)	TW
0.3	± 0.5	Fluxgate CTSR	+ 5/0	2.5V or V_{ref} ±1.2V	DC-3.5 (-1dB)	1	-40...+105	●		●		●	6	CTSR 0.3-TP/SP4 5)	
0.3	± 0.5	Fluxgate CTSR	+ 5/0	2.5V or V_{ref} ±1.2V	DC-3.5 (-1dB)	1	-40...+105	●		●		●	7	CTSR 0.3-TP/SP14 5)	TW
0.5	± 0.72	C/L	± 15	25 mA	DC-150 (-1dB)	0.5	-40...+70	●		●		●	1	LA 25-NP/SP13	
0.6	± 0.85	Fluxgate CTSR	+ 5/0	2.5V or V_{ref} ±1.4856V	DC-9.5 (-1dB)	0.7	-40...+105		●	●		●	2	CTSR 0.6-P 5)	
0.6	± 0.85	Fluxgate CTSR	+ 5/0	2.5V or V_{ref} ±1.4856V	DC-9.5 (-1dB)	0.7	-40...+105		●	●		●	4	CTSR 0.6-P/SP10 5)	TW
0.6	± 0.85	Fluxgate CTSR	+ 5/0	2.5V or V_{ref} ±1.4856V	DC-9.5 (-1dB)	0.7	-40...+105	●		●		●	6	CTSR 0.6-TP/SP2 5)	
0.6	± 0.85	Fluxgate CTSR	+ 5/0	2.5V or V_{ref} ±1.4856V	DC-9.5 (-1dB)	0.7	-40...+105	●		●		●	7	CTSR 0.6-TP/SP12 5)	TW
1	± 1.5	C/L	± 15	25 mA	DC-150 (-1dB)	0.5	0...+70	●		●		●	1	LA 25-NP/SP11	
1	± 1.7	Fluxgate CTSR	+ 5/0	2.5V or V_{ref} ±1.2V	DC-9.5 (-1dB)	1	-40...+105		●	●		●	2	CTSR 1-P 5)	
1.5	± 2.2	C/L	± 15	24 mA	DC-150 (-1dB)	0.5	0...+70	●		●		●	1	LA 25-NP/SP9	
1.5	± 5	Fluxgate CAS	+ 5/0	2.5V or V_{ref} ±0.625V	DC-300 (+/-3dB)	0.8	-40...+105	●		●		●	8	CKSR 6-NP 5)	
2	± 3	C/L	± 15	24 mA	DC-150 (-1dB)	0.5	0...+70	●		●		●	1	LA 25-NP/SP8	
2	± 6.4	C/L	+ 5/0	2.5 V ± 0.625 V	DC-200 (-1dB)	0.7	-40...+85	●		●		●	9	LTS 6-NP	
2	± 6.4	C/L	+ 5/0	2.5V or V_{ref} ± 0.625V	DC-200 (-1dB)	0.7	-40...+85	●		●		●	10	LTSR 6-NP 5)	

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Notes:

1) Small signal bandwidth to avoid excessive core heating at high frequency

5) Ref_{IN} & Ref_{out} modes

I_{PN} = 2 A ... 5 A

DRS / REU

Open–loop

Closed–loop

Fluxgate

I_{PN} A	I_P A	Technology	U_C V	V_{out} I_{out} @ I_{PN}	BW kHz	X @ I_{PN} T_A = 25°C %	T_A °C	Connection				UR or UL	Packaging No	Type	Features
								Primary		Secondary					
								PCB	Aperture, busbar, other	PCB	Other				
2	± 6.67	Fluxgate CAS	+ 5/0	2.5 V±0.625 V	DC-300 (+/-3dB)	0.8	-40...+85	●		●		●	11	CAS 6-NP	
2	± 6.67	Fluxgate CAS	+ 5/0	2.5V or V_{ref} ±0.625V	DC-300 (+/-3dB)	0.8	-40...+85	●		●		●	12	CASR 6-NP 5)	
2.5	± 3.6	C/L	± 15	25 mA	DC-150 (-1dB)	0.5	0...+70	●		●		●	1	LA 25-NP/SP7	
2.67	± 6.67	O/L	+ 5/0	2.5V or V_{ref} ±0.8V	DC-250 (-3dB)	1	-40...+105	●		●		●	13	HO 8-NP-0000 5)	
2.67	± 6.67	O/L	+ 5/0	2.5V or V_{ref} ±0.8V	DC-250 (-3dB)	1	-40...+105	SMD		SMD		●	14	HO 8-NSM-0000 5)	
2.67	± 6.67	O/L	+ 3.3/0	1.65V or V_{ref} ±0.460V	DC-250 (-3dB)	1	-40...+105	●		●		●	13	HO 8-NP/ SP33-1000 5)	
2.67	± 6.67	O/L	+ 3.3/0	1.65V or V_{ref} ±0.460V	DC-250 (-3dB)	1	-40...+105	SMD		SMD		●	14	HO 8-NSM/ SP33-1000 5)	
3	± 9	O/L	± 12...15	4 V	DC-50 (-3dB) 1)	2.4	-25...+85	●		●		●	15	HXN 03-P	
2 x 3	2 x ± 9	O/L	± 15	2 x 4 V	DC-50 (+/-3dB) 1)	3.75	-40...+85	●		●			16	HXD 03-P	DM
3	± 9.6	C/L	+ 5/0	2.5 V±0.625 V	DC-200 (-1dB)	0.7	-40...+85	●		●		●	9	LTS 6-NP	
3	± 9.6	C/L	+ 5/0	2.5V or V_{ref} ±0.625V	DC-200 (-1dB)	0.7	-40...+85	●		●		●	10	LTSR 6-NP 5)	
3	± 10	Fluxgate CAS	+ 5/0	2.5 V±0.625 V	DC-300 (+/-3dB)	0.8	-40...+85	●		●		●	11	CAS 6-NP	
3	± 10	Fluxgate CAS	+ 5/0	2.5V or V_{ref} ±0.625V	DC-300 (+/-3dB)	0.8	-40...+85	●		●		●	12	CASR 6-NP 5)	
3	± 10	Fluxgate CAS	+ 5/0	2.5V or V_{ref} ±0.625V	DC-300 (+/-3dB)	0.8	-40...+105	●		●		●	8	CKSR 6-NP 5)	
3.75	± 12.75	Fluxgate CAS	+ 5/0	2.5V or V_{ref} ±0.625V	DC-300 (+/-3dB)	0.8	-40...+105	●		●		●	8	CKSR 15-NP 5)	
4	± 10	O/L	+ 5/0	2.5V or V_{ref} ±0.8V	DC-250 (-3dB)	1	-40...+105	●		●		●	13	HO 8-NP-0000 5)	
4	± 10	O/L	+ 5/0	2.5V or V_{ref} ±0.8V	DC-250 (-3dB)	1	-40...+105	SMD		SMD		●	14	HO 8-NSM-0000 5)	
4	± 10	O/L	+ 3.3/0	1.65V or V_{ref} ±0.460V	DC-250 (-3dB)	1	-40...+105	●		●		●	13	HO 8-NP/ SP33-1000 5)	
4	± 10	O/L	+ 3.3/0	1.65V or V_{ref} ±0.460V	DC-250 (-3dB)	1	-40...+105	SMD		SMD		●	14	HO 8-NSM/ SP33-1000 5)	
5	± 7	C/L	± 15	25 mA	DC-150 (-1dB)	0.5	-40...+85	●		●		●	17	LA 25-NP	

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TW = Test Winding

DM = Dual Measurement

Dedicated data sheets are the only recognized reference documents for the given performances and data – Data sheets: www.lem.com

I_{PN} = 5 A ... 7.5 A

DRS / REU

Open–loop | Closed–loop | Fluxgate

I_{PN} A	I_P A	Technology	U_C V	V_{out} I_{out} @ I_{PN}	BW kHz	X @ I_{PN} T_A = 25°C %	T_A °C	Connection Primary PCB	Connection Primary Aperture, busbar, other	Connection Secondary PCB	Connection Secondary Other	UR or UL	Packaging No	Type	Features
5	± 12.5	O/L	+ 5/0	2.5V or V_{ref} ±0.8V	DC-250 (-3dB)	1	-40...+105	●		●		●	13	HO 15-NP-0000 5)	
5	± 12.5	O/L	+ 5/0	2.5V or V_{ref} ±0.8V	DC-250 (-3dB)	1	-40...+105	SMD		SMD		●	14	HO 15-NSM-0000 5)	
5	± 12.5	O/L	+ 3.3/0	1.65V or V_{ref} ±0.460V	DC-250 (-3dB)	1	-40...+105	●		●		●	13	HO 15-NP/ SP33-1000 5)	
5	± 12.5	O/L	+ 3.3/0	1.65V or V_{ref} ±0.460V	DC-250 (-3dB)	1	-40...+105	SMD		SMD		●	14	HO 15-NSM/ SP33-1000 5)	
5	± 15	O/L	± 12…15	4 V	DC-50 (-3dB) 1)	2.4	-25...+85	●		●		●	15	HXN 05-P	
2 x 5	2 x ± 15	O/L	± 15	2 x 4 V	DC-50 (+/-3dB) 1)	3.75	-40...+85	●		●			16	HXD 05-P	DM
5	± 16	C/L	+ 5/0	2.5 V±0.625 V	DC-200 (-1dB)	0.7	-40...+85	●		●		●	9	LTS 15-NP	
5	± 16	C/L	+ 5/0	2.5V or V_{ref} ±0.625V	DC-200 (-1dB)	0.7	-40...+85	●		●		●	10	LTSR 15-NP 5)	
5	± 17	Fluxgate CAS	+ 5/0	2.5 V±0.625 V	DC-300 (+/-3dB)	0.8	-40...+85	●		●		●	11	CAS 15-NP	
5	± 17	Fluxgate CAS	+ 5/0	2.5V or V_{ref} ±0.625V	DC-300 (+/-3dB)	0.8	-40...+85	●		●		●	12	CASR 15-NP 5)	
6	± 9	C/L	± 15	24 mA	DC-150 (-1dB)	0.5	-40...+85	●		●		●	17	LA 25-NP	
6	± 19.2	C/L	+ 5/0	2.5 V±0.625 V	DC-200 (-1dB)	0.7	-40...+85	●		●		●	9	LTS 6-NP	
6	± 19.2	C/L	+ 5/0	2.5V or V_{ref} ±0.625V	DC-200 (-1dB)	0.7	-40...+85	●		●		●	10	LTSR 6-NP 5)	
6	± 20	Fluxgate CAS	+ 5/0	2.5 V±0.625 V	DC-300 (+/-3dB)	0.8	-40...+85	●		●		●	11	CAS 6-NP	
6	± 20	Fluxgate CAS	+ 5/0	2.5V or V_{ref} ±0.625V	DC-300 (+/-3dB)	0.8	-40...+85	●		●		●	12	CASR 6-NP 5)	
6	± 20	Fluxgate CAS	+ 5/0	2.5V or V_{ref} ±0.625V	DC-300 (+/-3dB)	0.8	-40...+105	●		●		●	8	CKSR 6-NP 5)	
6.25	± 21.25	Fluxgate CAS	+ 5/0	2.5V or V_{ref} ±0.625V	DC-300 (+/-3dB)	0.8	-40...+105	●		●		●	8	CKSR 25-NP 5)	
7	± 14	C/L	± 15	35 mA	DC-150 (-1dB)	0.5	-25...+70	●		●		●	17	LA 35-NP	
7.5	± 18.75	O/L	+ 5/0	2.5V or V_{ref} ±0.8V	DC-250 (-3dB)	1	-40...+105	●		●		●	13	HO 15-NP-0000 5)	
7.5	± 18.75	O/L	+ 5/0	2.5V or V_{ref} ±0.8V	DC-250 (-3dB)	1	-40...+105	SMD		SMD		●	14	HO 15-NSM-0000 5)	
7.5	± 18.75	O/L	+ 3.3/0	1.65V or V_{ref} ±0.460V	DC-250 (-3dB)	1	-40...+105	●		●		●	13	HO 15-NP/ SP33-1000 5)	
7.5	± 18.75	O/L	+ 3.3/0	1.65V or V_{ref} ±0.460V	DC-250 (-3dB)	1	-40...+105	SMD		SMD		●	14	HO 15-NSM/ SP33-1000 5)	

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I_{PN} = 7.5 A ... 8.34 A

DRS / REU

Open–loop | Closed–loop | Fluxgate

I_{PN} A	I_P A	Technology	U_C V	V_{out} I_{out} @ I_{PN}	BW kHz	X @ I_{PN} T_A = 25°C %	T_A °C	Connection Primary PCB	Connection Primary Aperture, busbar, other	Connection Secondary PCB	Connection Secondary Other	UR or UL	Packaging No	Type	Features
7.5	± 24	C/L	+ 5/0	2.5 V±0.625 V	DC-200 (-1dB)	0.7	-40...+85	●		●		●	9	LTS 15-NP	
7.5	± 24	C/L	+ 5/0	2.5V or V_{ref} ±0.625V	DC-200 (-1dB)	0.7	-40...+85	●		●		●	10	LTSR 15-NP 5)	
7.5	± 25.5	Fluxgate CAS	+ 5/0	2.5 V±0.625 V	DC-300 (+/-3dB)	0.8	-40...+85	●		●		●	11	CAS 15-NP	
7.5	± 25.5	Fluxgate CAS	+ 5/0	2.5V or V_{ref} ±0.625V	DC-300 (+/-3dB)	0.8	-40...+85	●		●		●	12	CASR 15-NP 5)	
7.5	± 25.5	Fluxgate CAS	+ 5/0	2.5V or V_{ref} ±0.625V	DC-300 (+/-3dB)	0.8	-40...+105	●		●		●	8	CKSR 15-NP 5)	
8	± 12	C/L	± 15	24 mA	DC-150 (-1dB)	0.5	-40...+85	●		●		●	17	LA 25-NP	
8	± 16	C/L	± 15	32 mA	DC-150 (-1dB)	0.5	-25...+70	●		●		●	17	LA 35-NP	
8	± 18	C/L	± 12…15	24 mA	DC-200 (-1dB)	0.4	-25...+85	●		●		●	18	LAH 25-NP	
8	± 20	O/L	+ 5/0	2.5V or V_{ref} ±0.8V	DC-250 (-3dB)	1	-40...+105	●		●		●	13	HO 8-NP-0000 5)	
8	± 20	O/L	+ 5/0	2.5V or V_{ref} ±0.8V	DC-250 (-3dB)	1	-40...+105	SMD		SMD		●	14	HO 8-NSM-0000 5)	
8	± 20	O/L	+ 3.3/0	1.65V or V_{ref} ±0.460V	DC-250 (-3dB)	1	-40...+105	●		●		●	13	HO 8-NP/SP33-1000 5)	
8	± 20	O/L	+ 3.3/0	1.65V or V_{ref} ±0.460V	DC-250 (-3dB)	1	-40...+105	SMD		SMD		●	14	HO 8-NSM/ SP33-1000 5)	
8.33	± 16.66	C/L	+ 5/0	12.5 mA	DC-300 (-1dB)	0.7	-40...+85	●		●		●	19	LTSP 25-NP	
8.33	± 20.83	O/L	+ 5/0	2.5V or V_{ref} ±0.8V	DC-250 (-3dB)	1	-40...+105	●		●		●	13	HO 25-NP-0000 5)	
8.33	± 20.83	O/L	+ 5/0	2.5V or V_{ref} ±0.8V	DC-250 (-3dB)	1	-40...+105	SMD		SMD		●	14	HO 25-NSM-0000 5)	
8.33	± 20.83	O/L	+ 3.3/0	1.65V or V_{ref} ±0.460V	DC-250 (-3dB)	1	-40...+105	●		●		●	13	HO 25-NP/ SP33-1000 5)	
8.33	± 20.83	O/L	+ 3.3/0	1.65V or V_{ref} ±0.460V	DC-250 (-3dB)	1	-40...+105	SMD		SMD		●	14	HO 25-NSM/ SP33-1000 5)	
8.34	± 26.67	C/L	+ 5/0	2.5 V±0.625 V	DC-200 (-1dB)	0.7	-40...+85	●		●		●	9	LTS 25-NP	
8.34	± 26.67	C/L	+ 5/0	2.5V or V_{ref} ±0.625V	DC-200 (-1dB)	0.7	-40...+85	●		●		●	10	LTSR 25-NP 5)	
8.34	± 28.34	Fluxgate CAS	+ 5/0	2.5 V±0.625 V	DC-300 (+/-3dB)	0.8	-40...+85	●		●		●	11	CAS 25-NP	
8.34	± 28.34	Fluxgate CAS	+ 5/0	2.5V or V_{ref} ±0.625V	DC-300 (+/-3dB)	0.8	-40...+85	●		●		●	12	CASR 25-NP 5)	

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Notes:

1) Small signal bandwidth to avoid excessive core heating at high frequency

5) Ref_{IN} & Ref_{out} modes

DM = Dual Measurement

Dedicated data sheets are the only recognized reference documents for the given performances and data – Data sheets: www.lem.com

I_{PN} = 10 A ... 12.5 A

DRS / REU

I_{PN} A	I_P A	Technology	U_C V	V_{out} I_{out} @ I_{PN}	BW kHz	X @ I_{PN} T_A = 25°C %	T_A °C	Connection				UR or UL	Packaging No	Type	Features
								Primary		Secondary					
								PCB	Aperture, busbar, other	PCB	Other				
10	± 25	O/L	+ 5/0	2.5V or V_{ref} ±0.8V	DC-240 (-3dB)	1	-40...+105	●		●			20	HLSR 10-P 5)	
10	± 25	O/L	+ 5/0	2.5V or V_{ref} ±0.8V	DC-240 (-3dB)	1	-40...+105	SMD		SMD			21	HLSR 10-SM 5)	
10	± 25	O/L	+ 3.3/0	1.65V or V_{ref} ±0.460V	DC-240 (-3dB)	1	-40...+105	●		●			20	HLSR 10-P/SP33 5)	
10	± 25	O/L	+ 3.3/0	1.65V or V_{ref} ±0.460V	DC-240 (-3dB)	1	-40...+105	SMD		SMD			21	HLSR 10-SM/SP33 5)	
10	± 30	O/L	± 12...15	4 V	DC-50 (-3dB) 1)	2.4	-25...+85	●		●		●	15	HXN 10-P	
2 x 10	2 x ± 30	O/L	± 15	2 x 4 V	DC-50 (+/-3dB) 1)	3.75	-40...+85	●		●			16	HXD 10-P	DM
11	± 22	C/L	± 15	33 mA	DC-150 (-1dB)	0.5	-25...+70	●		●		●	17	LA 35-NP	
12	± 18	C/L	± 15	24 mA	DC-150 (-1dB)	0.5	-40...+85	●		●		●	17	LA 25-NP	
12	± 27	C/L	± 12...15	24 mA	DC-200 (-1dB)	0.4	-25...+85	●		●		●	18	LAH 25-NP	
12.5	± 25	C/L	+ 5/0	12.5 mA	DC-300 (-1dB)	0.7	-40...+85	●		●		●	19	LTSP 25-NP	
12.5	± 31.25	O/L	+ 5/0	2.5V or V_{ref} ±0.8V	DC-250 (-3dB)	1	-40...+105	●		●		●	13	HO 25-NP-0000 5)	
12.5	± 31.25	O/L	+ 5/0	2.5V or V_{ref} ±0.8V	DC-250 (-3dB)	1	-40...+105	SMD		SMD		●	14	HO 25-NSM-0000 5)	
12.5	± 31.25	O/L	+ 3.3/0	1.65V or V_{ref} ±0.460V	DC-250 (-3dB)	1	-40...+105	●		●		●	13	HO 25-NP/SP33-1000 5)	
12.5	± 31.25	O/L	+ 3.3/0	1.65V or V_{ref} ±0.460V	DC-250 (-3dB)	1	-40...+105	SMD		SMD		●	14	HO 25-NSM/SP33-1000 5)	
12.5	± 37.5	Fluxgate CAS	+ 5/0	2.5V or V_{ref} ±0.625V	DC-300 (+/-3dB)	0.8	-40...+105	●		●		●	8	CKSR 50-NP 5)	
12.5	± 40	C/L	+ 5/0	2.5 V±0.625 V	DC-200 (-1dB)	0.7	-40...+85	●		●		●	9	LTS 25-NP	
12.5	± 40	C/L	+ 5/0	2.5V or V_{ref} ±0.625V	DC-200 (-1dB)	0.7	-40...+85	●		●		●	10	LTSR 25-NP 5)	
12.5	± 42.5	Fluxgate CAS	+ 5/0	2.5 V±0.625 V	DC-300 (+/-3dB)	0.8	-40...+85	●		●		●	11	CAS 25-NP	
12.5	± 42.5	Fluxgate CAS	+ 5/0	2.5V or V_{ref} ±0.625V	DC-300 (+/-3dB)	0.8	-40...+85	●		●		●	12	CASR 25-NP 5)	
12.5	± 42.5	Fluxgate CAS	+ 5/0	2.5V or V_{ref} ±0.625V	DC-300 (+/-3dB)	0.8	-40...+105	●		●		●	8	CKSR 25-NP 5)	

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I_{PN} = 15 A ... 20 A

DRS / REU

I_{PN} A	I_P A	Technology	U_C V	V_{out} I_{out} @ I_{PN}	BW kHz	X @ I_{PN} T_A = 25°C %	T_A °C	Connection				UR or UL	Packaging No	Type	Features
								Primary		Secondary					
								PCB	Aperture, busbar, other	PCB	Other				
15	± 37.5	O/L	+ 5/0	2.5V or V_{ref} ±0.8V	DC-250 (-3dB)	1	-40...+105	●		●		●	13	HO 15-NP-0000 5)	
15	± 37.5	O/L	+ 5/0	2.5V or V_{ref} ±0.8V	DC-250 (-3dB)	1	-40...+105	SMD		SMD		●	14	HO 15-NSM-0000 5)	
15	± 37.5	O/L	+ 3.3/0	1.65V or V_{ref} ±0.460V	DC-250 (-3dB)	1	-40...+105	●		●		●	13	HO 15-NP/SP33-1000 5)	
15	± 37.5	O/L	+ 3.3/0	1.65V or V_{ref} ±0.460V	DC-250 (-3dB)	1	-40...+105	SMD		SMD		●	14	HO 15-NSM/SP33-1000 5)	
15	± 45	O/L	± 12...15	4 V	DC-50 (-3dB) 1)	2.4	-25...+85	●		●		●	15	HXN 15-P	
2 x 15	2 x ± 45	O/L	± 15	2 x 4 V	DC-50 (+/-3dB) 1)	3.75	-40...+85	●		●			16	HXD 15-P	DM
15	± 48	C/L	+ 5/0	2.5 V±0.625 V	DC-200 (-1dB)	0.7	-40...+85	●		●		●	9	LTS 15-NP	
15	± 48	C/L	+ 5/0	2.5V or V_{ref} ±0.625V	DC-200 (-1dB)	0.7	-40...+85	●		●		●	10	LTSR 15-NP 5)	
15	± 51	Fluxgate CAS	+ 5/0	2.5 V±0.625 V	DC-300 (+/-3dB)	0.8	-40...+85	●		●		●	11	CAS 15-NP	
15	± 51	Fluxgate CAS	+ 5/0	2.5V or V_{ref} ±0.625V	DC-300 (+/-3dB)	0.8	-40...+85	●		●		●	12	CASR 15-NP 5)	
15	± 51	Fluxgate CAS	+ 5/0	2.5V or V_{ref} ±0.625V	DC-300 (+/-3dB)	0.8	-40...+105	●		●		●	8	CKSR 15-NP 5)	
16.67	± 50	Fluxgate CAS	+ 5/0	2.5 V±0.625 V	DC-300 (+/-3dB)	0.8	-40...+85	●		●		●	11	CAS 50-NP	
16.67	± 50	Fluxgate CAS	+ 5/0	2.5V or V_{ref} ±0.625V	DC-300 (+/-3dB)	0.8	-40...+85	●		●		●	12	CASR 50-NP 5)	
17	± 34	C/L	± 15	34 mA	DC-150 (-1dB)	0.5	-25...+70	●		●		●	17	LA 35-NP	
20	± 50	O/L	+ 5/0	2.5V or V_{ref} ±0.8V	DC-240 (-3dB)	1	-40...+105	●		●			20	HLSR 20-P 5)	
20	± 50	O/L	+ 5/0	2.5V or V_{ref} ±0.8V	DC-240 (-3dB)	1	-40...+105	SMD		SMD			21	HLSR 20-SM 5)	
20	± 50	O/L	+ 3.3/0	1.65V or V_{ref} ±0.460V	DC-240 (-3dB)	1	-40...+105	●		●			20	HLSR 20-P/SP33 5)	
20	± 50	O/L	+ 3.3/0	1.65V or V_{ref} ±0.460V	DC-240 (-3dB)	1	-40...+105	SMD		SMD			21	HLSR 20-SM/SP33 5)	
20	± 60	O/L	± 12...15	4 V	DC-50 (-3dB) 1)	2.4	-25...+85	●		●		●	15	HXN 20-P	
2 x 20	2 x ± 60	O/L	± 15	2 x 4 V	DC-50 (+/-3dB) 1)	3.75	-40...+85	●		●			16	HXD 20-P	DM

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Notes:

1) Small signal bandwidth to avoid excessive core heating at high frequency
5) Ref_{IN} & Ref_{out} modes

DM = Dual Measurement

Dedicated data sheets are the only recognized reference documents for the given performances and data – Data sheets: www.lem.com

I_{PN} = 2.67 A ... 25 A

I_{PN} A	I_P A	Technology	U_C V	V_{out} I_{out} @ I_{PN}	BW kHz	X @ I_{PN} T_A = 25°C %	T_A °C	Connection Primary PCB	Connection Primary Aperture, busbar, other	Connection Secondary PCB	Connection Secondary Other	UR or UL	Packaging No	Type	Features
2.67 ; 5 ; 8.33	± 6.67 ; ± 12.5 ; ± 20.83	O/L	+ 5/0	2.5 ; 1.65 ; 1.5 ; 0.5 V or V_{ref} ±0.8V	DC-100 ; 250 ; 600 (-3dB)	1	-40...+105	●		●		●	13	HO 25-NPPR 5) Orange for default setting	P
4 ; 7.5 ; 12.5	± 10 ; ± 18.75 ; ± 31.25	O/L	+ 5/0	2.5 ; 1.65 ; 1.5 ; 0.5 V or V_{ref} ±0.8V	DC-100 ; 250 ; 600 (-3dB)	1	-40...+105	●		●		●	13	HO 25-NPPR 5) Orange for default setting	P
8 ; 15 ; 25	± 20 ; ± 37.5 ; ± 62.5	O/L	+ 5/0	2.5 ; 1.65 ; 1.5 ; 0.5 V or V_{ref} ±0.8V	DC-100 ; 250 ; 600 (-3dB)	1	-40...+105	●		●		●	13	HO 25-NPPR 5) Orange for default setting	P
2.67 ; 5 ; 8.33	± 6.67 ; ± 12.5 ; ± 20.83	O/L	+ 5/0	2.5 ; 1.65 ; 1.5 ; 0.5 V or V_{ref} ±0.8V	DC-100 ; 250 ; 600 (-3dB)	1	-40...+105	SMD		SMD		●	14	HO 25-NSMPR 5) Orange for default setting	P
4 ; 7.5 ; 12.5	± 10 ; ± 18.75 ; ± 31.25	O/L	+ 5/0	2.5 ; 1.65 ; 1.5 ; 0.5 V or V_{ref} ±0.8V	DC-100 ; 250 ; 600 (-3dB)	1	-40...+105	SMD		SMD		●	14	HO 25-NSMPR 5) Orange for default setting	P
8 ; 15 ; 25	± 20 ; ± 37.5 ; ± 62.5	O/L	+ 5/0	2.5 ; 1.65 ; 1.5 ; 0.5 V or V_{ref} ±0.8V	DC-100 ; 250 ; 600 (-3dB)	1	-40...+105	SMD		SMD		●	14	HO 25-NSMPR 5) Orange for default setting	P
2.67 ; 5 ; 8.33	± 6.67 ; ± 12.5 ; ± 20.83	O/L	+ 3.3/0	2.5 ; 1.65 ; 1.5 ; 0.5 V or V_{ref} ±0.460V	DC-100 ; 250 ; 600 (-3dB)	1	-40...+105	●		●		●	13	HO 25-NPPR/SP33 5) Orange for default setting	P
4 ; 7.5 ; 12.5	± 10 ; ± 18.75 ; ± 31.25	O/L	+ 3.3/0	2.5 ; 1.65 ; 1.5 ; 0.5 V or V_{ref} ±0.460V	DC-100 ; 250 ; 600 (-3dB)	1	-40...+105	●		●		●	13	HO 25-NPPR/SP33 5) Orange for default setting	P
8 ; 15 ; 25	± 20 ; ± 37.5 ; ± 62.5	O/L	+ 3.3/0	2.5 ; 1.65 ; 1.5 ; 0.5 V or V_{ref} ±0.460V	DC-100 ; 250 ; 600 (-3dB)	1	-40...+105	●		●		●	13	HO 25-NPPR/SP33 5) Orange for default setting	P
2.67 ; 5 ; 8.33	± 6.67 ; ± 12.5 ; ± 20.83	O/L	+ 3.3/0	2.5 ; 1.65 ; 1.5 ; 0.5 V or V_{ref} ±0.460V	DC-100 ; 250 ; 600 (-3dB)	1	-40...+105	SMD		SMD		●	14	HO 25-NSMPR/SP33 5) Orange for default setting	P
4 ; 7.5 ; 12.5	± 10 ; ± 18.75 ; ± 31.25	O/L	+ 3.3/0	2.5 ; 1.65 ; 1.5 ; 0.5 V or V_{ref} ±0.460V	DC-100 ; 250 ; 600 (-3dB)	1	-40...+105	SMD		SMD		●	14	HO 25-NSMPR/SP33 5) Orange for default setting	P
8 ; 15 ; 25	± 20 ; ± 37.5 ; ± 62.5	O/L	+ 3.3/0	2.5 ; 1.65 ; 1.5 ; 0.5 V or V_{ref} ±0.460V	DC-100 ; 250 ; 600 (-3dB)	1	-40...+105	SMD		SMD		●	14	HO 25-NSMPR/SP33 5) Orange for default setting	P

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Notes:

5) Ref$_{IN}$ & Ref$_{out}$ modes

P = Programmable by the user at any time for the current range (between 3 ranges) ; The internal reference (between 4 references) ; The response time (between 3 response times) ; Lower comsumption mode ; Overcurrent detection level ; Device faulty indication mode ; Standby mode.

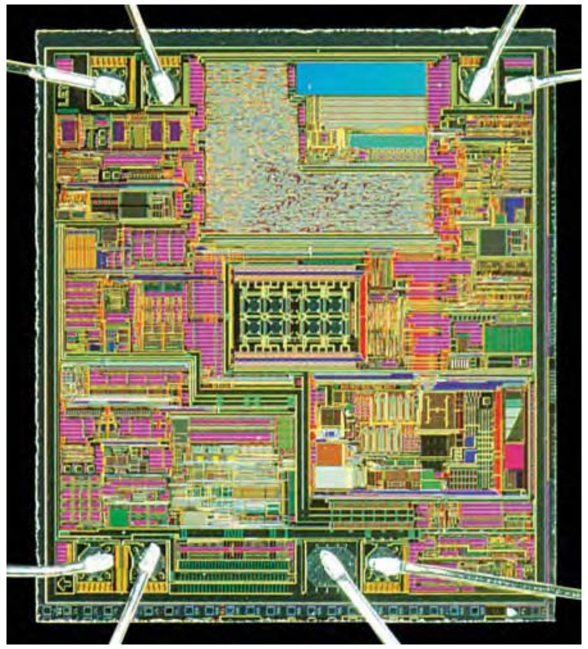
Dedicated data sheets are the only recognized reference documents for the given performances and data – Data sheets: www.lem.com

HO SERIES

Current Transducers with Advanced ASIC Technology Integrating Intelligent and Interactive Functions

Any logistics manager will appreciate the value of a single stock item that covers two or more part numbers: in the case of a current transducer, having one type that can cover several current ranges, offer various response times, and provide several choices for the internal reference voltage, all configurable by the engineering team. Achieving that flexibility has been the key motivation for LEM engineers while optimizing the cost and reducing the size, together with improving performance.

Special effort has been focused on a new Application Specific Integrated Circuit (ASIC) to help achieve these goals, resulting in a new generation of ASIC specific current transducers based on the Open Loop Hall effect technology leading to the development of the HO series.

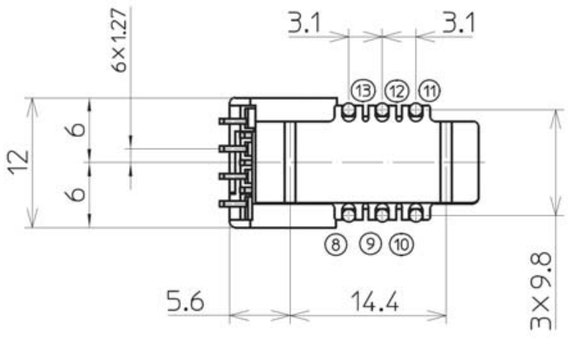


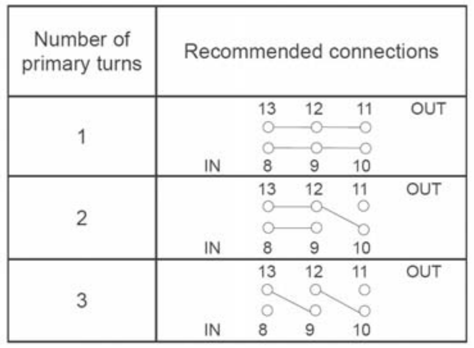
New ASIC die, a complete Open Loop Hall effect current transducer on a single chip.

With this ASIC at its heart, the HO models are designed for current measurements from 2.67 A$_{RMS}$ to 25 A$_{RMS}$ nominal, with nine possible current ranges selectable either by digital programmability or by multi-range PCB configuration.

Possible nominal ranges of HO 25-NPPR/-NSMPR with the various primary bus bar configurations

Number of primary turns	Primary current		
	Range 1 I_{PN} = 8 A	Range 2 I_{PN} = 15 A	Range 3 I_{PN} = 25 A
1	8 A	15 A	25 A
2	4 A	7.5 A	12.5 A
3	2.67 A	5 A	8.33 A





Recommended PCB Connection

I_{PN} = 25 A ... 40 A

DRS / REU

Open–loop Closed–loop Fluxgate

I_{PN} A	I_P A	Technology	U_C V	V_{out} I_{out} @ I_{PN}	BW kHz	X @ I_{PN} T_A = 25°C %	T_A °C	Connection				UR or UL	Packaging No	Type	Features
								Primary		Secondary					
								PCB	Aperture, busbar, other	PCB	Other				
25	± 36	C/L	± 15	25 mA	DC-150 (-1dB)	0.5	-40...+85	●		●		●	17	LA 25-NP	
25	± 36	C/L	± 15	25 mA	DC-150 (-1dB)	0.5	-40...+85	●		●		●	22	LA 25-NP/SP25	LP
25	± 50	C/L	+ 5/0	12.5 mA	DC-300 (-1dB)	0.7	-40...+85	●		●		●	19	LTSP 25-NP	
25	± 55	C/L	± 12...15	25 mA	DC-200 (-1dB)	0.4	-25...+85	●		●		●	18	LAH 25-NP	
25	± 62.5	O/L	+ 5/0	2.5V or V_{ref} ±0.8V	DC-250 (-3dB)	1	-40...+105	●		●		●	13	HO 25-NP-0000 5)	
25	± 62.5	O/L	+ 5/0	2.5V or V_{ref} ±0.8V	DC-250 (-3dB)	1	-40...+105	SMD		SMD		●	14	HO 25-NSM-0000 5)	
25	± 62.5	O/L	+ 3.3/0	1.65V or V_{ref} ±0.460V	DC-250 (-3dB)	1	-40...+105	●		●		●	13	HO 25-NP/SP33-1000 5)	
25	± 62.5	O/L	+ 3.3/0	1.65V or V_{ref} ±0.460V	DC-250 (-3dB)	1	-40...+105	SMD		SMD		●	14	HO 25-NSM/SP33-1000 5)	
25	± 75	O/L	± 12...15	4 V	DC-50 (-3dB) 1)	2.4	-25...+85	●		●		●	15	HXN 25-P	
2 x 25	2 x ± 75	O/L	± 15	2 x 4 V	DC-50 (+/-3dB) 1)	3.75	-40...+85	●		●			16	HXD 25-P	DM
3 x 25	3 x ± 75	O/L	± 12...15	3 x 4 V	DC-10 (-3dB) 1)	4.85	-10...+75		●	●		●	23	HTT 25-P	TM
25	± 80	C/L	+ 5/0	2.5 V±0.625 V	DC-200 (-1dB)	0.7	-40...+85	●		●		●	9	LTS 25-NP	
25	± 80	C/L	+ 5/0	2.5V or V_{ref} ±0.625V	DC-200 (-1dB)	0.7	-40...+85	●		●		●	10	LTSR 25-NP 5)	
25	± 85	Fluxgate CAS	+ 5/0	2.5 V±0.625 V	DC-300 (+/-3dB)	0.8	-40...+85	●		●		●	11	CAS 25-NP	

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Notes:

1) Small signal bandwidth to avoid excessive core heating at high frequency

5) Ref_{IN} & Ref_{out} modes

I_{PN} = 25 A ... 40 A

DRS / REU

Open–loop Closed–loop Fluxgate

I_{PN} A	I_P A	Technology	U_C V	V_{out} I_{out} @ I_{PN}	BW kHz	X @ I_{PN} T_A = 25°C %	T_A °C	Connection				UR or UL	Packaging No	Type	Features
								Primary		Secondary					
								PCB	Aperture, busbar, other	PCB	Other				
25	± 85	Fluxgate CAS	+ 5/0	2.5V or V_{ref} ±0.625V	DC-300 (+/-3dB)	0.8	-40...+85	●		●		●	12	CASR 25-NP 5)	
25	± 85	Fluxgate CAS	+ 5/0	2.5V or V_{ref} ±0.625V	DC-300 (+/-3dB)	0.8	-40...+105	●		●		●	8	CKSR 25-NP 5)	
25	± 75	Fluxgate CAS	+ 5/0	2.5 V±0.625 V	DC-300 (+/-3dB)	0.8	-40...+85	●		●		●	11	CAS 50-NP	
25	± 75	Fluxgate CAS	+ 5/0	2.5V or V_{ref} ±0.625V	DC-300 (+/-3dB)	0.8	-40...+85	●		●		●	12	CASR 50-NP 5)	
25	± 75	Fluxgate CAS	+ 5/0	2.5V or V_{ref} ±0.625V	DC-300 (+/-3dB)	0.8	-40...+105	●		●		●	8	CKSR 50-NP 5)	
32	± 80	O/L	+ 5/0	2.5V or V_{ref} ±0.8V	DC-240 (-3dB)	1	-40...+105	●		●			20	HLSR 32-P 5)	
32	± 80	O/L	+ 5/0	2.5V or V_{ref} ±0.8V	DC-240 (-3dB)	1	-40...+105	SMD		SMD			21	HLSR 32-SM 5)	
32	± 80	O/L	+ 3.3/0	1.65V or V_{ref} ±0.460V	DC-240 (-3dB)	1	-40...+105	●		●			20	HLSR 32-P/SP33 5)	
32	± 80	O/L	+ 3.3/0	1.65V or V_{ref} ±0.460V	DC-240 (-3dB)	1	-40...+105	SMD		SMD			21	HLSR 32-SM/SP33 5)	
35	± 70	C/L	± 15	35 mA	DC-150 (-1dB)	0.5	-25...+70	●		●		●	17	LA 35-NP	
40	± 100	O/L	+ 5/0	2.5V or V_{ref} ±0.8V	DC-240 (-3dB)	1	-40...+105	●		●			20	HLSR 40-P 5)	
40	± 100	O/L	+ 5/0	2.5V or V_{ref} ±0.8V	DC-240 (-3dB)	1	-40...+105	SMD		SMD			21	HLSR 40-SM 5)	
40	± 100	O/L	+ 3.3/0	1.65V or V_{ref} ±0.460V	DC-240 (-3dB)	1	-40...+105	●		●			20	HLSR 40-P/SP33 5)	
40	± 100	O/L	+ 3.3/0	1.65V or V_{ref} ±0.460V	DC-240 (-3dB)	1	-40...+105	SMD		SMD			21	HLSR 40-SM/SP33 5)	

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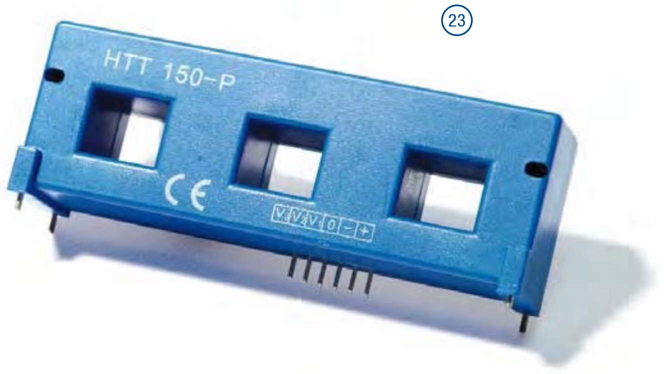


LP = Longer Pins

DM = Dual Measurement

TM = Triplet Measurement

I_{PN} = 50 A ... 88 A

DRS / REU

Open–loop | Closed–loop | Fluxgate

I_{PN} A	I_P A	Technology	U_C V	V_{out} I_{out} @ I_{PN}	BW kHz	X @ I_{PN} T_A = 25°C %	T_A °C	Connection Primary PCB	Connection Primary Aperture, busbar, other	Connection Secondary PCB	Connection Secondary Other	UR or UL	Packaging No	Type	Features
50	± 70	C/L	± 12…15	50 mA	DC-200 (-1dB)	0.65 [6]	-40...+85		●	●		●	24	LA 55-P	
50	± 70	C/L	± 12…15	50 mA	DC-200 (-1dB)	0.45 [6]	-40...+85		●	●		●	24	LA 55-P/SP23	
50	± 70	C/L	± 12…15	50 mA	DC-200 (-1dB)	0.65 [6]	-40...+85	●		●		●	25	LA 55-TP	
50	± 100	C/L	± 12…15	25 mA	DC-200 (-1dB)	0.65 [6]	-40...+85		●	●		●	24	LA 55-P/SP1	
50	± 100	C/L	± 12…15	25 mA	DC-200 (-1dB)	0.65 [6]	-40...+85	●		●		●	25	LA 55-TP/SP1	
50	± 100	C/L	± 12…15	25 mA	DC-200 (-1dB)	0.65 [6]	-40...+85	●		●		●	25	LA 55-TP/SP27	
50	± 100	O/L	± 12…15	4 V	DC-10 (-1dB) [1]	3.4	-10...+70		●		●	●	26	HTR 50-SB	SC
50	± 110	C/L	± 12…15	25 mA	DC-200 (-1dB)	0.3	-25...+85	●		●		●	27	LAH 50-P	
50	± 125	O/L	+ 5/0	2.5V or V_{ref} ±0.8V	DC-240 (-3dB)	1	-40...+105	●		●			20	HLSR 50-P [5]	
50	± 125	O/L	+ 5/0	2.5V or V_{ref} ±0.8V	DC-240 (-3dB)	1	-40...+105	SMD		SMD			21	HLSR 50-SM [5]	
50	± 125	O/L	+ 3.3/0	1.65V or V_{ref} ±0.460V	DC-240 (-3dB)	1	-40...+105	●		●			20	HLSR 50-P/SP33 [5]	
50	± 125	O/L	+ 3.3/0	1.65V or V_{ref} ±0.460V	DC-240 (-3dB)	1	-40...+105	SMD		SMD			21	HLSR 50-SM/SP33 [5]	
50	± 150	Fluxgate CAS	+ 5/0	2.5 V±0.625 V	DC-300 (+/-3dB)	0.8	-40...+85	●		●		●	11	CAS 50-NP	

Notes:

1) Small signal bandwidth to avoid excessive core heating at high frequency

5) Ref_{IN} & Ref_{out} modes

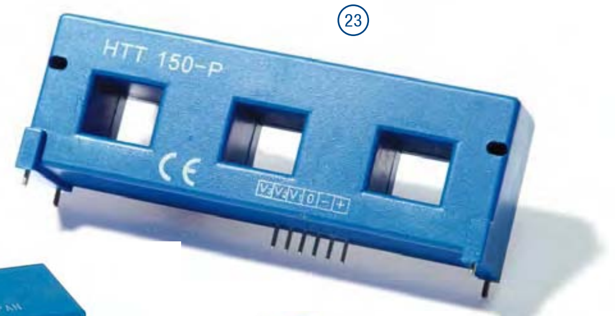
6) Accuracy calculated with max electrical offset instead of typical electrical offset @ U_C = ± 15 V

I_{PN} = 50 A ... 88 A

DRS / REU

Open–loop | Closed–loop | Fluxgate

I_{PN} A	I_P A	Technology	U_C V	V_{out} I_{out} @ I_{PN}	BW kHz	X @ I_{PN} T_A = 25°C %	T_A °C	Connection Primary PCB	Connection Primary Aperture, busbar, other	Connection Secondary PCB	Connection Secondary Other	UR or UL	Packaging No	Type	Features
50	± 150	Fluxgate CAS	+ 5/0	2.5V or V_{ref} ±0.625V	DC-300 (+/-3dB)	0.8	-40...+85	●		●		●	12	CASR 50-NP [5]	
50	± 150	Fluxgate CAS	+ 5/0	2.5V or V_{ref} ±0.625V	DC-300 (+/-3dB)	0.8	-40...+105	●		●		●	8	CKSR 50-NP [5]	
50	± 150	O/L	± 12…15	4 V	DC-50 (-3dB) [1]	2.4	-25...+85	●		●		●	15	HXN 50-P	
50	± 150	O/L	± 15	4 V	DC-50 (-3dB) [1]	2	-25...+85		●		●	●	28	HAL 50-S	
50	± 150	O/L	± 15	4 V	DC-50 (-3dB) [1]	2.5	-10...+80		●		●	●	29	HAS 50-S	
50	± 150	O/L	± 15	4 V	DC-50 (-3dB) [1]	2.5	-10...+80		●	●		●	30	HAS 50-P	
50	± 150	O/L	± 12…15	4 V	DC-50 (-3dB) [1]	2.75	-40...+80		●	●		●	31	HTB 50-P	
50	± 150	O/L	± 12…15	4 V	DC-50 (-3dB) [1]	2.75	-40...+80	●		●		●	32	HTB 50-TP	
50	± 150	O/L	+ 12…15	U_C/2 V +/- 1.667 V	DC-50 (-3dB) [1]	1.5	-25...+85		●	●		●	33	HTB 50-P/SP5	
50	± 150	O/L	+ 12…15	U_C/2 V +/- 1.667 V	DC-50 (-3dB) [1]	1.5	-25...+85	●		●		●	34	HTB 50-TP/SP5	
50	± 150	O/L	+ 5/0	2.5V or V_{ref} ±0.625V	DC-50 (-3dB) [1]	1.4	-40...+85		●		●	●	35	HASS 50-S [5]	
3 x 50	3 x ± 150	O/L	± 12…15	3 x 4 V	DC-10 (-3dB) [1]	3.75	-10...+75		●	●		●	23	HTT 50-P	TM
3 x 75	3 x ± 225	O/L	± 12…15	3 x 4 V	DC-10 (-3dB) [1]	3.75	-10...+75		●	●		●	23	HTT 75-P	TM
3 x 88	3 x ± 240	C/L	± 15	3 x 22 mA	DC-200 (-1dB)	1	-40...+85		●		●		36	LTT 88-S	TM



SC = Split Core

TM = Triplet Measurement

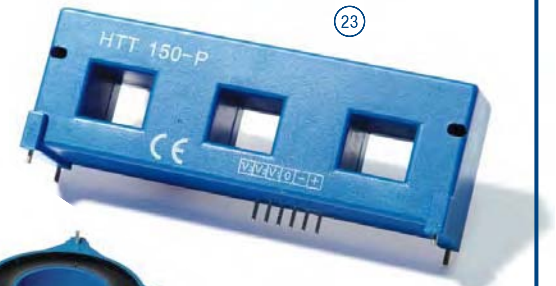
I_{PN} = 100 A ... 200 A

I_{PN} A	I_P A	Technology	U_C V	V_{out} I_{out} @ I_{PN}	BW kHz	X @ I_{PN} T_A = 25°C %	T_A °C	Connection Primary PCB	Connection Primary Aperture, busbar, other	Connection Secondary PCB	Connection Secondary Other	UR or UL	Packaging No	Type	Features
100	± 200	O/L	± 12...15	4 V	DC-10 (-1dB) 1)	3.4	-10...+70		●		●	●	26	HTR 100-SB	SC
100	± 300	O/L	± 15	4 V	DC-50 (-3dB) 1)	2.7	-10...+80		●		●	●	37	HAC 100-S	
100	± 300	O/L	± 15	4 V	DC-50 (-3dB) 1)	1.75	-25...+85		●		●	●	28	HAL 100-S	
100	± 300	O/L	± 15	4 V	DC-50 (-3dB) 1)	1.75	-25...+85		●		●	●	38	HTA 100-S	
100	± 300	O/L	± 15	4 V	DC-50 (-3dB) 1)	2.5	-10...+80		●		●	●	29	HAS 100-S	
100	± 300	O/L	± 15	4 V	DC-50 (-3dB) 1)	2.5	-10...+80		●	●		●	30	HAS 100-P	
100	± 300	O/L	± 12...15	4 V	DC-50 (-3dB) 1)	2.75	-40...+80		●	●		●	31	HTB 100-P	
100	± 300	O/L	± 12...15	4 V	DC-50 (-3dB) 1)	2.75	-40...+80	●		●		●	32	HTB 100-TP	
100	± 300	O/L	+ 12...15	U_C/2 V +/- 1.667 V	DC-50 (-3dB) 1)	1.5	-25...+85		●	●		●	33	HTB 100-P/SP5	
100	± 300	O/L	+ 12...15	U_C/2 V +/- 1.667 V	DC-50 (-3dB) 1)	1.5	-25...+85	●		●		●	34	HTB 100-TP/SP5	
100	± 300	O/L	+ 5/0	2.5V or V_{ref} ±0.625V	DC-50 (-3dB) 1)	1.4	-40...+85		●		●	●	35	HASS 100-S 5)	
3 x 100	3 x ± 300	O/L	± 12...15	3 x 4 V	DC-10 (-3dB) 1)	2.7	-10...+75		●	●		●	23	HTT 100-P	TM
150	± 450	O/L	± 12...15	4 V	DC-50 (-3dB) 1)	2.75	-40...+80		●	●		●	31	HTB 150-P	
3 x 150	3 x ± 450	O/L	± 12...15	3 x 4 V	DC-10 (-3dB) 1)	2.7	-10...+75		●	●		●	23	HTT 150-P	TM
200	± 300	O/L	± 12...15	4 V	DC-8 (-1dB) 1)	3.75	-10...+70		●		●	●	39	HOP 200-SB	SC
200	± 300	O/L	+ 5/0	U_C/2 V or V_{ref} ±1.25V	DC-50 (-3dB) 1)	1.4	-40...+105		●	●		●	41	HTFS 200-P 5)	
200	± 300	O/L	+ 5/0	U_C/2 V or V_{ref} ±1.25V	DC-50 (-3dB) 1)	1.4	-40...+105		●	●		●	40	HTFS 200-P/SP2 5)	
200	± 400	O/L	± 12...15	4 V	DC-10 (-1dB) 1)	3.4	-10...+70		●		●	●	26	HTR 200-SB	SC
200	± 500	O/L	± 12...15	4 V	DC-50 (-3dB) 1)	2.75	-40...+80		●	●		●	31	HTB 200-P	

Notes:
1) Small signal bandwidth to avoid excessive core heating at high frequency
5) Ref_{IN} & Ref_{out} modes

I_{PN} = 200 A ... 300 A

I_{PN} A	I_P A	Technology	U_C V	V_{out} I_{out} @ I_{PN}	BW kHz	X @ I_{PN} T_A = 25°C %	T_A °C	Connection Primary PCB	Connection Primary Aperture, busbar, other	Connection Secondary PCB	Connection Secondary Other	UR or UL	Packaging No	Type	Features
200	± 500	O/L	+ 12...15	U_C/2 V +/- 1.667 V	DC-50 (-3dB) 1)	1.5	-25...+85		●	●		●	33	HTB 200-P/SP5	
200	± 600	O/L	± 15	4 V	DC-50 (-3dB) 1)	2.7	-10...+80		●		●	●	37	HAC 200-S	
200	± 600	O/L	± 15	4 V	DC-50 (-3dB) 1)	1.75	-25...+85		●		●	●	28	HAL 200-S	
200	± 600	O/L	± 15	4 V	DC-50 (-3dB) 1)	1.75	-25...+85		●		●	●	38	HTA 200-S	
200	± 600	O/L	± 15	4 V	DC-50 (-3dB) 1)	2.5	-10...+80		●		●	●	29	HAS 200-S	
200	± 600	O/L	± 15	4 V	DC-50 (-3dB) 1)	2.5	-10...+80		●	●		●	30	HAS 200-P	
200	± 600	O/L	± 15	4 V	DC-25 (-3dB) 1)	1.75	-40...+105		●		●	●	42	HAT 200-S	
200	± 600	O/L	+ 5/0	2.5V or V_{ref} ±0.625V	DC-50 (-3dB) 1)	1.4	-40...+85		●		●	●	35	HASS 200-S 5)	
300	± 450	O/L	± 12...15	4 V	DC-8 (-1dB) 1)	3.75	-10...+70		●		●	●	39	HOP 300-SB	SC
300	± 600	O/L	± 12...15	4 V	DC-10 (-1dB) 1)	3.4	-10...+70		●		●	●	26	HTR 300-SB	SC
300	± 600	O/L	± 12...15	4 V	DC-50 (-3dB) 1)	2.75	-40...+80		●	●		●	31	HTB 300-P	
300	± 600	O/L	+ 12...15	U_C/2 V +/- 1.667 V	DC-50 (-3dB) 1)	1.5	-25...+85		●	●		●	33	HTB 300-P/SP5	
300	± 900	O/L	± 15	4 V	DC-50 (-3dB) 1)	2.7	-10...+80		●		●	●	37	HAC 300-S	
300	± 900	O/L	± 15	4 V	DC-50 (-3dB) 1)	1.75	-25...+85		●		●	●	28	HAL 300-S	
300	± 900	O/L	± 15	4 V	DC-50 (-3dB) 1)	1.75	-25...+85		●		●	●	38	HTA 300-S	
300	± 900	O/L	± 15	4 V	DC-50 (-3dB) 1)	2.5	-10...+80		●		●	●	29	HAS 300-S	
300	± 900	O/L	± 15	4 V	DC-50 (-3dB) 1)	2.5	-10...+80		●	●		●	30	HAS 300-P	
300	± 900	O/L	+ 5/0	2.5V or V_{ref} ±0.625V	DC-50 (-3dB) 1)	1.4	-40...+85		●		●	●	35	HASS 300-S 5)	



SC = Split Core
TM = Triplet Measurement
Dedicated data sheets are the only recognized reference documents for the given performances and data – Data sheets: www.lem.com

I_{PN} = 100 A ... 150 A

DRS / REU

Closed–loop

I_{PN} A	I_P A	Technology	U_C V	V_{out} I_{out} @ I_{PN}	BW kHz	X @ I_{PN} T_A = 25°C %	T_A °C	Connection				UR or UL	Packaging No	Type	Features
								Primary		Secondary					
								PCB	Aperture, busbar, other	PCB	Other				
100	± 150	C/L	± 12...15	50 mA	DC-200 (-1dB)	0.45 [6]	-40...+85		●	●		●	24	LA 100-P	
100	± 150	C/L	± 12...15	50 mA	DC-200 (-1dB)	0.45 [6]	-40...+85	●		●		●	25	LA 100-TP	
100	± 160	C/L	± 12...15	100 mA	DC-200 (-1dB)	0.45 [6]	-25...+70		●	●		●	24	LA 100-P/ SP13	
100	± 160	C/L	± 12...15	50 mA	DC-200 (-1dB)	0.3	-25...+85	●		●		●	27	LAH 100-P	
100	± 200	C/L	± 12...15	100 mA	DC-100 (-3dB)	0.4	-40...+85		●		●	●	43	LF 205-S/SP3	
125	± 200	C/L	± 12...15	125 mA	DC-100 (-1dB)	0.8	-40...+85		●	●		●	47	LA 125-P	
125	± 200	C/L	± 12...15	62.5 mA	DC-100 (-1dB)	0.8	-25...+85		●	●		●	47	LA 125-P/SP1	
125	± 200	C/L	± 12...15	125 mA	DC-100 (-1dB)	0.8	-25...+85		●	●		●	48	LA 125-P/SP3	PC
125	± 300	C/L	± 12...15	62.5 mA	DC-100 (-1dB)	0.8	-40...+85		●	●		●	47	LA 125-P/SP4	
125	± 200	C/L	± 12...15	125 mA	DC-100 (-3dB)	0.41	-40...+85	●		●		●	49	LAH 125-P	
130	± 200	C/L	± 12...15	130 mA	DC-150 (-1dB)	0.5	-40...+85		●	●		Pending	50	LA 130-P	
130	± 200	C/L	± 12...15	65 mA	DC-150 (-1dB)	0.5	-40...+85		●	●		Pending	50	LA 130-P/SP1	
150	± 212	C/L	± 12...15	75 mA	DC-150 (-1dB)	0.5	-40...+85		●	●		Pending	51	LA 150-P	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(52)

Notes:

6) Accuracy calculated with max electrical offset instead of typical electrical offset @ U_C = ± 15 V

I_{PN} = 150 A ... 366 A

DRS / REU

Closed–loop

I_{PN} A	I_P A	Technology	U_C V	V_{out} I_{out} @ I_{PN}	BW kHz	X @ I_{PN} T_A = 25°C %	T_A °C	Connection				UR or UL	Packaging No	Type	Features
								Primary		Secondary					
								PCB	Aperture, busbar, other	PCB	Other				
150	± 212	C/L	± 12...15	150 mA	DC-150 (-1dB)	0.5	-40...+85		●	●		Pending	51	LA 150-P/SP1	
150	± 212	C/L	± 12...15	75 mA	DC-150 (-1dB)	0.5	-40...+85	●		●		Pending	52	LA 150-TP	
200	± 300	C/L	± 12...15	100 mA	DC-100 (-1dB)	0.65	-40...+85		●	●		●	47	LA 200-P	
200	± 300	C/L	± 12...15	100 mA	DC-100 (-1dB)	0.65	-25...+85		●	●		●	47	LA 200-P/SP4	
200	± 300	C/L	± 12...15	100 mA	DC-100 (-1dB)	0.45	-25...+85		●		●		53	LAF 200-S	
200	± 420	C/L	± 12...15	100 mA	DC-100 (-3dB)	0.4	-40...+85		●		●	●	43	LF 205-S	
200	± 420	C/L	± 12...15	100 mA	DC-100 (-3dB)	0.4	-40...+85		●	●		●	45	LF 205-P	
200	± 420	C/L	± 12...15	100 mA	DC-100 (-3dB)	0.4	-40...+85		●		●	●	44	LF 205-S/SP1	
200	± 420	C/L	± 12...15	100 mA	DC-100 (-3dB)	0.4	-40...+85		●	●		●	46	LF 205-P/SP1	
300	± 500	C/L	± 12...20	150 mA	DC-100 (-1dB)	0.3	-40...+85		●		●	●	54	LF 305-S	
300	± 500	C/L	± 12...20	150 mA	DC-100 (-3dB)	0.3	-40...+85		●		●	●	55	LF 305-S/ SP10	
300	± 700	C/L	± 15	150 mA	DC-50 (-3dB)	0.4	-40...+85		●		●	●	56	LA 306-S	
366	± 950	C/L	± 15	183 mA	DC-100 (-1dB)	0.3	-10...+70		●		●		57	LT 305-S	


(54) (55)


(56)


(43) (44)


(45) (46)


(49)


(57)

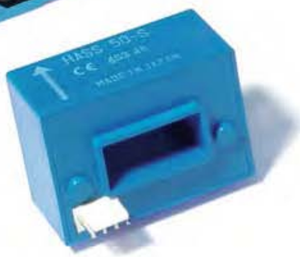

(47) (48)

PC = Pin Compatible LT 100–P

Dedicated data sheets are the only recognized reference documents for the given performances and data – Data sheets: www.lem.com

I_{PN} = 400 A ... 500 A

I_{PN} A	I_P A	Technology	U_C V	V_{out} I_{out} @ I_{PN}	BW kHz	X @ I_{PN} T_A = 25°C %	T_A °C	Connection				UR or UL	Packaging No	Type	Features
								Primary PCB	Primary Aperture, busbar, other	Secondary PCB	Secondary Other				
400	± 600	O/L	± 12...15	4 V	DC-50 (-3dB)[1]	2.75	-40...+80		●	●		●	31	HTB 400-P	
400	± 600	O/L	+ 12...15	U_C/2 V +/- 1.667 V	DC-50 (-3dB)[1]	1.5	-25...+85		●	●		●	33	HTB 400-P/SP5	
400	± 600	O/L	± 12...15	4 V	DC-8 (-1dB)[1]	3.75	-10...+70		●		●	●	39	HOP 400-SB	SC
400	± 600	O/L	+ 5/0	U_C/2 V or V_{ref} ±1.25V	DC-50 (-3dB)[1]	1.4	-40...+105		●	●		●	41	HTFS 400-P[5]	
400	± 600	O/L	+ 5/0	U_C/2 V or V_{ref} ±1.25V	DC-50 (-3dB)[1]	1.4	-40...+105		●	●		●	40	HTFS 400-P/ SP2[5]	
400	± 800	O/L	± 12...15	4 V	DC-10 (-1dB)[1]	3.4	-10...+70		●		●	●	26	HTR 400-SB	SC
400	± 900	O/L	± 15	4 V	DC-50 (-3dB)[1]	2.5	-10...+80		●		●	●	29	HAS 400-S	
400	± 900	O/L	± 15	4 V	DC-50 (-3dB)[1]	2.5	-10...+80		●	●		●	30	HAS 400-P	
400	± 900	O/L	+ 5/0	2.5V or V_{ref} ±0.625V	DC-50 (-3dB)[1]	1.4	-40...+85		●		●	●	35	HASS 400-S[5]	
400	± 1000	O/L	± 15	4 V	DC-50 (-3dB)[1]	1.75	-25...+85		●		●	●	28	HAL 400-S	
400	± 1000	O/L	± 15	4 V	DC-50 (-3dB)[1]	1.75	-25...+85		●		●	●	38	HTA 400-S	
400	± 1200	O/L	± 15	4 V	DC-50 (-3dB)[1]	2.7	-10...+80		●		●	●	37	HAC 400-S	
400	± 1200	O/L	± 15	4 V	DC-25 (-3dB)[1]	1.75	-40...+105		●		●	●	42	HAT 400-S	
500	± 750	O/L	± 12...15	4 V	DC-8 (-1dB)[1]	3.75	-10...+70		●		●	●	39	HOP 500-SB	SC
500	± 800	C/L	± 15...24	100 mA	DC-100 (-1dB)	0.3	-40...+70		●		●	●	58	LF 505-S	
500	± 800	C/L	± 15...24	100 mA	DC-100 (-1dB)	0.3	-10...+70		●		●	●	59	LF 505-S/SP15	
500	± 900	O/L	± 15	4 V	DC-50 (-3dB)[1]	2.5	-10...+80		●		●	●	29	HAS 500-S	
500	± 900	O/L	± 15	4 V	DC-50 (-3dB)[1]	2.5	-10...+80		●	●		●	30	HAS 500-P	
500	± 900	O/L	+ 5/0	2.5V or V_{ref} ±0.625V	DC-50 (-3dB)[1]	1.4	-40...+85		●		●	●	35	HASS 500-S[5]	
500	± 1000	O/L	± 12...15	4 V	DC-10 (-1dB)[1]	2.5	-10...+70		●		●	●	60	HOP 500-SB/ SP1	SC



Notes:

1) Small signal bandwidth to avoid excessive core heating at high frequency

5) Ref_{IN} & Ref_{out} modes

I_{PN} = 500 A ... 800 A

I_{PN} A	I_P A	Technology	U_C V	V_{out} I_{out} @ I_{PN}	BW kHz	X @ I_{PN} T_A = 25°C %	T_A °C	Connection				UR or UL	Packaging No	Type	Features
								Primary PCB	Primary Aperture, busbar, other	Secondary PCB	Secondary Other				
500	± 1000	O/L	± 12...15	4 V	DC-10 (-1dB)[1]	3.4	-10...+70		●		●	●	26	HTR 500-SB	SC
500	± 1000	O/L	± 15	4 V	DC-50 (-3dB)[1]	1.75	-25...+85		●		●	●	28	HAL 500-S	
500	± 1000	O/L	± 15	4 V	DC-50 (-3dB)[1]	1.75	-25...+85		●		●	●	38	HTA 500-S	
500	± 1500	O/L	± 15	4 V	DC-50 (-3dB)[1]	2.7	-10...+80		●		●	●	37	HAC 500-S	
500	± 1500	O/L	± 15	4 V	DC-25 (-3dB)[1]	1.75	-40...+105		●		●	●	42	HAT 500-S	
500	± 1500	O/L	± 15	4 V	DC-25 (-3dB)[1]	2.75	-25...+85		●		●	●	61	HAX 500-S	
600	± 900	O/L	± 12...15	4 V	DC-8 (-1dB)[1]	3.75	-10...+70		●		●	●	39	HOP 600-SB	SC
600	± 900	O/L	+ 5/0	U_C/2 V or V_{ref} ±1.25V	DC-50 (-3dB)[1]	1.4	-40...+105		●	●		●	41	HTFS 600-P[5]	
600	± 900	O/L	± 15	4 V	DC-50 (-3dB)[1]	2.5	-10...+80		●		●	●	29	HAS 600-S	
600	± 900	O/L	± 15	4 V	DC-50 (-3dB)[1]	2.5	-10...+80		●	●		●	30	HAS 600-P	
600	± 900	O/L	+ 5/0	2.5V or V_{ref} ±0.625V	DC-50 (-3dB)[1]	1.4	-40...+85		●		●	●	35	HASS 600-S[5]	
600	± 1000	O/L	± 15	4 V	DC-50 (-3dB)[1]	1.75	-25...+85		●		●	●	28	HAL 600-S	
600	± 1000	O/L	± 15	4 V	DC-50 (-3dB)[1]	1.75	-25...+85		●		●	●	38	HTA 600-S	
600	± 1800	O/L	± 15	4 V	DC-50 (-3dB)[1]	2.7	-10...+80		●		●	●	37	HAC 600-S	
600	± 1800	O/L	± 15	4 V	DC-25 (-3dB)[1]	1.75	-40...+105		●		●	●	42	HAT 600-S	
800	± 1200	O/L	+ 5/0	U_C/2 V or V_{ref} ±1.25V	DC-50 (-3dB)[1]	1.4	-40...+105		●	●		●	41	HTFS 800-P[5]	
800	± 1200	O/L	+ 5/0	U_C/2 V or V_{ref} ±1.25V	DC-50 (-3dB)[1]	1.4	-40...+105		●	●		●	40	HTFS 800-P/ SP2[5]	
800	± 1600	O/L	± 12...15	4 V	DC-10 (-1dB)[1]	2.5	-10...+70		●		●	●	60	HOP 800-SB	SC
800	± 1800	O/L	± 15	4 V	DC-50 (-3dB)[1]	2.7	-10...+80		●		●	●	37	HAC 800-S	
800	± 2400	O/L	± 15	4 V	DC-25 (-3dB)[1]	1.75	-40...+105		●		●	●	42	HAT 800-S	

SC = Split Core

Dedicated data sheets are the only recognized reference documents for the given performances and data – Data sheets: www.lem.com

I_{PN} = 500 A_{AC} ... 2000 A_{AC}

DRS / REU

Rogowski

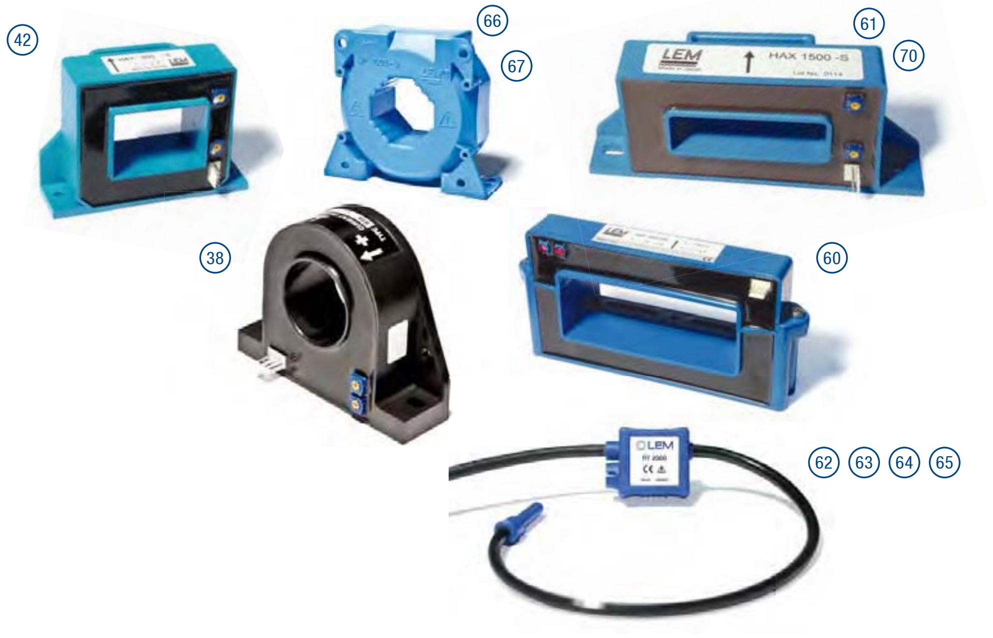
I_{PN} A_{AC}	Technology	U_C V	V_{out} I_{out} @ I_P	BW kHz	X @ I_P T_A = 25°C %	T_A °C	Connection				UR or UL	Packaging No	Type	Features
							Primary		Secondary					
							PCB	Aperture, busbar, other	PCB	Other				
500	Rogowski	Self powered	2.π.M. f.I_{PAC} V 3) 4) M.dI_P/dt V 2) 4)	700 (+3dB)	0.65 4) 7)	-10...+65		Split core Ø 55 mm Max		1.5 m cable	●	62	RT 500	
500	Rogowski	Self powered	2.π.M. f.I_{PAC} V 3) 4) M.dI_P/dt V 2) 4)	700 (+3dB)	0.80 4) 7)	-10...+65		Split core Ø 55 mm Max		3 m cable	●	63	RT 500/SP1	
2000	Rogowski	Self powered	2.π.M. f.I_{PAC} V 3) 4) M.dI_P/dt V 2) 4)	500 (+3dB)	0.65 4) 7)	-10...+65		Split core Ø 125 mm Max		1.5 m cable	●	64	RT 2000	
2000	Rogowski	Self powered	2.π.M. f.I_{PAC} V 3) 4) M.dI_P/dt V 2) 4)	430 (+3dB)	0.8 4) 7)	-10...+65		Split core Ø 125 mm Max		3 m cable	●	65	RT 2000/SP1	

I_{PN} = 1000 A ... 2000 A

Open–loop

Closed–loop

I_{PN} A	I_P A	Technology	U_C V	V_{out} I_{out} @ I_{PN}	BW kHz	X @ I_{PN} T_A = 25°C %	T_A °C	Connection				UR or UL	Packaging No	Type	Features
								Primary		Secondary					
								PCB	Aperture, busbar, other	PCB	Other				
1000	± 1000	O/L	± 15	4 V	DC-50 (-3dB) 1)	1.75	-25...+85		●		●	●	38	HTA 1000-S	
1000	± 1500	C/L	± 15…24	200 mA	DC-150 (-1dB)	0.3	-40...+85		●		●	●	66	LF 1005-S	
1000	± 1500	C/L	± 15…24	200 mA	DC-150 (-1dB)	0.3	-10...+85		●		●	●	67	LF 1005-S/SP22	
1000	± 2000	O/L	± 12…15	4 V	DC-10 (-1dB) 1)	2.5	-10...+70		●		●	●	60	HOP 1000-SB	SC
1000	± 2500	O/L	± 15	4 V	DC-25 (-3dB) 1)	1.75	-40...+105		●		●	●	42	HAT 1000-S	
1000	± 3000	O/L	± 15	4 V	DC-25 (-3dB) 1)	2.75	-25...+85		●		●	●	61	HAX 1000-S	
1200	± 2500	O/L	± 15	4 V	DC-25 (-3dB) 1)	1.75	-40...+105		●		●	●	42	HAT 1200-S	
1500	± 2500	O/L	± 15	4 V	DC-25 (-3dB) 1)	1.75	-40...+105		●		●	●	42	HAT 1500-S	
1500	± 3000	O/L	± 12…15	4 V	DC-10 (-1dB) 1)	2.5	-10...+70		●		●	●	60	HOP 1500-SB	SC
1500	± 4500	O/L	± 15	4 V	DC-25 (-3dB) 1)	2.75	-25...+85		●		●	●	61	HAX 1500-S	
2000	± 3000	O/L	± 12…15	4 V	DC-10 (-1dB) 1)	2.5	-10...+70		●		●	●	60	HOP 2000-SB	SC
2000	± 3000	O/L	± 12…15	4 V	DC-4 (-1dB) 1)	2.5	-10...+70		●		●	●	68	HOP 2000-SB/SP1	SC
2000	± 3000	C/L	± 15…24	400 mA	DC-100 (-1dB)	0.2	-40...+85		●		●	●	69	LF 2005-S	



Notes:
1) Small signal bandwidth to avoid excessive core heating at high frequency
2) Instantaneous
3) For sinusoidal wave (f in Hz)
4) M= Transfer ratio 0.064 µH (+/– 5%): RT models are provided with up to 5 % manufacturing tolerance
7) Max positioning error
8) 40 A_{RMS}
9) X_G = Global accuracy

I_{PN} = 2000 A ... 20000 A

DRS / REU

Open–loop

Closed–loop

Fluxgate

I_{PN} A	I_P A	Technology	U_C V	V_{out} I_{out} @ I_{PN}	BW kHz	X @ I_{PN} T_A = 25°C %	T_A °C	Connection				UR or UL	Packaging No	Type	Features
								Primary		Secondary					
								PCB	Aperture, busbar, other	PCB	Other				
2000	± 5500	O/L	± 15	4 V	DC-25 (-3dB) 1)	2.75	-25...+85		●		●	●	61	HAX 2000-S	
2000	± 5500	O/L	± 15	4 V	DC- 25(-1dB) 1)	2.75	-10...+80		●		●		70	HAXC 2000-S	
2500	± 5500	O/L	± 15	4 V	DC-25 (-3dB) 1)	2.75	-25...+85		●		●	●	61	HAX 2500-S	
4000	± 4000	O/L	± 15	10 V	DC-3 (-3dB) 1)	2	-25...+85		●		●		71	HAZ 4000-SB	
4000	± 4000	O/L	± 15	20 mA	DC-3 (-3dB) 1)	2	-25...+85		●		●		71	HAZ 4000-SBI	
4000	± 4000	O/L	± 15	4 mA @ -I_{PN} 20 mA @ +I_{PN}	DC-3 (-3dB) 1)	2	-25...+85		●		●		71	HAZ 4000-SBI/ SP1	
4000	± 6000	C/L	± 24	800 mA	DC-100 (-1dB)	0.3	-25...+70		●		●		72	LT 4000-S	
4000	± 6000	C/L	± 24	800 mA	DC-100 (-1dB)	0.3	-25...+70		●		●		73	LT 4000-T	
4000	± 12000	Fluxgate IT	± 24	1600 mA	DC- 50(1dB) 8)	0.06 9)	-40...+70		●		●		74	ITL 4000-S	
6000	± 6000	O/L	± 15	10 V	DC-3 (-3dB) 1)	2	-25...+85		●		●		71	HAZ 6000-SB	
6000	± 6000	O/L	± 15	20 mA	DC-3 (-3dB) 1)	2	-25...+85		●		●		71	HAZ 6000-SBI	
6000	± 6000	O/L	± 15	4 mA @ -I_{PN} 20 mA @ +I_{PN}	DC-3 (-3dB) 1)	2	-25...+85		●		●		71	HAZ 6000-SBI/ SP1	
10000	± 10000	O/L	± 15	10 V	DC-3 (-3dB) 1)	2	-25...+85		●		●		71	HAZ 10000-SB	
10000	± 10000	O/L	± 15	20 mA	DC-3 (-3dB) 1)	2	-25...+85		●		●		71	HAZ 10000-SBI	
10000	± 10000	O/L	± 15	4 mA @ -I_{PN} 20 mA @ +I_{PN}	DC-3 (-3dB) 1)	2	-25...+85		●		●		71	HAZ 10000-SBI/ SP1	
10000	± 15000	C/L	± 48…60	1 A	DC-100 (-1dB)	0.3	-25...+70		●		●		75	LT 10000-S	
12000	± 12000	O/L	± 15	10 V	DC-3 (-3dB) 1)	2	-25...+85		●		●		71	HAZ 12000-SB	
12000	± 12000	O/L	± 15	20 mA	DC-3 (-3dB) 1)	2	-25...+85		●		●		71	HAZ 12000-SBI	
12000	± 12000	O/L	± 15	4 mA @ -I_{PN} 20 mA @ +I_{PN}	DC-3 (-3dB) 1)	2	-25...+85		●		●		71	HAZ 12000-SBI/ SP1	
14000	± 14000	O/L	± 15	10 V	DC-3 (-3dB) 1)	2	-25...+85		●		●		71	HAZ 14000-SB	
14000	± 14000	O/L	± 15	20 mA	DC-3 (-3dB) 1)	2	-25...+85		●		●		71	HAZ 14000-SBI	
14000	± 14000	O/L	± 15	4 mA @ -I_{PN} 20 mA @ +I_{PN}	DC-3 (-3dB) 1)	2	-25...+85		●		●		71	HAZ 14000-SBI/ SP1	
20000	± 20000	O/L	± 15	10 V	DC-3 (-3dB) 1)	2	-25...+85		●		●		71	HAZ 20000-SB	
20000	± 20000	O/L	± 15	20 mA	DC-3 (-3dB) 1)	2	-25...+85		●		●		71	HAZ 20000-SBI	
20000	± 20000	O/L	± 15	4 mA @ -I_{PN} 20 mA @ +I_{PN}	DC-3 (-3dB) 1)	2	-25...+85		●		●		71	HAZ 20000-SBI/ SP1	

SC = Split Core

Dedicated data sheets are the only recognized reference documents for the given performances and data – Data sheets: www.lem.com

I_{PN} = 2 A ... 2000 A

DRS / REU

CT

PRIME

Signal conditioning type	I_{PN} A	Technology	U_C V	BW kHz	X @ I_{PN} T_A = 25 °C %	T_A °C	Aperture mm	Split Core	DIN Rail	Output	UR or UL	Packaging No	Type	Features
AC instantaneous	50	CT	Self powered	0.05…0.06	1	-20...+70	ø 8	●		0-16mA	■	155	TT 50-SD	
	100	CT	Self powered	0.05…0.06	1	-20...+70	ø 16	●		0-33mA	■	156	TT 100-SD	
AC RMS	5, 10, 20, 50, 100, 150	CT	Self powered	0.05…0.06	1.5 a)	-20...+60	ø 16	●		0-5/10 V_{DC}	■	157	AT 5..150 B5/10	RMS (average) output
	5, 10, 20, 50, 100, 150	CT	Loop powered +20…30 V_{DC}	0.05…0.06	1.5 a)	-20...+60	ø 16	●		4-20 mA_{DC}	■	158	AT 5..150 B420L	RMS (average) output
	10, 20, 50, 100, 150, 200	CT	Self powered	0.05…0.06	1	-20...+50	21.7 x 21.7	●	○	0-10 V_{DC}	▲	159	AK 50..200 B10	RMS (average) output
	2, 5, 10, 20, 50, 100, 150, 200	CT	Loop powered +24 V_{DC}	0.02…0.1	1	-20...+50	21.7 x 21.7	●	○	4-20 mA_{DC}	▲	159	AK 5..200 B420L	RMS (average) output
	10, 20, 50, 100, 150, 200	CT	Self powered	0.05…0.06	1	-20...+50	ø 19		○	0-10 V_{DC}	▲	161	AK 50..200 C10	RMS (average) output
	2, 5, 10, 20, 50, 100, 150, 200	CT	Loop powered +24 V_{DC}	0.02…0.1	1	-20...+50	ø 19		○	4-20 mA_{DC}	▲	161	AK 5..200 C420L	RMS (average) output
	10, 25, 50, 75, 100, 150, 200, 300, 400	PRiME	+24 V_{DC}	0.03…2	1 a)	-20...+60	ø 18.5	●	●	0-5/10 V_{DC}	▲	162	AP 50..400 B5/10	RMS output (average) 0-5/10 V_{DC} switch selectable voltage output Switch selectable measuring ranges
	10, 25, 50, 75, 100, 150, 200, 300, 400	PRiME	Loop powered +12…24 V_{DC}	0.03…2	1 a)	-20...+60	ø 18.5	●	●	4-20 mA_{DC}	▲	163	AP 50..400 B420L	RMS output (average) Switch selectable measuring ranges
AC True RMS	2, 5, 10, 20, 50, 100, 150, 200	CT	Loop powered +24 V_{DC}	0.01…0.4	1	-20...+50	21.7 x 21.7	●	○	4-20 mA_{DC}	▲	160	AKR 5..200 B420L	True RMS output Switch selectable measuring ranges
	2, 5, 10, 20, 50, 100, 150, 200	CT	Loop powered +24 V_{DC}	0.01…0.4	1	-20...+50	ø 19		○	4-20 mA_{DC}	▲	161	AKR 5..200 C420L	True RMS output Switch selectable measuring ranges
	10, 25, 50, 75, 100, 150, 200, 300, 400	PRiME	+24 V_{DC}	0.03…6	1 a)	-20...+60	ø 18.5	●	●	0-5/10 V_{DC}	▲	162	APR 50..400 B5/10	True RMS output (average) 0-5/10 V_{DC} switch selectable voltage output Switch selectable measuring ranges
	10, 25, 50, 75, 100, 150, 200, 300, 400	PRiME	Loop powered +12..24 V_{DC}	0.03…6	1 a)	-20...+60	ø 18.5	●	●	4-20 mA_{DC}	▲	163	APR 50..400 B420L	True RMS output Switch selectable measuring ranges
	375, 500, 750	CT	Loop powered +24 V_{DC}	0.01…0.4	1	-20...+50	ø 76			4-20 mA_{DC}		164	AKR 750 C420L J	True RMS output Switch selectable measuring ranges
	1000, 1333, 2000	CT	Loop powered +24 V_{DC}	0.01…0.4	1	-20...+50	ø 76			4-20 mA_{DC}		164	AKR 2000 C420L J	True RMS output Switch selectable measuring ranges

Notes:
- a) Excluding offset
- b) 2% for 400 A model
- ○ with adapter
- ▲ UL listed
- ■ recognized

(157)
(158)

(155) (156)

(164)

(168)

(161)

I_{PN} = 5 A ... 20000 A

DRS / REU

Open–loop

Signal conditioning type	I_{PN} A	Technology	U_C V	BW kHz	X @ I_{PN} T_A = 25 °C %	T_A °C	Aperture mm	Split Core	DIN Rail	Output	UR or UL	Packaging No	Type	Features
DC & AC True RMS	100, 200, 300, 400, 500, 600, 1000	O/L	+20..50 V_{DC}	DC & 0.02…6	1 a)	-40...+70	ø 32			0-5/10 V_{DC}	▲	165	DHR 100..1000 C5/10	UL from 100 to 400 A True RMS output
	100, 200, 300, 400, 500, 600, 1000	O/L	+20..50 V_{DC}	DC & 0.02…6	1 a)	-40...+70	ø 32			4-20 mA_{DC}	▲	165	DHR 100..1000 C420	UL from 100 to 400 A True RMS output
	500, 800, 1000, 1500, 2000	O/L	+20..50 V_{DC}	DC & 0.02…6	1 a)	-40...+70	104 x 40	●		0-5/10 V_{DC}		166	AHR 500..2000 B5/10	True RMS output
	500, 800, 1000, 1500, 2000	O/L	+20..50 V_{DC}	DC & 0.02…6	1 a)	-40...+70	104 x 40	●		4-20 mA_{DC}		166	AHR 500..2000 B420	True RMS output
	4k, 6k, 10k, 12k, 14k, 20k	O/L	+/- 15 V_{DC}	DC & 0.015…3	1 a)	-25...+85	162 x 42			0-10 V_{DC}		71	HAZ 4000..20000 -SRU	True RMS output
	4k, 6k, 10k, 12k, 14k, 20k	O/L	+/- 15 V_{DC}	DC & 0.015…3	1 a)	-25...+85	162 x 42			0-20 mA_{DC}		71	HAZ 4000..20000 -SRI	True RMS output
	4k, 6k, 10k, 12k, 14k, 20k	O/L	+/- 15 V_{DC}	DC & 0.015…3	1 a)	-25...+85	162 x 42			4-20 mA_{DC}		71	HAZ 4000..20000 -SRI/SP1	True RMS output
DC	50, 75, 100, 150, 200, 225, 300, 400	O/L	+20..45 V_{DC}	DC	2	-20...+50	21.7 x 21.7	●	○	0-5/10 V_{DC}		167	DK 100..400 B5/10	Magnitude only - Not the direction Switch selectable measuring ranges Unipolar voltage output
	50, 75, 100, 150, 200, 225, 300, 400	O/L	+20..45 V_{DC}	DC	2	-20...+50	21.7 x 21.7	●	○	4-20 mA_{DC}		167	DK 100..400 B420	Magnitude only - Not the direction - 4 mA at Ip=0 Switch selectable measuring ranges Unipolar current output
	50, 75, 100, 150, 200, 225, 300, 400	O/L	+20..45 V_{DC}	DC	2	-20...+50	21.7 x 21.7	●	○	0-20 mA_{DC}		167	DK 100..400 B020	Magnitude only - Not the direction - 0 mA at Ip=0 Switch selectable measuring ranges Unipolar current output
DC Bipolar	50, 75, 100, 150, 200, 225, 300, 400	O/L	+20..45 V_{DC}	DC	1 b)	-20...+50	21.7 x 21.7	●	○	4-20 mA_{DC}		167	DK 100..400 B420 B	DC bipolar measurement (magnitude and direction) 12 mA at Ip = 0
	5, 10, 20, 50, 75, 100	O/L	+20..45 V_{DC}	DC	1	-20...+50	ø 19.1		○	4-20 mA_{DC}		168	DK 20..100 C420 B	DC bipolar measurement (magnitude and direction) 12 mA at Ip = 0
	500, 800, 1000, 1500, 2000	O/L	Loop powered +20…30 V_{DC}	DC	1 a)	-10...+70	104 x 40	●		4-20 mA		169	DH 500..2000 B420L B	DC bipolar measurement (magnitude and direction) 12 mA at Ip = 0

(166) (169)

(165)

(162) (163)

(71)

(159) (160) (167)

V_{PN} = 10 V ... 2500 V

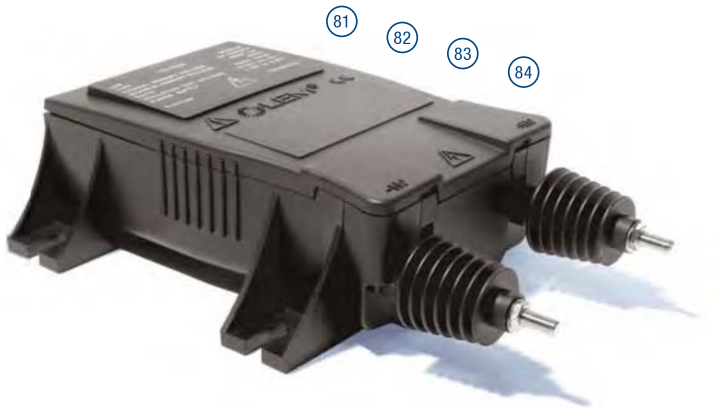
DRS / REU Closed–loop

I_{PN} (V_{PN}) mA	I_P (V_P) mA	Technology	U_C V	I_{out} @ I_{PN}	BW kHz	X_G T_A = 25 °C % @ I_{PN} with max offset taken	T_A °C	UR or UL	Packaging No	Type
10 (10 to 500 V)	± 14 (700 V)	C/L	± 12...15	25 mA	Note c)	0.9	0...+70	●	76	LV 25-P d)
10 (100 to 2500 V)	± 20 (5000 V)	C/L	± 15	50 mA	Note c)	0.7	0...+70		77	LV 100 e)

V_{PN} = 50 V ... 400 V

IDT Closed–loop Fluxgate

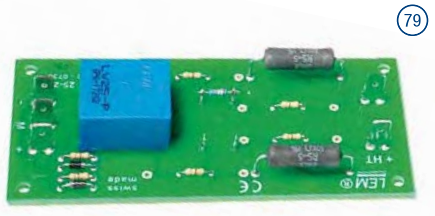
±V_{PN} V	±V_P V	Technology	U_C V	V_{out} I_{out} @ V_{PN}	BW kHz	X_G T_A = 25 °C % @ V_{PN} with max offset taken	T_A °C	UR or UL	Packaging No	Type	Connection primary	Connection secondary
50	75	Insulating digital technology	± 15...24	50 mA	DC-14 (-3dB)	0.5	-40...+85		78	DVL 50	2 x M5	3 x M5 + Faston
125	188	Insulating digital technology	± 15...24	50 mA	DC-14 (-3dB)	0.5	-40...+85		78	DVL 125	2 x M5	3 x M5 + Faston
150	225	Insulating digital technology	± 15...24	50 mA	DC-14 (-3dB)	0.5	-40...+85		78	DVL 150	2 x M5	3 x M5 + Faston
250	375	Insulating digital technology	± 15...24	50 mA	DC-14 (-3dB)	0.5	-40...+85		78	DVL 250	2 x M5	3 x M5 + Faston
200	300	C/L	± 12...15	25 mA	Note c)	0.9	-25...+70	O	79	LV 25-200	Faston	Faston
400	600	C/L	± 12...15	25 mA	Note c)	0.9	-25...+70	O	79	LV 25-400	Faston	Faston
140	200	Fluxgate "C"	± 15	10 V/200 V	DC-300 (-1dB)	0.2 @ Vp	-40...+85		80	CV 3-200	2 x M5	4 x M5
350	500	Fluxgate "C"	± 15	10 V/500 V	DC-300 (-1dB)	0.2 @ Vp	-40...+85		80	CV 3-500	2 x M5	4 x M5



V_{PN} = 500 V ... 4200 V

DRS / REU IDT Closed–loop Fluxgate

±V_{PN} V	±V_P V	Technology	U_C V	V_{out} I_{out} @ V_{PN}	BW kHz	X_G T_A = 25 °C % @ V_{PN} with max offset taken	T_A °C	UR or UL	Packaging No	Type	Connection primary	Connection secondary
500	750	Insulating digital technology	± 15...24	50 mA	DC-14 (-3dB)	0.5	-40...+85		78	DVL 500	2 x M5	3 x M5 + Faston
750	1125	Insulating digital technology	± 15...24	50 mA	DC-14 (-3dB)	0.5	-40...+85		78	DVL 750	2 x M5	3 x M5 + Faston
1000	1500	Insulating digital technology	± 15...24	50 mA	DC-14 (-3dB)	0.5	-40...+85		78	DVL 1000	2 x M5	3 x M5 + Faston
1000	1500	Insulating digital technology	± 15...24	50 mA	DC-12 (3dB)	0.3	-40...+85		81	DV 1000	Cable	Cable
1200	1800	Insulating digital technology	± 15...24	50 mA	DC-12 (3dB)	0.3	-40...+85		82	DV 1200/SP2	Cable	M5 + Faston
1500	2250	Insulating digital technology	± 15...24	50 mA	DC-14 (-3dB)	0.5	-40...+85		78	DVL 1500	2 x M5	3 x M5 + Faston
1500	2250	Insulating digital technology	± 15...24	50 mA	DC-12 (3dB)	0.3	-40...+85		82	DV 1500	Cable	M5 + Faston
2000	3000	Insulating digital technology	± 15...24	50 mA	DC-14 (-3dB)	0.5	-40...+85		78	DVL 2000	2 x M5	3 x M5 + Faston
2000	3000	Insulating digital technology	± 15...24	50 mA	DC-12 (3dB)	0.3	-40...+85		81	DV 2000	Cable	Cable
2000	3000	Insulating digital technology	± 15...24	50 mA	DC-12 (3dB)	0.3	-40...+85		82	DV 2000/SP1	Cable	M5 + Faston
2000	3000	Insulating digital technology	± 15...24	50 mA	DC-12 (3dB)	0.3	-40...+85		83	DV 2000/SP2	M5	M5
2800	4200	Insulating digital technology	± 15...24	50 mA	DC-12 (3dB)	0.3	-40...+85		84	DV 2800/SP4	M5	M5
3000	4500	Insulating digital technology	± 15...24	50 mA	DC-12 (3dB)	0.35	-40...+85		84	DV 3000/SP1	M5	M5
4200	6000	Insulating digital technology	± 15...24	50 mA	DC-12 (3dB)	0.3	-40...+85		81	DV 4200/SP3	Cable	Cable
4200	6000	Insulating digital technology	± 15...24	50 mA	DC-12 (3dB)	0.3	-40...+85		84	DV 4200/SP4	M5	M5
600	900	C/L	± 12...15	25 mA	Note c)	0.9	-25...+70		79	LV 25-600	Faston	Faston
800	1200	C/L	± 12...15	25 mA	Note c)	0.9	-25...+70		79	LV 25-800	Faston	Faston
1000	1500	C/L	± 12...15	25 mA	Note c)	0.9	-25...+70		79	LV 25-1000	Faston	Faston
1200	1800	C/L	± 12...15	25 mA	Note c)	0.9	-25...+70	●	79	LV 25-1200	Faston	Faston
2500	3750	C/L	± 15	50 mA	Note c)	0.9	0...+70		85	LV 100-2500	2 x M5	3 x M5 + Faston
3000	4500	C/L	± 15	50 mA	Note c)	0.9	0...+70		85	LV 100-3000	2 x M5	3 x M5 + Faston
3500	4500	C/L	± 15	50 mA	Note c)	0.9	0...+70		85	LV 100-3500	2 x M5	3 x M5 + Faston
4000	6000	C/L	± 15	50 mA	Note c)	0.9	0...+70		85	LV 100-4000	2 x M5	3 x M5 + Faston
700	1000	Fluxgate "C"	± 15	10 V/1000 V	DC-500 (-1dB @ 50 % V_{PN})	0.2 @ V_P	-40...+85		80	CV 3-1000	2 x M5	4 x M5
840	1200	Fluxgate "C"	± 15	10 V/1200 V	DC-800 (-1dB @ 40% V_{PN})	0.2 @ V_P	-40...+85		80	CV 3-1200	2 x M5	4 x M5
1000	1500	Fluxgate "C"	± 15	10 V/1500 V	DC-800 (-1dB @ 33% V_{PN})	0.2 @ V_P	-40...+85		80	CV 3-1500	2 x M5	4 x M5
1400	2000	Fluxgate "C"	± 15	10 V/2000 V	DC-300 (-1dB @ 25% V_{PN})	0.2 @ V_P	-40...+85		80	CV 3-2000	2 x M5	4 x M5



Notes:

c) See response time in individual data sheet

d) The primary and secondary connections of this transducer are done on PCB

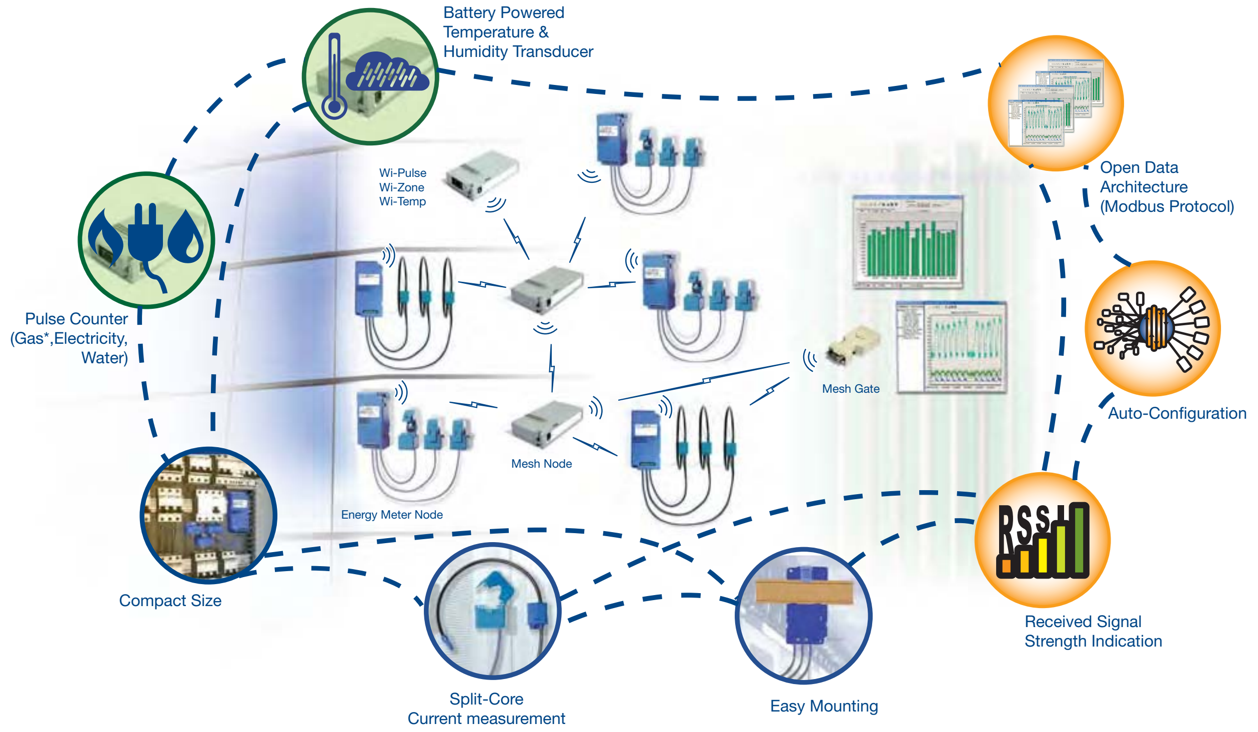
e) Mechanical Mounting

o) Recognition pending

Dedicated data sheets are the only recognized reference documents for the given performances and data – Data sheets: www.lem.com

Wi-LEM

Wireless Local Energy Meter



- Comprehensive Monitoring Solution
- Cut Installation Costs
- Easy Commissioning

Applications :

- Establish the breakdown of energy use (where does it all go?)
- Allocate energy wastes to users
- Determine efficiency of equipment
- Audit before & after energy use for retrofit projects
- Manage the load profile (peak demand)
- Maintenance and Entreprise Asset Management

* an additional intrinsic safety barrier module is needed

Wi-LEM COMPONENTS

Energy Meter Node (EMN):

Single or three phase energy meter with embedded wireless data transmission module

Measurement ranges:
- Current from 20 to 2000 A
- Voltage from 90 to 500 VAC

Measurement values:

	Interval Based Values (5 to 30 minutes Configurable Reading Intervals)										Cummulated Values			
	L1			L2			L3			SUM	L1	L2	L3	SUM
	Avg	Min	Max	Avg	Min	Max	Avg	Min	Max					
Current (A)			🟧			🟧			🟧					
Voltage (V)		🟧			🟧			🟧						
Active Energy (kWh)	🟧			🟧			🟧			🟧	🟧	🟧	🟧	🟧
Reactive Energy (kVarh)	🟧			🟧			🟧			🟧	🟧	🟧	🟧	🟧
Apparent Energy (kVA)	🟧			🟧			🟧			🟧	🟧	🟧	🟧	🟧
Frequency										🟧				

Wi-Pulse:

A transducer that counts and transmits pulses coming from meters like water or gas*

Wi-Zone:

Temperature and Humidity transducer

Wi-Temp:

Two inputs thermistors based temperature sensors

Mesh Gate:

A gateway managing the mesh network (up to 200 Nodes).
It provides data through serial interface to a PC or RTU

Mesh Node:

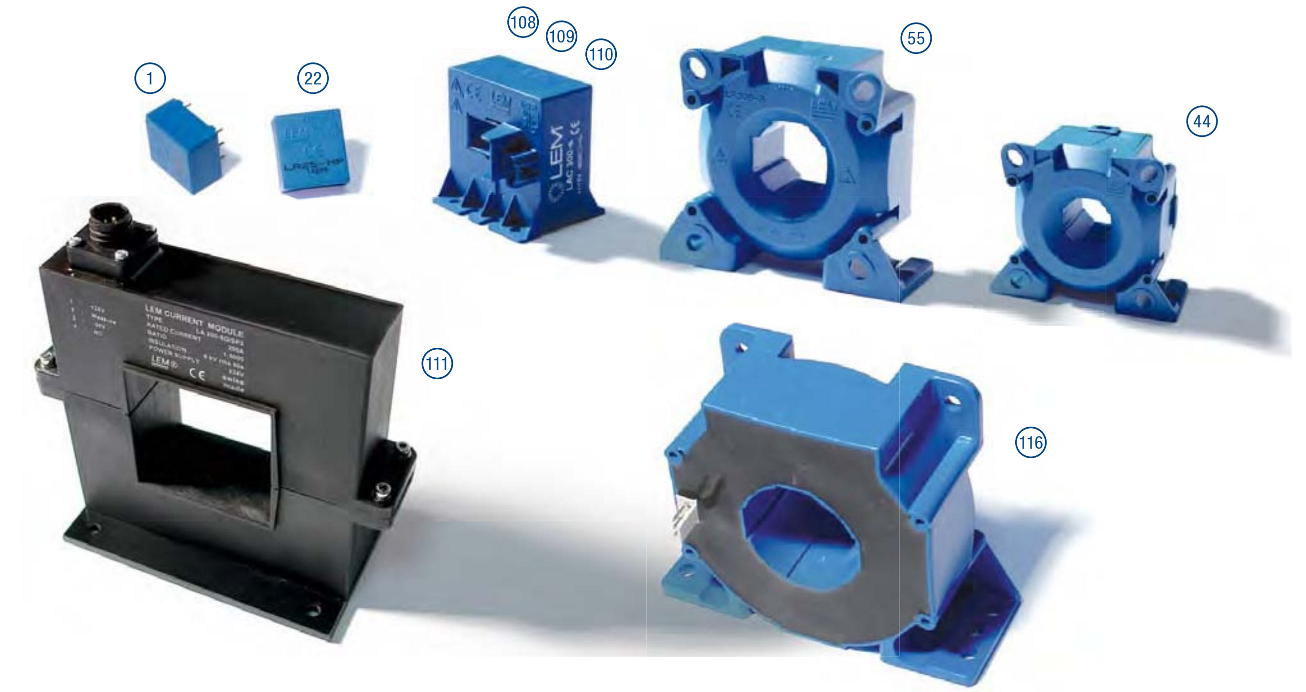
Repeater linking various Nodes. They enable wireless communication throughout a large installation

I_{PN} = 0.4 A ... 400 A

TTR - On-Board

Closed–loop

I_{PN} A	I_P A	Technology	U_C V	V_{out} I_{out} @ I_{PN}	BW kHz	X @ I_{PN} T_A = 25 °C %	X_G @ I_{PN} T_A = 25 °C %	T_A °C	Connection				UR or UL	Packaging No	Type	Features
									Primary		Secondary					
									PCB	Aperture, busbar, other	PCB	Other				
0.4	± 0.85	C/L	± 15	30 mA	DC-150 (-1dB)	0.5	0.8	-40...+85	●		●		●	1	LA 25-NP/SP38	
1.5	± 2.2	C/L	± 15	24 mA	DC-150 (-1dB)	0.5	0.9	-40...+85	●		●		●	1	LA 25-NP/SP34	
2	± 2.5	C/L	± 15	40 mA	DC-150 (-1dB)	0.5	0.7	-40...+85	●		●		●	1	LA 25-NP/SP39	
5	± 7	C/L	± 15	25 mA	DC-150 (-1dB)	0.5	0.9	-40...+85	●		●		●	22	LA 25-NP/SP25	
6	± 9	C/L	± 15	24 mA	DC-150 (-1dB)	0.5	0.9	-40...+85	●		●		●	22	LA 25-NP/SP25	
8	± 12	C/L	± 15	24 mA	DC-150 (-1dB)	0.5	0.9	-40...+85	●		●		●	22	LA 25-NP/SP25	
12	± 18	C/L	± 15	24 mA	DC-150 (-1dB)	0.5	0.9	-40...+85	●		●		●	22	LA 25-NP/SP25	
25	± 36	C/L	± 15	25 mA	DC-150 (-1dB)	0.5	0.9	-40...+85	●		●		●	22	LA 25-NP/SP25	
100	± 200	C/L	± 12…15	100 mA	DC-100 (-3dB)	0.4	0.6	-40...+85		Ø 15.5 mm		Molex	●	44	LF 205-S/SP5	Molex Minifit 5566
130	± 1000	C/L	± 24	65 mA	DC-50 (-3dB)	0.5	1.45	-40...+85		Aperture 13x30 mm		Molex	●	108	LAC 300-S/ SP5	Molex 70543-0003
200	± 400	C/L	± 24	50 mA	DC-50 (-3dB)	0.5	1	-40...+85		Aperture 13x30 mm		Cable	●	110	LAC 300-S/ SP8	
200	± 420	C/L	± 12…15	100 mA	DC-100 (-3dB)	0.4	0.5	-40...+85		Ø 15.5 mm		Molex	●	44	LF 205-S/SP1	Molex Minifit 5566
200	± 500	C/L	± 24	40 mA	DC-100 (-1dB)	0.7	1	-30...+70		Split core Aperture 67x67 mm		AMP		111	LA 200-SD/ SP3	AMP CPC 11/4
200	± 700	C/L	± 15	100 mA	DC-50 (-3dB)	0.5	1.25	-40...+85		Aperture 13x30 mm		Molex	●	108	LAC 300-S/ SP1	Molex 70543-0003
300	± 500	C/L	± 12…20	150 mA	DC-100 (-3dB)	0.3	0.47	-40...+85		Ø 20 mm		Molex	●	55	LF 305-S/SP10	Molex Minifit 5566
300	± 640	C/L	± 15	100 mA	DC-50 (-3dB)	0.4	1	-40...+85		Aperture 13x30 mm		Molex	●	108	LAC 300-S/ SP2	Molex 70543-0003
300	± 910	C/L	± 24	60 mA	DC-50 (-3dB)	0.5	1.4	-40...+85		Aperture 13x30 mm		Molex	●	108	LAC 300-S/ SP4	Molex 70543-0003
400	± 600	C/L	± 15	80 mA	DC-50 (-3dB)	0.4	1.1	-40...+85		Aperture 13x30 mm		Molex	●	108	LAC 300-S/ SP3	Molex 70543-0003

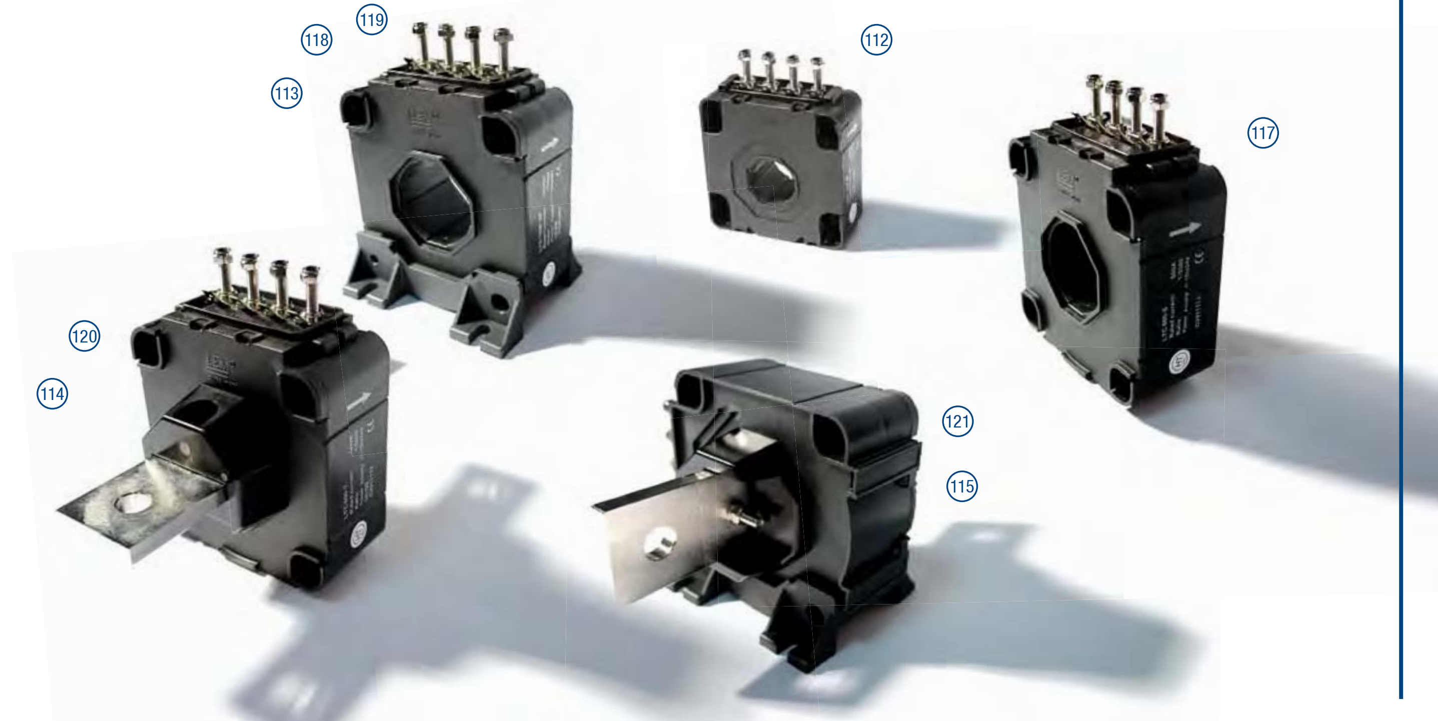


I_{PN} = 400 A ... 500 A

TTR - On-Board

Closed–loop

I_{PN} A	I_P A	Technology	U_C V	V_{out} I_{out} @ I_{PN}	BW kHz	X @ I_{PN} T_A = 25 °C %	X_G @ I_{PN} T_A = 25 °C %	T_A °C	Connection				UR or UL	Packaging No	Type	Features
									Primary		Secondary					
									PCB	Aperture, busbar, other	PCB	Other				
400	± 650	C/L	± 15	100 mA	DC-50 (-3dB)	0.4	1	-40...+85		Aperture 13x30 mm		Molex	●	108	LAC 300-S	Molex 70543-0003
400	± 1000	C/L	± 15	133 mA	DC-50 (-3dB)	0.4	1.2	-40...+75		Aperture 13x30 mm		Cable	●	109	LAC 300-S/ SP7	
350	± 1200	C/L	± 15…24	175 mA	DC-100 (-1dB)	0.3	0.5	-40...+85		Ø 27.5 mm		4 x M5		112	LTC 350-S	Screen
350	± 1200	C/L	± 15…24	175 mA	DC-100 (-1dB)	0.3	0.5	-40...+85		Ø 27.5 mm		4 x M5 + Faston		113	LTC 350-SF	With feet Screen
350	± 1200	C/L	± 15…24	175 mA	DC-100 (-1dB)	0.3	0.5	-40...+85		Busbar		4 x M5 + Faston		114	LTC 350-T	Screen
350	± 1200	C/L	± 15…24	175 mA	DC-100 (-1dB)	0.3	0.5	-40...+85		Busbar		4 x M5 + Faston		115	LTC 350-TF	With feet Screen
500	± 700	C/L	± 24	100 mA	DC-100 (-1dB)	0.4	1	-30...+70		Split core Aperture 67x67 mm		AMP		111	LA 500-SD/ SP2	AMP CPC 11/4
500	± 1000	C/L	± 24	100 mA	DC-100 (-1dB)	0.3	0.6	-40...+85		Ø 30.2 mm		Cable	●	116	LF 505-S/ SP23	Screen
500	± 1200	C/L	± 15…24	125 mA	DC-100 (-1dB)	0.4	0.6	-40...+85		Ø 27.5 mm		4 x M5 + Faston		112	LTC 500-S	Screen
500	± 1200	C/L	± 15…24	125 mA	DC-100 (-1dB)	0.4	0.6	-40...+85		Ø 27.5 mm		4 x M5 + Faston		113	LTC 500-SF	With feet Screen
500	± 1200	C/L	± 15…24	125 mA	DC-100 (-1dB)	0.4	0.6	-40...+85		Busbar		4 x M5 + Faston		114	LTC 500-T	Screen
500	± 1200	C/L	± 15…24	125 mA	DC-100 (-1dB)	0.4	0.6	-40...+85		Busbar		4 x M5 + Faston		115	LTC 500-TF	With feet Screen
500	± 1500	C/L	± 15…24	100 mA	DC-100 (-1dB)	0.3	0.7	-40...+85		Ø 42 mm		4 x M5 + Faston	●	117	LTC 600-S	Screen
500	± 1500	C/L	± 15…24	100 mA	DC-100 (-1dB)	0.3	0.7	-40...+85		Ø 42 mm		4 x M5 + Faston	●	118	LTC 600-SF	With feet Screen
500	± 1500	C/L	± 15…24	100 mA	DC-100 (-1dB)	0.3	0.7	-40...+85		Ø 42 mm		4 x M5 + Faston	●	119	LTC 600-SFC	With feet + clamp Screen
500	± 1500	C/L	± 15…24	100 mA	DC-100 (-1dB)	0.3	0.7	-40...+85		Busbar		4 x M5 + Faston	●	120	LTC 600-T	Screen
500	± 1500	C/L	± 15…24	100 mA	DC-100 (-1dB)	0.3	0.7	-40...+85		Busbar		4 x M5 + Faston	●	121	LTC 600-TF	With feet Screen



Dedicated data sheets are the only recognized reference documents for the given performances and data – Data sheets: www.lem.com

I_{PN} = 1000 A ... 2000 A

TTR

Open–loop Closed–loop Fluxgate

I_{PN} A	I_P A	Technology	U_C V	V_{out} I_{out} @ I_{PN}	BW kHz	X @ I_{PN} T_A = 25°C %	X_G @ I_{PN} T_A = 25°C %	T_A °C	Connection				UR or UL	Packaging No	Type	Features
									Primary		Secondary					
									PCB	Aperture, busbar, other	PCB	Other				
1000	± 1100	O/L	± 15	10 V	DC-10 (-3dB)1)	1.8	2.3	-40...+85		Ø 40 mm		Screws		122	HTC 1000-S/SP4	
1000	± 1500	C/L	± 24	200 mA	DC-150 (-1dB)	0.3	0.5	-40...+85		Ø 38.5 mm		4 x M4	●	123	LF 1005-S/SP14	Screen
1000	± 2400	C/L	± 15…24	200 mA	DC-100 (-1dB)	0.3	0.4	-40...+85		Ø 42 mm		4 x M5 + Faston	●	117	LTC 1000-S	Screen
1000	± 2400	C/L	± 15…24	250 mA	DC-100 (-1dB)	0.3	0.4	-40...+85		Ø 42 mm		4 x M5 + Faston	●	124	LTC 1000-S/SP1	Screen
1000	± 3000	C/L	± 15…24	250 mA	DC-100 (-1dB)	0.3	0.4	-40...+85		Ø 42 mm		4 x Faston	●	125	LTC 1000-S/SP25	Screen
1000	± 2400	C/L	± 15…24	200 mA	DC-100 (-1dB)	0.3	0.4	-40...+85		Ø 42 mm		4 x M5 + Faston	●	118	LTC 1000-SF	With feet Screen
1000	± 2400	C/L	± 15…24	200 mA	DC-100 (-1dB)	0.3	0.4	-40...+85		Ø 42 mm		4 x M4 + Faston	●	126	LTC 1000-SF/SP24	With long feet Footprint compatible with former LT 1000-SI series Screen
1000	± 2400	C/L	± 15…24	200 mA	DC-100 (-1dB)	0.3	0.4	-40...+85		Ø 42 mm		4 x M5 + Faston	●	119	LTC 1000-SFC	With feet + clamp Screen
1000	± 2400	C/L	± 15…24	200 mA	DC-100 (-1dB)	0.3	0.4	-40...+85		Busbar		4 x M5 + Faston	●	120	LTC 1000-T	Screen
1000	± 2400	C/L	± 15…24	200 mA	DC-100 (-1dB)	0.3	0.4	-40...+85		Busbar		4 x M5 + Faston	●	121	LTC 1000-TF	With feet Screen
1000	± 2500	O/L	± 15	5 V	DC-10 (-3dB)1)	1.7	2	-40...+70		Aperture 18x54 mm		Burndy		127	HAR 1000-S	Burndy SMS6GE4
2000	± 2200	O/L	± 15	10 V	DC-10 (-3dB)1)	1.8	2.3	-40...+85		Ø 40 mm		Screws		122	HTC 2000-S/SP4	
2000	± 3000	Fluxgate ITC	± 24	800 mA	DC-27 (3dB)f)	0.0015	0.01	-40...+85		Ø 63 mm		D-Sub		128	ITC 2000-S/SP1	Class 0.5R accuracy D-Sub male 15cts Test circuit

I_{PN} = 2000 A ... 4000 A

TTR

Open–loop Closed–loop Fluxgate

I_{PN} A	I_P A	Technology	U_C V	V_{out} I_{out} @ I_{PN}	BW kHz	X @ I_{PN} T_A = 25°C %	X_G @ I_{PN} T_A = 25°C %	T_A °C	Connection				UR or UL	Packaging No	Type	Features
									Primary		Secondary					
									PCB	Aperture, busbar, other	PCB	Other				
2000	± 3500	C/L	± 15…24	400 mA	DC-150 (-1dB)	0.2	0.325	-40...+85		Ø 56 mm		LEMO	●	129	LF 2005-S/SP1	LEMO EEJ.1B.304. CYC Internal screen
2000	± 3500	C/L	± 15…24	400 mA	DC-100 (-1dB)	0.2	0.325	-40...+80		Ø 56 mm		LEMO	●	130	LF 2005-S/SP27	LEMO EEJ.1B.304. CYC Internal screen Reversed current
2000	± 3500	C/L	± 15…24	400 mA	DC-100 (-1dB)	0.5	0.55	-40...+85		Ø 56 mm		4 x M5	●	131	LF 2005-S/SP28	Screen
3000	± 3300	O/L	± 15	10 V	DC-10 (-3dB) 1)	1.8	2.3	-40...+85		Ø 40 mm		Screws		122	HTC 3000-S/SP4	
3300	± 5000	C/L	± 24	660 mA	DC-100 (-1dB)	0.3	0.32	-25...+70		Ø 102 mm		LEMO		132	LT 4000-S/SP24	LEMO EGJ.1B.304. CYC Screen
3300	± 5000	C/L	± 24	660 mA	DC-100 (-1dB)	0.3	0.32	-25...+70		Ø 102 mm		3 x M5		133	LT 4000-S/SP44	Internal screen
4000	± 6000	C/L	± 24	800 mA	DC-100 (-1dB)	0.3	0.5	-25...+70		Ø 102 mm		3 x M5		72	LT 4000-S	
4000	± 6000	C/L	± 24	800 mA	DC-100 (-1dB)	0.3	0.5	-40...+70		Ø 102 mm		AMP		134	LT 4000-S/SP12	AMP CPC 13/9 Test circuit Screen
4000	± 6000	C/L	± 24	800 mA	DC-100 (-1dB)	0.3	0.5	-40...+70		Ø 102 mm		3 x M5		72	LT 4000-S/SP34	
4000	± 6000	C/L	± 24	800 mA	DC-100 (-1dB)	0.3	0.5	-40...+70		Ø 102 mm		LEMO		135	LT 4000-S/SP35	LEMO EGJ.1B.305. CYC Test circuit Internal screen
4000	± 6500	C/L	± 24	1 A	DC-100 (-1dB)	0.3	0.5	-40...+85		Ø 102 mm		Cable		136	LT 4000-S/SP43	Screen
4000	± 6000	C/L	± 24	800 mA	DC-100 (-1dB)	0.3	0.5	-25...+70		Busbar		3 x M5		73	LT 4000-T	
4000	± 6500	C/L	± 24	1 A	DC-100 (-1dB)	0.3	0.5	-40...+85		Busbar		Cable		137	LT 4000-T/SP40	
4000	± 6000	Fluxgate ITC	± 24	1600 mA	DC-82 (3dB) f)	0.0003	0.05	-40...+85		Ø 102 mm		7 x M5 inserts		138	ITC 4000-S	Class 0.5R accuracy Test circuit

Notes:

f) 100 A_{RMS}

1) Small signal bandwidth to avoid excessive core heating at high frequency

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I_{PN} = 2 A ... 10 A (Fault Detection)

Fluxgate

I_{PN} A	I_P A	Technology	U_C V	V_{out} I_{out} @ I_{PN}	BW kHz	X_G @ I_{PN} T_A = 25°C %	T_A °C	Connection Primary PCB	Connection Primary Aperture, busbar, other	Connection Secondary PCB	Connection Secondary Other	UR or UL	Packaging No	Type	Features
2	± 8	Flux "C"	± 15…24	20 mA	DC-10 (-3dB)	3	-25...+70		Ø 63.2 mm		Cable		139	CD 1000-S/SP6	Differential measurement: 2 x 1200 A_{RMS}
10	± 10	Flux "C"	± 24	10 V	DC-20 (-3dB)	3	-40...+70		2 x Busbars: 1 of 20x20x358 mm and 1 of 20x20x206 mm		Cable		140	CD 1000-T/SP7	Differential measurement: 2 x 1500 A_{RMS}

V_{PN} = 0.03 V (Shunt Isolator)

IDT

V_{PN} V	V_P V	Technology	U_C V	V_{out} I_{out} @ V_{PN}	BW kHz	X_G @ V_{PN} T_A = 25°C %	T_A °C	Connection Primary PCB	Connection Primary Aperture, busbar, other	Connection Secondary PCB	Connection Secondary Other	UR or UL	Packaging No	Type	Features
0.03	± 0.045	Insulating digital technology	± 15…24	50 mA	DC-10 (3dB)	0.2	-40...+85		Busbar		M5 Connecting		141	DI 30/SP1	Shunt Isolator Class 1R accuracy vs EN50463 when used with Class 0.2 shunt

(139) (140)

(141)

$I_{P\,AC}$ = 0.1 A_{AC} ... 20 A_{AC} (Interference Frequencies Detection)

Rogowski

I_P A_{AC}	Technology	U_C V	V_{out} I_{out} @ I_P	BW kHz	X @ I_P T_A = 25°C %	T_A °C	Connection Primary PCB	Connection Primary Aperture, busbar, other	Connection Secondary PCB	Connection Secondary Other	UR or UL	Packaging No	Type	Features
0.1…20 Measurement of alternating signal on DC primary current up to 1000 ADC	Rogowski	Self powered	$2.\pi.M.\,f.I_{PAC}$ V g) $M.dI_P/dt$ V 2)	0.02…3	3	-40...+85		Ø 42 mm		Cable		142	RA 1005-S	g) For sinusoidal wave $2.\pi.M = 25.10^{-6}$ H f in Hz 2) Instantaneous Test circuit
0.1…20 Measurement of alternating signal on DC primary current up to 3000 ADC	Rogowski	Self powered	$2.\pi.M.\,f.I_{PAC}$ V h) $M.dI_P/dt$ V 2)	0.02…3	3	-25...+70		Ø 102 mm		Cable		143	RA 2000-S/SP1	h) For sinusoidal wave $2.\pi.M = 27.657.10^{-6}$ H f in Hz 2) Instantaneous Test circuit
0.1…20 Measurement of alternating signal on DC primary current up to 4000 ADC	Rogowski	Self powered	$2.\pi.M.\,f.I_{PAC}$ V h) $M.dI_P/dt$ V 2)	0.02…3	3	-40...+70		Ø 102 mm		Cable		144	RA 2000-S/SP2	h) For sinusoidal wave $2.\pi.M = 27.657.10^{-6}$ H f in Hz 2) Instantaneous Test circuit
0.1…20 Measurement of alternating signal on DC primary current up to 4000 ADC	Rogowski	Self powered	$2.\pi.M.\,f.I_{PAC}$ V h) $M.dI_P/dt$ V 2)	0.02…3	3	-40...+70		Ø 102 mm		LEMO connector		145	RA 2000-S/SP3	h) For sinusoidal wave $2.\pi.M = 27.657.10^{-6}$ H f in Hz 2) Instantaneous Test circuit
0.1…20 Measurement of alternating signal on DC primary current up to 4000 ADC	Rogowski	Self powered	$2.\pi.M.\,f.I_{PAC}$ V h) $M.dI_P/dt$ V 2)	0.02…3	3	-40...+70 IP57		Ø 102 mm		Cable		146	RA 2000-S/SP4	h) For sinusoidal wave $2.\pi.M = 27.657.10^{-6}$ H f in Hz 2) Instantaneous Test circuit
0.1…20 Measurement of alternating signal on DC primary current up to 4000 ADC	Rogowski	Self powered	$2.\pi.M.\,f.I_{PAC}$ V h) $M.dI_P/dt$ V 2)	0.02…3	3	-40...+70		Busbar 20x100x340 mm		Cable		147	RA 2000-T/SP2	h) For sinusoidal wave $2.\pi.M = 27.657.10^{-6}$ H f in Hz 2) Instantaneous Test circuit

(143) (144) (145) (146)

(147)

(142)

I_{PN} = 10 A ... 6000 A

TTR - Track. / Sub.

Open–loop

Closed–loop

I_{PN} A	I_P A	Technology	U_C V	V_{out} I_{out} @ I_{PN}	BW kHz	X @ I_{PN} T_A = 25°C %	T_A °C	Connection				UR or UL	Packaging No	Type	Features
								Primary		Secondary					
								PCB	Aperture, busbar, other	PCB	Other				
10	± 20	C/L	+ 24	4-20 mA$_{DC}$ @ -/+I_P	DC	1 [a]	-25...+55 IP67		Split core Ø 15 mm		0.25 m wire + connector		148	PCM 10-P	
10	± 20	C/L	+ 24	4-20 mA$_{DC}$ @ -/+I_P	DC	1 [a]	-25...+55		Split core Ø 15 mm		2 m wire		149	PCM 10-P/SP1	
20	± 40	C/L	+ 24	4-20 mA$_{DC}$ @ -/+I_P	DC	1 [a]	-25...+55 IP67		Split core Ø 15 mm		0.25 m wire + connector		148	PCM 20-P	
20	+ 20	C/L	+ 24	4-20 mA$_{DC}$ @ +I_P	DC	1 [a]	-25...+55		Split core Ø 15 mm		3 m wire		150	PCM 20-P/SP2	
20	+ 20	C/L	+ 24	4-20 mA$_{DC}$ @ +I_P	DC	1 [a]	-25...+55		Split core Ø 15 mm		0.25 m wire + connector		151	PCM 20-P/SP3	
20	+ 20	C/L	+ 24	4-20 mA$_{DC}$ @ +I_P	DC	1 [a]	-25...+55		Split core Ø 15 mm		2.5 m wire + connector		152	PCM 20-P/SP4	
20	± 40	C/L	+ 24	4-20 mA$_{DC}$ @ -/+I_P	DC	1 [a]	-25...+55		Split core Ø 15 mm		3 m wire		150	PCM 20-P/SP6	
30	± 60	C/L	+ 24	4-20 mA$_{DC}$ @ -/+I_P	DC	1 [a]	-25...+55 IP67		Split core Ø 15 mm		0.25 m wire + connector		148	PCM 30-P	
30	+ 30	C/L	+ 24	4-20 mA$_{DC}$ @ +I_P	DC	1 [a]	-25...+55		Split core Ø 15 mm		3 m wire		150	PCM 30-P/SP1	
5	± 25	C/L	+ 24	4-12 mA$_{DC}$	0.04-1 (-3dB)	2 [a]	-25...+55		Split core Ø 15 mm		0.25 m wire + connector		153	PCM 5-PR/SP1	True RMS output 
5	± 25	C/L	+ 24	4-12 mA$_{DC}$	0.04-1 (-3dB)	2 [a]	-25...+55 IP67		Split core Ø 15 mm		2 m wire		154	PCM 5-PR/SP2	True RMS output
10	± 30	C/L	+ 24	4-12 mA$_{DC}$	0.04-1 (-3dB)	2 [a]	-25...+55		Split core Ø 15 mm		0.25 m wire + connector		153	PCM 10-PR/SP1	True RMS output 
4000	± 4000	O/L	± 15	10 V	DC-3 (+/-3dB) [1]	2	-25...+85		Aperture 162x42 mm		Fujicon		71	HAZ 4000-SB	Fujicon F2023A (6 terminals)
4000	± 4000	O/L	± 15	20 mA	DC-3 (+/-3dB) [1]	2	-25...+85		Aperture 162x42 mm		Fujicon		71	HAZ 4000-SBI	Fujicon F2023A (6 terminals)
4000	± 4000	O/L	± 15	4 mA @ -I_{PN} 20 mA @ +I_{PN}	DC-3 (+/-3dB) [1]	2	-25...+85		Aperture 162x42 mm		Fujicon		71	HAZ 4000-SBI/SP1	Fujicon F2023A (6 terminals)
4000	± 4000	O/L	± 15	0-20 mA$_{DC}$	DC & 0.015…3 (+/-3 dB) [1]	2	-25...+85		Aperture 162x42 mm		Fujicon		71	HAZ 4000-SRI	True RMS output Fujicon F2023A (6 terminals)
4000	± 4000	O/L	± 15	4-20 mA$_{DC}$	DC & 0.015…3 (+/-3 dB) [1]	2	-25...+85		Aperture 162x42 mm		Fujicon		71	HAZ 4000-SRI/SP1	True RMS output Fujicon F2023A (6 terminals)
4000	± 4000	O/L	± 15	0-10 V$_{DC}$	DC & 0.015…3 (+/-3 dB) [1]	2	-25...+85		Aperture 162x42 mm		Fujicon		71	HAZ 4000-SRU	True RMS output Fujicon F2023A (6 terminals)
6000	± 6000	O/L	± 15	10 V	DC-3 (+/-3dB) [1]	2	-25...+85		Aperture 162x42 mm		Fujicon		71	HAZ 6000-SB	Fujicon F2023A (6 terminals)
6000	± 6000	O/L	± 15	20 mA	DC-3 (+/-3dB) [1]	2	-25...+85		Aperture 162x42 mm		Fujicon		71	HAZ 6000-SBI	Fujicon F2023A (6 terminals)
6000	± 6000	O/L	± 15	4 mA @ -I_{PN} 20 mA @ +I_{PN}	DC-3 (+/-3dB) [1]	2	-25...+85		Aperture 162x42 mm		Fujicon		71	HAZ 6000-SBI/SP1	Fujicon F2023A (6 terminals)
6000	± 6000	O/L	± 15	0-20 mA$_{DC}$	DC & 0.015…3 (+/-3 dB) [1]	2	-25...+85		Aperture 162x42 mm		Fujicon		71	HAZ 6000-SRI	True RMS output Fujicon F2023A (6 terminals)
6000	± 6000	O/L	± 15	4-20 mA$_{DC}$	DC & 0.015…3 (+/-3 dB) [1]	2	-25...+85		Aperture 162x42 mm		Fujicon		71	HAZ 6000-SRI/SP1	True RMS output Fujicon F2023A (6 terminals)
6000	± 6000	O/L	± 15	0-10 V$_{DC}$	DC & 0.015…3 (+/-3 dB) [1]	2	-25...+85		Aperture 162x42 mm		Fujicon		71	HAZ 6000-SRU	True RMS output Fujicon F2023A (6 terminals)

(148) (149) (150) (151)
(152) (153) (154)

(71)

I_{PN} = 10000 A ... 20000 A

TTR - Track. / Sub.

Open–loop

Closed–loop

I_{PN} A	I_P A	Technology	U_C V	V_{out} I_{out} @ I_{PN}	BW kHz	X @ I_{PN} T_A = 25°C %	T_A °C	Connection				UR or UL	Packaging No	Type	Features
								Primary		Secondary					
								PCB	Aperture, busbar, other	PCB	Other				
10000	± 10000	O/L	± 15	10 V	DC-3 (+/-3dB) [1]	2	-25...+85		Aperture 162x42 mm		Fujicon		71	HAZ 10000-SB	Fujicon F2023A (6 terminals)
10000	± 10000	O/L	± 15	20 mA	DC-3 (+/-3dB) [1]	2	-25...+85		Aperture 162x42 mm		Fujicon		71	HAZ 10000-SBI	Fujicon F2023A (6 terminals)
10000	± 10000	O/L	± 15	4 mA @ -I_{PN} 20 mA @ +I_{PN}	DC-3 (+/-3dB) [1]	2	-25...+85		Aperture 162x42 mm		Fujicon		71	HAZ 10000-SBI/SP1	Fujicon F2023A (6 terminals)
10000	± 10000	O/L	± 15	0-20 mA$_{DC}$	DC & 0.015…3 (+/-3 dB) [1]	2	-25...+85		Aperture 162x42 mm		Fujicon		71	HAZ 10000-SRI	True RMS output Fujicon F2023A (6 terminals)
10000	± 10000	O/L	± 15	4-20 mA$_{DC}$	DC & 0.015…3 (+/-3 dB) [1]	2	-25...+85		Aperture 162x42 mm		Fujicon		71	HAZ 10000-SRI/SP1	True RMS output Fujicon F2023A (6 terminals)
10000	± 10000	O/L	± 15	0-10 V$_{DC}$	DC & 0.015…3 (+/-3 dB) [1]	2	-25...+85		Aperture 162x42 mm		Fujicon		71	HAZ 10000-SRU	True RMS output Fujicon F2023A (6 terminals)
12000	± 12000	O/L	± 15	10 V	DC-3 (+/-3dB) [1]	2	-25...+85		Aperture 162x42 mm		Fujicon		71	HAZ 12000-SB	Fujicon F2023A (6 terminals)
12000	± 12000	O/L	± 15	20 mA	DC-3 (+/-3dB) [1]	2	-25...+85		Aperture 162x42 mm		Fujicon		71	HAZ 12000-SBI	Fujicon F2023A (6 terminals)
12000	± 12000	O/L	± 15	4 mA @ -I_{PN} 20 mA @ +I_{PN}	DC-3 (+/-3dB) [1]	2	-25...+85		Aperture 162x42 mm		Fujicon		71	HAZ 12000-SBI/SP1	Fujicon F2023A (6 terminals)
12000	± 12000	O/L	± 15	0-20 mA$_{DC}$	DC & 0.015…3 (+/-3 dB) [1]	2	-25...+85		Aperture 162x42 mm		Fujicon		71	HAZ 12000-SRI	True RMS output Fujicon F2023A (6 terminals)
12000	± 12000	O/L	± 15	4-20 mA$_{DC}$	DC & 0.015…3 (+/-3 dB) [1]	2	-25...+85		Aperture 162x42 mm		Fujicon		71	HAZ 12000-SRI/SP1	True RMS output Fujicon F2023A (6 terminals)
12000	± 12000	O/L	± 15	0-10 V$_{DC}$	DC & 0.015…3 (+/-3 dB) [1]	2	-25...+85		Aperture 162x42 mm		Fujicon		71	HAZ 12000-SRU	True RMS output Fujicon F2023A (6 terminals)
14000	± 14000	O/L	± 15	10 V	DC-3 (+/-3dB) [1]	2	-25...+85		Aperture 162x42 mm		Fujicon		71	HAZ 14000-SB	Fujicon F2023A (6 terminals)
14000	± 14000	O/L	± 15	20 mA	DC-3 (+/-3dB) [1]	2	-25...+85		Aperture 162x42 mm		Fujicon		71	HAZ 14000-SBI	Fujicon F2023A (6 terminals)
14000	± 14000	O/L	± 15	4 mA @ -I_{PN} 20 mA @ +I_{PN}	DC-3 (+/-3dB) [1]	2	-25...+85		Aperture 162x42 mm		Fujicon		71	HAZ 14000-SBI/SP1	Fujicon F2023A (6 terminals)
14000	± 14000	O/L	± 15	0-20 mA$_{DC}$	DC & 0.015…3 (+/-3 dB) [1]	2	-25...+85		Aperture 162x42 mm		Fujicon		71	HAZ 14000-SRI	True RMS output Fujicon F2023A (6 terminals)
14000	± 14000	O/L	± 15	4-20 mA$_{DC}$	DC & 0.015…3 (+/-3 dB) [1]	2	-25...+85		Aperture 162x42 mm		Fujicon		71	HAZ 14000-SRI/SP1	True RMS output Fujicon F2023A (6 terminals)
14000	± 14000	O/L	± 15	0-10 V$_{DC}$	DC & 0.015…3 (+/-3 dB) [1]	2	-25...+85		Aperture 162x42 mm		Fujicon		71	HAZ 14000-SRU	True RMS output Fujicon F2023A (6 terminals)
20000	± 20000	O/L	± 15	10 V	DC-3 (+/-3dB) [1]	2	-25...+85		Aperture 162x42 mm		Fujicon		71	HAZ 20000-SB	Fujicon F2023A (6 terminals)
20000	± 20000	O/L	± 15	20 mA	DC-3 (+/-3dB) [1]	2	-25...+85		Aperture 162x42 mm		Fujicon		71	HAZ 20000-SBI	Fujicon F2023A (6 terminals)
20000	± 20000	O/L	± 15	4 mA @ -I_{PN} 20 mA @ +I_{PN}	DC-3 (+/-3dB) [1]	2	-25...+85		Aperture 162x42 mm		Fujicon		71	HAZ 20000-SBI/SP1	Fujicon F2023A (6 terminals)
20000	± 20000	O/L	± 15	0-20 mA$_{DC}$	DC & 0.015…3 (+/-3 dB) [1]	2	-25...+85		Aperture 162x42 mm		Fujicon		71	HAZ 20000-SRI	True RMS output Fujicon F2023A (6 terminals)
20000	± 20000	O/L	± 15	4-20 mADC	DC & 0.015…3 (+/-3 dB) [1]	2	-25...+85		Aperture 162x42 mm		Fujicon		71	HAZ 20000-SRI/SP1	True RMS output Fujicon F2023A (6 terminals)
20000	± 20000	O/L	± 15	0-10 V$_{DC}$	DC & 0.015…3 (+/-3 dB) [1]	2	-25...+85		Aperture 162x42 mm		Fujicon		71	HAZ 20000-SRU	True RMS output Fujicon F2023A (6 terminals)

Notes:
a) Exclude electrical offset
1) Small signal bandwidth to avoid excessive core heating at high frequency

Dedicated data sheets are the only recognized reference documents for the given performances and data – Data sheets: www.lem.com

V_{PN} = 10 V ... 1500 V

TTR - On-Board

Closed–loop

I_{PN} (V_{PN}) mA	I_P (V_P) mA	Technology	U_C V	I_{out} @ I_{PN}	BW kHz	X_G T_A = 25 °C % @ I_{PN} with max offset taken	T_A °C	UR or UL	Packaging No	Type	Features
10 (10 to 1500 V)	± 14 (2100 V)	C/L	± 15	25 mA	Note c)	0.8	-40...+85	●	76	LV 25-P/SP5 note d)	Isolation test voltage: 4.2 kV_{RMS}

V_{PN} = 50 V ... 1500 V

IDT

$\pm V_{PN}$ V	$\pm V_P$ V	Technology	U_C V	V_{out} I_{out} @ V_{PN}	BW kHz	X_G T_A = 25 °C % @ V_{PN} with max offset taken	T_A °C	UR or UL	Packaging No	Type	Connection primary	Connection secondary
50	75	Insulating digital technology	± 15...24	50 mA	DC-14 (-3dB)	0.5	-40...+85		78	DVL 50	2 x M5	3 x M5 + Faston
125	188	Insulating digital technology	± 15...24	50 mA	DC-14 (-3dB)	0.5	-40...+85		78	DVL 125	2 x M5	3 x M5 + Faston
150	225	Insulating digital technology	± 15...24	50 mA	DC-14 (-3dB)	0.5	-40...+85		78	DVL 150	2 x M5	3 x M5 + Faston
250	375	Insulating digital technology	± 15...24	50 mA	DC-14 (-3dB)	0.5	-40...+85		78	DVL 250	2 x M5	3 x M5 + Faston
500	750	Insulating digital technology	± 15...24	50 mA	DC-14 (-3dB)	0.5	-40...+85		78	DVL 500	2 x M5	3 x M5 + Faston
750	1125	Insulating digital technology	± 15...24	50 mA	DC-14 (-3dB)	0.5	-40...+85		78	DVL 750	2 x M5	3 x M5 + Faston
750	1125	Insulating digital technology	± 15...24	50 mA	DC-14 (-3dB)	0.5	-40...+85		86	DVL 750/SP2	M5	M5 insert
1000	1500	Insulating digital technology	± 15...24	50 mA	DC-14 (-3dB)	0.5	-40...+85		78	DVL 1000	2 x M5	3 x M5 + Faston
1000	1500	Insulating digital technology	± 15...24	50 mA	DC-14 (-3dB)	0.5	-40...+85		87	DVL 1000/SP1	M5	Burndy vertical
1000	1500	Insulating digital technology	± 15...24	50 mA	DC-14 (-3dB)	0.5	-40...+85		86	DVL 1000/SP5	M5	M5 insert
1000	1500	Insulating digital technology	± 15...24	50 mA	DC-14 (-3dB)	0.5	-40...+85		88	DVL 1000/SP7	cable	cable
1000	1500	Insulating digital technology	± 15...24	50 mA	DC-14 (-3dB)	0.5	-40...+85		89	DVL 1000/SP8	M5	cable
1000	1500	Insulating digital technology	± 15...24	50 mA	DC-12 (3dB)	0.3	-40...+85		81	DV 1000	Cable	Cable
1200	1800	Insulating digital technology	± 15...24	50 mA	DC-12 (3dB)	0.3	-40...+85		82	DV 1200/SP2	Cable	M5 + Faston
1500	2250	Insulating digital technology	± 15...24	50 mA	DC-14 (-3dB)	0.5	-40...+85		78	DVL 1500	2 x M5	3 x M5 + Faston
1500	2250	Insulating digital technology	± 15...24	50 mA	DC-14 (-3dB)	0.5	-40...+85		87	DVL 1500/SP1	M5	Burndy vertical
1500	2250	Insulating digital technology	± 15...24	50 mA	DC-14 (-3dB)	0.5	-40...+85		86	DVL 1500/SP2	M5	M5 insert
1500	2250	Insulating digital technology	± 15...24	50 mA	DC-14 (-3dB)	0.5	-40...+85		88	DVL 1500/SP5	cable	cable
1500	2250	Insulating digital technology	± 15...24	50 mA	DC-14 (-3dB)	0.5	-40...+85		89	DVL 1500/SP6	M5	cable
1500	2250	Insulating digital technology	± 15...24	50 mA	DC-12 (3dB)	0.3	-40...+85		82	DV 1500	Cable	M5 + Faston

Notes:
c) See response time in the individual data sheet
d) The primary and secondary connections of this transducer are done on PCB

(76)

V_{PN} = 140 V ... 4200 V

TTR - On-Board

IDT Fluxgate

$\pm V_{PN}$ V	$\pm V_P$ V	Technology	U_C V	V_{out} I_{out} @ V_{PN}	BW kHz	X_G T_A = 25 °C % @ V_{PN} with max offset taken	T_A °C	UR or UL	Packaging No	Type	Connection primary	Connection secondary
2000	3000	Insulating digital technology	± 15…24	50 mA	DC-14 (-3dB)	0.5	-40...+85		78	DVL 2000	2 x M5	3 x M5 + Faston
2000	3000	Insulating digital technology	± 15…24	50 mA	DC-14 (-3dB)	0.5	-40...+85		87	DVL 2000/SP1	M5	Burndy vertical
2000	3000	Insulating digital technology	± 15…24	50 mA	DC-14 (-3dB)	0.5	-40...+85		88	DVL 2000/SP5	cable	cable
2000	3000	Insulating digital technology	± 15…24	50 mA	DC-14 (-3dB)	0.5	-40...+85		89	DVL 2000/SP6	M5	cable
2000	3000	Insulating digital technology	± 15…24	50 mA	DC-12 (3dB)	0.3	-40...+85		81	DV 2000	Cable	Cable
2000	3000	Insulating digital technology	± 15…24	50 mA	DC-12 (3dB)	0.3	-40...+85		82	DV 2000/SP1	Cable	M5 + Faston
2000	3000	Insulating digital technology	± 15…24	50 mA	DC-12 (3dB)	0.3	-40...+85		83	DV 2000/SP2	M5	M5
2800	4200	Insulating digital technology	± 15…24	50 mA	DC-12 (3dB)	0.3	-40...+85		90	DV 2800/SP1	M5 vertical	Burndy vertical
2800	4200	Insulating digital technology	± 15…24	50 mA	DC-12 (3dB)	0.3	-40...+85		84	DV 2800/SP4	M5	M5
3000	4500	Insulating digital technology	± 15…24	50 mA	DC-12 (3dB)	0.35	-40...+85		84	DV 3000/SP1	M5	M5
4000	6000	Insulating digital technology	± 15…24	50 mA	DC-12 (3dB)	0.3	-40...+85		91	DV 4000/SP1	M5	Burndy vertical
4000	6000	Insulating digital technology	± 15…24	50 mA	DC-12 (3dB)	0.3	-40...+85		90	DV 4000/SP2	M5 vertical	Burndy vertical
4200	6000	Insulating digital technology	± 15…24	7 V	DC-12 (3dB)	0.3	-40...+85		92	DV 4200/SP1	M5	D-Sub
4200	6000	Insulating digital technology	± 15…24	50 mA	DC-12 (3dB)	0.3	-40...+85		81	DV 4200/SP3	Cable	Cable
4200	6000	Insulating digital technology	± 15…24	50 mA	DC-12 (3dB)	0.3	-40...+85		84	DV 4200/SP4	M5	M5
4200	6000	Insulating digital technology	± 15…24	50 mA	DC-12 (3dB)	0.3	-40...+85		93	DV 4200/SP5	M5 vertical	D-Sub
140	200	Fluxgate “C”	± 15	10 V/200 V	DC-300 (-1dB)	0.2 @ V_P	-40...+85		80	CV 3-200	2 x M5	4 x M5
350	500	Fluxgate “C”	± 15	10 V/500 V	DC-300 (-1dB)	0.2 @ V_P	-40...+85		80	CV 3-500	2 x M5	4 x M5
700	1000	Fluxgate “C”	± 15	10 V/1000 V	DC-500 (-1dB @ 50 % V_{PN})	0.2 @ V_P	-40...+85		80	CV 3-1000	2 x M5	4 x M5
840	1200	Fluxgate “C”	± 15	10 V/1200 V	DC-800 (-1dB @ 40% V_{PN})	0.2 @ V_P	-40...+85		80	CV 3-1200	2 x M5	4 x M5
1000	1500	Fluxgate “C”	± 15	10 V/1500 V	DC-800 (-1dB @ 33% V_{PN})	0.2 @ V_P	-40...+85		80	CV 3-1500	2 x M5	4 x M5
1400	2000	Fluxgate “C”	± 15	10 V/2000 V	DC-300 (-1dB @ 25% V_{PN})	0.2 @ V_P	-40...+85		80	CV 3-2000	2 x M5	4 x M5

(78) (86) (87) (88) (89)

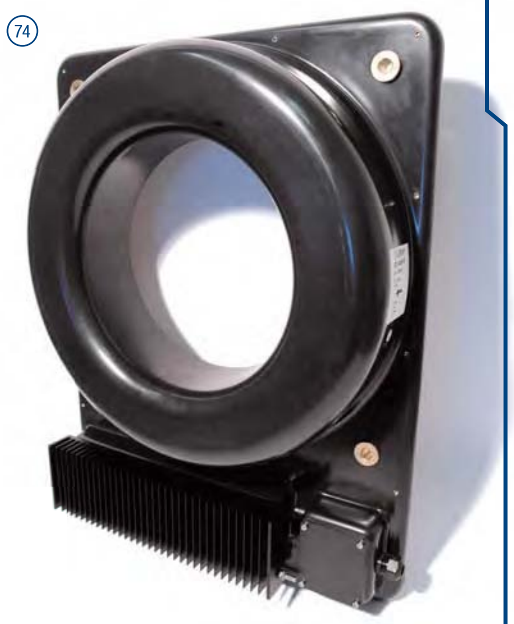
(80)

(81) (82) (83) (84)
(90) (91) (92) (93)

I_{PN} = 12.5 A ... 4000 A

	I_{PN} A_{DC}	I_{PN} A_{RMS}	I_P A	Technology	U_C V	V_{out} I_{out} @ I_{PN} (DC)	BW kHz Note j)	E_L Linearity (ppm) Note i) k)	I_{OE} V_{OE} Offset (ppm) Note k) l)	Noise (RMS) (ppm) (DC-100Hz) Note k)	Noise (RMS) (ppm) (DC-50kHz) Note k)	TCI_{OE} TCV_{OE} (ppm/K) Note k)	T_A °C	Mounting			Busbar Aperture Diameter (mm)	UR or UL	Packaging No	Type	Features
														PCB	On-board Panel	Measuring head + 19” rack electronic					
Stand-alone DC/AC Current Transducers	12.5	8.8	± 12.5	Fluxgate IT	± 15	50 mA	DC-500 (3dB)	4	500	0.5	10 (DC-100kHz)	2	10...+45	●			Integrated		94	ITN 12-P	Metal housing for high immunity against external influence
	60	42	± 60	Fluxgate IT	± 15	100 mA	DC-800 (3dB)	20	250	1	15	2.5	10...+50		●		26		95	IT 60-S	
	200	141	± 200	Fluxgate IT	± 15	200 mA	DC-500 (3dB)	3	80	1	15	2	10...+50		●		26		95	IT 200-S	
	300	300	± 450	Fluxgate IT	± 15	150 mA	DC-100 (-3dB)	10	666	N/A	N/A	6.66	-40...+85		●		21.5		96	ITB 300-S	
	400	282	± 400	Fluxgate IT	± 15	200 mA	DC-500 (3dB)	3	40	0.5	8	1	10...+50		●		26		95	IT 400-S	
	400	400	± 900	Fluxgate IT	± 15	266.66 mA	DC-200$^{\text{m)}}$ (3dB)	1	10	0.017 (0.125Hz-1kHz)	0.006 (1kHz-30kHz)	0.3	10...+50		●		Integrated busbar 19 mm diameter		97	ITL 900-T	
	600	424	± 600	Fluxgate IT	± 15	400 mA	DC-300 (3dB)	1.5	15	0.3	15 (DC-100kHz)	0.5	10...+50		●		30		98	ITN 600-S	
	700	495	± 700	Fluxgate IT	± 15	400 mA	DC-100 (3dB)	3	50	0.5	6	0.5	10...+50		●		30		99	IT 700-S	
	700	495	± 700	Fluxgate IT	± 15	400 mA	DC-100 (3dB)	3	50	1	16	0.5	10...+50		●		30		100	IT 700-SPR	Programmable from 80 A in step of 10 A
	700	495	± 700	Fluxgate IT	± 15	10 V	DC-100 (3dB)	30	60	2	10	4	10...+50		●		30		99	IT 700-SB	
	900	636	± 900	Fluxgate IT	± 15	600 mA	DC-300 (3dB)	1	10	0.2	10	0.3	10...+50		●		30		99	ITN 900-S	
	1000	707	± 1000	Fluxgate IT	± 15	1 A	DC-500 (3dB)	3	50	N/A	6	0.5	10...+50		●		30		101	IT 1000-S/SP1	High bandwidth
	4000	4000	± 12000	Fluxgate IT	± 24	1.6 A	DC-50$^{\text{n)}}$ (1dB)	100	62.5	125 (0.1Hz-10kHz)	125 (0.1Hz-10kHz)	1.38	-40...+70		●		268		74	ITL 4000-S	

74



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101

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Notes:

i) Linearity measured at DC

j) Bandwidth is measured under small signal conditions – amplitude of 0.5% I_{PN} (DC)

k) All ppm figures refer to V_{out} or I_{out} @ I_{PN} (DC) except for ITL 900–T where it refers to I_{OUT} = 600 mA

l) Electrical offset current + self magnetization + effect of earth magnetic field @ T_A = +25 °C

m) Small signal 5% of I_{PN} (DC), 32 A_{RMS}

n) Small signal 40 A_{RMS}

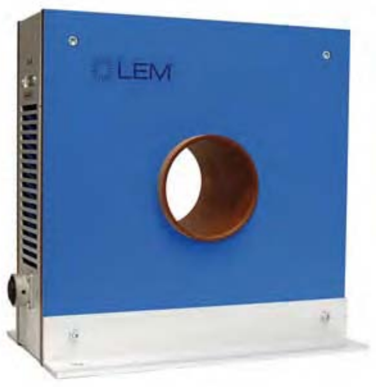
o) Bandwidth is measured under small signal conditions – amplitude of 1% I_{PN} (DC)

N/A : Not Available

I_{PN} = 40 A ... 24000 A

	I_{PN} A_{DC}	I_{PN} A_{RMS}	I_P A	Technology	U_C V	V_{out} I_{out} @ I_{PN} (DC)	BW kHz Note j)	E_L Linearity (ppm) Note i) k)	I_{OE} V_{OE} Offset (ppm) Note k) l)	Noise (RMS) (ppm) (DC-100Hz) Note k)	Noise (RMS) (ppm) (DC-50kHz) Note k)	TCI_{OE} TCV_{OE} (ppm/K) Note k)	T_A °C	Mounting			Busbar Aperture Diameter (mm)	UR or UL	Packaging No	Type	Features
														PCB	On-board Panel	Measuring head + 19” rack electronic					
Rack System DC/AC Current Transducers	600	424	± 600	Fluxgate IT	100-240 VAC - 50/60 Hz	1 A	DC-500 o) (3dB)	1	2	11 (DC-10kHz)	28 (DC-100kHz)	0.1	0...+55 Head +10…+40 Elec.			●	25.4		102 + 103	ITZ 600-SPR	Programmable by steps of 20 A from 40 A to 620 A
	600	424	± 600	Fluxgate IT	100-240 VAC - 50/60 Hz	10 V	DC-300 o) (3dB)	10	3	8 (DC-10kHz)	60 (DC-100kHz)	0.3	0...+55 Head +10…+40 Elec.			●	25.4		102 + 103	ITZ 600-SBPR	Programmable by steps of 20 A from 40 A to 620 A
	2000	1414	± 2000	Fluxgate IT	100-240 VAC - 50/60 Hz	2 A	DC-300 o) (3dB)	2	2	3 (DC-10kHz)	27 (DC-100kHz)	0.1	0...+55 Head +10…+40 Elec.			●	50		102 + 104	IT 2000-S	
	2000	1414	± 2000	Fluxgate IT	100-240 VAC - 50/60 Hz	10 V	DC-300 o) (3dB)	11	3	3 (DC-10kHz)	60 (DC-100kHz)	0.3	0...+55 Head +10…+40 Elec.			●	50		102 + 104	IT 2000-SB	
	2000	1414	± 2000	Fluxgate IT	100-240 VAC - 50/60 Hz	1 A	DC-80 o) (3dB)	2	2	7 (DC-10kHz)	42 (DC-100kHz)	0.1	0...+55 Head +10…+40 Elec.			●	50		102 + 104	IT 2000-SPR	Programmable by steps of 125 A from 125 A to 2000 A
	2000	1414	± 2000	Fluxgate IT	100-240 VAC - 50/60 Hz	10 V	DC-80 o) (3dB)	11	3	2 (DC-10kHz)	60 (DC-100kHz)	0.3	0...+55 Head +10…+40 Elec.			●	50		102 + 104	IT 2000-SBPR	Programmable by steps of 125 A from 125 A to 2000 A
	5000	3535	± 5000	Fluxgate IT	100-240 VAC - 50/60 Hz	2 A	DC-80 o) (3dB)	3	2	2.5 (DC-10kHz)	20 (DC-100kHz)	0.1	0...+55 Head +10…+40 Elec.			●	140.3		102 + 105	IT 5000-S	
	5000	3535	± 5000	Fluxgate IT	100-240 VAC - 50/60 Hz	10 V	DC-80 o) (3dB)	11	3	2.5 (DC-10kHz)	60 (DC-100kHz)	0.3	0...+55 Head +10…+40 Elec.			●	140.3		102 + 105	IT 5000-SB	
	10000	7070	± 10000	Fluxgate IT	100-240 VAC - 50/60 Hz	2 A	DC-20 o) (3dB)	5	2	8 (DC-10kHz)	20 (DC-100kHz)	0.1	0...+55 Head +10…+40 Elec.			●	100		102 + 106	IT 10000-S	
	10000	7070	± 10000	Fluxgate IT	100-240 VAC - 50/60 Hz	10 V	DC-20 o) (3dB)	12	3	8 (DC-10kHz)	60 (DC-100kHz)	0.3	0...+55 Head +10…+40 Elec.			●	100		102 + 106	IT 10000-SB	
	16000	11314	± 16000	Fluxgate IT	100-240 VAC - 50/60 Hz	2 A	DC-3 o) (3dB)	6	2	8 (DC-10kHz)	20 (DC-100kHz)	0.1	0...+55 Head +10…+40 Elec.			●	150.3		102 + 107	IT 16000-S	
	16000	11314	± 16000	Fluxgate IT	100-240 VAC - 50/60 Hz	10 V	DC-3 o) (3dB)	12	3	8 (DC-10kHz)	60 (DC-100kHz)	0.3	0...+55 Head +10…+40 Elec.			●	150.3		102 + 107	IT 16000-SB	
	24000	16970	± 24000	Fluxgate IT	100-240 VAC - 50/60 Hz	3 A	DC-2 o) (3dB)	6	2	8 (DC-10kHz)	20 (DC-100kHz)	0.1	0...+55 Head +10…+40 Elec.			●	150.3		102 + 107	IT 24000-S	


⑩⑤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⑩③


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Notes:

i) Linearity measured at DC

j) Bandwidth is measured under small signal conditions – amplitude of 0.5% I_{PN} (DC)

k) All ppm figures refer to V_{out} or I_{out} @ I_{PN} (DC) except for ITL 900–T where it refers to I_{OUT} = 600 mA

l) Electrical offset current + self magnetization + effect of earth magnetic field @ T_A = +25 °C

m) Small signal 5% of I_{PN} (DC), 32 A_{RMS}

n) Small signal 40 A_{RMS}

o) Bandwidth is measured under small signal conditions – amplitude of 1% I_{PN} (DC)

Dedicated data sheets are the only recognized reference documents for the given performances and data – Data sheets: www.lem.com

AUTOMOTIVE

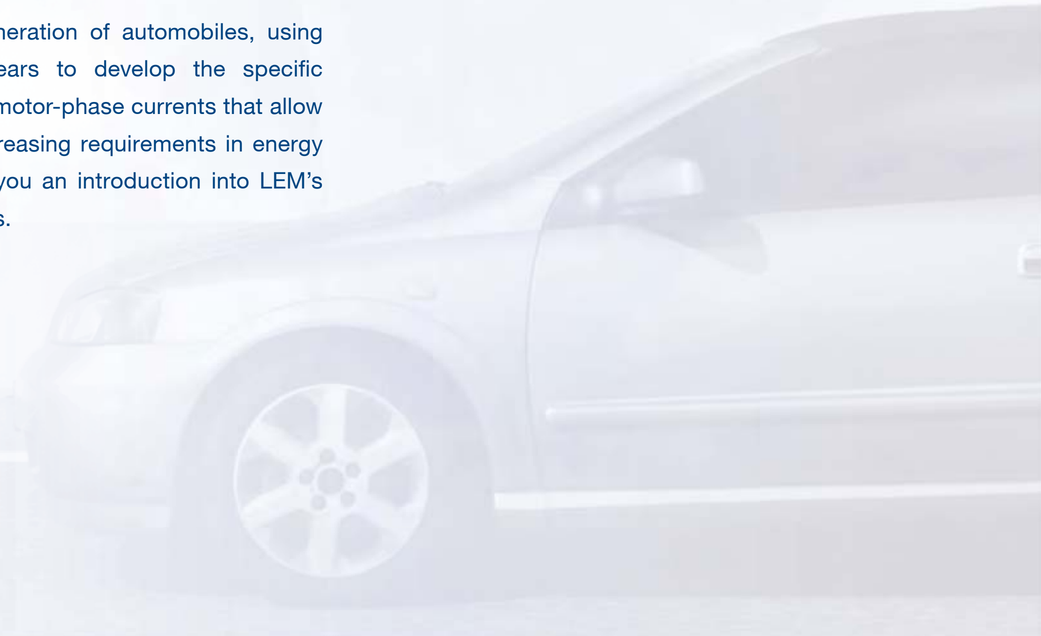
In the automotive market, LEM works with all the major car manufacturers and Tier-1 suppliers in the world, and supplies galvanically-isolated electronic transducers that measure electrical parameters in battery-management and motor-control applications.

The ever more stringent requirements for energy efficiency and reduced CO2 emissions lead car manufacturers to increasingly depend on on-board electrical components. From electric power-steering and stop-start technologies to on-board navigation and infotainment systems, these components put an additional load on the electrical circuits and particularly the battery, making it essential to control the energy generated and consumed by the various on-board systems. In collaboration with its customers and with the help of powerful simulation techniques, LEM uses the most-appropriate technology (from Hall-cell to fluxgate) to address the specific need of measuring the currents (coulombs) entering and leaving the car's battery and/or the alternator. This allows an intelligent management of available power that leads to the increased efficiency of today's internal-combustion engines. More importantly still, the hybrid- and electric-vehicles entering the market today depend on accurate measurement of battery-pack currents to determine the available driving range and recharging strategy. LEM has the technology.

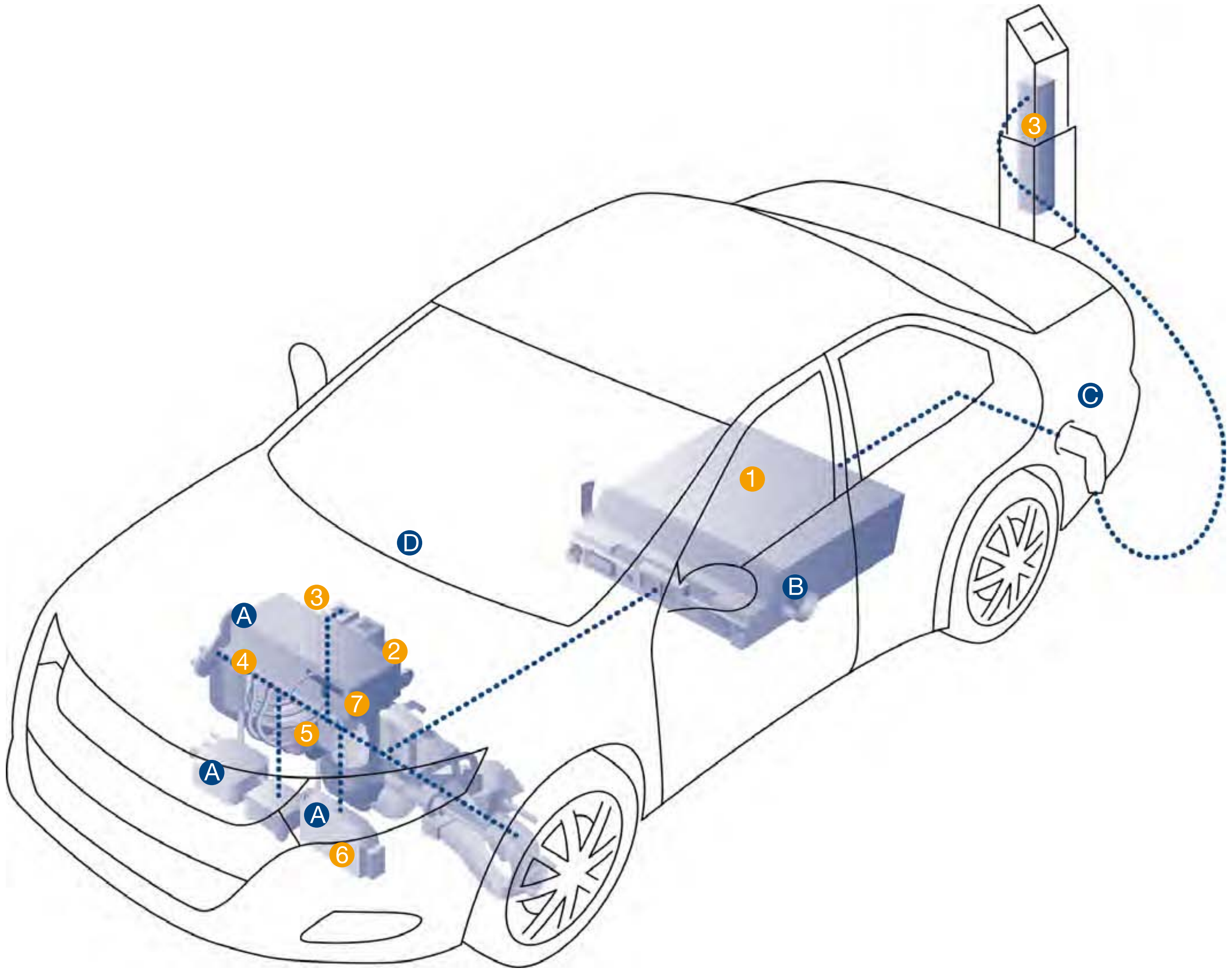
Not only must battery currents be accurately measured in hybrid- and electric-vehicles, but the electric motors driving the wheels of this new generation of automobiles also need to be precisely controlled to allow smooth operation. Electric motor phase-current sensing has been LEM's core competency since its beginning and remains today a major application for its technology. LEM has a dedicated product range for measuring phase-currents in motors and DC-DC converters essential to all hybrid- and electric-vehicles.

LEM is a key player in the new generation of automobiles, using its know-how acquired over 40 years to develop the specific technologies to measure battery and motor-phase currents that allow the car industry to meet the ever increasing requirements in energy efficiency. The following pages give you an introduction into LEM's technology for automotive applications.

HC2F model in inverter.



Automotive Applications Overview



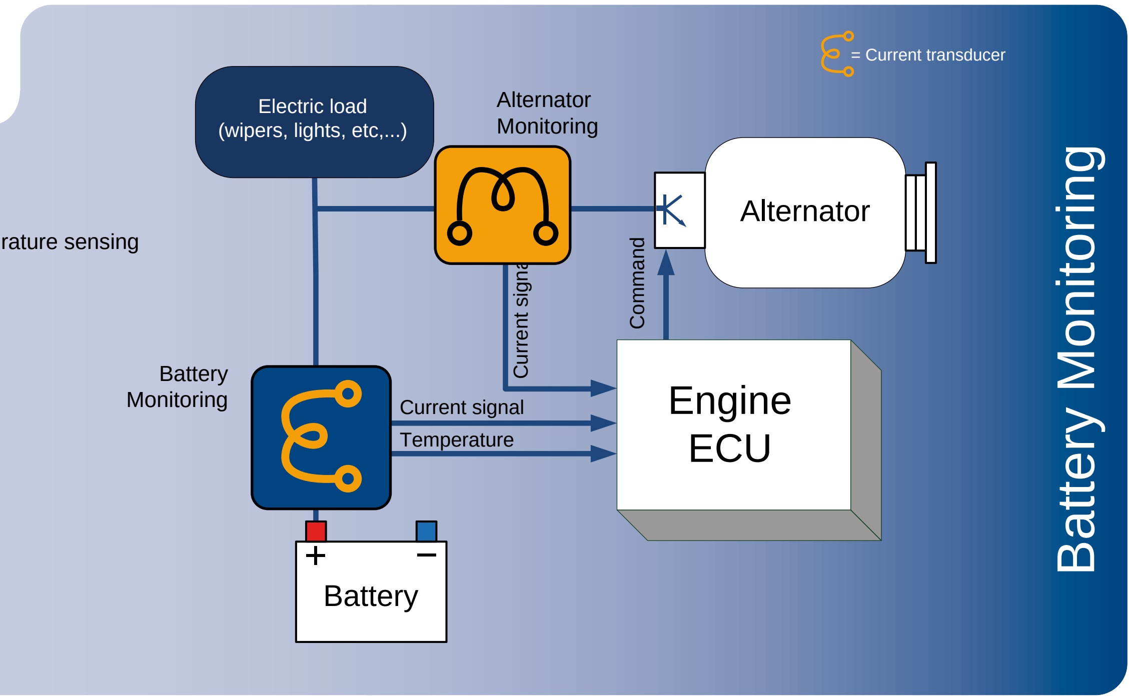
① High-voltage battery
② Vehicle control unit
③ Charger
④ Motor controller
⑤ Electric motor and transaxle
⑥ DC/DC converter
⑦ Electric power steering

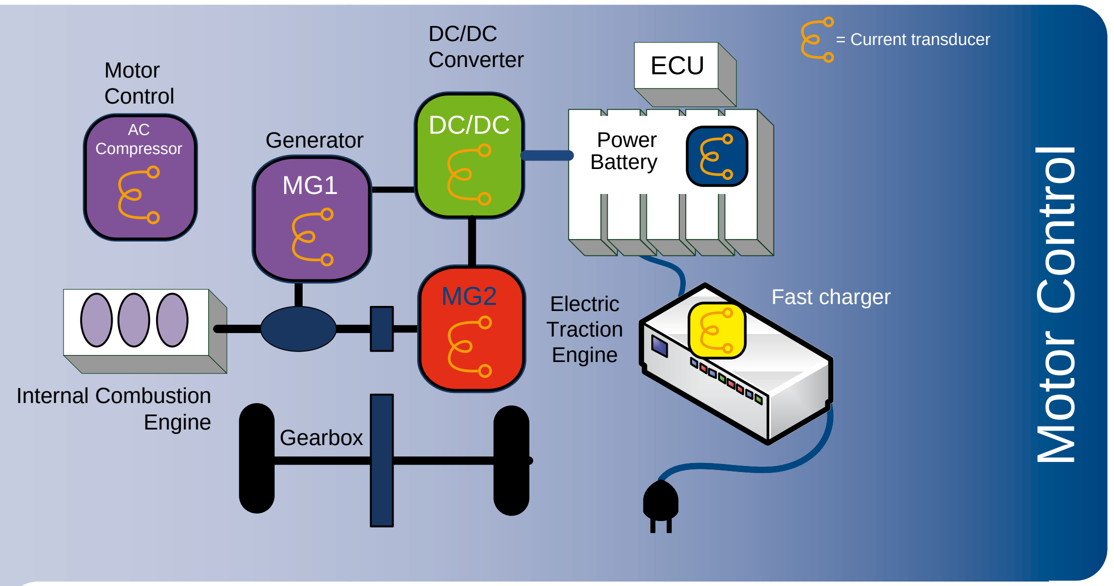
Ⓐ HAH1DR - HAH3 - HC2 - HC5 - HC6 - CKSR
Ⓑ DHAB - HAH1BV - CAB
Ⓒ CDT
Ⓓ FHS (dashboard)

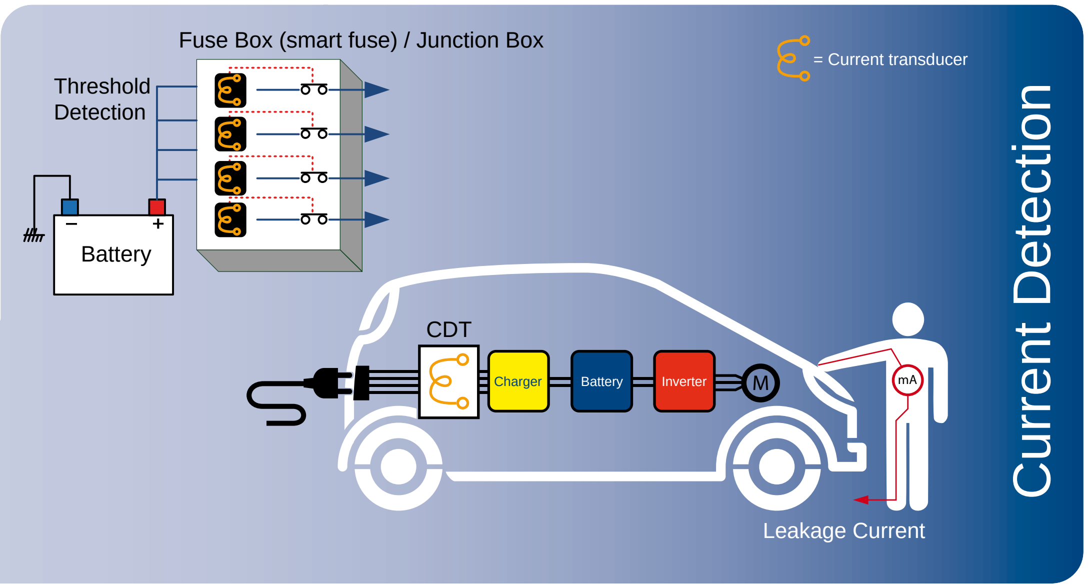
Automotive Selection Guide

Automotive Selection Guide

PRODUCT NAME		MAXIMUM PEAK MEASUREMENT RANGE (A)	OUTPUT SIGNAL	TYPICAL ACCURACY	APPLICATION
HAB		± 400	V / PWM	±2%	🟦
HABT		± 100	V	±2%	🟦 with temperature sensing
HAG		± 300	V / PWM	±2%	🟦🟧
DHAB		± 1000	V	±2%	🟦🟧
CAB		± 400	CAN / LIN*	±0.1%	🟦🟧
HAH1 BV		± 900	V	±2%	🟦
HAH1 DR		± 900	V	±2%	🟩🟥🟪
HC2F/HC2H		± 250	V	±3%	🟩🟥🟪
HC6F/HC6H		± 800	V	±3%	🟩🟥🟪
HC5FW		± 900	V	±1%	🟩🟥🟪
HC20		± 2000	V	±2%	🟩🟥🟪
HAH3		± 900	V	±1%	🟩🟥🟪 3 phase measurement
HAM		± 250	V	±1%	🟩🟥🟪🟨 very high frequency bandwidth
CKSR		± 75**	V	±1%	🟩🟪🟨
FHS40-P		± 100	V	±5%	⬛
CDT		0.1 A	V	±1mA***	⬜







- Operating temperature for all products: -40°C to 125°C
- Supply Voltage for all products: 5V, Ratiometric
- Customization of standard products possible. Contact us.

* Supply Voltage: 12V

** Operating temperature: -40°C to 105°C

*** Guaranteed error for leakage current detection

🟦 Battery Monitoring 🟧 Alternator Monitoring 🟩 DC/DC Converter 🟥 Inverter Drive 🟪 Motor Control 🟨 Charger ⬛ Threshold Detection ⬜ Leakage Current

Symbols and Terms

BW	Frequency bandwidth
CTI	Comparative Tracking Index
d_Cl	Clearance distance
d_Cp	Creepage distance
G	Sensitivity
ε_L	Linearity error
I_C	Current consumption
I_O	Zero offset current, $T_\mathrm{A} = 25$ °C
I_OE	Electrical offset current, $T_\mathrm{A} = 25$ °C
I_OM	Residual current @ $I_\mathrm{P} = 0$ after an overload
I_OT	Thermal drift of offset current
I_OUT	Max. allowable output current at I_PN or V_PN
I_PN	Primary nominal RMS current
I_P	Primary current
I_PM	Primary current, measuring range
I_PR	Primary residual current
I_S	Secondary current
I_SN	Secondary nominal RMS current
IPxx	Protection degree
K_N	Turns ratio
M	Mutual inductance
N	Number of turns
N_p	Number of primary turns
N_S	Number of secondary turns
$N_\mathrm{p}/N_\mathrm{S}$	Turns ratio
N_T	Number of turns (test winding)
R_IM	Internal measuring resistance
R_L	Load resistance
$R_\mathrm{M\ min}$	Minimum measuring resistance at $T_\mathrm{A\ max}$
$R_\mathrm{M\ max}$	Maximum measuring resistance at $T_\mathrm{A\ max}$
R_1	Primary resistor (voltage transducer)

R_P	Primary coil resistance at $T_\mathrm{A\ max}$
R_S	Secondary coil resistance at $T_\mathrm{A\ max}$
T_A	Ambient operating temperature
TCR_IM	Temperature coefficient of R_IM
TCI_OUT	Temperature coefficient of I_OUT
TCI_OE	Temperature coefficient of I_OE
TCV_OUT	Temperature coefficient of V_OUT
TCV_OE	Temperature coefficient of V_OE
TCV_Ref	Temperature coefficient of V_Ref
$TCV_\mathrm{OUT}/\ V_\mathrm{Ref}$	Temperature coefficient of $V_\mathrm{OUT}/V_\mathrm{Ref}$ @ $I_\mathrm{P} = 0$
TCG	Temperature coefficient of the gain
t_r	Response time
t_ra	Reaction time
U_C	Supply voltage
U_b	Rated isolation voltage RMS, reinforced or basic isolation
U_d	RMS voltage for AC isolation test, 50 Hz, 1 min
U_e	RMS voltage for partial discharge extinction @ 10 pc
U_Nm	Rated insulation voltage according to EN 50124–1
U_W	Impulse withstand voltage, 1,2/50 µs
V_H	Hall Voltage
V_O	Zero offset voltage, $T_\mathrm{A} = 25$ °C
V_OE	Electrical offset voltage, $T_\mathrm{A} = 25$ °C
V_OM	Residual voltage @ $I_\mathrm{P} = 0$ after an overload
V_OT	Temperature variation of offset voltage
V_OUT	Output voltage at ± I_PN or V_PN
V_PN	Primary nominal RMS voltage
V_P	Primary voltage, measuring range
V_Ref	Reference voltage
X	Typical accuracy, $T_\mathrm{A} = 25$ °C
X_G	Global accuracy @ I_PN or V_PN, $T_\mathrm{A} = 25$ °C

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Terms of delivery and rights to change design or specifications are reserved.

5 Year Warranty on LEM Transducers

We design and manufacture high quality and highly reliable products for our customers all over the world.

We have delivered several million current and voltage transducers since 1972 and most of them are still being used today for traction vehicles, industrial motor drives, UPS systems and many other applications requiring high quality standards.

The warranty granted on LEM transducers is for a period of 5 years (60 months) from the date of their delivery (not applicable to Energy-meter product family for traction and automotive transducers where the warranty period is 2 years).

During this period LEM shall replace or repair all defective parts at its' cost (provided the defect is due to defective material or workmanship).

Additional claims as well as claims for the compensation of damages, which do not occur on the delivered material itself, are not covered by this warranty.

All defects must be notified to LEM immediately and faulty material must be returned to the factory along with a description of the defect.

Warranty repairs and or replacements are carried out at LEM's discretion.

The customer bears the transport costs. An extension of the warranty period following repairs undertaken under warranty cannot be granted.

The warranty becomes invalid if the buyer has modified or repaired, or has had repaired by a third party the material without LEM's written consent.

The warranty does not cover any damage caused by incorrect conditions of useand cases of force majeure.

No responsibility will apply except legal requirements regarding product liability.
The warranty explicitly excludes all claims exceeding the above conditions.

Geneva, 21 June 2011

François Gabella
CEO LEM

June 2011/Version 1