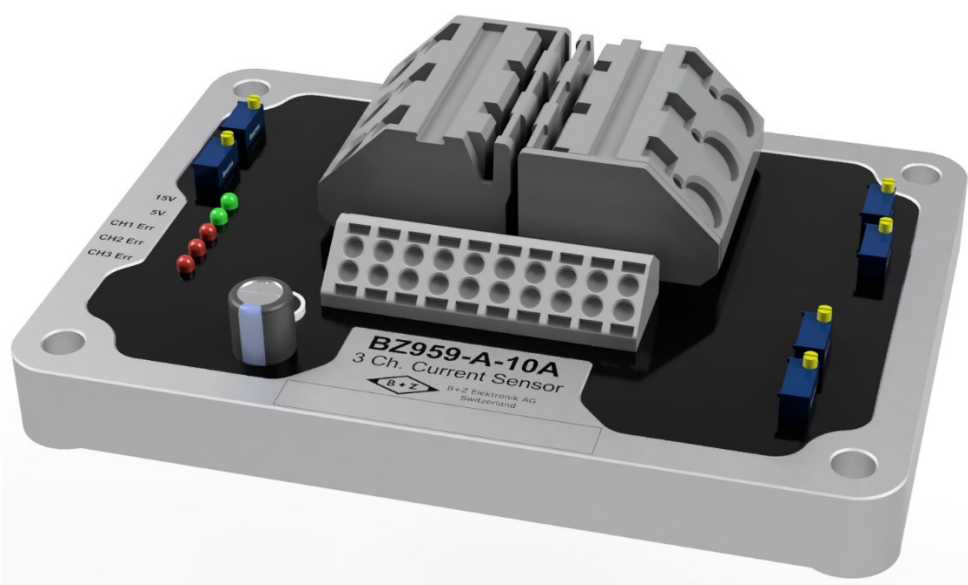




BZ959 Series

Three-phase AC current sensor with 4-20mA current loop output, available for operating voltages up to 500VAC



** Device appearance may vary based on the specific variant ordered.*

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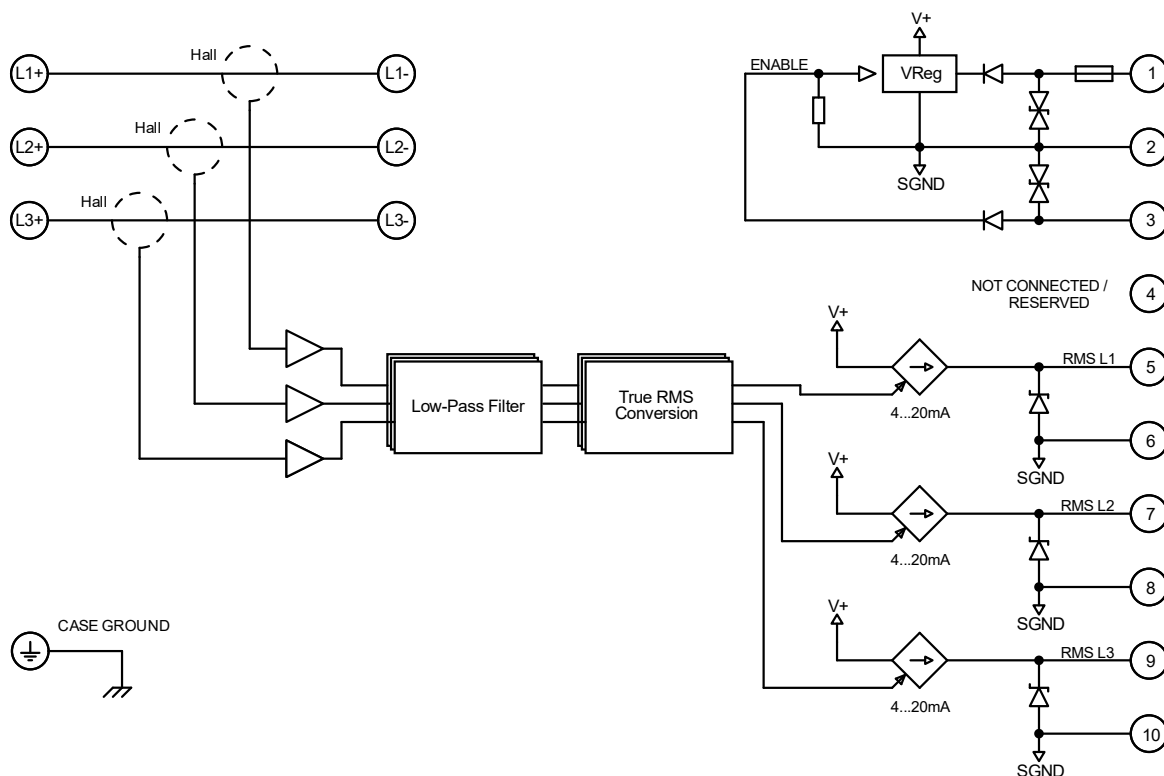
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ISO 9001
Certified
Quality Management System
www.tuvsud.com/ms-cert

Functionality and Features



Three Channel AC Current Measurement up to 30 A

The device measures AC RMS current in three independent channels, with working voltages up to 500VAC between channels and currents up to 30 A. A fully potted design ensures an isolation barrier between the current lines and the measurement circuit of 4kV. Surge currents of up to 3kA will not lead to destruction of the device.

True RMS Measurement

The current measured in each phase passes through a true RMS conversion circuit, providing accurate results for waveforms with crest factors up to 10 and frequencies in the range of 15 Hz to 500 Hz. For higher frequency signals special device variants can be created upon request.

4-20mA Current Loop Output

Each phase current output is realized using an industry standard 4-20mA current loop, where a 4 mA output indicates no current flow in this phase, and 20 mA indicates a current flow matching the specified full range value for that device variant. Phase currents above the specified measurement range will result in output currents above 20 mA. On power-on or device enable the outputs are held low for 100 ms typ. to prevent erroneous values from causing errors in attached conversion equipment. An error LED indicates output faults such as wire break or high load resistor for each channel.

Device Disable

To prevent over-range errors in attached ADC equipment in cases where more than the specified full range phase current is flowing, the device can be completely disabled with a digital input signal (ENABLE). Unless the voltage on this pin is > 15V, the device is fully disabled, draws no power from the supply net, and does not output any current signals. Phase current can still flow in this configuration.



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Three-Channel AC Current Sensor

Device Variants

BZ959 - A - 10A

Supply Voltage Range	Full Range Phase Current	
A (16V ... 45V)	5A	3.54 A _{RMS} (5 A _{PK})
B (30V ... 60V)	10A	7.07 A _{RMS} (10 A _{PK})
C (44V ... 138V)	20A	14.1 A _{RMS} (20 A _{PK})
See electrical environment for details	30A	21.2 A _{RMS} (30 A _{PK})

Environment

Stresses exceeding these limits may lead to device malfunction or damage.

General

Height above sea level	AX (max. 2500m)	(EN 50125-1:2014 Tab. 1)
Operational temperature	OT3 (-25°C to +70°C)	(EN 50155:2017 Tab. 1)
Temperature rise on power on	ST1	(EN 50155:2017 Tab. 2)
Fast temperature changes	H1	(EN 50155:2017 Tab. 3)
Vibration and shock	Kat. 1, Class B	(EN 61373:2010)
Dirt and condensation	PD2 (light / non-conducting)	(EN 50124-1:2017 Tab. A.4)

Electrical

Nominal supply voltage(s) / V		
Range A	24, 28, 36	(EN 50155:2017)
Range B	48	(EN 50155:2017)
Range C	72, 110	(EN 50155:2017)
Permissible long-term deviation	-30% to +25%	
Permissible short-term deviation (< 1s)	-40% to +40%	
Interruption class	S1 (none)	
Electromagnetic compatibility	EN 50121-3-2:2016	

Fire Protection

(Evaluated as grouped components according to EN 45545-2:2020)

	mounted inside of vehicle			mounted outside of vehicle		
	HL1	HL2	HL3	HL1	HL2	HL3
Combustible mass	124 g*	0g	0g	0g	0g	0g

* 100% of combustible mass is rated according to R24.

A detailed report as well as test certificates are available upon request.



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Technical Data

Power Supply

Power consumption	
Device enabled	1.3 W typ.
Device disabled	0W
Inrush current at power on	≤ 7 A for 500 μs at 2Ω supply
Inrush current at enable	≤ 100 mA
Transient protection	EN 50121-3-2:2016

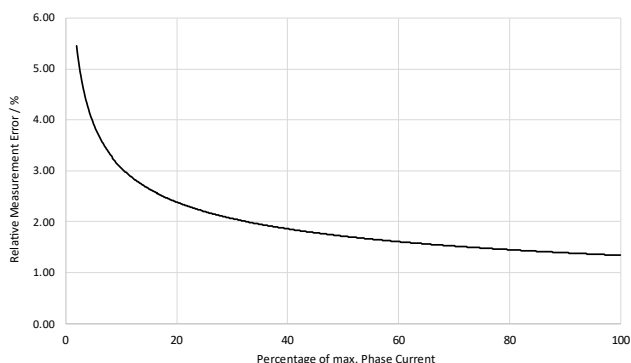
Current Measurement Channels

Max. operating voltage between two channels	500 VAC
Max. operating voltage between any channel and the supply voltage	500 VAC
Max. continuous current per channel	30 A
Channel resistance	< 4 mΩ typ.
Max. permissible 8/20 μs surge current	3 kA (EN61000-4-5)
Max. permissible single 10 ms pulse current	250 A

Transfer Characteristics

Pre RMS low-pass filter cut-off frequency	1.4 kHz typ.
Permissible frequency range for accurate RMS conversion	15 Hz to 500 Hz
Rated accuracy range	2% to 100% of rated current
Measurement accuracy within rated range after factory calibration	±5% typ. (see figure below)

Relative Measurement Error vs. Phase Current (typ.)



Current Output

Minimum output current	
Device enabled	4 mA
Device disabled	0 mA
Output short circuit current	37 mA typ.
Max. permissible short circuit duration	Infinite
Recovery from short circuit condition	Automatic
Max. load resistance	700 Ω
Duration of zero output on power-on or device-enable	100 ms typ.

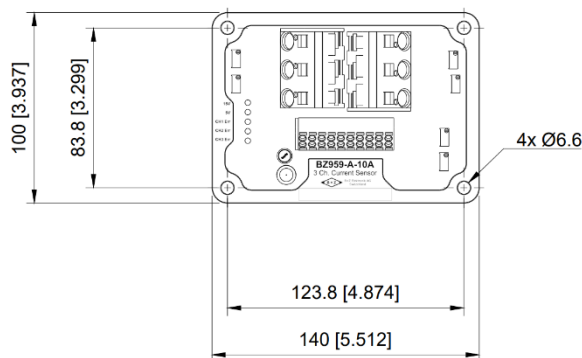
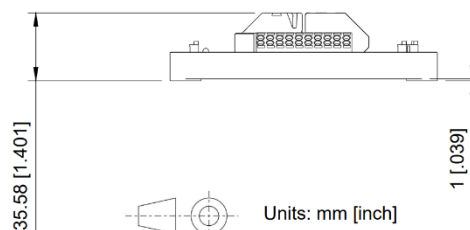
Insulation Data

Any phase (L1, L2, L3) to metal case	4 kVDC, 60s
Any phase to any other phase	4 kVDC, 60s
Any phase to measurement circuitry	4 kVDC, 60s
Measurement circuitry to metal case	4 kVDC, 60s

Mechanical Data

Weight	450 g
Mounting options	4xM6 on flat surface
	Use only 3 bolts if the mounting surface is not sufficiently flat, to prevent mechanical stress on the assembly.
Mounting position	any
Mounting distances:	
sides	5 mm
top / bottom	5 mm
Housing material:	
body	Aluminium
potting compound	PU based

Dimensions



Exposed Potentiometers

The exposed potentiometers are used for initial calibration of the device during manufacturing. Manual calibration by the end-user or service personnel is not required and may lead to increased measurement error and/or errors in the connected ADC equipment.

Degraded devices can be returned to B+Z for testing and re-calibration. Please contact us for an offer.



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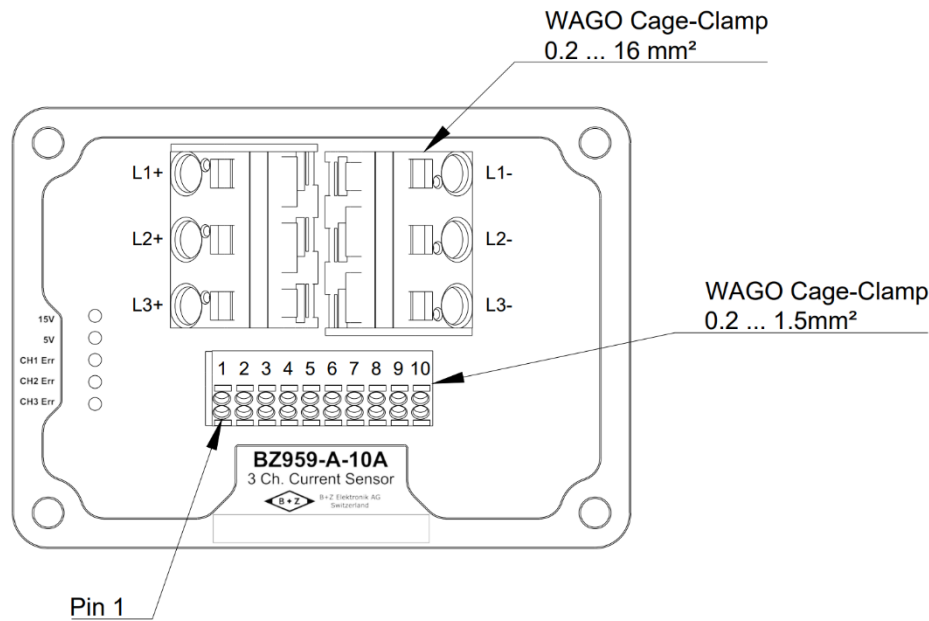
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Other Information

Front Panel



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