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3-range AC Current Transformer

-- ACCT-E-3R User's instructions --

Rev. 1.0

Record of updates

Version	Date	Updates performed
1.0	06/2018	ACCT-E-3R User's instructions First release

TABLE OF CONTENTS

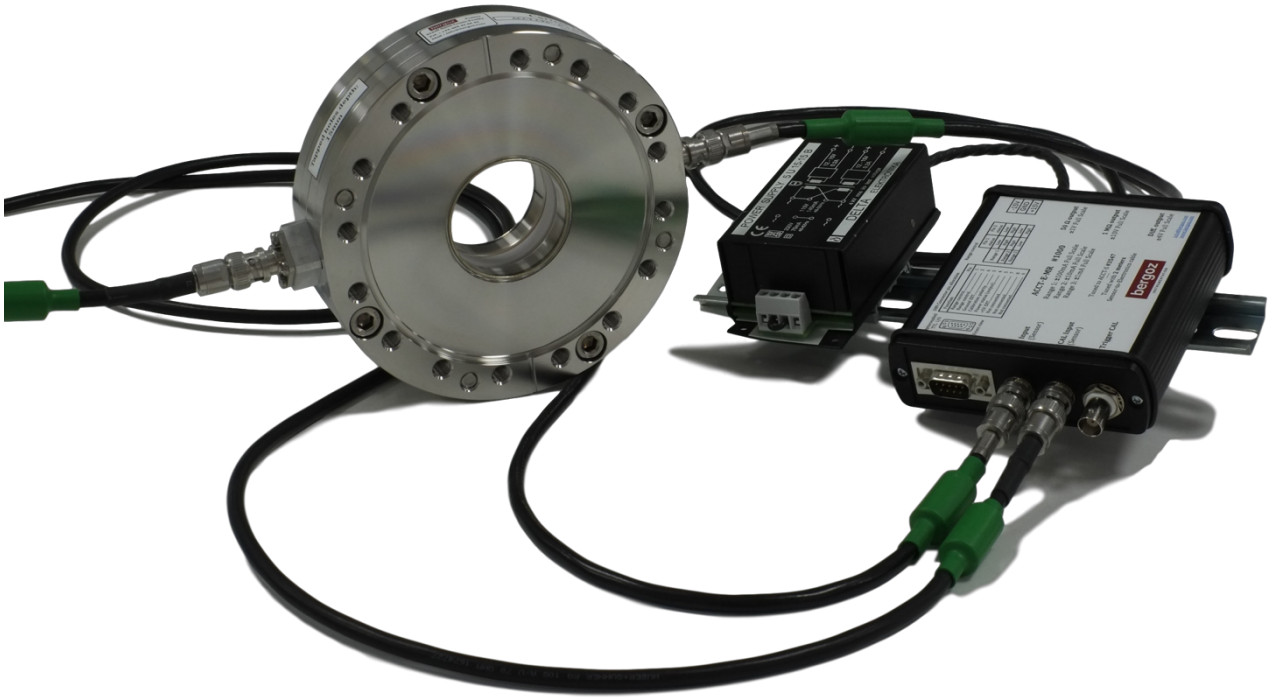
GENERAL DESCRIPTION

ACCT-E-3R has been developed to cover a large range of beam currents. Three preset selectable ranges from 1 mA full scale to 2 A full scale allow macropulses to be measured with <2 %/ms output droop and <120 ns output rise time.

The above droop figure and risetime correspond to 3 Hz to 3 MHz (-3dB) bandwidth.

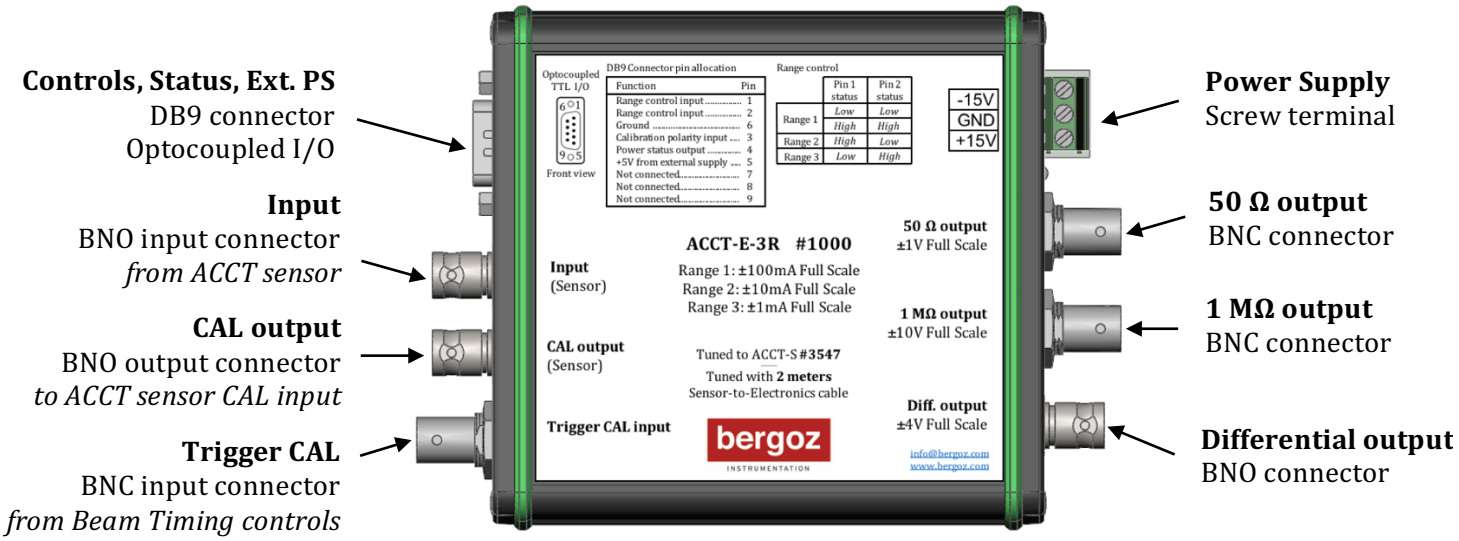
A set of ACCT with 3 ranges includes:

- One AC Current Transformer, In-air or In-flange model;
- One ACCT-E-3R external electronics box with three ranges. The ranges full scale value can be determined at the time of ordering. ACCT-E-3R mounts on a 35-mm normalized DIN rail. It must be supplied +15V and -15V to its screw terminal.
- One ACCT sensor to ACCT-E-3R interconnect cable. Maximum cable length without degradation of the ACCT specifications is 2 meters:
  - ACCT-Cxx is a standard cable, where xx is the cable length in meters. Cable is a twisted pair RG108 with PVC jacket, it is fitted at both ends with common-mode filters.
    -or-
  - ACCT-RHCxx, a radiation-tolerant shielded twisted pair cable in Siltem (R.I. >7), where xx is the cable length in meters.
- One ACCT-PS-1515, power supply unit mounted on the normalized 35-mm DIN rail.



In-flange ACCT sensor with ACCT-E-3R and power supply

INPUTS/OUTPUTS



DB9 Connector pin allocation

Function	*Pin*
Range Control input	1
Range Control input	2
Ground	6
Calibration Polarity input	3
Power Status output	4
+5V from external power supply	5
Not connected	7
Not connected	8
Not connected	9

DB9 connector input and output signals are TTL levels.

<u>Range Control input (pin 1 & 2)</u>

Pin 1 status	*Pin 2 status*	*Range*
Low	Low	Range 1
High	High	Range 1
High	Low	Range 2
Low	High	Range 3

<u>Calibration Polarity input (pin 3)</u>

Low	Positive calibration pulse
High	Negative calibration pulse

Power Status output (pin 4)

High when ACCT-E-3R is powered.
Low when ACCT-E-3R is not powered.

Since this output is optocoupled, +5 V must be provided on pin 5 of the DB9 connector to activate this functionality.

Ground (input, pin 6)

Reference of the TTL signals and +5V EXT (pin 5).

+5V from external power supply (input, pin 5)

+5V (referenced to Ground, pin 6) must be applied to activate the Power Status functionality.

Input
To be connected to the ACCT sensor output with a twisted pair cable fitted with BNO connectors and common-mode filters.

CAL output
To be connected to the ACCT sensor calibration winding output with a twisted pair cable fitted with BNO connectors and common-mode filters.
The calibrated pulse is generated by the ACCT-E-3R electronics and injected into the sensor calibration winding via the sensor CAL input connector.
The calibrated pulse amplitude is adjusted to be 50% of the full scale of the selected range.
E.g., when the range selected is 10 mA, the amplitude of the calibrated current pulse is 5 mA.
The calibrated current pulse length is defined by the Trigger CAL signal length.

Tigger CAL input
Trigger signal controlling the calibrated current pulse.
The trigger signal has to be TTL level.
The calibrated current pulse length is equal to the trigger pulse length.

Power Supply
The ACCT-R-3R is powered with +15 V and -15 V, 15 W.
It is recommended to use either the ACCT-5U15-15B or ACCT-PS-1515 power supplies provided by Bergoz Instrumentation. They guarantee the ACCT-E-3R output noise specifications.

50 Ω output
BNC connector, 50 Ω output impedance.
To be read in 50 Ω impedance input.
-1 V to +1 V proportional to the selected range full scale.
Maximum output current drive: 70 mA source or sink.

1 MΩ output

BNC connector, 50 Ω output impedance.
To be read in high impedance input.
-10 V to +10 V proportional to the selected range full scale.
Maximum output current drive: 32 mA source or sink.

Differential output
BNO connector, 50 Ω single-ended output impedance (100 Ω differential output impedance).
-4 V to +4 V proportional to the selected range full scale, when read in high impedance.
-2 V to +2 V proportional to the selected range full scale, when read in 50 Ω impedance.
Maximum output current drive: 40 mA source or sink.

SPECIFICATIONS

Full scale ranges	Any value from ± 1 mA to ± 2 A factory preset range ± 5 A on request.
50 Ω output full scale	-1 V ... +1 V in 50 Ω
1 MΩ output full scale	-10 V ... +10 V in high impedance
Differential output full scale	-4 V ... +4 V in high impedance
Lower cutoff frequency	< 3 Hz (-3dB)
Droop	< 2 %/ms
Upper cutoff frequency	3 MHz (-3dB)
Risetime	117 ns (10% - 90%)
50 Ω output offset	< 0.5 mV typ.
1 MΩ output offset	< 4 mV typ.
Differential output offset	< 4 mV typ.
Noise at 10mA F.S. (1 MΩ output)	< 4 μArms
Noise at 100mA F.S. (1 MΩ output)	< 20 μArms
Power supply	+15 Vdc and -15 Vdc, 100 mA ea.
Power supply unit	ACCT-PS-1515 recommended Mains voltage 95-125 Vac / 215-245 Vac, 50/60 Hz
Connectors	Sensor winding: TwinBNC aka BNO Sensor CAL winding: TwinBNC aka BNO Electronics input: TwinBNC aka BNO Electronics CAL output: TwinBNC aka BNO Electronics Trigger CAL: BNC Electronics 50 Ω output: BNC Electronics 1 MΩ output: BNC Electronics Differential output: TwinBNC aka BNO
Sensor cable	Shielded twisted pair 78 ohms. Up to 2 meters Above 2 meters overshoot may appear and rise time may increase
Ratio accuracy error	< 0.1 % FS
Destructive level	DC current: Unlimited Spikes: 100 mC max. AC current: 20 Arms max.
Output current limit	50 Ω output: 70 mA max. source or sink 1 MΩ output: 32 mA max. source or sink Differential output: 40 mA max. source or sink

Sensor saturation	External magnetic field: Transverse to sensor axis: 2 mT max Collinear with sensor axis: 10 mT max Can be exceeded with optional embedded shielding, Options –SH2L and –SH4L
Temperature drift	Negligible.