EXCOUNT-I
User´s guide

Power and productivity
for a better world™

Legal disclaimer

Any responsibility or liability for loss or damage in connection with the use of this product and the accompanying documentation is disclaimed. The information in this document is furnished for informational use only, is subject to change without notice, may contain errors or inaccuracies, and represents no commitment whatsoever.

WARNING!

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

Laser radiation — avoid direct eye exposure.
Class II laser product.

Safety instructions

Do not connect the sensor to voltage sources other than a 9-volt Lithium battery with a capacity of minimum 1200mAh. Ensure that the battery is connected correctly.

WARNING!

All work related to the fitting, mounting, assembly or handling of EXCOUNT-I and the surge arresters should be done with disconnected and earthed conductors. Follow all regulations and rules stated by international or national safety regulations.

Normally, the EXCOUNT-I and the surge arresters operate at a high voltage. Therefore they must be installed in such a way that only qualified personnel has access to them.

EXCOUNT-I is a surge counter with basic leakage current measurement function. The counter provides a number of unique features such as short-circuit safety and a well-proven electronic display which is easy to read, even in direct sunlight. EXCOUNT-I is specially designed for use with all makes and types of gapless arresters and in diverse environments.

This user´s guide covers ABB´s four different models of surge counter EXCOUNT-I. Please follow the instruction for your model.

Model	Surge Counting	Leakage current measurement	Auxiliary contact	Laser pointer included
1HSA440000-C	Yes			
1HSA440000-E	Yes		Yes	
1HSA440000-J	Yes	Yes		Yes
1HSA440000-L	Yes	Yes	Yes	Yes

Key to the symbols

This symbol is a visual notice to avoid mistakes which can result in damage of the material and/or no function of the surge arrester monitor EXCOUNT-I.
Read the text carefully and if you don't understand do not proceed.

Serious material damage, severe personal injury and/or death can be the result of not following the information given beside this symbol. Read the text carefully and if you don't understand do not proceed.

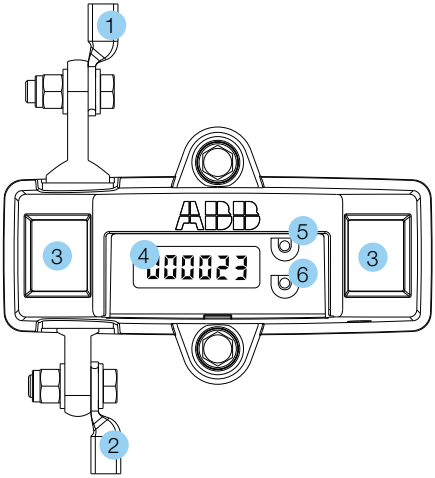

Figure 1.1 EXCOUNT-I

Laser radiation —
avoid direct eye exposure.
Class II laser product.

Figure 1.2 Laser pointer
1HSA440000-J and 1HSA440000-L

1	Connection from the arrester earth terminal	5	Activation diode, total leakage curent measurement
2	Connection to earth	6	Indication diode
3	Solar panel	7	Laser beam direction
4	Display surge counting/leakage current	8	Button to start the laser beam

2.1 Inspection upon arrival

Upon arrival it is important that the cases are inspected and the contents checked against the packing list which is attached to each case. Any shortage or damage should be reported immediately to the insurance and/or ABB representative and not later than 30 days from the arrival of the goods. ABB cannot take responsibility for shortages or damages not reported within this time period.

Verify that the following items are present together with this manual:

- EXCOUNT-I
- Laser pointer with three batteries (only for 1HSA440 000-J and 1HSA440 000-L)

If the contents are to be stored for a long period of time prior to use, they should be kept dry and indoors.

2.2 Tools for assembly

Special instruments or tools are not required for installation of the EXCOUNT-I.

2.3 Insert the 9V battery in the EXCOUNT-I

For indoor use a 9V battery should be installed since the power from the solar cells may be too low. To install the battery, open the battery cover using a Philips screwdriver to loosen the two screws. Insert the battery ensuring correct polarity,
then replace the battery cover and firmly tighten the screws.

The EXCOUNT-I shall be installed in such a way, that the battery cover can be opened.

2.4 Insert the batteries in the laser pointer (optional)

The laser pointer delivered together with EXCOUNT-I is used for triggering the total leakage current measurement, before using it you'll need to install all three batteries placed inside the laser pointer box.

2.5 Note the counter number

Read and note the counter number before operation of the sensor.

3.1 Design features

As with all surge counters from ABB, EXCOUNT-I does not negatively affect the residual voltage of the arrester thanks to the use of a single turn primary. EXCOUNT-I is housed in a sealed, weather-proof case, suitable for outdoor use and proven to match the short-circuit capability of the arresters. EXCOUNT-I has been designed for highest personal safety and has been successfully short-circuit tested at 65 kA.

EXCOUNT-I requires no external power supply as it incorporates its own internal power source in the form of a high-efficiency capacitor charged by solar cells.

The electronic display is of Cholesteric Liquid Crystal Display type. This ensures highest readability, even in direct sunlight. The display is Bi-stable, which means that power is only required during refresh of the display.

3.2 Surge registration

EXCOUNT-I registers the surge each time the arrester has discharged a current over 10 A. The accumulated number of surges is continuously shown on the electronic display.

3.2.1 Auxiliary contact (optional)

EXCOUNT-I with auxiliary contact for remote indication (surge count) can be connected to local recording equipment, eg SCADA, provided the connections made are compatible with the below criteria.

Version 1HSA440000-E and 1HSA440000-L has a passive normally-open auxiliary contact for remote indication of surge counting. The contact will be closed for approximately 100ms when EXCOUNT-I indicates an impulse count. Connection to the auxiliary contact is made via the 2-wire cable brought to the outside of the counter. The auxiliary contact is equipped with overvoltage protection. However, when wired for remote indication additional overvoltage protection at the remote end is strongly recommended.

The auxiliary contact may be fed by either AC or DC source. Maximum voltage shall not exceed values given in the table below.

Source	Max Voltage	Max Current
AC	250 V_{rms}	1 A_{rms}
DC	250 V	1 A

In addition, an auxiliary relay of suitable type must be connected separately to the EXCOUNT-I auxiliary contact as in the figure 3.3. This auxiliary relay is not included with EXCOUNT-I, as standard. ABB recommended relays listed in the table below should be used to guarantee correct functionality.

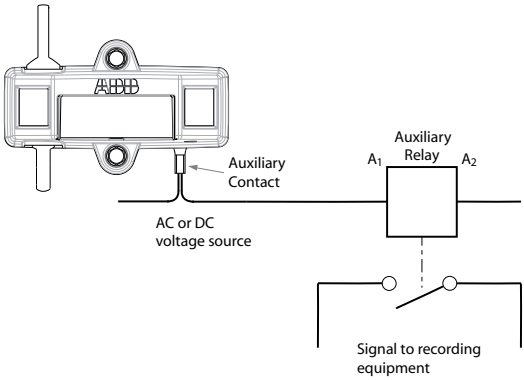

Figure 3.3

Recommended Auxiliary Relays	
Voltage source	**Relay type**
AC / 250 V	CR-M 230 AC 2
DC / 250 V	CR-M 220 DC 2
Other voltages: Details upon request	

3.3 Leakage current measurement (optional)

The measurement is initiated by triggering a light sensitive diode using the laser pointer. This will initiate EXCOUNT-I to start measuring the total leakage current for several cycles and shortly thereafter display the average value (in milliamperes). The counter will then automatically return to its normal state after 30 seconds and display number of impulses.

When triggering total leakage current measurement with the laser pointer it is recommended that one is standing in front of the surge monitor at a distance no further than 3m, see Figure 3.4.

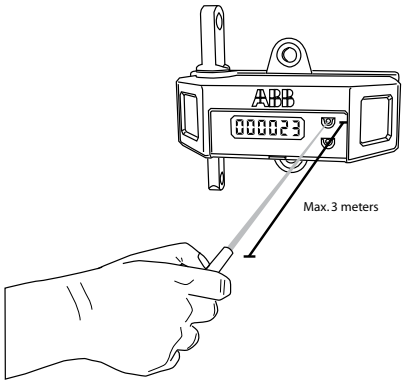

Figure 3.4

Safety information

Serious material damage, severe personal injury and/or death can be the result of not following this instruction. Therefore, the personnel responsible for the installation of the equipment should read and follow this instruction carefully.
Handling and maintenance of all the sensors described in this instruction must be done by personnel trained for this type of work.

WARNING!
All work related to the installation of EXCOUNT-I and the surge arresters should be made with de-energized and earthed conductors. Follow all regulations and rules stated by international or national safety regulations.
Normally, the EXCOUNT-I and the surge arresters operate at a high voltage. Therefore the sensor must be installed in such a way that only qualified personnel has access to it.

Battery replacement
If battery is needed, eg. for indoor use, the EXCOUNT-I should be installed in such a way, that the battery cover can be opened.

4.1 Installation on structure

For the size of the drilling plan, please refer to dimensions of the EXCOUNT-I in section 5, technical data.

If the included M10 bolt does not fit, another bolt with M10 thread can be used. Tightening torque for M10 is 49 Nm.

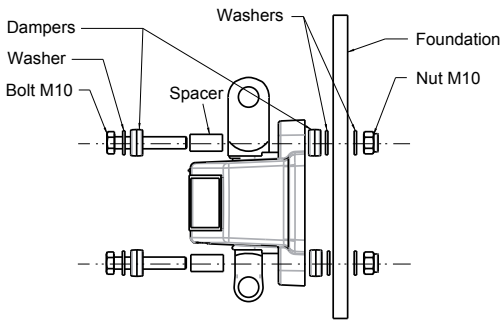

Figure 4.1

4.2 Connection of conductors

These bolts, nuts and washers are not included. Recommended bolt size M12, use washers, see Figure 4.2.

Tightening torque for M12 is 84 Nm

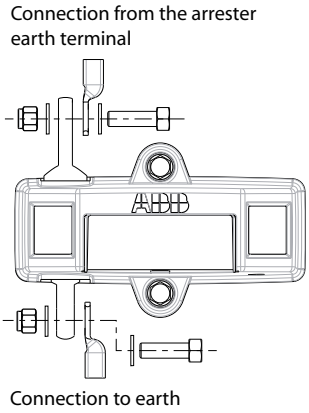

Figure 4.2

Length of the conductors

The length of the conductor between the arrester and the surge counter is to be minimum 0,5m when a clip-on CT is to be used for control measurements of leakage current. The maximum length shall not exceed 3 m in the case of the insulating base and conductor having a LIWV of 15 kV. Longer lengths up to 10m could be used with an insulating base having suitably higher LIWV. The insulated base and conductor shall then be insulated for 5xL kV (LIWV), where L is the conductor length in meters as shown in Figure 4.3.

The conductor from the earth terminal of the counter to connection with the grounded support stand (point A in Figure 4.3) on to which the counter is attached (or similar support) shall not exceed 0,5m. For example, Length B as shown in Figure 4.3. The earth conductor may be extended from the connection point at the support to any “earth point” if the support itself, due to local requirements, is not considered as sufficiently grounded. However, a flashover of the arrester base may occur if the total length (L+B in Figure 4.3) results in the LIWV as described above being exceeded and the counter may be damaged if the length B exceeds 0.5m.

Standard ABB insulated base	Maximum length L*)
1HSA430 000-A, -B	10
1HSA430 000-C, -D	10
1HSA430 000-H, -J	10
1HSA430 000-P	3

*) On the condition the connecting conductor has at least LIWV = 5xL kV

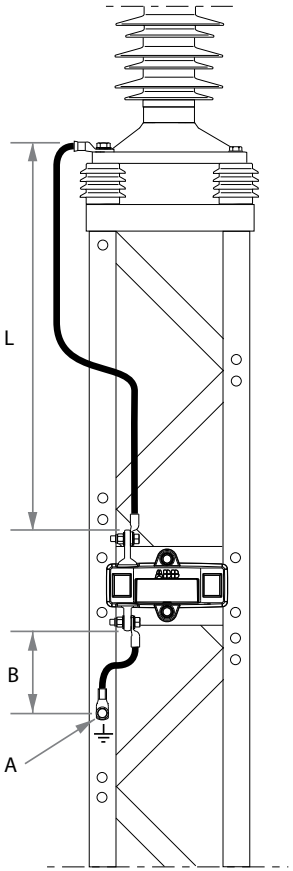

Figure 4.3

General

Climatic conditions	Sealed water-tight design, IP67
Short-circuit capability	65 kA according to IEC 60099-4
Power supply	Built-in solar cells Battery, alternative for indoor use 9-volt Lithium battery with a capacity of minimum 1200mAh.

Surge registration

Minimum counting threshold (8/20 microseconds)	10 A
Surge counting memory capacity	999999 registrations (wrap around)
Time resolution	< 0.5 s

Leakage current measurement

Measuring range of total leakage current	0.1 — 50 mA_{peak}
Measuring frequency range	48 — 62 Hz

Laser pointer

Battery type	LR44-L 1.5 V type Alkaline
Laser pointer wavelength	630 — 680 nm

EXCOUNT-I versions

EXCOUNT-I can be supplied with an output connection (auxiliary contact) for interfacing to external signalling equipment. A version with only surge counting function are also available.

Model	Surge Counting	Leakage current measurement	Auxiliary contact	Laser pointer included
1HSA440000-C	Yes			
1HSA440000-E	Yes		Yes	
1HSA440000-J	Yes	Yes		Yes
1HSA440000-L	Yes	Yes	Yes	Yes

Position of auxiliary contact

The length of the cable is about 50 cm.

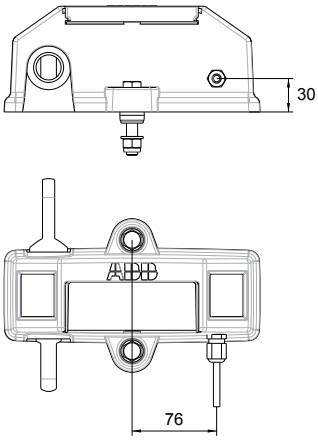

Figure 5.1

1HSA440000-E and 1HSA440000L

Dimensions

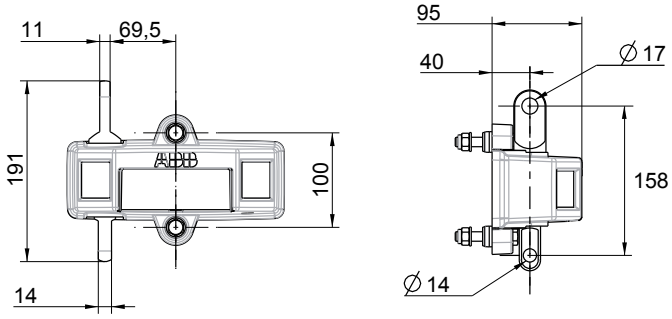

Figure 5.2

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NOTE! ABB AB is working continuously to improve the products. We therefore reserve the right to change designs, dimensions and data without prior notice.

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