

This document is intended as a reference guide for installing and using a Bender EDS440-L or EDS441-L ground fault location module, compatible only with the Bender iso685-D-P and LIM2010. This document includes installation, setup, and usage instructions. For complete details, including installation, setup, settings, and troubleshooting, refer to the complete EDS440 / EDS441 user manual. This document is intended as a supplement and not a replacement to the complete user manual.

Only qualified maintenance personnel shall operate or service this equipment. These instructions should not be viewed as sufficient for those who are not otherwise qualified to operate or service this equipment. This document is intended to provide accurate information only. No responsibility is assumed by Bender for any consequences arising from use of this document.



### Applicable and Compatible Devices

This document is for use only with models EDS440-L-4 and EDS441-L-4. These models are ONLY compatible with the Bender iso685-D-P ground fault detector and Bender LIM2010 line isolation monitor. Refer to EDS440 / EDS441 technical documentation for information on modules compatible with other ground fault detectors.

### Installation

#### Mounting

EDS440-L and EDS441-L modules are either DIN rail or screw mounted. Refer to Figure 1 for dimensions.

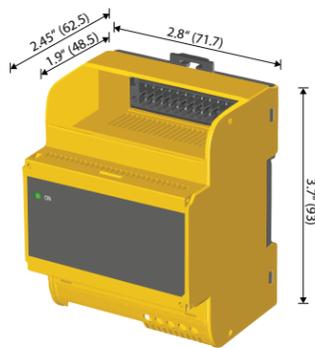


Figure 1 - EDS440 / EDS441 dimensions, in inches (mm)

### Wiring - Overview

Figures 2 and 3 show only basic connections to the respective device. For other configurations, such as for systems with voltage couplers or other external connections, refer to the respective devices' user manual.

Observe the following requirements while wiring:

- Supply voltage for EDS440-L / EDS441-L modules is AC/DC 24 - 240 V. Direct connection of the supply voltage to the monitored system is only allowed for systems 240 VAC line-to-line or less.
- Use minimum AWG 24, maximum AWG 12 wire.
- Use copper wire only.
- For screw terminals, appropriate stripping length is 0.25" (7 mm).
- For screw terminals, appropriate tightening torque is 5 - 7 lb-in (0.5 - 0.6 N-m).
- For push-wire terminals, the appropriate stripping length is 0.4" (10 mm).
- For RS-485 connections, use twisted, shielded pair RS-485 cable.
- Up to twelve (12) branches can be monitored from a single EDS module. Each branch / channel requires one (1) current transformer. All system conductors must be run through the current transformer. The ground conductor is NOT wired through the CT. Refer to "Wiring - Current Transformers" for more information.
- Direction is unimportant when routing conductors through current transformers.
- After completing wiring, replace the terminal cover, ensuring it clicks.

**⚠ DANGER**

**HAZARD OF ELECTRIC SHOCK,  
EXPLOSION, OR ARC FLASH**

- Disconnect all power before servicing.
- Observe all local, state, and national codes, standards, and regulations.

### Wiring - iso685

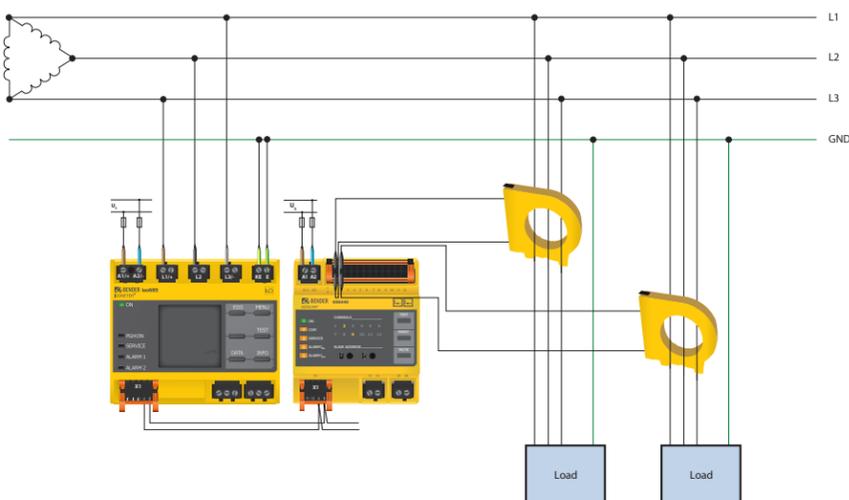


Figure 2 - Wiring diagram, iso685 and EDS440-L for typical three-phase AC application

### Wiring - LIM2010

NOTE: Wiring only required for retrofitting applications. Complete isolated power panels with EDS modules included at the factory are pre-wired.

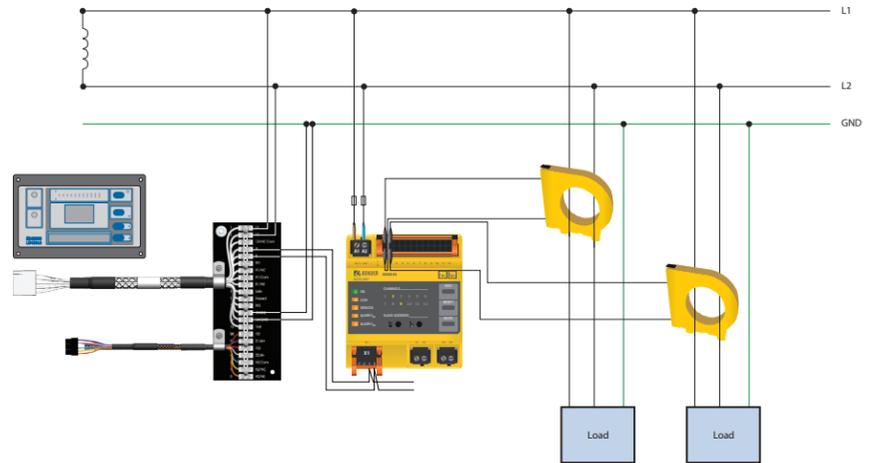


Figure 3 - Wiring diagram, LIM2010 and EDS441-L for typical isolated power system application

### Wiring - Current Transformers

Each channel requires one (1) Bender current transformer. Refer to EDS440 / EDS441 technical documentation for compatible current transformers. Only current transformers listed may be used with EDS modules.

All branch conductors must pass through the current transformer. The ground wire does NOT go through the current transformer. Direction is unimportant when routing conductors.

Depending on the current transformer type, terminals may be screw type or push-in type. Connect the terminals as shown in Figure 4 to the push-wire connectors on the EDS module.

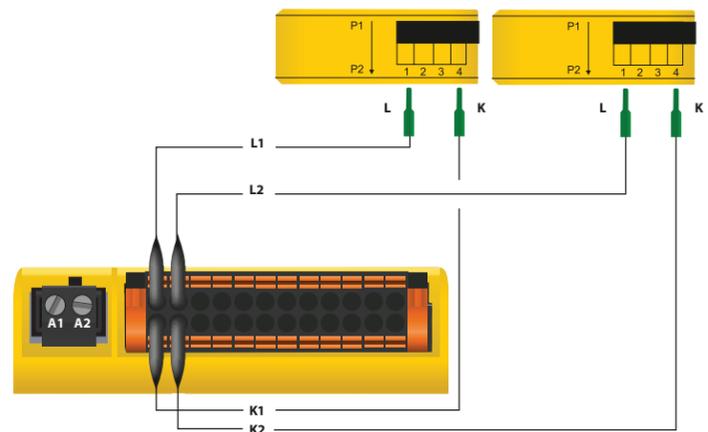


Figure 4 - Connecting Bender current transformers to EDS module

### Initial Setup - Communication Address

EDS440-L modules connect to the iso685-D-P or LIM2010 using an RS-485 communication bus. Each device on this bus must be wired in a daisy chain configuration, and assigned a unique address. No two devices on the same RS-485 bus must have the same address. Addresses should be assigned sequentially.

Refer to Figure 5. Using the dials located under "SLAVE ADDRESS" on the front of the EDS440/EDS441-L, assign a unique address. For example, if connecting to an iso685-D-P and nothing else, the iso685 should be assigned address 1, and the EDS should be assigned address 2.

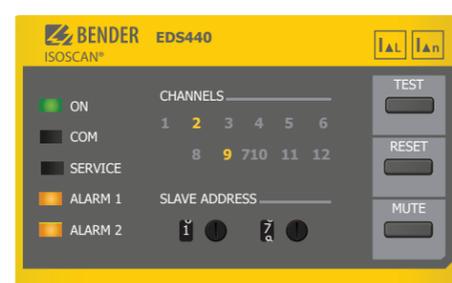


Figure 5 - EDS440-L front plate

### Initial Setup - LIM2010

All EDS441-L modules for use with the LIM2010 line isolation monitor for healthcare facilities are preconfigured at the factory. Contact Bender if any changes are required. Typical preconfigurations include the following (settings may vary by application):

- Tracer signal magnitude: 1 mA (as required by code / standards, may vary by application)
- Enabled channels: Configured to application / panel

### Initial Setup - iso685-D-P

All setup and alarm notifications appear on the connected iso685 device, as well as the indicator LED on the EDS440 / EDS441. Initial setup procedure varies depending on type of installation (new installation of connected iso685, or adding an EDS to an existing iso685-D-P installation).

#### New iso685 installation

During initial setup, a setup option entitled "EDS mode" will appear. Refer to Figure 6.

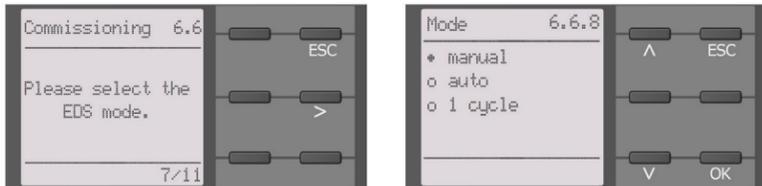


Figure 6 - EDS Mode configuration on iso685 during initial setup

EDS mode determines when the tracer signal for fault location is activated.

- Manual: Fault location is only activated when manually activated by user.
- Auto: Fault location is automatically activated when a fault has been detected by the connected iso685. Fault location remains active until the connected iso685 returns to the normal state. This option is recommended for most applications.
- 1 cycle: Fault location is automatically activated when a fault is detected by the connected iso685. Fault location runs only for 5 minutes.

After this step is completed, an additional steps requires selecting the magnitude of the tracer signal current used in fault location. Refer to Figure 7.

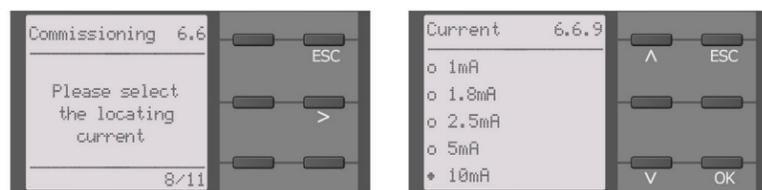


Figure 7 - EDS tracer signal current configuration on iso685 during initial setup (options as shown are for EDS441)

Appropriate tracer signal magnitudes vary by connected EDS module:

- EDS440: 5 mA, 10 mA, 25 mA, 50 mA
- EDS441: 1 mA, 1.8 mA, 2.5 mA, 5 mA

Selecting the appropriate tracer signal magnitude varies by a number of factors, including but not limited to system size, system voltage, and leakage capacitance. For general applications, select the lowest value possible that will still allow for optimal performance. Refer to EDS440 / EDS441 user manual for detailed information on selecting the appropriate tracer signal.

#### Existing iso685 installations

Follow the instructions below to enable EDS operation for iso685-D-P devices that have already been in service:

- Press the MENU button to enter the main menu.
- Navigate to menu option EDS. Press the RIGHT ARROW (>) button.
- Navigate to menu option CURRENT. Press the RIGHT ARROW (>) button.
- Select the tracer signal magnitude as described above. Press the OK button.
- Navigate to menu option MODE. Press the RIGHT ARROW (>) button.
- Select the EDS operation mode as described above. Press the OK button.
- Press the MENU button to return to the main screen.

### Initial Setup - iso685-D-P - Automatic Channel Setup

Each time after the iso685-D-P is powered, the device will detect channels with connected current transformers, activate them, and disable unused channels. During initial setup, this must be configured. This setup can also be accessed later by navigating to "MENU > EDS > SCAN CHANNELS" inside the iso685 main menu.



Figure 8 - Automatic scan for active channels

- Press START to begin the automatic channel scan. If CANCEL is not selected within 30 seconds, the scan begins automatically.
- Once the scan is completed, channels which do not have any connected current transformers will be disabled.
- To run this scan manually at a later time, navigate to MENU > EDS > SCAN CHANNELS in the iso685 main menu.

### Initial Setup - iso685-D-P - Manual Channel Setup

Follow the below procedure to activate channels manually. Refer to Figure 9.

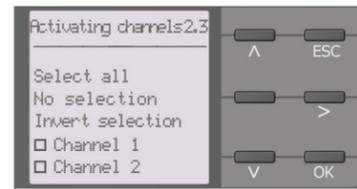


Figure 9 - Manual activation of channels

- Using the iso685, navigate to MENU > EDS > ACTIVATE CHANNEL inside the main menu.
- Use the selection options to manually select channels that will be active.
- Press the OK button. After the scan is complete, only manually selected channels will be active.

#### Use

- When fault location is activated, the connected iso685 or LIM2010 will display a message showing that the tracer signal has been activated.
- Once the fault has been located, the EDS module will activate the respective LED under CHANNELS on the face of the device. Refer to Figure 10.
- Fault location alarms will additionally be displayed on a connected iso685 or MK2430 / MK800 series remote indicator.

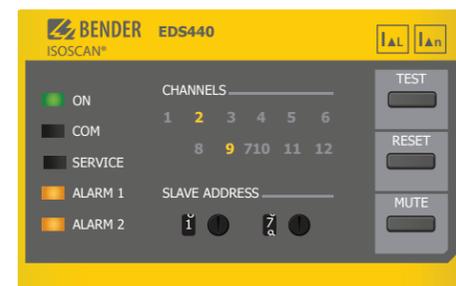


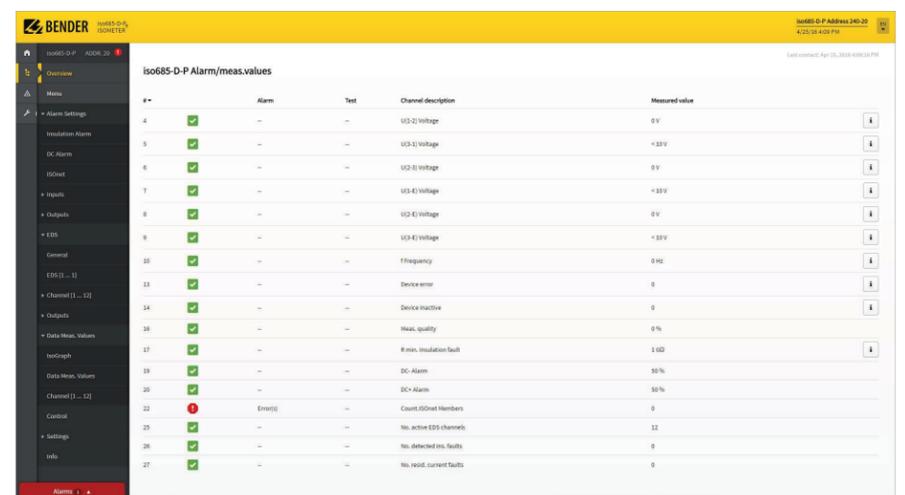
Figure 10 - EDS440-L front plate showing channels 2 and 9 are in alarm

### View EDS Status Using Web Server

EDS channel notifications can be viewed remotely by connecting to a Bender web server. The following devices provide web server functionality:

- iso685: Built-in web server, or through connected COM465IP / CP700
- LIM2010: Through connected COM465IP / CP700

For information on enabling remote communication, refer to the user manual of the respective communication device. Figure 11 below shows a sample view of a connected iso685 with EDS module. Measured values and alarms will appear with a green checkmark in the normal state, and a red alarm indicator in the alarm state.



#	Alarm	Test	Channel description	Measured value
4	✓	---	USD-2 Voltage	0V
5	✓	---	USD-3 Voltage	< 50V
6	✓	---	USD-6 Voltage	0V
7	✓	---	USD-7 Voltage	< 50V
8	✓	---	USD-8 Voltage	0V
9	✓	---	USD-9 Voltage	< 50V
10	✓	---	Frequency	0Hz
13	✓	---	Device error	0
14	✓	---	Device inactive	0
16	✓	---	Max. quality	0%
17	✓	---	R max. insulation fault	100
19	✓	---	DC-Alarm	50%
20	✓	---	SC-Alarm	50%
22	✗	Error!	Count (SDnet Members)	0
25	✓	---	No. active EDS channels	12
26	✓	---	No. detected ins. faults	0
27	✓	---	No. resp. current faults	0

Figure 11 - Sample display screen of connected iso685-D-P when fault location is active