

E-Series Troubleshooting Guide



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Self-supervision Error Codes

The protection device supervises its normal operation by executing various self-supervision checks during runtime of the device.

When detecting any serious faults, the system LED will start flashing alternating red and green. The issue will be recorded in an internal memory.

Please check the self-supervision error code under <Operation/ Self Supervision/ System Error>.

<i>Self-supervision Error Code¹</i>	<i>Message Description</i>	<i>Corrective Action</i>
Last Failure = 1	The device suffered an unscheduled restart.	Get in contact with our service-team. You will be supplied with a tool for error analysis.
Last Failure = 2..4	Critical level of internal resources.	Get in contact with our service-team. You will be supplied with a tool for error analysis.
Last Failure = 5..10	– reserved for future use –	
Last Failure = 11	Hardware: FRAM defect. The device will be set out-of-service on next reboot.	Send the device for repair.
Last Failure = 12	The battery for buffering the real time clock is low.	The battery can be exchanged by the manufacturer. There's no impact on the functionality of the device if the battery breaks down, except for the buffering of the clock while the unit is in de-energized condition.
Last Failure = 13	– reserved for future use –	
Last Failure = 14	Your device suffered a short-term sag or outage of the supply voltage.	Please check your power supply. You can quit the System LED by selecting <Operation/ Reset/ SSV.Ack System LED>.
Last Failure = 15	Critical level of internal resources.	Get in contact with our service-team. You will be supplied with a tool for error analysis.

¹ You can find the Error Code under <Operation/ Self Supervision/ System Error>

<i>Self-supervision Error Code</i>	<i>Message Description</i>	<i>Corrective Action</i>
Last Failure = 16..35	– reserved for future use –	

Troubleshooting by means of the System-OK-LED status

<i>System LED</i>	<i>Device Status</i>	<i>Potential Error Cause</i>	<i>Corrective Action</i>
off (not illuminated)	Other LEDs are also off.	Either no supply voltage or the power supply is faulty.	Please check the supply voltage. If it is OK, send the device to be repaired.
undefined, not flashing	Other LEDs are showing a random pattern.	The CPU board is faulty.	Send the device to be repaired.
constant red or flashing red	The HMI shows an error number.	Fatal system error	Get in contact with the manufacturer. The Service-Team will provide a tool for error analysis.
flashing green, switch to constant green within 30 seconds		No error. The device is in its start-up phase. When the System LED switches to constant green, the protection functions are active.	No action necessary.
flashing red/ green	The device is up and running. The protection functions are working.	The device is operating and all protection functions are working. But the internal self-supervision module has detected a previous problem in the system. The issue has been recorded within an integrated fault memory.	Please refer to chapter "Self-supervision Error Codes". You can quit the System LED by selecting <Operation/ Reset/ SSV.Ack System LED>.

<i>System LED</i>	<i>Device Status</i>	<i>Potential Error Cause</i>	<i>Corrective Action</i>
constant green	The device's HMI is not operable. There are no Softkeys shown on the panel. Instead the panel shows „Startup“ or just the device type (e.g. EDR-5000) without any Softkeys.	The device is starting up. The protection functions are already working, but the HMI is still starting up. If this is not finished after 5 minutes, the device is probably busy with handling Ethernet packets (Connector X100).	Check if the following action makes the device's HMI operable: Unplug the Ethernet (Connector X100). Is the HMI now operable, there is an error on your Ethernet network (e.g. an Ethernet storm). Please check your network traffic.
	The HMI is not operable. A normal page of the HMI is visible: Either there are Softkeys visible or the LED status page is being displayed.	The device is busy with handling Ethernet packets (Connector X100). The protection functions are working.	Unplug the Ethernet (Connector X100). Is the HMI now operable, there is an error on your Ethernet network (e.g. an Ethernet storm). Please check your network traffic. Should this action not change the device's behavior, please read the next entry of this table.
	The HMI is not operable. A normal page of the HMI is visible: Either there are Softkeys visible or the LED status page is being displayed. There is no Ethernet connector (Connector X100).	Some of the device's system parts are not working. The protection functions are working.	Leave the device connected to the supply voltage. Get in contact with our service-team. You will be supplied with a tool for error analysis.

<i>System LED</i>	<i>Device Status</i>	<i>Potential Error Cause</i>	<i>Corrective Action</i>
	The HMI is operable.	The device is ready for operation and protects your electrical equipment. If you have the impression that the relay is not working correctly or you have any problems with setting its parameters, please look-up the next tables.	Look-up the next tables.

Troubleshooting – Hardware

<i>Problem or maloperation in...</i>	<i>Problem Description</i>	<i>Corrective Action</i>
Failure of the display	After selecting any key, the whole display remains dark or the display is defective.	Check the following issues: • Is the supply voltage connected? This is the case when the System-LED is illuminated • Is the environmental temperature within the allowed range? • Try to adjust the contrast of the display by using PowerPort-E (increase/ decrease). If these checks do not show any results, send the relay back to the manufacturer.
Failure of a relay output (Also refer to: "relay outputs do not react")	The physical status does not match the reported state. Check the reported state of the relay output with the HMI or PowerPort-E.	Check the following issues: • Is the relay output in the latched state? Acknowledge the state if necessary. • Is <Inverting> parameter of the relay output set? • Check the wiring. • Unplug the wiring from the relay output and measure its output. Set the state of the relay output by using the test functions Force/Disarm. If these checks do not show any results, send the relay back to the manufacturer.

<i>Problem or maloperation in...</i>	<i>Problem Description</i>	<i>Corrective Action</i>
Failure of a digital input	The physical status of a digital input does not match its reported state. Check the reported state of the digital input with the HMI or PowerPort-E.	Check the following issues: • Is the configured voltage level set correctly? • Is the voltage level of the digital input (signal level) correct? • Is the parameter <Inverting> set? • Check the wiring. If these checks do not show any results, send the relay back to the manufacturer.
Wrong setting of the device's clock after a shortage of the supply voltage	The internal battery for powering the clock is empty or defect.	The relay is also working properly with an empty clock battery. The device's time can be synchronized. Please contact the service team.
Failure of a key		Send the relay back to the manufacturer.

Troubleshooting – Operation of the Device

<i>Problem or maloperation in...</i>	<i>Problem Description</i>	<i>Corrective Action</i>
Relay outputs or LEDs are in unexpected state.	A relay output or an LED has been reconfigured from latched to unlatched. Now you need to acknowledge the status once, if it was already pending before the reconfiguration.	Acknowledge the LEDs and relay outputs.
A trip shall be acknowledged without a password.		Set the password for <Password Level 0> to „empty input“. Now you do not have to enter any password for changes and acknowledges on security level 0.
What is the default password?		The factory-provided default password for all security levels is „1234“.
How do I reset the password?		Refer to the chapter „forgotten password“ of the user manual.

Troubleshooting – Parameter Settings

<i>Problem or maloperation in...</i>	<i>Problem Description</i>	<i>Corrective Action</i>
Transfer of device parameters from one protection device to another of the same type (e.g. EDR-5000).	You have configured the parameters of a E-Series device. Now you want to transfer these parameters to another relay. This is possible, if both relays are of the same type, e.g. EDR-5000.	Download the device parameters with PowerPort-E from the first relay. Save them into a file. Now reopen this file with PowerPort-E. Adapt the settings to the order code of the second device <Edit/Modify Device Configuration (Typecode)...>. Select <Apply>. By this the existing parameter file is being converted to the format of the second device. Now there may be implausible parameters. They are marked with a question mark. These are not valid for this device type. Please adapt the values of these implausible parameters. Afterward you can transfer the parameter settings to the second device.

Troubleshooting – Protection and Control

<i>Problem or maloperation in...</i>	<i>Problem Description</i>	<i>Corrective Action</i>
After first start-up of the protective device there is a pending trip.	Two red LEDs are illuminated at the front of the HMI. They indicate a trip and an alarm.	With the factory default settings the protection relay is configured with an undervoltage protection. Adapt the settings of the undervoltage protection or remove this module from the device project settings (if you do not need it). If you have any problems with acknowledging the pending alarm, please refer to „Failure of a relay output“.
The switchgears can not be operated by SCADA communication.		Set the switching authority of the device to „remote“.
Current and Voltage measurement	The measured values of current and voltage have a big fluctuation.	Adjust the field parameters' general settings to the connected grid frequency (50Hz or 60Hz).

<i>Problem or maloperation in...</i>	<i>Problem Description</i>	<i>Corrective Action</i>
Relay outputs do not react.	The contacts of the relay outputs do not open or close. This can be checked by simulating a fault and checking the relay output contacts with measurement equipment.	Check the following issues: • Acknowledge the relay outputs, if applicable. • Is the status of the relay output forced to a dedicated value? (The relay output can be overwritten for commissioning purpose, refer to <Service/ Test>.) • Is the correct parameter set active (1..4)? • Is the required protection function active? • Is overall protection active? • Are the field parameters set correctly (CT ratio etc.)? • Are the protection parameters set correctly (trip value, trip time)? • Is the assigned protection function blocked? • Is the protection function's trip signal routed to the Trip-Manager of the correct switchgear? • Is the trip signal of the switchgear routed to the correct relay output? • Is the wiring correct?

<i>Problem or maloperation in...</i>	<i>Problem Description</i>	<i>Corrective Action</i>
Failure of control from local or remote	You can not switch locally or remotely.	Check the following issues: • Is the switch command blocked? • Is the wiring correct? • Do you have switching authority? Check the value of switching authority („local“ or „remote“). • Is switching blocked by the synchro-check?

Troubleshooting – Communication

<i>Problem or maloperation in...</i>	<i>Problem Description</i>	<i>Corrective Action</i>
Failure of time synchronization.		Check the following issues: • Is the correct protocol for time synchronization selected (<Device Para/ Time / TimeSync>)? • Is the timezone set correctly? • Open the status page of the used protocol. Check, if the module works correctly. • IRIGB: Is the correct type (IRIGB-00x) selected? • SNTP: Is the IP address of a valid NTP Server configured?
Failure of the TCP/IP connection.		Check the following issues with your local IT: • Does the device answer a „ping“ request? • If the device and the PC are part of the same the same subnet, gateway and subnet mask have to be set correctly within the device (<Device Para/ TCP/IP/ TCP/IP Config>). • Is network communication blocked by a firewall?

<i>Problem or maloperation in...</i>	<i>Problem Description</i>	<i>Corrective Action</i>
USB COM port is not visible on the PC.	It is not possible to connect PowerPort-E, Field Device Installer or some other application to the relay via USB. The corresponding USB port (e.g. COM 5) is not visible in the application.	Check the following issues: • PowerPort-E: Have you installed release 3.60 or higher? • Plug off the USB cable from the protective device and plug it in again. After 10 seconds try again to connect PowerPort-E (or Field Device Installer) to the relay. • Restart your PC.
USB COM port visible, but no connection possible.	It is not possible to communicate with PowerPort-E to the relay via USB. The corresponding USB port (e.g. COM 5) is available and was selected correctly.	Check the following issues: • Is the USB port of the PC still occupied by another application (or program)? Close those applications. • Is the protective device started up completely?
Older protective devices with RS232: PowerPort-E does not connect via RS232.	It is not possible to establish a connection with PowerPort-E from a PC to the device via RS232.	Use a PowerPort-E version release 3.41 or higher. Starting from this release PowerPort-E supports a simplified creation of a serial connection. If your PC does not have a serial port, you need a USB-to-serial-adapter that has been approved by Eaton. This has to be installed correctly. Verify that your cable is a zero-modem cable (please refer to the corresponding chapter). A simple serial cable does not have any flow control lines. A connection is only possible with a zero-modem cable.

<i>Problem or maloperation in...</i>	<i>Problem Description</i>	<i>Corrective Action</i>
PowerPort-E can not connect to the device. This has been possible before by using the same PC.	A connection between PowerPort-E and device has been possible before using the same PC. Now it is not possible to connect to the device.	Check the following issues: • Are the connection settings of PowerPort-E correct (refer to <Settings/ Device Connection...>)? In case of Ethernet (TCP) connection: Is the correct IP address selected? • Check the wiring between PC and device. • In case of Ethernet (TCP) connections: Is the TCP/IP connection working? Refer to „Failure of the TCP/IP connection“. • Wait for 15 minutes and then try again to connect to the device. • Restart your PC and then try again to connect to the device.
No communication (data transfer) with PowerPort-E possible, even though a connection has been established.	Port 52152 is being blocked by a firewall.	Check the settings of your firewall. You may require to unblock port 52152.

Troubleshooting – Recorder

<i>Problem or maloperation in...</i>	<i>Problem Description</i>	<i>Corrective Action</i>
The Event Recorder is permanently logging new events.	The Event Recorder does permanently show new events (<Operation/ Recorders / Event rec>). To observe this phenomenon in PowerPort-E, please execute a „refresh“ (F5 or Ctrl+F5).	Proceed as follows: 1. Look inside the Event Recorder which protection function is creating the events. 2. Check the settings of this protection function. Adapt them, if necessary. Example: Protection function df/dt (ROCOF) is configured too sensitive and is creating alarms with high frequency. Change the settings of this function.
The Waveform Recorder is permanently creating new records.	The Waveform Recorder shows a high number of created disturbance records. This number is growing steadily over time (<Operation/ Recorders / Waveform rec>). To observe this phenomenon in PowerPort-E, please execute a „refresh“ (F5 or Ctrl+F5).	Check the following issues: 1. Check which events are configured to trigger the Waveform Recorder (<Device Para/ Recorders / Waveform rec>), e.g. Protection Alarm. 2. Check within the Event Recorder, which protection function creates the trigger (<Operation/ Recorders / Event rec>). 3. Check the settings of this protection function. Adapt them, if necessary. Example: Protection function df/dt (ROCOF) is configured too sensitive and is creating alarms with high frequency. Change the settings of this function. Alternatively you can also change the trigger source of the Waveform Recorder. But this is less advisable.

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