

Arc Quenching System Tester (AQST)



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Purpose

This instruction manual is expressly intended to cover the operation of the Arc Quenching System Tester (AQST). The AQST is the required testing device for the Arc Quenching System comprised of the Eaton Arc Flash Relay (EAFR) system and Arc Quenching Device (AQD).

Safety

All safety codes, safety standards, and/or regulations must be strictly observed in the installation and operation of this equipment.

⚠ WARNING

THE WARNINGS AND CAUTIONS INCLUDED AS PART OF THE PROCEDURAL STEPS IN THIS MANUAL ARE FOR PERSONNEL SAFETY AND PROTECTION OF EQUIPMENT FROM DAMAGE. AN EXAMPLE OF A TYPICAL WARNING LABEL HEADING IS SHOWN ABOVE TO FAMILIARIZE PERSONNEL WITH THE STYLE OF PRESENTATION. THIS WILL HELP TO ENSURE THAT PERSONNEL ARE ALERT TO WARNINGS. IN ADDITION, CAUTIONS ARE ALL UPPER CASE AND BOLDFACE.

Introduction

General information

⚠ CAUTION

PLEASE READ AND UNDERSTAND THESE INSTRUCTIONS BEFORE ATTEMPTING TO OPERATE THIS EQUIPMENT.

⚠ WARNING

THE ARC QUENCHING SYSTEM TESTER SHOULD NOT UNDER ANY CIRCUMSTANCES BE APPLIED OUTSIDE ITS NAMEPLATE RATINGS. OPERATION OUTSIDE OF THESE RATINGS COULD RESULT IN BODILY INJURY OR DAMAGE TO THE TESTER.

Safety practices

The AQST is intended for use in and around low-voltage switchgear. Personnel using the AQST with this equipment shall be qualified for the work, and trained to work around the associated hazards.

All personnel using the AQST shall have thoroughly reviewed this instruction manual, as well as the manuals of the equipment it is applied to.

Qualified personnel

For the purpose of operating the AQST, a person should not be considered qualified if the individual is not thoroughly trained in the operation of the AQST and how it interfaces with the assembly in which it is used.

For the purpose of using the AQST with a switchgear assembly, a qualified person should also be trained with respect to the hazards inherent to working with electricity and the proper way to perform such work. The individual should be able to de-energize, verify, and lock-out and tag-out circuits in accordance with established safety practices.

Other publications and documentation

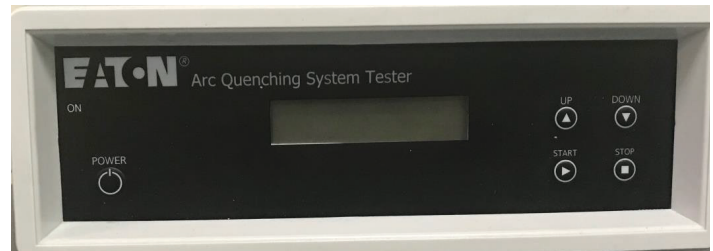
In addition to this instruction manual, other printed information and documentation is available and supplied as appropriate. This additional information includes, but is not necessarily limited to, an instruction manual for the Eaton Arc Flash Relay, Arc Quenching Device, instruction leaflets for accessory items, renewal parts information, etc. Relevant instruction manuals are referenced in this document where needed.

Equipment description and technical information

Introduction

For properly testing the Arc Quenching System (AQS), light and alternating current need to be supplied to the EAFR, and a Test Enable signal must be supplied to the AQD. The AQST kit comes with the Tester that supplies current to the EAFR and the Test Enable signal to the AQD, as well as a light source suitable for activating the EAFR's light sensors.

Operator interface



Power button

Pressing the Power button turns the AQST on and off. To protect the internal microprocessor, the Power button should always be used to turn the unit off.

Graphical display

The graphical display communicates status of the AQST to the user. Firmware version, feedback on current output status, and errors are displayed here.

Current supply controls

- **UP** increases the value of the current output. Pressing the button briefly increases the current level in 0.5 A increments. Pressing it for 2 or more seconds moves the cursor to the left to increase the current level in 1 A increments, and pressing briefly allows adjustment at the respective increment. Pressing it again for 2 or more seconds moves the cursor to the left once more to increase the current level in 10 A increments, and pressing briefly allows adjustment at the respective increment.
- **DOWN** decreases the value of the current output. Pressing the button briefly decreases the current level in 0.5 A increments. Pressing it for 2 or more seconds moves the cursor to the left to decrease the current level in 1 A increments, and pressing briefly allows adjustment at the respective increment. Pressing it again for 2 or more seconds moves the cursor to the left once more to decrease the current level in 10 A increments, and pressing briefly allows adjustment at the respective increment.
- **START** initiates current supply out of the unit. Upon pressing the button, the unit will supply current at the value set by the UP and DOWN buttons, and the Display will read "OUTPUT:ON".
- **STOP** halts current supply out of the unit. Upon pressing the button, the unit will stop supplying current, and the Display will read "OUTPUT:OFF".

Rear interface



Power connection

The power connection contains the IEC C14 socket for the IEC C13 power cord, as well as the unit's protective fuse. The main power switch is also located here. This switch can be used to power off the unit, however, it is recommended that the Power button on the front operator interface be used to power down the unit correctly.

Fan

The fan turns on periodically while the unit is supplying current to cool the internal components as necessary.

NOTICE

KEEP THE FAN'S INTAKE CLEAR OF OBSTRUCTIONS TO PREVENT DAMAGE OR DESTRUCTION OF THE AQST.

Output connector

The output connector is intended to receive the accessory cable for connection to the switchgear.

Accessory cable

The accessory cable connects the AQST's output to the switchgear.



Light source

The light source supplied is a high-intensity flashlight capable of producing light bright enough for EAFR light sensor pickup. With this light, the light sensors will pick up on the light from about 15 inches away.



Note: Ensure the flashlight is fully charged before testing the light sensors.

Technical specifications

Table 1. Electrical

Item	Specification
Supply voltage	120 Vac at 60 Hz
Power consumption	160 W at maximum output
Current output	0–30 A at 50 Hz
Current output open circuit voltage	5 V
Duty cycle	Continuous

Table 2. Mechanical

Item	Specification
Enclosure	NEMA® 1
Operating environment temperature	–20 to +40 °C

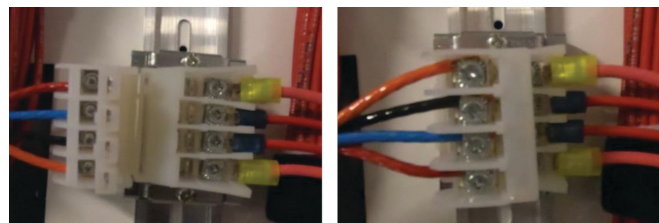
Operation

Performing an Arc Quenching System test

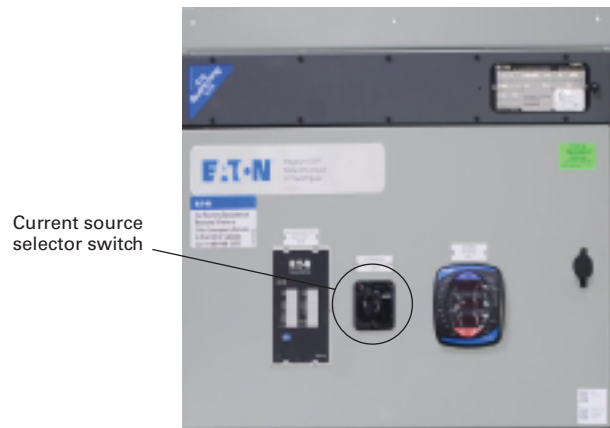
1. Ensure control power is supplied to the EAFR system and AQD in the switchgear, and that the AQD is racked into the Disconnect position (see IB019010EN for details on testing the AQD).



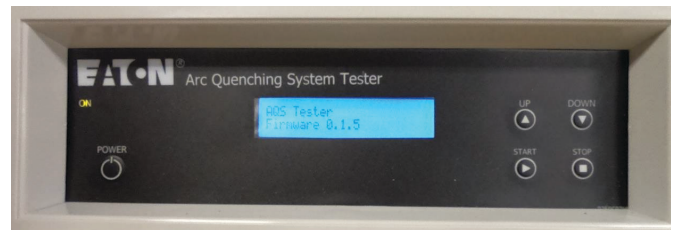
2. Connect the AQST accessory cable to the AQST and to the corresponding terminal block in the switchgear. The terminal block will be located in the instrument compartment behind the current source selector, in most cases.



3. Turn the Current Source Selector Switch on the switchgear instrument door from CT to AQST. This shorts the bus-mounted CTs in the switchgear feeding the EAFR-110 and connects the EAFR-110 current inputs to the AQST.

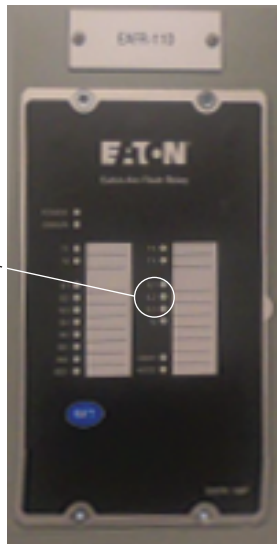


4. Connect power to the AQST, and turn the AQST on via the Power button.



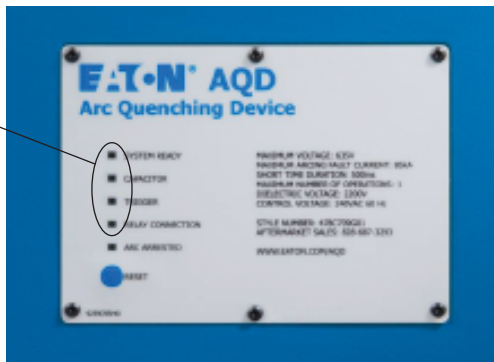
5. Using the UP and DOWN buttons on the AQST, set the current output on the AQST to a level above the current threshold setting of the EAFR (see MN026007EN for details on setting the EAFR Current Threshold Setting).
6. To determine the current threshold setting of the EAFR, observe the position of "Phase Sensor" and "Gnd Sensor" setting switches on the rear of the EAFR (see SW2, Switches 2 and 1, respectively). These switches will be set to 1 A or 5 A. It will typically be set to 5 A. Next determine what multiplier the corresponding potentiometer is set to—the lowest being 0.5x and 6x the highest, for phase current. If your phase sensor current is set to 5 A, then your threshold should be between 2.5 A and 30 A.

- Press START on the AQST to output current to the EAFR-110. IL1, IL2, and IL3 indicating lights on the EAFR should illuminate to indicate that the relay has picked up on the supplied current. If the relay does not pick up on the current, try increasing the current output from the tester until the relay picks up.



Indicating lights that should be illuminated

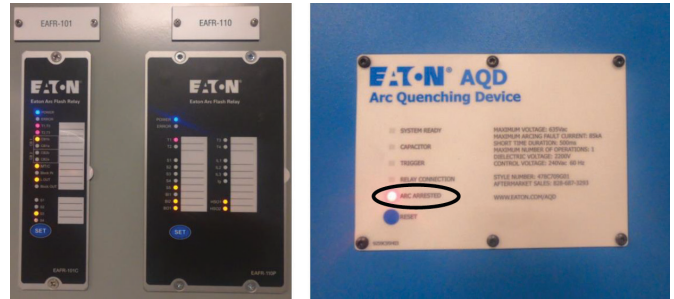
- If the AQD is in the Disconnect position and the AQST is connected to the terminal block in the switchgear, the lights on the AQD operator interface should be flashing to indicate that it has successfully been placed into Test mode. Observe that the first four lights on the AQD Operator Interface are blinking.



Indicating lights that should be blinking

- Use the light source supplied in the AQST kit to illuminate the specific light point sensor chosen for testing.

- Once the light sensor is properly illuminated, the EAFR-101 connected to the light sensor and the EAFR-110 will trip. The "Arc Arrested" light on the AQD should now be illuminated with all other AQD lights off.



The first test is now complete. Reset the EAFR-110 relay and the applicable EAFR-101 relay by briefly pressing the "SET" button on each relay one time. Press the blue "RESET" button on the front of the AQD. The four indicating lights should begin blinking again. Consult the EAFR and AQD manuals for more information.

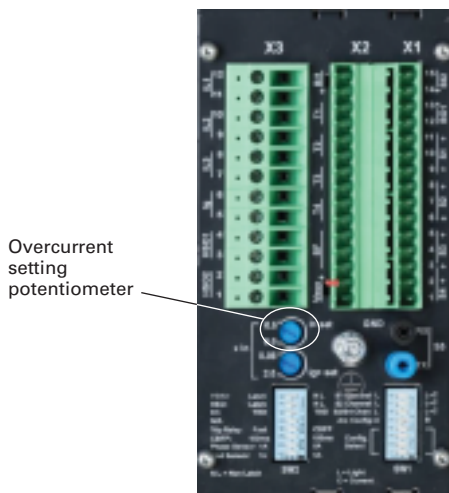
NOTICE

IT IS NOT RECOMMENDED THAT THE AQD BE TESTED MORE THAN ONCE DURING A GIVEN ARC QUENCHING SYSTEM TEST INTERVAL. TO TAKE THE AQD OUT OF TEST MODE, RACK THE AQD IN A FEW TURNS VIA THE RACKING MECHANISM. THREE INDICATING LIGHTS WILL CEASE TO BLINK AND THE SYSTEM READY LIGHT WILL REMAIN BLINKING INDICATING THAT THE AQD IS NOT IN READY MODE. WHEN READY TO PLACE THE AQD BACK INTO PROTECTIVE SERVICE, RACK IT IN TO THE CONNECT POSITION. SEE THE AQD MANUAL FOR MORE INFORMATION.

Proceed to use the flashlight to test the remaining light point sensors in the switchgear.

Using the AQST for adjusting EAFR current threshold setting

1. Ensure control power is supplied to the EAFR-110 relay and that the AQST is connected to the switchgear via the AQST accessory cable. See “Performing an Arc Quenching System Test” for more details.
2. Turn the EAFR-110’s phase current setting potentiometer fully clockwise to the 6.0 x I_n position.



3. Set the AQST to output current at the desired current pickup level for the EAFR and turn the output on.
4. Turn the EAFR-110’s overcurrent setting potentiometer back counter-clockwise slowly until IL1, IL2, and IL3 on the front of the EAFR-110 illuminate.
5. The overcurrent threshold level for the EAFR is now set.

AQST errors

The AQST has error states that will be shown on the display in the event of an error. See **Table 3** for a list of errors and corrective actions.

Table 3. AQST errors

Error	Corrective action
0006 Load Fault	Check the accessory cable to make sure it is connected to the switchgear properly. Press STOP if the connection is good but the error persists.
0001 Temperature Fault	Turn the unit off and allow it to cool for a few minutes before turning back on.
0002 Overcurrent Fault	Cycle power to the unit. If the fault persists, return the unit to the factory for investigation.

Maintenance

Storage and cleaning

When not in use, store the AQST in its supplied case to prevent damage to the unit. A mild, alcohol-based cleaner can be used to clean the AQST and the accessory cable if dirty. It is not recommended that any of the AQST kit components be submerged in water.

Service

The only serviceable part on the AQST is the power supply fuse, integrated as part of the power jack on the rear of the unit. The fuse is a 6.3 A, 250 V glass cartridge, Slo-Blo type. Should the fuse ever need to be replaced, it should be replaced with an equal or equivalent part to that supplied with the unit.

Renewal parts

For renewal parts, contact LVA Aftermarket Sales at 1-800-257-3278. A list of applicable part numbers is shown in **Table 4**.

Table 4. Renewal parts

Description	Part number
Arc quenching system tester kit	41-3844-101
Arc quenching system tester	41-3844-007
AQST protective case	41-3844-005
AQST accessory cable	41-3844-003
AQST light source	41-3844-004

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