

Arc Reflection Filters



- **Choice of standard and heavy-duty models**
- **Delivers highest energy levels to the fault, improving fault locating capability**
- **Designed for safe, continuous operation with appropriate companion impulse generators**
- **Designed for minimum trace distortion on companion time domain reflectometers**

DESCRIPTION

Arc Reflection Filters marry impulse generators to high-voltage “radars” (time domain reflectometers, TDR), providing fault locating crews with integrated systems to meet all cable fault locating needs. Two models are available:

- **Standard Arc Reflection Filter (detachable):** designed to withstand 1,000,000 Joules/hour (continuous operation with a standard impulse generator) and 50 kV proof/burn voltage.
- **Heavy-Duty Arc Reflection Filter (detachable):** designed to withstand over 3,000,000 Joules/hour (continuous operation with a heavy-duty impulse generator) and 70 kV proof/burn voltage.

Choice of an Arc Reflection Filter is dependent upon the energy producible by the impulse generator with which it will be used.

The Standard Arc Reflection Filter can be used with any non-heavy-duty impulse generator. The Heavy-Duty Arc Reflection Filter is used whenever the system includes a heavy-duty style impulse generator (generates in excess of 1,000,000 Joules/hour and/or 70-kV proof/burn voltage).

The arc reflection filter, including its sturdy metal cabinet of welded construction, and all its components are designed to withstand the rough handling it will experience in the field.

For operator convenience, a mode selector switch is provided on the top control panel. When the selector switch is set to ARC REFLECTION TEST, the arc reflection

filter network is connected to the cable under test. This makes it possible for the operator to make either TDR tests or arc reflection tests, as well as other tests requiring the use of the filter.

When the selector switch is set to the PROOF/BURN/IMPULSE mode, the filter is bypassed, allowing stand-alone operation of the impulse generator system on impulse, proof or burn.

A wide-band current transformer is permanently connected electrically and mounted inside the cabinet for use with the surge pulse.

APPLICATIONS

With Arc Reflection Filters, cable faults can be located on power cables rated at up to 35 kV. Relatively small systems, such as most direct buried underground residential distribution (URD) systems, are easily satisfied with the standard filter. Larger systems, including especially long direct buried distribution cable and especially complex circuits using lead-covered cable, require much more energy (such as is made possible using the heavy-duty filter).

FEATURES AND BENEFITS

Designed to withstand continuous operation

- System is not vulnerable to operator error (if left on after fault localization).
- System can be operated for the time required to localize complex faults.
- Operator can use the full proof-burn capability of the thumper in use.

Components designed as distributed circuit elements

- Helps to provide a clear, distinct display on the companion TDR.
- Helps to eliminate unwanted background reflections on the companion TDR by contributing less than 5% noise.

Slow voltage rise time

- Limits the voltage that reaches the cable under test to the voltage required to break down the fault.
- Operator cannot overstress a faulted cable while in the arc reflection mode.

Low output impedance

- More effective in energizing large cable/network systems.
- Improved fault locating capability.

High output current capability

- Ionizes faults immersed in oil or water
- Power matches the fault for more effective fault locating

SPECIFICATIONS

Standard Model

Mode Selector Switch

Position 1: Arc reflection test and time domain reflectometry

Position 2: Proof, burn, impulse, current impulse mode

Electrical Characteristics

Voltage

DC: 50 kV

Impulse: 25 kV

Transient Withstand: 60 kV

Duty Cycle at 30 kV: Continuous

Polarity: Bipolar

Current

Arc Reflection Mode

Peak Current at 1250 J: 70 A

Duty Cycle at 1250 J: Continuous

Impulse Mode

Duty Cycle at 25,000-A Peak

Impulse: Continuous

Discharge

Internal Energy: Less than 60 s to 1% of initial starting voltage

High-Voltage Waveform (arc reflection mode):

Exponentially damped sinusoid

Environmental Characteristics

Operating Temperature Range

-4 to +122° F (-20 to +50° C) continuous duty

Storage Temperature Range

-22 to +131° F (-30 to +55° C)

Altitude

7500 ft (2286 m) max.

Voltage derates at higher altitudes.

Humidity

5 to 95% RH noncondensing (operating and storage)

Climate

Operation prohibited in direct rain or snow

Cables Supplied

A 150-ft (45.6-m) shielded output cable with vice-grip clamps for connection to the conductor and shield of the cable under test is supplied on a storage reel with wheels.

A 150-ft (45.6-m) insulated, No. 8 AWG flexible ground cable

mounted on a storage reel and a 150-ft (45.6-m) No. 16 AWG power input cord with standard cap (NEMA 5-15P) for 120 V on a storage reel with a duplex receptacle are also supplied.

Physical Characteristics

Dimensions

27 H x 13.5 W x 13.5 D in. (690 H x 340 W x 340 D mm)

Weight

120 lb (55 kg)

Heavy-Duty MODEL

Mode Selector Switch

Position 1: Arc reflection test and time domain reflectometry

Position 2: Proof, burn, impulse, current impulse mode

Electrical Characteristics

Voltage

DC: 70 kV max.

Impulse: 30 kV max.

Transient Withstand: 60 kV max.

Duty Cycle at 25 kV: Continuous

Polarity: Bipolar

Current

Arc Reflection Mode

Peak Current at 7500 J: 600 A

Duty Cycle at 7500 J: Continuous

Impulse Mode

Duty Cycle at 25,000-A Peak

Impulse: Continuous

Discharge

Internal Energy: Less than 60 s to 1% of initial starting voltage

High-Voltage Waveform (arc reflection mode):

Exponentially damped sinusoid

Environmental Characteristics

Operating Temperature Range

-4 to +122° F (-20 to +50° C) continuous duty

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Altitude

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Climate

Operation prohibited in direct rain or snow

Cables Supplied

150-ft (45.6-m) permanently connected, high-voltage, shielded output cable with vice-grip clamps for connection to both the conductor and shield of the cable under test. This cable is conveniently mounted on a cable rack on one side of the cabinet. 150-ft (45.6-m) No. 8 AWG, insulated ground cable mounted on a storage reel and fitted with a vice-grip grounding clamp

Physical Characteristics

Dimensions

38 H x 28 W x 27 D in. (960 H x 710 W x 680 D mm)

Weight

214 lb (96 kg)

ORDERING INFORMATION

| Item (Qty) | Cat. No. |
|----------------------------------|----------|
| Standard Arc Reflection Filter | 655850 |
| Heavy-Duty Arc Reflection Filter | 655901 |

UK

Archcliffe Road Dover
 CT17 9EN England
 T +44 (0) 1304 502101
 F +44 (0) 1304 207342

UNITED STATES

4271 Bronze Way Dallas
 TX75237-1017 USA
 T 800 723 2861 (USA only)
 T +1 214 330 3203
 F +1 214 337 3038

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