Surge Arresters
Catalog Data
CA235015EN

Effective April 2015
Supersedes TD235004EN September 2014

COOPER POWER SERIES

Storm Trapper™ H.E. (high energy) low-voltage distribution-class MOV surge arrester

General

Eaton designs its Cooper Power™ series Storm Trapper™ H.E. (High Energy), low-voltage distribution-class surge arresters to provide surge protection at distribution transformer secondary bushings.

The Storm Trapper H.E. arrester is the industry's first low-voltage distribution-class arrester and has successfully passed all design tests for light duty distribution class arresters per IEEE Std C62.11™ -1993 standard.

Years of research by Eaton's Cooper Power Systems Division in low-voltage secondary circuits concluded that the types and magnitudes of surges that can exist in these circuits are more severe than previously thought. The Storm Trapper H.E. arrester, born out of this research, was designed to reliably handle the stresses found in these low-voltage circuits. The research further noted that transformer failure rates can be significantly reduced by adding surge protection to transformer secondary bushings. Field experiments in some of the most severe lightning areas of the United States has shown that transformer failure rates can be reduced to far below 0.1% by applying Storm Trapper H.E. arresters to transformer secondaries.

Top image depicts external mount. Bottom row, left to right, displays metal enclosed and internal mount.

Features

The Storm Trapper H.E. family of arresters incorporates the highest energy handling Metal Oxide Varistors (MOV) when compared to other arresters promoted for similar applications. This superior energy handling ability assures long service life even in the most severe service conditions. Storm Trapper H.E. arresters were designed with a full 40 kA surge withstand capability, four times the level of traditional secondary arresters.

The durable MOVs used in the Storm Trapper H.E. arrester are manufactured by Eaton at our ISO 9001 certified plant in Olean, New York. This allows constant QA monitoring to assure that only the highest quality high energy MOVs get selected for use in Storm Trapper H.E. arresters.

Powering Business Worldwide

Features and detailed description

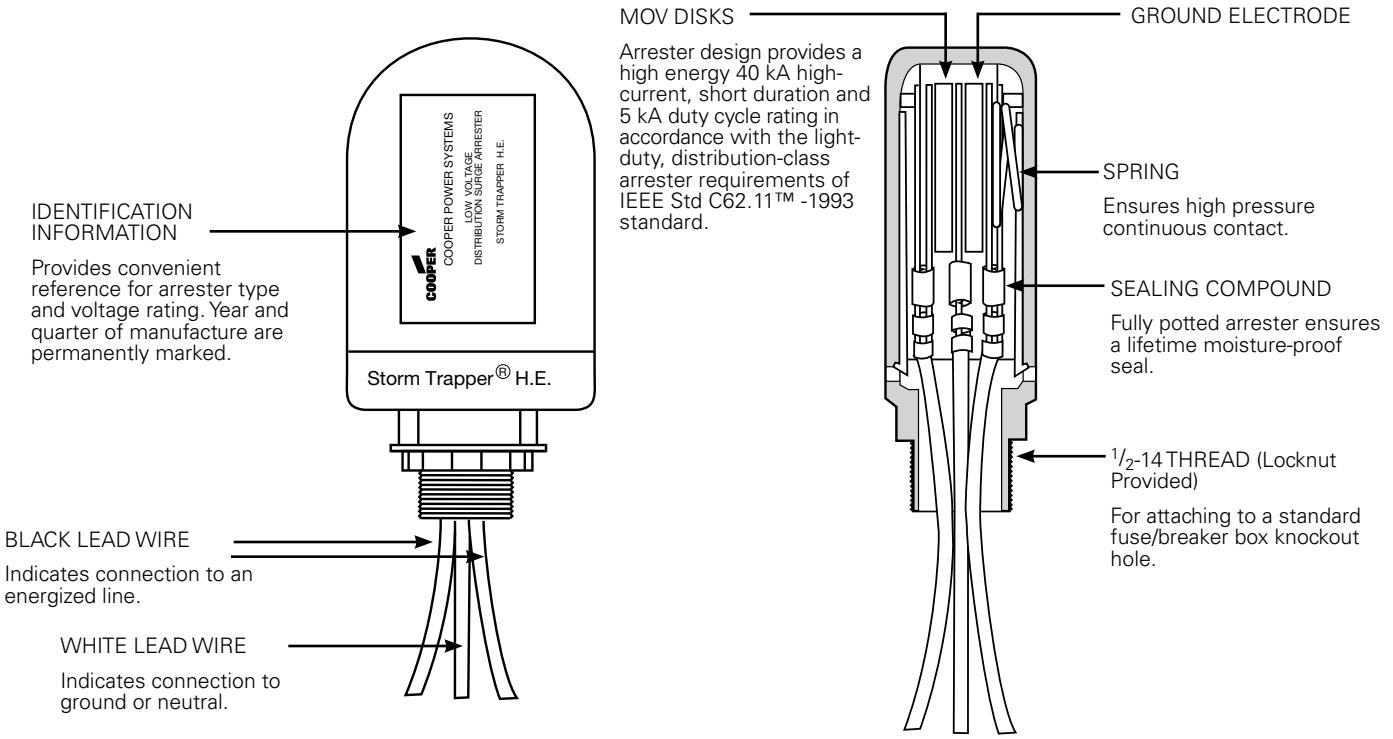

Figure 1. Cutaway Illustration of external mount Storm Trapper H.E. arrester without mounting bracket (two pole model illustrated).

Designs

The Storm Trapper H.E. arrester is available in two design configurations: external mount and metal-enclosed mount. All external mount and metal-enclosed Storm Trapper H.E. arresters are CSA® Listed for safety.

Standard line and ground leads on the external mount and metal-enclosed designs are 18 inch, #10 AWG stranded copper. The line leads that are connected to the energized source come with black wire insulation while the ground lead has white insulation. The length of the line and ground leads play an important role in the protective ability of the arrester. The longer the leads are, the higher the voltage let through to the protected equipment. Thus to improve the equipment protection, it is strongly recommended that all line and ground leads be kept to the minimum required length.

External mount Storm Trapper H.E. arrester

The external mount Storm Trapper H.E. arrester is designed for connection to, and protection of, the secondary bushings of overhead distribution transformers or other low voltage equipment. The external mount Storm Trapper H.E. arrester has been designed for outdoor application with a weather resistant housing over a fully-potted, void-free inner chamber. Identification information is permanently molded or stamped into the housing of the arrester for full lifetime readability. Arresters rated 175, 240, 480 and 650 volts are available in one, two and three pole designs. An optional mounting bracket is also available.

Metal-enclosed Storm Trapper H.E. arrester

The metal-enclosed Storm Trapper H.E. arrester provides non-fragmenting performance by fully encapsulating an external mount Storm Trapper H.E. arrester in a stainless steel housing. The enclosed Storm Trapper H.E. arrester has successfully passed 60 Hz. fault current tests exceeding 35 kA as a non-fragmenting device.

The metal housing contains an indicator window which blackens in the unlikely event of arrester failure, noting the need for arrester replacement. As with the external mount Storm Trapper H.E. arrester, ratings of 175, 240, 480 and 650 volts in one, two and three pole designs are available with or without a mounting bracket.

Production tests

A complete production test program assures a quality product. Tests are performed on the completed arrester assemblies.

- 100% Physical Inspection
- 100% Reference Voltage Test (Vref)
- 100% Radio Interference Voltage Test (RIV)

Each MOV disk receives a series of tests.

- 100% Physical Inspection
- 100% 5 kA Discharge Voltage
- 100% V1mA/cm^2
- 100% Leakage Current at 80% of V1mA/cm^2
- 100% Batch High Current Short-Duration Test
- 100 Batch Thermal Stability Test

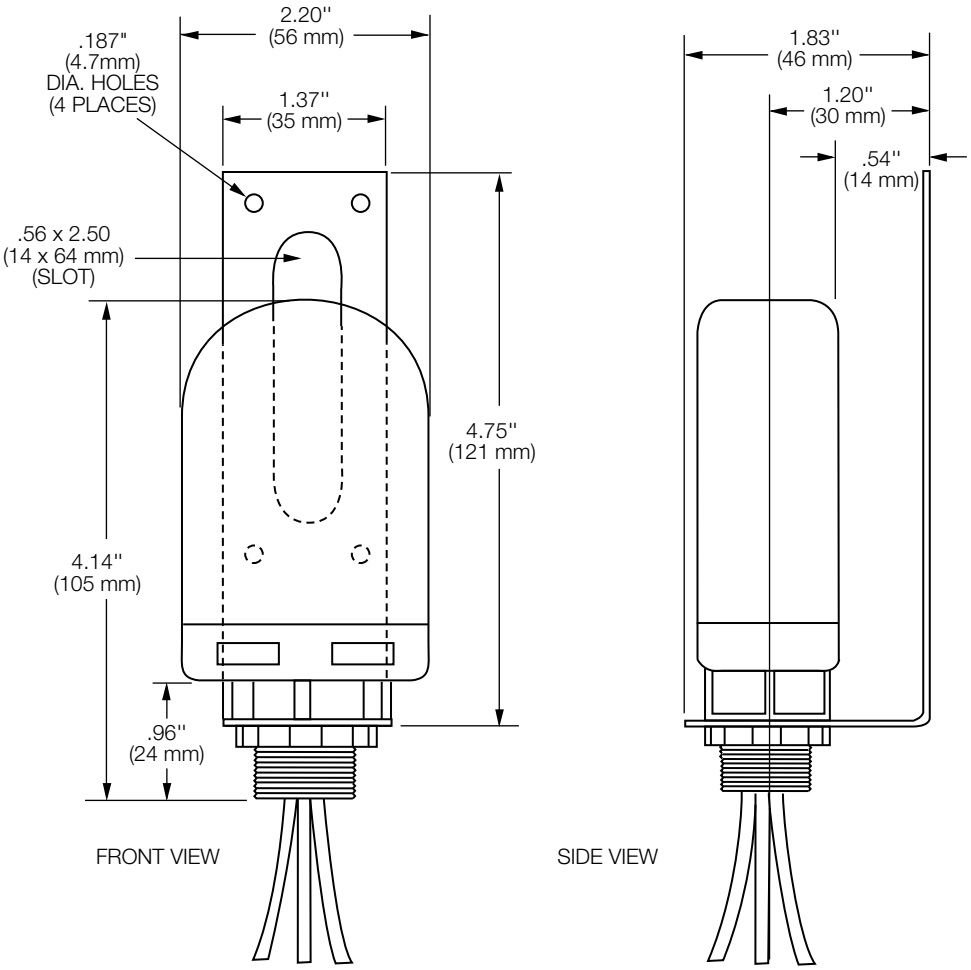

Figure 2. Dimensional information for external mount Storm Trapper H.E. arrester (shown with optional mounting bracket).

Note: Dimensions are given for reference only.

Table 1. Protective Characteristics

Arrester Rating (V rms)	MCOV (V rms)	Maximum Energy Capability (Joules/Phase)	Front of Wave Protective Level* (kV Crest)	Maximum Discharge Voltage (kV crest) 8/20 µs Current Wave				
			5 kA	1.5 kA	5 kA	10 kA	20 kA	40 kA
175	175	3226	1.7	1.4	1.6	1.8	2.0	2.4
240	240	3405	1.8	1.5	1.7	1.9	2.2	2.6
480	400	3776	2.0	1.7	1.9	2.1	2.4	2.9
650	540	4660	2.6	2.1	2.4	2.6	3.0	3.6

* Based on a current impulse that results in a discharge voltage cresting in 0.5 µs.

Table 2. Insulation Withstand Voltages

Arrester Rating (V rms)	1.2/50 Impulse (kV crest)	1 min Dry (kV rms)	10 sec Wet (kV rms)
All Ratings	10	6	6

Table 3. Performance Test Characteristics*

Description	Characteristics
High-current, Short-duration	2 discharges of 40 kA crest, 4/10 µs current wave
Low-current, Long-duration	20 surges of 75 A-2000 microsecond duration
Duty Cycle	22 operations of 5 kA crest, 8/20 µs current wave

* Tests were performed in accordance with applicable sections of IEEE Std C62.11™ -1993 standard (Metal Oxide Surge Arresters for Alternating Current Power Circuits).

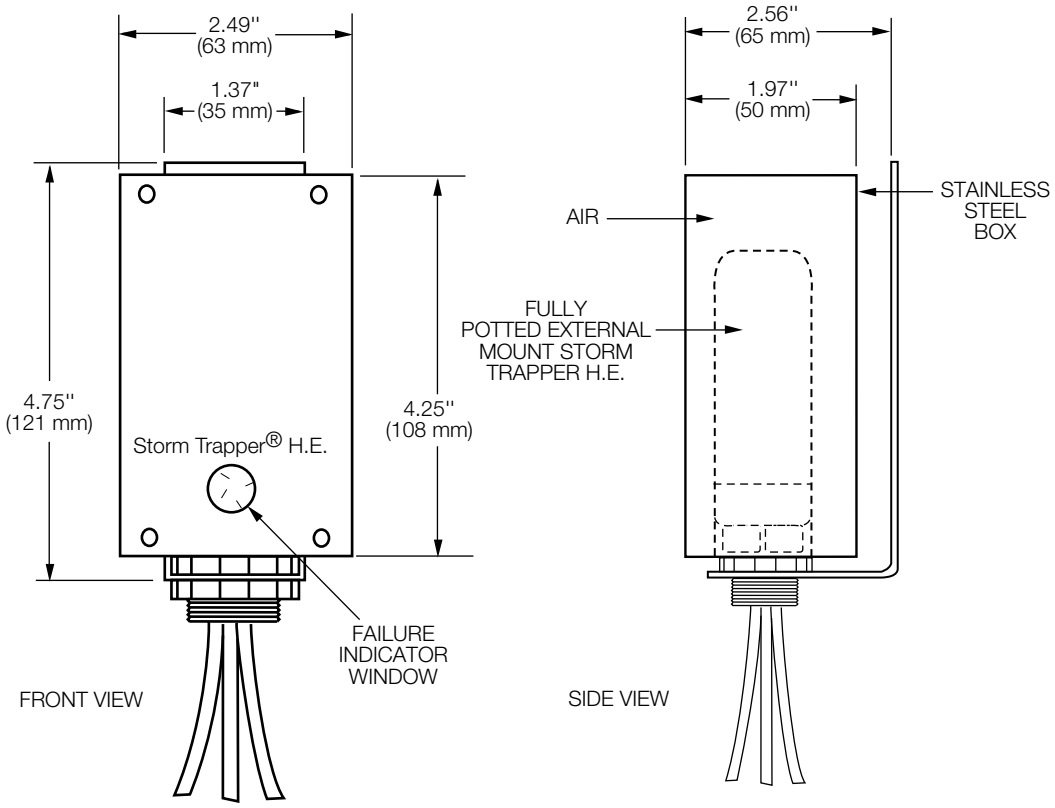

Figure 3. Dimensional information for metal-enclosed Storm Trapper H.E. arrester (shown with optional mounting bracket).

Temporary overvoltage (TOV) capability

The ability of the Storm Trapper H.E. arrester to withstand 60 Hz temporary overvoltage conditions is graphically shown in Figure 4. The graph shows for a given voltage magnitude (on a per unit of MCOV basis), the time an arrester can survive a TOV condition without going into thermal runaway.

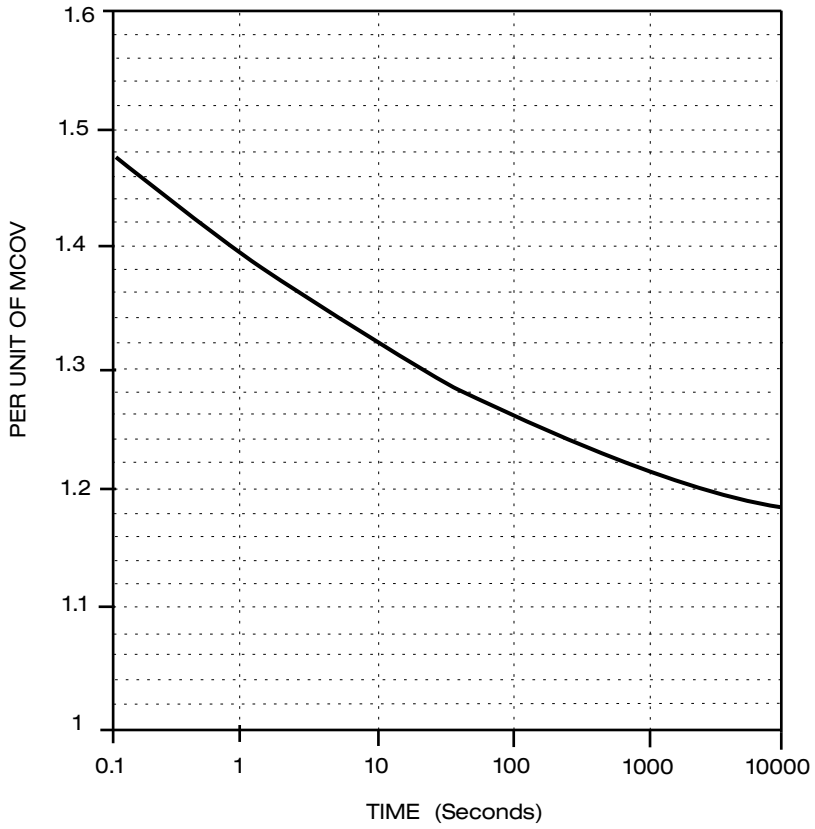

Figure 4. Temporary Overvoltage Capability.

Ordering information

To order a Storm Trapper H.E. arrester, determine the arrester Maximum Continuous Operating Voltage (MCOV) rating for the intended application and specify the appropriate catalog number from Table 4. Contact your Eaton representative for more information.

Table 4. Storm Trapper H.E. Arrester Selection

Storm Trapper H.E. Arrester Type	Voltage Rating (V rms)	MCOV (V rms)	Number of Poles	Catalog Number Without Hanger Bracket*
External Mount	175	175	1	ASZH175C100
	175	175	2	ASZH175C200
	175	175	3	ASZH175C300
	240	240	1	ASZH240C100
	240	240	2	ASZH240C200
	240	240	3	ASZH240C300
	480	400	1	ASZH480C100
	480	400	2	ASZH480C200
	480	400	3	ASZH480C300
	650	540	1	ASZH650C100
	650	540	2	ASZH650C200
	650	540	3	ASZH650C300
Metal-Enclosed	175	175	1	ASZH175E100
	175	175	2	ASZH175E200
	175	175	3	ASZH175E300
	240	240	1	ASZH240E100
	240	240	2	ASZH240E200
	240	240	3	ASZH240E300
	480	400	1	ASZH480E100
	480	400	2	ASZH480E200
	480	400	3	ASZH480E300
	650	540	1	ASZH650E100
	650	540	2	ASZH650E200
	650	540	3	ASZH650E300

* To order an arrester with mounting bracket change the last digit from a 0 to a 1. (Example: Change ASZH480C200 to ASZH480C201)

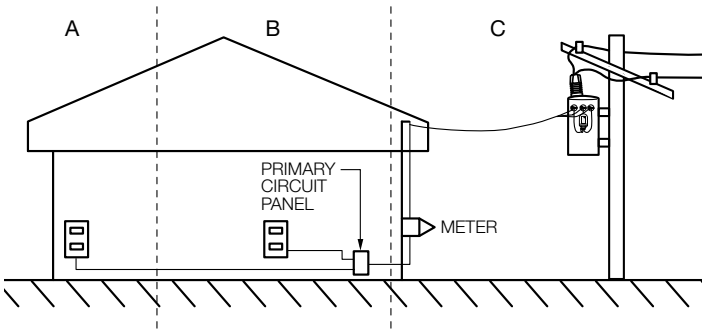

Figure 5. Location categories in low-voltage circuits.

Recommended arrester applications

IEEE Std C62.41™ -1991 standard, IEEE® Recommended Practice on Surge Voltages in Low-Voltage AC Power Circuits, defines three areas of low voltage service from the distribution transformer secondary bushings down to electrical outlets within a home or business. (See Figure 5.)

Storm Trapper H.E. arresters are designed for use in category C locations. Category C applications include use on transformer secondaries.

Outlets and long branch circuits are considered category A. Typically, category A overvoltage protection has been limited to plug-in style voltage suppressors.

This page intentionally left blank.

Eaton
1000 Eaton Boulevard
Cleveland, OH 44122
United States
Eaton.com

Eaton's Cooper Power Systems Division
2300 Badger Drive
Waukesha, WI 53188
United States
Eaton.com/cooperpowerseries

Printed in USA
Publication No. CA235015EN

For Eaton's Cooper Power series Storm Trapper H.E. MOV surge arrester product information call 1-877-277-4636 or visit: www.eaton.com/cooperpowerseries.

Powering Business Worldwide