

Hi-Tech® EXT backup current-limiting fuses

Trans-Guard® EXT current-limiting backup fuse

Minimize energy let-through – maximize equipment protection.

In addition to interrupting higher fault currents, the Trans-Guard EXT current-limiting backup fuse serves the very important function of limiting the amount of energy let-through to the source of the fault to a value below the withstand capability of the equipment being protected.

New and improved design offers you:

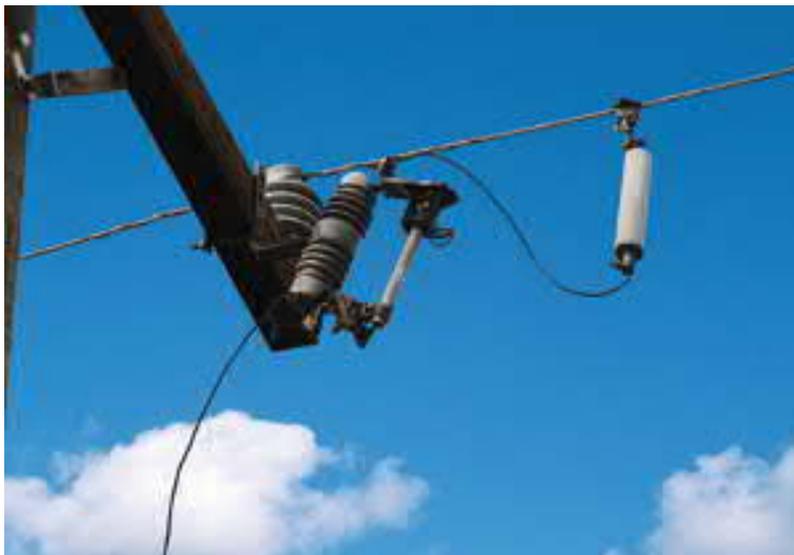
- Smaller size and lighter weight for easier handling
- Lowest energy let-through in the industry
- The most complete range of ratings available
- Lowest total I^2t let-throughs in the industry provide maximum protection for equipment by minimizing energy let-through during a fault
- Higher melt I^2t 's on smaller fuse ratings make fuses less susceptible to damage from current surges

- High fault interrupting capability – as high as 50 kA symmetrical
- Shorter, lighter weight design makes fuses easy to handle and install
- Integral pre-assembled hardware reduces installation time and likelihood of joint deterioration

Application

Designed to enhance protection on overhead distribution systems, the Trans-Guard EXT current-limiting backup fuse both significantly reduces energy let-through during a fault and offers very high interrupting capability to provide state-of-the-art protection against today's ever-increasing available fault currents.

01 The Trans-Guard EXT current-limiting backup fuse interrupts high-level currents and must be applied in series with another device capable of interrupting low- to mid-level currents. This is most commonly a cutout expulsion fuse. When properly coordinated, the Trans-Guard EXT current-limiting backup fuse always allows sufficient let-through current to cause the cutout fuse to melt and drop open, making it easy to visually pinpoint where the fault occurred.

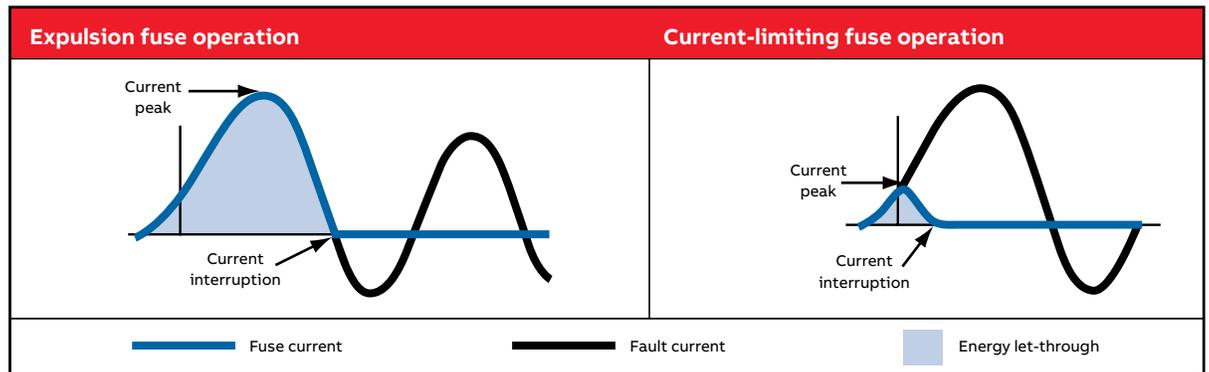


Hi-Tech® EXT backup current-limiting fuses

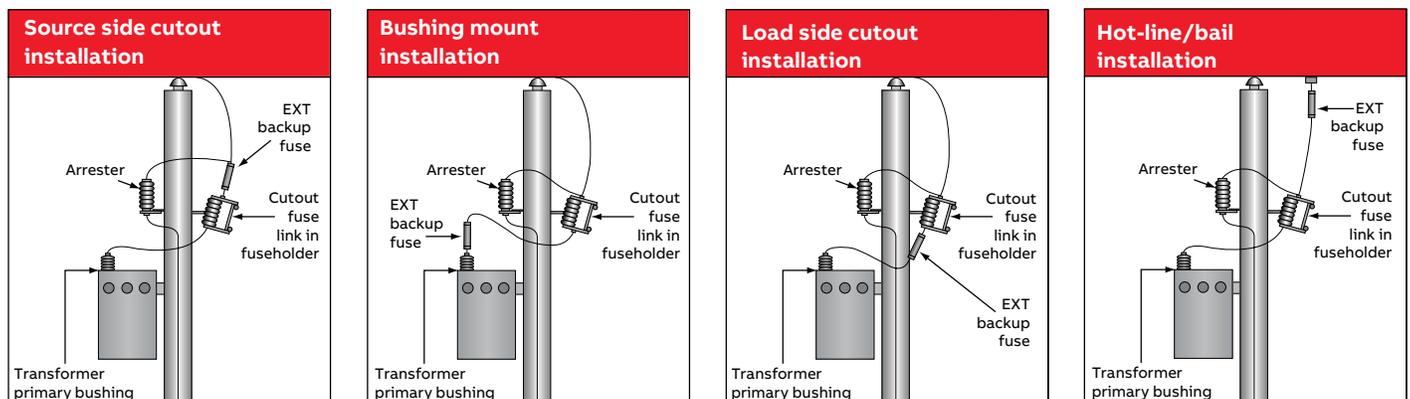
Trans-Guard® EXT current-limiting backup fuse



- Durable design features machined brass endcaps and filament-wound epoxy, centerless ground tubular bodies coated with oven-baked acrylic paint
- Broadest range of ratings available – up to 100 kA at 8.3 kV and 15.5 kV; up to 80 kA at 23 kV
- Current-limiting action improves power quality by reducing voltage dip time during a fault and reduces flame discharge and noise associated with the operation of the series-connected cutout fuse
- Wide variety of mounting and connection options for greater flexibility in installation
- 100% leak tested to ensure hermetic sealing
- Reduced energy let-through provides arc flash reduction

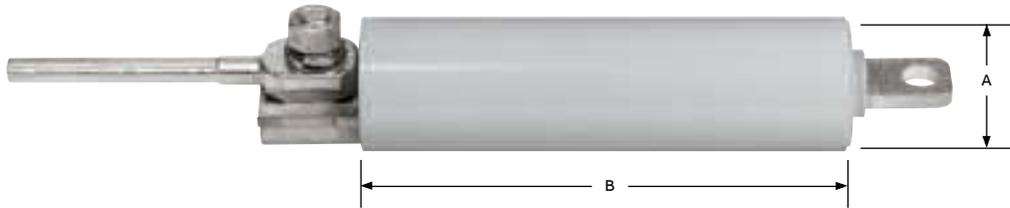


Type of Installations



Hi-Tech® EXT backup current-limiting fuses

Trans-Guard® EXT current-limiting backup fuse for 12 kA to 40 kA ratings

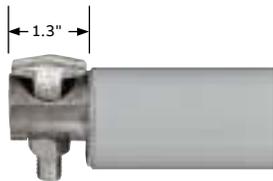


Ordering information

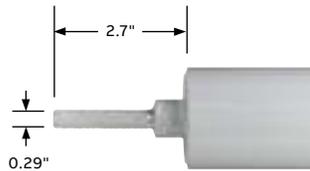
Base cat. no.*	Nominal voltage rating (kV)	Current rating (kA)	Dimension "A" (in.)	Dimension "B" (in.)	Weight (lbs.)
HTDE23 (X) 012	8.3	12	1.5	5.2	1.0
HTDE23 (X) 025		25	1.5	7.1	1.1
HTDE23 (X) 040		40	2.2	6.3	2.2
HTDE24 (X) 012	15.5	12	1.5	8.6	1.3
HTDE24 (X) 025		25	1.5	11.9	1.8
HTDE24 (X) 040		40	2.2	10.4	3.3
HTDE25 (X) 012	23.0	12	1.5	10.5	1.6
HTDE25 (X) 025		25	2.2	13.4	4.0
HTDE25 (X) 040		40	2.2	13.4	4.0

* When ordering, replace the (X) in the base catalog number with the appropriate hardware code from the chart below.

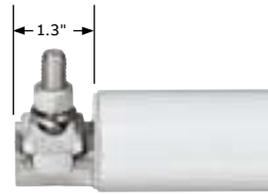
Hardware for 12 kA to 40 kA ratings



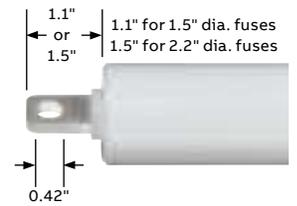
Eyebolt
(accepts #8 – 2/0)



Knurled stud



Parallel-groove
(accepts #6 – 2/0)



Spade

Hardware code

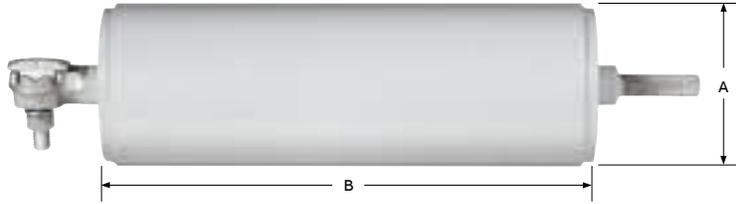


Universal adapter
rotatable through 180°

Hardware code (X)	1st end hardware	2nd end hardware
1	Spade	Knurled stud
5	Parallel-groove	Knurled stud
6	Parallel-groove	Spade
8	Eyebolt	Knurled stud
9	Universal adapter	Spade
C	Universal adapter	Knurled stud
F	Eyebolt	Eyebolt
G	Parallel-groove	Eyebolt
H	Eyebolt	Spade
J	Eyebolt	Universal adapter
W	Parallel-groove	Parallel-groove
Z	Parallel-groove	Universal adapter

Hi-Tech® EXT backup current-limiting fuses

Trans-Guard® EXT current-limiting backup fuse for 65 kA to 80 kA ratings



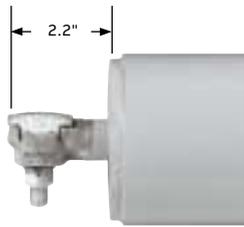
Ordering information

Base cat. no.*	Nominal voltage rating (kV)	Current rating (kA)	Dimensions (in.)		Weight (lbs.)
			"A"	"B"	
HTDE33 (X) 065	8.3	65	3.3	9.9	7.5
HTDE33 (X) 080		80			
HTDE34 (X) 065	15.5	65	3.3	15.5	10.5
HTDE34 (X) 080		80			
HTDE35 (X) 065	23.0	65	3.3	18.3	12.5
HTDE35 (X) 080		80			

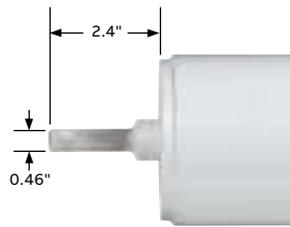
* When ordering, replace the (X) in the base catalog number with the appropriate hardware code from the chart below.

Hardware code

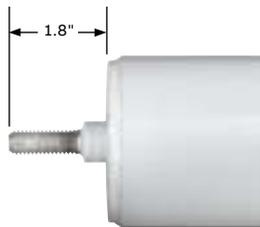
Hardware code (X)	1st end hardware	2nd end hardware
A	Threaded stud	Threaded stud
E	Eyebolt	Knurled stud
F	Eyebolt	Eyebolt
U	Eyebolt	Universal adapter



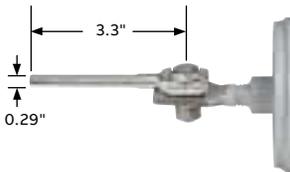
Eyebolt (accepts #8 - 2/0)



Knurled stud

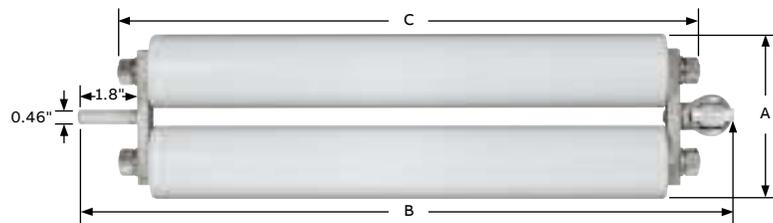


Threaded stud (1/2"-13 threads)



Universal adapter rotatable through 180°

Trans-Guard® EXT current-limiting backup fuse for 100 kA ratings



Eyebolt (accepts #8 - 2/0)

Base cat. no.	Nominal voltage rating (kV)	Current rating (kA)	Dimensions (in.)			Weight (lbs)
			"A"	"B"	"C"	
HTDE23E100	8.3	100	4.9	14.0	11.9	7.5
HTDE24E100	15.5	100	4.9	19.4	17.5	10.5

Hi-Tech® EXT backup current-limiting fuses

Voltage Selection – Refer to first table below. Each Trans-Guard® EXT current-limiting backup fuse is suitable for use in both single-phase and three-phase applications where the system voltage does not exceed the Maximum System Voltage listed. For single-phase applications on delta systems, one fuse is needed in each line.

Current-Rating Selection – Refer to second table below. Each Trans-Guard EXT current-limiting backup fuse will coordinate with any link having a rating no greater than that listed. For types of links not listed in this table, please contact ABB for assistance.

Hardware Selection – Many different hardware options are available. Some options vary depending on the size of the Trans-Guard EXT current-limiting backup fuse required.

Electrical characteristics of Trans-Guard EXT current-limiting backup fuse

Nominal voltage rating (kV)	Current rating (kA)	Rated maximum interrupting current (kA)	Rated maximum voltage (kV)	Maximum system voltage (kV)	Peak arc voltage (kV)	Minimum melt I ² t (amp ² -sec)	Maximum total I ² t (amp ² -sec)
8.3	12	50	8.3	14.4	26	2,700	8,000
	25				26	11,000	29,000
	40	25			26,000	72,000	
	65	22			67,000	230,000	
	80	22			156,000	580,000	
	100	24			218,000	850,000	
15.5	12	44	17.2	27.6	47	2,700	9,000
	25				49	11,000	34,000
	40				47	26,000	85,000
	65	50	15.5	24.9	44	67,000	230,000
	80				44	156,000	580,000
	100				46	204,000	730,000
23.0	12	31	23.0	34.5	62	2,700	10,000
	25				60	11,000	37,000
	40	50			62	26,000	88,000
	65				65	67,000	220,000
	80				63	123,000	360,000

Trans-Guard EXT current-limiting backup fuse/expulsion fuse link coordination

Trans-Guard EXT fuse rating (kA)	Coordinates with links up through								
	Type K	Type T	Type N	Type S	Type H	Type D	Type X	Type QA	Type KS
12	12	8	20	5	8	3	2.5	15	3
25	25	15	30	7	8	20	10	30	7
40	40	20	50	15	8	20	15	50	15
65	65	30	60	25	8	20	15	75	15
80	80	50	85	40	8	20	15	100	15
100	100	65	85	50	8	20	15	125	15

Hi-Tech® EXT backup current-limiting fuses

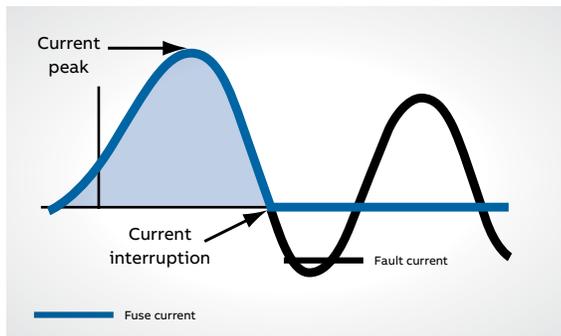
Trans-Guard® EXT current-limiting backup fuse for 46–138 kV systems

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01 Expulsion fuse
operation
—
02 Current-limiting
fuse operation

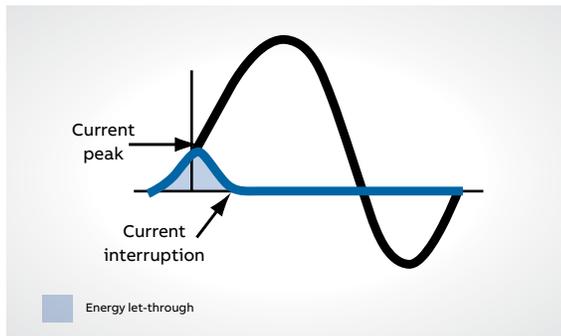


Minimize energy let-through. Maximize equipment protection.

Commonly used on 34.5 kV and lower systems to enhance protection, external current-limiting backup fuses coordinate with series expulsion fuse to offer very high interrupting capability and reduce energy let-through during a fault. The proven benefits of the two fuse approach widely used on distribution systems is now available for application up to 138 kV that traditionally only protected by a standard expulsion fuse.



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01



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02

Safety

- Offers a higher interrupting capability than a stand-alone expulsion fuse
- Significant reduction in energy let-through

Environmentally friendly

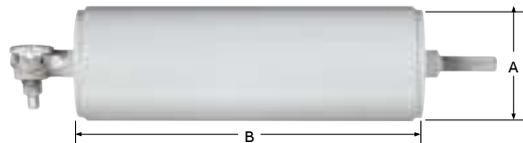
- Lessens the chance of an oil leakage by reducing the energy let-through during a short circuit fault condition
- Fully sealed design ensures that no contaminants are released into the environment during operation

Life cycle cost reduction

- Minimizes transformer damage during an internal fault condition, thus making repairs less costly
- Minimizes effects to transformer and surrounding infrastructure

Hi-Tech® EXT backup current-limiting fuses

Trans-Guard® EXT current-limiting backup fuse for 46 kV systems



Ordering 46 kV

46 kV catalog numbers

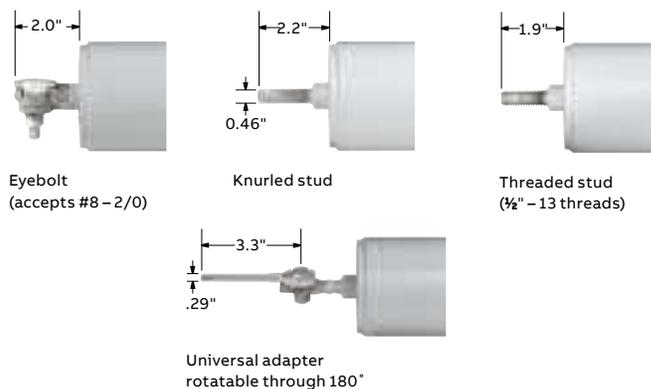
Base cat. no.*	Nominal voltage rating (kV)	Current rating (kA)	Dimension 'A' (inches)	Dimension 'B' (inches)	Weight (lbs)
HTDE37 (X) 010	38.0	10	3.3	18.3	12.5
HTDE37 (X) 015	38.0	15	3.3	18.3	12.5
HTDE37 (X) 025	38.0	25	3.3	18.3	12.5
HTDE37 (X) 030	38.0	30	3.3	18.3	12.5
HTDE37 (X) 050	38.0	50	3.3	21.0	13.5

*When ordering, replace (X) in the base catalog number with the appropriate hardware code from the chart below.

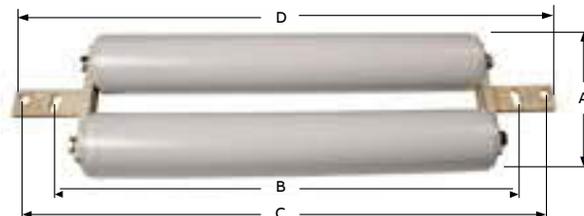
Hardware for 10 kA to 50 kA ratings

Hardware code: 10 kA to 50 kA

Hardware code (*)	1st end hardware	2nd end hardware
A	Threaded stud	Threaded stud
E	Eyebolt	Knurled stud
F	Eyebolt	Eyebolt
U	Eyebolt	Universal adapter



Trans-Guard EXT current-limiting backup fuse for 69–138 kV systems



Ordering 69 kV

For 69 kV application: 1x HTDE37X100 module

Base cat. no.	Nominal voltage rating (kV)	Current rating (kA)	Dimension 'A' (inches)	Dimension 'B' (inches)	Dimension 'C' (inches)	Dimension 'D' (inches)	Weight (lbs)
HTDE37X100	38.0	100	7.9	25.1	28.6	29.6	32

Ordering 115–138 kV

For 115 / 138 kV application: 2x HTDE37X100 modules in series required

For 115 / 138 kV applications, two (2) HTDE37X100 are required and ordered individually. The modules should be assembled in series during field installation. Reference the 69kV table above for individual dimensions of each module. The overall length will depend on installation.

Hi-Tech® EXT backup current-limiting fuses

Trans-Guard® EXT current-limiting backup fuse for 46–138 kV systems

EXT selection

Voltage selection

Each EXT current-limiting backup fuse is suitable for use in both single-phase and three-phase applications where the system voltage does not exceed the maximum system voltage listed. For single-phase applications on delta systems, one fuse is needed in each line.

Current-rating selection

Each EXT current-limiting backup fuse will coordinate with any link having a rating no greater

than that listed. For link types not listed in Table 2, please contact ABB for assistance. For additional coordination information, please consult application guide FS-10.

Hardware selection

Many different hardware options are available. Some options vary depending on the size of the current-limiting backup fuse required. Please refer to ordering information for available options.

Table 1: Electrical characteristics

Nominal voltage rating (kV)	Current rating (kA)	Rated max interrupting current (kA)	Rated max voltage (kV)	Max system voltage (kV)	Peak arc voltage (kV)	Min. melt I ² t (amp ² -sec)	Max total I ² t (amp ² -sec)
38.0	10	50	38.0	48.3	110	2,600	12,100
38.0	15	50	38.0	48.3	110	5,600	23,500
38.0	25	50	38.0	48.3	110	13,900	55,000
38.0	30	50	38.0	48.3	110	19,300	70,000
38.0	50	50	38.0	48.3	110	43,500	155,000
38.0	100	20	42.5	69.0*	106	172,000	830,000

*Maximum system voltage increased to 138 kV when two (2) 100 K modules are used in series.

Table 2: Expulsion fuse link coordination

Trans-Guard EXT fuse rating (kA)	S&C SMD standard speed (TCC 153-1)	S&C SMD slow speed (TCC 119-1)
10	10E	–
15	15E	15E
25	25E	25E
30	30E	30E
50	50E	40E
100	100E	80E

Hi-Tech® EXT backup current-limiting fuses

Trans-Guard® EXT current-limiting backup fuse

Application for 46–138 kV systems

Field tested and proven to reduce the energy let through during a fault, the Trans-Guard EXT current-limiting backup fuse family now includes options at 46 kV, 69 kV and 138 kV. All coordinate with existing power expulsion fuses to create an ideal two-fuse protection scheme.

In addition to increasing the interrupting capabilities of the standalone expulsion fuse, the Trans-Guard EXT drastically decreases the amount of energy let-through and peak currents during a high current fault condition. The two-fuse combination provides a safe and effective solution for protecting high-value infrastructure and personnel in proximity to a substation.

Features	Benefits/Descriptions
Superior performance	Clears high current faults by modifying the circuit conditions, resulting in clearing faults before the nature occurring zero crossing, results in tremendous reduction in I ² t let-through the system would have been subjected to otherwise.
High fault interrupting capability	As high as 50 kA symmetrical. (see Table 1)
Durable, robust design	Extends outdoor life and includes machined brass endcaps and filament-wound epoxy, centerless ground tubular bodies, ground and coated with oven-baked acrylic paint.
Current-limiting action	Improves power quality by reducing voltage dip time during a fault and reduces flame discharge and noise associated with the operation of the series-connected cutout fuse.
Hermetically sealed	100% leak tested to ensure hermetic sealing.
Minimal equipment damage	Current-limiting action minimizes the internal damage to the transformer during a primary fault condition; therefore, making equipment repair less expensive.
Matched-melt coordination	Ensures sufficient energy let-through to melt open series-connected expulsion fuse, providing visual indication of the fault.

01 138 kV EXT current-limiting backup fuse in series with power expulsion fuse offers state of the art protection. When properly coordinated, the Trans-Guard® EXT current-limiting backup fuse always allows sufficient let-through current to cause the power expulsion fuse to melt and drop open, making it easy to visually pinpoint where the fault occurred.

