



Heat Shrink Terminations

MHI and MHO Series For 12/20(24) kV Polymeric Cables

Data Sheet

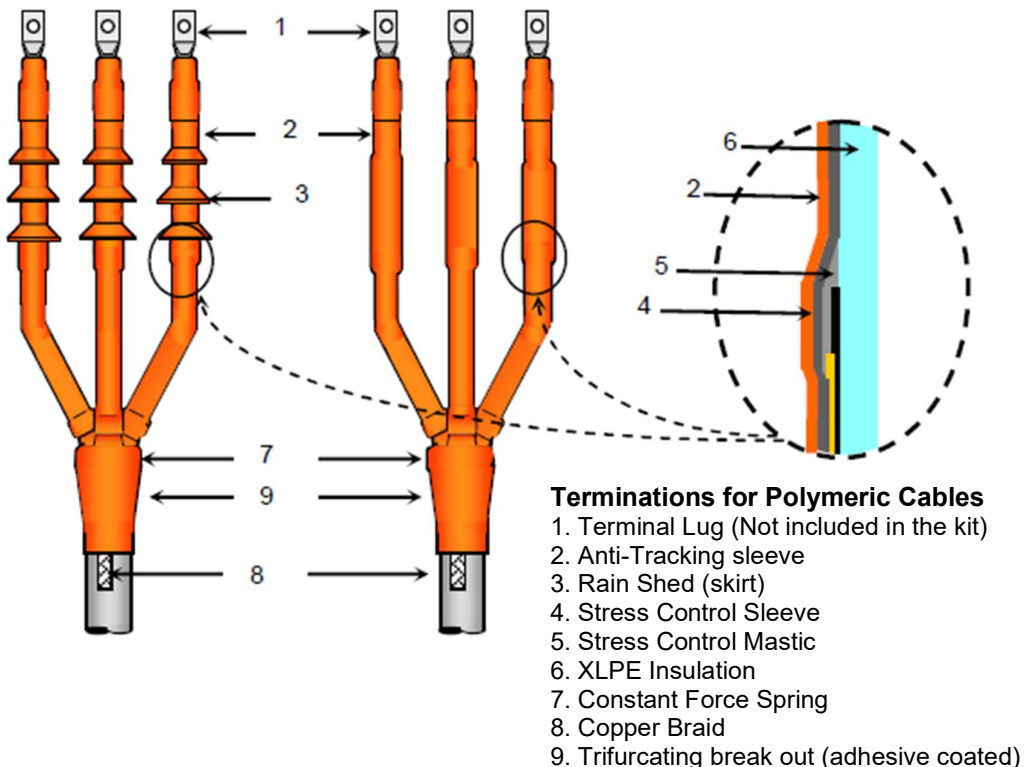
1. Product Description

3M Heat Shrink medium voltage terminations are available for tape/wire shielded , armoured/unarmoured medium voltage single core and three core polymeric cables. 3M Heat Shrinkable terminations utilizes a unique high dielectric constant (High K) stress control tube and mastic for effective grading of electrical stresses. The non tracking heat shrinkable insulating outer tube is optimally designed for reliable environmental protection. The modular heat shrinkable skirts allow installation of the termination in inverted condition if required. For three core cable terminations, a heat shrinkable breakout is provided for environment sealing of the trifurcating crotch area. All the heat shrinkable components are supplied in an expanded state and would shrink effectively on application of heat.

All the grounding connections are solder-less.

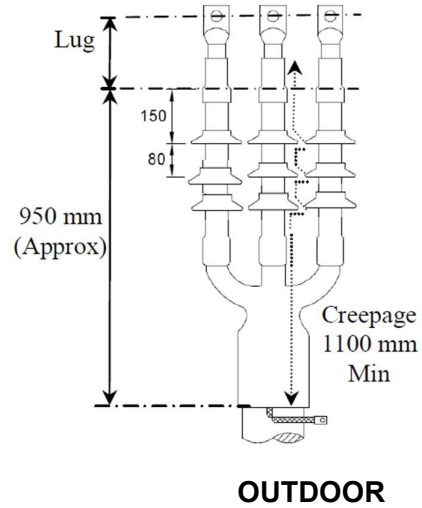
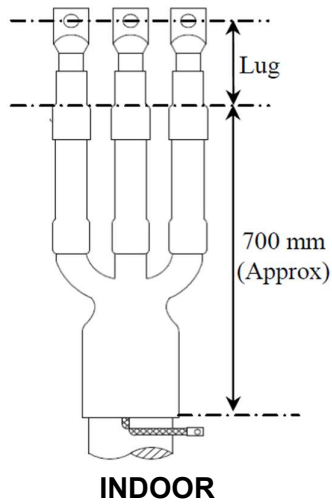
2. Product Features

- Available for 1-core and 3-core polymeric cables.
- Provides excellent environmental protection and moisture sealing.
- Wide conductor size ranges.

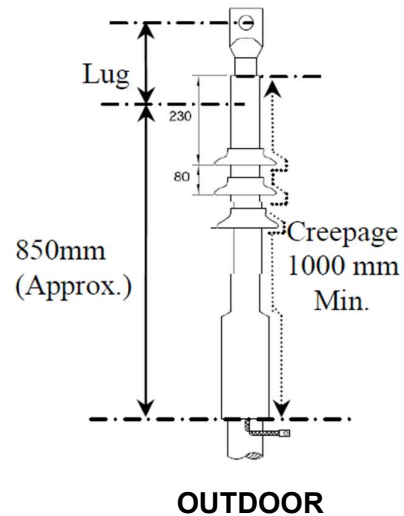
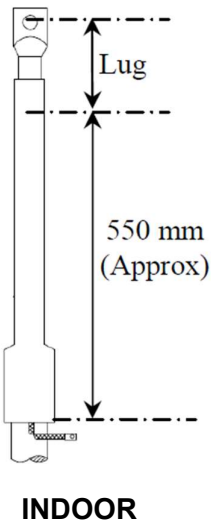


3. Typical Dimensions

3 CORE TERMINATIONS



1 CORE TERMINATIONS



4. Typical Physical and Electrical Properties.

- Anti- Tracking Tube

Electrical properties	- Dielectric strength	kV/mm	18
	(ASTM D-149)		
	- Dielectric Constant		3.5
	(ASTM D-150)		
	- Volume Resistivity	Ohm.cm	2.4×10^{14}
	- Tracking Resistance	20 min@3.25kV	No tracking
	(ASTM D-2303)		

Physical properties	- Color		Red
	- Tensile strength (ASTM D-412)	N/mm2	8
	- Ultimate Elongation (ASTM D-412)	%	300
	- Water Absorption (ASTM D-570)	%	0.3
	- Properties after corrosion test-500 hrs @ 120°C		
	▪ Tensile strength	N/ mm2	6
	▪ Ultimate Elongation	%	100
	- Fungus Resistance		Non nutrient
	- Longitudinal change	%	10
Thermal properties	- Heat shock	30 min @ 200°C	
		Pass (ASTM D-2671)	
	- Flammability (UL94)		Pass
	- Properties after thermal aging, 168 hrs @ 150°C		
	▪ Tensile strength	N/mm2	7
	▪ Ultimate Elongation	%	200
	- Low temperature flexibility (ESI 09-13, 4 hrs @ -20°C)		No cracks
• Stress Control Tube			
Electrical properties	- Dielectric Constant (min) (ASTM D-150)		15
	- Volume Resistivity	Ohm.cm	1 x 10 ⁹ (min)
Physical properties	- Color		Black
	- Tensile strength (ASTM D-412)	N/mm2	10
	- Ultimate Elongation (ASTM D-412)	%	200
	- Water Absorption (ASTM D-570)	%	0.3
	- Properties after corrosion test-500hrs @ 120°C		
	▪ Tensile strength	N/ mm2	8
	▪ Ultimate Elongation	%	50
	- Fungus Resistance		Non- nutrient
	- Longitudinal change	%	5
Thermal properties	- Heat shock	30 min @ 200°C	
		Pass (ASTM D-2671)	
	• Properties after thermal aging, 168 hrs @ 150°C		
	▪ Tensile strength	N/ mm2	8
	▪ Ultimate Elongation	%	100
	- Low temperature flexibility (ESI 09-13, 4 hrs @ -20°C)		No cracks
• Stress Control Mastic			
Electrical properties	- Dielectric Constant (min) (ASTM D-150)		9
	- Volume Resistivity	Ohm.cm	1 x 10 ¹⁰
	- Dissipation factor		0.15
Physical properties	- Color		Yellow
	- Tensile strength (ASTM D412)	N/ mm ²	0.08
	- Ultimate Elongation (ASTM D412)	%	500
	- Water Absorption (ASTM D-570)	%	0.5
	- Service Temp	°C	90

- **Red Sealing Mastic**

Electrical properties	- Dielectric strength	kV/mm	10
Physical properties	- Color		Brick red
	- Fusion		Passes
	(ASTM D4388)		
	- Service Temp	°C	90

5. Application range

Breakout Boot	Application range (mm)
MHI/MHO 24KV 3C-35/50 SQMM ID/OD c/w:	Breakout boot size 1330
Finger / Phase core side shrink ratio 35/12	28 .. 14
Cable side shrink ratio 80/40	64 .. 48
MHI/MHO 24KV 3C-70/120 SQMM ID/OD & MHI/MHO 24KV 3C-150/300 SQMM ID/OD c/w:	Breakout boot size 2145
Finger / Phase core side shrink ratio 52/18	42 .. 21
Cable side shrink ratio 110/47	88 .. 56

Kit description	Cable Insulation Outer Diameter Application range (mm)
MHI/MHO 24KV 35/50 SQMM ID/OD c/w:	
Stress Control Tube 30/15	24 .. 18
Anti-Tracking Tube 35/12	28 .. 14.4
MHI/MHO 24KV 70/120 SQMM ID/OD c/w:	
Stress Control Tube 45/20	36 .. 24
Anti-Tracking Tube 45/19	36 .. 22.8
MHI/MHO 24KV 150/300 or 400* SQMM ID/OD c/w:	
Stress Control Tube 50/25	40 .. 30
Anti-Tracking Tube 55/20	44 .. 24
MHI/MHO 24KV 400/500 SQMM ID/OD c/w:	
Stress Control Tube 50/25	40 .. 30
Anti-Tracking Tube 70/30	56 .. 36
MHI/MHO 24KV 630/800 SQMM ID/OD c/w:	
Stress Control Tube 65/30	52 .. 36
Anti-Tracking Tube 70/30	56 .. 36

6. Test Results

Test	Test Value	Result
Partial Discharge Test	Less than 10 pC at 22 kV	Pass
5 min AC HighVoltage Test	57 kV	Pass
1 min AC HighVoltage Test	65 kV	Pass
Load Cycle Test, at 2.5 U ₀	63 cycles	Pass
15 Min DC Withstand test	76 kV	Pass
Impulse Voltage Test	150 kVp	Pass

7. Electrical kitting available

No.	Product Description	Cable (mm2)	Phase	/Outdoor Indoor	Voltage
1	MHI 24KV 1C-35/50 SQMM ID	35/50	1	Indoor	24kV
2	MHI 24KV 1C-70/120 SQMM ID	70/120	1	Indoor	24kV
3	MHI 24KV 1C-150/300 SQMM ID	150/300	1	Indoor	24kV
4	MHI 24KV 1C-400/500 SQMM ID	400/500	1	Indoor	24kV
5	MHI 24KV 1C-630/800 SQMM ID	630/800	1	Indoor	24kV
6	MHO 24KV 1C-35/50 SQMM OD	35/50	1	Outdoor	24kV
7	MHO 24KV 1C-70/120 SQMM OD	70/120	1	Outdoor	24kV
8	MHO 24KV 1C-150/300 SQMM OD	150/300	1	Outdoor	24kV
9	MHO 24KV 1C-400/500 SQMM OD	400/500	1	Outdoor	24kV
10	MHO 24KV 1C-630/800 SQMM OD	630/800	1	Outdoor	24kV
11	MHI 24KV 3C-35/50 SQMM ID	35/50	3	Indoor	24kV
12	MHI 24KV 3C-70/120 SQMM ID	70/120	3	Indoor	24kV
13	MHI 24KV 3C-150/300 SQMM ID	150/300	3	Indoor	24kV
14	MHO 24KV 3C-35/50 SQMM OD	35/50	3	Outdoor	24kV
15	MHO 24KV 3C-70/120 SQMM OD	70/120	3	Outdoor	24kV
16	MHO 24KV 3C-150/300 SQMM OD	150/300	3	Outdoor	24kV

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