



MSP™ - Medium Voltage Motor Surge Protection



General

NEPSI's MSP™ (Motor Surge Protector) is designed to protect medium voltage motors and generators from voltage surges due to lightning and switching events. The MSP™ accomplishes this task better than any other product by decreasing the slope and crest of impending voltage surges to safe levels.

Application of the MSP™ is guaranteed to reduce the likelihood of motor failures, resulting in less down-time and higher productivity.

Figure 1
 NEPSI's Medium Voltage Motor Surge Protection equipment protects motor insulation from power system transients.

Product Scope

- Reduced medium voltage motor and generator failures from voltage surges due to lightning, faults, and switching events.
- Units can be custom designed for direct mounting to generators, motor, and compressor housing.
- Units can be supplied with over-current and differential protection current transformers. Reduced downtime and material waste from motor failure.
- Simple to install and requires no maintenance.
- MSP's are custom designed for many OEM's utilizing medium voltage motors and generators.

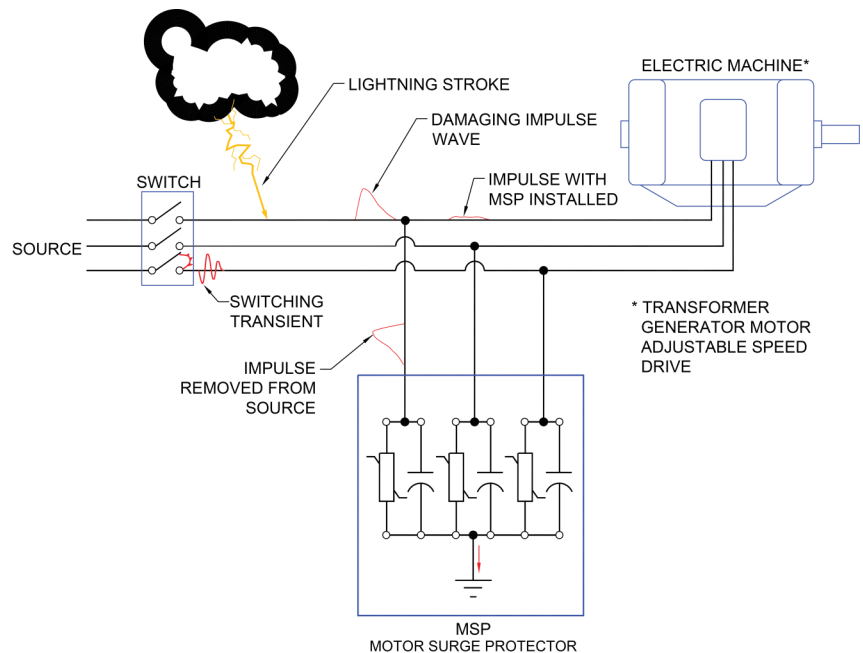


Figure 2
 Principle operation of the MSP™ is to decrease the crest voltage and rate of rise of the impending surges. High rates of rise damage end turns while high crest voltages damage winding to core insulation. Both of these types of damaging surges are mitigated with NEPSI's MSP™.



Product Application

Due to the wavelength and travel time of lightning and switching transients, the MSP™ is most effective when placed as close as practical to the motor terminals with the ground leads being as short as possible. This will limit the surge voltage seen by the motor to the discharge voltage of the arrester. For best protection, one MSP™ should be placed at each medium voltage motor or generator. Where

there are many small motors or explosion proof motors in hazardous locations, a single MSP™ at the motor control center is recommended.

The proper choice of MSP™ is based on the system and/or motor voltage and the system grounding. The order guide below can be used to determine the correct MSP™ for your application.

Standard Features

Enclosure

11 gauge galvanized steel all welded construction, C2 structural steel channel base, bolted stainless steel hinged door. NEMA 1, 3R, 4X (optional), 12 | IEC IP10, IP14, IP56, IP52, NEC Class 1 & 2, Div. II designs also available.

Surge Capacitor

The MSP™ is equipped with hermetically sealed low-loss, low-inductance surge capacitors. Their capacitance rating is based upon the MSP™ voltage rating as shown in Table 1 below. The surge capacitor is equipped with discharge resistors that reduce the residual voltage on the capacitor to 50 volts in 5 minutes.

Wall mounting flanges

Allows the MSP™ to be mounted on suitable walls.

Surge/Lightning Arresters

The MSP™ is equipped with heavy duty, silicone rubber housed MOV distribution class lightning arresters incorporating the latest in metal oxide varistor (MOV) design techniques (Station Class are available as an option). The high track resistant, non-fragmenting silicone rubber housed arrester provides increased safety for personnel and equipment. The lightning arresters comply with the latest revision of ANSI/IEEE C62.11 "IEEE Standard for Metal Oxide Surge Arresters for AC Power Circuits."

Terminals

The MSP is provided with a Copper NEMA 2-hole pad for interconnection with customer wiring.

Operating Temperature

-40F (-40C) to +115F (+46C)

Warranty

1 year replacement parts per NEPSI's Standard Warranty.

Optional Features

Fuses

Increases system and equipment reliability by removing a failed MSP™. Blown fuse detection is provided through a set of dry contacts to alert plant personnel of a blown fuse.

Pecker-Head/Motor Terminal Mounting

The MSP™ can be custom designed for direct mounting to a motor or generator to act as a terminal box. The equipment can be equipped with a neutral grounding resistor, differential CT's, and ground CT to provide all fault sensing.

Differential current transformers

This option is shown in Figure 3, below. The differential CT's are placed inside the MSP™ and afford the highest level of protection for the motor or generator.

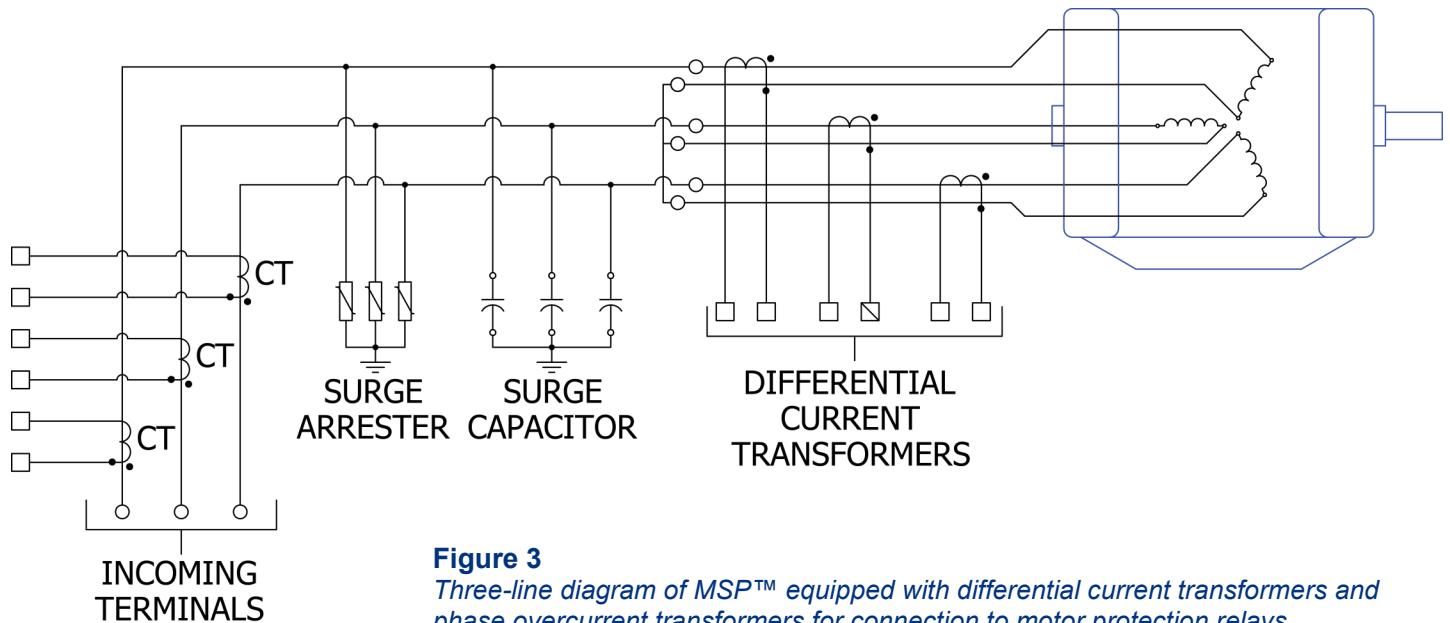


Figure 3
 Three-line diagram of MSP™ equipped with differential current transformers and phase overcurrent transformers for connection to motor protection relays.

MSP™ Ordering Guide

The MSP™ can be ordered by choosing the part number from the table below based on the system voltage and type of grounding. Options are ordered by adding part number suffixes.

Table 1
 MSP™ Standard Part Numbers

System Voltage		Recommended Part Number (kV RMS)		
Nominal	Maximum	Four-Wire Wye: Multi-grounded Neutral	Three-Wire Wye: Solidly Grounded Neutral	Delta, Resistive Grounded and Ungrounded Wye
2.4	2.54	-	-	MSP3A0240
4.16Y/2.4	4.4Y/2.54	MSP3A0416	MSP6A0416	MSP6A0416
4.16	4.4	-	-	MSP6A0416
4.8	5.08	-	-	MSP6A0690
6.9	7.26	-	-	MSP9A0690
8.32Y/4.8	8.8Y/5.08	MSP6A1380	MSP9A1380	-
12.0Y/6.93	12.7Y/7.33	MSP9A1380	MSP12A1380	-
12.47Y/7.2	13.2Y/7.62	MSP9A1380	MSP15A1380	-
13.2Y/7.62	13.97Y/8.07	MSP10A1380	MSP15A1380	-
13.8Y/7.97	14.52Y/8.38	MSP10A1380	MSP15A1380	-
13.8	14.52	-	-	MSP15A1380
20.78/12.0	22Y/12.7	MSP15A2400	MSP21A2400	-
22.86/13.2	24.2Y/13.87	MSP18A2400	MSP24A2400	-
23	24.34	-	-	MSP24A2400
24.94Y/14.4	26.4Y/15.24	MSP18A2400	MSP27A2400	-

For Options Add Suffixes On Following Page



For example, an MSP™ for a 500 HP motor that is on a 4.16kV resistive grounded system with the wall mounting brackets would have the following part number: MSP6A0416

Contact the factory or your nearest sales representative for options and voltages not shown above.

Table 2
MSP Part Suffixes

MSP™ OPTIONS	Model Number Suffix
Station Class Lightning Arresters	S
Pecker-Head/Motor-Generator Terminal Box Mounting	PHM
Current Limiting Fuses	CLF
Neutral Grounding Resistor	GR
Over-Current CTs	OVCT
Differential CTs	DCT####

For differential current transformer option specify the desired primary current rating of the CT where #### appears.

Table 3
MSP Dimensions Weights and Electrical Values

Part Number	H Height (Inches)	W Width (Inches)	D Depth (Inches)	Capacitance rating of Surge Capacitor (µF)	Surge Arrester Duty Rating (kV)	Weight (LBS)
MSP3A0240	39.0	43.0	24.0	0.5	3.0	310
MSP3A0416	39.0	43.0	24.0	0.5	3.0	310
MSP6A0416	39.0	43.0	24.0	0.5	6.0	310
MSP9A0690	43.0	43.0	24.0	0.5	9.0	420
MSP6A1380	47.0	43.0	24.0	0.25	6.0	420
MSP9A1380	47.0	43.0	24.0	0.25	9.0	420
MSP10A1380	47.0	47.0	24.0	0.25	10.0	420
MSP12A1380	47.0	47.0	24.0	0.25	12.0	420
MSP15A1380	47.0	47.0	24.0	0.25	15.0	420
MSP15A2400	47.0	47.0	24.0	0.125	15.0	470
MSP21A2400	51.0	51.0	28.0	0.125	21.0	470
MSP24A2400	51.0	51.0	28.0	0.125	24.0	470
MSP27A2400	51.0	51.0	28.0	0.125	27.0	470

Note: Add 8 inches to the width dimension if the current transformer option is chosen

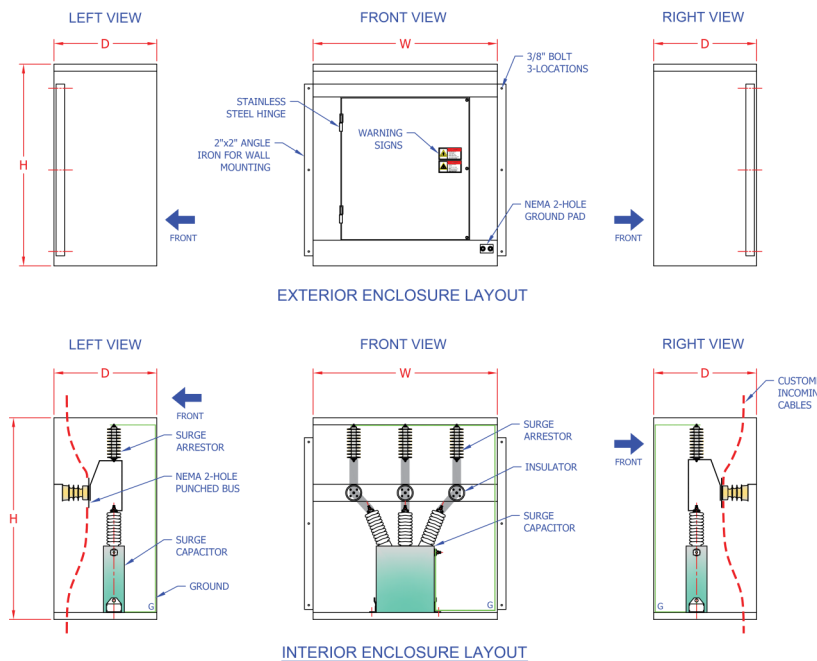


Figure 4
Approximate Layout for basic MSP™. Layout and dimensions may change without notice. Confirm layout and dimensions at order placement.