



Shown without optional Monitoring package

# STMV Medium Voltage Surge Protective Device Installation, Voltage Selection & Operation Instructions 1000V - 4160V

**Read and Understand these Instructions**

**Warning:  
Hazardous & Potentially Deadly  
Energy Levels Present**

- Risk of Explosion
- Risk of Electrical Shock
- Risk of Fire



## **CONDITIONS OF USE**

### **IMPORTANT INFORMATION - WARNING**

This Surge Protective Device (SPD) is available for use by those who understand and accept its benefits and risks. It is assumed that users have appropriate system monitoring and controls to prevent unintended effects.

This SPD is designed to control high-energy transient overvoltages having short time durations. In the event of sustained overvoltages caused by electrical distribution system anomalies, this unit will fail short-circuited. The unit will attempt to flow its available fault current. This may result in the clearing of upstream overcurrent protection and/or severe non-passive SPD failure. It is important to note that SPD failures are symptoms of system level overvoltage problems. SPD's do not fail randomly or for no apparent reason. Be aware that ungrounded distribution systems are intended to 'float' and 'move' with respect to ground. A failed SPD may escalate the initial distribution system anomaly, resulting in equipment shutdown, single-phasing, loss of production, etc. This unit should be positioned or shielded in a manner such that rupture failure does not represent a hazard to personnel or property.

This SPD is supplied without internal overcurrent protection. The SPD can be installed at any location in the distribution system. The user/installer is responsible for providing and coordinating fusing or overcurrent protection. Ferraz Shawmut, Bussman, etc., offer full lines of field installable overcurrent protection.

We recommend that any installed overcurrent protection be rated lower than the immediate upstream overcurrent protection. This ensures that a failed SPD will not effect upstream portions of the distribution system. Note that too conservative of overcurrent protection may result in premature or nuisance clearing, which may be difficult to detect.

Some users of medium voltage suppressors have reported excellent success from installing units in a secure location without overcurrent protection. In the event of unit failure, hazards are minimized, upstream overcurrent protection clears the affected load(s) including the SPD(s), power monitoring detects undesirable power quality (i.e., single-phasing, etc.) and shuts down appropriate loads.

APT recommends that medium voltage SPD(s) not be installed unless this information is understood and acceptable to the end-user.

## Decoding Model Numbers:

Example Part Number: ST41MV1204M = 4160V; 120kA per phase; NEMA 4 Enclosure, Optional Monitoring Package

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### Voltage Codes

10	=	1000V
15	=	1500V
20	=	2000V
25	=	2500V
30	=	3000V
36	=	3600V
41	=	4160V

### Series Designation

MV	=	Non-Modular, Fixed Voltage, Medium Voltage
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### Surge Current Ratings

12	=	120kA per phase
24	=	240kA per phase

### Enclosure Ratings

04	=	NEMA 4
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### Available Options

M	=	Monitoring Package: Indicator lights per phase, dry contacts per phase, surge counters per phase
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### Environmental Specifications:

- Relative Humidity Range: 0-100% Non-condensing
- Operating Frequency: 50Hz & 60Hz Systems
- Operating Temperature: -40°F to +160°F (-40°C to +70°C)
- NEMA 4 (IP66) Heavy Gauge Steel Enclosure Standard
- Standard Size: 31cm x 31cm x 15.5cm (12" x 12" x 6")
- With monitoring package: 41cm x 35.5cm x 15.5cm (16" x 14" x 6")
- Weight: 29.5 kg (65 lbs) to 34.5kg (75lbs)

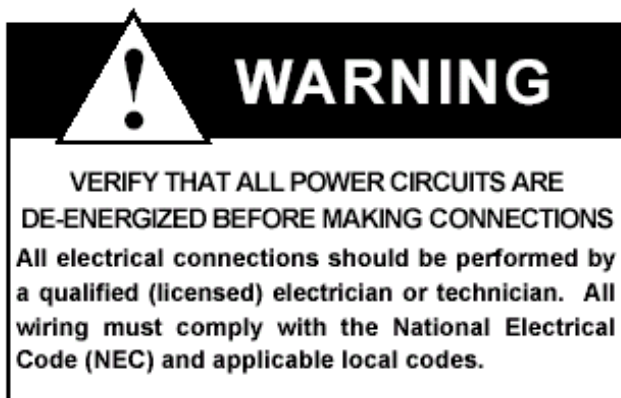


	WARNING
<p>VERIFY THAT ALL POWER CIRCUITS ARE DE-ENERGIZED BEFORE MAKING CONNECTIONS</p> <p>All electrical connections should be performed by a qualified (licensed) electrician or technician. All wiring must comply with the National Electrical Code (NEC) and applicable local codes.</p>	

## *Installation:*

NOTE: There are no user serviceable parts inside main SPD enclosure. Opening door does not gain access to serviceable components (Optional Monitoring Package door provides service access to Monitoring Display board)

- 1.) Read all Instructions
- 2.) All electrical connections should be performed by qualified electrician or technician
- 3.) Verify system voltages and compare to model number. Ensure that the proper voltage unit is being installed.
- 4.) Verify that all power circuits are deenergized and locked out.
- 5.) Verify that overcurrent protection rated 200A or lower exists in the distribution system to protect the SPD.
- 6.) Identify suitable location for SPD:
  - Need leads as short and straight as possible
  - Need to mount on surface capable of supporting 65lbs (30kg)
  - Do not cut pre-installed conductors until after installation is thought through
- 7.) Mount SPD, install overcurrent protection and conduit as appropriate. SPD operation is not sensitive to physical orientation - SPD with Optional Monitoring Package must be installed such that vent hood is on top and vent holes are on bottom.
- 8.) Connect SPD's #6 ground conductor to system ground
- 9.) Connect SPD's three #6 phase conductors to phases A, B & C (not phase sensitive)
- 10.) Verify system is clear of deficiencies. Maintain distance as precaution against misapplication. Energize unit.



## *Problems & Failures:*

- SPDs are purposely put in harm's way to protect load
- SPDs will protect load or Die Trying
- SPDs will protect until failure
- SPDs rarely fail from surges
- Failed SPD is usually caused by system related Sustained Overvoltage – there is usually a problem in the system – check it!
- SPD does not draw current unless it is actively suppressing an overvoltage. Therefore, it does not normally generate heat. In the event of overtemperature, paint discoloration, deformed enclosure, deformed conductors or other abnormal condition, maintain safe distance and deenergize SPD immediately.

## *Open Nearby Overcurrent Protection:*

This is usually a signal of problems on the system, such as equipment fault, etc. Under certain conditions, it is possible that an equipment failure can skew system voltages far enough that the SPD will attempt to control any overvoltages. Due to relatively sustained conditions, this may fail the SPD. This may not be obvious. Be aware that SPD's rarely fail from surges; they almost always fail from system level overvoltage problems. When the equipment is serviced and reenergized, the SPD may fail. We recommend that the SPD be tested in conjunction with any other equipment failure as follows:

## *Troubleshooting:*

Safely deenergize unit and isolate from other all equipment. Use a DC ohmmeter or continuity meter to measure the impedance of each phase's suppression elements. The following combinations exist: A-B, B-C, C-A, A-G, B-G and C-G. The ohmmeter should show Megaohm to Infinite impedance for every mode of protection. (AC ohmmeters may load down the circuit and provide false indication of low impedance.) Any short circuits clearly indicate an internal fault - *do not reuse SPD - replace it*. If you have or suspect problems, call SurgTec Tech Support at (727) 535-6339.

## *Operational Status: Standard STMV without Optional Monitoring Package:*

The standard STMT SPD does not have operational indicators. One may assume that it is 100% functional when energized. Treat the SPD as suspect whenever an upstream overcurrent protection operates.

## Operational Status: Enhanced STMV with Optional Monitoring Package:

**Indicator Lights:** Each phase has a bright cluster of green LEDs. When lit, the suppression circuit for that phase is on-line and working properly.

An extinguished indicator light indicates:

- Failed SPD
- Loss of phase or grounded phase

Either situation requires immediate action by appropriate service personnel

If all three phase indicators are extinguished the unit may be improperly installed, deenergized or needs replacement.

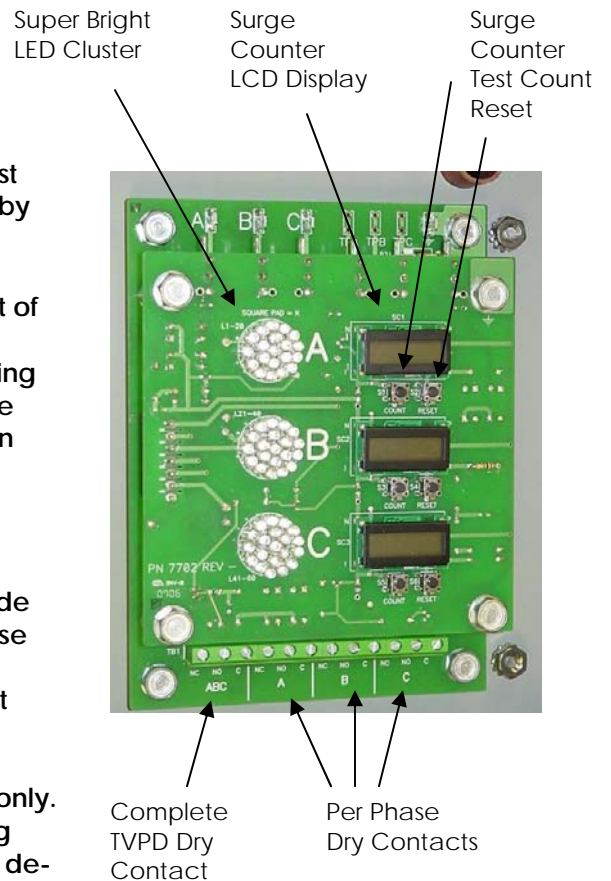
**Surge Counters:** Each phase has its own surge counter for statistical recording purposes. The surge counter provides a means to totalize the number of transient voltage surges encountered since the counter was last reset.

Under the front cover, each phase has its own "Reset" and "Test Count" buttons. Pressing "Test Count" increments the counter by one (1). Pressing "Reset" resets the counter to zero (0).

**Dry Contacts:** The entire SPD, plus each phase has its own set of Form C Normally Open (NO) and Normally Closed (NC) dry contacts. The terminal block is inside the cover of the monitoring option enclosure. These relay contacts can be used for remote indication of the SPD's operating status. Typical Normally Open configuration will use the NO and Common terminals. Typical Normally Closed configuration will use the NC and Common terminals.

Remote monitoring of each phase's dry contact will also provide indication of a Phase to Ground fault. For example, if one phase faults, that line's voltage drops to zero and the dry contact will change state. This can be remotely configured as ground fault indication.

The Dry Contacts are designed for low voltage control signals only. Maximum switching current is 0.5Amp and maximum switching voltage is 120VAC. The Diagnostic Board is field replaceable if de-energized and capacitance bled off unit. Please call for assistance.



Phase	Output Terminals	Description
ABC	NC (normally closed)	Use either the NO or NC terminal and the Common to monitor the operating status of all 3 Phases simultaneously
	NO (normally open)	
	Common	
A	NC (normally closed)	Use either the NO or NC terminal and the Common to monitor the operating status of Phase A only
	NO (normally open)	
	Common	
B	NC (normally closed)	Use either the NO or NC terminal and the Common to monitor the operating status of Phase B only
	NO (normally open)	
	Common	
C	NC (normally closed)	Use either the NO or NC terminal and the Common to monitor the operating status of Phase C only
	NO (normally open)	
	Common	