

## INTRODUCTION

The Thermally Protected High Energy, TPHE, Series is designed for safe disconnection of the Varistor from the circuit due to abnormal operating conditions. The TPHE Series is designed to withstand the rigors of UL1449 4<sup>th</sup> Edition Type 1 and Type 2 applications while still meeting the requirements of typical High Energy Varistor applications.

The FSS design is for new and existing applications requiring high current surge capabilities, with integrated thermal protection accommodating form, and fit allowing for a drop in replacement for existing product offerings.

The FSD design is also for new and existing applications. It is packaged in a DIN-RAIL mounting configuration. The FSD design is available with 1, 2, 3, and 4 pole configurations for Delta and Wye connections.

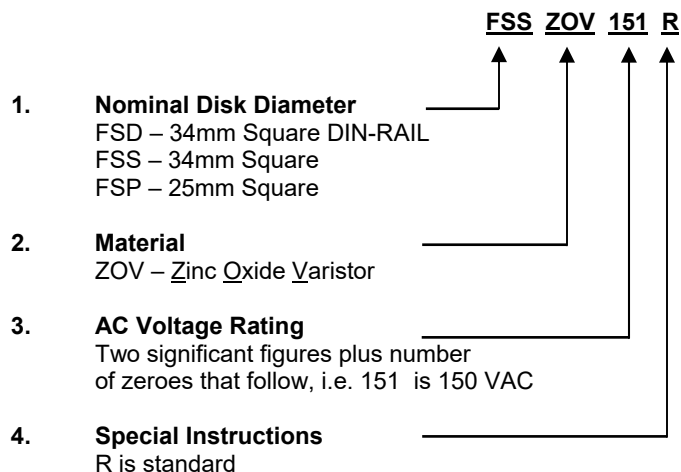
The FSP design is similar to the FSS. It utilizes a smaller package to accommodate lower profile applications.

Current ranges:  $I_N$  – (10kA, and 20kA)  
 $I_{MAX}$  – (25kA, and 50kA)

## STYLE DESIGNATION

The Maida Style Number is the typical means to identify our components when ordered. The style number identifies several parameters that are important for the characteristics of the device. An alternative ordering method, if known, is by our Item Number.

The following example is the standard part numbering system when ordering our Thermally Protected Series components by the Maida Style Number:



## STANDARD MARKING

Minimum marking shall consist of an abbreviated style designation and, when space is available, the manufacturer's initials or company logo.

Example:

MDC  
 FSS  
 151

Where:

MDC – Company initials/Logo  
 FS - Fail Safe  
 S - 34 mm  
 151 - AC Voltage Rating (150VAC)

A manufacturing date code and/or special markings are available upon request. Other safety agency designations are included where applicable.

The FSP, FSS and FSD TPHE Designs



# THERMALLY PROTECTED HIGH ENERGY (TPHE) SERIES

## SPECIFICATIONS

### THROUGH HOLE VARISTORS

Maida Style Number	Recognitions To Safety Agency Standards						Nominal Size (mm)	Minimum Marking	MCOV (AC)	Peak Current (8x20us)		VPR (V)	SCCR (kA)	Thermal Properties		UL SPD Type
										# of pulses				Operating Temp (°C)	Flame Rating (UL 94)	
										1	15 (I <sub>N</sub> )					
	A	B	C	D	E	F				(kA)	(kA)					
FSPZOV151R	X	X					25	MDC-FSP-151	150	25	10	600	200	-40 to 80	V0	2CA
FSPZOV181R	X	X					25	MDC-FSP-181	180	25	10	800	200	-40 to 80	V0	2CA
FSPZOV321R	X	X					25	MDC-FSP-321	320	25	10	1000	200	-40 to 80	V0	2CA
FSPZOV421R	X	X					25	MDC-FSP-421	420	25	10	1200	200	-40 to 80	V0	2CA
FSPZOV551R	X	X					25	MDC-FSP-551	550	25	10	1800	200	-40 to 80	V0	2CA
FSPZOV681R	X	X					25	MDC-FSP-681	690	25	10	2000	200	-40 to 80	V0	2CA
FSSZOV151CR	X	X					34	MDC-FSS-151C	150	50	20	600	200	-40 to 85	V0	2CA
FSSZOV151R	X						34	MDC-FSS-151	150	50	20	600	200	-40 to 85	V0	1CA
FSSZOV181CR	X	X					34	MDC-FSS-181	180	50	20	600	200	-40 to 85	V0	2CA
FSSZOV181R	X						34	MDC-FSS-181	180	50	20	600	200	-40 to 85	V0	1CA
FSSZOV271CAR	X	X					34	MDC-FSS-271CA	275	50	20	800	200	-40 to 85	V0	2CA
FSSZOV271AR	X						34	MDC-FSS-275A	275	50	20	800	200	-40 to 85	V0	1CA
FSSZOV321CR	X	X					34	MDC-FSS-321CR	275	50	20	1000	200	-40 to 85	V0	2CA
FSSZOV321R	X						34	MDC-FSS-321	320	50	20	1000	200	-40 to 85	V0	1CA
FSSZOV421CR	X	X					34	MDC-FSS-421CR	420	50	20	1500	200	-40 to 85	V0	2CA
FSSZOV421R	X						34	MDC-FSS-421	420	50	20	1500	200	-40 to 85	V0	1CA
FSSZOV551CR	X	X					34	MDC-FSS-551CR	550	50	20	1500	200	40 to 85	V0	2CA
FSSZOV551R	X						34	MDC-FSS-551	550	50	20	1500	200	-40 to 85	V0	1CA
FSSZOV681CR	X	X					34	MDC-FSS-681CR	690	50	20	2000	200	-40 to 85	V0	2CA
FSSZOV681R	X						34	MDC-FSS-681	690	50	20	2000	200	-40 to 85	V0	1CA

**NOTES:**

Appendix A lists the single-pulse peak current and energy ratings on file with the Safety Agencies.

Maximum transient rating specified in this table are valid. They may differ from those shown in Appendix A.

A = UL1449 File E321173 - Surge Protective Devices

B = cUL File E321173 - Surge Protective Devices

C = CSA C22.2 File 033468

D = VDE File 40017480

E = SEV - 96.7 70250.01

# THERMALLY PROTECTED HIGH ENERGY (TPHE) SERIES

## SPECIFICATIONS

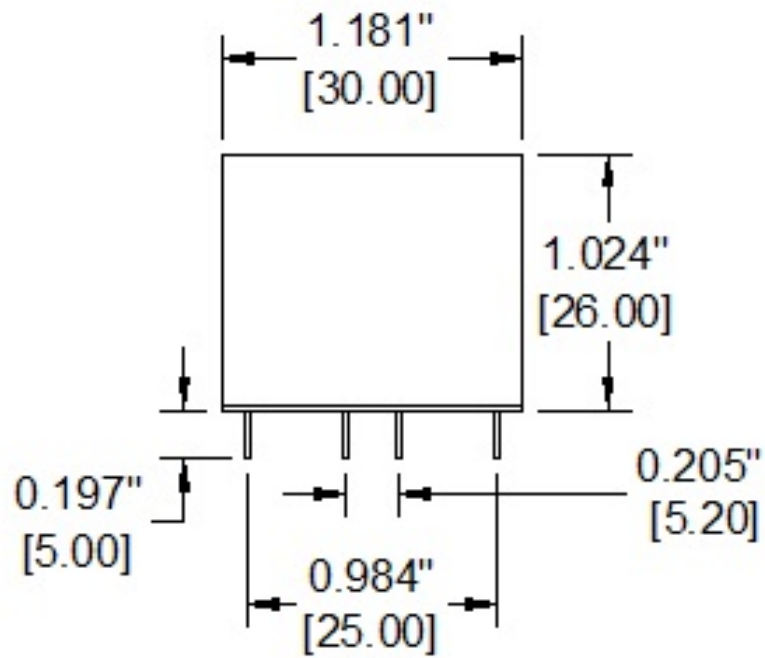
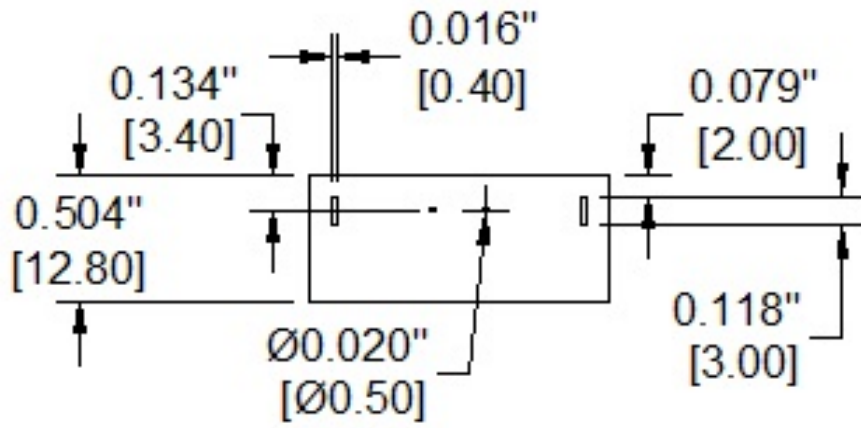
### DIN-RAIL VARISTORS

Maida Style Number	Recognitions To Safety Agency Standards						# of Poles	Minimum Marking	Nominal Voltage	MCOV				Peak Current (8x20us)		MLV				SCCR	Operating Temp. (°C)	UL SPD Type	
														# of pulses									
	(VAC)				1	15 (I <sub>N</sub> )				(V)													
	A	B	C	D	E	F				(VAC)	L-L	L-N	L-G	N-G	(kA)	(kA)	L-L	L-N	L-G				N-G
FSDZOV151-R	X	X					1	MDC-FSD-151	120	150	-	-	-	50	20	1560	-	-	-	-	-40 to 85	4CA	
FSDZOV151-2R	X	X					2	MDC-FSD-151-2R	120	-	150	150	150	50	20	-	3120	1560	1560	-	-	-40 to 85	4CA
FSDZOV151-3R	X	X					3	MDC-FSD-151-3R	208/120	300	-	150	-	50	20	3120	-	1560	-	-	-	-40 to 85	4CA
FSDZOV151-3NR	X	X					3	MDC-FSD-151-3N	208/120	300	150	150	48	50	20	3120	1560	2730	1170	-	-	-40 to 85	4CA
FSDZOV151-4R	X	X					4	MDC-FSD-151-4R	208/120	300	150	150	150	50	20	3120	3120	1560	1560	-	-	-40 to 85	4CA
FSDZOV151-NR	X	X					2	MDC-FSD-151-N	120	-	150	150	48	50	20	-	1560	2730	1170	-	-	-40 to 85	4CA
FSDZOV181-R	X	X					1	MDC-FSD-181	120	180	-	-	-	50	20	1570	-	-	-	-	-	-40 to 85	4CA
FSDZOV181-2R	X	X					2	MDC-FSD-181-2R	120	-	180	180	180	50	20	-	3140	1570	1570	-	-	-40 to 85	4CA
FSDZOV181-3R	X	X					3	MDC-FSD-181-3R	208/120	360	-	180	-	50	20	3140	-	1570	-	-	-	-40 to 85	4CA
FSDZOV181-3NR	X	X					3	MDC-FSD-181-3N	208/120	360	180	180	48	50	20	3140	1570	2740	1170	-	-	-40 to 85	4CA
FSDZOV181-4R	X	X					4	MDC-FSD-181-4R	208/120	360	180	180	180	50	20	3140	3140	1570	1570	-	-	-40 to 85	4CA
FSDZOV181-NR	X	X					2	MDC-FSD-181-N	120	-	180	180	48	50	20	-	1570	2740	1170	-	-	-40 to 85	4CA
FSDZOV271-R	X	X					1	MDC-FSD-271	240	275	-	-	-	50	20	1830	-	-	-	-	-	-40 to 85	4CA
FSDZOV271-2R	X	X					2	MDC-FSD-271-2R	240	-	275	275	275	50	20	-	3660	1830	1830	-	-	-40 to 85	4CA
FSDZOV271-3R	X	X					3	MDC-FSD-271-3R	415/240	550	-	275	-	50	20	3660	-	1830	-	-	-	-40 to 85	4CA
FSDZOV271-3NR	X	X					3	MDC-FSD-271-3N	415/240	550	275	275	48	50	20	3660	1830	3460	1630	-	-	-40 to 85	4CA
FSDZOV271-4R	X	X					4	MDC-FSD-271-4R	415/240	550	275	275	275	50	20	3660	3660	1830	1830	-	-	-40 to 85	4CA
FSDZOV271-NR	X	X					2	MDC-FSD-271-N	240	-	275	275	48	50	20	-	1830	3460	1630	-	-	-40 to 85	4CA
FSDZOV321-R	X	X					1	MDC-FSD-321	277	320	-	-	-	50	20	1890	-	-	-	-	-	-40 to 85	4CA
FSDZOV321-2R	X	X					2	MDC-FSD-321-2R	277	-	320	320	320	50	20	-	3780	1890	1890	-	-	-40 to 85	4CA
FSDZOV321-3R	X	X					3	MDC-FSD-321-3R	480/277	640	-	320	-	50	20	3780	-	1890	-	-	-	-40 to 85	4CA
FSDZOV321-4R	X	X					4	MDC-FSD-321-4R	480/277	640	320	320	320	50	20	3780	3780	1890	1890	-	-	-40 to 85	4CA
FSDZOV321-NR	X	X					2	MDC-FSD-321-N	277	-	320	320	48	50	20	-	1890	3520	1630	-	-	-40 to 85	4CA
FSDZOV421-R	X	X					1	MDC-FSD-421	347	420	-	-	-	50	20	2180	-	-	-	-	-	-40 to 85	4CA
FSDZOV421-2R	X	X					2	MDC-FSD-421-2R	347	-	420	420	420	50	20	-	4360	2180	2180	-	-	-40 to 85	4CA
FSDZOV421-3R	X	X					3	MDC-FSD-421-3R	600/347	840	-	420	-	50	20	4360	-	2180	-	-	-	-40 to 85	4CA
FSDZOV421-3NR	X	X					3	MDC-FSD-421-3N	600/347	840	420	420	48	50	20	4360	2180	3810	1630	-	-	-40 to 85	4CA
FSDZOV421-4R	X	X					4	MDC-FSD-421-4R	600/347	840	420	420	420	50	20	4360	4360	2180	2180	-	-	-40 to 85	4CA
FSDZOV421-NR	X	X					2	MDC-FSD-421-N	347	-	420	420	48	50	20	-	2180	3900	1630	-	-	-40 to 85	4CA
FSDZOV551-R	X	X					1	MDC-FSD-551	480	550	-	-	-	50	20	2550	-	-	-	-	-	-40 to 85	4CA
FSDZOV551-2R	X	X					2	MDC-FSD-551-2R	480	-	1000	550	550	50	20	-	5100	2550	2550	-	-	-40 to 85	4CA
FSDZOV551-3R	X	X					3	MDC-FSD-551-3R	600/347	1000	-	550	-	50	20	5240	-	2550	-	-	-	-40 to 85	4CA
FSDZOV551-4R	X	X					4	MDC-FSD-551-4R	600/347	1000	550	550	550	50	20	5240	5240	2550	2550	-	-	-40 to 85	4CA
FSDZOV681-R	X	X					1	MDC-FSD-681	600	690	-	-	-	50	20	2990	-	-	-	-	-	-40 to 85	4CA
FSDZOV681-2R	X	X					2	MDC-FSD-681-2R	600	-	690	690	690	50	20	-	5980	2990	2990	-	-	-40 to 85	4CA
FSDZOV681-3R	X	X					3	MDC-FSD-681-3R	600/347	1000	-	690	-	50	20	5980	-	2990	-	-	-	-40 to 85	4CA
FSDZOV681-4R	X	X					4	MDC-FSD-681-4R	600/347	1000	690	690	690	50	20	5980	5980	2990	2990	-	-	-40 to 85	4CA

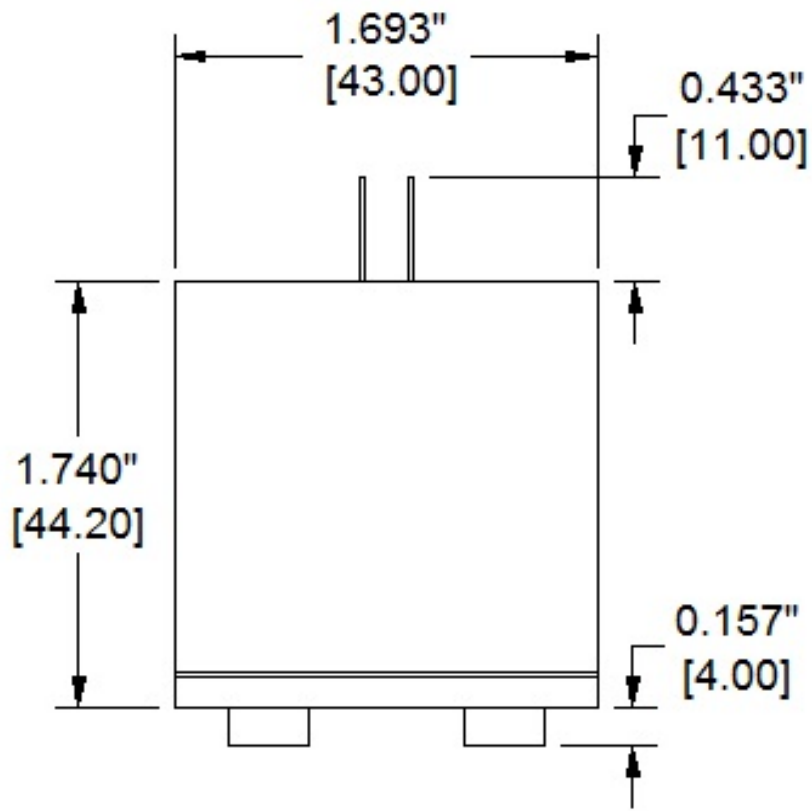
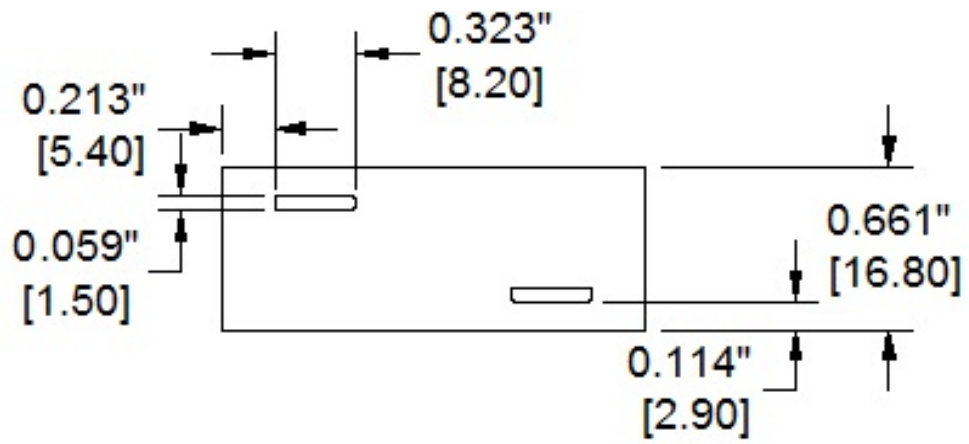
**NOTES:**

Appendix A lists the single-pulse peak current and energy ratings on file with the Safety Agencies.  
 Maximum transient rating specified in this table are valid. They may differ from those shown in Appendix A.  
 A = UL1449 File E321173 - Surge Protective Devices      D = VDE File 40017480  
 B = cUL File E321173 - Surge Protective Devices      E = SEV - 96.7 70250.01  
 C = CSA C22.2 File 033468

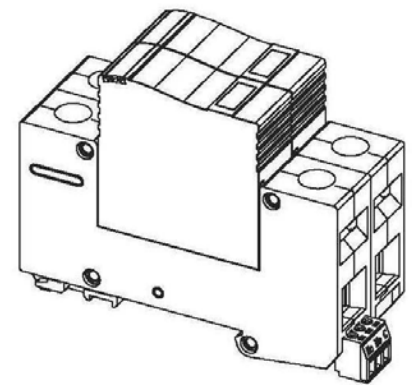
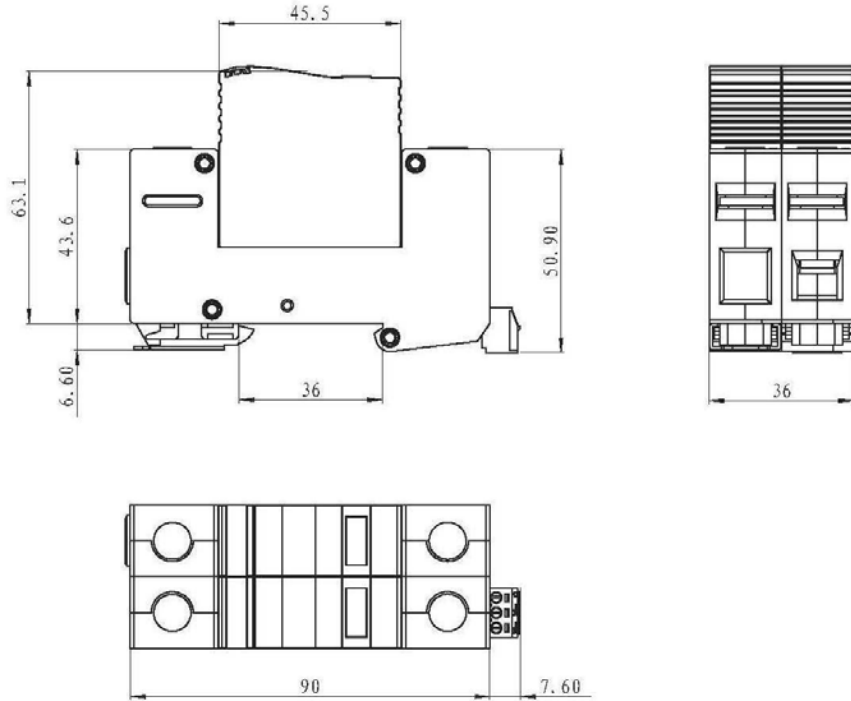
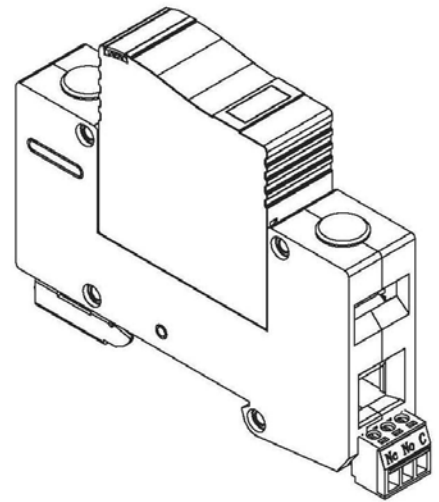
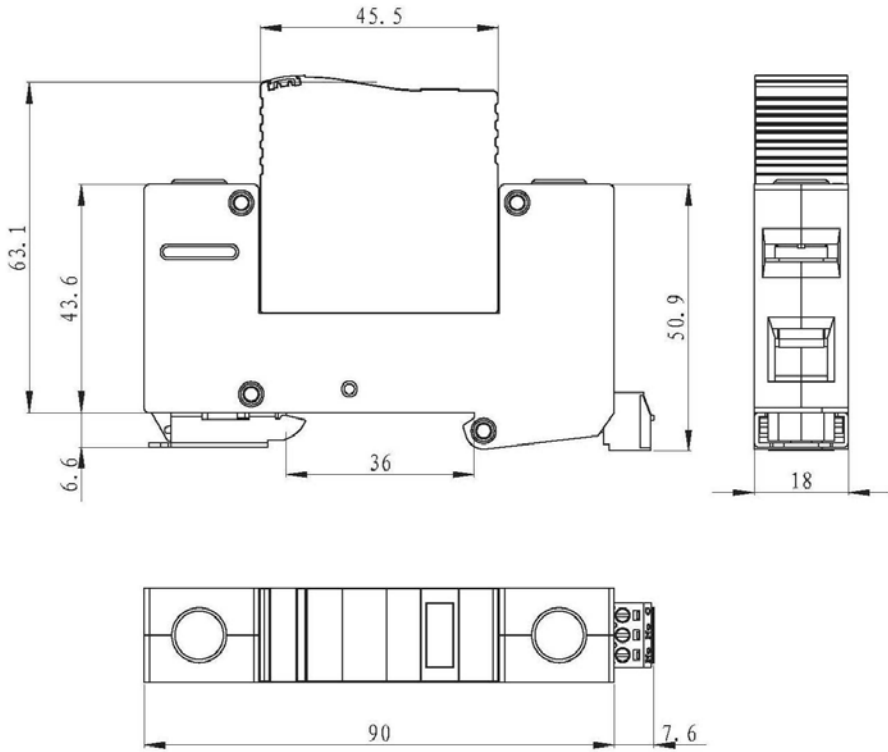
FSP Dimensions



FSS Dimensions



# FSD Dimensions



FSD Dimensions (cont.)

