

Semiconductor Fuses



Microswitches & Studs

Microswitch Systems

MICROSWITCH SYSTEMS ADAPTED TO THE FOLLOWING FUSES:

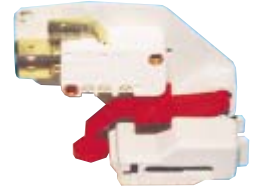
- PSC sizes 30, 31, 32, 33 / 70, 71, 72, 73
- Blade-type PSC (PA) sizes 0-1, 2-3 / 70, 71, 72, 73
- PSC sizes 000 / 00



MS 4L 2-5 B6



MS PA 2-5



MS 4L 2-5



HIGHLY RESISTANT STUDS OFFERING OPTIMIZED CONNECTION, EXCELLENT ELECTRICAL CONTACT AND HIGH MECHANICAL WITHSTAND FOR STUD-STYLE FUSES

Connection studs



MS 7V 1-5



MAIN CHARACTERISTICS

Code	AC Insulation voltage rating (***)	Positive operating voltage/current	Current rating	Interrupting rating						AC voltage withstand test (*)	Impulse voltage test Uimp 1.2/50 µs (**)	Fire class according to UL 94	
				Current	Non inductive circuit			Inductive circuit : L/R = 25ms					
					30V	110V	250V	30V	110V				250V
MS 3V 1-5	1000 V	20 V	10 A	50/60 Hz	10 A	10 A	10 A	10 A	10 A	10 A	8,5 kV	14 kV	H.B
MS 7V 1-5	1500 V	50 mA		DC	8 A	0,4 A	0,2 A	4 A	0,2 A	0,1 A	12 kV	20 kV	
MS 3V 1-5 BS	1000 V	10 V	3 A	50/60 Hz	3 A	3 A	3 A	2 A	1 A	1 A	8,5 kV	14 kV	
MS 3V 1-9 BS	1500 V				10 mA	DC	3 A	0,5 A	0,25 A	3 A			
MS 7V 1-5 BS		1500 V	10 mA	DC			3 A	0,5 A	0,25 A	3 A	0,2 A	0,1 A	
MS 7V 1-9 BS													
MS 3V 1-5 ET	1000 V	10 V	3 A	50/60 Hz	3 A	3 A	3 A	2 A	1 A	1 A	8,5 kV	14 kV	H.B.
MS 7V 1-5 ET	1500 V	10 mA		DC	3 A	0,5 A	-	2 A	0,2 A	-	12 kV	20 kV	
MS PA 2-5	1500 V	20 V	10 A	50/60 Hz	10 A	10 A	10 A	10 A	10 A	10 A	9 kV	13 kV	V0
MS PA 2-9		50 mA		DC	8 A	0,4 A	0,2 A	4 A	0,2 A	0,1 A			
MS PA 2-5 B2	1500 V	20 V	5 A	50 Hz	4 A	4 A	5 A		5 A	5 A	12 kV	16 kV	V0
MS 4L 2-5 B2 + Pres	1000 V	100 mA		DC					2 A	0,4 A		8 kV	
MS 4L 2-5 B6 + Pres	1000 V	20 V	10 A	50/60 Hz	10 A	10 A	10 A	10 A	10 A	10 A	8 kV	10 kV	V0
		50 mA	DC	8 A	0,4 A	0,2 A	4 A	0,2 A	0,1 A				
MC 6,3 GR 2-5 N	1000 V	20 V	5 A	50/60 Hz		5 A	3 A		3 A	2 A	3,5 kV		H.B.
		100 mA		DC	4 A	0,4 A		3 A	0,4 A				
MC 36 GR 2-5	1000 V	20 V	5 A	50/60 Hz		5 A	5 A		5 A	5 A	7,5 kV		
		100 mA		DC	4 A	0,4 A		2 A	0,4 A				

* Between power circuit and microswitch terminals as per IEC 60 and 694 and NFC 64010 (50/60 Hz 1 min duration in dry air)

** Between power circuit and microswitch terminals Uimp: impulse voltage as per IEC 947-1

*** Between power circuit and microswitch terminals

EACH MICROSWITCH WEIGHS LESS THAN 100 g, THEREFORE NO FUME AND SMOKE GRADE IS REQUIRED BY NF F 16-102 STANDARD

Semiconductor Fuses



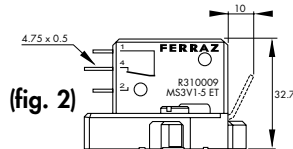
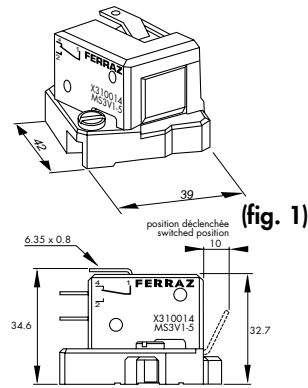
Microswitches & Studs

Microswitches systems for PSC

INDICATION SYSTEMS FOR PSC FUSE SIZES 30 TO 73

MS 3V...

These patented indication systems are exclusively hand resettable.



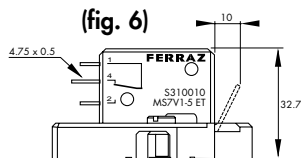
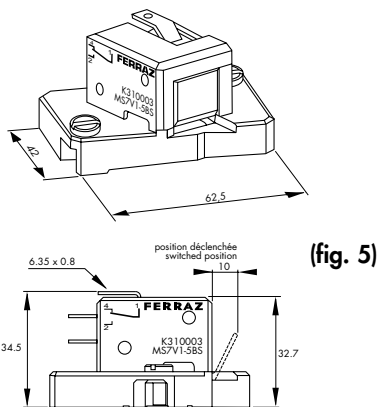
Fuse size	Code	Ref. Number	Indication style	Weight (g)	Packaging
Sizes 30, 31 32, 33	MS 3V 1-5 (fig.1)	X310014	Standard NO-NC	34	3 pieces
	MS 3V 1-5 BS (3)	W310013	Low level NO-NC	34	3 pieces
	MS 3V 1-9 BS (4)	T310011	Low level NO-NC	44	3 pieces
	MS 3V 1-5 ET (fig.2)	R310009	Low level NO-NC IP 50 (9)	34	3 pieces

(3) Same as fig.1

(4) Same dimensions as figure 1 but with 2 microswitches side by side

(9) Watertightness class

MS 7V1...



Fuse size	Code	Ref. Number	Indication style	Weight (g)	Packaging
Sizes 70, 71 72, 73	MS 7V 1-5 (fig.5)	J310002	Standard NO-NC	45	3 pieces
	MS 7V 1-5 BS (7)	K310003	Low level NO-NC	45	3 pieces
	MS 7V 1-9 BS (8)	P310007	Double pole NO-NC low level	55	3 pieces
	MS 7V 1-5 ET (fig.6)	S310010	Low level NO-NC IP 50 (9)	55	3 pieces

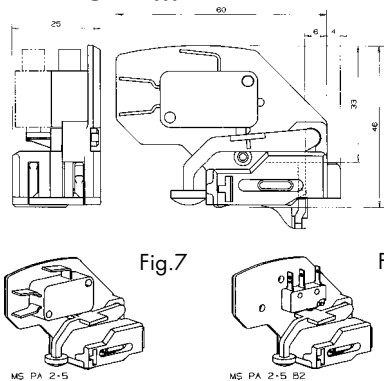
(7) Same as fig. 5

(8) Same dimensions as figure 5 but with 2 microswitches side by side

(9) Watertightness class

Attention: Microswitch systems exclusively designed for FERRAZ SHAWMUT PSC fuses fitted with a patented trip-indicator, saving use of EDV.

MS PA...



Exclusive "MS PA" indication systems are automatically resettable

Fuse sizes	Catalog Number	Reference Number	Indication Style	Weight	Pack.
0-1-2-3 71-72-73	MS PA 2-5	H210158	OF Standard (fig. 7)	32,5	1
	MS PA 2-9V	J210159	Double (fig.7) OF side by side	39,5	1
	MS PA 2-5 B2	C210360	OF Terminals 2,8 (fig. 8)	27	1
70	MS PA 2-5	T210398	OF Standard (fig.7)	31	1
	MS PA 2-9	V210399	Double (fig.7) OF side by side	37	1
	MS PA 2-5 B2	W210400	OF Terminals 2,8 (fig.8)	27	1

Semiconductor Fuses





Microswitches & Studs

Studs for threaded terminal fuses

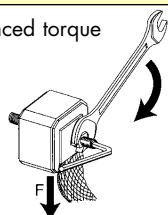
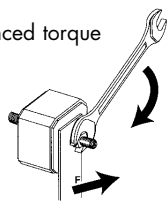
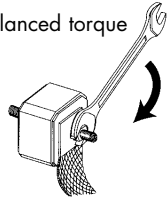
METRIC STUDS FOR THREADED TERMINAL FUSES



Type and fuse size	Catalog Number	Ref. Number	Unit weight (g)	Packaging
 Sizes 0 and 1 Size 2 Size 3	HC stud pair M8x30 & M8x35	S098801	23	6 pairs
	HC stud pair M10x30 & M10x50	T098802	40	6 pairs
	HC stud pair M12x35 & M12x50	V098803	60	6 pairs
 Size 2 Size 3	HC stud pair M10x50	W098804	45	6 pairs
	HC stud pair M12x50	X098805	45	6 pairs

We recommend the use of studs, whose quality is suited to all FERRAZ SHAWMUT square-body fuses with terminals

STUD MOUNTING

Torque type	Stud type	Maximum stud tightening torque (Nm) ⁽¹⁾	Maximum nut tightening torque (Nm) ⁽¹⁾
Balanced torque 	M8x30 & M8x35 M10x30 & M10x50 M12x35 & M12x50	13.5 15 15	13.5 26 46
Balanced torque 	M8x30 & M8x35 M10x30 & M10x50 M12x35 & M12x50	13.5 15 15	13.5 26 46
Unbalanced torque 	M8x30 & M8x35 M10x30 & M10x50 M12x35 & M12x50	13.5 15 15	13.5 26 15

(1) Factory limit on torque at 20°C ambient: +0, -2Nm; except on 46Nm value (+0, -4Nm)

Semiconductor Fuses



Microswitch Systems

Protistor® Fuses

MICROSWITCH SYSTEMS
FOR ROUND AND SQUARE-BODY FUSES
(EXCEPT PSC LINE)

- ▶ REMOTE SIGNALING SYSTEMS FOR FITTING ON FERRAZ SHAWMUT FUSES EQUIPPED WITH MICROSWITCH SUPPORT (all square-body and round fuses except PSC)
- ▶ PERMANENT INDICATION OF FUSE STATE
 - CONDUCTIVE
 - BLOWN
- ▶ HAND RESETTING FOR CHECKING AND AFTER BLOW
- ▶ STANDARD MODEL AND LOW ELECTRICAL LEVEL WITH DIFFERENT INSULATION LEVELS
- ▶ VAPOR AND WATERTIGHT MODEL FOR USE IN CORROSIVE ATMOSPHERE



MAIN CHARACTERISTICS

Type	Catalog Number	AC or DC Insulation voltage rating U_i (V)	AC voltage withstand test (*)	Impulse voltage test $U_{imp1,2/50 \mu s}$ (**)	Positive operating min. voltage /min. current	Current rating	Interrupting rating						
							Current	Non-inductive circuit			Inductive circuit: L/R = 25ms		
								30V	110V	250V	30V	110V	250V
Standard	MC3E 1-5N	1250V	15 kV	20 kV	20 V	5 A	50/60 Hz	10 A	10 A	7 A			6 A
	MCR3E 1-5N	2200	20 kV	30 kV	50 mA		DC	5 A	0.5 A		1.6 A	0.3 A	
Low level	MC3E 1-5NBS	1250 V	15 kV	20 kV	10 V 10 mA	3 A	50/60 Hz	3 A	3 A	3 A	2 A	1 A	1 A
	MCR3E 1-5NBS							2200 V	20 kV (1)	30 kV	3 A	3 A	3 A
	MCR3E 1-9NBS	23 kV (2)	DC	3 A			0.5 A		0.25 A		3 A	0.2 A	0.1 A
	MC2R3E 1-5NBS	6000 V	24 kV (1)	40 kV			3 A	0.5 A	0.25 A	3 A	0.2 A	0.1 A	
MC2R3E 1-9NBS	26 kV (2)		32 kV (3)										
Watertight IP 50	MC3E 1-5NET	1250 V	11 kV	16 kV	10 V 10 mA	3 A	50 Hz		3 A	3 A		1 A	1 A
	MCR3E 1-5NET	2200 V	20 kV (1)	30 kV					0.5 A			0.2 A	
	MC2R3E 1-5NET	6000 V	24 kV (2)	40 kV									

Catalog Numbering system: MC3E 1-5 single pole microswitch - MC3E 1-9 double pole microswitch - MCR, MC2R reinforced insulation microswitch.

* Between power circuit and microswitch terminals as per IEC 60 and 694 and NFC 64010 (50/60 Hz 1 min duration in dry air).

** Between power circuit and microswitch terminals U_{imp} : impulse voltage according to IEC 947-1.

*** Between power circuit and microswitch terminals

Each microswitch weighs less than 100g, therefore no fume and smoke grade is required by NF F16102 standard

(1) fitting short body fuses (sizes 30 - 31 - 32 - 33 - 70 - 71 - 72 - 73 - 83 - 84).

(2) fitting sizes 100 - 91 - 92 - 93 - 94 fuses and longer.

(3) fitting sizes 171 - 172 - 173 - 174 fuses and longer

Semiconductor Fuses

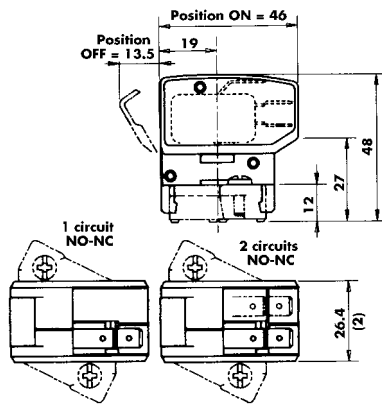


Microswitches

Microswitch Systems

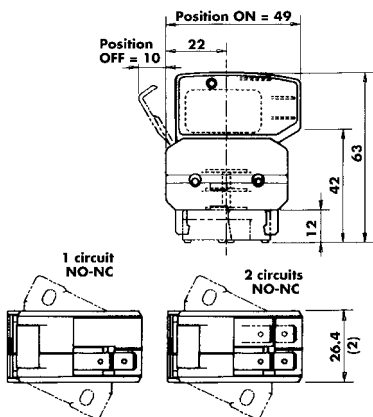
Protistor® Fuses

REMOTE SIGNALING WITH 1250 V AC/DC INSULATION VOLTAGE



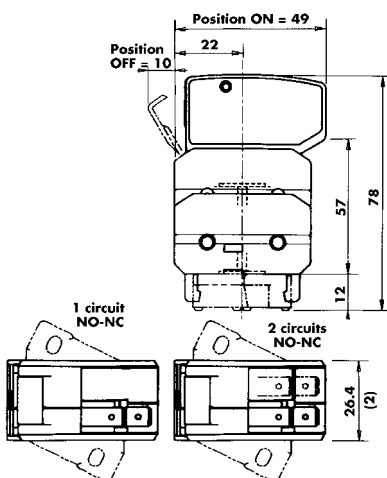
Quantity of NO-NC separated circuits	Contact	Catalog Number	Ref. Number	Weight (g)	Pack. (1)
1	standard	MC3E 1-5N	D310020	39.5	3
1	low level	MC3E 1-5NBS	E310021	39.5	3
2	low level	MC3E 1-9NBS	F310022	45.7	3
1	watertight	MC3E 1-5NET	L310027	40.2	3

REMOTE SIGNALING WITH INSULATION VOLTAGE UP TO 2200 V AC/DC



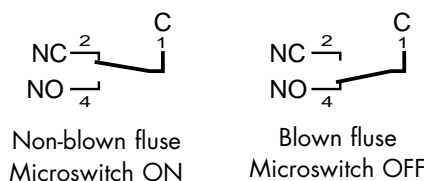
Quantity of NO-NC separated circuits	Contact	Catalog Number	Ref. Number	Weight (g)	Pack.
1	standard	MCR3E 1-5N	G310023	51.7	1
1	low level	MCR3E 1-5NBS	P310030	51.7	1
2	low level	MCR3E 1-9NBS	H310024	58.0	1
1	watertight	MCR3E 1-5NET	Q310031	52.5	1

REMOTE SIGNALING WITH INSULATION VOLTAGE UP TO 6000 V AC/DC



Quantity of NO-NC separated circuits	Contact	Catalog Number	Ref. Number	Weight (g)	Pack.
1	low level	MC2R3E 1-5NBS	J310025	64.0	1
1	watertight	MC2R3E 1-5NET	N310029	64.8	1
2	low level	MC2R3E 1-9NBS	K310026	70.3	1

Electrical diagram of each microswitch circuit



All of these signalling systems are hand resettable and fitted with silver-plated 3-terminal microswitch C, NO and NC.

The C terminal is on the top and connection is made via 6.35 mm clips except for watertight models whose clips are 4.8 mm wide.

NOTE (2): The 26.4 dimension is the same with 1 or 2 separated circuits NO-NC.

Tests with sine vibrations carried out at ambient with scanning of the three main holder axes.

Spectrum: 1st segment (2 to 16 Hz) constant trip $x = 5$ mm peak.

2nd segment (16 to 250 Hz) constant acceleration $\gamma = 5$ g peak.

Exponential scanning speed : 1 octave per minute.

Duration: 2 hours per axis.

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