

# Semiconductor Fuses



## 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													
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	12 kV	20 kV	
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	13 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



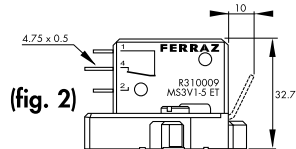
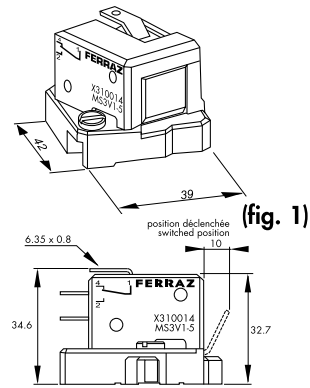
Microswitches & Studs

## Microswitches systems for PSC

### INDICATION SYSTEMS FOR PSC FUSE SIZES 30 TO 73

#### MS 3V...

These patented indication systems are exclusively hand resettable.



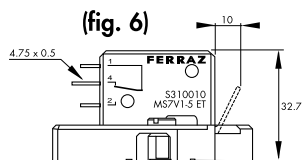
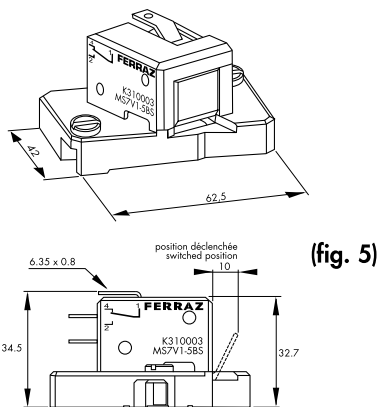
Fuse size	Code	Ref. Number	Indication style	Weight (g)	Packaging
Sizes 30, 31 32, 33	MS 3V 1-5 (fig.1)	X310014	Standard NO-NC	34	3 pieces
	MS 3V 1-5 BS (3)	W310013	Low level NO-NC	34	3 pieces
	MS 3V 1-9 BS (4)	T310011	Low level NO-NC	44	3 pieces
	MS 3V 1-5 ET (fig.2)	R310009	Low level NO-NC IP 50 (9)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

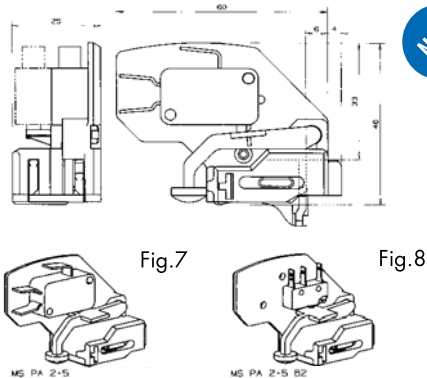
(7) Same as fig. 5

(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

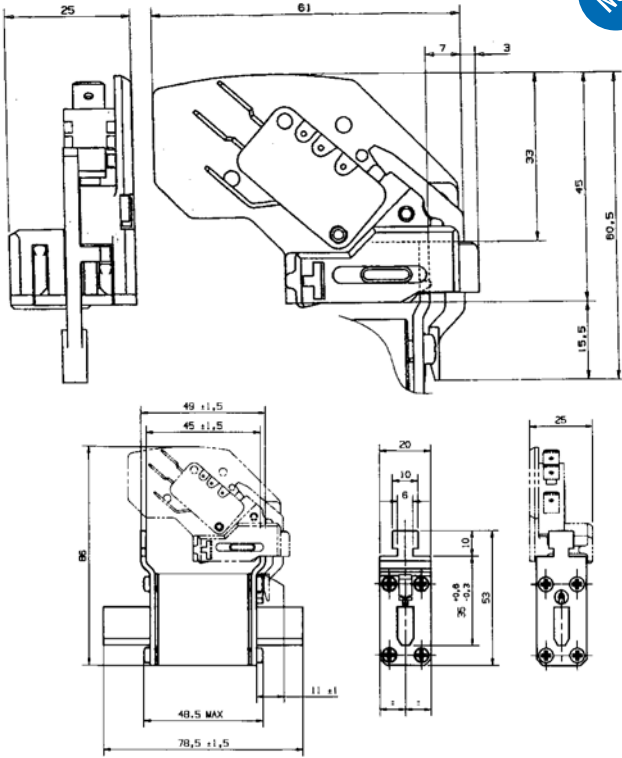
Fuse sizes	Catalog Number	Reference Number	Indication Style	Weight	Pack.
0-1-2-3 71-72-73	MS PA 2-5	H210158	OF Standard (fig. 7)	32,5	1
	MS PA 2-9V	J210159	Double (fig.7) OF side by side	39,5	1
	MS PA 2-5 B2	C210360	OF Terminals 2,8 (fig. 8)	27	1
70	MS PA 2-5	T210398	OF Standard (fig.7)	31	1
	MS PA 2-9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



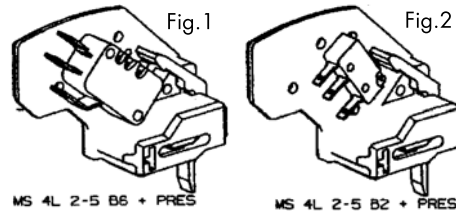
## Microswitch Systems

### MICROSWITCH INDICATION SYSTEM FOR 000 & 00 FUSES AS PER DIN 43653 AND DIN 43620 TERMINALS



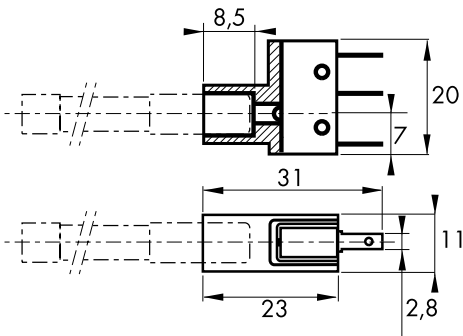
Catalog Number	Ref. Number	Weight (g)	Packaging
MS 4L 2-5 B6 + PRES (Fig. 1) <sup>(1)</sup>	F210156C	30	3
MS 4L 2-5 B2 + PRES (Fig. 2) <sup>(2)</sup>	G210157C	26	3

Automatically resettable, these microswitch systems indicate fuse presence (PRES) and proper mounting. In case of improper mounting or fuse melting, this is indicated (terminal 1-4 closed)

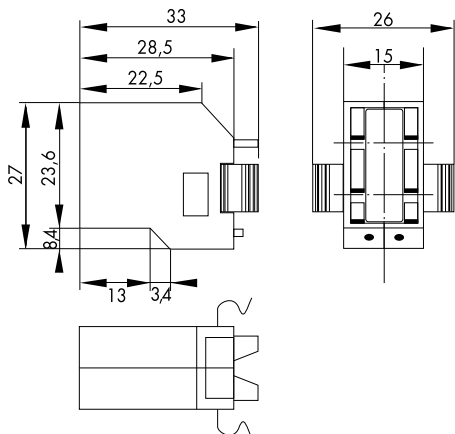


- (1) 6.3 mm clips
- (2) 2.8 mm clips

### MC indication system for BS 88-4 separate blown fuse trip-indicator



Catalog Number	Ref. Number	Weight (g)	Packaging
MC 6,3 GR 2-5 N with separate trip-indicator	Y 310015	10	3 pieces



Catalog Number	Ref. Number	Weight (g)	Packaging
MC 36 GR 2-5 for British standard with built-in trip-indicator Ø 27 and 36	P 092496	10	3 pieces



# Semiconductor Fuses



## Studs for threaded terminal fuses

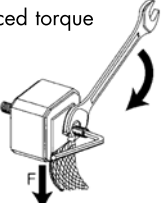
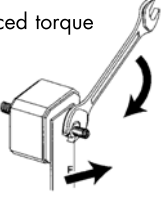
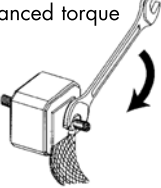
### METRIC STUDS FOR THREADED TERMINAL FUSES



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) <sup>(1)</sup>	Maximum nut tightening torque (Nm) <sup>(1)</sup>
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



Microswitches

## 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
	MC3E 1-9NBS							2200 V	20 kV (1)	30 kV	3 A	3 A	3 A
	MCR3E 1-5NBS	20 kV (1)	40 kV	DC			3 A		0.5 A		0.25 A	3 A	0.2 A
	MCR3E 1-9NBS	23 kV (2)											
Watertight IP 50	MC2R3E 1-5NBS	6000 V	24 kV (1)	40 kV	10 V 10 mA	3 A	50 Hz		3 A	3 A		1 A	1 A
	MC2R3E 1-9NBS		26 kV (2)										
	MCR3E 1-5NET	2200 V	20 kV (1)										
	MCR3E 1-5NET	2200 V	20 kV (1)	30 kV									
	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

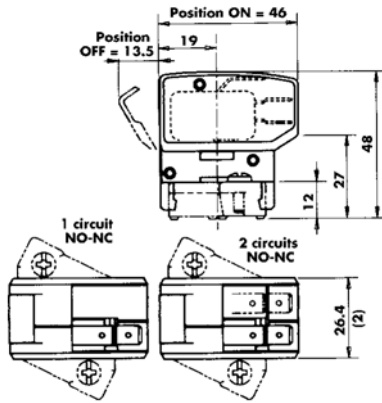


Microswitches

## Microswitch Systems

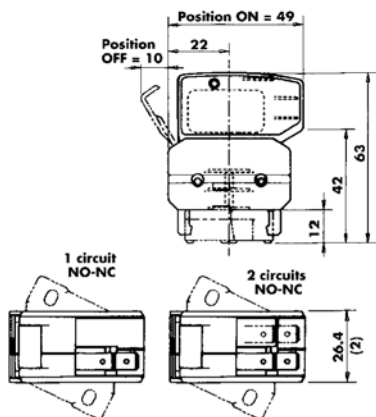
## Protistor® Fuses

### REMOTE SIGNALING WITH 1250 V AC/DC INSULATION VOLTAGE



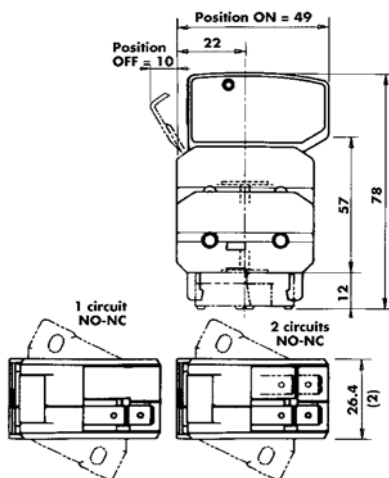
Quantity of NO-NC separated circuits	Contact	Catalog Number	Ref. Number	Weight (g)	Pack. (1)
1	standard	MC3E 1-5N	D310020	39.5	3
1	low level	MC3E 1-5NBS	E310021	39.5	3
2	low level	MC3E 1-9NBS	F310022	45.7	3
1	watertight	MC3E 1-5NET	L310027	40.2	3

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



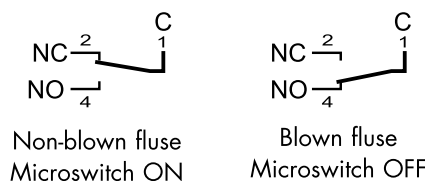
Quantity of NO-NC separated circuits	Contact	Catalog Number	Ref. Number	Weight (g)	Pack.
1	standard	MCR3E 1-5N	G310023	51.7	1
1	low level	MCR3E 1-5NBS	P310030	51.7	1
2	low level	MCR3E 1-9NBS	H310024	58.0	1
1	watertight	MCR3E 1-5NET	Q310031	52.5	1

### 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: 1<sup>st</sup> segment (2 to 16 Hz) constant trip  $x = 5$  mm peak.

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

Exponential scanning speed : 1 octave per minute.

Duration: 2 hours per axis.