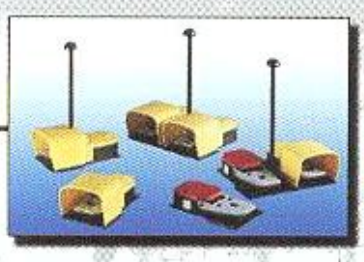
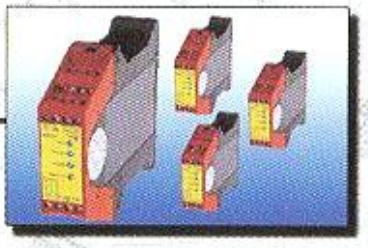
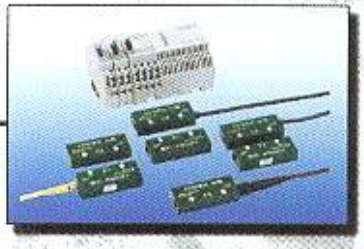
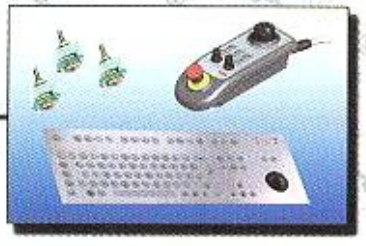
NORSTAT Inc.

Your source for Machine Safety and Automation Products









Get ***Safe*** *Get* ***Automated***

V-I-II

About Our Company

Since 1962 **Norstat**, has been servicing the industrial automation marketplace by offering safety and automation solutions to the machine and process control industries with a complete line of safety, control, and automation products. Our trained engineering staff both in Rockaway and in the field close to our customers can offer expert solutions for all your safety and automation requirements.

Our ***SAFETY*** program includes Safety Light Curtains & Barriers, Muting Light Curtain Systems, Safety Controllers, Safety Interlocks and Non Contact Safety Switches, Safety Control Relays and Audible and Visual Signaling Devices. Our ***AUTOMATION*** program includes, Foot Switches and Limit Switches for axis control, Connectors for sensors and solenoid valves. The program enables machine builders, automation integrators and distributors a full product line enabling conformance to all domestic and international safety standards.

Visit us on the web at www.norstat.com, www.norstatblog.com for a complete view of the entire program

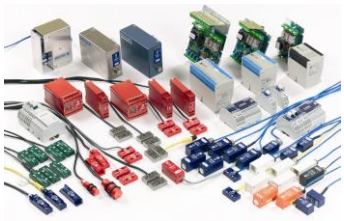
MISSION STATEMENT

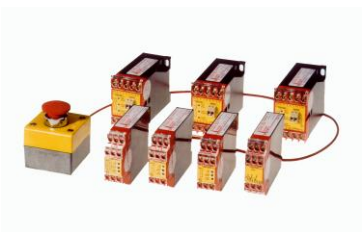
Our goal is to offer our customers the most comprehensive, synergistic and state of the art program of Safety and Automation products providing the best solutions to their application requirements. We accomplish the task through an engineering and sales staff that comprises the best and the brightest in the field of technology. We have worldwide experience in supporting our customers and are the "Source for all your Safety and Automation" needs

Get Safe

Get Automated

Table of Contents





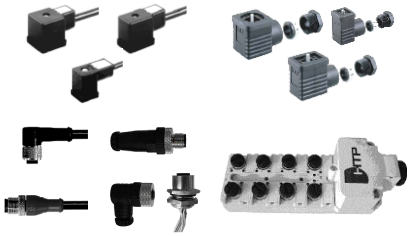
01 - SAFETY SWITCHES	
Keyed Safety Interlock Switches	01.02 - 01.03
Solenoid Locking Safety Interlock Switches	01.04 - 01.07
Manual & Cut Key Locking	01.08
Safety Rope Pull Switches	01.09
E-Stop Buttons	01.10

02 - NON CONTACT SAFETY SWITCHES	
Magnetically Operated Safety Switches	02.02 – 02.03
ISIS Magnetically Operated Safety System	02.04 – 02.07
F-Series Active Signaling System	02.08 – 02.11
Electronic Safety Switches SSS & SS-R, SS-C	02.12

03 - SAFETY RELAYS	
Emergency Stop & Gate Monitor (Category 2-3)	03.02
Emergency Stop & Gate Monitor (Category 4)	03.03 – 03.04
Expansion Modules	03.05 & 03.09
Mat & Edge Monitoring	03.06
Two Hand Control	03.06
Light Curtain	03.07
Safety Relay With Time Delay	03.08
Safety Relay With Multiple Outputs	03.09

04 - OPTICAL / AUDIBLE SIGNALING DEVICES	
Glossary	04.02 – 04.06
Signal Tower Program	04.07 – 04.08
Product Descriptions	04.09
LED Bulb	04.10 – 04.11
LED Life Chart	04.13

Table of Contents



05 - AUTOMATION PRODUCTS	
Small Limit Switches	05.02 – 05.03
IEC Body Limit Switches	05.04 – 05.05
Small Limit Switches with Cable	05.06
Footswitches	05.07
Enabling Switch	05.08
Handwheel	05.09

06 - DIN 43650 MOLDED ASSEMBLIES & CONNECTORS	
DIN 43650 Assemblies & Connectors	06.02 – 06.15
M12 Assemblies & Connectors	06.16 – 06.25
M8 Assemblies & Connectors	06.26 – 06.33
Micro-mini (8mm) Assemblies & Connectors	06.34 – 06.35

-	

09/10/ 11 OTHER INFORMATION	
Other Products	09.01 – 09.04
Introduction to Safety	10.01 – 10.08

About This Catalog

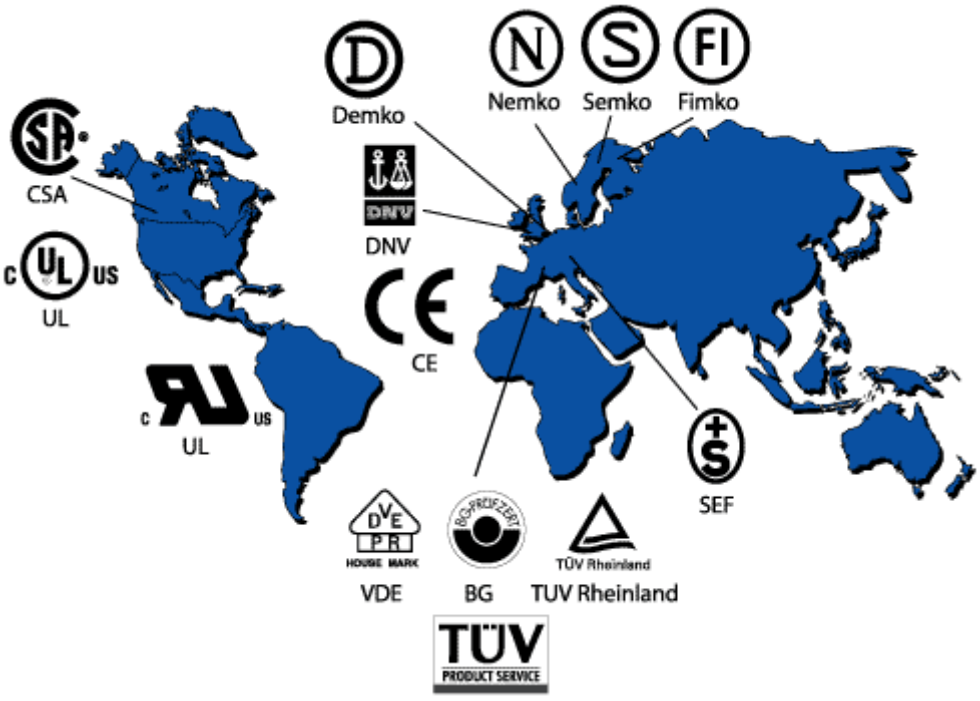
Contents
We offer over 10,000 different part numbers!

This catalog represents only a very small portion of the products that are available to you. The parts listed here are the more popular products, but there are many more variations, models and types offered.

Complete full line catalogs are available in hard copy form or CD. Additional information is also available on our website.

Please call us with your application needs.

Global Standards



NORSTAT INC.
300 Roundhill Drive, Unit 4, Rockaway, NJ 07866
Telephone – (973) 586-2500 FAX – (973) 596-1590
E-Mail – info@norstat.com Website – www.norstat.com

Safety Switches

- Plastic Safety Interlock Switches
- Metal Safety Interlock Switches
- Solenoid Locking Safety Switches
- Safety Rope Pull Switches
- E-Stop Buttons

Keyed Safety Interlock Switches
Compact Size
Plastic Body Switches

Actuator Keys

Straight Key

90° Key

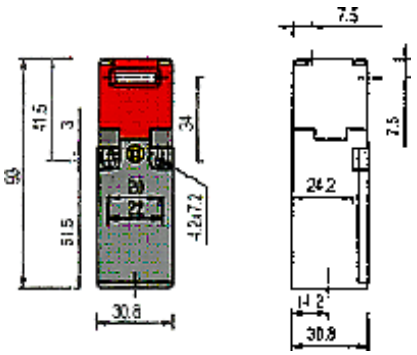
Hinged Key
(Pivots Left & Right)

Hinged Key
(Pivots Left & Right and Up & Down)

Hinged Key
(Pivots Left & Right with Standard Footprint)

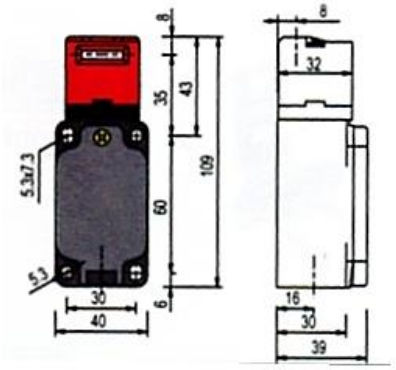
- *Positively driven contacts*
- *Many unique actuator keys styles*
- *5mm backlash*
- *Trapped switch head (FR Series)*
- *Bifurcated (twin) contacts*
- *Key retention force:*
  - *Regular - 10N (2.3 Pounds)*
  - *"E3" Version - 30N (6.7 Pounds)*
- *Available factory wired with M12*

Plastic Body
FR Series



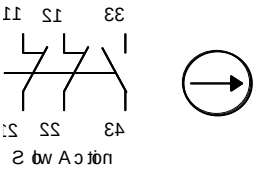
Compact Size

Plastic Body
FP Series

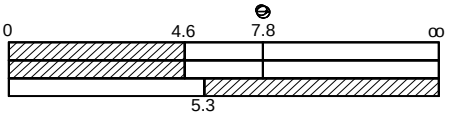


Standard NEMA & IEC Body

Switching Contacts

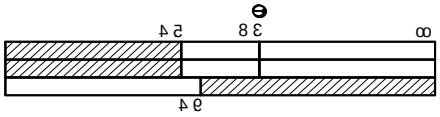


2NC – 1NO



Positively Driven

2NC – 1NO



Positively Driven

Part Numbers

	Key Only		
Without Key		FR 2092	FP 2093
Straight Key		FR 2092 D	FP 2093 F
90° Key		FR 2092 D1	FP 2093 F1
Hinged Key		FR 2092 D2	FP 2093 F2
Double Hinged Key		FR 2092 D3	FP 2093 F3
Special Hinged Key			

Technical Information

Material	Glass-reinforced Polymer	Mechanical Endurance	1 Million Operations
Cable Entry	Pg 13.5	Max. Operation Frequency	3,600 Cycles Per Hour
Protection Rating	FR = IP65; FP = IP66	Max./Min. Actuator Speed	0.5 m/s – 1mm/s
NEMA Rating	1, 4X	Voltage/Current Rating	500 VAC – 600 VDC / 10A
Temperature Rating	-25°C to +80°C	Approvals	UL 508, CE, IEC 947-5-1

Additional products are available from the manufacturer. Please call us with your application needs.

300 Roundhill Drive, Unit 4, Rockaway, NJ 07866
Telephone – (973) 586-2500 FAX – (973) 596-1590
E-Mail – info@norstat.com Website – www.norstat.com

Keyed Safety Interlock Switches
Compact Size
Metal Body Switches

Actuator Keys

Straight Key

90° Key

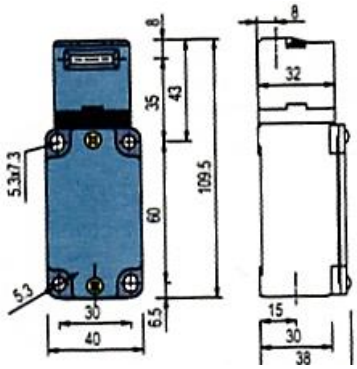
Hinged Key
(Pivots Left & Right)

Hinged Key
(Pivots Left & Right
and Up & Down)

Hinged Key
(Pivots Left & Right with
Standard Footprint)

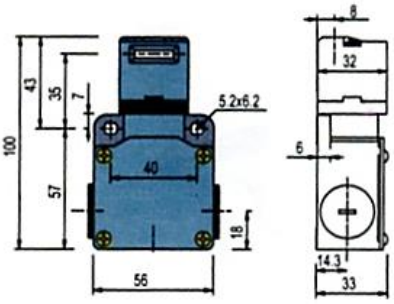
- *Rugged metal housing & head*
- *Positively driven contacts*
- *Many unique actuator keys styles*
- *5mm backlash prevents accidental switching due to vibration*
- *Bifurcated (twin) contacts*
- *Key retention force:*
  Regular - 10N (2.3 Pounds)
  "E3" Version - 30N (6.7 Pounds)
- *Available factory wired with M12*

Metal Body
FD Series



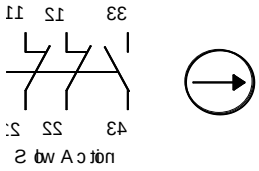
Standard NEMA & IEC Body

Metal Body
FL Series

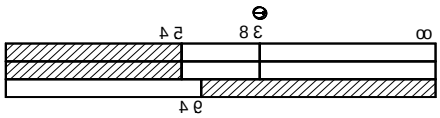


3 Cable Entries

Switching Contacts

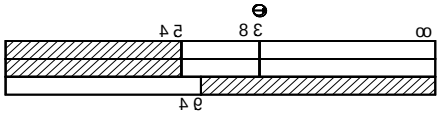


2NC – 1NO



Positively Driven

2NC – 1NO



Positively Driven

Part Numbers	Key Only		
Without Key		FD 2093	FL 2093
Straight Key		FD 2093 F	FL 2093 F
90° Key		FD 2093 F1	FL 2093 F1
Hinged Key		FD 2093 F2	FL 2093
Double Hinged Key		FD 2093 F3	FL 2093 F3
Special Hinged Key		FD 2093 F7	FL 2093 F7

Technical Information

Material	Baked Epoxy Coated Metal	Mechanical Endurance	1 Million Operations
Cable Entry	Pg 13.5	Max. Operation Frequency	3,600 Cycles Per Hour
Protection Rating	IP66	Max./Min. Actuator Speed	0.5 m/s – 1mm/s
NEMA Rating	1, 4X	Voltage / Current Rating	500 VAC – 600 VDC / 10A
Temperature Rating	-25°C to +80°C	Approvals	UL 508, CE, IEC947-5-1

Additional products are available from the manufacturer. Please call us with your application needs.

300 Roundhill Drive, Unit 4, Rockaway, NJ 07866
Telephone – (973) 586-2500 FAX – (973) 596-1590
E-Mail – info@norstat.com Website – www.norstat.com

Solenoid Locking Safety Interlock Switches

Compact Size – Plastic Body

For Machines with Inertia

Actuator Keys

Straight Key

90 Degree Key

Hinged Key (Pivots Left & Right)

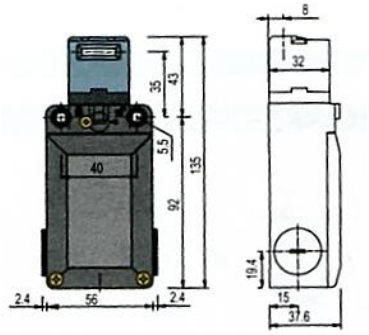
Double Hinged Key (Pivots Left & Right and Up & Down)

Special Hinged Key (Pivots Left & Right Standard Footprint)

- *1000N (225 Pounds) locking force*
- *40N (9 Pounds) key retention*
- *Manual override on "D" versions*
- *5mm backlash*
- *Internal cascade circuit (24V only) used to stager solenoid activation, reduces the power requirements for multiple switch applications*

Unlocked with Power

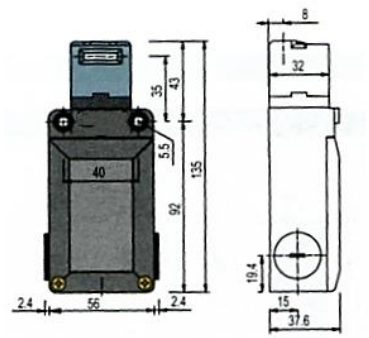
Key Locked in Switch
Without Power to the Solenoid



With Emergency Override

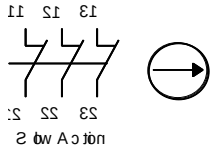
Locked with Power

Key is Unlocked in Switch
Without Power to the Solenoid



Without Emergency Override

Switching Contacts

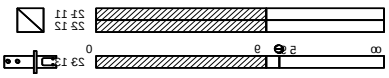


Positively Driven

3 NC Contacts

2 Switched By Solenoid; 1 Switched by Key

3 NC Contacts



2 Switched By Solenoid; 1 Switched by Key

Part Numbers Solenoid Voltage	24V	120V	24V	120V
Without Key	FS 2996 D024	FS 2996 D120	FS 2996 E024	FS 2996 E120
Straight Key	FS 2996 D024 F	FS 2996 D120 F	FS 2996 E024 F	FS 2996 E120 F
90° Key	FS 2996 D024 F1	FS 2996 D120 F1	FS 2996 E024 F1	FS 2996 E120 F1
Hinged Key	FS 2996 D024 F2	FS 2996 D120 F2	FS 2996 E024 F2	FS 2996 E120 F2
Double Hinged Key	FS 2996 D024 F3	FS 2996 D120 F3	FS 2996 E024 F3	FS 2996 E120 F3
Special Hinged Key	FS 2996 D024 F7	FS 2996 D120 F7	FS 2996 E024 F7	FS 2996 E120 F7

Technical Information

Material	Glass reinforced Polymer	Mechanical Endurance	800,000 Operations
Cable Entry	Pg 13.5	Max. Operation Frequency	600 Cycles Per Hour
Protection Rating	IP66	Max./Min. Actuator Speed	0.5 m/s – 1mm/s
NEMA Rating	1, 4X	Voltage / Current Rating	500 VAC – 600 VDC / 10A
Temperature Rating	-25°C to +80°C	Approvals	CE, UL 508, IEC947-5-1

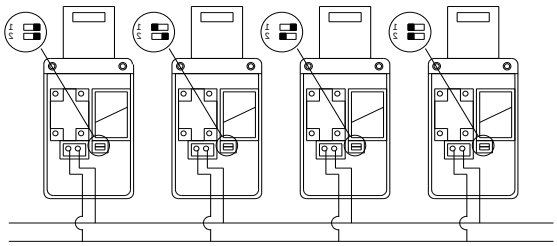
Addiitional products are available from the manufacturer. Please call us with your application needs.

300 Roundhill Drive, Unit 4, Rockaway, NJ 07866
Telephone – (973) 586-2500 FAX – (973) 596-1590
E-Mail – info@norstat.com Website – www.norstat.com

Solenoid Locking Safety Interlock Switches
Additional Information

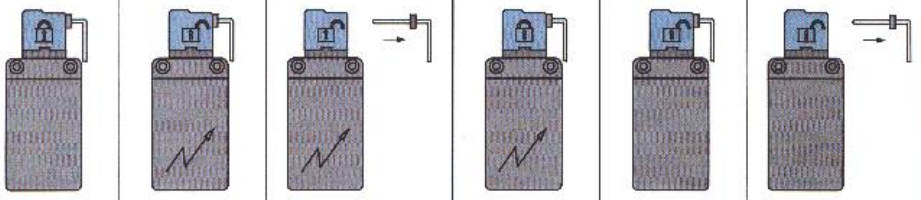
Multiple Switch Installation

Solenoid Cascade Delay (24V Versions Only)



The inrush power required to initiate the locking solenoid is approximately 56 VA for 0.1 seconds. If several switches are installed in parallel, the combined energy requirements for these units is considerable and may cause an excess burden to the power supply. To elevate this problem, the 24 Volt versions of the FS solenoid locking switches have a built in millisecond time delay for the activation of the solenoid. This delay can be configured into 4 ranges, that are set through two internal dip switches. Setting the time delay will sequence the inrush demands of the solenoid, reducing the demands on the power supply.

Additional Contact and Solenoid Configuration

	Working principle "D" with normally de-energized solenoid			Working principle "E" with normally energized solenoid		
Actuator	Inserted and locked	Inserted and unlocked	Extracted	Inserted and locked	Inserted and unlocked	Extracted
Solenoid	De-energized	Energized	Energized	Energized	De-energized	De-energized
Contact blocks						
FS 06••••• 1NC+1NC controlled by the solenoid	21–22 13–14	21–22 13–14	21–22 13–14	21–22 13–14	21–22 13–14	21–22 13–14
FS 20••••• 2NC+1NO controlled by the solenoid	11–12 21–22 33–34	11–12 21–22 33–34	11–12 21–22 33–34	11–12 21–22 33–34	11–12 21–22 33–34	11–12 21–22 33–34
FS 21••••• 3NC controlled by the solenoid	11–12 21–22 31–32	11–12 21–22 31–32	11–12 21–22 31–32	11–12 21–22 31–32	11–12 21–22 31–32	11–12 21–22 31–32
FS 28••••• 1NO+1NC controlled by the solenoid 1NC controlled by the actuator	11–12 21–22 33–34	11–12 21–22 33–34	11–12 21–22 33–34	11–12 21–22 33–34	11–12 21–22 33–34	11–12 21–22 33–34
FS 29••••• 2NC controlled by the solenoid 1NC controlled by the actuator	11–12 21–22 31–32	11–12 21–22 31–32	11–12 21–22 31–32	11–12 21–22 31–32	11–12 21–22 31–32	11–12 21–22 31–32
FS 30••••• 1NC controlled by the solenoid 2NC controlled by the actuator	11–12 21–22 31–32	11–12 21–22 31–32	11–12 21–22 31–32	11–12 21–22 31–32	11–12 21–22 31–32	11–12 21–22 31–32

Addiitional products are available from the manufacturer. Please call us with your application needs.

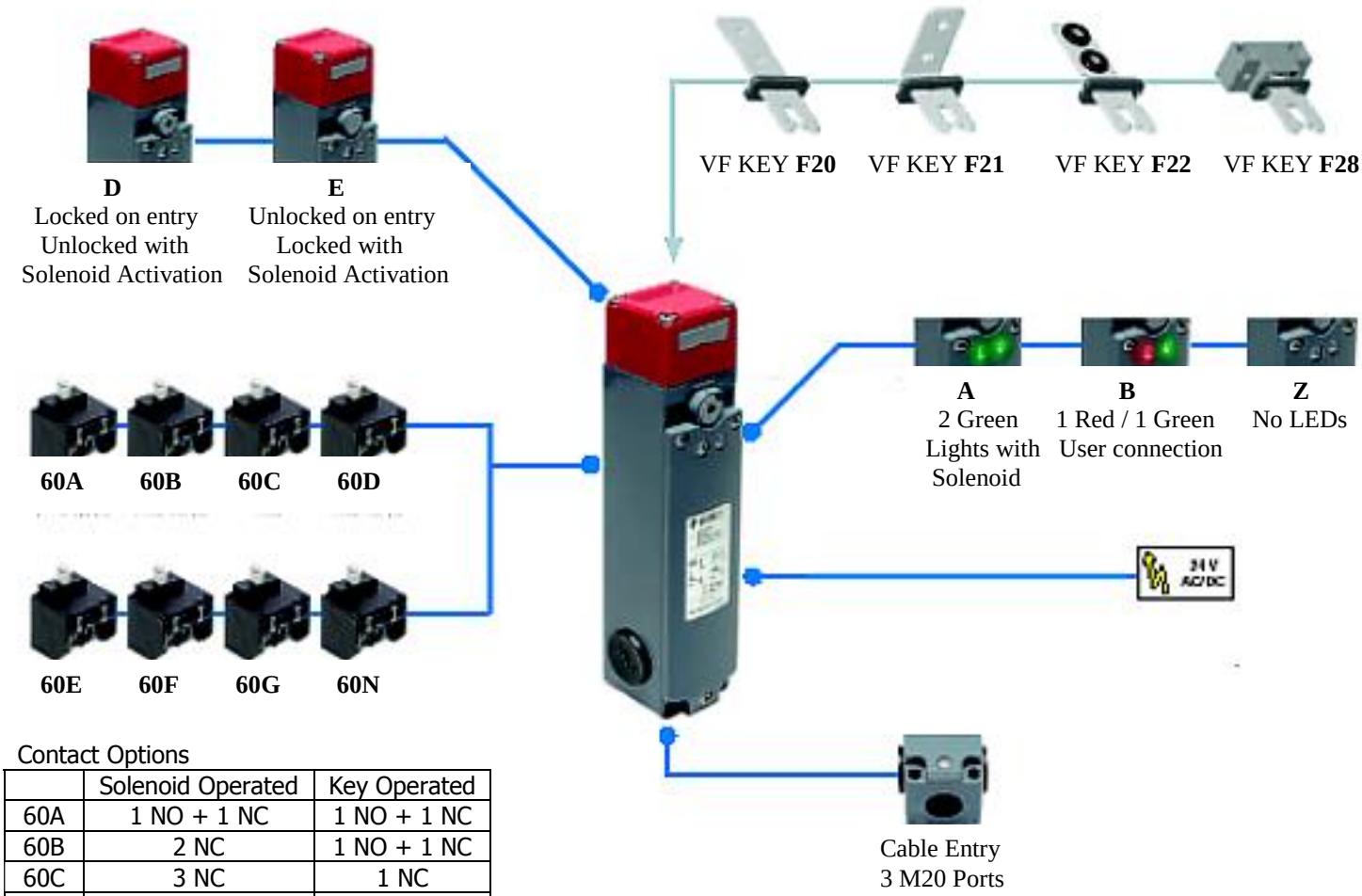
300 Roundhill Drive, Unit 4, Rockaway, NJ 07866
Telephone – (973) 586-2500 FAX – (973) 596-1590
E-Mail – info@norstat.com Website – www.norstat.com

New FG Solenoid Locking Metal Body Safety Interlock Switches

For Machines with Inertia

Features

- Actuator holding force 2500N (562 lbs)
- 8 contact blocks with 4 pole contacts
- Metal housing with 3 cable entries
- Protection rating IP 67
- 4 stainless steel actuators available
- Rotating switch head
- Locking or unlocking solenoid options
- LED Indicator Lights



Contact Options

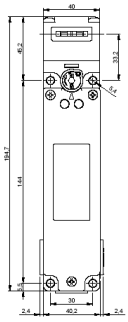
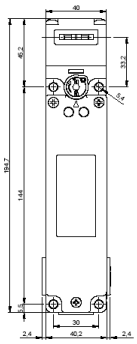
	Solenoid Operated	Key Operated
60A	1 NO + 1 NC	1 NO + 1 NC
60B	2 NC	1 NO + 1 NC
60C	3 NC	1 NC
60D	1 NO + 1 NC	2 NC
60E	1 NO + 2 NC	1 NC
60F	1 NO + 2 NC	1 NO
60G	2 NC	2 NC
60N	1 NO + 1 NC	2 NO

300 Roundhill Drive, Unit 4, Rockaway, NJ 07866
Telephone – (973) 586-2500 FAX – (973) 596-1590
E-Mail – info@norstat.com Website – www.norstat.com

Solenoid Locking Metal Body Safety Interlock Switches

With 4 Contacts

For Machines with Inertia

Actuator Keys	Unlocked with Power Key Locked in Switch Without Power to the Solenoid	Locked with Power Key is Unlocked in Switch Without Power to the Solenoid
Red & Green LED Indication with independent lead wire connection, allows installer to determine color code and indication function	 **With Emergency Override**	 **Without Emergency Override**

Switching Contacts

	Contact Block 60B **2 NC Solenoid Activated** **1 NO / 1 NC Key Activated**	**Contact Block 60B** **2 NC Solenoid Activated** **1 NO / 1 NC Key Activated**
Part Numbers Solenoid Voltage	**24V**	**24V**
Without Key	FG 60B D1 D0B	FG 60B D1 E0B
Straight Key – F20	FG 60B D1 D0B F20	FG 60B D1 E0B F20
90° Key – F21	FG 60B D1 D0B F21	FG 60B D1 E0B F21
Straight Key with Grommets – F22	FG 60B D1 D0B F21	FG 60B D1 E0B F21
Double Hinged Key – F26	FG 60B D1 D0B F26	FG 60B D1 E0B F26

Technical

Material	Glass reinforced Polymer	Mechanical Endurance	800,000 Operations
Cable Entry	M20	Max. Operation Frequency	600 Cycles Per Hour
Protection Rating	IP66	Max./Min. Actuator Speed	0.5 m/s – 1mm/s
NEMA Rating	1, 4X	Voltage / Current Rating	500 VAC – 600 VDC / 10A
Temperature Rating	-25°C to +80°C	Approvals	CE, UL 508, IEC947-5-1

Addiitional products are available from the manufacturer. Please call us with your application needs.

300 Roundhill Drive, Unit 4, Rockaway, NJ 07866
Telephone – (973) 586-2500 FAX – (973) 596-1590
E-Mail – info@norstat.com Website – www.norstat.com

Safety Interlock Switches
Metal Body Switches

Actuator Keys

Straight Key

90° Key

Hinged Key

Hinged Key (Pivots Left

Hinged Key (Pivots Left &

• Key Locking – allows access by authorized personnel only. Used in normal operation or during set ups or repairs

• Mechanical Delay – unique solution for machines with inertia, eliminates the need for external power, timing circuits or motion sensors

Keyed Locking

FP Series

Operation

The actuation key can be locked into place, in the switch, by turning the cut key into the 180° position. Only in this state will the 2 N/C contacts be closed (and the 1 N/O contact be open). Turning the key to the 0° position will allow the actuation key to be removed. If the cut key is in the 0° position or the actuation key is removed, the 2 N/C contacts will open (and the 1 N/O contact will close). The cut key can be removed in the 0° or 180° position to prevent unauthorized access.

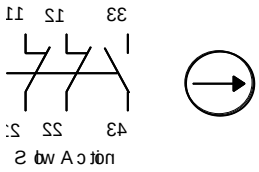
Mechanical Delay

FP Series

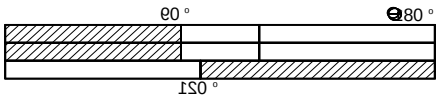
Operation

The actuation key is locked into place when the thumbscrew knob is turned all the way counter clockwise. At this point the 2 N/C contacts be closed (and the 1 N/O contact be open). When the thumbscrew knob is rotated clockwise, two turns, the 2 N/C contacts will open (and the 1 N/O contact will close). To remove the key you must continue to turn the thumbscrew clockwise to the end position (approximately 26 turns). This operation takes 18 to 20 seconds, giving the machine time to wind down.

Switching Contacts

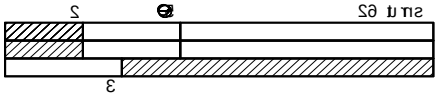


2NC – 1NO



Positively Driven

2NC – 1NO



Positively Driven

Part Numbers

Without Key	FP 2099	FP 20R2
Straight Key	FP 2099 F	FP 20R2 F
90° Key	FP 2099 F1	FP 20R2 F1
Hinged Key	FP 2099 F2	
Double Hinged Key	FP 2099 F3	FP 20R2 F3
Special Hinged Key	FP 2099 F7	FP 20R2 F7

Technical

Material	Glass reinforced Polymer	Mechanical Endurance	1 Million Operations
Cable Entry	Pg 13.5	Max. Operation Frequency	3,600 Cycles Per Hour
Protection Rating	IP66	Max./Min. Actuator Speed	0.5 m/s – 1mm/s
NEMA Rating	1, 4X	Voltage / Current Rating	500 VAC – 600 VDC / 10A
Temperature Rating	-25°C to +80°C	Approvals	UL 508, CE, IEC947-5-1

Additional products are available from the manufacturer. Please call us with your application needs.

300 Roundhill Drive, Unit 4, Rockaway, NJ 07866
Telephone – (973) 586-2500 FAX – (973) 596-1590
E-Mail – info@norstat.com Website – www.norstat.com

pizzato

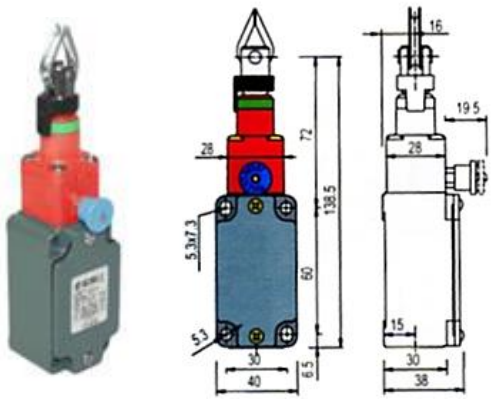
Safety Rope Pull Switches
With Tension Monitoring and Reset
Provides Greater Area of E-Stop Access

• Rope pull switches	Straight Cable	90° Cable

with tension monitoring and reset button are generally used for e-stop applications. We also offer rope switches for non-safety stop command (without reset button) and start command applications (without reset button and tension monitoring).

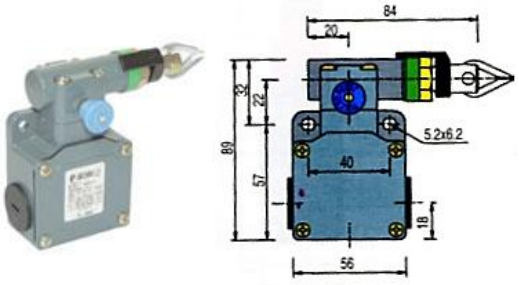
- *We now offer a new rope installation system. The FAST line features quick mounting end connectors with built in tension adjustment*

For Cable Lengths Up to 6 Meters
(Lengths can be extended by using cable supports)



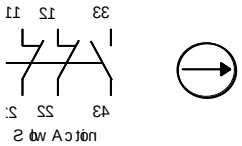
With Reset Button and Tension Monitoring

For Cable Lengths Up to 16 Meters
(Lengths can be extended by using cable supports)

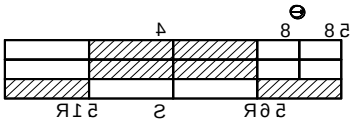


With Reset Button and Tension Monitoring

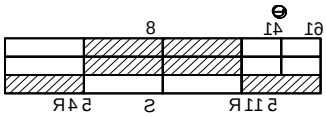
Switching Contacts



2 NC – 1NO Contacts



2 NC – 1NO Contacts



Part Numbers	Top Entry	Left Entry	Right Entry
	FD 2078	FL 2083	FL 2084

Accessories

Safety Rope	Rope Clamp	Thimble	Turnbuckle
VF F05-100 (100 M Roll)	VF M870	VF C870	VF AF-TR2

Technical Information

Material	Baked Epoxy Coated Metal	Mechanical Endurance	1 Million Operations
Cable Entry	Pg 13.5	Max. Operation Frequency	1 Cycle / 6 s
Protection Rating	IP66	Max./Min. Actuator Speed	0.5 m/s – 1mm/s
NEMA Rating	1, 4X	Voltage /Current Rating	500 VAC – 600 VDC / 10A
Temperature Rating	-25°C to +80°C	Approvals	CE, UL 508, IEC 947-5-1

Additional products are available from the manufacturer. Please call us with your application needs.

300 Roundhill Drive, Unit 4, Rockaway, NJ 07866
Telephone – (973) 586-2500 FAX – (973) 596-1590
E-Mail – info@norstat.com Website – www.norstat.com

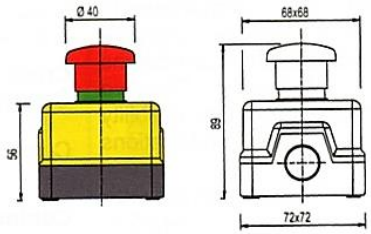
pizzato

Enclosed E-Stop Button

Box and E-Stop Button

Simple to Install, Easy to Wire

- *The CC series offers a simple way to surface mount an E-Stop button*
- *Boxes are rated NEMA 1, NEMA 4X and IP 65*
- *Boxes are available with or without the e-stop button; fully enclosed or with a 22mm mounting hole*
- *Other switch types are available upon request*



Contacts	**2 NC**	**1 NC – 1 NO**
Part Numbers	**CC01 AAB 00 AC**	CC01 AAB 00 AD
Box Only CPA07075NG012		

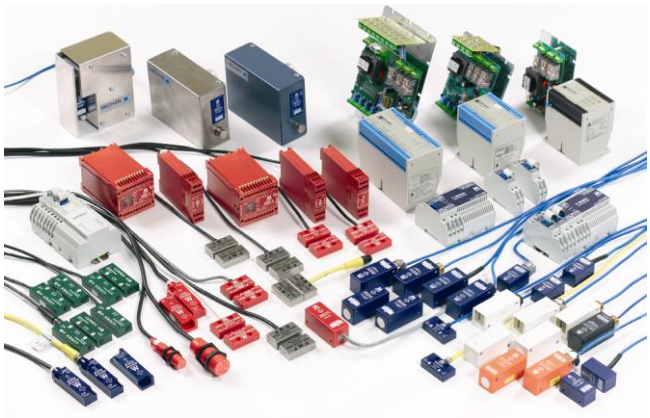
Technical

Material	Glass-reinforced Polymer	Temperature Rating	-25°C to +70°C
Protection Rating	IP 65	Protection Rating	IP 65
NEMA Rating	1, 4X	Maximum Wire Size	14 AWG
Left Knockout Size	½ NPT / Pg 13.5 / M20x1.5	Minimum Wire Size	18 AWG
Right Knockout Size	3/8 NPT / Pg 11	Voltage Rating	500 VAC; 600 VDC
Bottom Knockout Size	½ NPT / Pg 13.5 / M20x1.5	Current Rating	16A

Additional products are available from the manufacturer. Please call us with your application needs.

300 Roundhill Drive, Unit 4, Rockaway, NJ 07866
Telephone – (973) 586-2500 FAX – (973) 596-1590
E-Mail – info@norstat.com Website – www.norstat.com

Non Contact Safety Switches



- Non-Contact Safety Systems
- Uniquely Coded Switch System
- Solid State Non-Contact Switches
- Magnetic Non-Contact Switches

Non Contact Safety Switches
MagnaSafe Series
Magnetically Operated Safety Switches

MAGNASAFE ADVANTAGES

- *Easy to install*
- *Tolerant to misalignment*
- *Stainless steel versions available*
- *Up to 2A switching capability*
- *Large range of sizes and fittings*
- *IP 67 – suitable for wet, wash-down areas*
- *Quick disconnect options*
- *Compatible with most safety relays*
- *Can operate up to 30 switches in series*
- *AC and DC Versions*
- *8 – 10 mm switching*
- *LED indication available on some types*
- *M18 and M30 cylinder types available*

Description

MAGNASAFE is a complete range of non-contact magnetically operated switches for use in safety applications.

Constructed using special, heavy duty reed switches, encapsulated into ABS housings and protected with iinternal fuses, these switches can safely perform up to 1,000,000 operations at full load.

Non-contact switches are easy to fit and the 10+mm switching distance ensures tolerance to misalignment and gate wear. They are ideal for wet, dusty, oily environments and in areas where hygiene is important.

Operation

When the switch and actuator are separated, the safety contacts are open and the auxiliary contacts are closed.

Moving the actuator to within the operating range of the switch (target to target), the safety contacts close and the auxiliary contacts open.

Dual safety contact versions of the MS1, MS3 and MS5 can be used with safety relays to provide a higher integrity safety system.

MS-5

Size:
W = 52mm
H = 28mm
D = 14mm

Part Number	Contacts	Voltage
MS5-21-DC-03M	*2 NO/ 1NC*	*DC*

The MS5 is a low current magnetic safety switch, capable of switching 400 mA at 24VDC. These units are ideal for integration into systems using low in-rush current safety relays. Conectorized version using an M12 pig tail are available.

MS5-SS

Size:
W = 52mm
H = 28mm
D = 14mm

Part Number	Contacts	Voltage
MS5-SS-21-DC-03M	*2 NO/ 1NC*	*DC*

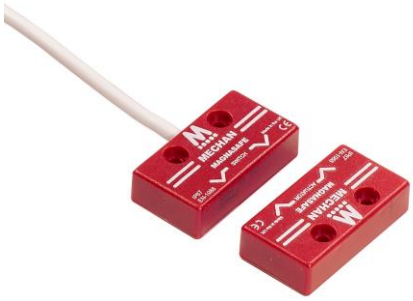
The MS5-SS is the stainless steel version of the MS5. This features a rugged housing made 316 stainless steel. Conectorized version using an using an M12 pigtail are available.

Additional products are available from the manufacturer. Please call us with your application needs.

300 Roundhill Drive, Unit 4, Rockaway, NJ 07866
Telephone – (973) 586-2500 FAX – (973) 596-1590
E-Mail – info@norstat.com Website – www.norstat.com

Non Contact Safety Switches
MagnaSafe Series
Magnetically Operated Safety Switches

MS4



Size:
W = 52mm
H = 28mm
D = 14mm

Part Number	Contacts	Voltage
MS4-11-DC-03M	1 NO / 1 NC	DC

Maximum Switching Capacity at 30V DC = 1A

MS4-SS

Size:
W = 52mm
H = 28mm
D = 14mm

Part Number	Contacts	Voltage
MS4-SS-11-DC-03M	1 NO / 1 NC	DC

Maximum Switching Capacity at 30V DC = 1A

MS2

Size:
D = 18mm
Switch
L = 81mm
Actuator
L = 57mm

Part Number	Contacts	Voltage
MS2-11-DC	1 NO / 1NC	DC

Maximum Switching - 30VDC=1A / 230V AC = 2A

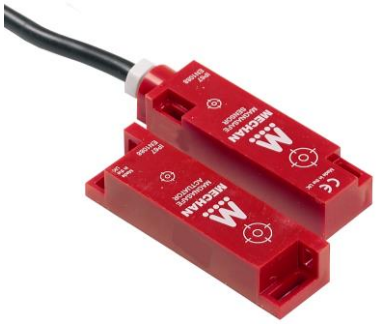
MS3

Size:
D = 30mm
Switch
L = 81mm
Actuator
L = 45mm

Part Number	Contacts	Voltage

Maximum Switching - 30VDC=1A / 230V AC = 2A

MS1



Size:
W = 78mm
H = 17mm
D = 24mm

Part Number	Contacts	Voltage
MS1-21-DC	2 NO / 1NC	DC

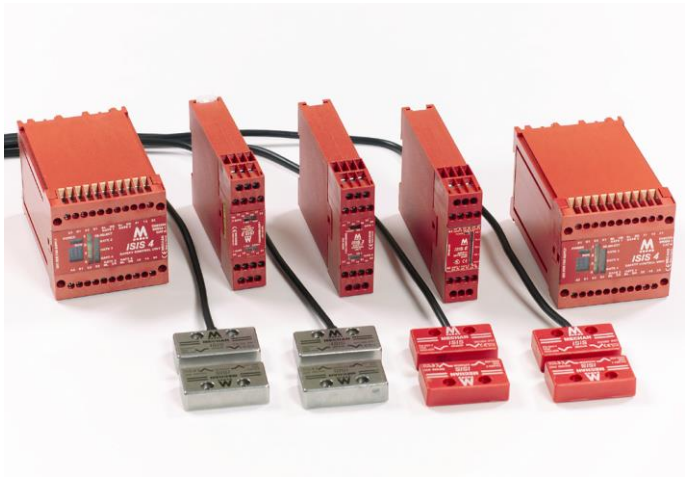
Maximum Switching - 30VDC=1A / 230V AC = 2A

Additional products are available from the manufacturer. Please call us with your application needs.

300 Roundhill Drive, Unit 4, Rockaway, NJ 07866
Telephone – (973) 586-2500 FAX – (973) 596-1590
E-Mail – info@norstat.com Website – www.norstat.com

Non Contact Safety Switches
ISIS Safety System
Magnetically Operated Safety Switches

NON CONTACT



ISIS SYSTEM ADVANTAGES

- *Immediately detects all faults*
- *Active communication uses only 2 wires to connect each switch*
- *Category 3 safety (Category 4 pending)*
- *IP 67 – suitable for wet, wash-down areas*
- *Modular control system can be expanded to accommodate up to 30 switches*
- *Quick disconnect options*
- *Tamper resistant*
- *Stainless steel versions available*
- *8 mm switching*
- *LED indication available of each switch*
- *UL, cUL, TUV and CE approved*

Description

With the growing demand for simple, efficient and more secure safety systems, the ISIS system offers the ideal solution.

Available in a range of voltages, the ISIS control units provide two normally-open safety contacts and one normally-closed auxiliary contact.

A major advantage of the ISIS safety system is that it detects both open and short circuit faults in the connections to the switch when they occur, giving immediate indication and moving the control unit to a safe state. This eliminates the possibility of faults accumulating without being detected.

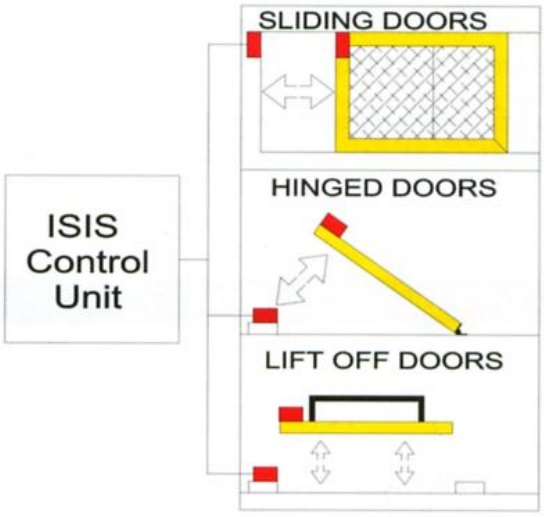
The ISIS-4 control unit can also be used to monitor the emergency stop buttons or mechanical safety switches, combining both safety functions into one DIN rail mountable unit.

The ISIS-E Extender modules can be added to either the ISIS-4 or ISIS-2 control units giving ISIS switch inputs for monitoring larger systems.

ISIS switches can only be run by ISIS controllers. ISIS safety switches use coded magnet technology, are compact, tamper-resistant and yet still have 8mm switching and IP 67 environmental protection. This makes them ideal for all types of applications where additional security is required.

Operation

Connect the required number of safety switches to the ISIS control unit (an internal switch is used to select how many are in operation). With the power on and all the safety switches closed the system self check is performed. The output safety contacts will only close if all activated safety contacts are operating correctly and the internal self checking is completed successfully.



300 Roundhill Drive, Unit 4, Rockaway, NJ 07866
Telephone – (973) 586-2500 FAX – (973) 596-1590
E-Mail – info@norstat.com Website – www.norstat.com

ISIS Series Switches
Monitored with ISIS Controller

ISIS-03

Size:
W = 52mm
H = 28mm
D = 14mm

ABS Plastic Switch with 3 Meter Cable
Switch can only be monitored with an ISIS controller

ISIS-SS-03

Size:
W = 52mm
H = 28mm
D = 14mm

316 Stainless Steel Switch with 3 Meter Cable
Switch can only be monitored with an ISIS controller

ISIS-QD-05

Size:
W = 52mm
H = 28mm
D = 14mm

ABS Plastic Switch with M8 connector
Switch can only be monitored with an ISIS controller

ISIS-SS-QD-05

Size:
W = 52mm
H = 28mm
D = 14mm

316 Stainless Steel Switch with M8 connector
Switch can only be monitored with an ISIS controller

Additional products are available from the manufacturer. Please call us with your application needs.

300 Roundhill Drive, Unit 4, Rockaway, NJ 07866
Telephone – (973) 586-2500 FAX – (973) 596-1590
E-Mail – info@norstat.com Website – www.norstat.com

Non Contact Safety Switches
ISIS Controllers and Extended Module For Monitoring ISIS Switches

ISIS-4

24V =
110V =

The ISIS-4 control unit is available in 4 different input voltages and can monitor up to 4 ISIS safety switches. The easy to install, 35mm DIN Rail mounting housing provides 2 x safety and 1 x auxiliary output contacts (4A / 230V ac). Indicator LED's in the ISIS-4 show the number of gates that have been selected, gate status, power and run. A DIP switch located beneath the lid is used to select the number of active safety switches (note: The selector switch and number of safety switches must match or the control unit will not operate.)

ISIS-2

24V =

The ISIS-2 control unit can monitor up to 2 ISIS safety switches and is housed in a slim-line (22.5mm), DIN Rail mounting housing. This unit can accept either 24V ac or dc supply, and provides 2 x safety and 1 x auxiliary output contacts (4A / 230V ac). Indicator LED's in the ISIS-2 lid show power, run and gate status. Like the ISIS-4, a DIP switch located beneath the lid selects the number of active safety switches (note: The selector switch and number of safety switches must match or the control unit will not operate.)

ISIS-E

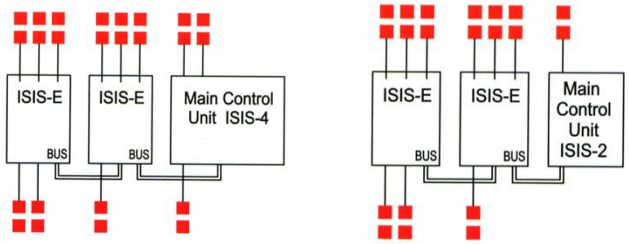
24V =

The ISIS-E Extender module provides 5 safety switch inputs to an ISIS control unit (ISIS-2 or ISIS-4).

Multiple ISIS-E extender modules can be connected together into one system, making it possible to monitor large numbers of machine guards or to add gates to an existing system at a later date.

The ISIS-E requires 24V ac/dc supply and a simple 2 wire connection from the ISIS-E to any active ISIS safety switch input. LED indication is available from all gate switches showing guard status.

Multi Gate System Examples



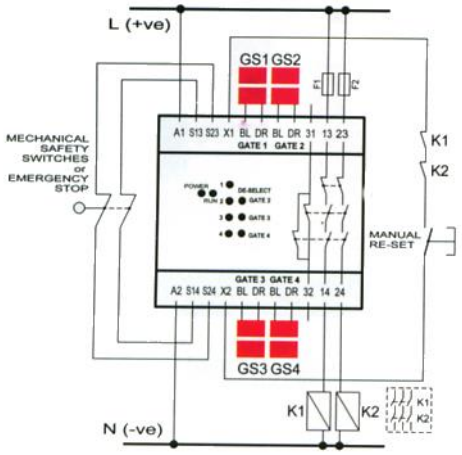
Complete System Price Estimates

Number of Switches	ISIS-2 Control Module	ISIS-E Extender Module	ISIS-03M Switch	Total System List	List per Position
1	315.77		78.10	393.87	393.87
2	315.77		156.20	471.97	235.99
3	315.77	282.53	234.30	832.60	277.53
4	315.77	282.53	312.40	910.70	227.68
5	315.77	282.53	390.50	988.80	197.76
6	315.77	282.53	468.60	1,066.90	177.82
7	315.77	565.06	546.70	1,427.53	203.93
8	315.77	565.06	624.80	1,505.63	188.20
9	315.77	565.06	702.90	1,583.73	175.97
10	315.77	565.06	781.00	1,661.83	166.18

Additional products are available from the manufacturer. Please call us with your application needs.

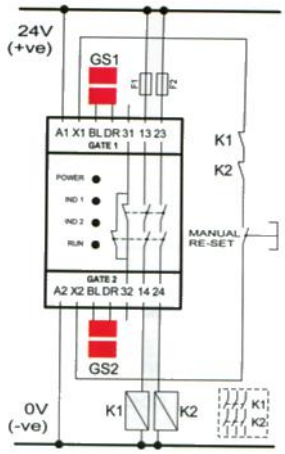
300 Roundhill Drive, Unit 4, Rockaway, NJ 07866
Telephone – (973) 586-2500 FAX – (973) 596-1590
E-Mail – info@norstat.com Website – www.norstat.com

ISIS-4 Connection Diagram



Typical 4 Gate system with manual reset, optional mechanical or emergency stop button inputs, switching dual contactors (K1 & K2) which are monitored.

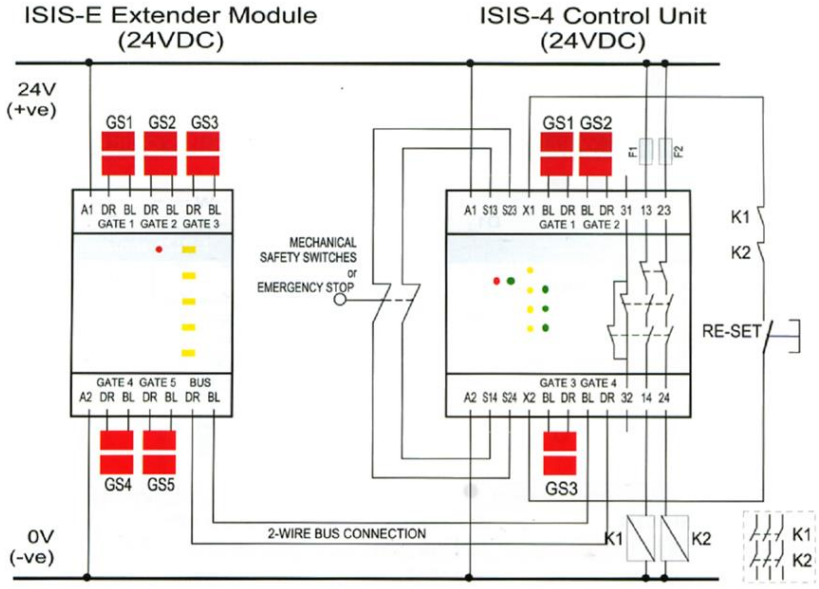
ISIS-2 Connection Diagram



Typical 2 Gate system with manual reset, switching dual contactors (K1 & K2) which are monitored by the ISIS-2.

ISIS-4 and ISIS-E Connection Diagram

8 Gate system, using the ISIS-4 and 1 x ISIS-E extender module. More extender modules can be added to monitor more gate switches if required, simply connect the ISIS-E 2-wire 'Bus' connection into the next available gate switch input on the ISIS-4 / ISIS-2 control module, or the ISIS-E extender module.

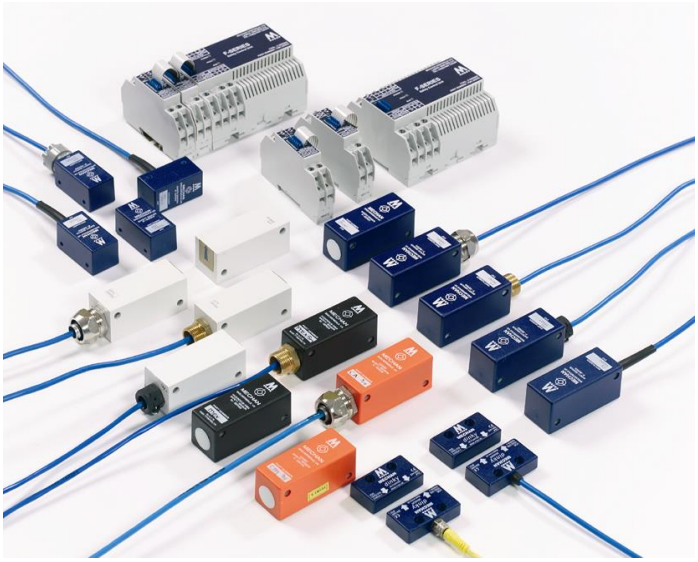


Additional products are available from the manufacturer. Please call us with your application needs.

300 Roundhill Drive, Unit 4, Rockaway, NJ 07866
Telephone – (973) 586-2500 FAX – (973) 596-1590
E-Mail – info@norstat.com Website – www.norstat.com

Non Contact Safety Switches
F-Series Safety System
Active Signaling Safety Switches

NON CONTACT



F-SERIES ADVANTAGES

- *Immediately detects all faults*
- *Active communication uses only 2 wires to connect each switch*
- *Safety Category 3 or 4*
- *IP 67 – suitable for wet, wash-down areas*
- *Modular control system can be expanded to accommodate up to 30 switches*
- *Expansion modules linked via jumper cables*
- *Individual status LED & contact for each*
- *Uniquely coded switches available*
- *8 to 10mm switching*
- *Quick disconnect options*
- *UL, cUL, TUV and CE approved*

Description

Mechan Controls developed the electronic non-contact safety switch in 1973. The **F-SERIES,** is the latest version of this product, which now has a record of more than 30 YEARS proven safety and reliability.

The F-SERIES is a uniquely flexible DIN rail mounting safety control unit designed for monitoring up to 30 Mechan safety switches.

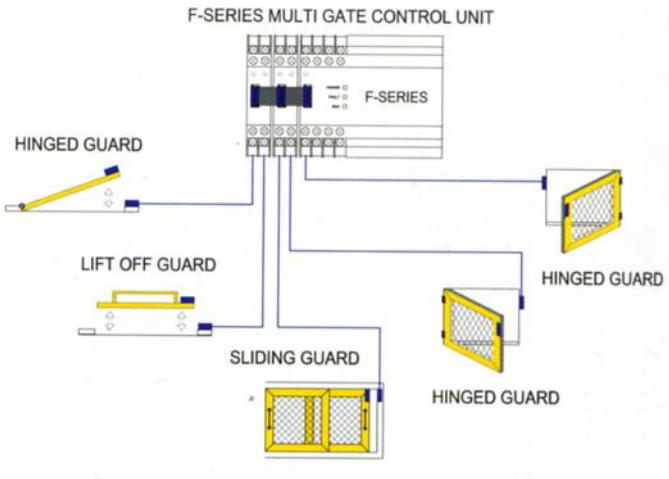
The main control module (FM1) contains the power supply, dual safety contacts and a monitoring circuit for easy integration into your control circuits along with the input and indication for one safety switch.

The extender modules provide inputs for 1 (FX1) or 2 (FX2) Mechan safety switches and provide both LED and volt free contact indication from each of the safety switches enabling fast, easy diagnosis of open gates or faults.

Mechan safety switches are available in a variety of sizes to suit all applications. They are tamper-proof, i.e. only a Mechan actuator will operate the system, and with an 8-10 mm switching distance, they are easy to install, tolerant to misalignment and guard wear. Designed to withstand the harshest environments, the electronic switching is encapsulated into an ABS housing making the Mechan safety switches immune to water, hot hosing, dust or oil etc.

Operation

When the safety switch actuator is brought within the operating range of the sensor (8-10mm target to target), a signal is generated and transmitted to the safety control unit The control unit evaluates this signal and if all monitored gates are closed and the control module's internal self-check is completed, the Mechan safety contacts will close.



300 Roundhill Drive, Unit 4, Rockaway, NJ 07866
Telephone – (973) 586-2500 FAX – (973) 596-1590
E-Mail – info@norstat.com Website – www.norstat.com

Non Contact Safety Switches
F-Series Switches
Monitored with F-Series Controller

Dinky

DNK 1 – 05M

Size:
W = 52mm
H = 28mm
D = 14mm

The increasing need for fast, safe access to hazardous areas has led to the use of more safety interlocked access points on machinery. With the dinky safety switch it is now possible to interlock even the smallest guards with our reliable electronic safety system.

Like all Mechan safety switches, the dinky are designed for use in most environments. Available pre-wired with 5, 10 or 15 meter cables encapsulated into the ABS housing, the dinky safety switch is immune to water, hot hosing, dust or oil etc. and the small size makes it easy to hide or to use on very small access points.

8-10mm switching distance means that safety series are just as tolerant to misalignment and guard wear over their long operational life as the bigger F & B Type.

Dinky Quick Disconnect

DNK 2 - QD

Size:
W = 52mm
H = 28mm
D = 14mm

For ease of installation and maintenance, Mechan can now offer the dinky safety switches with the option of an M8 quick disconnect.

Like the Pre-Wired version, the safety switch electronics are encapsulated into an ABS housing along with the Brad Harrison M8 connector.

The dinky, quick disconnect, safety switches can be ordered with 5 or 15 meter M8 cables.

FMA

FMA – 5M

Size:
W = 34mm
H = 75mm
D = 34mm

FMA switch is a totally encapsulated (IP67), fail safe, electronic safety switch that can only be operated by the Mechan Actuator. They are designed to work in the harshest of conditions, and with an 8-10mm switching distance, they are easy to install and tolerant to guard misalignment and wear. The cables up to 100 meters are possible, using Mechan specified cable or the switches can be purchased direct with longer cable lengths already encapsulated.
There are tens of thousands of these safety switches being used around the world!

CMA – Uniquely Coded

CMA – 5M

Size:
W = 34mm
H = 75mm
D = 34mm

The 'CMA' safety switches are uniquely coded versions of the standard F-Type and will work with any of the standard F-Series safety control units. With up to 500,000 unique codes available, they are ideal for situations where the highest security against tampering is required. The CMA safety switch can also be used as a Master Key in a control panel to prevent start up when personnel are in dangerous areas. A MATCHING CONTROL MODULE OR EXTENDER MUST BE ORDERED WITH THE CMA SWITCH!

Additional products are available from the manufacturer. Please call us with your application needs.

300 Roundhill Drive, Unit 4, Rockaway, NJ 07866
Telephone – (973) 586-2500 FAX – (973) 596-1590
E-Mail – info@norstat.com Website – www.norstat.com

Non Contact Safety Switches
F-Series Controller and Extender Module
For Monitoring F-Series Switches

FM1 Controller Module

All 'F' series systems start with the FM1. The FM1 contains the regulated power supply, 2 safety contact outputs, external/internal relay monitoring/reset circuit and system indication, along with the input for one safety switch sensor and it's indication outputs.

The FM 1 and one Safety Switch Sensor are all that is required for a system monitoring one guard. Simply connect the FM1 into a suitable control input, fit the safety switch sensor to guard and connect the supply and the volt free control contacts as shown in the installation guide. For larger systems see FX1 & FX2 Extender units.

FX1 Single Extender Module

The FX1 is a 17.5mm wide extender module which clips onto 35mm DIN rail and connects to the main control module (FM1) via a 6 position ribbon cable.

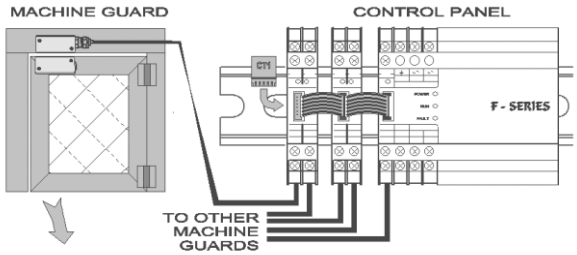
The FX1 adds 1 gate switch input and corresponding LED and volt free contact indicator output.

FX2 Double Extender Module

The FX2 is a 17.5mm wide extender module which clips onto 35mm DIN rail and connects to the main control module (FM1) via a 6-way connector strap.

The FX2 adds 2 gate switch inputs and corresponding LED and volt free contact indicator outputs.

F-Series System

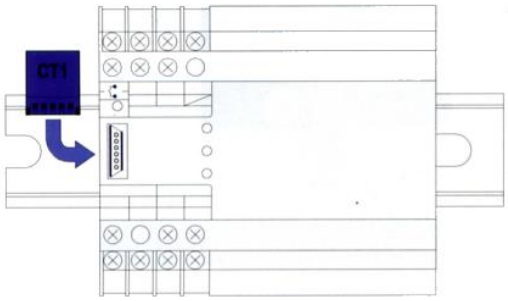


Additional products are available from the manufacturer. Please call us with your application needs.

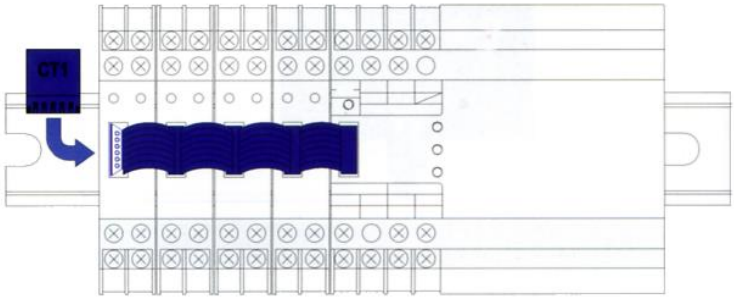
300 Roundhill Drive, Unit 4, Rockaway, NJ 07866
Telephone – (973) 586-2500 FAX – (973) 596-1590
E-Mail – info@norstat.com Website – www.norstat.com

Non Contact Safety Switches
F-Series System Installation Drawings
Connections Diagrams

F-Series System Assembly

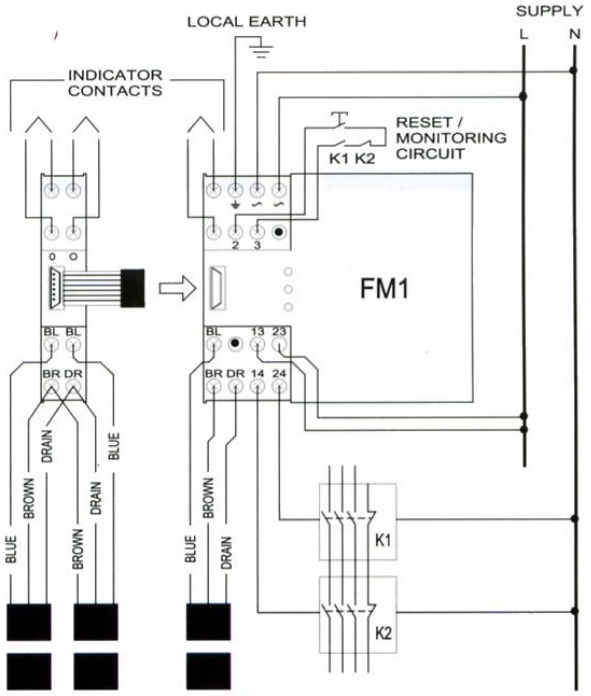


The FM1 control module monitors one gate switch. If no further gate switches are to be monitored, the CT1 (Terminator plug, supplied with the FM1) is fitted as shown.



Where more than one safety switch is to be monitored, connect the required number of FX2's and/or FX1's to the main control module (FM1). Fit the CT1 (Terminal plug, supplied with the FM1) to the last unit as shown.

F-Series Connection



Standard F-SERIES safety switches for a dual channel control circuit. The FM1 is switching two contactors which have normally closed contacts monitored by the FM1 reset circuit (terminals 2 & 3). If on of the contacts welds closed, the second contactor will operate normally on the next demand on the safety system and the reset circuit will prevent a start up.

Additional products are available from the manufacturer. Please call us with your application needs.

Non Contact Safety Switches

SSS Switches

Electronic Stand Alone Safety Switch

MAGNASAFE ADVANTAGES

- *Easy to install*
- *Tolerant to misalignment*
- *Tamper proof switching*
- *Up to 2A switching capability*
- *IP 67 – suitable for wet, wash-down areas*
- *Quick disconnect options*
- *Compatible with most safety relays*
- *10 mm switching*
- *LED indication available*
- *EMC tested*
- *CE, UL and cUL approved*

Description

The SSS is a tamper-proof, standalone safety switch that can be used to switch relays, contactors or safety relays directly. Only a Mechan actuator will operate the SSS switch correctly.

Featuring dynamic signal technology, these switches offer the advantages of electronic switching for standalone applications.

Operation

When the switch actuator is bought within the operating range of the fixed switch (8-10mm target to target), a dynamic signal is generated in the actuator and transmitter to the switch.

When the switch is in position (target to target) the NO contacts close and the NC contacts (SSS-11) open.

SSS

Size:
W = 87mm
H = 17mm
D = 24mm

Part Number	Contacts	Voltage
SSS-11-03M	1 NO/ 1NC	DC
SSS-20-03M	2 NO	DC

SSS-QD

Size:
W = 87mm
H = 17mm
D = 24mm

Part Number	Contacts	Voltage
SSS-11-QD	1 NO/ 1NC	DC
SSS-20-QD	2 NO	DC

Additional products are available from the manufacturer. Please call us with your application needs.

300 Roundhill Drive, Unit 4, Rockaway, NJ 07866
Telephone – (973) 586-2500 FAX – (973) 596-1590
E-Mail – info@norstat.com Website – www.norstat.com

SS-R Electronic Safety Switch

Description

Mechan SS-R safety switches are electronically operated non-contact safety switches for use in machine guarding applications.

The non-contact operation makes the SS-R easy to install and tolerant to misalignment, providing a simple reliable solution to machine guard interlocking.

The electronic switching provides additional security and a single point switching, leading to a more reliable and secure long term switching solution. The switch and actuator are IP67 rated and can be used in wet or dusty environments and are ideal for connecting to any safety relay.

Operation

The SS-R has 2 x N/O safety contacts and 1 x N/C indicator contact along with a dual color LED for simple diagnostics.

When installed on a machine guard, power is applied, and the switch and actuator are within the specified operating range (See table on page 4 for switching distances). The **Safety Contacts** will be closed and the **Auxiliary Contact** will be open. The dual color LED will be GREEN.

When the actuator moves out of the operating range, the **Safety Contacts** will open the **Auxiliary Contact** will close for indication. The dual color LED will be RED.

The SS-R safety switch and actuator have a 8 mm switching distance can approach each other from most angles. When the switch is closed the targets on the printed face of the switch must be aligned. To avoid physical damage, do not use the switch and actuator as a stop, set a 2 mm gap for best operation and tolerance to machine guard vibration.

Applications

Interlocked guards where additional security is required. Door locking is not required.

Food and Beverage packing/filling systems
Dairy Pharmaceutical Paper Industry
Can Forming and Filling, (Aluminum, Steel, Plastic)
Semiconductor Manufacture/Assembly.

SS-R

Pending

Approvals

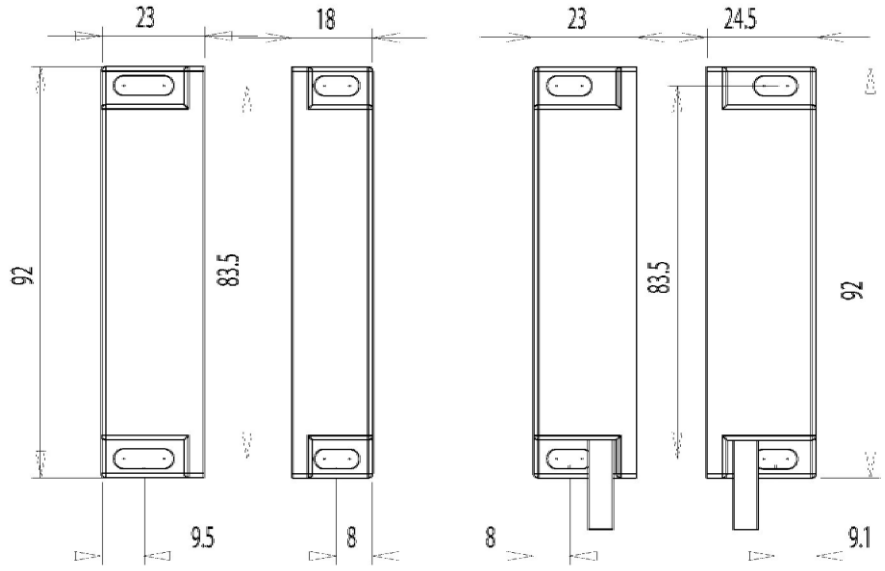
CE	Complies with the relevant sections of the CE marking directive.
UL	Pending
EUROPEAN DIRECTIVES	
Machinery Directive 98/37/EC	
Low Voltage Directive 73/23/EC	
Electromagnetic Compatibility Directive 89/336/EC	
EUROPEAN STANDARDS	
EN292	Safety of Machinery Basic concepts, general principles for design.
EN 60204	Safety of Machinery Electrical equipment of machines.
EN 954-1	Safety of Machinery Safety related parts of controls systems
EN 1088	Interlocking devices associated with guards.
EN 60947-5-3	Safety of Machinery Specification for low voltage switchgear and control gear.

Declaration of Conformity

A Declaration of Conformity may be obtained from Mechan Controls

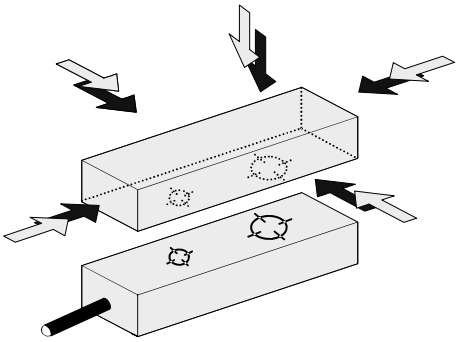
DIMENSIONS

Dimensions in MM



MOUNTING

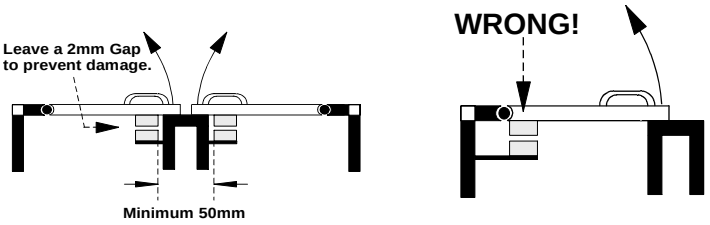
The SS-R safety switches can approach each other from most angles. When the guard is closed the targets on the printed face of the switch and actuator must be aligned.



Mount the switch on to the machine frame and the Actuator on to the opening edge of the door. Always try to mount the switch on non-ferrous material. (*Ferrous materials may reduce the switching distance.)*

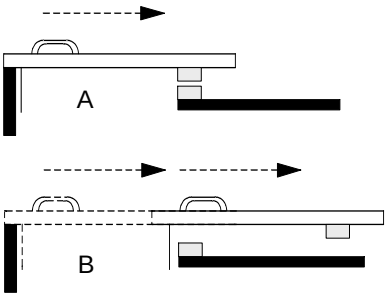
Use the tamper proof screws provided to make more secure.

Do not use the safety switch as a door stop. Leave a minimum of 50 mm between any adjacent switches.



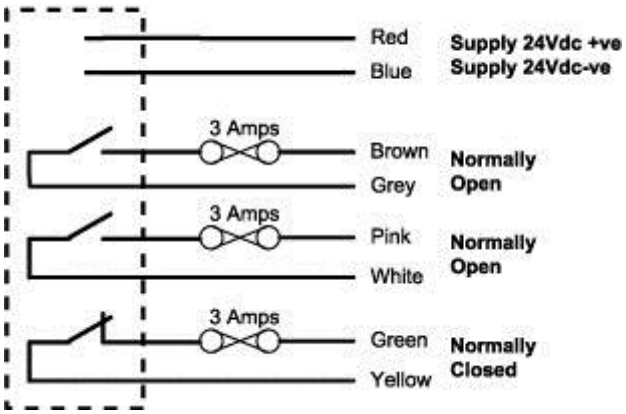
EN 1088
Provides some mounting suggestions, see example opposite.

When fixing the safety switch to a sliding door (A), ensure that when the door is opened (B) it is not easily accessible, helping prevent the system being overridden



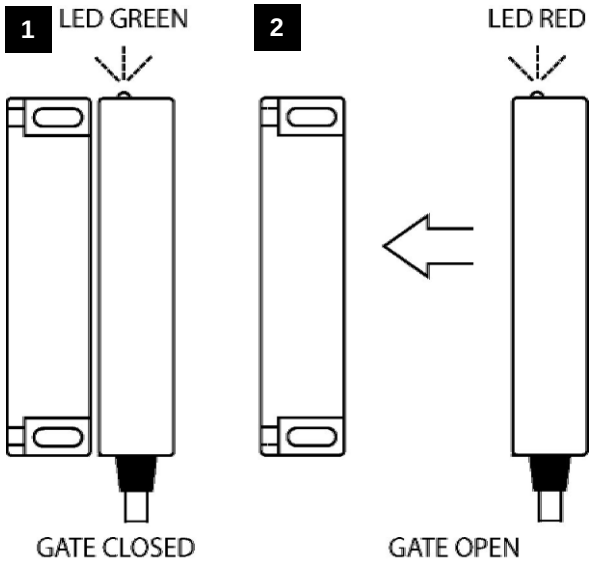
CONTACTS, CONNECTIONS & FUSES

SS-R SAFETY SWITCH



NOTE
SS-R Contact states shown when Actuator is not in place.

OPERATION



1 POWER ON, GATE CLOSED
When the switch has power and the actuator is in place, the LED will be GREEN. The N/O contacts will be closed and the N/C contact will be open.

2 POWER ON, GATE OPEN
When the switch has power and the actuator is out of range, the LED will be RED. The N/O contacts will be open and the N/C contact will be closed.

TECHNICAL SPECIFICATION

TYPE		SS-R
Power Supply		24VDC
Power Consumption		2VA/2W
Contact Arrangements:		2 X N/O Safety Contacts, 1 X N/C Auxiliary Contact
Safety Contact Rating	AC	230VAC/2A
	DC	24VDC/2A
Auxiliary Contact Rating	AC	230VAC/2A
	DC	24VDC/2A
Contact Operating Distance		8mm ON/10mm OFF
Internal Fuse (Safety & Auxiliary)		3A Fast Acting
External Fuse (Customer Supplied)		3A Fast Acting
IP Rating		IP67
Vibration/Shock		50-100Hz/10g
Operating Temperature		-10-+55C
Mounting & Fixture		Target to Target
Connection		Pre-wired
Cable Length		Max 100m
Construction		ABS Resin Filled

MECHAN

SS-C Electronic Coded Safety Switch

- **Electronic safety switch**
- **1 x N/O + 1 x N/C**
- **10mm Operating distance**
- **Dual color LED Indication**
- **500mA Switching**
- **IP67**
- **Slim-line ABS Housing**
- **UL Pending**
- **CE**

CE

DESCRIPTION

The Mechan SS-C Safety switches are electronic, non-contact safety switches.

Mechan's unique electronic switching provides additional security and a single switching point leading to a more reliable and secure long term safety switching solution.

The SS-C switch is pre-wired with 5 or 10 meters of cable and has a dual color indicator LED to clearly show the guard status.

The SS-C is fully encapsulated to IP67 and is suitable for use in wet, wash down or dusty areas. Its slim-line package and 10mm switching distance makes the SS-C easy to fit to most guarding systems.

With 1 x N/O and 1 x N/C contact the SS-C is ideal for use with many of the new 'Low Inrush' current safety relays where category 3 or 4 performance is required for a safety application.

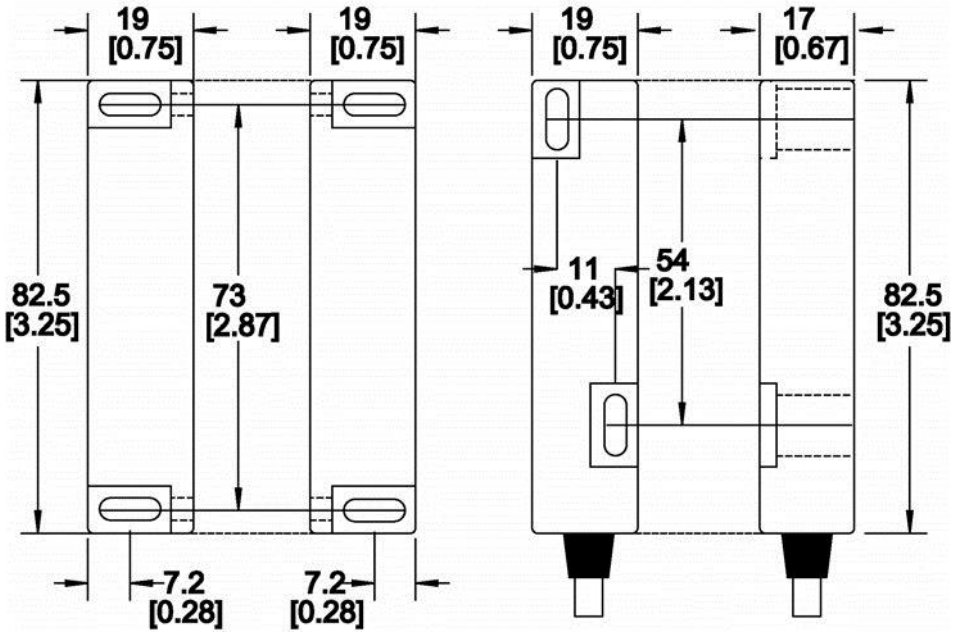
300 Roundhill Drive, Unit 4, Rockaway, NJ 07866
Telephone – (973) 586-2500 FAX – (973) 596-1590
E-Mail – info@norstat.com Website – www.norstat.com

TECHNICAL SPECIFICATION

Type	SS-C Electronic Safety Switch
Technology	Electronic
Approvals	CE;
Power Supply	24vDC
Power Consumption	2VA / 2W
Contact Arrangements	1 x N/O Safety; 1 x N/C Auxiliary
Safety Contact Operating Distance	9mm ON / 10 mm OFF
Safety Contact Rating	AC : 110Vac / 500mA / DC: 24Vdc / 500mA
Auxiliary Contact Operating Distance	9mm OFF / 10 mm ON
Auxiliary Contact Rating	AC : 110Vac / 500mA / DC: 24Vdc / 500mA
External Fuse (Customer Supplied)	300 mA
Dimensions Switch	82.5 x 19 x 17mm
Dimensions Actuator	82.5 x 19 x 19mm
IP Rating	IP67
Cable length	100 meters max
Vibration / Shock	50—100Hz / 10g
Operating Temperature	-10 to +55C
Mounting & Fixture	Target to Target
Construction	Blue ABS Resin Filled

DIMENSIONS

Dimensions in MM

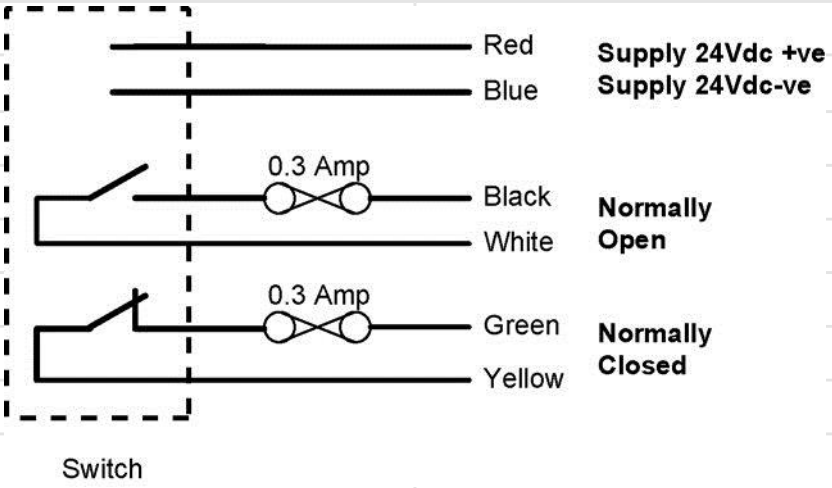


CONNECTIONS

SS-C SAFETY SWITCH

NOTE

SS-C Shown when Actuator is not in place.

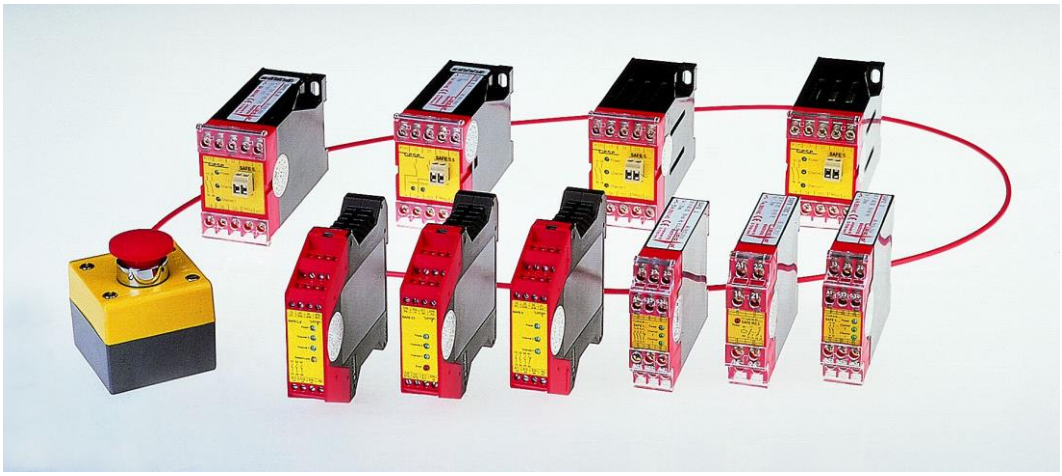


Ordering Information

Part Number	Contacts	Contact Rating	External Fuse	IP	Housing	Cable Exit & Length	Code
SS-C-03M	1N/O + 1 N/C	110VAC/500mA 24VDC/500mA	300mA	IP67	ABS	3m pre wired	363-000
SS-C-05M	1N/O + 1 N/C	110VAC/500mA 24VDC/500mA	300mA	IP67	ABS	5m pre wired	363-001
			ACTUATOR ONLY				
SS-C-ACT				IP67	ABS		363-099

300 Roundhill Drive, Unit 4, Rockaway, NJ 07866
Telephone – (973) 586-2500 FAX – (973) 596-1590
E-Mail – info@norstat.com Website – www.norstat.com

Safety Relays



- Emergency Stop & Gate Monitoring
- Expansion Modules
- Mat & Edge Monitoring
- Two Hand Controls
- Light Curtain Relays
- Time Delay Relays

Safety Relays

Category 2-3 Application

Emergency Stop & Gate Monitoring

- *Smallest safety relay available*
- *Easy to wire: simply connect the safety components (NC e-stop buttons and safety switches) in series with the power source for the relay. Add a momentary start button (or jumper for auto reset) to Y1 & Y2 terminals and your done!*
- *For single channel (Cat 2) installation, connect the single contact safety components in series with the 24V+ (A1 Terminals).*
- *For dual channel (Cat 3) installation, connect one contact of the dual contact safety components in series with the 24V+ (A1) and the other contact in series with the 0V (A2).*

SAFE 1.1

With Start Control Monitoring
(Manual Reset)

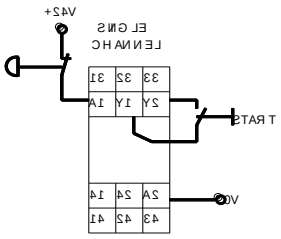
Emergency Stop and Gate Monitoring Applications

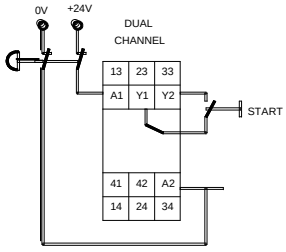
SAFE 1

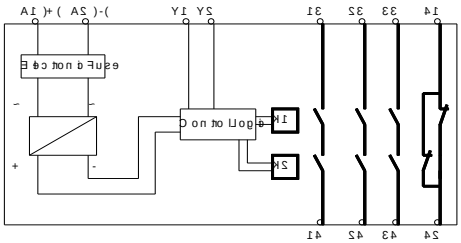
Without Start Control Monitoring
(Automatic Reset)

Emergency Stop and Gate Monitoring Applications

Connection Diagram







Part Numbers

Operation Voltage	24V AC/DC	24V AC/DC
Output Contacts	3 NO Safety, 1 NC Auxiliary	3 NO Safety, 1 NC Auxiliary
Max. Contact Capacity	5A (AC or DC)	5A (AC or DC)
Min. Contact Capacity	1 mA	1 mA
Switching Capacity	1250 VA (Resistive Load)	1250 VA (Resistive Load)
Power Consumption	2.5 VA / 2.5 W	2.5 VA / 2.5 W
Start Up Delay / Fallback	<50ms / <80ms	<50ms / <80ms
Simultaneity	-	-
Security	6.3A quick acting or 4A time lag	6.3A quick acting or 4A time lag
Temperature Range	-25°C to +55°C	-25°C to +55°C
Approvals	CE, BG, UL, cUL	CE, BG, UL, cUL

Additional Products are available from the manufacturer. Please call us with your application needs.

300 Roundhill Drive, Unit 4, Rockaway, NJ 07866
Telephone – (973) 586-2500 FAX – (973) 596-1590
E-Mail – info@norstat.com Website – www.norstat.com

- *The smallest safety relay available!*
- *Designed for dual safety channel (Cat 4) applications*
- *Easy to install:*

1. Connect 24V (A1) & 0V (A2)
2. Connect safety channel 1 between S11 & S12
3. Connect safety channel 2 between S21 & S22
4. Connect restart button (or jumper for automatic restart) between S33 & S34

- *The relay monitors the two safety circuits and will open the output contacts if either circuit is broken. The relay checks that both circuits open at the same time, ensuring the switches are operating correctly*

SAFE 2

With Start Control Monitoring
(Manual Reset)

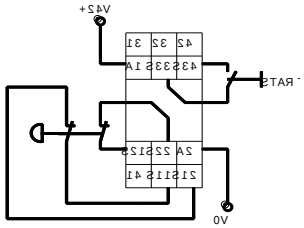
Emergency Stop and Gate Monitoring Applications

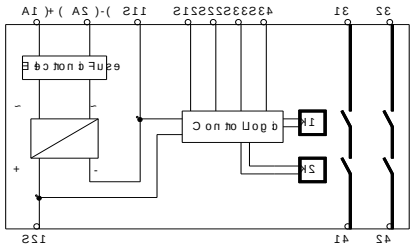
SAFE 2.1

Without Start Control Monitoring
(Automatic Reset)

Emergency Stop and Gate Monitoring Applications

Connection Diagram





Part Numbers

Operation Voltage	24V AC/DC	24V AC/DC
Output Contacts	2 NO Safety	2 NO Safety
Max. Contact Capacity	6A (AC or DC)	6A (AC or DC)
Min. Contact Capacity	1 mA	1 mA
Switching Capacity	1500 VA (Resistive Load)	1500 VA (Resistive Load)
Power Consumption	2.5 VA / 2.5 W	2.5 VA / 2.5 W
Start Up Delay / Fallback	<50ms / <30ms	<50ms / <30ms
Simultaneity	40 ms	40 ms
Security	6.3A quick acting or 4A time lag	6.3A quick acting or 4A time lag
Temperature Range	-25°C to +55°C	-25°C to +55°C
Approvals	CE, BG, UL, cUL	CE, BG, UL, cUL

Additional products are available from the manufacturer. Please call us with your application needs.

300 Roundhill Drive, Unit 4, Rockaway, NJ 07866
Telephone – (973) 586-2500 FAX – (973) 596-1590
E-Mail – info@norstat.com Website – www.norstat.com

Category 4 Applications
Emergency Stop & Gate Monitoring

- *Our most popular relay*
- *Designed for dual safety channel (Cat 4) applications*
- *Easy to install:*

1. Connect 24V (A1) & 0V (A2)
2. Connect safety channel 1 between S11 & S12
3. Connect safety channel 2 between S21 & S22
4. Connect restart button (or jumper for automatic restart) between S33 & S34

- *The relay monitors the two safety circuits and will open the output contacts if either circuit is broken. The relay checks that both circuits open at the same time, ensuring the switches are operating correctly*

SAFE 4

With Start Control Monitoring
(Manual Reset)

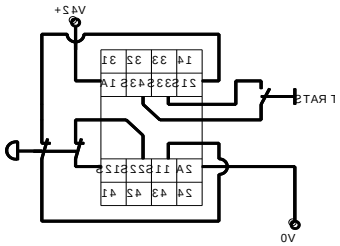
Emergency Stop and Gate Monitoring Applications

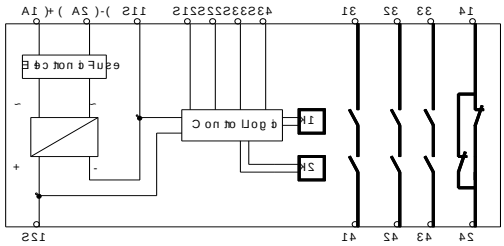
SAFE 4.1

Without Start Control Monitoring
(Automatic Reset)

Emergency Stop and Gate Monitoring Applications

Connection Diagram





Part Numbers

Operation Voltage	24V AC/DC, 120V AC, 240 V AC	24V AC/DC, 120V AC, 240 V AC
Output Contacts	3 NO Safety, 1 NC Auxiliary	3 NO Safety, 1 NC Auxiliary
Max. Contact Capacity	5A (AC or DC)	5A (AC or DC)
Min. Contact Capacity	1 mA	1 mA
Switching Capacity	1250 VA (Resistive Load)	1250 VA (Resistive Load)
Power Consumption	24VAC=5VA; 24VDC=3W; 120-230VAC=3.7VA	24VAC=5VA; 24VDC=3W; 120-230VAC=3.7VA
Start Up Delay / Fallback	<50ms / <30ms	<50ms / <30ms
Simultaneity	-	-
Security	6.3A quick acting or 4A time lag	6.3A quick acting or 4A time lag
Temperature Range	-25°C to +55°C	-25°C to +55°C
Approvals	CE, TUV, UL, cUL	CE, TUV, UL, cUL

Additional products are available from the manufacturer. Please call us with you application needs.

300 Roundhill Drive, Unit 4, Rockaway, NJ 07866
Telephone – (973) 586-2500 FAX – (973) 596-1590
E-Mail – info@norstat.com Website – www.norstat.com

Safety Relays

Category 4 Applications Expansion Module

- *Extension modules are used in combination with a standard safety relay to increase the number of outputs available*
- *The relays can be wired for single channel, dual channel and dual channel with opposite polarity protection*
- *Typically the main relay is used to disconnect the operating voltage between U1 & K1 for single channel installations and U1 & K1 and U22 & K21 for dual channel installations*
- *For an extra level of protection the NC auxiliary contacts from the extension modules can be run in series to the restart circuit of the main relay*

SAFE X4

For Wiring With Opposite Polarity Between Channels

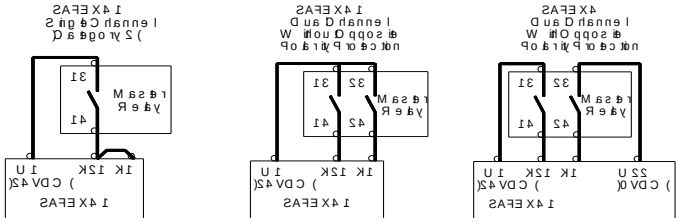
Used with a standard safety relay to increase the number of outputs.

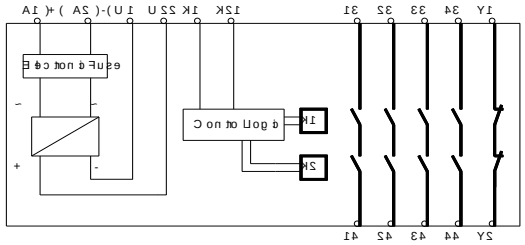
SAFE X4.1

For Wiring Without Opposite Polarity Between Channels

Used with a standard safety relay to increase the number of outputs.

Connection Diagram





Part Numbers

Operation Voltage	24V AC/DC, 120V AC, 240 V AC	24V AC/DC, 120V AC, 240 V AC
Output Contacts	4 NO Safety, 1 NC Auxiliary	4 NO Safety, 1 NC Auxiliary
Max. Contact Capacity	6A (AC or DC)	6A (AC or DC)
Min. Contact Capacity	1 mA	1 mA
Switching Capacity	2000 VA (Resistive Load)	2000 VA (Resistive Load)
Power Consumption	4 VA	4 VA
Start Up Delay / Fallback	… / <50ms	… / <50ms
Simultaneity	-	-
Security	10A quick acting or 6A time lag	10A quick acting or 6A time lag
Temperature Range	-25°C to +55°C	-25°C to +55°C
Approvals	CE, TUV, UL, cUL	CE, TUV, UL, cUL

Additional products are available from the manufacturer. Please call us with your application needs.

300 Roundhill Drive, Unit 4, Rockaway, NJ 07866
Telephone – (973) 586-2500 FAX – (973) 596-1590
E-Mail – info@norstat.com Website – www.norstat.com

Safety Relays

Category 4 Applications

Mat & Edge Monitoring – 2 Hand Control

• The SAFE M is used with contact edges and mats, which are normally open until the contact is made (as opposed to safety switches and e-stop buttons which are normally closed). These can be used for 2 wire or 4 wire edges and mats. 4 wire applications insure that the wires to and from the device are monitored

• The SAFE Z.2 is used to insure the closure of two buttons or switches, each with 1 NO & 1NC contacts, within ½ a second of each other

SAFE M – SAFE M.1

SAFE M – Auto Restart
SAFE M.1 – Manual Restart

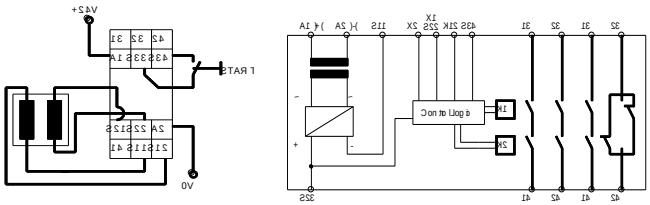
SAFE Z.2

Insures Simultaneous Closure of Two Buttons or Switches

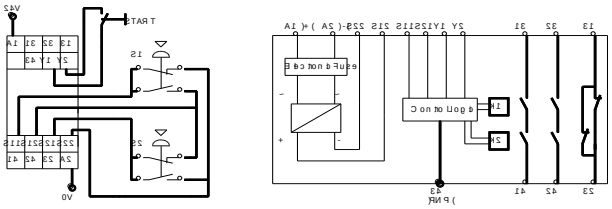
	Mat and Edge Control Monitoring Applications	Two Hand Anti Tie Down Control Application

Connection Diagram

SAFE M



SAFE Z.2



Part Numbers

Operation Voltage	24V AC/DC	24V AC/DC, 120 or 230 VAC
Output Contacts	3 NO Safety, 1 NC Aux.	2 NO Safety, 1 NC Aux., 1 PNP
Max. Contact Capacity	5A (AC or DC)	6A (AC or DC)
Min. Contact Capacity	1 mA	1 mA
Switching Capacity	1250 VA (Resistive Load)	1500 VA (Resistive Load)
Power Consumption	2.5 VA / 2.5 W	3 VA
Start Up Delay / Fallback	<50ms / <30ms	<50ms / <25ms
Simultaneity		.5 s
Security	6.3A quick acting or 4A time lag	6.3A quick acting or 4A time lag
Temperature Range	-25°C to +55°C	-25°C to +55°C
Approvals	CE, BG, (UL, cUL pending)	CE, TUV, UL, cUL

Additional products are available from the manufacturer. Please call us with your application needs.

300 Roundhill Drive, Unit 4, Rockaway, NJ 07866
Telephone – (973) 586-2500 FAX – (973) 596-1590
E-Mail – info@norstat.com Website – www.norstat.com

- *The SAFE L series is used to light curtains, single light beams or other devices with 2 PNP outputs*
- *The two separate PNP outputs from the solid state device are run into S12 and S22*

SAFE L – L.1

L - With Start Control Monitoring
L.1 – Without Start Control Monitoring

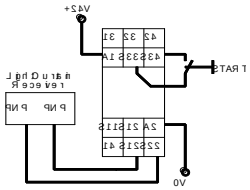
Monitoring Light Curtains or Other Safety Solid State Devices

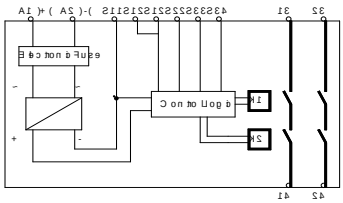
SAFE L.2

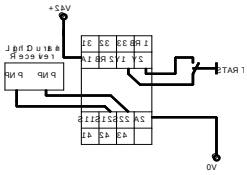
With or Without Start Control Monitoring (Set by External Bridge)

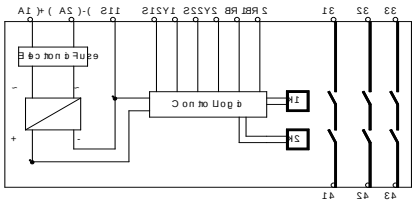
Monitoring Light Curtains or Other Safety Solid State Devices

Connection Diagram









Part Numbers

Operation Voltage	24V AC/DC	24V AC/DC
Output Contacts	2 NO Safety	3 NO Safety
Max. Contact Capacity	6A (AC or DC)	6A (AC or DC)
Min. Contact Capacity	1 mA	1 mA
Switching Capacity	1500 VA (Resistive Load)	1500 VA (Resistive Load)
Power Consumption	3 VA	3 VA
Start Up Delay / Fallback	<50ms / <30ms	<50ms / <25ms
Simultaneity	40 ms	40 ms
Security	6.3A quick acting or 4A time lag	6.3A quick acting or 4A time lag
Temperature Range	-25°C to +55°C	-25°C to +55°C
Approvals	CE, TUV, UL, cUL	CE, TUV, UL, cUL

Additional products are available from the manufacturer. Please call us with your application needs.

300 Roundhill Drive, Unit 4, Rockaway, NJ 07866
Telephone – (973) 586-2500 FAX – (973) 596-1590
E-Mail – info@norstat.com Website – www.norstat.com

Safety Relays

Category 4 Applications

Relay With Safe Time Delayed Outputs

SAFE T Series

Used With Locking Switches
to Delay Access on Machine with Inertia

SAFE T
OPERATION TYPES

SAFE TN –
Simultaneity = 1 Sec.
Reset Time = 0.5-0.6 Sec
Relay can not be reset during timed cycle.

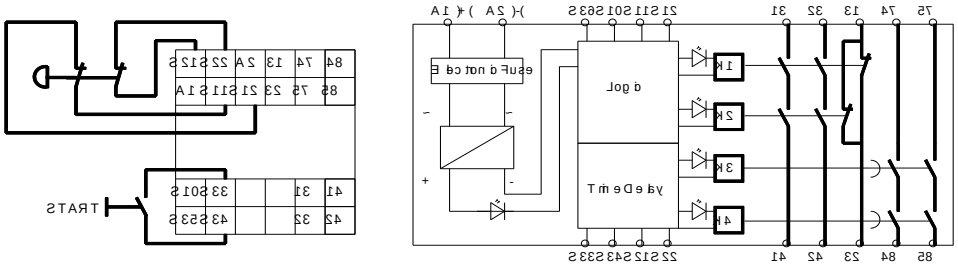
SAFE TA –
Simultaneity = 3 Sec.
Reset Time = 0.5-0.6 Sec.
Relay can be reset during timed cycle

SAFE TR –
Simultaneity = 3 Sec.
Relay can be reset during timed cycle

SAFE TU –
Simultaneity = Infinite
Reset Time = 0.5-0.6 Sec
Relay can be reset during timed cycle

When emergency stop is activated, 2 NO contacts immediately open, 2 additional contacts open after a preset time delay. This redundant time delay can be set from 0.005 to 600 S, in 64 steps. Both timers must be set the same.

Connection Diagram



Operation Voltage	24V AC/DC
Output Contacts	2 NO Safety, 2 Delayed NO Safety
Max. Contact Capacity	6A (AC or DC)
Min. Contact Capacity	10 mA
Switching Capacity	1500 VA (Resistive Load)
Power Consumption	6.5 W / 13 VA
Start Up Delay / Fallback	Time Delay=.5-.6S / Non Delay<50ms
Simultaneity	TN=1S / TA-TR=3S / TU=inf.
Security	10A quick acting or 6A time lag
Temperature Range	-25°C to +55°C
Approvals	CE, TUV, UL, cUL

Additional products are available from the manufacturer. Please call us with your application needs.

300 Roundhill Drive, Unit 4, Rockaway, NJ 07866
Telephone – (973) 586-2500 FAX – (973) 596-1590
E-Mail – info@norstat.com Website – www.norstat.com

Safety Relays
Category 4 Applications
Emergency Stop & Gate Monitoring – Expansion Module

- *The RS-NAGV is designed for application which require many safety and auxiliary outputs*
- *Extension modules are used in combination with a standard safety relay to increase the number of outputs available The relays can be wired for single channel, dual channel and dual channel with opposite polarity protection*

RS-NAGV
6 NO Safety Outputs
4 NC Auxiliary Outputs

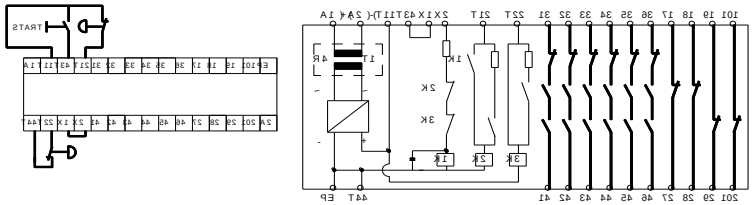
Emergency Stop and Gate Monitoring Applications

RS-NAGX 5
Expansion Module

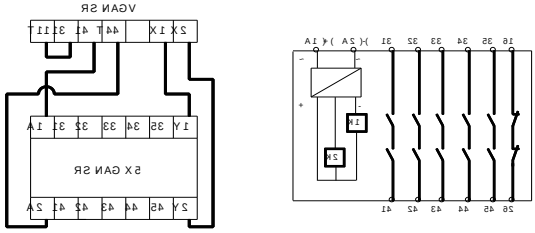
Used with a standard relay to increase the number of outputs

Connection Diagram

RS-NAGV



RS-NAGX5



Part Numbers

Operation Voltage	24V AC/DC, 120V AC, 240 V AC	24V AC/DC
Output Contacts	6 NO Safety, 4 NC Auxiliary	5 NO Safety, 1 NC Safety
Max. Contact Capacity	4A (AC or DC)	6A (AC or DC)
Min. Contact Capacity	10 mA	1 mA
Switching Capacity	1500 VA (Resistive Load)	2000 VA (Resistive Load)
Power Consumption	3 VA	6 VA
Start Up Delay / Fallback	<150ms / <1000ms	<50ms
Simultaneity	75ms	-
Security	6A quick acting or 4A time lag	10A quick acting or 6A time lag
Temperature Range	-25°C to +55°C	-25°C to +55°C
Approvals	CE, TUV	CE, TUV, UL, cUL Pending

Additional products are available from the manufacturer. Please call us with your application needs.

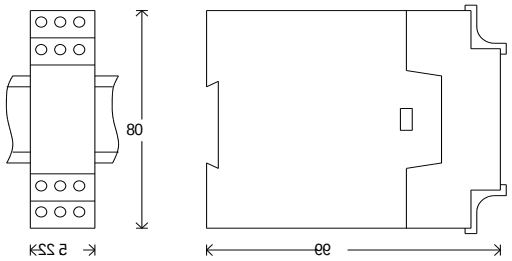
300 Roundhill Drive, Unit 4, Rockaway, NJ 07866
Telephone – (973) 586-2500 FAX – (973) 596-1590
E-Mail – info@norstat.com Website – www.norstat.com

Dimensions

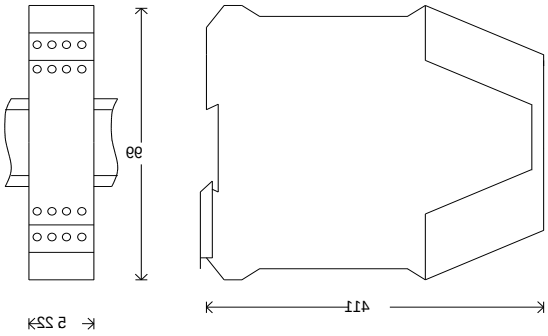
In mm

Dimensions

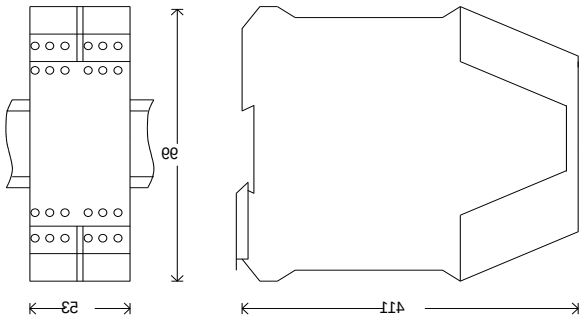
SAFE 1
SAFE 2
SAFE 2.2
SAFE L



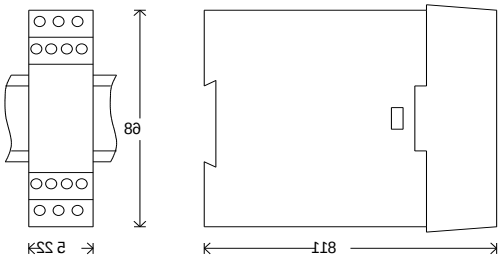
SAFE 4
SAFE X4
SAFE L.2



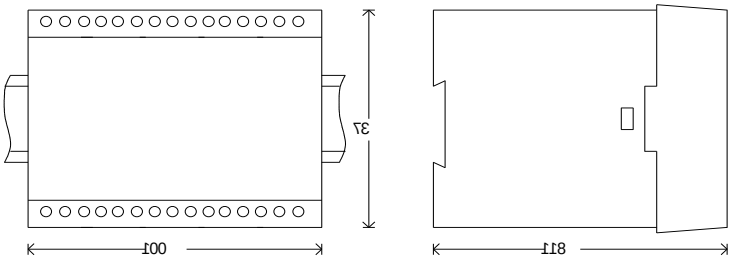
SAFE T



RS-NAGX5



RS-NAGV



300 Roundhill Drive, Unit 4, Rockaway, NJ 07866
Telephone – (973) 586-2500 FAX – (973) 596-1590
E-Mail – info@norstat.com Website – www.norstat.com

Optical / Audible Signaling Devices

- Stack Lights
- Single Beacons
- Buzzer Modules
- Optical/Audible Modules
- Installation Beacons

Signaling Devices Glossary

Permanent light element with incandescent bulb

50mm Diameter Permanent light elements with BA15d sockets can accommodate incandescent bulbs (sold separately) with either 5 or 10-Watt power, for optical indication. Common signal Lenses can be used with either LED or incandescent bulbs. The bulb used determines the voltage range.

Permanent light element with LED bulb

Permanent light elements with BA15d sockets can accommodate colored LED-lamp bulbs (sold separately), providing vibration proof optical indication, with long service life. Common signal elements can be used with either LED or incandescent bulbs. The bulb used determines the voltage range.

Blinking light element with incandescent or LED bulb

Blinking signal elements with integrated blinking circuit and a BA15d socket. The blinking frequency is approximately 2 Hz. Blinking signal elements can be used with either LED or incandescent bulbs. The bulb used determines the voltage range.

.

1 Joule Flashing light element

Flashing light elements are ideal for providing light indication for large bright areas, due to the high intensity light created by the integrated Xenon-flash tube. The flash frequency is approximately 1 Hz. The elements are offered with either 3 or 6 Joule light intensity. Voltage ranges include 12-48 VAC/DC, 100-120VAC and 220-240 VAC.

Audible signal element

Audible signal elements provide an extra level of indication or warning.
The buzzer module can either be installed separately or on top of a stack light. The tone can be set to continuous tone, pulse tone or two-tone via an internal switch. Volume and frequency can be adjusted via internal potentiometers. Voltage ranges include 12-48 VAC/DC, 100-120VAC and 220-240 VAC.

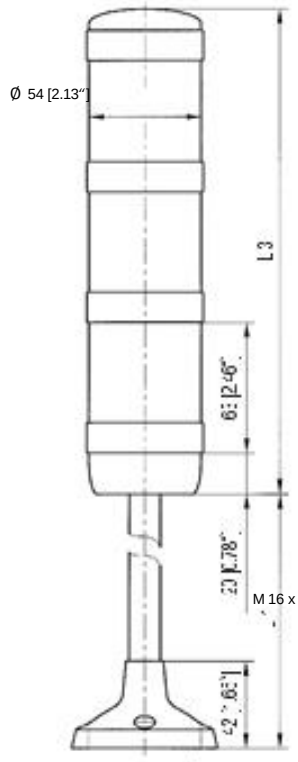
300 Roundhill Drive, Unit 4, Rockaway, NJ 07866
Telephone – (973) 586-2500 FAX – (973) 596-1590
E-Mail – info@norstat.com Website – www.norstat.com

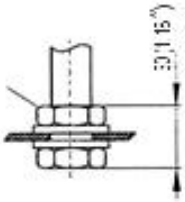
BR 50 Signal Tower Program

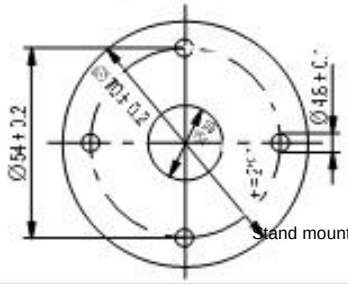
- Modular design with a sturdy enclosure for all indoor and outdoor applications
- Wherever equipment is required to display machine status and provide warning signals.
- High level of protection against electric shock with IP 54 (IP 65 is optional).
- A flexible modular system guarantees easy operation. Up to five modules with a choice of six globe colors can be simply plugged together in any permutation, even at a later point in time.
- The mechanical and electronic systems are decoupled. From it results a stable construction insensitive to vibration .
- You have the choice between four different modules:
  - — Module with continuous beam max. 7 W
  - — Blinking-light module max. 7 W
  - — Flashing-light module max. 0,6 joules
  - — Acoustic module 85 dB (A)
- Versatility in installation: also the mounting methods will meet all your requirements. Stand, tube or direct mounting.
- The environmentally friendly materials used in manufacture comply with the DIN ISO 14000.

IP 54	IP 65	+45 °C / -25 °C	+60 °C / -30 °C	90%
Protective system	Protective system (optional)	Operating temperature	Operating temperature **(with LED)**	Relative humidity

The modular construction guarantees flexible adaptation to any application







Stand mounting gasket

Dimensions:

Tube mounting	L1 Mounting stand	L1
Length of tube 100	78 (3.1″)	88 (3.58″)
Length of tube 250	228 (9.0″)	238 (9.4″)
Length of tube 400	378 (14.9″)	388 (15.2″)

L2	
single-stage	107 (4.2″)
2-stages	170 (6.7″)
3-stages	233 (9.2″)
4-stages	296 (11.6″)
5-stages	359 (14.1″)

The bayonet fixing ensures that you install the modules easily and rapidly

Technical data:

Globe colors	red yellow amber green blue transparent						
Module data	**Continuous-beam module**		**Blinking-light module 1.5 Hz**		**Flashing-light module**		**Acoustic module**
	Light bulb	**LED**	**Light bulb**	**LED**			
Modular stages	max. 5 (sequence and color freely selectable)						
Angle of beam	360°						
Percentage duty cycle	100%						
Rated power, max. with 5 stages	7 W 5 W	depending on voltage	7 W 5 W	depending on voltage			
Lamp socket	BA 15 d		BA 15 d				
Flashing power					0.6 Joules		
Service life of light bulb/tube	approx. 1500 h	approx. 100000 h	approx. 1500 h	approx. 100000 h	after 8 mill. flashes min. 70% light emission		
Sound level at 1 m (39.3″) distance							85 dB (A)
Sound patterns							7
AC voltage rating 230 V	50/60 Hz - 15% to + 10%						
Current capacity rating 230 V	0.035 A	0.015 A	0.03 A	-	0.011 A		0.015 A
AC voltage rating 115 V	50/60 Hz -15% to +10%						
Current capacity rating 115 V	0.064 A	0.015 A	-	-	0.02 A		0.015 A
DC voltage rating 24 V	- 15% bis + 20%						
Current capacity rating	0.3 A	0.030 A	0.25 A	0.030 A	0.04 A		0.012 A
Weight of modules	80 g		90 g		90 g		130 g

The acoustic module is always installed at the top of the signal tower.

Other data:

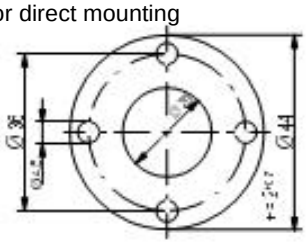
Installation	Vertical or horizontal - mounting stand, tube mounting, direct mounting
Accessories	Gasket for light module + basic module IP 65, gasket for tubular stand on plinth IP 65, gasket for direct mounting IP 65 (IP 65 not for sound module) Wall bracket with hood
Weight of plinth	Stand mounting (w/o module): approx. 220 g Tube mounting (w/o module): approx. 200 g Direct mounting (w/o module): approx. 180 g
Materials	Globe: polycarbonate, Plinth: ABS, Tube: stainless steel Tube threat 30 mm (1.18″), M 16 x 1.5

Lamp installation/ Removal Tool

Base and end module

Order No.: 28250010000

Gasket and installation material for direct mounting



Order No.: 28250210000

Wall bracket with hood for mounting stand

Order No.: 28250200000

Wall bracket for direct mounting (optional IP 65) and for double side mounting, up to 10 modules

Available Future

Option with IP 65:

a) Ring gasket for light module / base module (1 per light module plus 1 base module), order no.: 28250220000

b) Ring gasket for mounting tube (only applies to stand or tube mounting), order no.: 28250230000

300 Roundhill Drive, Unit 4, Rockaway, NJ 07866
Telephone – (973) 586-2500 FAX – (973) 596-1590
E-Mail – info@norstat.com Website – www.norstat.com

How to order: select your signal tower from the variety of combinations as modular kit, customized to meet

Product description		Order designation	Order No.
MODULAR KIT			
Base and end module		BR50-BC	28250010000
Continuous-beam module	transparent	BR50-CL-CL	28250040010
Continuous-beam module	yellow	BR50-CL-YE	28250040030
Continuous-beam module	amber	BR50-CL-AM	28250040040
Continuous-beam module	red	BR50-CL-RE	28250040050
Continuous-beam module	green	BR50-CL-GR	28250040060
Continuous-beam module	blue	BR50-CL-BL	28250040070
Blinking-light module 24V	transparent	BR50-BL-CL 24V	28250058010
Blinking-light module 24V	yellow	BR50-BL-YE 24V	28250058030
Blinking-light module 24V	amber	BR50-BL-AM 24V	28250058040
Blinking-light module 24V	red	BR50-BL-RE 24V	28250058050
Blinking-light module 24V	green	BR50-BL-GR 24V	28250058060
Blinking-light module 24V	blue	BR50-BL-BL 24V	28250058070
Blinking-light module 230V	transparent	BR50-BL-CL 230V	28250051010
Blinking-light module 230V	yellow	BR50-BL-YE 230V	28250051030
Blinking-light module 230V	amber	BR50-BL-AM 230V	28250051040
Blinking-light module 230V	red	BR50-BL-RE 230V	28250051050
Blinking-light module 230V	green	BR50-BL-GR 230V	28250051060
Blinking-light module 230V	blue	BR50-BL-BL 230V	28250051070
Flashing-light module 24V	transparent	BR50-FL-CL 24V	28250078010
Flashing-light module 24V	yellow	BR50-FL-YE 24V	28250078030
Flashing-light module 24V	amber	BR50-FL-AM 24V	28250078040
Flashing-light module 24V	red	BR50-FL-RE 24V	28250078050
Flashing-light module 24V	green	BR50-FL-GR 24V	28250078060
Flashing-light module 24V	blue	BR50-FL-BL 24V	28250078070
Flashing-light module 115V	transparent	BR50-FL-CL 115V	28250071610
Flashing-light module 115V	yellow	BR50-FL-YE 115V	28250071630
Flashing-light module 115V	amber	BR50-FL-AM 115V	28250071640
Flashing-light module 115V	red	BR50-FL-RE 115V	28250071650
Flashing-light module 115V	green	BR50-FL-GR 115V	28250071660
Flashing-light module 115V	blue	BR50-FL-BL 115V	28250071670
Flashing-light module 230V	transparent	BR50-FL-CL 230V	28250071010
Flashing-light module 230V	yellow	BR50-FL-YE 230V	28250071030
Flashing-light module 230V	amber	BR50-FL-AM 230V	28250071040
Flashing-light module 230V	red	BR50-FL-RE 230V	28250071050
Flashing-light module 230V	green	BR50-FL-GR 230V	28250071060
Flashing-light module 230V	blue	BR50-FL-BL 230V	28250071070
Acoustic module 24V		BR50-SM 24V	28250088000
Acoustic module 115V		BR50-SM 115V	28250081600
Acoustic module 230V		BR50-SM 230V	28250081000
Light bulb BA15d 24V DC / 7 W		BR50-L 24 7W	030303022
Light bulb BA15d 115V AC / 7 W		BR50-L 115 7W	030303032
Light bulb BA15d 230V AC / 7 W		BR50-L 230 7W	030303042
Light bulb BA15d 24V DC / 5 W		BR50-L 24 5W	030303023
Light bulb BA15d 115V AC / 5 W		BR50-L 115 5W	030303033
Light bulb BA15d 230V AC / 5 W		BR50-L 230 5W	030303043

300 Roundhill Drive, Unit 4, Rockaway, NJ 07866
Telephone – (973) 586-2500 FAX – (973) 596-1590
E-Mail – info@norstat.com Website – www.norstat.com

For your individual requirements.

Product description		Order designation	Order No.
ACCESSORIES			
LED light bulbs BA15d / 24V	transparent	BR50-LED-WH	
LED light bulbs BA15d / 24V	yellow	BR50-LED-YE	
LED light bulbs BA15d / 24V	red	BR50-LED-RE	
LED light bulbs BA15d / 24V	green	BR50-LED-GR	
LED light bulbs BA15d / 24V	blue	BR50-LED-BL	
LED light bulbs BA15d / 115V	transparent	BR50-LED-WH	
LED light bulbs BA15d / 115V	yellow	BR50-LED-YE	
LED light bulbs BA15d / 115V	red	BR50-LED-RE	
LED light bulbs BA15d / 115V	green	BR50-LED-GR	
LED light bulbs BA15d / 115V	blue	BR50-LED-BL	
LED light bulbs BA15d / 230V	transparent	BR50-LED-WH	
LED light bulbs BA15d / 230V	yellow	BR50-LED-YE	
LED light bulbs BA15d / 230V	red	BR50-LED-RE	
LED light bulbs BA15d / 230V	green	BR50-LED-GR	
LED light bulbs BA15d / 230V	blue	BR50-LED-BL	
Tubular stand with plinth	100 mm (3.93″)	BR50-S100	28250150010
Tubular stand with plinth	250 mm (9.82″)	BR50-S250	28250150020
Tubular stand with plinth	400 mm (15.7″)	BR50-S400	28250150040
Threaded tubular stand with bracket (without seal and cable)	100 mm (3.93″)	BR50-T100	28250160010
Threaded tubular stand with bracket (without seal and cable)	250 mm (9.82″)	BR50-T250	28250160020
Threaded tubular stand with bracket (without seal and cable)	400 mm (15.7″)	BR50-T400	28250160040
Wall bracket with hood for mounting stand		BR50-W	28250200000
Gasket for light module + base module IP 65		BR50-MG	28250220000
Tube gasket IP 65		BR50-TG	28250230000
Mounting kit with gasket for direct mounting IP 65		BR50-BG	28250210000

The new LED's do not fit into the 115 V and 230 V blinking modules

How to order:

Mounting stand

Sample order for mounting stand:	Order No.
1x base and end module	28250010000
1x stand with plinth 250 mm	28250150020
1x continuous-beam module red	28250040050
1x continuous-beam module yellow	28250040030
1x continuous-beam module green	28250040060
3x light bulb 24V/7W	030303022

Direct mounting

Sample order for plinth/direct mounting:	Order No.
1x base and end module	28250010000
1x continuous-beam green	28250040060
1x continuous-beam red	28250040050
1x continuous-beam clear	28250040010
1x continuous-beam amber	28250040040
1x continuous-beam blue	28250040070
5x light bulb 24V/5W	030303023
1x assembly kit	28250210000

Tube mounting

Sample order for tube mounting:	Order No.
1x base and end module	28250010000
1x continuous-beam red	28250040050
1x continuous-beam clear	28250040010
1x continuous-beam amber	28250040040
1x threaded tubular stand with bracket	28250160020
3x light bulb 24V/7W	030303022

LED Generation - Multi LED BA 15d

Energy- and cost-saving
high-performance SMD LED replace light bulbs

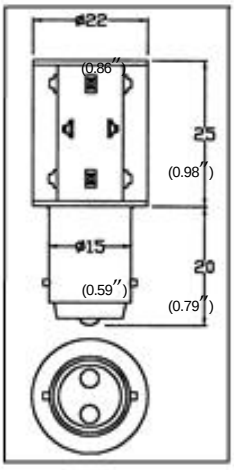
- Extremely long service life (> 50.000 hours)
- Low power consumption (e.g. 0.72 W at 24 V DC)
- Resistant to shock, vibration and flashing
- Selection of colors: white, yellow, red, blue and green

Same level of brightness at same level of voltage

- AC/DC operation
- Resistant to environmental influences

Colors (λp) chip structure	Voltage (V)	Current (mA)	Light intensity level (in Lm)
White x = 0.31 / Y = 0.32	24	30	6600
Ga N/AI	115	15	6600
	230	15	6600
Yellow / 520 nm	24	30	2500
Ga N/AiP	115	15	2500
	230	15	2500
Red / 645 nm	24	30	6000
Ga N/AiP	115	15	6000
	230	15	6000
Green / 520 nm	24	30	6600
Ga N/AI	115	15	6600
	230	15	6600
Blue / 468 nm	24	30	6600
Ga N/AI	115	15	6600
	230	15	6600

Electro-optical characteristics data measured at Tu = 25 °C
Maximum overvoltage 5%
Storage temperature: -30 °C ~ 90 °C
Operating temperature: -30 °C ~ 60 °C



300 Roundhill Drive, Unit 4, Rockaway, NJ 07866
Telephone – (973) 586-2500 FAX – (973) 596-1590
E-Mail – info@norstat.com Website – www.norstat.com

Norstat Signal Products

PF BR50 Stack Lights Part Description

	Description	Part name & number		
	Terminal Base Element	BR50-BC	28250010000	
	Buzzer/Acoustic Module	BR50-SM-24V	28250088000	
	Buzzer/Acoustic Module	BR50-SM-115V	28250081600	
	Buzzer/Acoustic Module	BR50-SM-230V	28250081000	
	Clear Lens Element 12-240V	BR50-CL-CL	28250040010	
	Yellow lens Element 12-240V	BR50-CL-YE	28250040030	
	Amber Lens Element 12-240V	BR50-CL-AM	28250040040	
	Red Lens Element 12-240V	BR50-CL-RE	28250040050	
	Green Lens Element 12-240V	BR50-CL-GR	28250040060	
	Blue Lens Element 12-240V	BR50-CL-BL	28250040070	
	Flashing Light Module Clear 24V	BR50-FL-CL-24V	28250078010	
	Flashing Light Module Yellow 24V	BR50-FL-YE-24V	28250078030	
	Flashing Light Module Amber 24V	BR50-FL-AM-24V	28250078040	
	Flashing Light Module Red 24V	BR50-FL-RE-24V	28250078050	
	Flashing Light Module Green 24V	BR50-FL-GR-24V	28250078060	
	Flashing Light Module Blue 24V	BR50-FL-BL-24V	28250078070	
	Flashing Light Module Clear 115V	BR50-FL-CL-115V	28250071610	
	Flashing Light Module Yellow 115V	BR50-FL-YE-115V	28250071630	
	Flashing Light Module Amber 115V	BR50-FL-AM-115V	28250071640	
	Flashing Light Module Red 115V	BR50-FL-RE-115V	28250071650	
	Flashing Light Module Green 115V	BR50-FL-GR-115V	28250071660	
	Flashing Light Module Blue 115V	BR50-FL-BL-115V	28250071670	
	Flashing Light Module Clear 230V	BR50-FL-CL-230V	28250071010	
	Flashing Light Module Yellow 230V	BR50-FL-YE-230V	28250071030	
	Flashing Light Module Amber 230V	BR50-FL-AM-230V	28250071040	
	Flashing Light Module Red 230V	BR50-FL-RE-230V	28250071050	
	Flashing Light Module Green 230V	BR50-FL-GR-230V	28250071060	
	Flashing Light Module Blue 230V	BR50-FL-BL-230V	28250071070	
	Blinking Light Module Clear 24V	BR50-BL-CL-24V	28250058010	
	Blinking Light Module Yellow 24V	BR50-BL-YE-24V	28250058030	
	Blinking Light Module Amber 24V	BR50-BL-AM-24V	28250058040	
	Blinking Light Module Red 24V	BR50-BL-RE-24V	28250058050	
	Blinking Light Module Green 24V	BR50-BL-GR-24V	28250058060	
	Blinking Light Module Blue 24V	BR50-BL-BL-24V	28250058070	
	Blinking Light Module Clear 115V	BR50-BL-CL 115	28250051610	
	Blinking Light Module Yellow 115V	BR50-BL-YE 115	28250051630	
	Blinking Light Module Amber 115V	BR50-BL-AM 115	28250051640	

	Blinking Light Module Red 115V	BR50-BL-RE 115	28250051650	
	Blinking Light Module Green 115V	BR50-BL-GR 115	28250051660	
	Blinking Light Module Blue 230V	BR50-BL-BL 115	28250051670	
	Blinking Light Module Clear 230V	BR50-BL-CL-230V	28250051010	
	Blinking Light Module Yellow 230V	BR50-BL-YE-230V	28250051030	
	Blinking Light Module Amber 230V	BR50-BL-AM-230V	28250051040	
	Blinking Light Module Red 230V	BR50-BL-RE-230V	28250051050	
	Blinking Light Module Green 230V	BR50-BL-GR-230V	28250051060	
	Blinking Light Module Blue 230V	BR50-BL-BL-230V	28250051070	
	Tubular Stand w Metal Base 100mm	BR50-S100	28250150010	
	Tubular Stand w Metal Base 250mm	BR50-S250	28250150020	
	Tubular Stand w Metal Base 400mm	BR50-S400	28250150040	
	Tubular Stand w Angle Bracket 100mm	BR50-T100	28250160010	
	Tubular Stand w Angle Bracket 250mm	BR50-T250	28250160020	
	Tubular Stand w Angle Bracket 400mm	BR50-T400	28250160040	
	Plastic Wall Mounting Stand	BR50-W	28250200000	
	Gasket Mounting Kit	BR50-BG	28250210000	
	Terminal Base Gasket kit	BR50-MG	28250220000	
	Bulb Removal Tool	BR50-LS	28250250000	

BR50 Bulbs

	LED Bulb BA 15d Clear 24V	BR50-LED 24V transp	28213000006	
	LED Bulb BA 15d Clear 115-230V	BR50-LED 115-230V transp	28213000022	
	LED Bulbs available in colors same price as above			
	Bulb	BR50-L 24V/7W BA15d	28213000000	
	Bulb	BR50-L 115V/7W BA15d	28213000002	
	Bulb	BR50-L 230V/7W BA15d	28213000004	

300 Roundhill Drive, Unit 4, Rockaway, NJ 07866
Telephone – (973) 586-2500 FAX – (973) 596-1590
E-Mail – info@norstat.com Website – www.norstat.com

Automation Products

- Position Switches
- Footswitches

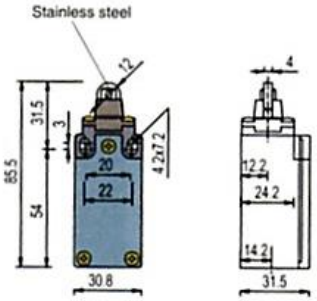
AUTOMATION

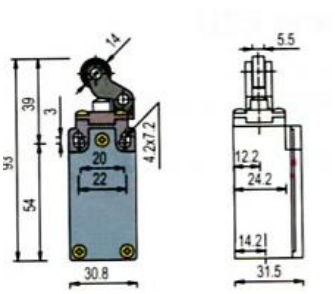
FR & FM Series Switches

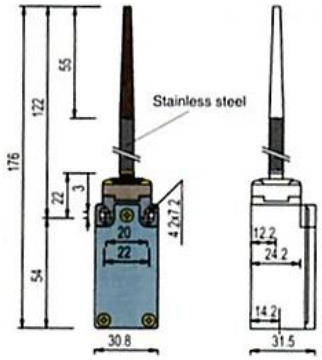
For Position & End of Travel Sensing

Top Mount Sensing

- *Pizzato offers a huge range of limit and position switches. Each switch is also available with several different contact options. All these switches are listed on their website: www.pizzato.com*
- *Most switches now feature bifurcated contacts. Each contact has two armature bridges and two sets of contact points. The resulting internal redundancy creates a huge increase in the life expectancy of the switches*
- *These switches are also available pre wired from the factory with M12 connectors*







Contacts	Plastic	Metal	Plastic	Metal	Plastic	Metal
1 NC – 1 NO Snap Action Positively Driven	FR 515	FM 515	FR 502	FM 502	FR 520	FM 520
2 NC – 1 NO Slow Action Positively Driven	FR 2015	FM 2015	FR 2002	FM 2002	FR 2020	FM 2020

Technical

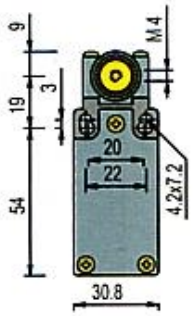
Material	Polymer or Coated Metal	Mechanical Endurance	1 Million Operations
Cable Entry	Pg 13.5	Max. Operation Frequency	3,600 Cycles Per Hour
Protection Rating	FR = IP65; FP = IP66	Max./Min. Actuator Speed	0.5 m/s – 1mm/s
NEMA Rating	1, 4X	Voltage Rating	400 V
Temperature Rating	-25°C to +80°C	Current Rating	10A

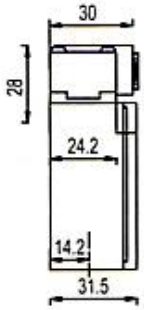
Additional products are available from the manufacturer. Please call us with your application needs.

FR & FM Switches

For Position & End of Travel Sensing
Switch Body and Actuator Sold Separately

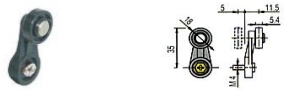
• Pizzato offers a huge range of limit and position switches.
Each switch is also available with several different contact options.
All these switches are listed on their website: www.pizzato.com
• Most switches now feature bifurcated contacts. Each contact has two armature bridges and two sets of contact points. The resulting internal redundancy creates a huge increase in the life expectancy of the switches

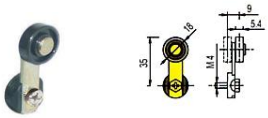


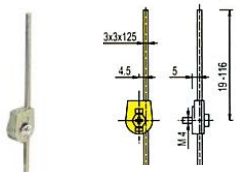


Switch Bodies	Plastic	Metal
1 NC – 1 NO Snap Action Positively Driven	FR 538	FM 538
2 NC – 1 NO Slow Action Positively Driven	FR 2038	FM 2038

Actuators

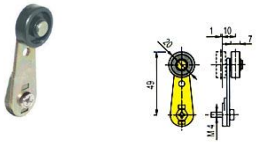

VF LE30

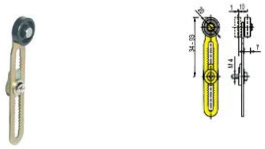

VF LE31


VF LE55

VF LE34

VF LE51


VF LE52


VF LE56

Technical

Material	Polymer or Coated Metal	Mechanical Endurance	1 Million Operations
Cable Entry	Pg 13.5	Max. Operation Frequency	3,600 Cycles Per Hour
Protection Rating	FR = IP65; FP = IP66	Max./Min. Actuator Speed	0.5 m/s – 1mm/s
NEMA Rating	1, 4X	Voltage Rating	400 V
Temperature Rating	-25°C to +80°C	Current Rating	10A

Additional products are available from the manufacturer. Please call us with your application needs.

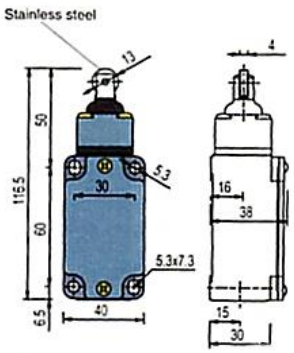
AUTOMATION

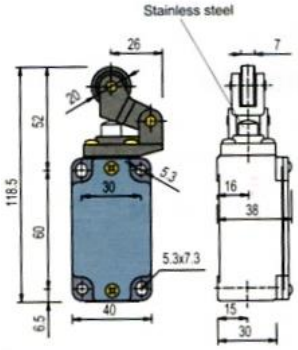
FP & FD Series Switches

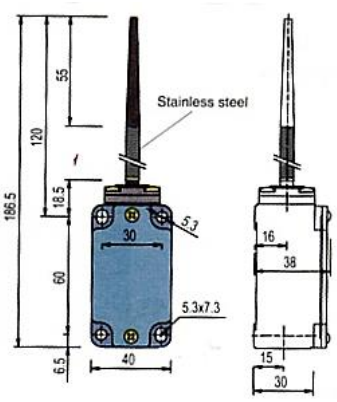
For Position & End of Travel Sensing

Top Mount Sensing

- *Pizzato offers a huge range of limit and position switches. Each switch is also available with several different contact options. All these switches are listed on their website: www.pizzato.com*
- *Most switches now feature bifurcated contacts. Each contact has two armature bridges and two sets of contact points. The resulting internal redundancy creates a huge increase in the life expectancy of the switches*
- *These switches are also available pre wired from the factory with M12 connectors*







Contacts	Plastic	Metal	Plastic	Metal	Plastic	Metal
1 NC – 1 NO Snap Action Positively Driven	FP 515	FD 515	FP 502	FD 502	FP 520	FD 520
2 NC – 1 NO Slow Action Positively Driven	FP 2015	FD 2015	FP 2002	FD 2002	FP 2020	FD 2020

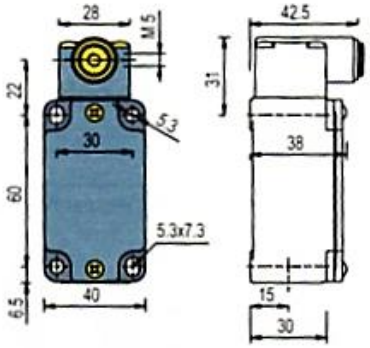
Technical			
Material	Polymer or Coated Metal	Mechanical Endurance	1 Million Operations
Cable Entry	Pg 13.5	Max. Operation Frequency	3,600 Cycles Per Hour
Protection Rating	FR = IP65; FP = IP66	Max./Min. Actuator Speed	0.5 m/s – 1mm/s
NEMA Rating	1, 4X	Voltage Rating	400 V
Temperature Rating	-25°C to +80°C	Current Rating	10A

Additional products are available from the manufacturer. Please call us with your application needs.

FP & FD Switches

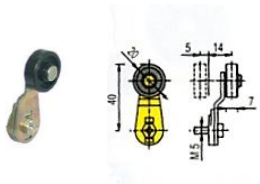
For Position & End of Travel Sensing
Switch Body and Actuator Sold Separately

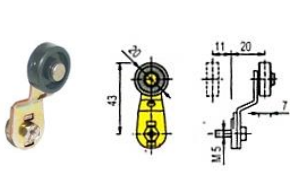
- *Pizzato offers a huge range of limit and position switches. Each switch is also available with several different contact options. All these switches are listed on their website: www.pizzato.com*
- *Most switches now feature bifurcated contacts. Each contact has two armature bridges and two sets of contact points. The resulting internal redundancy creates a huge increase in the life expectancy of the switches*

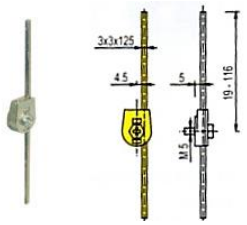


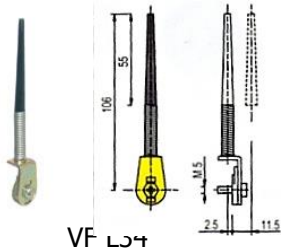
Switch Bodies	Plastic	Metal
1 NC – 1 NO Snap Action Positively Driven	FP 538	FD 538
2 NC – 1 NO Slow Action Positively Driven	FP 2038	FD 2038

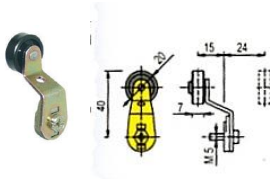
Actuators

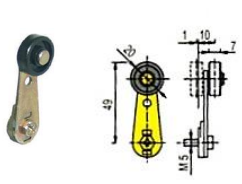

VF L31

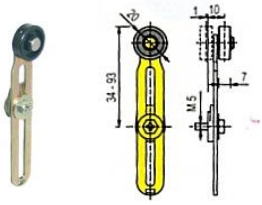

VF L57

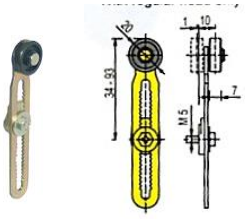

VF L33


VF L34


VF L51


VF L52


VF L35


VF L56

Technical

Material	Polymer or Coated Metal	Mechanical Endurance	1 Million Operations
Cable Entry	Pg 13.5	Max. Operation Frequency	3,600 Cycles Per Hour
Protection Rating	FR = IP65; FP = IP66	Max./Min. Actuator Speed	0.5 m/s – 1mm/s
NEMA Rating	1, 4X	Voltage Rating	400 V
Temperature Rating	-25°C to +80°C	Current Rating	10A

Additional products are available from the manufacturer. Please call us with your application needs.

AUTOMATION

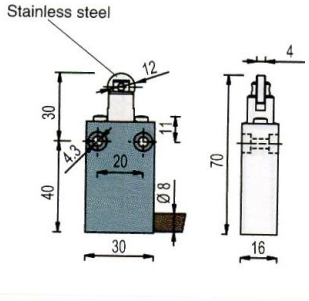
300 Roundhill Drive, Unit 4, Rockaway, NJ 07866
Telephone – (973) 586-2500 FAX – (973) 596-1590
E-Mail – info@norstat.com Website – www.norstat.com

FA-FB Switches

For Position & End of Travel Sensing With 2 Meter Cable Attached

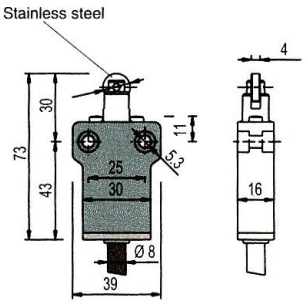
- *This series of switches is very popular because of their versatility and durability*
- *The housing is a very rugged cast metal, the contacts are fully enclosed, the cable is attached and then potted*
- *These switches are also available with M12 connectors*
- *A lower cost plastic body series is also available*

FA Series



Prewired With 2 Meter Cable

FB Series



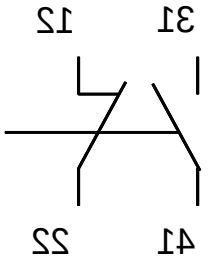
Prewired With 2 Meter Cable

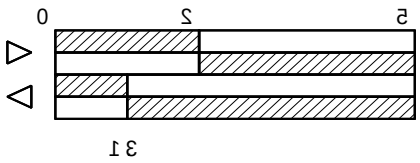
AUTOMATION

Part Number

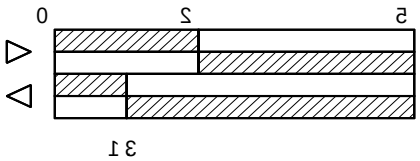
	FA 4115 2DN	FB 4115 2SN

Contacts





1 NO / 1 NC Snap Action



1 NO / 1 NC Snap Action

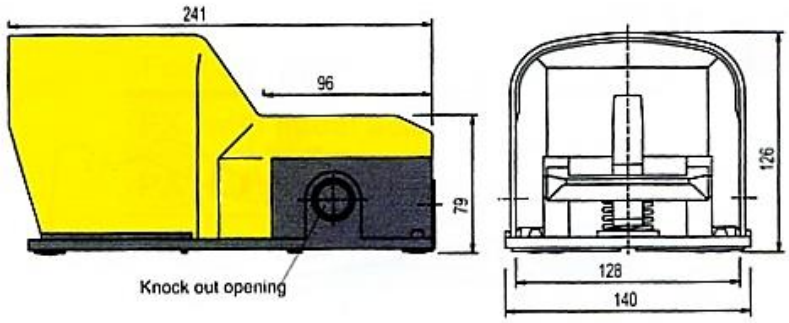
Technical

Material	Baked Epoxy Coated Metal	Mechanical Endurance	20 Million Operations
Protection Rating	P67	Max. Operation Frequency	3,600 Cycles Per Hour
NEMA Rating	4X, 6	Max./Min. Actuator Speed	0.5 m/s – 1mm/s
Temperature Rating	-25°C to +70°C	Voltage Rating	500 VAC / 600 VDC
Cable	18/5	Current Rating	10A
Approvals	CE, UL & cUL	Roller Material	Stainless Steel
Conforming to	UL 508	Operation Max. Speed	0.1 m/s with 30° cam
Utilization Categories	Q300, A600	Minimum Operation Force	10 N

Addtitonal products are available from the manufacturer. Please call us with your application needs.

300 Roundhill Drive, Unit 4, Rockaway, NJ 07866
Telephone – (973) 586-2500 FAX – (973) 596-1590
E-Mail – info@norstat.com Website – www.norstat.com

Footswitches
Reinforced Thermoplastic With Cover

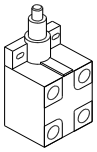
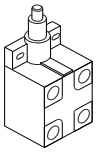
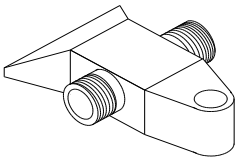


These plastic covered footswitches are designed for industrial applications. Many customers are getting away from the typical big metal bulletproof footswitches, in favor of these much more reasonably priced alternatives.

Contacts & Part Number

1 NC / 1 NO	**PX 10100**
Snap Action with positively driven back up of the NC contact	

Accessories & Part Numbers

Extra Contact Set An extra block can be mounted in the footswitch to provide additional contacts	VF B501 1 NC / 1 NO Contacts Snap Action with positively driven back up of the NC contact 	VF B901 2 NO Contacts Slow Action with both contacts positively driven 
Joiner Kit Joiner kits can be used to connect several footswitches into one multiple pedal unit	VF KIT 20 	

Technical

Material	Glass Reinforced Thermoplastic	Mechanical Endurance	20 Million Operations
Cable Entry	Pg 13.5 in back	Max. Operation Frequency	3,600 Cycles Per Hour
Additional Entry	1 Knockout on each side	Actuation Force	16 N
Protection Rating	IP 65	Voltage Rating	500 VAC / 600 VDC
Temperature Rating	-25°C to +80°C	Current Rating	10A

Additional products are available from the manufactruer. Please call us with your application needs.

300 Roundhill Drive, Unit 4, Rockaway, NJ 07866
Telephone – (973) 586-2500 FAX – (973) 596-1590
E-Mail – info@norstat.com Website – www.norstat.com

Accessories

To Complete Your Installation
Connectors, Cable Glands, Adaptors & Lights

AUTOMATION

M12 Male Switch Connector

M12 Connector With Pg13 Thread and 3 ½" Leads

Number of Poles	Part Number
4	VF CNP4PM
5	VF CNP5PM
8	VF CNP8PM

Female Cable Assemblies

M12 Molded Assembly With 3 Meter PVC Cable

Number of Poles	Part Number
4	*VF CA4PD3M*
5	*VF CA5PD3M*
8	*VF CA8PD3M*

Cable Glands

Plastic Cable Glands with Wire Trap

Thread Size	Cable Range	Part Number
Pg 13.5	6 to 12 mm	VF PAP13C6N
Pg 11	5 to 10 mm	VF PAP11C5N
M20 x 1.5	6 to 12 mm	VF PAM20C6N
M16 x 1.5	5 to 10 mm	VF PAM16C5N

Adaptors

Plastic Adaptors for NPT, PG & Metric Threads

Male Thread	Female Thread	Part Number
Pg 13.5	Pg 11	VF ADPG13-11
Pg 13.5	M20 x 1.5	VF ADPG13-M20
Pg 13.5	½" NPT	VF ADPG13-1/2NPT
Pg 11	½" NPT	VF ADPG11-1/2NPT
Pg 11	Pg 13.5	VF ADPG11-PG13

Protection Caps

Plastic Threaded Cap

Thread Size	Part Number
Pg 13.5	VF PTG13.5
M20 x 1.5	VF PTM20
Pg 11	VF PTG11
M16 x 1.5	VF PTM 16

Technical Information

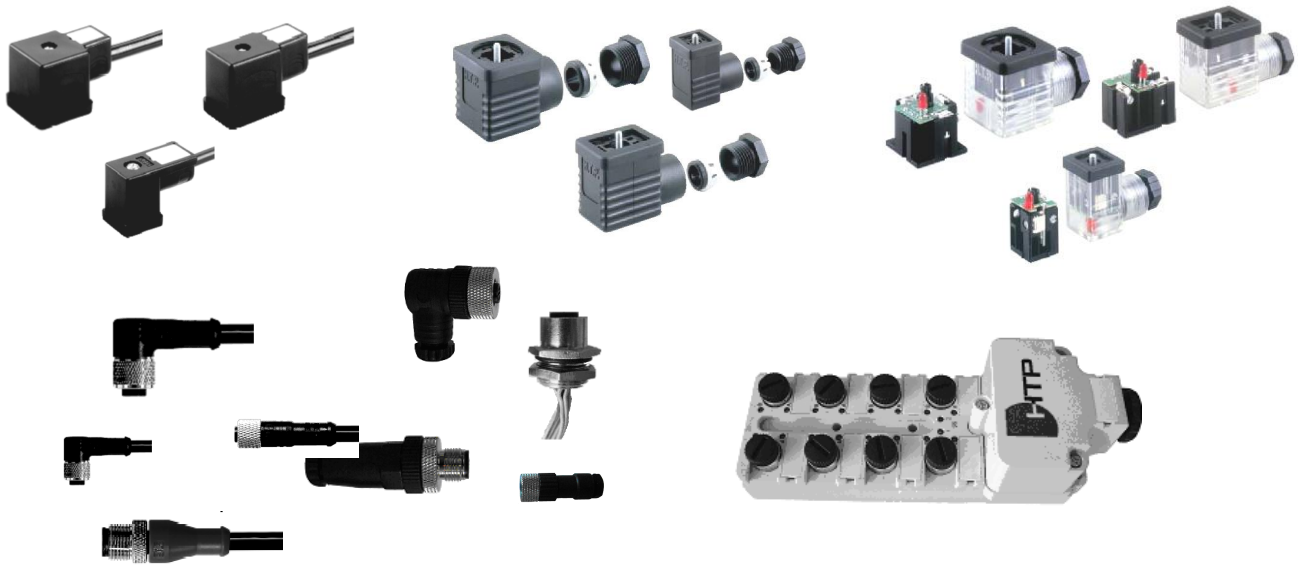
Yellow Incandescent Light with Pg 13.5 Thread

Voltage	Part Number
24 VAC/DC	VF ILI024GP
110 VAC/DC	VF ILI110GP

Additional products are available from the manufacturer. Please call us with your application needs.

300 Roundhill Drive, Unit 4, Rockaway, NJ 07866
Telephone – (973) 586-2500 FAX – (973) 596-1590
E-Mail – info@norstat.com Website – www.norstat.com

Molded Cable Assemblies, Connectors and Distribution Boxes

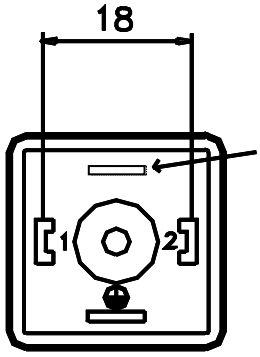


- DIN 43650 Molded Assemblies
- DIN 43650 Connectors
- M12 & M8 Molded Assemblies
- M12 & M8 Connectors
- Distribution Boxes

300 Roundhill Drive, Unit 4, Rockaway, NJ 07866
Telephone – (973) 586-2500 FAX – (973) 596-1590
E-Mail – info@norstat.com Website – www.norstat.com

DIN 43650 – 18mm
Molded Cable Assemblies
For Solenoid Valve Applications

See page 06.15 for application information

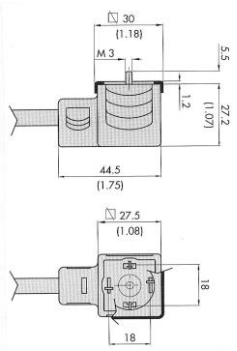


DUAL JUMPED GROUND PINS – Molded cable assemblies can be mounted with cable exiting the ground side or opposite.

* Four wire units have one ground pin and 3 "U" shaped pins. Cable exit direction must be specified.

Molded Cable Assemblies

Black PVC Cable & Connector



3 Pole (2 "U" pins & 2 Flat GNDs)

Part Numbers	Cable Length	Poles	
0 to 250 VAC/DC	3 Meter (9.8 Feet)	3	CG1-N02-000-C02-3N
	5 Meter (16.4 Feet)	3	CG1-N02-000-C02-5N
	3 Meter (9.8 Feet)	4*	CG1-N03-000-B01-3N
Without LED & Suppression	5 Meter (16.4 Feet)	4*	CG1-N03-000-B01-5N
12 to 24 VAC/DC	3 Meter (9.8 Feet)	3	CG1-N02-VL1-C02-3N
	5 Meter (16.4 Feet)	3	CG1-N02-VL1-C02-5N
With LED & Suppression			
110 to 120 VAC/DC	3 Meter (9.8 Feet)	3	CG1-N02-VL2-C02-3N
	5 Meter (16.4 Feet)	3	CG1-N02-VL2-C02-5N
With LED & Suppression			

ASSEMBLIES

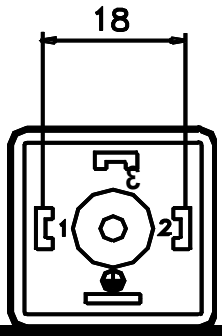
Technical

Connection Voltage	As Listed in Drawing	***Cable Type***	HO5VVF
Nominal Power	10A	Jacket Material	Black PVC
Test Voltage	250VAC - 300 VDC max.	Conductor Size	18/3 AWG
Insulation Group	VDC 0110 1/89 Class C	Conductor Color	Brn, Blue, (Black), Grn/Yel
Clamping Voltage 24V	42V	Nominal Cable OD	6.7mm
Clamping Voltage 110V	185V	Bend Radius	10 X Cable OD
Connector Material	Glass Reinforced Polypropylene	Center Screw	M3 x 28.7mm
Protection Rating	IP 67	Temperature Range	-5° to +70° C
Contact Resistance	$\leq$ 4 mΩ		

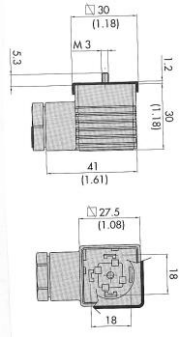
Additional products are available from the manufacturer. Please call us with your application needs.

DIN 43650 – 18mm
Connectors
For Solenoid Valve Applications

See page 06.15 for application information



Connectors



Part Numbers	Poles	Gland Size	12-24V	110-130V
Without Components	3	Pg 9/11 (.23" to .43")	G1-NU2-000	G1-NU2-000
	3	½" NPT	G1-NF2-000	G1-NF2-000
	4	Pg 9/11 (.23" to .43")	G1-NU3-000	G1-NU3-000
	4	½" NPT	G1-NF3-000	G1-NF3-000
LED Only	3	Pg 9/11 (.23" to .43")	G1-TU2-L01	G1-TU2-LO2
	3	½" NPT	G1-TF2-L01	G1-TF2-LO2
Varistor & LED	3	Pg 9/11 (.23" to .43")	G1-TU2-VL1	G1-TU2-VL2
	3	½" NPT	G1-TF2-VL1	G1-TF2-VL2
Diode & LED	3	Pg 9/11 (.23" to .43")	G1-TU2-DL1	G1-TU2-DL2
	3	½" NPT	G1-TF2-DL1	G1-TF2-DL2
Rectifier	3	Pg 9/11 (.23" to .43")		G1-TU2-RL2
	3	½" NPT		G1-TF2-RL2

Technical

Connection Voltage	As Listed in Drawing	Max Wire Size	16 AWG
Nominal Power	10A (16A Maximum)	Center Screw	M3 x 32.5mm
Insulation Group	VDC 0110 1/89 Class C	Temperature Range	-2° to +176° F
Connector Material	Glass Reinforced Polypropylene	Varistor Clamp – 24/110	42V / 185V
Protection Rating	IP 65	Diode Type	1N4007
Contact Resistance	≤ 4 mΩ	Rectifier Factor	X .9

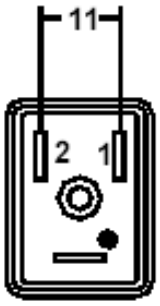
Additional products are available from the manufacturer. Please call us with your application needs.

ASSEMBLIES

300 Roundhill Drive, Unit 4, Rockaway, NJ 07866
Telephone – (973) 586-2500 FAX – (973) 596-1590
E-Mail – info@norstat.com Website – www.norstat.com

Industrial Form B – 11mm
Molded Cable Assemblies
For Solenoid Valve Applications

See page 06.15 for application information

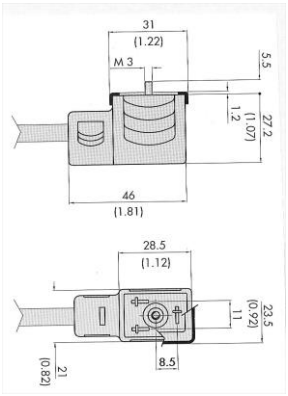


Actual Size

GROUND PIN LOCATION must be specified. Position is noted looking at the face of the connector with the cable exiting down. In the 6:00 position the ground pin is at the bottom. In the 12:00 position the ground pin is at the top

Molded Cable Assemblies

Black PVC Cable & Connector



Part Numbers	Cable Length	12:00 (Ground Up)	6:00 (Ground Down)
0 to 250 VAC/DC	3 Meter (9.8 Feet)	CM1-N02-000-B02-3N	CM1-N02-000-A02-3N
	5 Meter (16.4 Feet)	CM1-N02-000-B02-5N	CM1-N02-000-A02-5N
Without LED & Suppression			
12 to 24 VAC/DC	3 Meter (9.8 Feet)	CM1-N02-VL1-B02-3N	CM1-N02-VL1-A02-3N
	5 Meter (16.4 Feet)	CM1-N02-VL1-B02-5N	CM1-N02-VL1-A02-5N
With LED & Suppression			
110 to 120 VAC/DC	3 Meter (9.8 Feet)	CM1-N02-VL2-B02-3N	CM1-N02-VL2-A02-3N
	5 Meter (16.4 Feet)	CM1-N02-VL2-B02-5N	CM1-N02-VL2-A02-5N
With LED & Suppression			

Technical

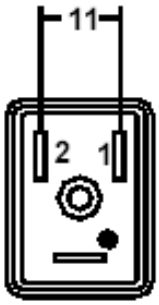
Connection Voltage	As Listed in Drawing	***Cable Type***	HO5VVF
Nominal Power	10A	Jacket Material	Black PVC
Test Voltage	250VAC - 300 VDC max.	Conductor Size	18/3 AWG
Insulation Group	VDC 0110 1/89 Class C	Conductor Color	Brown, Blue, Grn/Yel
Clamping Voltage 24V	42V	Nominal Cable OD	6.7mm
Clamping Voltage 110V	185V	Bend Radius	10 X Cable OD
Connector Material	Glass Reinforced Polypropylene	Center Screw	M3 x 28.7mm
Protection Rating	IP 65; IP 67 on Request	Temperature Range	-2° to +176° F
Contact Resistance	< 4 mΩ		

Additional products are available from the manufacturer. Please call us with your application needs.

300 Roundhill Drive, Unit 4, Rockaway, NJ 07866
Telephone – (973) 586-2500 FAX – (973) 596-1590
E-Mail – info@norstat.com Website – www.norstat.com

Industrial Form B – 11mm
Connectors
For Solenoid Valve Applications

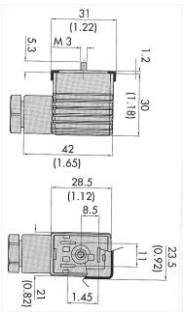
See page 06.15 for application information

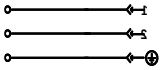
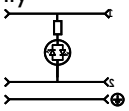
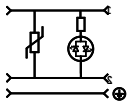
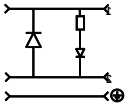


Actual Size

GROUND PIN LOCATION can be rotated 180° when the connector is wired.

Connectors



Part Numbers	Poles	Gland Size	12-24V	110-130V
Without Components 	3	Pg9 (.24" to .32")	M1-NS2-000	M1-NS2-000
LED Only 	3	Pg9 (.24" to .32")	M1-TS2-L01	M1-TS2-L02
Varistor & LED 	3	Pg9 (.24" to .32")	M1-TS2-VL1	M1-TS2-VL2
Diode & LED 	3	Pg9 (.24" to .32")	M1-TS2-DL1	M1-TS2-DL2

ASSEMBLIES

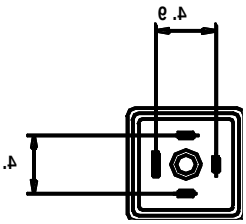
Technical			
Connection Voltage	As Listed in Drawing	Max Wire Size	16 AWG
Nominal Power	10A (16A Maximum)	Center Screw	M3 x 32.5mm
Insulation Group	VDC 0110 1/89 Class C	Temperature Range	-2° to +176° F
Connector Material	Glass Reinforced Polypropylene	Varistor Clamp – 24/110	42V / 185V
Protection Rating	IP 65	Diode Type	1N4007
Contact Resistance	≤ 4 mΩ	Rectifier Factor	X .9

Additional products are available from the manufacturer. Please call us with your application needs.

300 Roundhill Drive, Unit 4, Rockaway, NJ 07866
Telephone – (973) 586-2500 FAX – (973) 596-1590
E-Mail – info@norstat.com Website – www.norstat.com

Industrial Form C – 9.4mm
Molded Cable Assemblies
For Solenoid Valve Applications

See page 06.15 for application information

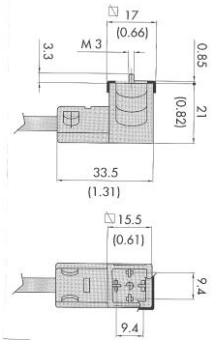


DUAL JUMPED GROUND PINS – Molded cable assemblies can be mounted with cable exiting the ground side or opposite.

* Four wire units have one ground pin and 3 "U" shaped pins. Cable exit direction must be specified.

Molded Cable Assemblies

Black PVC Cable & Connector



3 Pole (3 Flat Pins)

Part Numbers	Cable Length	Poles	
0 to 250 VAC/DC	3 Meter (9.8 Feet)	3	CP2-N02-000-C01-3
	5 Meter (16.4 Feet)	3	CP2-N02-000-C01-5
	3 Meter (9.8 Feet)	4*	
Without LED & Suppression	5 Meter (16.4 Feet)	4*	
12 to 24 VAC/DC	3 Meter (9.8 Feet)	3	CP2-N02-VL1-C01-3
	5 Meter (16.4 Feet)	3	CP2-N02-VL1-C01-5
With LED & Suppression			
110 to 120 VAC/DC	3 Meter (9.8 Feet)	3	CP2-N02-VL2-C01-3
	5 Meter (16.4 Feet)	3	CP2-N02-VL2-C01-5
With LED & Suppression			

Technical

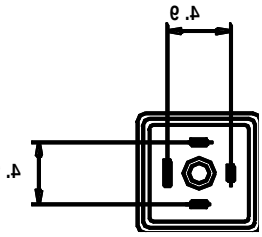
Connection Voltage	As Listed in Drawing	***Cable Type***	HO3VVF
Nominal Power	3A	Jacket Material	Black PVC
Test Voltage	250VAC - 300 VDC max.	Conductor Size	20/3 AWG
Insulation Group	VDC 0110 1/89 Class C	Conductor Color	Brn, Blue, (Blk), Grn/Yel
Clamping Voltage 24V	42V	Nominal Cable OD	6.7mm
Clamping Voltage 110V	185V	Bend Radius	10 X Cable OD
Connector Material	Glass Reinforced Polypropylene	Center Screw	M3 x 21.5mm
Protection Rating	IP 65; IP 67 on Request	Temperature Range	-2° to +176° F
Contact Resistance	≤ 4 mΩ		

Additional products are available from the manufacturer. Please call us with your application needs.

300 Roundhill Drive, Unit 4, Rockaway, NJ 07866
Telephone – (973) 586-2500 FAX – (973) 596-1590
E-Mail – info@norstat.com Website – www.norstat.com

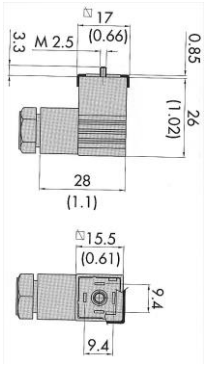
Industrial Form C – 9.4mm
Connectors
For Solenoid Valve Applications

See page 06.15 for application information



GROUND PIN LOCATION can be rotated 90° when the connector is wired.

Connectors



Part Numbers	Poles	Gland Size	12-24V	110-130V
Without Components	3	Pg9 (.24" to .32")	P2-NZ2-000	P2-NZ2-000
	4	Pg9 (.24" to .32")	P2-NZ3-000	P2-NZ3-000
LED Only	3	Pg9 (.24" to .32")	P2-TZ2-L01	P2-TZ2-L02
Varistor & LED	3	Pg9 (.24" to .32")	P2-TZ2-VL1	P2-TZ2-VL2
Diode & LED	3	Pg9 (.24" to .32")	P2-TZ2-DL1	P2-TZ2-DL2

ASSEMBLIES

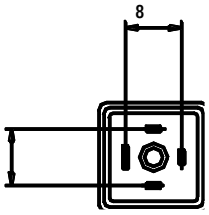
Technical			
Connection Voltage	As Listed in Drawing	Max Wire Size	16 AWG
Nominal Power	10A (16A Maximum)	Center Screw	M3 x 28.5mm
Insulation Group	VDC 0110 1/89 Class C	Temperature Range	-2° to +176° F
Connector Material	Glass Reinforced Polypropylene	Varistor Clamp – 24/110	34V / 185V
Protection Rating	IP 65; IP 67 on Request	Diode Type	1N4007
Contact Resistance	≤ 4 mΩ	Rectifier Factor	X .9

Additional products are available from the manufacturer. Please call us with your application needs.

300 Roundhill Drive, Unit 4, Rockaway, NJ 07866
Telephone – (973) 586-2500 FAX – (973) 596-1590
E-Mail – info@norstat.com Website – www.norstat.com

DIN 43650C – 8mm
Molded Cable Assemblies
For Solenoid Valve Applications

See page 06.15 for application information

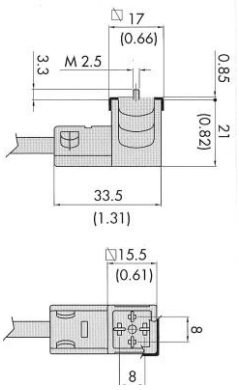


DUAL JUMPED GROUND PINS – Molded cable assemblies can be mounted with cable exiting the ground side or opposite.

* Four wire units have one ground pin and 3 "U" shaped pins. Cable exit direction must be specified.

Molded Cable Assemblies

Black PVC Cable & Connector



3 Pole (3 Flat Pins)

Part Numbers	Cable Length	Poles	
0 to 250 VAC/DC	3 Meter (9.8 Feet)	3	CP1-N02-000-C01-3
	5 Meter (16.4 Feet)	3	CP1-N02-000-C01-5
	3 Meter (9.8 Feet)	4*	
Without LED & Suppression	5 Meter (16.4 Feet)	4*	
12 to 24 VAC/DC	3 Meter (9.8 Feet)	3	CP1-N02-VL1-C01-3
	5 Meter (16.4 Feet)	3	CP1-N02-VL1-C01-5
With LED & Suppression			
110 to 120 VAC/DC	3 Meter (9.8 Feet)	3	CP1-N02-VL2-C01-3
	5 Meter (16.4 Feet)	3	CP1-N02-VL2-C01-5
With LED & Suppression			

Technical

Connection Voltage	As Listed in Drawing	***Cable Type***	HO3VVF
Nominal Power	3A	Jacket Material	Black PVC
Test Voltage	250VAC - 300 VDC max.	Conductor Size	20/3 AWG
Insulation Group	VDC 0110 1/89 Class C	Conductor Color	Brn, Blue, (Blk), Grn/Yel
Clamping Voltage 24V	34V	Nominal Cable OD	6.7mm
Clamping Voltage 110V	185V	Bend Radius	10 X Cable OD
Connector Material	Glass Reinforced Polypropylene	Center Screw	M2.5 x 21.5mm
Protection Rating	IP 65; IP 67 on Request	Temperature Range	-2° to +176° F
Contact Resistance	≤ 4 mΩ		

Additional products are avaialble from the factory. Please call us with your application needs.

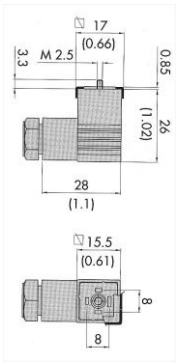
300 Roundhill Drive, Unit 4, Rockaway, NJ 07866
Telephone – (973) 586-2500 FAX – (973) 596-1590
E-Mail – info@norstat.com Website – www.norstat.com

DIN43650C – 8mm
Connectors
For Solenoid Valve Applications

See page 06.15 for application information

GROUND PIN LOCATION can be rotated 90° when the connector is wired.

Connectors



Part Numbers	Poles	Gland Size	12-24V	110-130V
Without Components	3	Pg9 (.24" to .32")	P1-NZ2-000	P1-NZ2-000
	4	Pg9 (.24" to .32")	P1-NZ3-000	P1-NZ3-000
LED Only	3	Pg9 (.24" to .32")	P1-TZ2-L01	P1-TZ2-L02
Varistor & LED	3	Pg9 (.24" to .32")	P1-TZ2-VL1	P1-TZ2-VL2
Diode & LED	3	Pg9 (.24" to .32")	P1-TZ2-DL1	P1-TZ2-DL2

ASSEMBLIES

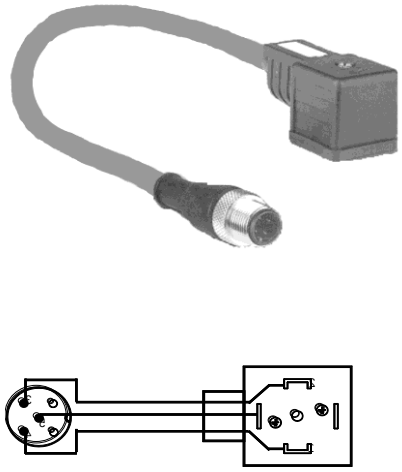
Technical			
Connection Voltage	As Listed in Drawing	Max Wire Size	16 AWG
Nominal Power	10A (16A Maximum)	Center Screw	M3 x 28.5mm
Insulation Group	VDC 0110 1/89 Class C	Temperature Range	-2° to +176° F
Connector Material	Glass Reinforced Polypropylene	Varistor Clamp – 24/110	34V / 185V
Protection Rating	IP 65; IP 67 on Request	Diode Type	1N4007
Contact Resistance	≤ 4 mΩ	Rectifier Factor	X .9

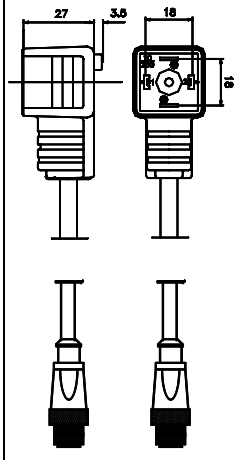
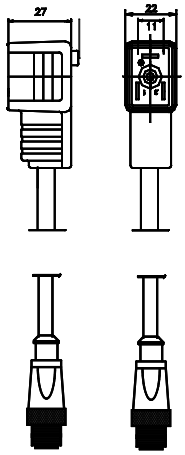
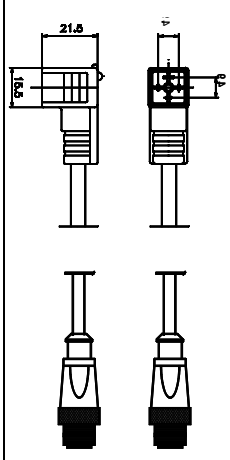
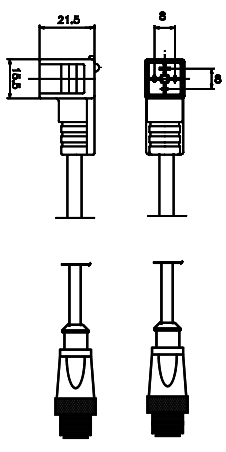
Additional products are available from the manufacturer. Please call us with your application needs.

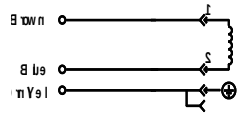
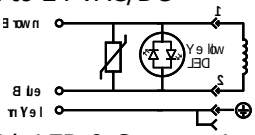
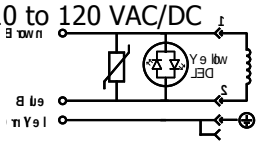
300 Roundhill Drive, Unit 4, Rockaway, NJ 07866
Telephone – (973) 586-2500 FAX – (973) 596-1590
E-Mail – info@norstat.com Website – www.norstat.com

DIN 43650 to M12
Molded Cable Assemblies
For Distribution Box Applications

See page 06.15 for application information



	DIN 43650 A 18mm	**Industrial Form B** 11mm	**Industrial Form C** 9.4mm	**DIN 43650 C** 8mm
				
	Dual Ground	Ground Up	Dual Ground	Dual Ground

Part Numbers	**Length**				
0 to 250 VAC/DC  Without LED & Suppression	.5 Meter 1.6 Feet	12MD3-CG1-N02-000-C02-E	12MD3-CM1-N02-000-B02-E	12MD3-CP2-N02-000-C01-E	12MD3-CP1-N02-000-C01-E
12 to 24 VAC/DC  With LED & Suppression	.5 Meter 1.6 Feet	12MD3-CG1-N02-VL1-C02-E	12MD3-CM1-N02-VL1-B02-E	12MD3-CP2-N02-VL1-C01-E	12MD3-CP1-N02-VL1-C01-E
110 to 120 VAC/DC  With LED & Suppression	.5 Meter 1.6 Feet	12MD3-CG1-N02-VL2-C02-E	12MD3-CM1-N02-VL2-B02-E	12MD3-CP2-N02-VL2-C01-E	12MD3-CP1-N02-VL2-C01-E

Technical

Connection Voltage	As Listed in Drawing	***Cable Type***	HO5VVF or HO3VVF
Nominal Power	3A	Jacket Material	Black PVC
Test Voltage	250VAC - 300 VDC max.	Conductor Size	18/3 or 20/3
Insulation Group	VDC 0110 1/89 Class C	Conductor Color	Brn, Blue, (Blk), Grn/Yel
Clamping Voltage 24V	34V	Nominal Cable OD	6.7mm
Clamping Voltage 110V	185V	Bend Radius	10 X Cable OD
Connector Material	Glass Reinforced Polypropylene	Center Screw	Depending on Connector
Protection Rating	IP 65; IP 67 on Request	Temperature Range	-2° to +176° F
Contact Resistance	≤ 4 mΩ		

Additional products are avaialble from the factory. Please call us with your application needs.

ASSEMBLIES

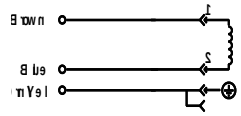
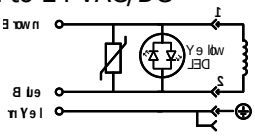
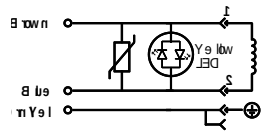
300 Roundhill Drive, Unit 4, Rockaway, NJ 07866
Telephone – (973) 586-2500 FAX – (973) 596-1590
E-Mail – info@norstat.com Website – www.norstat.com

Multiple Connector Assemblies
Molded Cable Assemblies
For Distribution Box Applications

See page 06.15 for application information

Distance between connectors = 7.9" (200mm)
(Other lengths available upon request).

Standard main cable length = 3.3 Feet (1 Meter)
(Other lengths available upon request)

Part Numbers	Heads	DIN 43650 A 18mm Dual Ground	**Industrial Form B** 11mm Ground Up	**Industrial Form C** 9.4mm Dual Ground	**DIN 43650 C** 8mm Dual Ground
0 to 250 VAC/DC  Without LED & Suppression	2	CG1-D02-000-C02-1	CM1-D02-000-B02-1	CP2-D02-000-C02-1	CP1-D02-000-C02-1
	3	CG1-302-000-C02-1	CM1-302-000-B02-1	CP2-302-000-C02-1	CP1-302-000-C02-1
	4	CG1-402-000-C02-1	CM1-402-000-B02-1	CP2-402-000-C02-1	CP1-402-000-C02-1
12 to 24 VAC/DC  With LED & Suppression	2	CG1-D02-VL1-C02-1	CM1-D02-VL1-B02-1	CP2-D02-VL1-C02-1	CP1-D02-VL1-C02-1
	3	CG1-302-VL1-C02-1	CM1-302-VL1-B02-1	CP2-302-VL1-C02-1	CP1-302-VL1-C02-1
	4	CG1-402-VL1-C02-1	CM1-402-VL1-B02-1	CP2-402-VL1-C02-1	CP1-402-VL1-C02-1
110 to 120 VAC/DC  With LED & Suppression	2	CG1-D02-VL2-C02-1	CM1-D02-VL2-B02-1	CP2-D02-VL2-C02-1	CP1-D02-VL2-C02-1
	3	CG1-302-VL2-C02-1	CM1-302-VL2-B02-1	CP2-302-VL2-C02-1	CP1-302-VL2-C02-1
	4	CG1-402-VL2-C02-1	CM1-402-VL2-B02-1	CP2-402-VL2-C02-1	CP1-402-VL2-C02-1

Technical

Connection Voltage	As Listed in Drawing	***Cable Type***	HO5VVF or HO3VVF
Nominal Power	3A	Jacket Material	Black PVC
Test Voltage	250VAC - 300 VDC max.	Conductor Size	18/3 or 20/3
Insulation Group	VDC 0110 1/89 Class C	Conductor Color	Brn, Blue, (Blk), Grn/Yel
Clamping Voltage 24V	34V	Nominal Cable OD	6.7mm
Clamping Voltage 110V	185V	Bend Radius	10 X Cable OD
Connector Material	Glass Reinforced Polypropylene	Center Screw	Depending on Connector
Protection Rating	IP 65; IP 67 on Request	Temperature Range	-2° to +176° F
Contact Resistance	$\leq$ 4 mΩ		

Additional products are avaialble from the factory. Please call us with your application needs.

300 Roundhill Drive, Unit 4, Rockaway, NJ 07866
Telephone – (973) 586-2500 FAX – (973) 596-1590
E-Mail – info@norstat.com Website – www.norstat.com

Accessories
For Connectors and Molded Cable Assemblies

See page 06.15 for application information

Center Screws

Size	Used for	Plated Screw
M2.5 x 21.5	8mm Molded	500-015-000
M2.5 x 28.5	8mm Connectors	500-015-00A
M3 x 21.5	9.5mm Molded	650-015-000
M3 x 28.7	9.5mm Connectors	200-015-00A
M3 x 28.5	18mm, 11mm, 10mm Molded	700-015-00B
M3 x 32.5	18mm, 11mm, 10mm Connectors	100-015-000

Gaskets

DIN 43650 A 18mm		**Industrial Form B 11mm**		**DIN 43650 C & Micro Mini 8mm & 9.4mm**	
Flat	Sectional	Flat	Sectional	Flat	Sectional
Nitrile Rubber 100-014-00A	**Nitrile Rubber** **100-013-000**	**Nitrile Rubber** 300-014-00A	**Nitrile Rubber** 300-013-00A	**Nitrile Rubber** 500-014-00A	**Nitrile Rubber** 500-013-000
Silicone 100-121-000	Silicone 100-123-000	Silicone 300-121-000	Silicone 300-123-000	Silicone 500-121-000	Silicone 500-123-000

Label Plate

Label Plate used on all versions of the molded cable assemblies

200-007-000

Center Screw Washer

Plastic Washer used with the center screw to provide extra sealing capacity

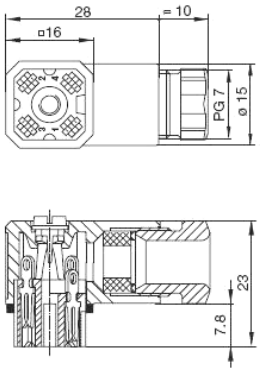
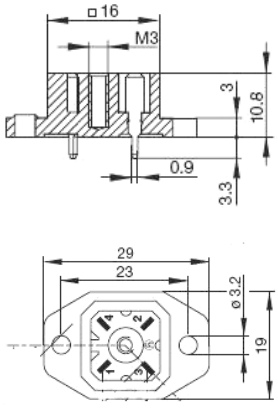
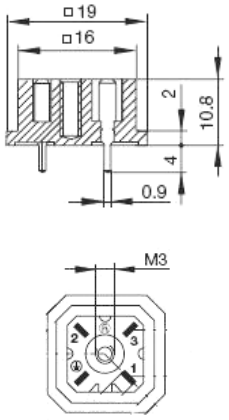
M3 Washer

Additional products are available from the manufacturer. Please call us with your application needs.

300 Roundhill Drive, Unit 4, Rockaway, NJ 07866
Telephone – (973) 586-2500 FAX – (973) 596-1590
E-Mail – info@norstat.com Website – www.norstat.com

	Female Connector	**Male Bolt On**	Male PCB

Dimensions

Part Numbers

	Consult Norstat	Consult Norstat	Consult Norstat

Technical

Contacts	4 (3 + Gnd.)	4 (3 + Gnd.)	4 (3 + Gnd.)
Color	Black	Black	Grey
Cable Gland	Pg 7	-	-
Connection	Screw Terminals	Solder	Solder

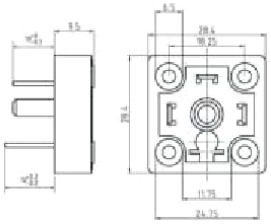
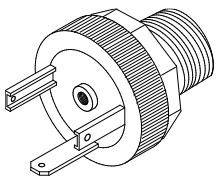
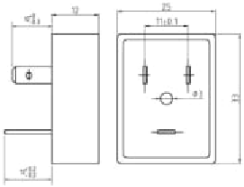
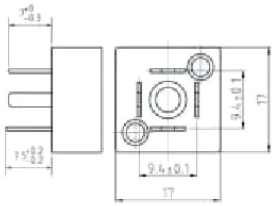
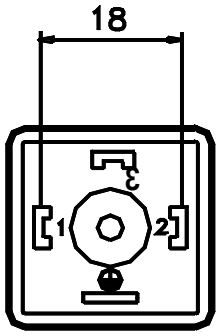
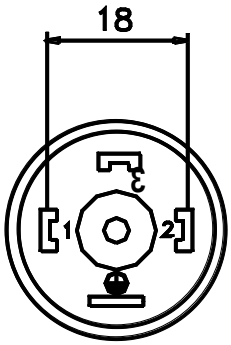
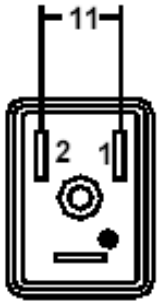
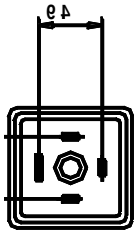
Additional products are avaialble from the factory. Please call us with your application needs.

ASSEMBLIES

300 Roundhill Drive, Unit 4, Rockaway, NJ 07866
Telephone – (973) 586-2500 FAX – (973) 596-1590
E-Mail – info@norstat.com Website – www.norstat.com

DIN 43650
Male Connectors
For Panel & Port Mounting

See page 06.15 for application information

	DIN 43650 A 18mm Panel Mount	**DIN 43650 A** 18mm ½" Port Mounting	Industrial Form B 11mm Panel Mount	Industrial Form C 9.4mm Panel Mount
				
				
Part Numbers				
3 Pole	BG1-N02-000	GSP-212	BM1-N02-000	BP2-N02-000
4 Pole	BG1-N03-000	GSP-312		BP3-N02-000
Parts Included				
	4 Pcs. M3 x 10 Screws		1 Pcs. M4 x 15.5 Screw	1 Pcs. M3 x 9.6 Screw
	1 Pcs. M3 x 4.8 Screw		1 Pcs. M3 x 5	1 Pcs. Flat Gasket
	1 Pcs. Flat Gasket		1 Pcs. Flat Gasket	
Technical				
Connection Type	Solder	Solder	Solder	Solder
Mounting	Screw	Male ½" NPT Thread	Screw	Screw
Max. Wire Size	17 AWG (1 mm2)	17 AWG (1 mm2)	17 AWG (1 mm2)	18 AWG (.75 mm2)
Rated Voltage	250 V	250 V	250 V	250 V

Additional products are avaialble from the factory. Please call us with your application needs.

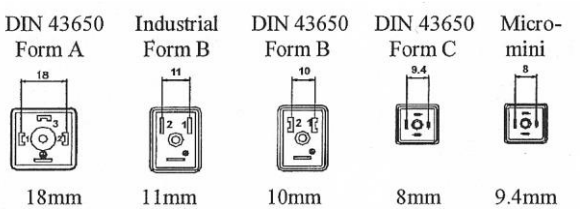
300 Roundhill Drive, Unit 4, Rockaway, NJ 07866
Telephone – (973) 586-2500 FAX – (973) 596-1590
E-Mail – info@norstat.com Website – www.norstat.com

General Information
Frequently Asked Questions
About DIN43650 Connectors and Assemblies

What is DIN?
DIN (or Deutsche Industrial Normale) is a series of uniformity standards developed in Germany, which apply to commonly manufactured items.

What is DIN 43650?
DIN 43650 is the standard for a series of electrical connectors, which are commonly used with solenoid valves (especially those used on valves in hydraulics and pneumatics). Other applications include the connection special sensors, such as pressure switches, filter switches, optical, proximity and limit switches.

What does DIN 43650 include?
The DIN43650 family consists of 5 connectors:



Although their "official" names are listed on top, we generally refer to them as 18mm, 11mm, 10mm, 8mm or 9.4mm, which is the actual spacing between pin #1 and pin #2.

How are these connectors applied?
Generally, the male connector is attached to the solenoid valve or sensor and the female side connects to the cable.

The general rule in applying connectors is that a female connector is used to transfer the power to the male. This prevents the possibility of direct exposure to "hot pins", (exposed male pins carrying voltage).

Female connectors are offered as shells, which allow you to attach your own cable via screw terminals or in molded cable assembly form, pre-wired with the cable attached to a solid molded plastic connector.

Why use a molded assembly?
Molded assemblies provide a more secure installation, offer many technical advantages and save installation time, labor and cost. Hand wiring a DIN connector is very labor intensive. Considering the overall cost of the connector, wire and labor, molded cable assemblies are generally much less expensive.

What other advantages do molded cable assemblies offer?

- Solid plastic construction super durability and resistance to harsh environments
- Impact resistant with greater cable strain relief
- Cleaner looking installation
- Available in all DIN 43650 configurations
- Offered in a large range of cable lengths
- With (or without) built in LED indication and surge suppression

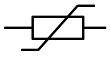
What does the light indicate?
The LED on the top of the connector indicates if the connector is receiving power and is used for diagnostic purposes. Connectors with dual colored LED's are also available to show the state of pressure and filter switches.

Why use surge suppression?
In solenoid valve applications, a magnetic field is created around the coil. When the power is turned off (as the coil is de-energized) the remaining magnetic field collapses back onto the coil. This creates an electrical surge, which can exceed 3,000 volts. This happens in both AC and DC applications, with operating voltages as low as 12 volts. The resulting surge can cause component damage (both short and long term) and can create noise problems that can interfere with control and measurement signals.

Building in surge suppression into the connector, stops the transient surge at the source. Some solenoid valves offer built in surge suppression, however since heat can effect the performance of surge suppression components, this is not always possible.

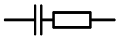
How does common surge suppression work?
Typically simple surge suppression components either re-direct or absorb the transient surge. There are several different components which are commonly used:

Suppression Diodes – (also called "fly-back" diodes or "avalanche" diodes) allow voltage and current to flow in only one direction. Placed in parallel to the load, the diodes react to the surge's polarity and re-direct the spike back to the coil where it dissipates. Diodes offer very good suppression; eliminating most of the surge. The are, however, polarity dependant (if they are installed incorrectly they cause a dead short). They also only work in DC circuits and can cause a release delay problem (the energy directed to the coil may delay the solenoid operation).



Varistors – (also called VDR's or MOV's) are voltage dependant resistors, which close the circuit once an assigned voltage is exceeded. Placed in parallel to the coil, they redirect any voltage, which is above the assigned or "cut off" levels, back to the coil where they dissipate. Varistors work for both AC and DC application and are polarity independent.

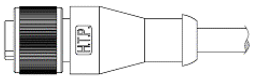
Zener Diodes (also called Z diodes) are also voltage dependant devices which work similarly to Varistors.



Resistor-Capacitor Networks – (also called RC's and snubbers) absorb the surge and gradually discharge the energy back onto the circuit.

M12 Molded Cable Assemblies
3, 4, 5 and 8 Pole
With PVC, Shielded PVC and PUR Cable

See page 06.36 for application information



Part Numbers		Length			
		Cable Type	PVC	Shielded PVC	PUR
		Conductor Size	24 AWG	24 AWG	22 AWG
3 Pole Male		9.8′ (3M)	12MD3-A3Z	12MD3-Q3Z	12MD3-C3Z
3 Pole Female		9.8′ (3M)	12FD3-A3Z	12FD3-Q3Z	12FD3-C3Z
4 Pole Male		9.8′ (3M)	12MD4-A3Z	12MD4-Q3Z	12MD4-C3Z
4 Pole Female		9.8′ (3M)	12FD4-A3Z	12FD4-Q3Z	12FD4-C3Z
5 Pole Male		9.8′ (3M)	12MD5-A3Z	12MD5-Q3Z	12MD5-C3Z
5 Pole Female		9.8′ (3M)	12FD5-A3Z	12FD5-Q3Z	12FD5-C3Z
8 Pole Male		9.8′ (3M)	12MD8-A3Z	12MD8-Q3Z	12MD8-C3Z
8 Pole Female		9.8′ (3M)	12FD8-A3Z	12FD8-Q3Z	12FD8-C3Z

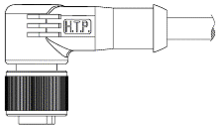
Technical

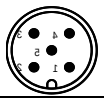
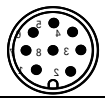
Operating Voltage	250 VAC / 300 VDC	**Contact Resistance**	≤ 6 MΩ
Operating Current	4 A	**Male Pin Dimension**	1 mm (8 pole = 0.9mm)
Protection Rating	IP 67	**Female Contact Material**	Phosphorous Bronze
Operating Temperature	-25° C to +85° C	**Female Contact Plating**	Nickel + 0.3 µm AU Gold
Housing Material	Nylon 6 + 30% Glass fiber	**Male Contact Material**	Brass
Overmolding Material	Polyurethane	**Male Contact Plating**	Nickel + 0.3 µm AU Gold

Additional products are avaialble from the factory. Please call us with your application needs.

300 Roundhill Drive, Unit 4, Rockaway, NJ 07866
Telephone – (973) 586-2500 FAX – (973) 596-1590
E-Mail – info@norstat.com Website – www.norstat.com

M12 Molded Cable Assemblies
3, 4, 5 and 8 Pole
With PVC, Shielded PVC and PUR Cable



Part Numbers		Length			
		Cable Type	**PVC**	**Shielded PVC**	**PUR**
		Conductor Size	**24 AWG**	**24 AWG**	**22 AWG**
3 Pole Male		9.8′ (3M)	12MA3-A3Z	12MA3-Q3Z	12MA3-C3Z
3 Pole Female		9.8′ (3M)	12FA3-A3Z	12FA3-Q3Z	12FA3-C3Z
4 Pole Male		9.8′ (3M)	12MA4-A3Z	12MA4-Q3Z	12MA4-C3Z
4 Pole Female		9.8′ (3M)	12FA4-A3Z	12FA4-Q3Z	12FA4-C3Z
5 Pole Male		9.8′ (3M)	12MA5-A3Z	12MA5-Q3Z	12MA5-C3Z
5 Pole Female		9.8′ (3M)	12FA5-A3Z	12FA5-Q3Z	12FA5-C3Z
8 Pole Male		9.8′ (3M)	12MA8-A3Z	12MA8-Q3Z	12MA8-C3Z
8 Pole Female		9.8′ (3M)	12FA8-A3Z	12FA8-Q3Z	12FA8-C3Z

ASSEMBLIES

Technical

Operating Voltage	250 VAC / 300 VDC	**Contact Resistance**	≤ 6 MΩ
Operating Current	4 A	**Male Pin Dimension**	1 mm (8 pole = 0.9mm)
Protection Rating	IP 67	**Female Contact Material**	Phosphorous Bronze
Operating Temperature	-25° C to +85° C	**Female Contact Plating**	Nickel + 0.3 µm AU Gold
Housing Material	Nylon 6 + 30% Glass fiber	**Male Contact Material**	Brass
Overmolding Material	Polyurethane	**Male Contact Plating**	Nickel + 0.3 µm AU Gold

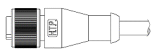
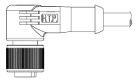
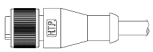
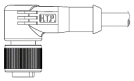
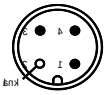
Additional products are avaialble from the factory. Please call us with your application needs.

300 Roundhill Drive, Unit 4, Rockaway, NJ 07866
Telephone – (973) 586-2500 FAX – (973) 596-1590
E-Mail – info@norstat.com Website – www.norstat.com

M12 Molded Cable Assemblies

2 LED Light Indicators
With PVC Cable

See page 06.36 for application information

Part Numbers		Length				
						
	Circuit Type		NPN		PNP	
	Conductor Size		24 AWG		24 AWG	
3 Pole Male		9.8′ (3M)	12MH3-A3Z	12ME3-A3Z	12MG3-A3Z	12MF3-A3Z
3 Pole Female		9.8′ (3M)	12FH3-A3Z	12FE3-A3Z	12FG3-A3Z	12FF3-A3Z
4 Pole Male		9.8′ (3M)	12MH4-A3Z	12ME4-A3Z	12MG4-A3Z	12MF4-A3Z
4 Pole Female		9.8′ (3M)	12FH4-A3Z	12FE4-A3Z	12FG4-A3Z	12FF4-A3Z
5 Pole Male		9.8′ (3M)	12MH5-A3Z	12ME5-A3Z	12MG5-A3Z	12MF5-A3Z
5 Pole Female		9.8′ (3M)	12FH5-A3Z	12FE5-A3Z	12FG5-A3Z	12FF5-A3Z
8 Pole Male		9.8′ (3M)	12MH8-A3Z	12ME8-A3Z	12MG8-A3Z	12MF8-A3Z
8 Pole Female		9.8′ (3M)	12FH8-A3Z	12FE8-A3Z	12FG8-A3Z	12FF8-A3Z

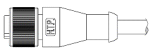
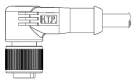
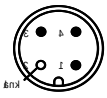
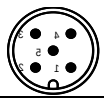
Technical

Operating Voltage	250 VAC / 300 VDC	**Contact Resistance**	≤ 6 MΩ
Operating Current	4 A	**Male Pin Dimension**	1 mm (8 pole = 0.9mm)
Protection Rating	IP 67	**Female Contact Material**	Phosphorous Bronze
Operating Temperature	-25° C to +85° C	**Female Contact Plating**	Nickel + 0.3 µm AU Gold
Housing Material	Nylon 6 + 30% Glass fiber	**Male Contact Material**	Brass
Overmolding Material	Polyurethane	**Male Contact Plating**	Nickel + 0.3 µm AU Gold

Additional products are avaialble from the factory. Please call us with your application needs.

300 Roundhill Drive, Unit 4, Rockaway, NJ 07866
Telephone – (973) 586-2500 FAX – (973) 596-1590
E-Mail – info@norstat.com Website – www.norstat.com

See page 06.36 for application information

Part Numbers		**Length**		
				
	Circuit Type		**PNP**	
	Conductor Size		**24 AWG**	
3 Pole Male		9.8′ (3M)	12MI3-A3Z	12MK3-A3Z
3 Pole Female		9.8′ (3M)	12FI3-A3Z	12FK3-A3Z
4 Pole Male		9.8′ (3M)	12MI4-A3Z	12MK4-A3Z
4 Pole Female		9.8′ (3M)	12FI4-A3Z	12FK4-A3Z
5 Pole Male		9.8′ (3M)	12MI5-A3Z	12MK5-A3Z
5 Pole Female		9.8′ (3M)	12FI5-A3Z	12FK5-A3Z
8 Pole Male		9.8′ (3M)	12MI8-A3Z	12MK8-A3Z
8 Pole Female		9.8′ (3M)	12FI8-A3Z	12FK8-A3Z

ASSEMBLIES

Technical

Operating Voltage	250 VAC / 300 VDC	**Contact Resistance**	≤ 6 MΩ
Operating Current	4 A	**Male Pin Dimension**	1 mm (8 pole = 0.9mm)
Protection Rating	IP 67	**Female Contact Material**	Phosphorous Bronze
Operating Temperature	-25° C to +85° C	**Female Contact Plating**	Nickel + 0.3 µm AU Gold
Housing Material	Nylon 6 + 30% Glass fiber	**Male Contact Material**	Brass
Over molding Material	Polyurethane	**Male Contact Plating**	Nickel + 0.3 µm AU Gold

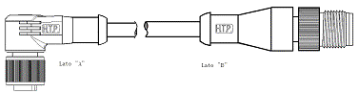
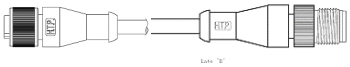
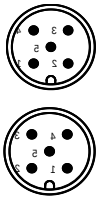
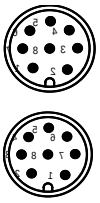
Additional products are avaialble from the factory. Please call us with your application needs.

300 Roundhill Drive, Unit 4, Rockaway, NJ 07866
Telephone – (973) 586-2500 FAX – (973) 596-1590
E-Mail – info@norstat.com Website – www.norstat.com

M12 Molded Cable Assemblies

Male to Female Cables
With PVC or PUR Cable

See page 06.36 for application information

Part Numbers		Length			
					
	Cable Type		PVC	PUR	PVC	PUR
3 Pole Male to 3 Pole Female		3.2′ (1M)	12FA3A1Z-12MD	12FA3C1Z-12MD	12FD3A1Z-12MD	12FD3C1Z-12MD
4 Pole Male to 4 Pole Female		3.2′ (1M)	12FA4A1Z-12MD	12FA4C1Z-12MD	12FD4A1Z-12MD	12FD4C1Z-12MD
5 Pole Male to 5 Pole Female		3.2′ (1M)	12FA5A1Z-12MD	12FA5C1Z-12MD	12FD5A1Z-12MD	12FD5C1Z-12MD
8 Pole Male to 8 Pole Female		3.2′ (1M)	12FA8A1Z-12MD	12FA8C1Z-12MD	12FD8A1Z-12MD	12FD8C1Z-12MD

ASSEMBLIES

Technical

Operating Voltage	250 VAC / 300 VDC	**Contact Resistance**	≤ 6 MΩ
Operating Current	4 A	**Male Pin Dimension**	1 mm (8 pole = 0.9mm)
Protection Rating	IP 67	**Female Contact Material**	Phosphorous Bronze
Operating Temperature	-25° C to +85° C	**Female Contact Plating**	Nickel + 0.3 µm AU Gold
Housing Material	Nylon 6 + 30% Glass fiber	**Male Contact Material**	Brass
Over molding Material	Polyurethane	**Male Contact Plating**	Nickel + 0.3 µm AU Gold

Additional products are avaialble from the factory. Please call us with your application needs.

300 Roundhill Drive, Unit 4, Rockaway, NJ 07866
Telephone – (973) 586-2500 FAX – (973) 596-1590
E-Mail – info@norstat.com Website – www.norstat.com

M12 Y Assemblies & T Connector

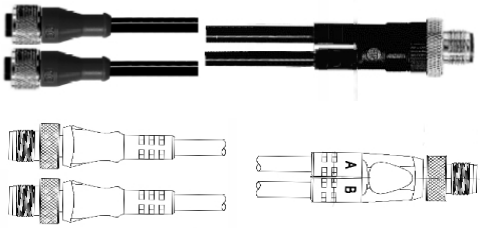
5 Pole M12 Single Male to Double Female
For Expanding Ports on Distribution Boxes

See page 06.36 for application information

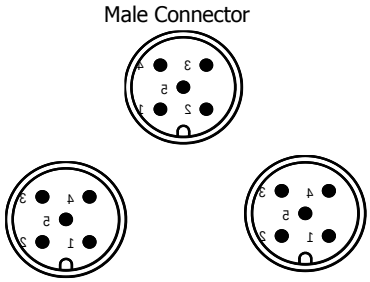
"T" and "Y" connectors provide the ability to expand the inputs and output of a distribution box. The distribution boxes offer two independent wires to each port. By using the "T" or "Y" connectors, each port can accommodate two sensors or output devices.

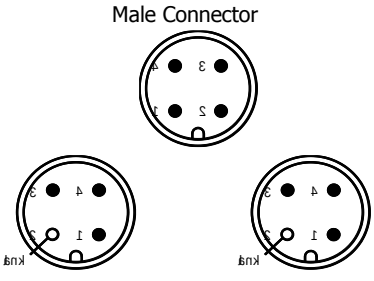
T Connector

Y Assembly



Configuration



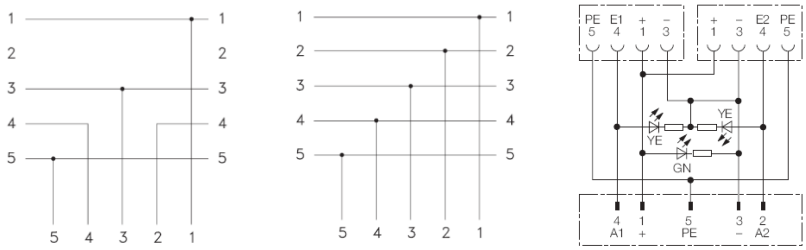


Part Numbers

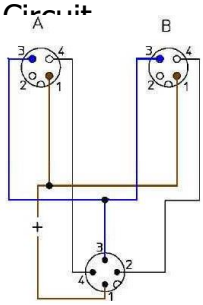
Split Circuit	12T34-000	Y - PCV Cable 4 Pole 1M
Parallel Circuit	12T35-000	Y - PUR Cable 4 Pole 1M
Parallel Circuit with LED	12T45-000	Standard cable length 3.2' (1 Meter) Other cable lengths available upon request.

Circuits

T Connector Circuits



Y Assembly Circuit



Split Circuit

Technical

Operating Voltage	250 VAC / 300 VDC	**Contact Resistance**	≤ 6 MΩ
Operating Current	4 A	**Male Pin Dimension**	1 mm (8 pole = 0.9mm)
Protection Rating	IP 67	**Female Contact Material**	Phosphorous Bronze
Operating Temperature	-25° C to +85° C	**Female Contact Plating**	Nickel + 0.3 µm AU Gold
Housing Material	Nylon 6 + 30% Glass fiber	**Male Contact Material**	Brass
Over molding Material	Polyurethane	**Male Contact Plating**	Nickel + 0.3 µm AU Gold

Additional products are avaialble from the factory. Please call us with your application needs.

300 Roundhill Drive, Unit 4, Rockaway, NJ 07866
Telephone – (973) 586-2500 FAX – (973) 596-1590
E-Mail – info@norstat.com Website – www.norstat.com

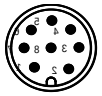
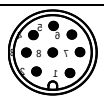
M12 Connectors
with Solder Terminals
in 4, 5 and 8 Position

See page 06.36 for application information

Straight Pg7

Right Angle Pg7

Right Angle Pg 11

Part Numbers			Length			
		Type	**Straight**	**Right Angle**	**Straight**	**Right Angle**
		Cable Gland	**Pg7**	**Pg7**	**Pg11**	**Pg11**
		Cable Entry	**Single Cable**	**Single Cable**	**Single or Double Cable**	**Single or Double Cable**
		Cable Range	.15" - .23" (4-6mm)	.15" - .23" (4-6mm)	.23" - .43" (6-11mm) 2 x .15" - .23" (4-6mm)	.23" - .43" (6-11mm) 2 x .15" - .23" (4-6mm)
4 Pole Male		Black Clear	12MC4-000 12MZ4-000	12MB4-000 12MT4-000	12ML4-000 NA	12MU4-000 NA
4 Pole Female		Black Clear	12FC4-000 12FZ4-000	12FB4-000 12FT4-000	12FL4-000 NA	12FU4-000 NA
5 Pole Male		Black Clear	12MC5-000 12MZ5-000	12MB5-000 12MT5-000	12ML5-000 NA	12MU5-000 NA
5 Pole Female		Black Clear	12FC5-000 12FZ5-000	12FB5-000 12FT5-000	12FL5-000 NA	12FU5-000 NA
8 Pole Male		Black Clear	12MC8-000 12MZ8-000	12MB8-000 12MT8-000	12ML8-000 NA	12MU8-000 NA
8 Pole Female		Black Clear	12FC8-000 12FZ8-000	12FB8-000 12FT8-000	12FL8-000 NA	12FU8-000 NA

Technical

Operating Voltage	250 VAC / 300 VDC	**Contact Resistance**	≤ 6 MΩ
Operating Current	4 A	**Male Pin Dimension**	1 mm (8 pole = 0.9mm)
Protection Rating	IP 67	**Female Contact Material**	Phosphorous Bronze
Operating Temperature	-25° C to +85° C	**Female Contact Plating**	Nickel + 0.3 µm AU Gold
Housing Material	Nylon 6 + 30% Glass fiber	**Male Contact Material**	Brass
Over molding Material	Polyurethane	**Male Contact Plating**	Nickel + 0.3 µm AU Gold

LED Bridge Circuit for Clear Connectors

ELB001
Single Yellow LED

ELB001
Bi Color LED

Additional products are avaialble from the factory. Please call us with your application needs.

ASSEMBLIES

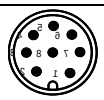
300 Roundhill Drive, Unit 4, Rockaway, NJ 07866
Telephone – (973) 586-2500 FAX – (973) 596-1590
E-Mail – info@norstat.com Website – www.norstat.com

See page 06.36 for application information

Straight Pg7

Right Angle Pg7

Right Angle Pg 11

Part Numbers			Length			
		Type	**Straight**	**Right Angle**	**Straight**	**Right Angle**
		Cable Gland	**Pg7**	**Pg7**	**Pg11**	**Pg11**
		Cable Entry	**Single Cable**	**Single Cable**	**Single or Double Cable**	**Single or Double Cable**
		Cable Range	.15" - .23" (4-6mm)	.15" - .23" (4-6mm)	.23" - .43" (6-11mm) 2 x .15" - .23" (4-6mm)	.23" - .43" (6-11mm) 2 x .15" - .23" (4-6mm)
4 Pole Male		Black Clear	12MC4-000S 12MZ4-000S	12MB4-000S 12MT4-000S	12ML4-000S NA	12MU4-000S NA
4 Pole Female		Black Clear	12FC4-000S 12FZ4-000S	12FB4-000S 12FT4-000S	12FL4-000S NA	12FU4-000S NA
5 Pole Male		Black Clear	12MC5-000S 12MZ5-000S	12MB5-000S 12MT5-000S	12ML5-000S NA	12MU5-000S NA
5 Pole Female		Black Clear	12FC5-000S 12FZ5-000S	12FB5-000S 12FT5-000S	12FL5-000S NA	12FU5-000S NA
8 Pole Male		Black Clear	12MC8-000S 12MZ8-000S	12MB8-000S 12MT8-000S	12ML8-000S NA	12MU8-000S NA
8 Pole Female		Black Clear	12FC8-000S 12FZ8-000S	12FB8-000S 12FT8-000S	12FL8-000S NA	12FU8-000S NA

ASSEMBLIES

Technical

Operating Voltage	250 VAC / 300 VDC	**Contact Resistance**	≤ 6 MΩ
Operating Current	4 A	**Male Pin Dimension**	1 mm (8 pole = 0.9mm)
Protection Rating	IP 67	**Female Contact Material**	Phosphorous Bronze
Operating Temperature	-25° C to +85° C	**Female Contact Plating**	Nickel + 0.3 µm AU Gold
Housing Material	Nylon 6 + 30% Glass fiber	**Male Contact Material**	Brass
Over molding Material	Polyurethane	**Male Contact Plating**	Nickel + 0.3 µm AU Gold

LED Bridge Circuit for Clear Connectors

ELB001
Single Yellow LED

ELB001
Bi Color LED

Additional products are avaialble from the factory. Please call us with your application needs.

300 Roundhill Drive, Unit 4, Rockaway, NJ 07866
Telephone – (973) 586-2500 FAX – (973) 596-1590
E-Mail – info@norstat.com Website – www.norstat.com

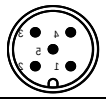
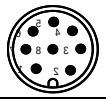
M12 Panel Mount Connectors
4, 5 and 8 Pole
Front Mount

See page 06.36 for application information

Solder Connections

PCB Connection

Part Numbers

Connection Type		Solder	PCB	With Wire
Mounting Hole		**Pg9/.60"/15.2mm**	**Pg9/.60"/15.2mm**	**Pg9/.60"/15.2mm**
Type		**Front Mount**	**Front Mount**	**Front Mount**
Cable Length				**7.9" (200mm)**
4 Pole Male		12MP4-000	12MQ4-000	12MP4-A0B
4 Pole Female		12FP4-000	12FQ4-000	12FP4-A0B
5 Pole Male		12MP5-000	12MQ5-000	12MP5-A0B
5 Pole Female		12FP5-000	12FQ5-000	12FP5-A0B
8 Pole Male		12MP8-000	12MQ8-000	12MP8-A0B
8 Pole Female		12FP8-000	12FQ8-000	12FP8-A0B

Technical

Operating Voltage	250 VAC / 300 VDC	**Contact Resistance**	≤ 6 MΩ
Operating Current	4 A	**Male Pin Dimension**	1 mm (8 pole = 0.9mm)
Protection Rating	IP 67	**Female Contact Material**	Phosphorous Bronze
Operating Temperature	-25° C to +85° C	**Female Contact Plating**	Nickel + 0.3 µm AU Gold
Housing Material	Nylon 6 + 30% Glass fiber	**Male Contact Material**	Brass
Over molding Material	Polyurethane	**Male Contact Plating**	Nickel + 0.3 µm AU Gold

Additional products are avaialble from the factory. Please call us with your application needs.

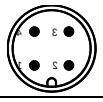
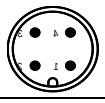
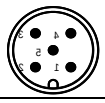
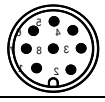
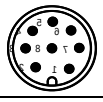
300 Roundhill Drive, Unit 4, Rockaway, NJ 07866
Telephone – (973) 586-2500 FAX – (973) 596-1590
E-Mail – info@norstat.com Website – www.norstat.com

See page 06.36 for application information

Solder Connections

PCB Connections

Part Numbers

Connection Type		Solder	PCB	With Wire
Mounting Hole		**Pg9/.60"/15.2mm**	**Pg9/.60"/15.2mm**	**Pg9/.60"/15.2mm**
Type		**Back Mount**	**Back Mount**	**Back Mount**
Cable Length				**7.9" (200mm)**
4 Pole Male		12MR4-000	12MS4-000	12MR4-A0B
4 Pole Female		12FR4-000	12FS4-000	12FR4-A0B
5 Pole Male		12MR5-000	12MS5-000	12MR5-A0B
5 Pole Female		12FR5-000	12FS5-000	12FR5-A0B
8 Pole Male		12MR8-000	12MS8-000	12MR8-A0B
8 Pole Female		12FR8-000	12FS8-000	12FR8-A0B

Technical

Operating Voltage	250 VAC / 300 VDC	**Contact Resistance**	≤ 6 MΩ
Operating Current	4 A	**Male Pin Dimension**	1 mm (8 pole = 0.9mm)
Protection Rating	IP 67	**Female Contact Material**	Phosphorous Bronze
Operating Temperature	-25° C to +85° C	**Female Contact Plating**	Nickel + 0.3 µm AU Gold
Housing Material	Nylon 6 + 30% Glass fiber	**Male Contact Material**	Brass
Over molding Material	Polyurethane	**Male Contact Plating**	Nickel + 0.3 µm AU Gold

Additional products are avaialble from the factory. Please call us with your application needs.

ASSEMBLIES

300 Roundhill Drive, Unit 4, Rockaway, NJ 07866
Telephone – (973) 586-2500 FAX – (973) 596-1590
E-Mail – info@norstat.com Website – www.norstat.com

M8 Molded Cable Assemblies

Straight - Threaded Collar - 3 and 4 Pole
With PVC, Shielded PVC and PUR Cable

See page 06.36 for application information

Part Numbers		Length			
		Cable Type	PVC	Shielded PVC	PUR
		Conductor Size	24 AWG	24 AWG	24 AWG
3 Pole Male		9.8′ (3M)	08MD3-A3Z	08MD3-Q3Z	08MD3-C3Z
3 Pole Female		9.8′ (3M)	08FD3-A3Z	08FD3-Q3Z	08FD3-C3Z
4 Pole Male		9.8′ (3M)	08MD4-A3Z	08MD4-Q3Z	08MD4-C3Z
4 Pole Female		9.8′ (3M)	08FD4-A3Z	08FD4-Q3Z	08FD4-C3Z

ASSEMBLIES

Technical

Operating Voltage	250 VAC / 300 VDC	**Contact Resistance**	≤ 6 MΩ
Operating Current	4 A	**Male Pin Dimension**	1 mm (8 pole = 0.9mm)
Protection Rating	IP 67	**Female Contact Material**	Phosphorous Bronze
Operating Temperature	-25° C to +85° C	**Female Contact Plating**	Nickel + 0.3 µm AU Gold
Housing Material	Nylon 6 + 30% Glass fiber	**Male Contact Material**	Brass
Over molding Material	Polyurethane	**Male Contact Plating**	Nickel + 0.3 µm AU Gold

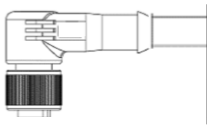
Additional products are avaialble from the factory. Please call us with your application needs.

300 Roundhill Drive, Unit 4, Rockaway, NJ 07866
Telephone – (973) 586-2500 FAX – (973) 596-1590
E-Mail – info@norstat.com Website – www.norstat.com

M8 Molded Cable Assemblies

Right Angle - Threaded Collar - 3 and 4 Pole
With PVC, Shielded PVC and PUR Cable

See page 06.36 for application information



Part Numbers		Length			
		Cable Type	PVC	Shielded PVC	PUR
		Conductor Size	24 AWG	24 AWG	24 AWG
3 Pole Male		9.8′ (3M)	08MA3-A3Z	08MA3-Q3Z	08MA3-C3Z
3 Pole Female		9.8′ (3M)	08FA3-A3Z	08FA3-Q3Z	08FA3-C3Z
4 Pole Male		9.8′ (3M)	08MA4-A3Z	08MA4-Q3Z	08MA4-C3Z
4 Pole Female		9.8′ (3M)	08FA4-A3Z	08FA4-Q3Z	08FA4-C3Z

ASSEMBLIES

Technical Information

Operating Voltage	250 VAC / 300 VDC	**Contact Resistance**	≤ 6 MΩ
Operating Current	4 A	**Male Pin Dimension**	1 mm (8 pole = 0.9mm)
Protection Rating	IP 67	**Female Contact Material**	Phosphorous Bronze
Operating Temperature	-25° C to +85° C	**Female Contact Plating**	Nickel + 0.3 µm AU Gold
Housing Material	Nylon 6 + 30% Glass fiber	**Male Contact Material**	Brass
Over molding Material	Polyurethane	**Male Contact Plating**	Nickel + 0.3 µm AU Gold

Additional products are avaialble from the factory. Please call us with your application needs.

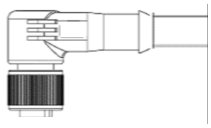
300 Roundhill Drive, Unit 4, Rockaway, NJ 07866
Telephone – (973) 586-2500 FAX – (973) 596-1590
E-Mail – info@norstat.com Website – www.norstat.com

M8 Molded Cable Assemblies

With LED Indication for NPN Sensors

Straight - Threaded Collar - 3 and 4 Pole - PVC Cable

See page 06.36 for application information



Part Numbers		Length		
	Connector Type		**Straight**	**Right Angle**
	Cable Type		**PVC - 24 AWG**	**PVC - 24 AWG**
3 Pole Male		9.8′ (3M)	08MH3-A3Z	08ME3-A3Z
3 Pole Female		9.8′ (3M)	08FH3-A3Z	08FE3-A3Z
4 Pole Male		9.8′ (3M)	08MH4-A3Z	08ME4-A3Z
4 Pole Female		9.8′ (3M)	08FH4-A3Z	08FE4-A3Z

ASSEMBLIES

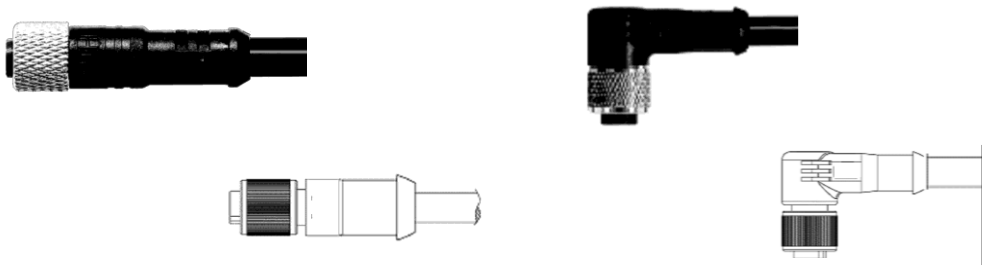
Technical

Operating Voltage	250 VAC / 300 VDC	**Contact Resistance**	≤ 6 MΩ
Operating Current	4 A	**Male Pin Dimension**	1 mm (8 pole = 0.9mm)
Protection Rating	IP 67	**Female Contact Material**	Phosphorous Bronze
Operating Temperature	-25° C to +85° C	**Female Contact Plating**	Nickel + 0.3 µm AU Gold
Housing Material	Nylon 6 + 30% Glass fiber	**Male Contact Material**	Brass
Over molding Material	Polyurethane	**Male Contact Plating**	Nickel + 0.3 µm AU Gold

Additional products are avaialble from the factory. Please call us with your application needs.

300 Roundhill Drive, Unit 4, Rockaway, NJ 07866
Telephone – (973) 586-2500 FAX – (973) 596-1590
E-Mail – info@norstat.com Website – www.norstat.com

M8 Molded Cable Assemblies
With LED Indication for PNP Sensors
See page 06.36 for application information
Right Angle - Threaded Collar - 3 and 4 Pole – PVC Cable



Part Numbers		Length		
	Connector Type		**Straight**	**Right Angle**
	Cable Type		**PVC - 24 AWG**	**PVC - 24 AWG**
3 Pole Male		9.8′ (3M)	08MG3-A3Z	08MF3-A3Z
3 Pole Female		9.8′ (3M)	08FG3-A3Z	08FF3-A3Z
4 Pole Male		9.8′ (3M)	08MG4-A3Z	08MF4-A3Z
4 Pole Female		9.8′ (3M)	08FG4-A3Z	08FF4-A3Z

ASSEMBLIES

Technical

Operating Voltage	250 VAC / 300 VDC	**Contact Resistance**	≤ 6 MΩ
Operating Current	4 A	**Male Pin Dimension**	1 mm (8 pole = 0.9mm)
Protection Rating	IP 67	**Female Contact Material**	Phosphorous Bronze
Operating Temperature	-25° C to +85° C	**Female Contact Plating**	Nickel + 0.3 µm AU Gold
Housing Material	Nylon 6 + 30% Glass fiber	**Male Contact Material**	Brass
Over molding Material	Polyurethane	**Male Contact Plating**	Nickel + 0.3 µm AU Gold

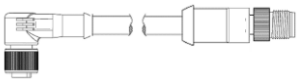
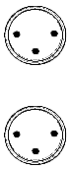
Additional products are avaialble from the factory. Please call us with your application needs.

300 Roundhill Drive, Unit 4, Rockaway, NJ 07866
Telephone – (973) 586-2500 FAX – (973) 596-1590
E-Mail – info@norstat.com Website – www.norstat.com

M8 Molded Cable Assemblies

Male to Female Cables
With PVC or PUR Cable

See page 06.36 for application information

Part Numbers		Length				
						
		Cable Type	PVC	PUR	PVC	PUR
3 Pole Male to 3 Pole Female		3.2′ (1M)	08FA3A1Z-08MD	08FA3C1Z-08MD	08FD3A1Z-08MD	08FD3C1Z-08MD
4 Pole Male to 4 Pole Female		3.2′ (1M)	08FA4A1Z-08MD	08FA4C1Z-08MD	08FD4A1Z-08MD	08FD4C1Z-08MD

Technical

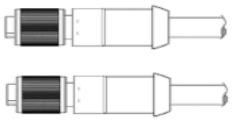
Operating Voltage	250 VAC / 300 VDC	**Contact Resistance**	≤ 6 MΩ
Operating Current	4 A	**Male Pin Dimension**	1 mm (8 pole = 0.9mm)
Protection Rating	IP 67	**Female Contact Material**	Phosphorous Bronze
Operating Temperature	-25° C to +85° C	**Female Contact Plating**	Nickel + 0.3 µm AU Gold
Housing Material	Nylon 6 + 30% Glass fiber	**Male Contact Material**	Brass
Over molding Material	Polyurethane	**Male Contact Plating**	Nickel + 0.3 µm AU Gold

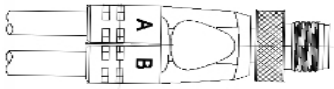
Additional products are avaialble from the factory. Please call us with your application needs.

300 Roundhill Drive, Unit 4, Rockaway, NJ 07866
Telephone – (973) 586-2500 FAX – (973) 596-1590
E-Mail – info@norstat.com Website – www.norstat.com

M8 Y Assemblies
3 and 4 Pole
With PVC, Shielded PVC and PUR Cable

See page 06.36 for application information

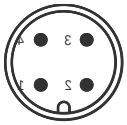




Configuration

"Y" assemblies provide the ability to expand the inputs and output of a distribution box. The distribution boxes offer two independent wires to each port. By using the "Y" connectors, each port can

Male M12 Connector

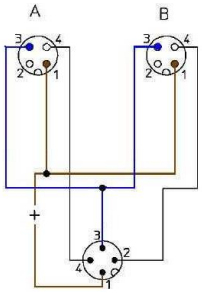


Female M8 Connector

Female M8 Connector

Part Numbers

M12 Male to Double M8 Female Connectors	3.2' (1M)	**Y - PCV Cable 4 Pole 1M** **Y - PUR Cable 4 Pole 1M**



Technical

Operating Voltage	250 VAC / 300 VDC	**Contact Resistance**	≤ 6 MΩ
Operating Current	4 A	**Male Pin Dimension**	1 mm (8 pole = 0.9mm)
Protection Rating	IP 67	**Female Contact Material**	Phosphorous Bronze
Operating Temperature	-25° C to +85° C	**Female Contact Plating**	Nickel + 0.3 µm AU Gold
Housing Material	Nylon 6 + 30% Glass fiber	**Male Contact Material**	Brass
Overmolding Material	Polyurethane	**Male Contact Plating**	Nickel + 0.3 µm AU Gold

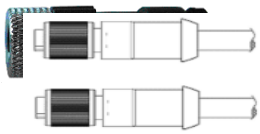
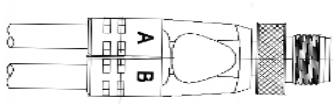
Additional products are avaialble from the factory. Please call us with your application needs.

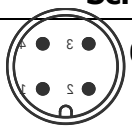
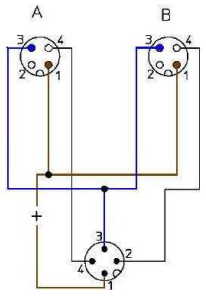
ASSEMBLIES

300 Roundhill Drive, Unit 4, Rockaway, NJ 07866
Telephone – (973) 586-2500 FAX – (973) 596-1590
E-Mail – info@norstat.com Website – www.norstat.com

M8 Molded Connectors
3 and 4 Pole
Solder and Screw Connections

See page 06.36 for application information

Part Numbers		Length	
	Type	**Straight**	**Straight**
	Connection	**Solder**	**Screw Terminals**
3 Pole Male		08MC3-000	 08MC3-000-S
3 Pole Female		08FC3-000	08FC3-(
4 Pole Male		08MC4-000	08MC4-000-S
4 Pole Female		08FC4-000	08FC4-000-S
			

Technical

Operating Voltage	250 VAC / 300 VDC	**Contact Resistance**	≤ 6 MΩ
Operating Current	4 A	**Male Pin Dimension**	1 mm (8 pole = 0.9mm)
Protection Rating	IP 67	**Female Contact Material**	Phosphorous Bronze
Operating Temperature	-25° C to +85° C	**Female Contact Plating**	Nickel + 0.3 µm AU Gold
Housing Material	Nylon 6 + 30% Glass fiber	**Male Contact Material**	Brass
Overmolding Material	Polyurethane	**Male Contact Plating**	Nickel + 0.3 µm AU Gold

Additional products are avaialble from the factory. Please call us with your application needs.

ASSEMBLIES

NORSTAT INC.
300 Roundhill Drive, Unit 4, Rockaway, NJ 07866
Telephone – (973) 586-2500 FAX – (973) 596-1590
E-Mail – info@norstat.com Website – www.norstat.com

M8 Panel Mount Connectors

Front Mount - 3 and 4 Pole - Threaded Collar
With Solder, PCB Connections or Pre Wired

See page 06.36 for application information

Solder Connections

PCB Connections

With 200mm Wire

Part Numbers

Connector Type		**Solder**	**PCB**	**With Wire**
Mounting Hole		**Pg 7/.49"/12.5mm**	**Pg 7/.49"/12.5mm**	**Pg 7/.49"/12.5mm**
Wire Length				**7.9" (200mm)**
3 Pole Male		08MP3-000	08MQ3-000	08MP3-A0B
3 Pole Female		08FP3-000	08FQ3-000	08FP3-A0B
4 Pole Male		08MP4-000	08MQ4-000	08MP4-A0B
4 Pole Female		08FP4-000	08FQ4-000	08FP4-A0B

Technical

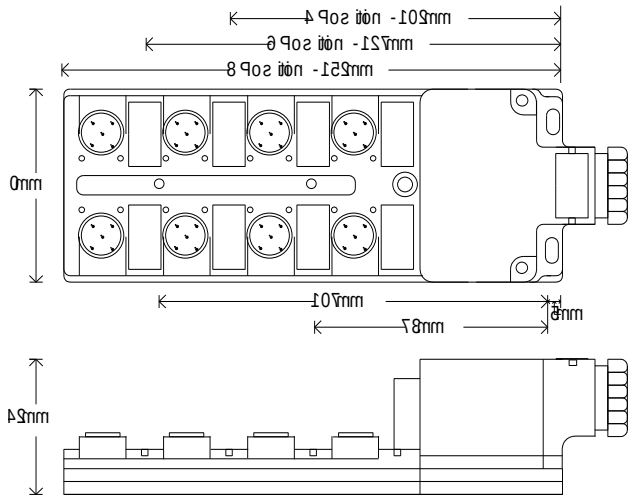
Operating Voltage	250 VAC / 300 VDC	**Contact Resistance**	$\leq$ 6 MΩ
Operating Current	4 A	**Male Pin Dimension**	1 mm (8 pole = 0.9mm)
Protection Rating	IP 67	**Female Contact Material**	Phosphorous Bronze
Operating Temperature	-25° C to +85° C	**Female Contact Plating**	Nickel + 0.3 μm AU Gold
Housing Material	Nylon 6 + 30% Glass fiber	**Male Contact Material**	Brass
Overmolding Material	Polyurethane	**Male Contact Plating**	Nickel + 0.3 μm AU Gold

Additional products are avaialble from the factory. Please call us with your application needs.

M12 Distribution Boxes

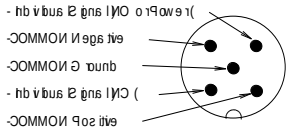
5 Pole / 4, 6 & 8 Position
Field Wire able Main Cable

See page 06.36 for application information

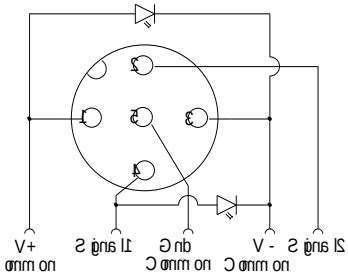


Circuit

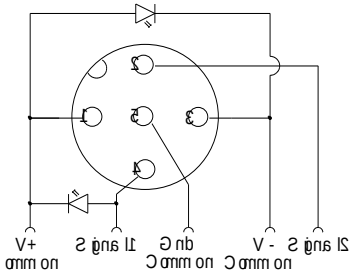
Standard M12 Connector Wiring



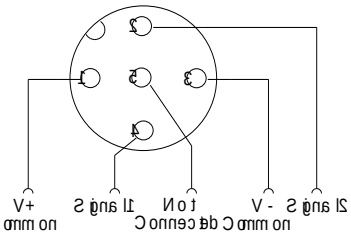
PNP LED Circuit
Standard Production



NPN LED Circuit
Special Production



No LED Circuit
Special Production



Part Numbers

4 Position	J12-T4B5	J12-T4B5-NPN	J12-T4B5-NL
6 Position	J12-T6B5	J12-T6B5-NPN	J12-T6B5-NL
8 Position	J12-T8B5	J12-T8B5-NPN	J12-T8B5-NL

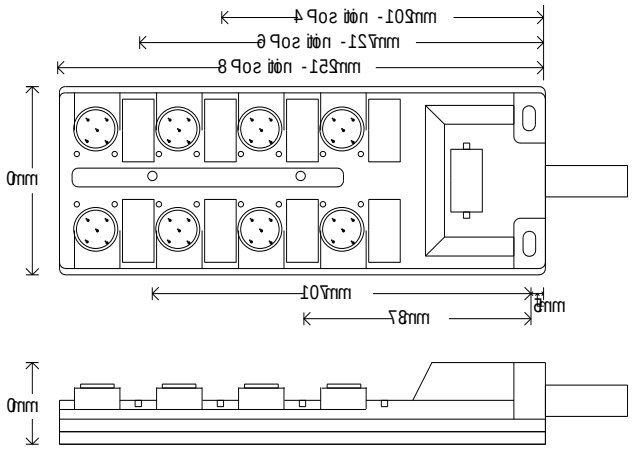
Technical

Operating Voltage	250 VAC / 300 VDC	**Contact Resistance**	≤ 6 MΩ
Operating Current	4 A	**Male Pin Dimension**	1 mm (8 pole = 0.9mm)
Protection Rating	IP 67	**Female Contact Material**	Phosphorous Bronze
Operating Temperature	-25° C to +85° C	**Female Contact Plating**	Nickel + 0.3 µm AU Gold
Housing Material	Nylon 6 + 30% Glass fiber	**Male Contact Material**	Brass
Overmolding Material	Polyurethane	**Male Contact Plating**	Nickel + 0.3 µm AU Gold

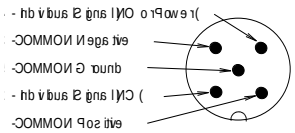
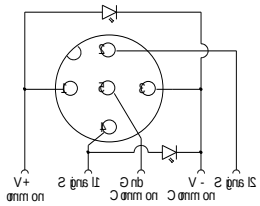
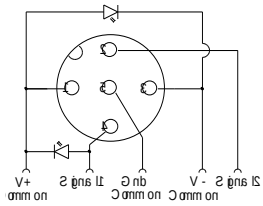
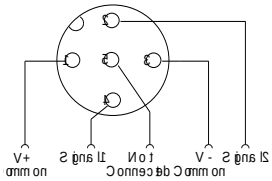
Additional products are avaialble from the factory. Please call us with your application needs.

M12 Distribution Boxes
5 Pole / 4, 6 & 8 Position
Molded PUR Main Cable

See page 06.36 for application information



Circuit

Standard M12 Connector Wiring	PNP LED Circuit Standard Production	NPN LED Circuit Special Production	No LED Circuit Special Production
			

Part Numbers

4 Position	5M	J12-T4B5-P5	J12-T4B5-P5-NPN	J12-T4B5-P5-NL
	10M	J12-T4B5-P1	J12-T4B5-P1-NPN	J12-T4B5-P1-NL
	15M	J12-T4B5-PA	J12-T4B5-PA-NPN	J12-T4B5-PA-NL
6 Position	5M	J12-T6B5-P5	J12-T6B5-P5-NPN	J12-T6B5-P5-NL
	10M	J12-T6B5-P1	J12-T6B5-P1-NPN	J12-T6B5-P1-NL
	15M	J12-T6B5-PA	J12-T6B5-PA-NPN	J12-T6B5-PA-NL
8 Position	5M	J12-T8B5-P5	J12-T8B5-P5-NPN	J12-T8B5-P5-NL
	10M	J12-T8B5-P1	J12-T8B5-P1-NPN	J12-T8B5-P1-NL
	15M	J12-T8B5-PA	J12-T8B5-PA-NPN	J12-T8B5-PA-NL

Technical

Operating Voltage	250 VAC / 300 VDC	**Contact Resistance**	≤ 6 MΩ
Operating Current	4 A	**Male Pin Dimension**	1 mm (8 pole = 0.9mm)
Protection Rating	IP 67	**Female Contact Material**	Phosphorous Bronze
Operating Temperature	-25° C to +85° C	**Female Contact Plating**	Nickel + 0.3 µm AU Gold
Housing Material	Nylon 6 + 30% Glass fiber	**Male Contact Material**	Brass
Overmolding Material	Polyurethane	**Male Contact Plating**	Nickel + 0.3 µm AU Gold

Additional products are avaialble from the factory. Please call us with your application needs.

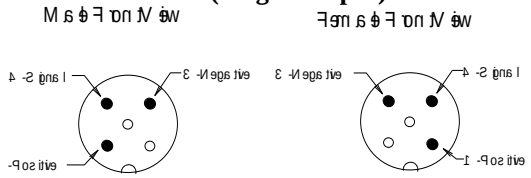
General Information
Frequently Asked Questions
About M8 and M12 Connectors and Assemblies

What is an M8 / M12 Connector?
The M12 (also called a "micro" connector) and M8 (also called "nano" connector) are standard electrical connectors typically used as an interface for sensors (proximity switches, photo-optics, small limit switches, etc.). The M12 refers to the thread size of the mating screw collars.

What are the benefits of the M8 / M12 Connectors?
This connector features a small diameter and is designed for harsh environments. Molded cables are rated to IP 67 (temporary immersion) and field wired connectors are rated to IP 65 (wash down).

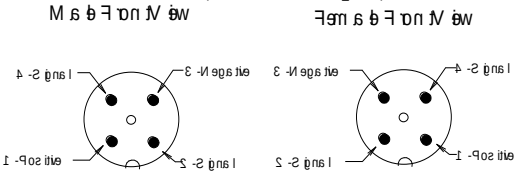
How are the M12 Connectors typically wired?

3 Wire Sensor
(Single Output)

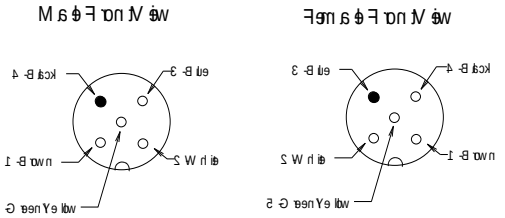


4 Wire Sensor

(Double Output)



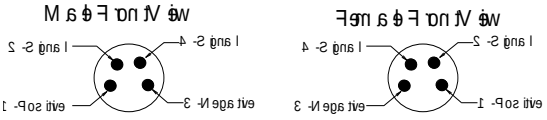
What is the usual color code for M12 assemblies?



How are the M8 Connectors typically wired?

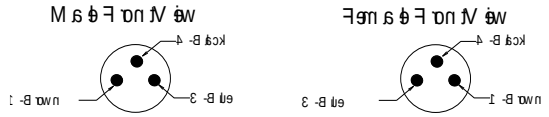
3 Pole M8

4 Pole M8

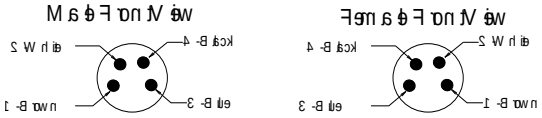


What is the usual color code for M8 assemblies?

3 Pole M8



4 Pole M8



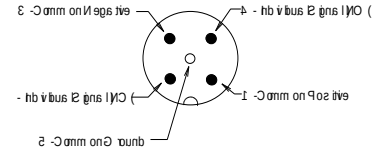
What are the benefits of using Distribution Boxes?

- Simplifies installation by operating up to 8 input or output points with one cable; cleans up cabling confusion and saves labor in cable routing.
- Offers common ground, negative and positive wires to further reduce labor in wiring.
- Modular plug in input and output cables provide easy installation, change out and maintenance.
- Compatible with standard M12 plug wiring schemes.

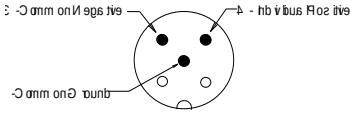
How do distribution boxes work?
Distribution Boxes are designed around the standard wiring used for the connectors. Common wiring (to each connector position) is provided for positive, negative and ground positions. Each connector has 2 individual wires available to transfer NO & NC position status for input devices or one wire can be used to provide separate power for output devices.

What is the wiring scheme used for distribution boxes?

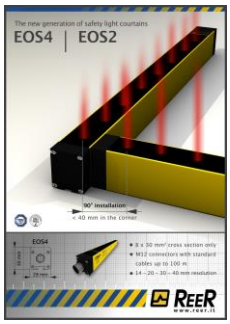
Input Devices



Output Devices



Other Products



- Additional Switch Types
- Safety Light Curtains
- Safety Controllers
- Hinged Door Safety Switches
- Other Safety Relay Types
- Electronic Modules
- E-Stop Housings

300 Roundhill Drive, Unit 4, Rockaway, NJ 07866
Telephone – (973) 586-2500 FAX – (973) 596-1590
E-Mail – info@norstat.com Website – www.norstat.com

Additional Products

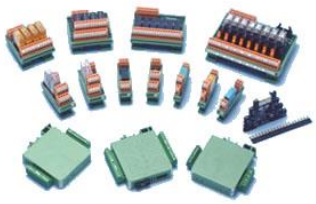
Small Safety Switch FC (Metal) & FK (Plastic)	Wide Body Safety Switches FL (Metal) & FX (Plastic)	Solenoid & Key Locking FS Series	Blank Control Box CP Series
Hinged Operated Safety Switches FD Series	Hinged Operated Safety Switches FK Series	Hinged Operated Safety Switches FR (Metal) & FM (Plastic)	Hinged Operated Safety Switches FZ (Metal) & FX (Plastic)
Pivot Point Safety Switches FR (Metal) & FM (Plastic)	Pivot Point Safety Switches FZ (Metal) & FX (Plastic)	Pivot Point Safety Switches FK Series	Safety Rope Pull FP (Plastic) & FD (Metal)
Safety Rope Pull FC Series	Safety Rope Pull FC Series	Safety Rope Pull FP (Plastic) & FD (Metal)	Safety Rope Pull FL Series

Additional Products

Position Switch Body Metal Heavy Duty FL Series	Position Switch Body Small Metal Heavy Duty FC Series	Position Switch Body Robust Plastic FX Series	Position Switch Body Metal Heavy Duty FZ Series
Position Switch Body Small Plastic Body FK Series	Pre-wired Switches Plastic Body FF Series	Micro-switches MS Series	Contact Blocks Mechanical VF-B
Contact Blocks Electronic Switching VF-E	Safety Relays SAFE S.6	Safety Relays Switches up to 10A SAFE S.10	Safety Relays Switches up to 8A RS-NAGMP
Safety Relays Mat & Edge Control RS-NAGAO	Safety Relay Muting Application RS-NAGU	Safety Relay With Timer RS-NAGT	Force Guide Relay SAFE-IRZ

300 Roundhill Drive, Unit 4, Rockaway, NJ 07866
Telephone – (973) 586-2500 FAX – (973) 596-1590
E-Mail – info@norstat.com Website – www.norstat.com

Additional Products

Safety Controller Programmable Safety			
Encoders Very Small Housings	Relays & Opto Couplers 	Interface Modules & Cables 	CNC & I/O Systems
Pizzato Safety Range 	Safety Light Barriers 	CAT 4 Safety Light Barriers 	CAT 2 Safety Light Barriers

Introduction to Safety

Who is Responsible?

Everyone has a role in the safe operation and functioning of a machine, including the machine designer/builder, safe guarding supplier, the manufacturer/user and the operational and maintenance personnel.

The American National Standards Institute, in their ***ANSI B11.19-2003 Performance Criteria for Safeguarding for Machine Tools*** publication, states the following:

4 *Responsibility*

4.1 *Safeguarding supplier*

4.1.1 *The safeguarding supplier, within the scope of its work activity shall ensure that safeguarding meets the design, construction, integration and installation requirement of this standard.*

4.2 *Safeguarding user*

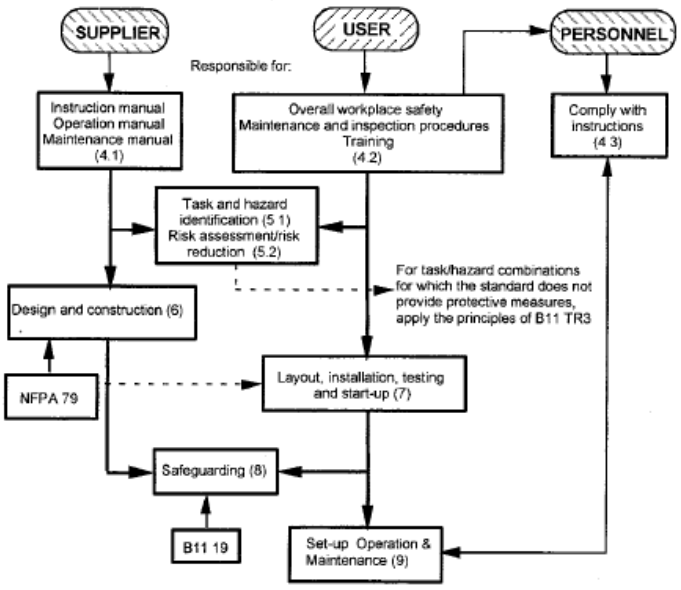
4.2.1 *The user shall be responsible for ensuring that safeguarding is provided, integrated, installed, maintained, and used in accordance with the requirements of this standard.*

4.2.2 *The user shall be responsible for ensuring the supervisors, operators, maintenance and service personnel are trained in the proper installation, adjustment and maintenance of the safeguarding, within the scope of their work activity.*

4.3 *Personnel*

Personnel involved with the installation, operation or maintenance of the safeguarding shall be responsible for following the training and safety procedures provided by the user in the operation and maintenance of the safeguarding.

The American National Standards Institute, further defines these roles in ***Annex A – Guidance in Understanding the B11 Standards, B11.19 and B11.TR3***, in the same publication, with the following chart:



For information only, please see appropriate standards for details.

Risk Assessment

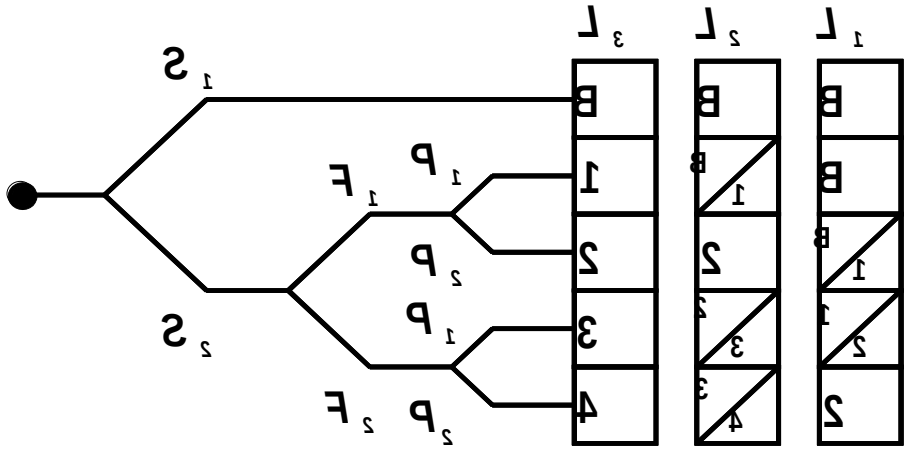
3.8 Risk Assessment
*A comprehensive estimation of the probability and the degree of possible injury or damage to health in a hazardous situation – **EN 292.1991***

Different types of machines have different levels of associated risk. It's these risk levels that need to be determined at the design stage in order to specify how far you, the designer, needs to go with the mechanical and electrical design, in order to meet the requirements of US, British and European Machine Directives. In simple terms the assessment of risk determines to a large extent, the level of safety precautions that are necessary to institute into the design of your machine.

New and already existing European and US standards, such as ANSI B11…, RIA 15.06, EN292 and EN60204, define Risk Assessment as a process intended to help designers and safety engineers define the most appropriate measures, enabling them to achieve the highest possible levels of safety according to "state of the art" and resulting constraints or regulations.

Also included, is information for formulating documentation, which is necessary when compiling a technical file, as required for regulations both here and abroad, as well as if legal action is taken against the machine designer or user.

There are many different charts and systems offered to establish the level of risk on a machine. The chart listed below outlines one of the more popular methods, however the choice of system to use should be based on the procedure that best suites your application requirements.



Severity of injury
- **S₁** *Slight injury (bruise)*
- **S₂** *Severe injury (amputation or death)*

Frequency of exposure to hazard
- **F₁** *Seldom*
- **F₂** *Frequent to continuous*

Possibility of avoiding the hazard
- **P₁** *Possible*
- **P₂** *Less possible*

Likelihood of occurrence (if an interlock fails)
- **L₁** *Very unlikely*
- **L₂** *Unlikely*
- **L₃** *Highly likely*

For information only, please see appropriate standards for details.

Safety Category Requirements

Risk categories for the design of fail safe control systems – EN 954	
Category B	***Safety devices and control systems, at a minimum, must be designed, selected and assembled to meet the operational requirements of design limits and the influence of the processed materials and other external influences. Most domestic appliances fall into this category, and providing the components are correctly specified (load, switching frequency, etc.), then no other special features are required.***
Category 1	***All conditions of B apply, but the safety related system must use "well tried" principles and components, see 7.2.2 EN 954-1. Software or electronic logic is not considered adequate at this level.***
Category 2	***All conditions of B apply, but in addition, the machine shall be prevented from starting if a fault is detected on power up. This suggests the use of an interface relay with redundancy and self-checking on energization. Single channel operation is permitted providing that the input devices (E-stop buttons, gate switches) are tested for operation on a regular basis.***
Category 3	***All conditions of B apply, but the complete safety control system shall be designed so that any single fault shall not lead to the loss of the safety function and where practical, the single fault shall be detected. This calls not only for redundancy in the interface relay but also in the input devices pointing to dual channel systems.***
Category 4	***All conditions of B apply, but now single fault detection is imperative and calls not only for redundancy in the input and output devices, but also for self-checking and cross monitoring; again dual channel control is called for.***

Basic Guidelines

Designers should in all circumstances:

1) **Specify the limits of the machine**

2) **Identify the hazards and assess the risk**

3) **Remove the hazards and limit the risk as far as possible**

4) **Design in safeguards, against remaining risks**

5) **Inform and warn the user about any residual risks**

6) **Consider any other precautions**

For information only, please see appropriate standards for details.

Common Safety Principles
From the Standards

Control Reliability

The capacity of the machine control system, the safeguarding, other control components and related interfacing to achieve a safe state in the event of a failure within their safety related functions."
ANSI B11.19-2003 3.14 Definitions

"The control system shall be constructed so that a failure within the system does not prevent the normal stopping action from being applied to the equipment when required, but does prevent initiation of a successive stroke until failure is corrected. The failure shall be detectable by a simple test or indicated by the control system."
OSHA Code of Federal Regulations, 1910.217, (b) (13) 29 CRF Ch. XVII (7-1-91)

"Control components failure protection" of electrical, electronic or pneumatic systems frequently consists of multiple, independent, parallel or series circuitry or components so arranged that any single failure would not significantly affect the stopping performance of the system or the machine tool. If a failure of a component has occurred, this arrangement either sends a stop command to the machine tool or prevents a successive cycle from being initiated."
ANSI B11.19-1990 Section E5.5

Single Component Failure

"A component may fail open, closed or to the point that its intended function is no longer viable. All failures should be considered in the evaluation of the system"
ANSI B11.19-1990 Section E5.5

"Safety system .... must be designed and constructed .... such that a single component failure or single operating error will not cause injury to personnel due to point of operation hazards."
OSHA Code of Federal Regulations, 1910.217 29 CRF Ch. XVII (7-1-91)

"The control system shall be designed, constructed and installed such that a single control component failure within the system does not prevent stopping action from taking place but will prevent successive system cycles until the failure has been corrected."
ANSI B11.20.6.13 Control Reliability

Redundancy

"The use of multiple means to perform the same function"
ANSI B11.19-2003 3.48 Definitions

"Component redundancy is the use of two or more control components in parallel or series circuits."
ANSI B11.20 E6.13 Control Reliability

For information only, please see appropriate standards for details.

Common Safety Principles
From the Standards

Monitoring

"The checking of system components to detect a failure of a component, subassembly or module that affects the performance of the safety related functions."
ANSI B11.19-2003 3.14 Definitions

"Failure of one of the redundant components can go undetected, allowing the appearance of safe operation." " When the additional elements of the redundant circuit subsequently fails an unsafe condition can occur. Monitoring and response to such single failures is essential."
ANSI B11.20 E6.13 Control Reliability

"That redundancy, and comparison and/or diagnostic checking, exist for the critical items that may cause injury, and the electrical, electronic, electromechanical and mechanical parts and components are selected so that they can withstand operational and external environments."
OSHA Code of Federal Regulations, 1910.217 29 CRF Ch. XVII (7-1-91)

"The control system shall perform checks for proper operation of all cycle control logic elements switches and contacts at least once each cycle."
OSHA Code of Federal Regulations, 1910.217 29 CRF Ch. XVII (7-1-91)

Positive Force

"Electromechanical systems that require redundancy and checking of relay contacts should use relays that are designed with a mechanical linkage to provide a positive relation between normally open and normally closed contacts to check the contact operation."
ANSI B11.19

"2.1 All -or-Nothing relays with positively driven contacts are all-or-nothing relays whose contacts are mechanically connected together in such a way that break contacts and make contacts can never be closed at the same time."
EN50205 Relays with Positively Driven Contacts

"Position sensors used in circuits with safety-related functions shall have positive (direct) opening operation"
NFPA 79 10.1.4.2

Operation

"System Emergency Stop shall immediately initiate stopping action of those motions which pose an imminent hazard to personnel. Resetting of the emergency stop shall not initiate, restart or create any hazardous motion. A manually operated emergency stop shall be provided at each operator station and shall be hard wired into the emergency stop circuit and shall function independently from the programmable electronic system (PES)"
ANSI B11.20.6.7.1

7-6 Emergency Stop. - (d) The emergency stop circuit shall: (1) operate by deactivation or deenergization and on loss of power. (2) have only hardware based components (i.e., it shall not rely on software to operate), although it may be possible to initiate the circuit from the software of the programmable electronic system.
ANSI/NFPA 79

For information only, please see appropriate standards for details.

Safety Organizations Reference Sources

There are many different organizations involved in machine and control safety standards, in the United States, Canada and Europe. Manufacturers associations are also a good source for the safety requirements of specific manufacturing sectors. The following is a list of some of the more popular agencies and information sources.

ANSI
American National Standards Institute
1819 L Street NW
Washington, DC 20036
Tel: (202) 293-8020
Fax: (202) 293-9287
www.ansi.org

ASME
American Society of Mechanical Engineers
3 Park Avenue
New York, NY 10016-5990
Tel: (212) 591-7722
FAX: (212) 591-7674
www.asme.org

ASSE
American Society of Safety Engineers
1800 East Oakton Street
Des Plaines, IL 60018
Tel: (847) 699-2929
Fax: (847) 768-3434
www.asse.org

CCOHS
Canadian Center for Occupational Health & Safety
250 Main Street East
Hamilton, ON L8N 1H6 Canada
Tel: (800) 688-4284
Fax: (905) 527-2206
www.ccohs.ca

CSA
Canadian Standards Association
5060 Spectrum Way, Suite 100
Mississauga, ON L4W 5N6 CAN.
Tel: (416) 747-4000
Fax: (416) 747-2473
www.csa.ca

CEMA
Conveyor Equipment Manufacturers Association
6724 Lone Oak Boulevard
Naples, FL 34109
Tel: (941) 514-3441
FAX: (941) 514-3470
www.cemanet.org

CENELEC
(European Committee for Electro technical Standardization)
35, Rue de Stassart
1050 Brussels
Tel: 011-32-2-519-68-71
Fax: 011-32-2-519-19
www.cenelec.org

CEN
European Committee for Standardization
36, Rue de Stassart
1050 Brussels
Tel: 011-32-2-550-08-19
Fax: 011-32-2-550-08-11
www.cenorm.be

DCI
Document Center, Inc.

11 Industrial Road, Suite 9
Belmont, CA 94002
Tel: (650) 591-7600
Fax: (650) 591-7617
www.document-center.com

GLOBAL
Global Engineering Documents
15 Inverness Way East
Englewood, CO 80112
Tel: (800) 624-3974
Fax: (303) 792-2192
www.global.his.com

NFPA
National Fire Protection Association
1 Batterymarch Park
Quincy, MA 002269-9101
Tel: (617) 770-3000
Fax: (617) 770-0700
www.nfpa.org

OSHA
Occupational Safety and Health Administration
200 Constitution Avenue, NW
Washington, DC 20210
Tel: (800) 321-6742
www.osha.gov

RIA
Robotics Industry Association

900 Victors Way, PO Box 3742
Ann Arbor, MI 48106
Tel: (734) 994-6088
Fax: (734) 994-3338
www.robotics.org

TUV
TUV America, Inc.

5 Cherry Hill Drive
Danvers, MA 01923
Tel: (800) TUV-0123
Fax: (987-777-8411
www.TUVamerica.com

UL
Underwriters Laboratories, Inc.
333 Pfingsten Road
Northbrook, IL 60062
Tel: (847) 272-8800
Fax: (847) 272-8129

NORSTAT INC.
300 Roundhill Drive, Unit 4, Rockaway, NJ 07866
Telephone (973) 586-2500 Fax (973) 586-1590
E-Mail info@norstat.com Website www.norstat.com