

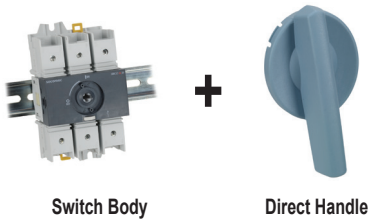
# SIRCO M UL 98

## Compact Non-Fusible Disconnect Switches

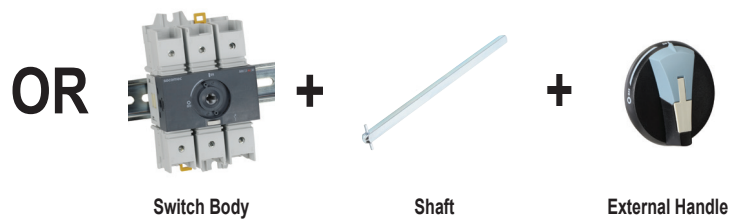


To assemble a switch, please select:

### Direct Operation



### External Operation



UL 98 Compact Non-Fusible Disconnect Switches				
Part Number*	Description	Amp Rating	Voltage Rating	Price
<a href="#">22013003</a>	Non-fusible rotary 3-pole disconnect switch, M3 frame size	30	600VAC	\$78.00
<a href="#">22013006</a>		60	600VAC	\$91.00
<a href="#">22003010</a>		100	600VAC	\$106.00

\* These part numbers are direct replacements for previous part numbers with a "-UL" suffix. They have identical technical specs, form, fit and function. There is no change in agency approvals, the UL mark, listing, or File numbers E173959 and E201138.

Handles – Defeatable and Lockable						
Part Number	Description	Switch Body Rating (A)	Handle Color	Handle Type	NEMA/UL Type	Price
<a href="#">22995032</a>	Mounts directly on switch, no shaft required*	30 - 100	Blue	M01	—	\$5.50
<a href="#">147D1111</a>	External front and right side handles, shaft required	16 - 100	Black/Blue	S00	4, 4X	\$27.50
<a href="#">147E1111</a>			Red/Yellow			\$27.50
<a href="#">14831111</a>		16 - 100	Black/Blue	S0	1, 3R, 12	\$29.00
<a href="#">14841111</a>			Red/Yellow			\$29.00
<a href="#">148D1111</a>			Black/Blue		4, 4X	\$48.50
<a href="#">148E1111</a>			Red/Yellow			\$48.50
<a href="#">140F2111</a>			Black/Blue	S01	1, 3R, 12	\$35.00
<a href="#">140G2111</a>			Red/Yellow			\$35.00
<a href="#">140D2111</a>			Black/Blue		4, 4X	\$51.00
<a href="#">140E2111</a>			Red/Yellow			\$51.00



\* Not defeatable

Shafts for External Handles					
Part Number	Switch Body Rating (A)	Handle Type	Length (in)	Length (mm)	Price
<a href="#">14070515</a>	16 - 100	S00, S0	5.9	150	\$7.00
<a href="#">14070520</a>			7.9	200	\$8.25
<a href="#">14070532</a>			12.6	320	\$9.00
<a href="#">14040520</a>		S01	7.9	200	\$11.00
<a href="#">14040532</a>			12.6	320	\$13.50
<a href="#">14040540</a>			15.7	400	\$22.00



# SIRCO M UL 98

## Compact Non-Fusible Disconnect Switches



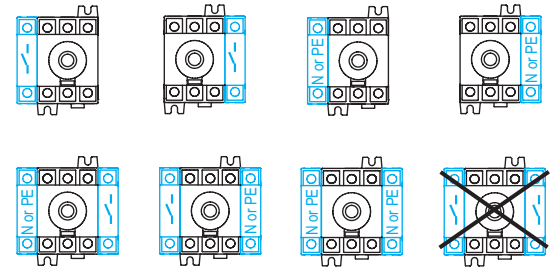
### Shaft Guide for External Handle

Part Number	Description	Handle Type	Price
<a href="#">14190000</a>	This accessory makes alignment connections between the shaft and handle easier. Allows up to 15mm misalignment tolerance. Required for a shaft length over 300mm. Included with longer shafts.	S00, S0	\$3.25
<a href="#">14290000</a>		S01, S1, S2, S3	\$6.75

[14190000](#)

### Additional Poles

Part Number*	Description	Switch Body Rating (A)	No. of Poles	Use	Price
<a href="#">22011003</a>	Fourth pole module switched 600VAC 100kA SCCR	30	1	Adding one additional pole transforms a non-fusible disconnect switch from 3 poles to 4 poles	\$23.50
<a href="#">22011006</a>	Fourth pole module switched 600VAC 65kA SCCR	60	1		\$27.00
<a href="#">22001010</a>	Fourth pole module switched 600VAC 100kA SCCR	100	1		\$33.50
<a href="#">22005011</a>	Solid neutral pole module unswitched 600VAC	30 - 100	1	Transforms the 3-pole switch into a 3-pole + solid neutral	\$28.00
<a href="#">22009011</a>	Grounding pole module unswitched 600VAC	30 - 100	1	Adds 1 ground module pole to the switch-disconnector	\$28.00

[22011003](#)

4th Pole Configurations

\* These part numbers are direct replacements for previous part numbers with a "-UL" suffix. They have identical technical specs, form, fit and function. There is no change in agency approvals, the UL mark, listing, or File numbers E173959 and E201138.

### Terminal Shrouds

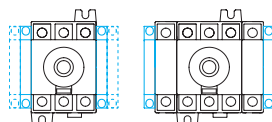
Part Number	Description	Switch Body Rating (A)	No. of Poles	Price
<a href="#">22941011</a>	Terminal shroud line/load mount, 2 per pack, offers additional protection against direct contact with the terminals.	30 - 100	1	\$6.00
<a href="#">22943016</a>		30 - 100	3	\$8.00

[22941011](#)

### Auxiliary Contacts

Part Number*	Description	Switch Body Rating (A)	Contacts	Price
<a href="#">22990001</a>	Auxiliary contact block module, 10A @ 240VAC, can be mounted on left or right side of switch, maximum 4 auxiliary contacts can be used (requires 2 modules)	16 - 100	1 NO / 1 NC	\$22.00
<a href="#">22990011</a>		16 - 100	2 NO	\$24.00

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[22990001](#)

Auxiliary Contact Configurations

# SIRCO M UL 98

## Compact Non-Fusible Disconnect Switches



### Technical Characteristics

Characteristics According to UL 98 / CSA 22.2#4			
DIN rail panel	22013003	22013006	22003010
General use rating (A)	30	60	100
Short-circuit rating at 480VAC (kA) <sup>1</sup>	100	100	100
Short-circuit rating at 600VAC (kA) <sup>1</sup>	100	100	25
Type of fuse	J	J	J
Max fuse rating (A)	30	60	100
Max. motor hp / FLA 3-phase motor max.			
220-240 VAC	10 / 28	20 / 54	20 / 54
440-480 VAC	20 / 27	40 / 52	50 / 65
600VAC	25 / 27	50 / 52	50 / 52
Max. motor hp / FLA 1-phase motor max.			
120VAC	2 / 24	3 / 34	5 / 56
240VAC	5 / 28	10 / 50	10 / 50
Wire type/temperature	Cu / 75°C (167°F)		
Product weight – lb (kg)	1.3 (0.6)		
Wire range			
Solid (AWG)	#12-10	#12-10	#12-10
Torque – lb·in (N·m)	35.4 (4)	35.4 (4)	35.4 (4)
Stranded (AWG)	#10-1	#10-1	#10-1
Torque – lb·in (N·m)	35.4 (4)	35.4 (4)	35.4 (4)
Stranded (AWG)	1/0	1/0	1/0
Torque – lb·in (N·m)	39.8 (4.5)	39.8 (4.5)	39.8 (4.5)
Stranded (AWG)	2/0	2/0	2/0
Torque – lb·in (N·m)	44.3 (5)	44.3 (5)	44.3 (5)
Mechanical characteristics			
Endurance (number of operating cycles)	10,000	10,000	10,000
Operating torque (lb·in / N·m)	12.4 / 1.4	12.4 / 1.4	12.4 / 1.4
Environmental - switch body			
Operating temperature <sup>2</sup>	-20°C to 70°C (-4°F to +158°F)		
Flammability rating	UL 94-V0		
Mounting	35mm DIN rail or panel mount		
Auxiliary contacts			
Electrical characteristics	A300	A300	A300
Agency approvals			
UL file # E201138 (UL 98), CSA file # 112964 (C22.2 NO. 14)			

<sup>1</sup> Short-circuit rating achieved when used with corresponding fuse type and max fuse rating.

<sup>2</sup> At temperatures above 40°C, the current rating of the switch has to be de-rated 1% per °C over 40°C. Example: At 60°C a 100A switch is rated 80A.

Note: These part numbers are direct replacements for previous part numbers with a "-UL" suffix. They have identical technical specs, form, fit and function. There is no change in agency approvals, the UL mark, listing, or File numbers E173959 and E201138.

To obtain the most current agency approval information, see the Agency Approval Checklist section on the specific part number's web page.

# SIRCO M UL 98

## Compact Non-Fusible Disconnect Switches



### Technical Characteristics (Continued)

Characteristics According to IEC 60647-3			
	<u>22013003</u>	<u>22013006</u>	<u>22003010</u>
<b>Thermal current <math>I_{th}</math> at 40°C (A)</b>	30	60	100
<b>Rated insulation voltage <math>U_i</math> (V)</b>	800	800	800
<b>Rated impulse withstand voltage <math>U_{imp}</math> (kV)</b>	8	8	8
<b>Rated operational currents <math>I_e</math></b>			
<b>400VAC / AC-22A utilization category (A)<sup>1</sup></b>	32	63	100
<b>400VAC / AC-23A utilization category (A)<sup>1</sup></b>	32	63	100
<b>690VAC / AC-22A utilization category (A)<sup>1</sup></b>	32	63	80
<b>690VAC / AC-23A utilization category (A)<sup>1</sup></b>	32	63	63
<b>Operational power in AC-23 (kW)<sup>2/3</sup></b>			
<b>@ 400VAC without prebreak AC in AC-23</b>	15	30	45
<b>@ 500VAC without prebreak AC in AC-23</b>	15	30	45
<b>@ 690VAC without prebreak AC in AC-23</b>	18.5	30	45
<b>Overload capacity (<math>U_e</math> 415VAC)</b>			
<b>Rated short-circuit making capacity <math>I_{cm}</math> (kA peak)<sup>4</sup></b>	12	12	12
<b>Connection</b>			
<b>Min. connection section (mm<sup>2</sup>)</b>	2.5	2.5	10
<b>Max. connection section (mm<sup>2</sup>)</b>	70	70	70

<sup>1</sup>Category with index A = frequent operation.

<sup>2</sup>A/B: Category with index A = frequent operation - Category with index B = infrequent operation.

<sup>3</sup>The power value is given for information only, the current values vary from one manufacturer to another.

<sup>4</sup>For a rated operating voltage  $U_e$  = 400VAC

Note: These part numbers are direct replacements for previous part numbers with a "-UL" suffix. They have identical technical specs, form, fit and function. There is no change in agency approvals, the UL mark, listing, or File numbers E173959 and E201138.

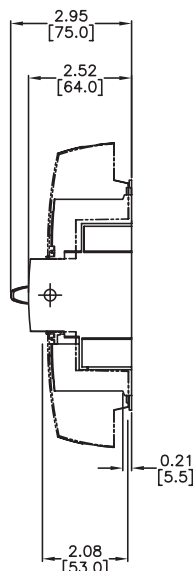
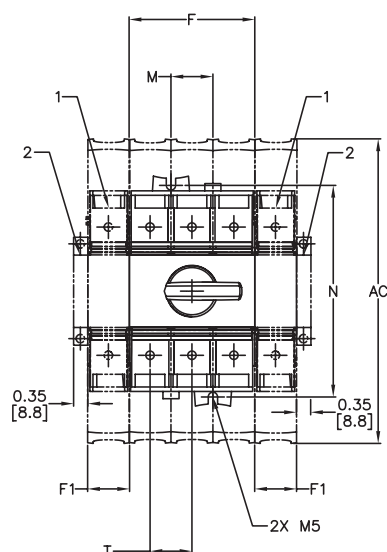
# SIRCO M UL 98

## Compact Non-Fusible Disconnect Switches



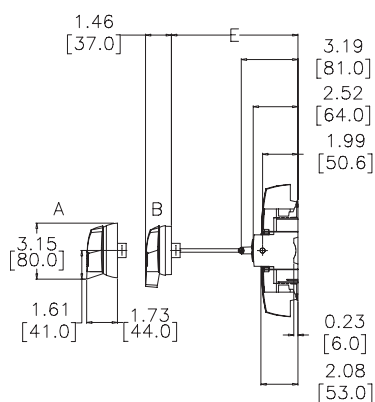
### Dimensions [inches/mm]

Direct operation with handle

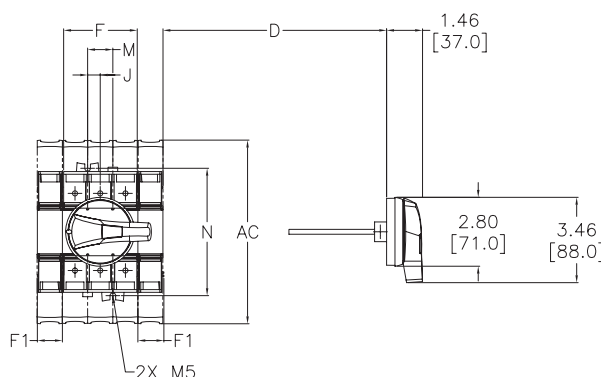


1. Location for: 1 switched fourth pole module (1 per device max), or 1 unswitched neutral pole module, or 1 auxillary contact module
  2. Position for auxillary contact module
- NOTE: MAX OF 2 ADDITIONAL BLOCK MODULES

External front operation



External side operation



### Dimensions

Switch Body Rating (A) / Frame Size	Units	Overall Dimensions				Terminal Shrouds AC	Switch Body				Switch Mounting		Connection
		D min	D Max	E min	E max		F	F1	G	J	M	N	
100 / M3	in	1.18	7.87	3.94	14.65	7.44	3.07	1.02	4.91	0.51	1.02	5.17	1.02
	mm	30	201	100	372	189	78	26	124.6	13	26	131.4	26

Please see our website [www.AutomationDirect.com](http://www.AutomationDirect.com) for complete engineering drawings.

# Accessories Dimensions

## Handles

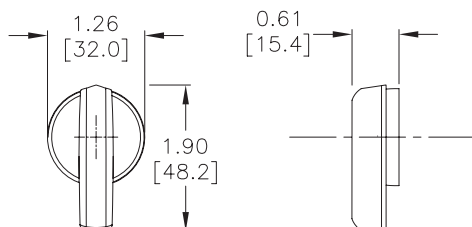
[inches/mm]



### Direct Handle for UL 98 Compact Non-Fusible Disconnect Switches

**22995032**

#### Handle Dimensions



### External Handles for UL 98 Compact Non-Fusible Disconnect Switches

#### S00 Type

Handle Dimensions	Direction of Operation	Door Drilling

#### S0 Type

Handle Dimensions	Direction of Operation	Door Drilling

#### S01 Type

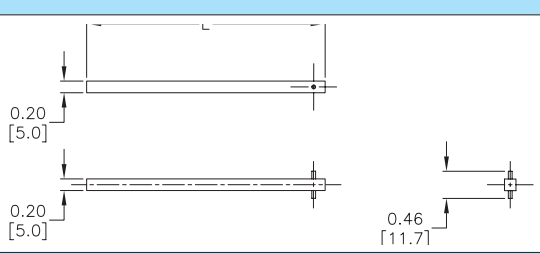
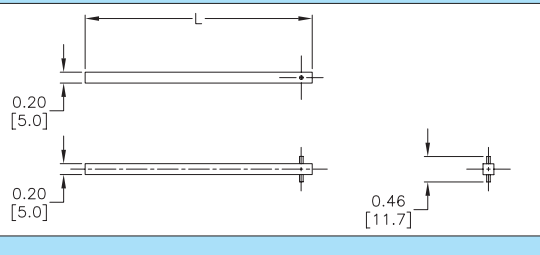
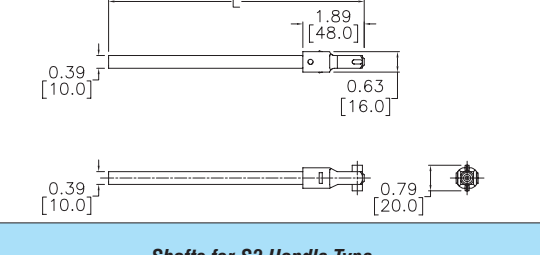
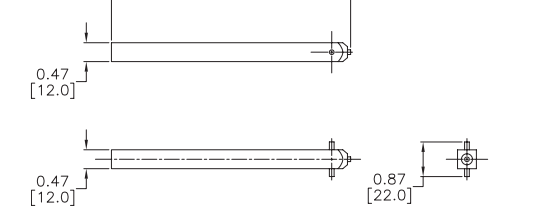
Handle Dimensions	Direction of Operation	Door Drilling

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# Accessories Dimensions

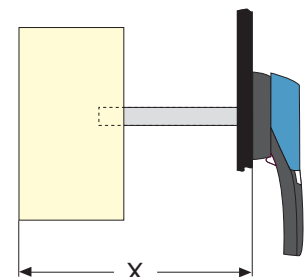
## Shafts for Non-Fusible Disconnect Switches

[inches/mm]

Shafts for Non-Fusible Disconnect Switches				
Shafts for S00, S0 Handle Type	Part Number	Switch Body Rating (A)	Length	
			in	mm
	<a href="#">14070515</a>	16 - 100	5.9	150
	<a href="#">14070520</a>		7.9	200
	<a href="#">14070532</a>		12.6	320
Shafts for S01 Handle Type	Part Number	Switch Body Rating (A)	Length	
			in	mm
	<a href="#">14040520</a>	16 - 100	7.9	200
	<a href="#">14040532</a>		12.6	320
	<a href="#">14040540</a>		15.7	400
Shafts for S1, S2 Handle Type	Part Number	Switch Body Rating (A)	Length	
			in	mm
	<a href="#">14001020</a>	100 - 400	7.9	200
	<a href="#">14001032</a>		12.6	320
	<a href="#">14001040</a>		15.7	400
Shafts for S3 Handle Type	Part Number	Switch Body Rating (A)	Length	
			in	mm
	<a href="#">14011520</a>	600	7.9	200
	<a href="#">14011532</a>		12.6	320
	<a href="#">14011540</a>		15.7	400

Please see our website [www.AutomationDirect.com](http://www.AutomationDirect.com) for complete engineering drawings.

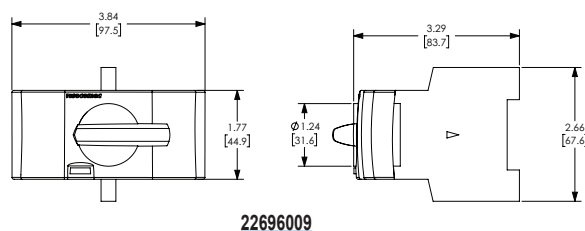
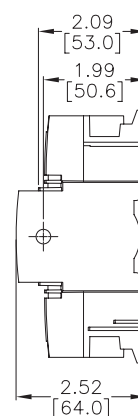
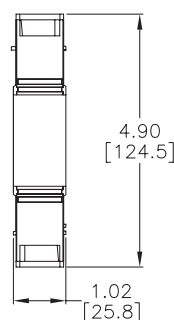
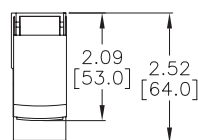
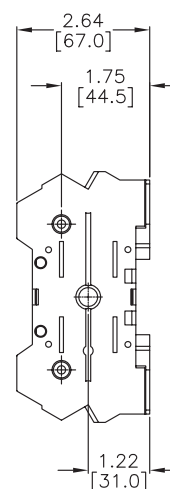
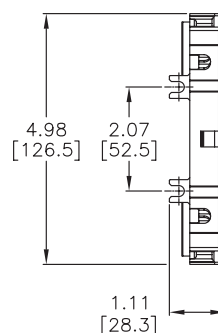
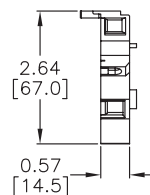
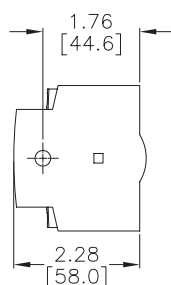
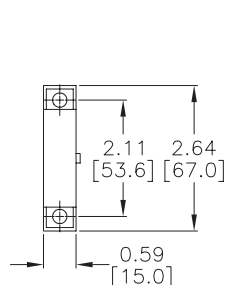
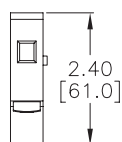
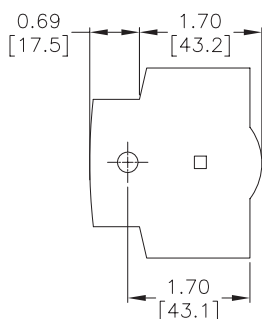
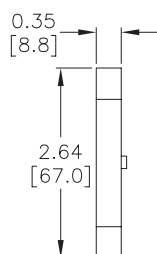
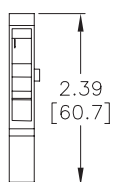
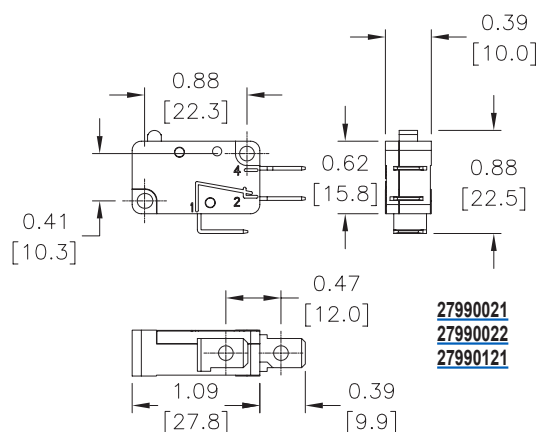
Shaft Length Minimum Dimensions						
Use standard lengths: 7.9 in / 200mm – 12.6 in / 320mm – 15.7 in / 400mm						
Switch Body Rating (A)	Dimension X		Handle Type	Length		Part Number
	in	mm		in	mm	
100 - 400	5.31 - 10.43	135 - 265	S2	7.9	200	<a href="#">14001020</a>
100 - 400	5.31 - 15.16	135 - 385	S2	12.6	320	<a href="#">14001032</a>
100 - 400	5.31 - 18.31	135 - 465	S2	15.7	400	<a href="#">14001040</a>
600	8.70 - 13.50	221 - 343	S3	7.9	200	<a href="#">14011520</a>
600	8.70 - 18.23	221 - 463	S3	12.6	320	<a href="#">14011532</a>
600	8.70 - 21.38	221 - 543	S3	15.7	400	<a href="#">14011540</a>



# Accessories Dimensions

## Auxiliary Contacts and Additional Poles

[inches/mm]

Please see our website [www.AutomationDirect.com](http://www.AutomationDirect.com) for complete engineering drawings.



# Disconnect Switches

## Introduction

### **UL®/CSA® Standards for Disconnect Switches**

#### **UL 98 – Enclosed and Deadfront Switches (CSA C22.2 No. 4)**

These requirements cover enclosed or deadfront switches, with or without provision for fuses, at 600V or less. These products are used as disconnecting means without restrictions; they are heavy-duty products requiring 2 inches (50mm) minimum of creepage distance between phases, which gives maximum safety for users and installation. The short-circuit withstand of these products goes up to 200kA.

#### **UL 489 – Molded Case Switches (CSA C22.22 No. 5)**

These requirements cover molded case circuit breakers, molded case switches and fused molded case switches, rated at 600V or less and 6000A or less.

### **NFPA® 79 Electrical Standard for Industrial Machinery**

The following types of machines are identified as industrial machinery:

- Metalworking machine tools, including machines that cut or form metal
- Plastics machinery
- Wood machinery, including woodworking, laminating and sawmill machines
- Assembly machines
- Material handling machines, including industrial robots and transfer machines
- Inspection and testing machines, including coordinate measuring and in-process gauging machines

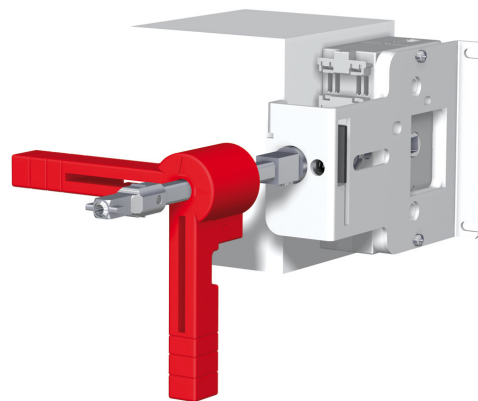
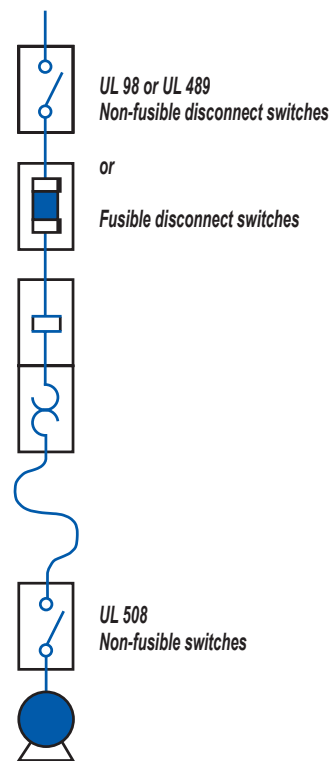
### **UL® Standards for Electrical Machinery**

#### **UL 508 – Industrial Control Equipment (CSA C22.2 No. 14)**

These requirements cover manual, magnetic and solidstate starters and controllers, overload relays, pushbuttons, selector switches and control lights. These products are smaller, requiring only a creepage distance between phases of 0.50 inch (12.7 mm). Their use as a disconnecting means is limited to local disconnection of motors. These products can be used as a disconnect means only when they have been additionally tested "suitable as motor disconnect." This additional testing ensures that the switch has a proper closing capacity on a short circuit.

UL 508 devices **cannot** be used as main disconnect of an electrical panel, e.g., at the entrance of control panels. A manual motor controller marked "suitable as motor disconnect" shall be installed only on the load side of the branch circuit protective device [UL 508A 30.3.3 and NEC 430.109 (6)].

#### **Typical Control Panel**



### **Meeting the requirements of UL508A and NFPA79**

#### **The disconnect shall be operable independent of the door position.**

The disconnect must be operable, by qualified persons, independent of the door position without the use of accessory tools or devices.

**Note:** NFPA 79; Paragraph 5.3.3.1 (5).

An operating mechanism for the disconnecting means shall be operable independent of the door position without the use of accessory tools or devices.


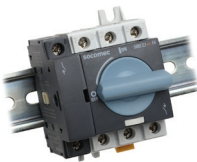



**Note:** UL 508A; Paragraph 66.6.3 c.

# Non-Fusible Disconnect Switches



## Selection Guide

- Which application?
- Which function?
- Which operation handle?
- Which type of breaking?

Machine Control			Power Distribution	
UL 98 Compact Non-Fusible Disconnect Switches	UL 508 Non-Fusible Disconnect Switches*	UL 508 Non-Fusible Enclosed Disconnect Switches	UL 98 Non-Fusible Disconnect Switches	UL 98B DC Non-Fusible Disconnect Switches
				
<a href="#">22013003</a> <a href="#">22013006</a> <a href="#">22003010</a>	<a href="#">22003000</a> , <a href="#">22003001</a> <a href="#">22003002</a> , <a href="#">22003003</a> <a href="#">22003004</a> , <a href="#">22003006</a> <a href="#">22003008</a>	<a href="#">22143503</a> <a href="#">22243503</a> <a href="#">22243506</a>	<a href="#">27003011</a> , <a href="#">27004011</a> <a href="#">27003021</a> , <a href="#">27004021</a> <a href="#">27003041</a> , <a href="#">27003060</a>	<a href="#">27DC3011</a> <a href="#">27DC4011</a> <a href="#">27DC3021</a> <a href="#">27DC4021</a>

Applications					
Main switchboard		✓	✓	✓	✓
Distribution panel		✓	✓	✓	✓
Emergency disconnect		✓	✓	✓	✓
Local safety disconnect (padlockable)		✓	✓	✓	✓
Photovoltaic disconnect					✓
Enclosed switches		✓	✓	✓	✓
Functions					
3/4 pole non-fusible disconnect switch		✓	✓	✓	✓
Characteristics					
Operation	Manual (rotating)	✓	✓	✓	✓
Direct operation handle	Front	✓	✓	✓	✓
External operation handle	Front	✓	✓	✓	✓
	Right side	✓	✓		
Indication of breaking	Positive break indication	✓	✓	✓	✓
Switch body	Modular	✓	✓		

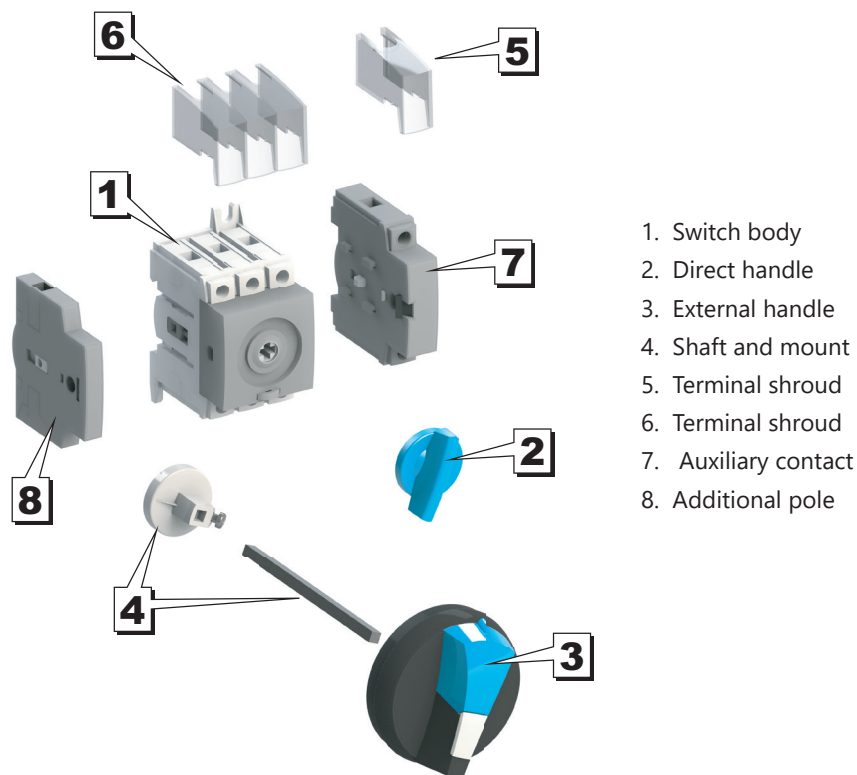
\* Note: These part numbers are direct replacements for previous part numbers with a "-UL" suffix. They have identical technical specs, form, fit and function. There is no change in agency approvals, the UL mark, listing, or File numbers E173959 and E201138.

# Non-Fusible Disconnect Switches

## Assembly of Accessories

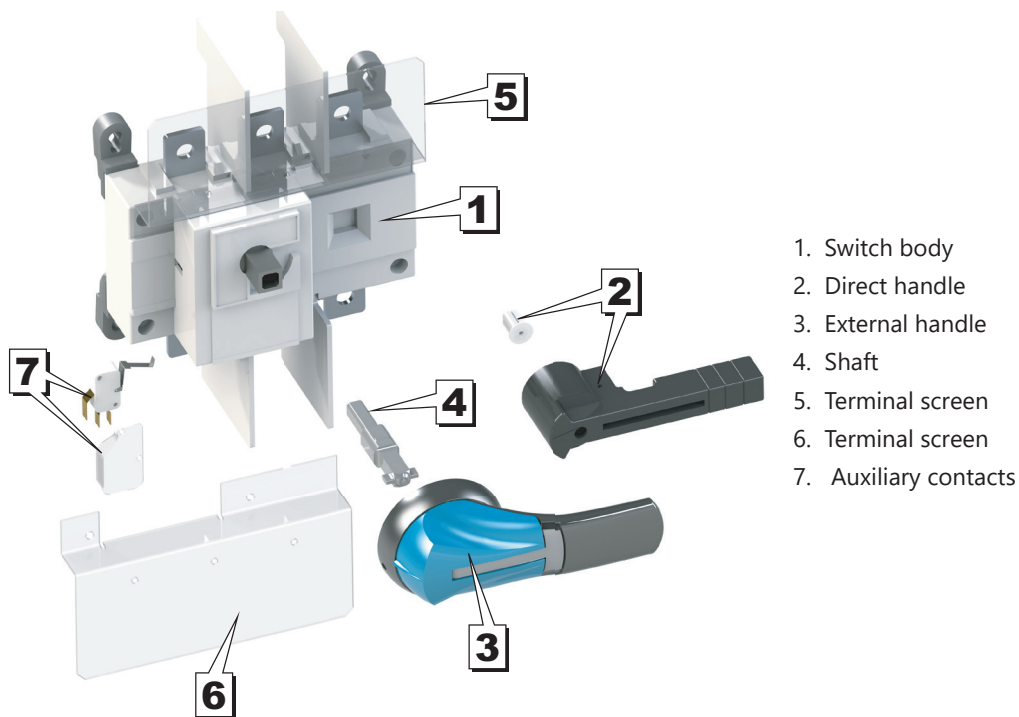


### Non-fusible 16 - 100A Disconnect Switches Accessories



1. Switch body
2. Direct handle
3. External handle
4. Shaft and mount
5. Terminal shroud
6. Terminal shroud
7. Auxiliary contact
8. Additional pole

### Non-fusible 100 - 600A Disconnect Switches Accessories



1. Switch body
2. Direct handle
3. External handle
4. Shaft
5. Terminal screen
6. Terminal screen
7. Auxiliary contacts