

Severe Duty Mill and Foundry Limit Switches

Catalog
May

05



Mill and Foundry Switches

- **Selection** *pages 4 to 5*
- **9007T Mill and 9007FT Foundry Switches**
 - Presentation, Applications, and Characteristics *pages 6 to 7*
 - References — Limit Switches *pages 8 to 11*
 - References — Levers and Replacement Parts *pages 12 to 13*
 - Dimensions *pages 14 to 17*
- **L100 Mill, L300 Foundry Switches, L140, L2153 Cable Pulls, and L525 Belt Conveyor**

Note: L100 has been known as the R. B. Denison® Lox Switch.

 - Presentation, Characteristics *pages 18 to 19*
 - References — L100 Limit Switches *pages 20 to 22*
 - References — L300 Limit Switches *pages 22 to 25*
 - References — Cable Pulls *pages 24*
 - References — Conveyor Belt *page 25*
 - References — Lever Arms *pages 26 to 27*
 - Lever Arm Options and Accessories *pages 28 to 29*
 - Dimensions and General Ordering Information *pages 30 to 31*
 - Product Reference Index *pages 32*
- **Schneider Electric Worldwide**
 - Addresses *pages 33 to 38*

Severe Duty Limit Switches

Mill and Foundry Switches

Conforming to NEMA A600 and UL508

Applications	Mill	Mill	Foundry
Design	9007T Convertible sequence	L100 Fixed sequence	9007FT Convertible sequence



Enclosure	Metal	Metal	Metal
Features	Extra heavy duty contact ratings Page 13	Extra heavy duty contact ratings Page 29	Designed specifically for rough foundry applications Page 13
Factory modifications:			
Conforming to standards Product	NEMA A600 UL508	NEMA A600 UL508	NEMA A600 UL508
Product certifications	UL Listed, CSA Certified	UL Listed, CSA Certified	UL Listed, CSA Certified
Body dimensions (w x h x d) in inches (mm) surface mounting	2.31 x 4.5 x 2.54 (58.67 x 114.3 x 64.5)	2.31 x 4.95 x 2.10 (58.7 x 126 x 53.3)	2.31 x 4.5 x 3.41 (58.67 x 114.3 x 86.614)
Head	Rotary movement (lever)	Rotary movement (lever)	Rotary movement (lever)
Contact blocks	1 N.C. + 1 N.O.	1 N.C. + 1 N.O.	1 N.C. + 1 N.O.
Snap action contacts ♦			
Sequences	Convertible	Fixed	Convertible
Rated insulation voltage	600 V	600 V	600 V
Thermal current (Ithe)	20 A ac/dc	20 A ac, 5 A dc	20 A ac/dc
Degree of protection	NEMA Type 1, 2, 4, 12, 13 IP65, 66, 67	NEMA Type 1, 4, 13 IP65, 66	NEMA Type 1, 2, 4, 12, 13 IP65, 66, 67
Connection	Cable entry or connector 0.5" NPT (metric available)	Cable entry or connector 0.5" NPT (metric available)	Cable entry or connector 0.5" NPT (metric available)
Type reference	9007T●●●	L100●●●	9007FT●●●
Presentation, Applications and Characteristics	Pages 8 and 9	Pages 20 through 22	Pages 10 and 11
Interpretation of Reference Numbers	Page 31	Page 31	Page 31

♦ For other contact options see pages 8 through 11.

Foundry	Mill and Foundry	Mill	Mill
L300 Fixed sequence	L2153 Dual Pull Stop Fixed sequence	L14 Single Cable Pulls Fixed sequence	L525 Belt Conveyor Fixed sequence



Metal	Metal	Metal	Metal
Designed specifically for rough foundry applications	Extra heavy duty contact ratings	Extra heavy duty contact ratings	Extra heavy duty contact ratings
Page 29	Page 29	Page 29	Page 29
NEMA A600 UL508	NEMA A600 UL508	NEMA A600 UL508	NEMA A600 UL508
UL Listed, CSA Certified	UL Listed, CSA Certified	UL Listed, CSA Certified	UL Listed, CSA Certified
2.31 x 4.95 x 2.10 (58.7 x 126 x 53.3)	2.31 x 4.95 x 2.10 (58.7 x 126 x 53.3)	2.31 x 4.95 x 2.10 (58.7 x 126 x 53.3)	2.31 x 4.95 x 2.10 (58.7 x 126 x 53.3)
Rotary movement (lever)	Rotary movement (lever)	Rotary movement (lever)	Rotary movement (lever)
1 N.C. + 1 N.O.	1 N.C. + 1 N.O.	1 N.C. + 1 N.O.	1 N.C. + 1 N.O.
Fixed	Fixed	Fixed	Fixed
600 V	600 V	600 V	600 V
20 A ac, 5 A dc	20 A ac, 5 A dc	20 A ac, 5 A dc	20 A ac, 5 A dc
NEMA Type 1, 4, 13 IP65, 66	NEMA Type 1, 4, 13 IP65, 66	NEMA Type 1, 4, 13 IP65, 66	NEMA Type 1, 4, 13 IP65, 66
Cable entry or connector 0.5" NPT (metric available)	Cable entry or connector 0.5" NPT (metric available)	Cable entry or connector 0.5" NPT (metric available)	Cable entry or connector 0.5" NPT (metric available)
L300●●●	L2153	L14	L525
Pages 22 through 25	Page 24	Page 24	Page 25
Page 31	Page 31	Page 31	Page 31

Lever arms are optional and must be ordered separately.

Description

9007T Mill Switches

Use the 9007T Mill switches instead of other limit switches in the following applications:

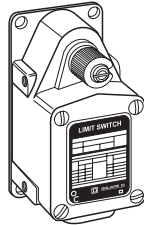
- 1 Where the current load exceeds the typical heavy duty limit switch contact rating of 10 A and falls within the range of up to 20 A continuous.
- 2 Where an operating sequence is required that is not possible on other limit switches. Fifteen sequences are available. Universal type has twelve different operating sequences with CW only, CCW only and neutral position. Standard type has three operating sequences with CW and CCW operation.
- 3 Where higher reset forces are required due to foreign material interfering with lever arm operation, or where long heavy arms must reset against gravity.

9007FT Foundry Switches

The 9007FT Foundry switches are for use in foundries or mills where the applications described above are required, and where falling foundry sand or similar material could build up and jam the operating mechanism. The shaft has a dust boot and extends from the switch case, preventing sand build up around the shaft. The devices can withstand hot falling sand up to 300° F (149° C).

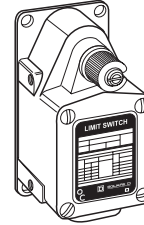
9007 (convertible sequence)

9007T Mill Switches



Pages 8 and 9

9007FT Foundry Switches



Pages 10 and 11

Application Information

Type T — Ideal for applications requiring extra heavy duty contact ratings, or higher operating and reset forces. Rugged mechanical construction with several different operating sequences in one basic switch.

Type FT — Designed specifically for rough foundry application. The shaft is entirely beyond the switch case to prevent jamming of the lever arm due to build up of sand. A dust boot is furnished as standard to further prevent sand packing and allow free movement of the lever arm. An extra long shaft bearing makes the switch extremely rugged and able to handle the rough applications encountered in foundries, mills, machine tool and similar industries. The switch will withstand hot falling sand up to 300° F (149° C).

Type T and FT

Enclosure — Oil-tight, dust-tight, water-tight, drip-tight meets NEMA 2, 4, and 13 requirements. Die cast zinc construction.

Operating Sequences — Fifteen sequences available. Universal type has 12 different operating sequences with CW only, CCW only, and neutral position operation. Standard type has three operating sequences with CW and CCW operation. Various sequences will give quick make and break, spring return with maintained contact, or slow make and break. Most sequences are convertible by removing the base plate and adjusting the positioning plate and/or latches

Ambient Temperature Range — 10° F (-12.2° C) to 185° F (85° C) ambient at full rated load, up to 220° F (104° C) ambient with single coil load.

Lever Arm — Die cast zinc construction with hardened, oil-impregnated, sintered iron rollers.

Conduit — 0.5" standard / 20 mm optional - Form M11

Mounting — Four baseplates provide end or side mounting holes and/or manifold mounting. All mounting holes are 0.25" (6.35 mm) diameter. Two tapped holes on each side of switch allows side mounting.

Contacts — SPDT, double break and three point double throw single break. Silver contact tips. Phenolic contact block. Nylon liner. Polarity must be same on double throw contacts.

Severe Duty Limit Switches

9007T Mill and 9007FT Foundry Switches

Conforming to NEMA A600 and UL508

Environment characteristics

Conforming to standards	UL508
Product certifications	UL Listed, CSA Certified, CE Marked
Protective treatment	Corrosion resistant gray paint
Ambient air temperature	- 10 °F to + 185 °F (-23 °C to + 85 °C)
Vibration resistance	10G (10 - 55 Hz)
Shock resistance	30G
Electric shock protection	Class O
Degree of protection	NEMA Type 1, 2, 4, 12, 13, IP65, 66, 67
Cable entry or connector	0.5" NPT (metric available)
Materials	Cast zinc ◊

Contact block characteristics

Rated operational characteristics hard contacts	AC Voltage	NEMA A600 Ithe = 20 A 20 A Resistive and continuous
Rated operational characteristics hard contacts	DC Voltage	NEMA P 600 Ithe = 20 A 20 A Resistive and continuous
Rated insulation voltage		600 V
Rated impulse withstand voltage		2,500 Vac for 1 minute for CE, 2,200 Vac for 1 minute for UL, and 2,640 Vac for 1 minute for CSA
Positive opening		No
Short circuit protection		20 A Bussmann Class CC KTK-R-20 fuse, non time delay
Terminal wire sizes (Cabling/Screw Clamp)		12 – 22 AWG (3.31 mm ² – 0.326 mm ²) wire max.
Maximum actuation speed		15.2 fpm / 27.4 fpm (50 fpm / 90 fpm) with 45 ° Cam angle, levers only
Electrical durability		N/A (future availability)

Maximum current ratings for control circuit contacts

Contacts	Volts	AC							Volts	DC		
		Inductive 35% Power Factor				Con- tinuous Carrying Amperes	Resistive 75% Power Factor			Inductive and Resistive		
		Make		Break			Make, Break and Continuous Carrying Amperes	Make and Break Amperes		Con- tinuous Carrying Amperes		
		Amperes	VA	Amperes	VA	Single Throw		Double Throw				
SPDT Quick Make and Break	120	150	18,000	20	2400	20	20	120	5.0	⊕	20	
	240	75	18,000	12.5	3000	20	20	250	1.0	⊕	20	
	480	37.5	18,000	6.25	3000	20	20	600	0.2	⊕	20	
	600	30	18,000	5	3000	20	20					
All Slow Make and Break	120	60	7200	6	720	20	10	20	...	...	...
	240	30	7200	3	720	20	10	20	...	...	...
	480	15	7200	1.5	720	20	10	20	...	...	...
	600	12	7200	1.2	720	20	10	20	...	...	...

Characteristics for material and ratings comparisons — standard switches ◊

	9007 Type T/FT	Type L (R. B. Denison Lox Switch)
Body material	Cast zinc	Cast aluminum
Cover material	Cast zinc	Aluminum
Base plate material	Steel with zinc plating	Steel with chromate plating
Shaft seal material	Nitrile	PVC
Contact block material	Phenolic	Glass filled nylon
Moveable contact material	Fine silver on copper backing	Coin Silver on steel backing
Stationary contact material	Fine silver on copper backing	90/10 AgCdO on copper backing
Low ambient temperature rating	-10° F	0° F
High ambient temperature at full rating ◊	180° F	200° F
Enclosure rating	NEMA Types 1, 2, 4, 12 and 13	NEMA Types 1, 4 and 13
Vibration resistance	10G (10 - 150 Hz)	40G max (10-150 Hz)

















◊ Many switches are available with higher or lower temperature limits by selecting special versions or special options. See page 29.

Severe Duty Limit Switches

9007T Mill Switches

Universal operating sequences

Universal References







Base Plate							
Surface Mounted	A	9007TUA1	9007TUA2	9007TUA3	9007TUA4	9007TUA5	9007TUA6
	B	9007TUB1	9007TUB2	9007TUB3	9007TUB4	9007TUB5	9007TUB6
	C	9007TUC1	9007TUC2	9007TUC3	9007TUC4	9007TUC5	9007TUC6
	D	9007TUD1	9007TUD2	9007TUD3	9007TUD4	9007TUD5	9007TUD6
		No. 1 Single Pole Double Throw Spring Return CW Only	No. 2 Single Pole Double Throw Spring Return CW Only	No. 3 ④ Single Pole Double Throw Maintained Contact	No. 4 Single Pole Double Throw Spring Return Neutral Position	No. 5 Single Pole Double Throw Spring Return CCW Only	No. 6 Single Pole Double Throw Spring Return CCW Only
		Initial position and CCW  CW 	Initial position and CCW  Middle CW  Final CW 	Spring return of arm to initial pos. Contact pos. maintained until operated in reverse direction CCW  CW  If high speed cam or snap-back is present, use No. 12	Initial position  CCW  CW 	Initial position and CW  CCW 	Initial position and CW  Middle CCW  Final CCW 

Characteristics
















Nominal Operating Data

Pre-travel ①	14°	Int. Pos. 9°, Final 16°	7°	6°	14°	Int. Pos. 9°, Final 16°
Total travel	88°	88°	81°	81°	88°	88°
Differential	12°	5°	7°	5°	12°	5°
Operating torque	12 lb-in (1.35 N•m)	12 lb-in (1.35 N•m)	12 lb-in (1.35 N•m)	12 lb-in (1.35 N•m)	12 lb-in (1.35 N•m)	12 lb-in (1.35 N•m)
Repeat accuracy ②	± 0.004" (0.10mm)	± 0.004" (0.10mm)	± 0.004" (0.10mm)	± 0.004" (0.10mm)	± 0.004" (0.10mm)	± 0.004" (0.10mm)

To convert sequences, remove base plate, position plate and latches. Reassemble positioning plate and latches as shown.

						
Weight lb (kg)	2.35 lb. (0.18 kg)	2.35 lb. (0.18 kg)	2.35 lb. (0.18 kg)	2.35 lb. (0.18 kg)	2.35 lb. (0.18 kg)	2.35 lb. (0.18 kg)

Universal References (continued)






Base Plate							
Surface Mounted	A	9007TUA7	9007TUA8	9007TUA9	9007TUA10	9007TUA11	9007TUA12
	B	9007TUB7	9007TUB8	9007TUB9	9007TUB10	9007TUB11	9007TUB12
	C	9007TUC7	9007TUC8	9007TUC9	9007TUC10	9007TUC11	9007TUC12
	D	9007TUD7	9007TUD8	9007TUD9	9007TUD10	9007TUD11	9007TUD12
		No. 7 Single Pole Double Throw Maintained	No. 8 ④ Single Pole Double Throw Maintained Neutral Position	No. 9 Single Pole Double Throw Spring Return Slow Make Slow Break	No. 10 Single Pole Double Throw Spring Return Slow Make Slow Break	No. 11 Single Pole Double Throw Spring Return Slow Make Slow Break	No. 12 Single Pole Double Throw Maintained
		If high speed cam or snap-back present, use No. 12  CCW 	Initial position If high speed cam or snap-back is present, use No. 12  CCW  CW 	Initial position and CCW  CW 	Initial position  CCW  CW 	Initial position and CW  CCW 	CCW  CW 

Characteristics

Nominal Operating Data


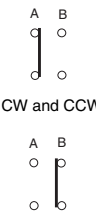
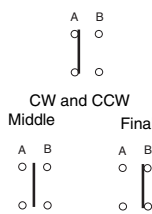
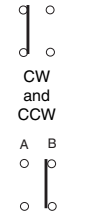
Pre-travel ①	10°	6°	12°	3°	12°	45°
Total travel	85°	81°	87°	81°	87°	90°
Differential	12°	10°	0°	0°	0°	0°
Operating torque	2.5 lb-in (0.28 N•m)	2.5 lb-in (0.28 N•m)	12 lb-in (1.35 N•m)	12 lb-in (1.35 N•m)	12 lb-in (1.35 N•m)	8 lb-in (0.9 N•m)
Repeat accuracy ②	± 0.004" (0.10mm)	± 0.004" (0.10mm)	± 0.004" (0.10mm)	± 0.004" (0.10mm)	± 0.004" (0.10mm)	± 0.004" (0.10mm)

To convert sequences, remove base plate, position plate and latches. Reassemble positioning plate and latches as shown.

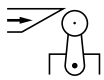
						Not adjustable
Weight lb (kg)	2.35 lb (0.18 kg)	2.35 lb. (0.18 kg)	2.35 lb. (0.18 kg)	2.35 lb. (0.18 kg)	2.35 lb. (0.18 kg)	2.35 lb. (0.18 kg)

Standard References

Base Plate

Surface Mounted	A B C D	9007TSA1 9007TSB1 9007TSC1 9007TSD1	9007TSA2 9007TSB2 9007TSC2 9007TSD2	9007TSA3 9007TSB3 9007TSC3 9007TSD3
		No. 1 Single Pole Double Throw Spring Return CW & CCW	No. 2 Single Pole Double Throw Spring Return CW & CCW	No. 3 Single Pole Double Throw Spring Return CW & CCW Slow Make Slow Break
		Initial position 	Initial position 	Initial position 

Characteristics (nominal operating data)

Switch actuation	By 30° cam		
Type of actuation			
Pre-travel ①	14°	Int. Pos. 9°, Final 16°	9°
Total travel	89°	89°	89°
Differential	12°	Int. Pos. 5.5°, Final 7.5°	5°
Reverse overtravel	N/A (future availability)	N/A (future availability)	N/A (future availability)
Mechanical durability in millions of operating cycles	N/A (future availability)	N/A (future availability)	N/A (future availability)
Operating torque/force 1 pole & 2 pole	10 lb-in (1.13 N•m)	10 lb-in (1.13 N•m)	10 lb-in (1.13 N•m)
Terminal wire sizes (Cabling/Screw Clamp)	#12 - 22 AWG (3.31 mm ² - 0.326 mm ²)	#12 - 22 AWG (3.31 mm ² - 0.326 mm ²)	#12 - 22 AWG (3.31 mm ² - 0.326 mm ²)
Repeatability ② (linear travel of cam)	± 0.004" (0.10mm)	± 0.004" (0.10mm)	± 0.004" (0.10mm)
Cable entry (metric available)	0.5" NPT	0.5" NPT	0.5" NPT
Weight lb (kg)	2.35 lb. (0.18 kg)	2.35 lb. (0.18 kg)	2.35 lb. (0.18 kg)

① The pre-travel listed may vary up to 5° additional for universal switches or up to 2° additional for standard switches due to free travel of lever arm at initial position.

② Linear travel of cam on 1.5" (38.1mm) lever arm.

③ Remove spring from the positioning plate.

④ Sequence 3, 7, and 8 devices are available but are not recommended where high speed cams or lever arm snap-back is present.




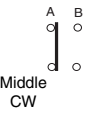


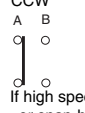

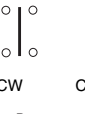




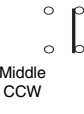


The application should be checked and No. 12 sequences substituted where possible.

Note: Type FT Foundry Switches are obtained by changing the "T" at the beginning of the equivalent type number above to "FT" (Example: FTUB1).

See pages 10 and 11.

Universal References

Base Plate







Surface Mounted	A 9007FTUA1 9007FTUB1 9007FTUC1 9007FTUD1	9007FTUA2 9007FTUB2 9007FTUC2 9007FTUD2	9007FTUA3 9007FTUB3 9007FTUC3 9007FTUD3	9007FTUA4 9007FTUB4 9007FTUC4 9007FTUD4	9007FTUA5 9007FTUB5 9007FTUC5 9007FTUD5	9007FTUA6 9007FTUB6 9007FTUC6 9007FTUD6
	No. 1 Single Pole Double Throw Spring Return CW Only	No. 2 Single Pole Double Throw Spring Return CW Only	No. 3 ④ Single Pole Double Throw Maintained Contact	No. 4 Single Pole Double Throw Spring Return Neutral Position	No. 5 Single Pole Double Throw Spring Return CCW Only	No. 6 Single Pole Double Throw Spring Return CCW Only
	Initial position and CCW  CW 	Initial position and CCW  Middle CW  Final CW 	Spring return of arm to initial pos. Contact pos. maintained until operated in reverse direction CCW  CW  If high speed cam or snap-back is present, use No. 12	Initial position  CCW  CW 	Initial position and CW  CCW 	Initial position and CW  Middle CCW  Final CCW 

Characteristics

Nominal Operating Data


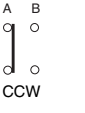

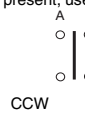


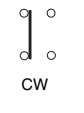

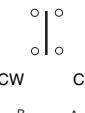


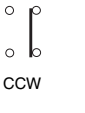

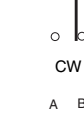

Pre-travel ①	14°	Int. Pos. 9°, Final 16°	7°	6°	14°	Int. Pos. 9°, Final 16°
Total travel	88°	88°	81°	81°	88°	88°
Differential	12°	5°	7°	5°	12°	5°
Operating torque	12 lb-in (1.35 N•m)	12 lb-in (1.35 N•m)	12 lb-in (1.35 N•m)	12 lb-in (1.35 N•m)	12 lb-in (1.35 N•m)	12 lb-in (1.35 N•m)
Repeat accuracy ②	± 0.004" (0.10mm)	± 0.004" (0.10mm)	± 0.004" (0.10mm)	± 0.004" (0.10mm)	± 0.004" (0.10mm)	± 0.004" (0.10mm)

To convert sequences, remove base plate, position plate and latches. Reassemble positioning plate and latches as shown.

						
Weight lb (kg)	2.57 lb (0.96 kg)	2.57 lb (0.96 kg)	2.57 lb (0.96 kg)	2.57 lb (0.96 kg)	2.57 lb (0.96 kg)	2.57 lb (0.96 kg)

Universal References (continued)

Base Plate






Surface Mounted	A 9007FTUA7 9007FTUB7 9007FTUC7 9007FTUD7	9007FTUA8 9007FTUB8 9007FTUC8 9007FTUD8	9007FTUA9 9007FTUB9 9007FTUC9 9007FTUD9	9007FTUA10 9007FTUB10 9007FTUC10 9007FTUD10	9007FTUA11 9007FTUB11 9007FTUC11 9007FTUD11	9007FTUA12 9007FTUB12 9007FTUC12 9007FTUD12
	No. 7 Single Pole Double Throw Maintained	No. 8 ④ Single Pole Double Throw Maintained Neutral Position	No. 9 Single Pole Double Throw Spring Return Slow Make Slow Break	No. 10 Single Pole Double Throw Spring Return Slow Make Slow Break	No. 11 Single Pole Double Throw Spring Return Slow Make Slow Break	No. 12 Single Pole Double Throw Maintained
	If high speed cam or snap-back present, use No. 12  CCW 	Initial position If high speed cam or snap-back present, use No. 12  CCW  CW 	Initial position and CCW  CW 	Initial position  CCW  CW 	Initial position and CW  CCW 	CCW  CW 

Characteristics


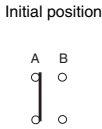
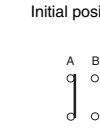
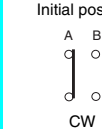
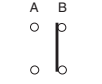
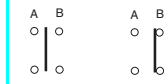
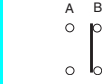
Nominal Operating Data

Pre-travel ①	10°	6°	12°	3°	12°	45°
Total travel	85°	81°	87°	81°	87°	90°
Differential	12°	10°	0°	0°	0°	0°
Operating torque	2.5 lb-in (0.28 N•m)	2.5 lb-in (0.28 N•m)	12 lb-in (1.35 N•m)	12 lb-in (1.35 N•m)	12 lb-in (1.35 N•m)	8 lb-in (0.9 N•m)
Repeat accuracy ②	± 0.004" (0.10mm)	± 0.004" (0.10mm)	± 0.004" (0.10mm)	± 0.004" (0.10mm)	± 0.004" (0.10mm)	± 0.004" (0.10mm)


To convert sequences, remove base plate, position plate and latches. Reassemble positioning plate and latches as shown.

						Not adjustable
Weight lb (kg)	2.57 lb (0.96 kg)	2.57 lb (0.96 kg)	2.57 lb (0.96 kg)	2.57 lb (0.96 kg)	2.57 lb (0.96 kg)	2.57 lb (0.96 kg)

Standard References

Base Plate				
Surface Mounted	A B C D	9007FTSA1 9007FTSB1 9007FTSC1 9007FTSD1	9007FTSA2 9007FTSB2 9007FTSC2 9007FTSD2	9007FTSA3 9007FTSB3 9007FTSC3 9007FTSD3
		No. 1 Single Pole Double Throw Spring Return CW & CCW	No. 2 Single Pole Double Throw Spring Return CW & CCW	No. 3 Single Pole Double Throw Spring Return CW & CCW Slow Make Slow Break
		Initial position 	Initial position 	Initial position 
		CW and CCW 	CW and CCW Middle Final 	CW and CCW 

Characteristics (nominal operating data)

Switch actuation	By 30° cam		
Type of actuation			
Pre-travel ①	14°	Int. Pos. 9°, Final 16°	9°
Total travel	89°	89°	89°
Differential	12°	Int. Pos. 5.5°, Final 7.5°	5°
Reverse overtravel	N/A (future availability)	N/A (future availability)	N/A (future availability)
Mechanical durability (in millions of operating cycles)	N/A (future availability)	N/A (future availability)	N/A (future availability)
Operating torque/force 1 pole & 2 pole	10 lb-in (1.13 N•m)	10 lb-in (1.13 N•m)	10 lb-in (1.13 N•m)
Terminal wire sizes (Cabling/Screw Clamp)	#12 - 22 AWG (3.31 mm ² - 0.326 mm ²)	#12 - 22 AWG (3.31 mm ² - 0.326 mm ²)	#12 - 22 AWG (3.31 mm ² - 0.326 mm ²)
Repeatability ② (linear travel of cam)	± 0.004" (0.10mm)	± 0.004" (0.10mm)	± 0.004" (0.10mm)
Cable entry (metric available)	0.5" NPT	0.5" NPT	0.5" NPT
Weight lb (kg)	2.57 lb. (0.96 kg)	2.57 lb. (0.96 kg)	2.57 lb. (0.96 kg)

① The pre-travel listed may vary up to 5° additional for universal switches or up to 2° additional for standard switches due to free travel of lever arm at initial position.

② Linear travel of cam on 1.5" (38.1mm) lever arm.

③ Remove spring from the positioning plate.

④ Sequence 3, 7, and 8 devices are available but are not recommended where high speed cams or lever arm snap-back is present.

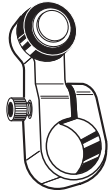
The application should be checked and No. 12 sequences substituted where possible.

Note: Type FT Foundry Switches are obtained by changing the "T" at the beginning of the equivalent type number to "FT" (Example: FTUB1).

Severe Duty Limit Switches

9007 Mill and Foundry Switches

Lever Arms for 9007T and FT



Standard Roller

Standard Roller					
Arm	Steel roller	Roller Position	Reference	Weight	
Length Inches (mm)	Diameter Inches (mm)	Width Inches (mm)		lb (kg)	
1.5 (38.1)	0.75 (19)	Optional	0.25 (6.3)	9007B1	0.17 (0.063)
1.5 (38.1)	1.0 (25.4)	Optional	0.25 (6.3)	9007B2	0.19 (0.071)
1.5 (38.1)	1.38 (35)	Optional	0.25 (6.3)	9007B3	0.23 (0.085)
2.5 (63.5)	0.75 (19)	Optional	0.25 (6.3)	9007B7	0.25 (0.093)
2.5 (63.5)	1.0 (25.4)	Optional	0.25 (6.3)	9007B8	0.25 (0.093)
2.5 (63.5)	1.38 (35)	Optional	0.25 (6.3)	9007B9	0.27 (0.100)
1.5 (38.1)	0.75 (19)	Optional	0.5 (12.7)	9007B12	0.34 (0.126)
1.5 (38.1)	1.0 (25.4)	Optional	0.5 (12.7)	9007B13	0.34 (0.126)
1.5 (38.1)	1.38 (35)	Optional	0.5 (12.7)	9007B14	0.42 (0.156)
5 (127)	0.75 (19)	Optional	0.25 (6.3)	9007B19	1.0 (0.373)
2.88 (73.1)	0.75 (19)	No roller	—	9007B21	0.20 (0.074)
2.5 (63.5)	0.75 (19)	Optional	0.5 (12.7)	9007B22	0.22 (0.082)
2.5 (63.5)	1.0 (25.4)	Optional	0.5 (12.7)	9007B23	0.28 (0.104)
2.5 (63.5)	1.38 (35)	Optional	0.5 (12.7)	9007B24	0.36 (0.134)
(1) Adjustable	0.75 (19)	Optional	0.25 (6.3)	9007R18	0.50 (0.186)
(1) Adjustable	1.0 (25.4)	Optional	0.25 (6.3)	9007R19	0.50 (0.186)
(1) Adjustable	1.38 (35)	Optional	0.25 (6.3)	9007R20	0.50 (0.186)

(1) Does not include lever arm clamp or rod. If lever arm clamp is required, use 9007R16 or R17.

Offset Type (used to obtain different cam track dimensions)

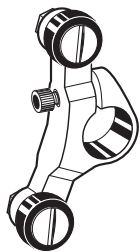
Arm	Steel roller	Roller Position	Reference	Weight	
Length Inches (mm)	Diameter Inches (mm)	Width Inches (mm)		lb (kg)	
1.5 (38.1)	0.75 (19)	Inside offset	0.25 (6.3)	9007C1	0.50 (0.186)
1.5 (38.1)	1.0 (25.4)	Inside offset	0.25 (6.3)	9007C2	0.50 (0.186)
1.5 (38.1)	1.38 (35)	Inside offset	0.25 (6.3)	9007C3	0.50 (0.186)
1.5 (38.1)	0.75 (19)	Outside offset	0.25 (6.3)	9007D1	0.18 (0.067)
1.5 (38.1)	1.0 (25.4)	Outside offset	0.25 (6.3)	9007D2	0.18 (0.067)
1.5 (38.1)	1.38 (35)	Outside offset	0.25 (6.3)	9007D3	0.18 (0.067)
1.88 (48)	0.75 (19)	Outside offset	0.25 (6.3)	9007E4	0.20 (0.074)
1.88 (48)	1.0 (25.4)	Outside offset	0.25 (6.3)	9007E5	0.27 (0.100)
1.88 (48)	1.38 (35)	Outside offset	0.25 (6.3)	9007E6	0.27 (0.100)
1.88 (48)	0.75 (19)	Inside offset	0.25 (6.3)	9007F4	0.30 (0.112)
1.88 (48)	1.0 (25.4)	Inside offset	0.25 (6.3)	9007F5	0.30 (0.112)
1.88 (48)	1.38 (35)	Inside offset	0.25 (6.3)	9007F6	0.30 (0.112)

120° Forked (used with maintained contact lever arm type switches)

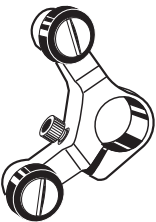
Arm	Steel roller	Roller	Reference	Weight	
Length Inches (mm)	Diameter Inches (mm)	Roller Position	Width Inches (mm)	lb (kg)	
1.5 (38.1)	0.75 (19)	Same side	0.25 (6.3)	9007J1	0.31 (0.115)
1.5 (38.1)	1.0 (25.4)	Same side	0.25 (6.3)	9007J2	0.40 (0.149)
1.5 (38.1)	0.75 (19)	LH on opp. side	0.25 (6.3)	9007K1	0.50 (0.186)
1.5 (38.1)	1.0 (25.4)	LH on opp. side	0.25 (6.3)	9007K2	0.50 (0.186)
1.5 (38.1)	0.75 (19)	RH on opp. side	0.25 (6.3)	9007N1	0.66 (0.246)
1.5 (38.1)	1.0 (25.4)	RH on opp. side	0.25 (6.3)	9007N2	0.70 (6.261)

90° Forked (used with maintained contact lever arm type switches)

Arm	Steel roller	Roller	Reference	Weight	
Length Inches (mm)	Diameter Inches (mm)	Roller Position	Width Inches (mm)	lb (kg)	
1.5 (38.1)	0.75 (19)	Same side	0.25 (6.3)	9007X1	0.30 (0.112)
1.5 (38.1)	1.0 (25.4)	Same side	0.25 (6.3)	9007X2	0.40 (0.149)
1.5 (38.1)	0.75 (19)	RH on opp. side	0.25 (6.3)	9007Y1	0.50 (0.186)
1.5 (38.1)	1.0 (25.4)	RH on opp. side	0.25 (6.3)	9007Y2	0.50 (0.186)
1.5 (38.1)	0.75 (19)	LH on opp. side	0.25 (6.3)	9007Z1	0.66 (0.246)
1.5 (38.1)	1.0 (25.4)	LH on opp. side	0.25 (6.3)	9007Z2	0.70 (0.261)



120° Forked

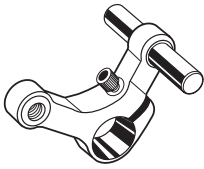


90° Forked

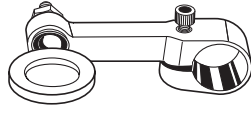
Severe Duty Limit Switches

9007 Mill and Foundry Switches

Lever Arms and Replacement Parts

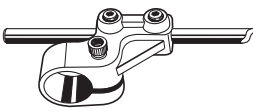


With Reset



With Spring

Cable Operated



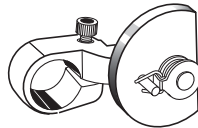
Rod Type



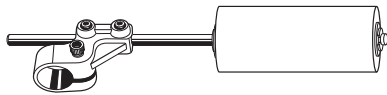
Ball Bearing Type



Weld-On Type



1-Way Roller Type



Conveyor Side Guide



Style C



Style D



Style B

Base Plates

Cable operated

Arm Length Inches (mm)	Steel roller Diameter Inches (mm)	Roller Roller Position	Width Inches (mm)	Reference	Weight lb (kg)
1.5 (38.1)	0.75 (19)	None	None	9007Y3	-
2.5" (63.5mm) long with eyebolt 0.25 (6.3mm) I.D. instead of roller.				9007B27	-
Rod Type (used on conveyor systems or where unusual shapes are required)					
Adjustable	0.75 (19)	(1) 0.19 (4.8)	None	9007R16	0.18 (0.067)
Adjustable	0.75 (19)	(2) 0.25 (6.3)	None	9007R17	0.18 (0.067)

(1) Rod not included

(2) Key stock not included

Ball Bearing Type (for abrasive dust areas or with high speed cams)

1.5 (38.1)	0.75 (19)	Center	0.28 (7.1)	9007B16	0.15 (0.055)
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Weld-On Type (used where a special operator is required to weld to lever)

3.5 (89)	0.75 (19)	None	None	9007G10	0.50 (0.186)
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One Way Roller Type (used with reversible cams for one way operations)

1.5 (38.1)	0.75 (19)	Outside offset	0.25 (6.3)	9007D4	0.64 (0.238)
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Conveyor Side Guide

8.44" (214.3) long with 1.5" (38.1) dia. 3.75" (95.2) Delrin roller	9007R21	1.63 (0.608)
8.44" (214.3) long with 0.88" (22.3) dia. 3.75" (95.2) Delrin roller	9007R22	1.42 (0.530)

Separate Base Plates (2)

Style	Mounting Holes	Reference	Weight lb (kg)
A	None (1)	2934D32G1	
B	End	2934D14G1	0.34 (0.126)
C	Side	2934D33G1	0.42 (0.156)
D	End	2934D34G1	0.36 (0.134)

(1) No mounting holes in base plate. Side mounting holes in switch case must be used.

(2) Acceptable wire sizes 14 – 18 AWG (2.08 – 0.823 mm²); recommended terminal clamp torque 13 – 16 lb-in. (1.46 – 1.80 N•m).

Optional Conduit Threads

Description	Reference	Weight lb (kg)
Metric		
M20 - 20mm (per B.S. 4568)	M11	
Example: 9007TUB4M11		

Three Point Contacts — Ordering Information

Select Type number of desired contact operating sequence for standard contact switch. Change the letter following "T" or "FT" as shown below.

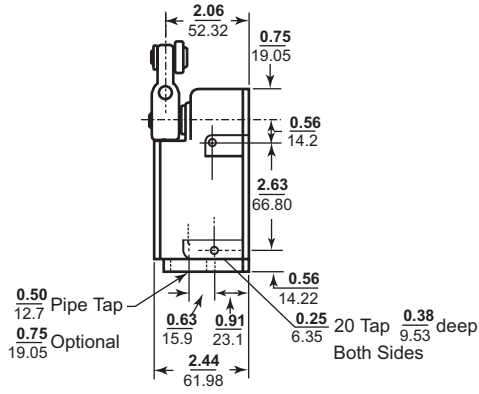
Change: U to Y Contact Configuration Changes
S to K From: A B

For example:
TUB1 changes to TYB1
TSB1 changes to TKB1

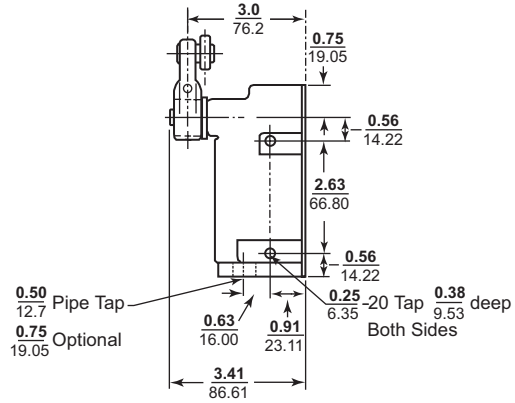


Surface Mounting

Type T

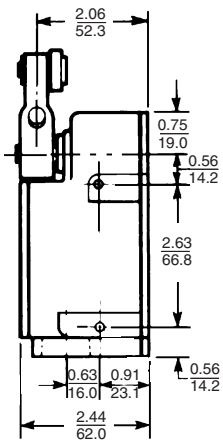


Type FT

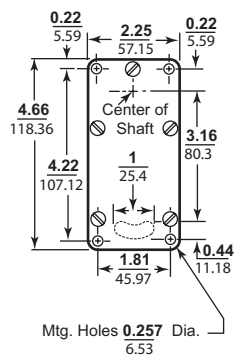


Base Plates

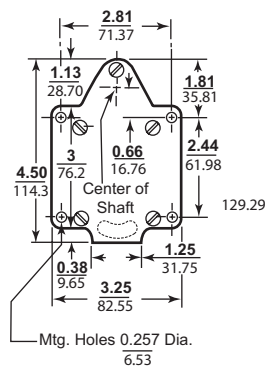
Style A



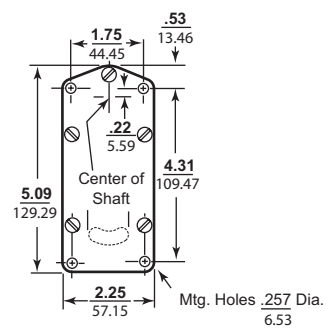
Style B



Style C

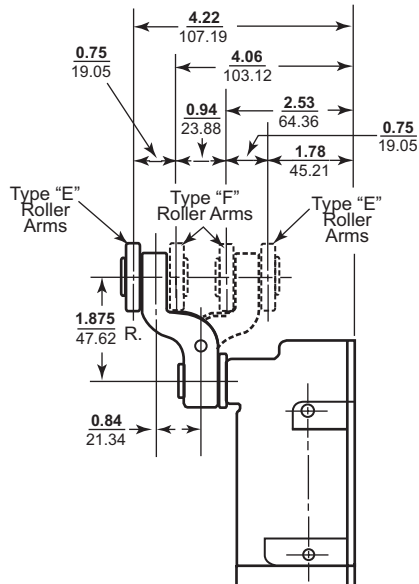
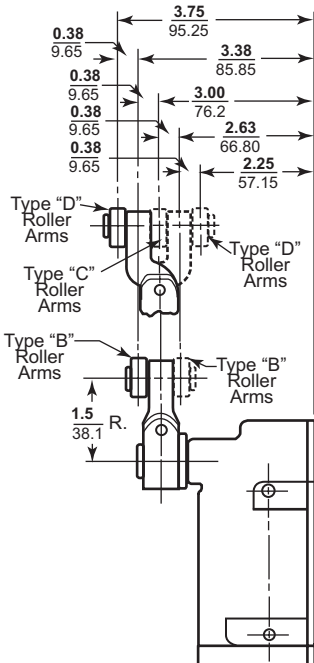
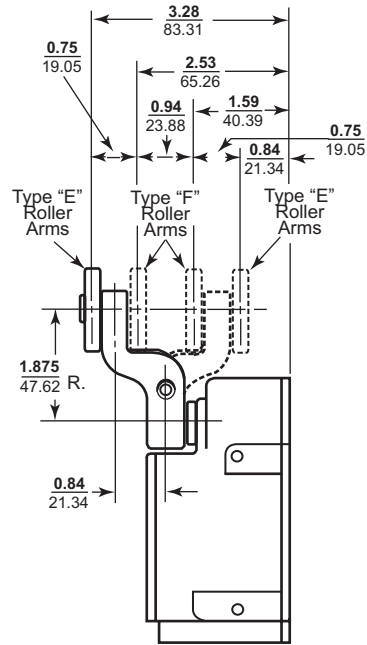
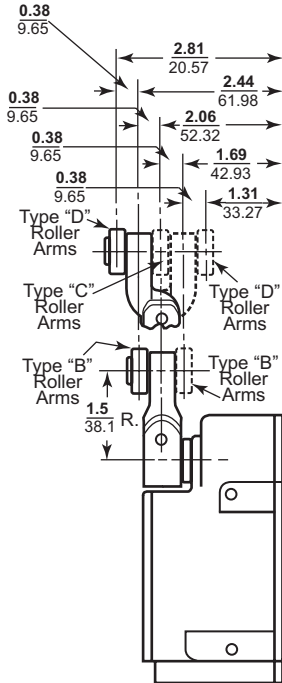


Style D



Dual dimensions: $\frac{\text{inches}}{\text{mm}}$

CAM Track Dimensions



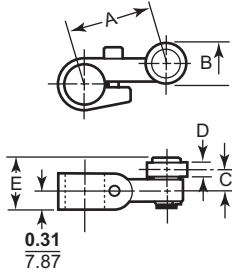
Dual dimensions: $\frac{\text{inches}}{\text{mm}}$

Severe Duty Limit Switches

9007 Mill and Foundry Switches
Lever Arms

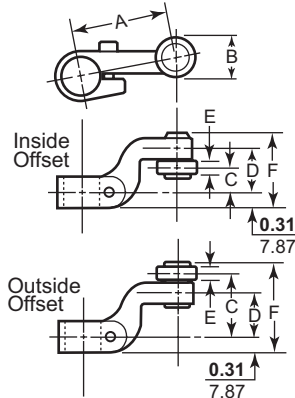
Type T and FT Lever Arms

Standard Roller

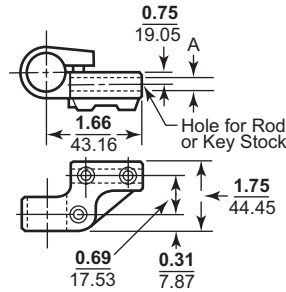


For dimension A refer to page 12.

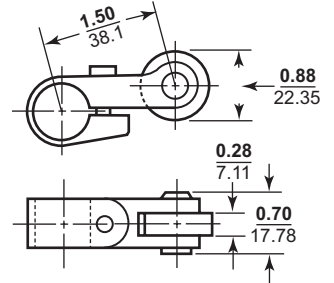
Offset Type



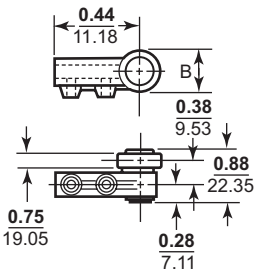
Adjustable Length Rod Type



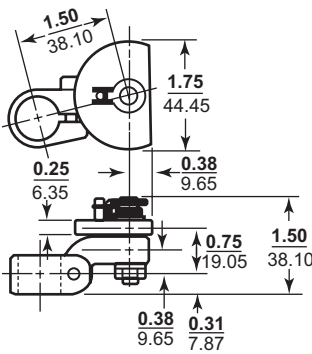
Ball Bearing Roller Type B16



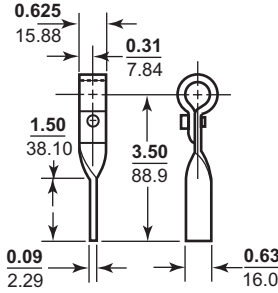
Roller Arm for use with Type R17



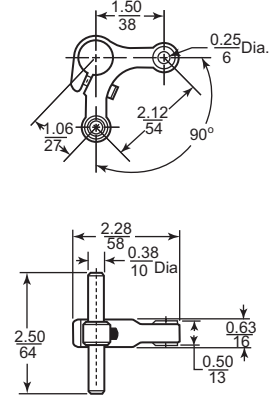
1-Way Roller Type D4



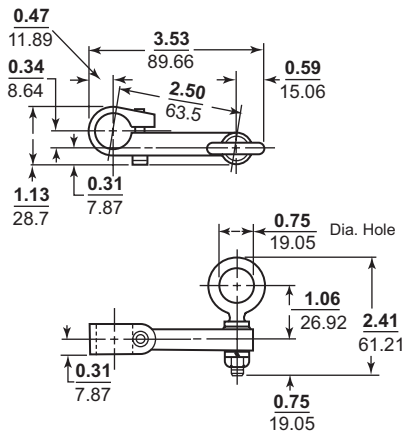
Weld-On Arm Type G10



Cable Operated with Reset Type Y3



Cable Operated Type B27



Dual dimensions: $\frac{\text{inches}}{\text{mm}}$

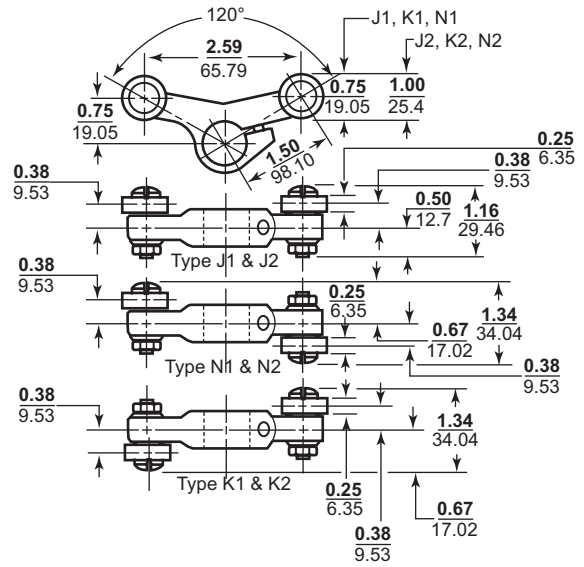
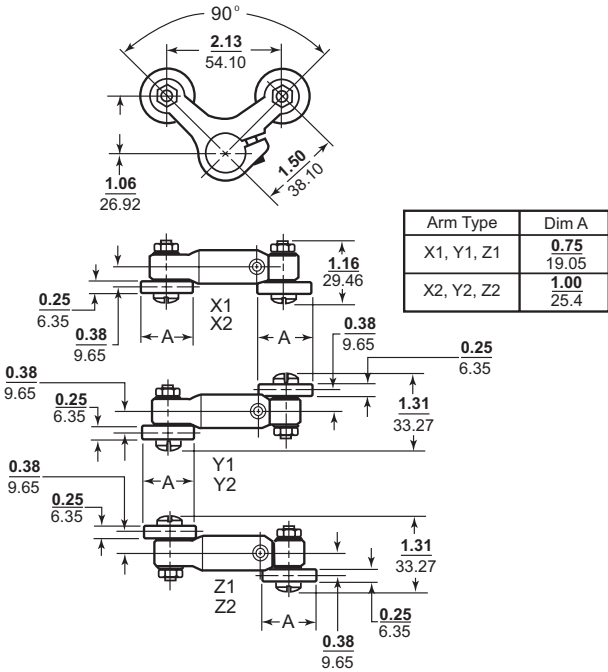
Severe Duty Limit Switches

9007 Mill and Foundry Switches
Lever Arms

Type T and FT Lever Arms (continued)

90° Forked

120° Forked



Severe Duty Limit Switches

L100, L300 Mill and Foundry Switches
 L140, L2153 Cable Pulls, L529 Belt Conveyor
 Conforming to NEMA A600 and UL508

Description

L100W Switches ♦

Use the L100W Mill switches instead of other limit switches in the following applications:

- 1 Where the current load exceeds the typical heavy duty limit switch contact rating of 10 A and falls within the range of up to 20 A continuous.
- 2 Where an operating sequence is required that is not possible on other limit switches (35 choices with the L switches).
- 3 Where higher reset forces are required due to foreign material interfering with lever arm operation, or where long heavy arms must reset against gravity.

♦ L switches are not preceded by 9007. They are known as the R.B. Denison® Lox Switch, and include conveyor belt and slack cable pull switches in the product offering.

L300W Switches

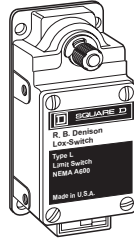
The L300W Foundry switches are for use in foundries or mills where the applications described above are required, and where falling foundry sand or similar material could build up and jam the operating mechanism. The shaft has a dust boot and extends from the switch case, preventing sand build up around the shaft. The devices can withstand hot falling sand up to 300° F (149° C).

Features L100, L300, L140, L2153, L525

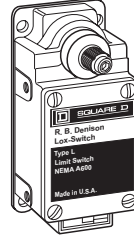
- Captive cover screws
- Heavy duty snap action mechanism prevents teasing or false contact opening.
- Positive trip action prevents the lever from slipping around the 0.5" (12.7mm) shaft even if not properly tightened.
- High current capability. 20 A maximum continuous
- Isolated (no polarity) double and triple circuits with double break (throw) action
- Wide 0.25" (6.3mm) contact gap ensures very high shock and vibration resistance.
- Easy to access contacts allow for easy inspection and replacement.
- Stamped contact configuration number for easy identification even if the switch is painted
- Many contact arrangements to solve difficult applications
- Model L300 is an extra heavy duty version for very aggressive environments.
- The booted shaft design prevents penetration of foreign materials such as sand, dust, or grit between the shaft and the bushing.
- Heavy duty stainless steel springs and hardened spring operators permit longer life under extreme lever fly-back and high impact.
- Same parameters as L100 models except the distance between the back of the switch and the lever (0.34" (8.6mm) greater).
- Two and three circuits in CW, CCW, neutral position, spring return and maintained, snap action or slow-make slow-break, two steps (L525) are available.
- 2 circuit models can be CW or CCW field converted.
- Wide range of options: high shock and vibration, with gold contact, low or very high temperature
- 0.5" (12.7mm) NPT conduit entrance standard on 2 pole models (5 wires max.)
- 0.75" (19mm) NPT conduit entrance standard on 3 pole models (7 wires max.)

L100, L300 Switches (fixed sequence)

L100 Mill



L300 Foundry



Pages 20 through 22 Pages 22 through 25

- Model L300 is an extra heavy duty version for very aggressive environments
- The booted shaft design prevents penetration of foreign materials such as sand, dust, or grit between the shaft and the bushing
- Heavy duty stainless steel springs and hardened spring operators permit longer life under extreme lever fly-back and high impact
- Same parameters as L100 models except the distance between the back of the switch and the lever (0.34" (8.6mm) greater).

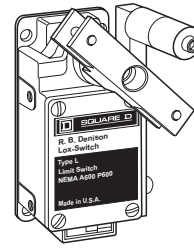
Cable Pulls (fixed sequence)

L140 Mill and Foundry



Page 24

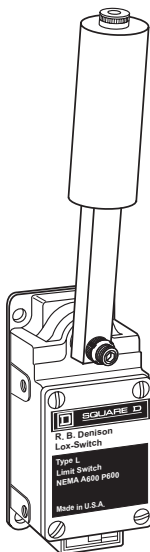
L2153 Mill and Foundry



Page 24

Belt Conveyors

L525 Mill and Foundry



Page 25

Conveyor belt limit switches are ideal for policing the lateral movement of belt conveyors. When the conveyor belt shifts, it contacts the switch roller and a 12° movement of the lever transfers the first set of contacts. This set is usually wired to initiate a warning alarm system to alert the worker that the belt is moving off the rollers. Further lateral movement of the belt, causing the lever to move another 8°, trips the second set of contacts. These contacts are normally wired to the conveyor drive system and when actuated stop the system, minimizing damage to the conveyor or loss of material on the belt.

Environment characteristics

Conforming to standards	UL Listed L100W, L300W, L325W, L525W, L140 through L149, L340 through L349, and L2153 ● CSA Certified L100W and L300W ▲
Protective treatment	Corrosion resistant aluminum
Ambient air temperature	0° F to 200° F (-17° to 93° C) optional -20° F (-18° C); +350° F (176° C) The minimum temperatures listed are based on the absence of freezing moisture or water.
Vibration resistance	30G max. (10 - 150 Hz)
Shock resistance	30G
Electric shock protection	N/A
Degree of protection	NEMA Type 1, 4 and 13, IP65, 66
Cable entry or connector	0.5" NPT standard double circuit, 0.75" NPT triple circuit switches
Materials	Cast aluminum ◊

● All of these can be followed by DL, DR, NCS, NS, S, TL or TR, followed by 2, followed by M, and may be followed by 1 or 2.

▲ All of these can be followed by DL, DR, NCS, NS, S, TL or TR, followed by 2, followed by M, and followed by 3 or 4.

Contact block characteristics

Rated operational characteristics hard contacts	NEMA A 600 Ithe = 20 A											
AC Voltage	20 A Resistive and continuous											
Switching ratings	120 V		125 V		240 V		250 V		480 V		≤ 600 V	
M = make / B = break	M	B	M	B	M	B	M	B	M	B	M	B
Maximum current (amp)	60	6.00	—	—	30	3.00	—	—	15	1.50	—	1.20
Maximum volt (amp)	Make 7200 / Break 720											
Rated operational characteristics hard contacts	NEMA P 600 Ithe = 5 A											
DC Voltage	20 A Resistive and continuous											
Switching ratings	120 V		125 V		240 V		250 V		480 V		≤ 600 V	
M = make / B = break	M	B	M	B	M	B	M	B	M	B	M	B
Maximum current (amp)	—	—	1.1	1.1	—	—	0.55	0.55	—	—	0.2	0.2
Maximum volt (amp)	Make 138 / Break 138											
Rated insulation voltage	600 Vac and Vdc											
Rated impulse withstand voltage	2,500 Vac for 1 minute for CE, 2,200 Vac for 1 minute for UL, and 2,640 Vac for 1 minute for CSA											
Positive Opening	No											
Short Circuit Protection	20 A Bussman Class CC KTK-R-20 fuse, non time delay											
Terminal wire sizes (Cabling/Screw Clamp)	1 x #12 (3.31 mm ²) AWG or 2 x #14 (2.08 mm ²) AWG											
Maximum Actuation Speed	N/A (future availability)											
Electrical Durability	N/A (future availability)											

Characteristics for material and ratings comparisons - standard switches ◊

	Dension L	9007 Type T/FT
Body material	Cast aluminum	Cast zinc
Cover material	Aluminum	Cast zinc
Base plate material	Steel with chromate plating	Steel with zinc plating
Shaft seal material	PVC	Nitrile
Contact block material	Glass filled nylon	Phenolic
Moveable contact material	Coin Silver on steel backing	Fine silver on copper backing
Stationary contact material	90/10 AgCdO on copper backing	Fine silver on copper backing
Low ambient temperature rating	0° F	-10° F
High ambient temperature at full rating ♦	200° F	180° F
Enclosure rating	NEMA Types 1, 4 and 13	NEMA Types 1, 2, 4, 12 and 13
Vibration resistance	30G max (10-150 Hz)	10G (10-150 Hz)

♦ Many switches are available with higher or lower temperature limits by selecting special versions or special options. See page 29.

Severe Duty Limit Switches

L100 Mill Switches

Conforming to NEMA A600 and UL508

L100					
Mill Switches					
Description	Operating Torque	Contact Diagram	Reference	Operating Data (pg 21)	Weight lb (kg)
Snap-action CW spring return	190 oz-in (1.34 N•m)		L100WS2M1	A	1.51 (0.56)
Snap-action CCW spring return	190 oz-in (1.34 N•m)		L100WS2M2	A	1.51 (0.56)
Maintained contact ■ CW and CCW snap action	45 oz-in (0.32 N•m)		L100WS2M3	A	1.51 (0.56)
Snap action CW spring return	190 oz-in (1.34 N•m)		L100WDR2M4	A	1.51 (0.56)
Snap action CCW spring return	190 oz-in (1.34 N•m)		L100WDR2M5	A	1.51 (0.56)
Maintained contact ■ CW and CCW snap action	45 oz-in (0.32 N•m)		L100WDR2M6	A	1.51 (0.56)
Snap action CCW spring return	190 oz-in (1.34 N•m)		L100WDL2M7	A	1.51 (0.56)
Snap action CW spring return	190 oz-in (1.34 N•m)		L100WDL2M8	A	1.51 (0.56)
Snap action CW 1 N.C./ 2 N.O. spring return	190 oz-in (1.34 N•m)		L100WTR2M10	A	1.51 (0.56)
Snap action CCW 1 N.O./ 2 N.C. spring return	190 oz-in (1.34 N•m)		L100WTR2M11	A	1.51 (0.56)
Maintained contact ■ CW and CCW snap action, 3 poles	45 oz-in (0.32 N•m)		L100WTR2M12	A	1.51 (0.56)
Snap action CCW 2 N.O./ 1 N.C. spring return	190 oz-in (1.34 N•m)		L100WTL2M13	A	1.51 (0.56)
Snap action CW 1 N.O./ 2 N.C. spring return	190 oz-in (1.34 N•m)		L100WTL2M14	A	1.51 (0.56)
Maintained contact ■ CW and CCW snap action, 3 poles	45 oz-in (0.32 N•m)		L100WTL2M15	A	1.51 (0.56)
Neutral position ■ spring return, slow make and break 1 N.O. contact per direction	95 oz-in (0.67 N•m)		L100WN2M16	B	1.51 (0.56)
Neutral position ■ spring return, slow make and break 1 N.O. contact for both directions	95 oz-in (0.67 N•m)		L100WN2M17	B	1.51 (0.56)

L100 (continued)

Mill Switches

Description	Operating Torque	Contact Diagram	Reference	Operating Data (pg 21)	Weight lb (kg)
Neutral position ■ spring return, slow make and break 1 N.C.-CW, 1 N.C.-CCW	95 oz-in (0.67 N•m)		L100WNC2M18	B	1.51 (0.56)
Neutral position ■ spring return, slow make and break 2 N.O.-CW, 1 N.O.-CCW	95 oz-in (0.67 N•m)		L100WTRN2M20	B	1.51 (0.56)
Neutral position ■ spring return, slow make and break N.O.-CW, 2 N.O.-CCW	95 oz-in (0.67 N•m)		L100WTLN2M21	B	1.51 (0.56)
Slow make-before-break, CW spring return	170 oz-in (1.2 N•m)		L100WS02M22	C	1.51 (0.56)
Slow make-before-break, CCW spring return	170 oz-in (1.2 N•m)		L100WS02M23	C	1.51 (0.56)
Neutral position ■ N.O.-CW, N.O.-CCW spring return, snap action	170 oz-in (1.2 N•m)		L100WNS2M26	D	1.51 (0.56)
Neutral position ■ N.O.-CW, N.O.-CCW maintained in CCW only	170 oz-in (1.2 N•m)		L100WNSR2M28	D	1.51 (0.56)
Neutral position ■ N.O.-CW, N.O.-CCW maintained in CW only	170 oz-in (1.2 N•m)		L100WNSL2M29	D	1.51 (0.56)
Neutral position ■ N.C.-CW, N.C.-CCW spring return, snap action	170 oz-in (1.2 N•m)		L100WNC2M34	D	1.51 (0.56)
Neutral position ■ N.O.-CW, N.O./N.C.-CCW spring return, slow make and break	95 oz-in (0.67 N•m)		L100WTRN1C2M38	B	1.51 (0.56)
Neutral position ■ N.O./N.C.-CW, N.O.-CCW spring return, slow make and break	95 oz-in (0.67 N•m)		L100WTLN1C2M39	B	1.51 (0.56)
Neutral position ■ N.O./N.C.-CW, N.C.-CCW spring return, slow make and break	95 oz-in (0.67 N•m)		L100WTRN2C2M40	B	1.51 (0.56)
Neutral position ■ N.C.-CW, N.O./N.C.-CCW spring return, slow make and break	95 oz-in (0.67 N•m)		L100WTLN2M41	B	1.51 (0.56)
Neutral position ■ N.O./N.C.-CW, N.C.-CCW spring return, snap action	95 oz-in (0.67 N•m)		L100WTRN2CS2M48	D	1.51 (0.56)

Operating Data for Contact Arrangements

	A	B	C	D
Pretravel	17° nominal	7° maximum	7° nominal	9° nominal
Differential travel	11° nominal	4° maximum	–	6° nominal
Overlapping travel	–	–	4° nominal	–
Total travel	80°	70°	80°	70°
Recommended installation travel	20° - 35°	10° - 25°	20° - 35°	13° - 30°
Repetitive accuracy of switch	± 0.03°	–	–	± 0.03°
Operating torque, max with return spring	190 oz-in (1.34 N•m)	95 oz-in (0.67 N•m)	170 oz-in (1.2 N•m)	170 oz-in (1.2 N•m)
Maintained contact	45 oz-in (0.317 N•m)	–	–	45 oz-in (0.317 N•m)

L300

Foundry Switches

Description	Operating Torque	Contact Diagram	Reference	Operation Data (pg 23)	Weight lb (kg)
Snap-action CW spring return	190 oz-in (1.34 N•m)		L300WS2M1	A	1.54 (0.57)
Snap-action CCW Spring return	190 oz-in (1.34 N•m)		L300WS2M2	A	1.54 (0.57)
Maintained contact ■ CW and CCW snap action	45 oz-in (0.32 N•m)		L300WS2M3	A	1.54 (0.57)
Snap action CW spring return	190 oz-in (1.34 N•m)		L300WDR2M4	A	1.54 (0.57)
Snap action CCW spring action	190 oz-in (1.34 N•m)		L300WDR2M5	A	1.54 (0.57)
Maintained contact ■ CW and CCW snap action	45 oz-in (0.32 N•m)		L300WDR2M6	A	1.54 (0.57)
Snap action CCW spring return	190 oz-in (1.34 N•m)		L300WDL2M7	A	1.54 (0.57)
Snap action CW spring return	190 oz-in (1.34 N•m)		L300WDL2M8	A	1.54 (0.57)
Snap action CW 1 N.C./2 N.O. spring return	190 oz-in (1.34 N•m)		L300WTR2M10	A	1.54 (0.57)
Snap action CCW 1 N.O./2 N.C. spring return	190 oz-in (1.34 N•m)		L300WTR2M11	A	1.54 (0.57)
Maintained contact ■ CW and CCW snap action, 3 poles	45 oz-in (0.32 N•m)		L300WTR2M12	A	1.54 (0.57)
Snap action CCW 2 N.O./1 N.C. spring return	190 oz-in (1.34 N•m)		L300WTL2M13	A	1.54 (0.57)
Snap action CW 1 N.O./2 N.C. spring return	190 oz-in (1.34 N•m)		L300WTL2M14	A	1.54 (0.57)
Maintained contact ■ CW and CCW snap action, 3 poles	45 oz-in (0.32 N•m)		L300WTL2M15	A	1.54 (0.57)
Neutral position ■ spring return, slow make and break 1 N.O. contact per direction	95 oz-in (0.67 N•m)		L300WN2M16	B	1.54 (0.57)
Neutral position ■ spring return, slow make and break 1 N.O. contact for both directions	95 oz-in (0.67 N•m)		L300WN2M17	B	1.54 (0.57)

L300 (continued)

Foundry Switches

Description	Operating Torque	Contact Diagram	Reference	Operational Data (pg 23)	Weight lb (kg)
Neutral position ■ spring return, slow make and break 1 N.C.-CW, 1 N.C.-CCW	95 oz-in (0.67 N•m)		L300WNC2M18	B	1.54 (0.57)
Neutral position ■ spring return, slow make and break 2 N.O.-CW, 1 N.O.-CCW	95 oz-in (0.67 N•m)		L300WTRN2M20	B	1.54 (0.57)
Neutral position ■ spring return, slow make and break N.O.-CW, 2 N.O.-CCW	95 oz-in (0.67 N•m)		L300WTLN2M21	B	1.54 (0.57)
Slow make-before-break, CW spring return	170 oz-in (1.2 N•m)		L300WS02M22	C	1.54 (0.57)
Slow make-before-break, CCW spring return	170 oz-in (1.2 N•m)		L300WS02M23	C	1.54 (0.57)
Neutral position ■ N.O.-CW, N.O.-CCW spring return, snap action	170 oz-in (1.2 N•m)		L300WNS2M26	D	1.54 (0.57)
Neutral position ■ N.O.-CW, N.O.-CCW maintained in CCW only	170 oz-in (1.2 N•m)		L300WNSR2M28	D	1.54 (0.57)
Neutral position ■ N.O.-CW, N.O.-CCW maintained in CW only	170 oz-in (1.2 N•m)		L300WNSL2M29	D	1.54 (0.57)
Neutral position ■ N.C.-CW, N.C.-CCW spring return, snap action	170 oz-in (1.2 N•m)		L300WNC2M34	D	1.54 (0.57)
Neutral position ■ N.O.-CW, N.O./N.C.-CCW spring return, slow make and break	95 oz-in (0.67 N•m)		L300WTRN1C2M38	B	1.54 (0.57)
Neutral position ■ N.O./N.C.-CW, N.O.-CCW Spring return, slow make and break	95 oz-in (0.67 N•m)		L300WTLN1C2M39	B	1.54 (0.57)
Neutral position ■ N.O./N.C.-CW, N.C.-CCW spring return, slow make and break	95 oz-in (0.67 N•m)		L300WTRN2C2M40	B	1.54 (0.57)
Neutral position ■ N.C.-CW, N.O./N.C.-CCW spring return, slow make and break	95 oz-in (0.67 N•m)		L300WTLN2M41	B	1.54 (0.57)
Neutral position ■ N.O./N.C.-CW, N.C.-CCW spring return, snap action	95 oz-in (0.67 N•m)		L300WTRN2CS2M48	D	1.54 (0.57)

Operating Data for Contact Arrangements

	A	B	C	D
Pretravel	17° nominal	7° maximum	7° nominal	9° nominal
Differential travel	11° nominal	4° maximum	–	6° nominal
Overlapping travel	–	–	4° nominal	–
Total travel	80°	70°	80°	70°
Recommended installation travel	20° - 35°	10° - 25°	20° - 35°	13° - 30°
Repetitive accuracy of switch	± 0.03°	–	–	± 0.03°
Operating torque, max with return spring	190 oz-in (1.34 N•m)	95 oz-in (0.67 N•m)	170 oz-in (1.2 N•m)	170 oz-in (1.2 N•m)
Maintained contact	45 oz-in (0.317 N•m)	–	–	45 oz-in (0.317 N•m)



L140 Cable Pull



L2153 Dual Pull Stop

L140 Series Cable Pulls (1)

Circuit	Direction	Reference	Weight lb (kg)
1 N.C.	CW right	L142	1.54 (0.57)
1 N.O. and 1 N.C.	CW right	L143	1.54 (0.57)
1 N.O. and 1 N.C.	CCW left	L144	1.54 (0.57)
1 N.C.	CCW left	L145	1.54 (0.57)
2 N.O. and 1 N.C.	CW right	L146	1.54 (0.57)
2 N.C. and 1 N.O.	CW right	L147	1.54 (0.57)
2 N.O. and 1 N.C.	CCW left	L148	1.54 (0.57)
2 N.C. and 1 N.O.	CCW left	L149	1.54 (0.57)

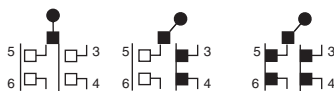
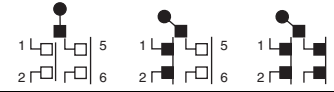
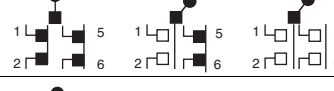
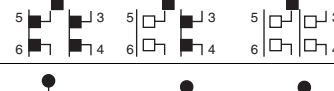
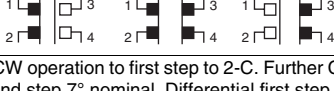
(1) Style K levers were designed specifically for this application; see page 27 (order separately).

L2153 Dual Pull Stop

Description	Reference	Weight lb (kg)
Dual pull cord switch - maintained contacts	L2153	2.04 (0.76)

Characteristics

Pretravel	17° ± 2°
Differential travel	11° ± 2°
Overlapping travel	–
Total travel	80°
Recommended installation travel	–
Repetitive accuracy of switch	± 0.03°
Operating torque, max with return spring	13 - 27 lb-in (1.47 - 3.05 N•m)
Reset torque	7 - 19 lb-in (0.79 - 2.14 N•m)
Temperature range	-20° F to 120° F (-6.6° C to 48.8° C)
Maintained contact	–

L525					
Belt Conveyor Switches					
Description	Operating Torque	Contact Diagram	Reference	Weight lb (kg)	
2 step sequence CW spring return, snap action, 2 N.O.	150 oz-in (1.06 N•m)		L525WDR2M56	1.5 (0.55)	
2 step sequence CCW spring return, snap action, 2 N.O.	150 oz-in (1.06 N•m)		L525WDL2M57	1.5 (0.55)	
2 step sequence CW spring return, snap action, 2 N.C.	150 oz-in (1.06 N•m)		L525WDL2M58	1.5 (0.55)	
2 Step sequence CCW spring return, snap action, 2 N.C	150 oz-in (1.06 N•m)		L525WDR2M59	1.5 (0.55)	
2 Step sequence CW spring return, snap action, N.O./N.C ■	150 oz-in (1.06 N•m)		L100WS0S2M60	1.5 (0.55)	

■ Two step snap action. One normally closed, one normally open; CW operation to first step to 2-C. Further CW operation to second step, 1-O, 1-C. Spring return. Pretravel 9° nominal. Additional travel 8° nominal. Differential second step 7° nominal. Differential first step 7° nominal.

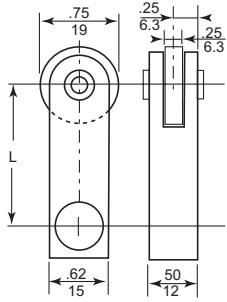
Characteristics

Pretravel	12° nominal
Additional travel	8° nominal
Differential travel	7° nominal
Total travel	75° nominal
Operating torque, max with return spring	150 oz-in nominal (1.06 N•m)

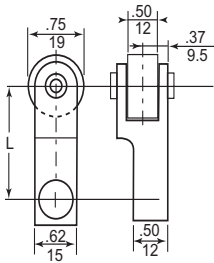
Severe Duty Limit Switches

L100, L300 Mill and Foundry Switches

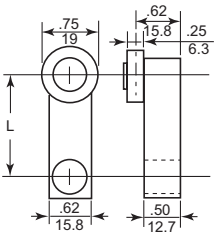
Lever Arms



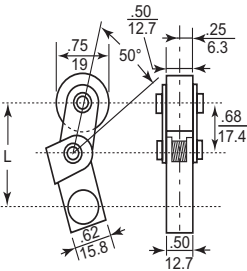
Style A



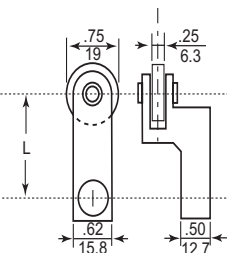
Style B



Style C



Style E



Style F

Style A Steel Roller

Arm	Steel roller	Reference	Weight
Length Inches (mm)	Diameter Inches (mm)	Width Inches (mm)	lb (kg)
1.25 (31.7)	0.75 (19)	0.25 (6.3)	AC 0.06 (0.022)
1.50 (38.1)	0.75 (19)	0.25 (6.3)	AA 0.06 (0.022)
1.75 (44.4)	0.75 (19)	0.25 (6.3)	AD 0.07 (0.026)
2.00 (50.8)	0.75 (19)	0.25 (6.3)	AH 0.08 (0.029)
2.25 (57.1)	0.75 (19)	0.25 (6.3)	AJ 0.09 (0.033)
2.50 (63.5)	0.75 (19)	0.25 (6.3)	AO 0.10 (0.037)
2.75 (69.8)	0.75 (19)	0.25 (6.3)	AK 0.10 (0.037)
3.00 (76.2)	0.75 (19)	0.25 (6.3)	AB 0.11 (0.041)
3.50 (88.9)	0.75 (19)	0.25 (6.3)	AL 0.12 (0.044)
4.00 (101.6)	0.75 (19)	0.25 (6.3)	AM 0.13 (0.048)
4.50 (114.3)	0.75 (19)	0.25 (6.3)	AN 0.14 (0.052)
5.00 (127.0)	0.75 (19)	0.25 (6.3)	AP 0.16 (0.059)
5.50 (139.7)	0.75 (19)	0.25 (6.3)	AQ 0.18 (0.067)
6.00 (152.4)	0.75 (19)	0.25 (6.3)	AR 0.20 (0.074)

Style B Steel Roller

Arm	Steel roller	Reference	Weight
Length Inches (mm)	Diameter Inches (mm)	Width Inches (mm)	lb (kg)
1.50 (38.1)	0.75 (19)	0.50 (12.7)	BA 0.06 (0.022)
2.00 (50.8)	0.75 (19)	0.50 (12.7)	BH 0.08 (0.029)
2.50 (63.5)	0.75 (19)	0.50 (12.7)	BO 0.10 (0.037)
3.00 (76.2)	0.75 (19)	0.50 (12.7)	BB 0.12 (0.044)
4.00 (101.6)	0.75 (19)	0.50 (12.7)	BM 0.13 (0.048)
4.50 (114.3)	0.75 (19)	0.50 (12.7)	BN 0.14 (0.052)
5.50 (139.7)	0.75 (19)	0.50 (12.7)	BQ 0.18 (0.067)
6.00 (152.4)	0.75 (19)	0.50 (12.7)	BR 0.20 (0.074)

Style C Steel Roller On Side

Arm	Steel roller	Reference	Weight
Length Inches (mm)	Diameter Inches (mm)	Width Inches (mm)	lb (kg)
1.25 (31.7)	0.75 (19)	0.25 (6.3)	CC 0.06 (0.022)
1.50 (38.1)	0.75 (19)	0.25 (6.3)	CA 0.06 (0.022)
1.75 (44.4)	0.75 (19)	0.25 (6.3)	CD 0.07 (0.026)
2.00 (50.8)	0.75 (19)	0.25 (6.3)	CH 0.08 (0.029)
2.50 (63.5)	0.75 (19)	0.25 (6.3)	CO 0.10 (0.037)
3.00 (76.2)	0.75 (19)	0.25 (6.3)	CB 0.11 (0.041)
3.50 (88.9)	0.75 (19)	0.25 (6.3)	CL 0.12 (0.044)
4.00 (101.6)	0.75 (19)	0.25 (6.3)	CM 0.13 (0.048)
6.00 (152.4)	0.75 (19)	0.25 (6.3)	CR 0.20 (0.074)

Style E One Way Steel Roller

Arm	Steel roller	Reference	Weight
Length Inches (mm)	Diameter Inches (mm)	Width Inches (mm)	lb (kg)
1.50 (38.1)	0.75 (19)	0.50 (12.7)	EA 0.30 (0.111)
1.75 (44.4)	0.75 (19)	0.50 (12.7)	ED 0.40 (0.149)
3.00 (76.2)	0.75 (19)	0.50 (12.7)	EB 0.50 (0.186)

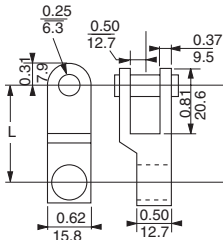
Style F Offset Steel Roller

Arm	Steel roller	Roller Position	Reference	Weight
Length Inches (mm)	Diameter Inches (mm)	Offset Inches (mm)	Width Inches (mm)	lb (kg)
1.50 (38.1)	0.75 (19)	0.62 (15.8)	0.15 (3.8)	FB 0.06 (0.022)
1.50 (38.1)	0.75 (19)	0.87 (22.2)	0.15 (3.8)	FA 0.06 (0.022)
1.50 (38.1)	0.75 (19)	1.00 (25.4)	0.15 (3.8)	FC 0.06 (0.022)
2.00 (50.8)	0.75 (19)	1.00 (25.4)	0.15 (3.8)	FE 0.08 (0.029)
2.50 (63.5)	0.75 (19)	1.00 (25.4)	0.15 (3.8)	FG 0.10 (0.037)
3.00 (76.2)	0.75 (19)	0.62 (15.8)	0.15 (3.8)	FI 0.11 (0.041)
3.00 (76.2)	0.75 (19)	1.00 (25.4)	0.15 (3.8)	FJ 0.11 (0.041)

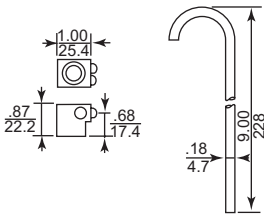
Example: AC — This is the complete reference to order.

Severe Duty Limit Switches

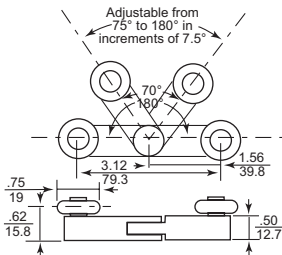
L100, L300 Mill and Foundry Switches
Lever Arms



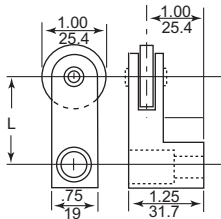
Style K



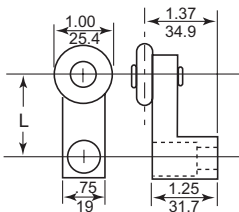
Style R



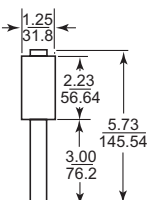
Style V



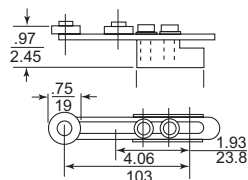
Style LA



Style LC



Rolling Pin



Adjustable Rolling Pin

Style K (for use with L140 cable pulls)

Arm	Steel roller	Description	Reference	Weight
Length Inches (mm)	Diameter Inches (mm)	Width Inches (mm)		lb (kg)
1.50 (38.1)			KA	0.05 (0.018)
2.50 (63.5)			KO	0.08 (0.018)
3.00 (76.2)			KB	0.09 (0.033)

Style L (for use with L2153 dual pull stop)

Arm	Steel roller	Description	Reference	Weight
Length Inches (mm)	Diameter Inches (mm)	Width Inches (mm)		lb (kg)
		Lever	AL1746	0.25 (0.093)
		Mechanical stop	AL1649	0.10 (0.037)

Style R Steel Rod

Arm	Steel roller	Description	Reference	Weight
Length Inches (mm)	Diameter Inches (mm)	Width Inches (mm)		lb (kg)
		Hub only	R	0.10 (0.037)
		Rod only	R9	0.09 (0.033)

Style V Yoke (for maintained position switches)

Arm	Steel roller	Description	Reference	Weight
Length Inches (mm)	Diameter Inches (mm)	Width Inches (mm)		lb (kg)
			VA	0.50 (0.186)

Style LA (to pass over switch cover)

Arm	Steel roller	Description	Reference	Weight
Length Inches (mm)	Diameter Inches (mm)	Width Inches (mm)		lb (kg)
1.50 (30)			LAA1	0.12 (0.044)
2.00 (50)			LAH1	0.12 (0.044)
2.50 (63)			LA01	0.12 (0.044)

Style LC (to pass over switch cover)

Arm	Steel roller	Description	Reference	Weight
Length Inches (mm)	Diameter Inches (mm)	Width Inches (mm)		lb (kg)
1.50 (30)			LCA1	0.12 (0.044)
2.00 (50)			LCH1	0.12 (0.044)
2.50 (63)			LCO1	0.13 (0.048)

Rolling Pin (for use with 2 step switches for conveyor or belt applications)

Arm	Steel roller	Description	Reference	Weight
Length Inches (mm)	Diameter Inches (mm)	Width Inches (mm)		lb (kg)
2.25 (75.1)			AL1650	0.30 (0.111)
2.25 (75.1)		High temp. teflon	AL1650-1	0.33 (0.123)
3.0 (50.8)			AL1802	0.33 (0.123)

Rolling Pin (adjustable)

Arm	Steel roller	Description	Reference	Weight
Length Inches (mm)	Diameter Inches (mm)	Width Inches (mm)		lb (kg)
2.00 (51) to 4.00 (102)	0.75 (19)	0.25 (6.3)	AL 1650	0.30 (0.111)

Example: KA — This is the complete reference to order.

Severe Duty Limit Switches

L100, L300 Mill and Foundry Switches
Lever Arm Roller Options

Roller Options for Style A		
Diameter Inches (mm)	Description	Reference Add Suffix
1.00 (25.4)	Roller	1
1.25 (32)	Roller	4
1.50 (38.1)	Roller	2
	Nylon roller	N
0.75 (19)	Ball bearing roller	R
	Stainless steel roller	NS

Roller Options for Style B		
Diameter Inches (mm)	Description	Reference Add Suffix
	Nylon roller	N
1.50 (38.1)	Roller	2

Roller Options for Style C		
Diameter Inches (mm)	Description	Reference Add Suffix
1.0 (24.5)	Roller	1
1.25 (32)	Roller	4
1.50 (38.1)	Roller	2
	Nylon roller	N

Roller Options for Style E		
Diameter Inches (mm)	Description	Reference Add Suffix
	Nylon roller	N

Roller Options for Style F		
Diameter Inches (mm)	Description	Reference Add Suffix
1.00 (24.5)	Roller	1
	Nylon roller	N

Roller Options for Style V		
Diameter Inches (mm)	Description	Reference Add Suffix
1.0 (24.5)	Roller	1
	Nylon roller	N
0.75 (19)	Ball bearing roller	R

Roller Options for Style LA		
Diameter Inches (mm)	Description	Reference Add Suffix
1.5 (38)	Roller	2
	Nylon roller	N

Roller Options for Style LC		
Diameter Inches (mm)	Description	Reference Add Suffix
1.25 (32)	Roller	4
1.5 (38)	Roller	2
	Nylon roller	N

Severe Duty Limit Switches

L100, L300 Mill and Foundry Switches
Options and Accessories



Mini Change Connector



Straight Male Connector



90° Angle Male Connector

Housing Options •

Description	Example Full Reference Number	Reference	Weight
		Add Prefix	lb (kg)
0.75" conduit opening Available on 2 circuit switches. Standard on 3 circuit switches	L100WS2M1 changes to GL100WS2M1	G	1.54 (0.57)
High temperature 0 °F to +350 °F (-17.7 °C to + 176.6 °C) ■ Metal front cover only	L100WS2M1 changes to HL100WS2M1	H	1.54 (0.57)
Low temperature -20 °F to 200 °F (-28.8 °C to + 93.3 °C) ■	L100WS2M1 changes to TL100WS2M1	T	1.54 (0.57)
High shock Available only on operating sequences 1, 2, 4, 5, 7-11, 13, 14	L100WS2M1 changes to L526WS2M1 L300WS2M1 changes to L326WS2M1	526/326	1.54 (0.57)
Gold contacts	L100WS2M1 changes to L522WS2M1 L300WS2M1 changes to L322WS2M1	522/322	1.54 (0.57)
Metric conduit threads M20 (20 mm)	L100WS2M1 changes to ML100WS2M1	M	1.54 (0.57)

Wiring

Description	Example Full Reference Number	Reference	Weight
		Add Prefix	lb (kg)
Straight male receptacle 4 pin ▲ Factory prewired	L100WS2M1 changes to PL100WS2M1	P	1.54 (0.57)
90° Angle male receptacle 4 pin ▲ Factory prewired - facing right	L100WS2M1 changes to APL100WS2M1	AP	1.54 (0.57)
Ministyle male receptacle † 8A max. 5 pin (double circuit) 7A max. 7 pin (triple circuit)	L100WS2M1 changes to BL100WS2M1	B B	1.54 (0.57)
		Add Suffix	lb (kg)
Potted and prewired	L100WS2M1 changes to	P	1.54 (0.57)
5 wires 6 feet (1.8 mm) long	L100WS2M1 P	P12	
5 wires 12 feet (3.6 mm) long	L100WS2M1 changes to	P18	
5 wires 18 feet (5.5 mm) long	L100WS2M1 P12 L100WS2M1 changes to L100WS2M1 P18		

Front Covers

Description	Example Full Reference Number	Reference	Weight
		Add Suffix	lb (kg)
Standard metal		M	—
Transparent plastic cover with metal frame		PF	—
Transparent plastic cover with metal frame and Neon indicator light (not connected)		GF	—
	L100WS2M1 changes to L100WS2 PF 1		1.54 (0.57)

Accessories

Description	Reference	Weight
		lb (kg)
Sealed female plug and cable for P and AP connector		
4 pin, #16 AWG STO cable	4 ft. (1.21 m)	1010004 1.20 (0.44)
140 °F (60 °C)	6 ft. (1.82 m)	1010006 1.25 (0.46)
	10 ft. (3.04 m)	10100010 1.50 (0.55)
Sealed female plug and cable for ministyle connector (B)		
5 pin, #16 AWG STO cable	3 ft. (0.91 m)	BH2053 1.50 (0.55)
221 °F (105 °C)	6 ft. (1.82 m)	BH2056 1.70 (0.63)
	12 ft. (3.65 m)	BH20512 2.10 (0.78)

- Other options available — contact your Square D representative for details.
- ▲ Receptacle is a 4 pin male APL/PL-SWTS, Cannon part # MS3102E20-4P-F79 or equal.
- † Ministyle male connector are:
5-pin: Brad Harrison #41310 (or equal)
7-pin: Brad Harrison #42805 (or equal)
- The minimum temperatures listed are based on the absence of freezing moisture or water.

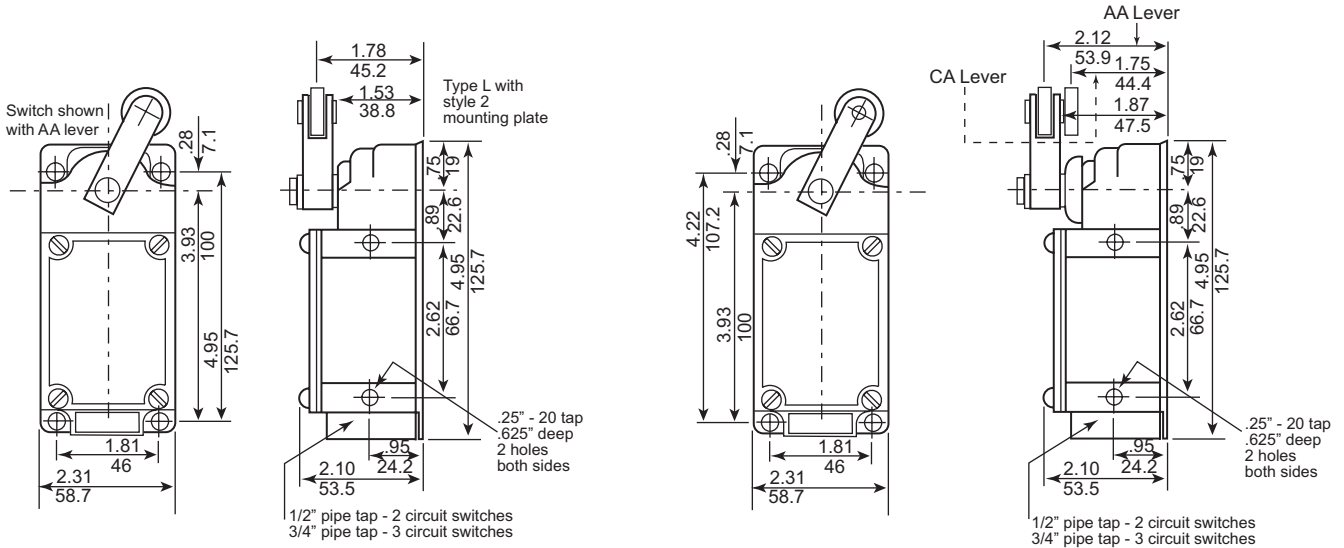
Severe Duty Limit Switches

L100, L300 Mill and Foundry Switches

Switches

Type L100

Type L300



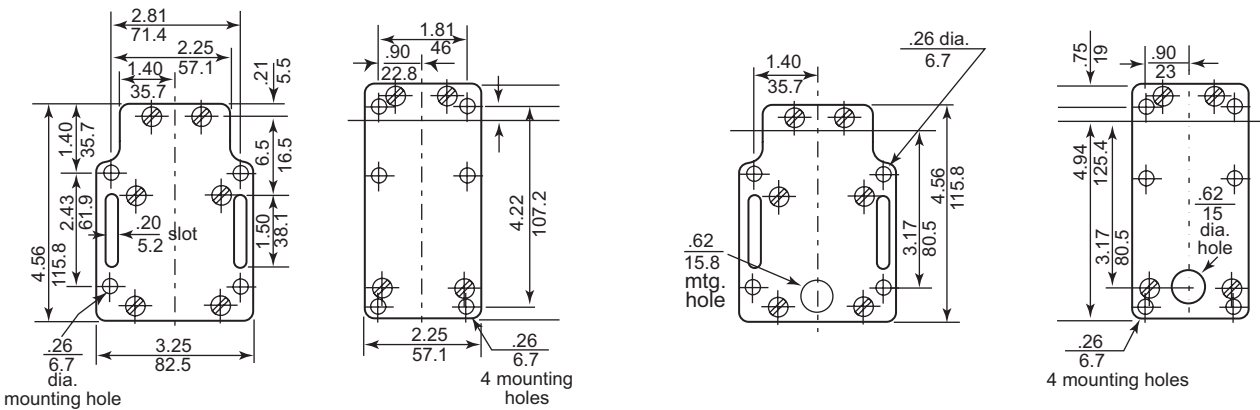
Base Plates

Style 1

Style 2

Style 3

Style 4

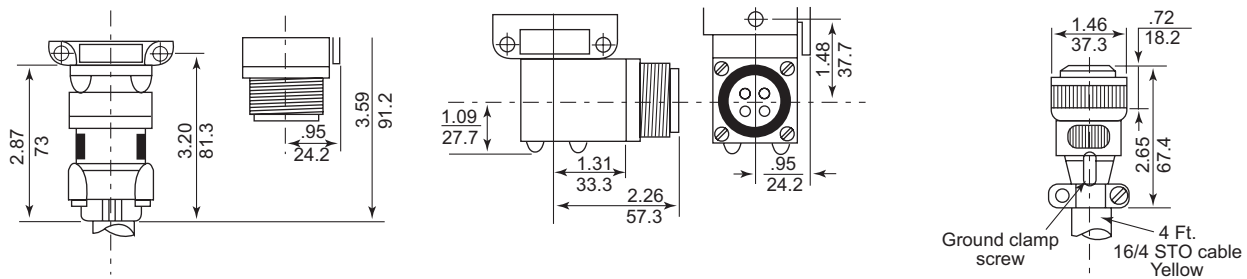


Receptacles

PL

APL

101000



Dual dimensions: $\frac{\text{inches}}{\text{mm}}$

Severe Duty Limit Switches

L100, L300 Mill and Foundry Switches
9007 Mill and Foundry Switches

Interpretation of Reference Numbers

The interpretation of reference numbers is intended to help you understand how the reference number is laid out. It is to be used with **existing numbers only**. New reference numbers **should not be generated** from the table below. If the contact sequence required is not listed, contact your local field office.

L100 and L300

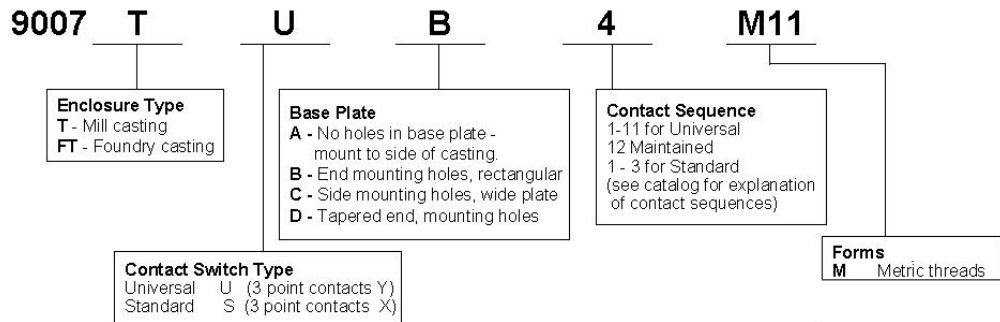


Style	Housing			Function		Mounting Plate	Front Cover		Contact Arrangement		
L	1	0	0	W	S	2	P	F	1 to 60		
Mill	100	L14" and L2153 pull cord switches			WS	Style 1	1	M	Standard metal		
Foundry	300					Style 2	2	PF	Transparent plastic		
Belt Conveyor	525					Style 3	3	GF	Transparent plastic with neon light		
Two circuit single operation				WD		Style 4	4				
Two circuit dual operation				WT							
Triple circuit				WN							
Neutral											

The only modifications to the existing catalog numbers are:

- Base Plates:
 - Select style 1, 2, 3 or 4
- Front Covers: Select metal, transparent plastic, or transparent plastic with neon light. For special features see page 28.

9007T and FT



Numerics	9007FTUB6 10	9007TUB11 8	BM 26	L142 24
1 28	9007FTUB7 10	9007TUB12 8	BN 26	L143 24
10100010 29	9007FTUB8 10	9007TUB2 8	BO 26	L144 24
1010004 29	9007FTUB9 10	9007TUB3 8	BQ 26	L145 24
1010006 29	9007FTUC1 10	9007TUB4 8	BR 26	L146 24
2 28	9007FTUC10 10	9007TUB5 8	C	L147 24
4 28	9007FTUC11 10	9007TUB6 8	CA 26	L148 24
522 29	9007FTUC12 10	9007TUB7 8	CB 26	L149 24
526 29	9007FTUC2 10	9007TUB8 8	CC 26	L2153 24
9007B1 12	9007FTUC3 10	9007TUB9 8	CD 26	L300WDL2M7 22
9007B12 12	9007FTUC4 10	9007TUC1 8	CH 26	L300WDL2M8 22
9007B13 12	9007FTUC5 10	9007TUC10 8	CL 26	L300WDR2M4 22
9007B14 12	9007FTUC6 10	9007TUC11 8	CM 26	L300WDR2M5 22
9007B16 13	9007FTUC7 10	9007TUC12 8	CO 26	L300WDR2M6 22
9007B2 12	9007FTUC8 10	9007TUC2 8	CR 26	L300WN2M16 22
9007B21 12	9007FTUC9 10	9007TUC3 8	E	L300WN2M17 22
9007B22 12	9007FTUD1 10	9007TUC4 8	EA 26	L300WNC2M18 23
9007B23 12	9007FTUD10 10	9007TUC5 8	EB 26	L300WNCS2M34 23
9007B24 12	9007FTUD11 10	9007TUC6 8	ED 26	L300WNS2M26 23
9007B27 13	9007FTUD12 10	9007TUC7 8	F	L300WNSL2M29 23
9007B3 12	9007FTUD2 10	9007TUC8 8	FA 26	L300WNSR2M28 23
9007B7 12	9007FTUD3 10	9007TUC9 8	FB 26	L300WS02M22 23
9007B8 12	9007FTUD4 10	9007TUD1 8	FC 26	L300WS02M23 23
9007B9 12	9007FTUD5 10	9007TUD10 8	FE 26	L300WS2M1 22
9007C1 12	9007FTUD6 10	9007TUD11 8	FG 26	L300WS2M2 22
9007C2 12	9007FTUD7 10	9007TUD12 8	FI 26	L300WS2M3 22
9007C3 12	9007FTUD8 10	9007TUD2 8	FJ 26	L300WTL2M13 22
9007D1 12	9007FTUD9 10	9007TUD3 8	G	L300WTL2M14 22
9007D2 12	9007G10 13	9007TUD4 8	G 29	L300WTL2M15 22
9007D3 12	9007J1 12	9007TUD5 8	GF 29	L300WTLN1C2M39 23
9007D4 13	9007J2 12	9007TUD6 8	H	L300WTLN2M21 23
9007E4 12	9007K1 12	9007TUD7 8	H 29	L300WTLN2M41 23
9007E5 12	9007K2 12	9007TUD8 8	K	L300WTR2M10 22
9007E6 12	9007N1 12	9007TUD9 8	KA 27	L300WTR2M11 22
9007F4 12	9007N2 12	9007X1 12	KB 27	L300WTR2M12 22
9007F5 12	9007R16 13	9007X2 12	KO 27	L300WTRN1C2M38 23
9007F6 12	9007R17 13	9007Y1 12	L	L300WTRN2C2M40 23
9007FTSA1 11	9007R18 12	9007Y2 12	L100WDL2M7 20	L300WTRN2CS2M48 23
9007FTSA2 11	9007R19 12	9007Y3 13	L100WDL2M8 20	L300WTRN2M20 23
9007FTSA3 11	9007R20 12	9007Z1 12	L100WDR2M4 20	L525WDL2M57 25
9007FTSB1 11	9007R21 13	9007Z2 12	L100WDR2M5 20	L525WDL2M58 25
9007FTSB2 11	9007R22 13	A	L100WDR2M6 20	L525WDR2M56 25
9007FTSB3 11	9007TSA1 9	AA 26	L100WN2M16 20	L525WDR2M59 25
9007FTSC1 11	9007TSA2 9	AB 26	L100WN2M17 20	LA01 27
9007FTSC2 11	9007TSA3 9	AC 26	L100WNC2M18 21	LAA1 27
9007FTSC3 11	9007TSB1 9	AD 26	L100WNCS2M34 21	LAH1 27
9007FTSD1 11	9007TSB2 9	AH 26	L100WNS2M26 21	LCA1 27
9007FTSD2 11	9007TSB3 9	AJ 26	L100WNSL2M29 21	LCH1 27
9007FTSD3 11	9007TSC1 9	AK 26	L100WNSR2M28 21	LCO1 27
9007FTUA1 10	9007TSC2 9	AL 26, 27	L100WS02M22 21	M
9007FTUA10 10	9007TSC3 9	AL1649 27	L100WS02M23 21	M 29
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9007FTUA12 10	9007TSD2 9	AL1746 27	L100WS2M1 20	N
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9007FTUA3 10	9007TUA1 8	AM 26	L100WS2M3 20	NS 28
9007FTUA4 10	9007TUA10 8	AN 26	L100WTL2M13 20	P
9007FTUA5 10	9007TUA11 8	AO 26	L100WTL2M14 20	P 29
9007FTUA6 10	9007TUA12 8	AP 26, 29	L100WTL2M15 20	P12 29
9007FTUA7 10	9007TUA2 8	AQ 26	L100WTLN1C2M39 21	P18 29
9007FTUA8 10	9007TUA3 8	AR 26	L100WTLN2M21 21	PF 29
9007FTUA9 10	9007TUA4 8	B	L100WTLN2M41 21	R
9007FTUB1 10	9007TUA5 8	B 29	L100WTR2M10 20	R 27, 28
9007FTUB10 10	9007TUA6 8	BA 26	L100WTR2M11 20	R9 27
9007FTUB11 10	9007TUA7 8	BB 26	L100WTR2M12 20	T
9007FTUB12 10	9007TUA8 8	BH 26	L100WTRN1C2M38 21	T 29
9007FTUB3 10	9007TUA9 8	BH20512 29	L100WTRN2C2M40 21	V
9007FTUB4 10	9007TUB1 8	BH2053 29	L100WTRN2CS2M48 21	VA 27
9007FTUB5 10	9007TUB10 8	BH2056 29	L100WTRN2M20 21	



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