

2c



**HEAVY DUTY LIMIT SWITCHES
Types T and FT**

- Robust, heavy duty switch
- 15 operating sequences available
- Most sequences are convertible in the field.
- Type T suitable for heavy duty applications.
- Type FT specifically designed for foundry and mill applications
- High contact ratings up to 20A
- Interchangeable base plates enable various mounting options
- Full range of heavy duty lever arms available

Heavy Duty Limit Switches Type T	2c2
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Universal Limit Switches Ingress Protection IP66 (IEC144)

Lever Types Oil-Tight, Dust-Tight, Water Tight and Drip Tight Enclosure. NEMA Types 2, 4 and 13

Universal Type Switch Adjustable to 11 Different Operating Sequences



Operating sequence Number 1 and Diagram*	Lever Arm Movement (viewed facing cover)	Contact Operation Diagram						Order ● Class 9007 Type ...
		Lever Arm in Initial Position		Intermediate Position		Final Position		
		Circuit A	Circuit B	Circuit A	Circuit B	Circuit A	Circuit B	
1	Clockwise	○	○	○	○	○	○	TUA 1 TUC 1 TUB 1 TUD 1
2	Clockwise	○	○	○	○	○	○	TUA 2 TUC 2 TUB 2 TUD 2
3	Clockwise	○	○	○	○	○	○	TUA 3 TUC 3 TUB 3 TUD 3
4	Counter-Clockwise	○	○	○	○	○	○	TUA 4 TUC 4 TUB 4 TUD 4
	Clockwise	○	○	○	○	○	○	
5	Counter-Clockwise	○	○	○	○	○	○	TUA 5 TUC 5 TUB 5 TUD 5
6	Counter-Clockwise	○	○	○	○	○	○	TUA 6 TUC 6 TUB 6 TUD 6
7	Clockwise	○	○	○	○	○	○	TUA 7 TUC 7 TUB 7 TUD 7
	Counter-Clockwise	○	○	○	○	○	○	
8	Clockwise	○	○	○	○	○	○	TUA 8 TUC 8 TUB 8 TUD 8
	Clockwise (From Position 'O')	○	○	○	○	○	○	
	Counter-Clockwise (from position 'O')	○	○	○	○	○	○	
9	Clockwise	○	○	○	○	○	○	TUA 9 TUC 9 TUB 9 TUD 9
10	Clockwise	○	○	○	○	○	○	TUA 10 TUC 10 TUB 10 TUD 10
	Counter-Clockwise	○	○	○	○	○	○	
11	Counter-Clockwise	○	○	○	○	○	○	TUA 11 TUC 11 TUB 11 TUD 11

Universal Type Switch, Non Adjustable, Maintained Contact

12	Clockwise	○	○	○	○	○	○	TUA 12 TUC 12 TUB 12 TUD 12
	Counter-Clockwise	○	○	○	○	○	○	

Standard Type Switch Adjustable to 3 Different Operating Sequences

1	Clockwise or Counter-Clockwise	○	○	○	○	○	○	TSA 1 TSC 1 TSB 1 TSD 1
		○	○	○	○	○	○	
2	Clockwise or Counter-Clockwise	○	○	○	○	○	○	TSA 2 TSC 2 TSB 2 TSD 2
		○	○	○	○	○	○	
3	Clockwise or Counter-Clockwise	○	○	○	○	○	○	TSA 3 TSC 3 TSB 3 TSD 3
		○	○	○	○	○	○	

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* _____ Maintained (Normal) Position A-"A" Contact Closed B-"B" Contact Closed O-Both Contacts Open
 -----Spring Return (Tripped) Position

- Third letter in Type indicates baseplate style. Select as required, see Page 2b6 for further details.
- ± If high speed cam or snap-back present, use maintained contact switch-Sequence No. 12
- ≠ These operating sequences have slow make, slow break, contact action.
- ▲ Arm has spring return to initial position. Cam design must prevent fly-back action of operating arm. Contact position is maintained until arm is operated in reverse direction.
- Cam design must prevent fly-back action of operating arm.

Ordering Instructions
 State... **Class** and **Type**
 Eg: Class **9007** Type **TUB-4**
 Order lever arm from Page 2c4

Note: Preferred items shown in bold print.
 □ When fitted with suitable cable gland or adequately sealed conduit.

Universal Limit Switches For Foundry Use Ingress Protection IP66 (IEC144)

Lever Types Oil-Tight, Dust-Tight, Water Tight and Drip Tight Enclosure. NEMA Types 2, 4 and 13



Type FTUB4
With D1 ARM

Universal Type Switch Adjustable to 11 Different Operating Sequences

Operating sequence Number 1 and Diagram*	Lever Arm Movement (viewed facing cover)	Contact Operation Diagram Lever Arm in						Order ● Class 9007 Type ...	
		Initial Position Circuit A	Circuit B	Intermediate Position Circuit A	Circuit B	Final Position Circuit A	Circuit B		
1	Clockwise	○	○	○	○	○	○	FTUA 1	FTUC 1
		○	○	○	○	○	○	FTUB 1	FTUD 1
2	Clockwise	○	○	○	○	○	○	FTUA 2	FTUC 2
		○	○	○	○	○	○	FTUB 2	FTUD 2
3	Clockwise	○	○	○	○	○	○	FTUA 3	FTUC 3
	Counter-Clockwise	○	○	○	○	○	○	FTUB 3	FTUD 3
4	Clockwise	○	○	○	○	○	○	FTUA 4	FTUC 4
	Counter-Clockwise	○	○	○	○	○	○	FTUB 4	FTUD 4
5	Counter-Clockwise	○	○	○	○	○	○	FTUA 5	FTUC 5
		○	○	○	○	○	○	FTUB 5	FTUD 5
6	Counter-Clockwise	○	○	○	○	○	○	FTUA 6	FTUC 6
		○	○	○	○	○	○	FTUB 6	FTUD 6
7	Clockwise	○	○	○	○	○	○	FTUA 7	FTUC 7
	Counter-Clockwise	○	○	○	○	○	○	FTUB 7	FTUD 7
8	Clockwise (From Position '0')	○	○	○	○	○	○	FTUA 8	FTUC 8
	Counter-Clockwise (from position '0')	○	○	○	○	○	○	FTUB 8	FTUD 8
	Counter-Clockwise	○	○	○	○	○	○		
9	Clockwise	○	○	○	○	○	○	FTUA 9	FTUC 9
		○	○	○	○	○	○	FTUB 9	FTUD 9
10	Clockwise	○	○	○	○	○	○	FTUA 10	FTUC 10
	Counter-Clockwise	○	○	○	○	○	○	FTUB 10	FTUD 10
11	Counter-Clockwise	○	○	○	○	○	○	FTUA 11	FTUC 11
		○	○	○	○	○	○	FTUB 11	FTUD 11

Universal Type Switch, Non Adjustable, Maintained Contact

12	Clockwise	○	○	○	○	○	○	FTUA 12	FTUC 12
	Counter-Clockwise	○	○	○	○	○	○	FTUB 12	FTUD 12

Standard Type Switch Adjustable to 3 Different Operating Sequences

1	Clockwise	○	○	○	○	○	○	FTSA 1	FTSC 1
	Counter-Clockwise	○	○	○	○	○	○	FTSB 1	FTSD 1
2	Clockwise	○	○	○	○	○	○	FTSA 2	FTSC 2
	Counter-Clockwise	○	○	○	○	○	○	FTSB 2	FTSD 2
3	Clockwise	○	○	○	○	○	○	FTSA 3	FTSC 3
	Counter-Clockwise	○	○	○	○	○	○	FTSB 3	FTSD 3

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* ——— Maintained (Normal) Position A-"A" Contact Closed B-"B" Contact Closed O-Both Contacts Open
 -----Spring Return (Tripped) Position

- Third letter in Type indicates baseplate style. Select as required, see Page 2b6 for further details.
- ± If high speed cam or snap-back present, use maintained contact switch-Sequence No. 12
- ± These operating sequences have slow make, slow break, contact action.
- ▲ Arm has spring return to initial position. Cam design must prevent fly-back action of operating arm. Contact position is maintained until arm is operated in reverse direction.
- Cam design must prevent fly-back action of operating arm.

Ordering Instructions
 State... **Class** and **Type**
 Eg: Class **9007** Type **FTUB-1**
 Order lever arm from Page 2c4

Note: Preferred items shown in bold print.
 □ When fitted with suitable cable gland or adequately sealed conduit.

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Lever Arms And Base Plates

Lever Arms For Types T and FT

Straight



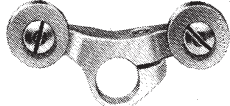
Offset



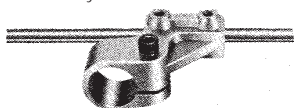
90° Forked



120° Forked



Rod or Key Stock



One Way Roller



Weld on



Length of Arm mm	Lever Offset mm	Roller Position	Roller Width mm	Distance from Cam Track mm (CL of Roller to Switch Base)	Order Class 9007 Type...		
					19mm dia. Roller	25mm dia. Roller	35mm dia. Roller

Straight

38	None	Optional	6	43 or 62	B1	B2	B3
64	None	Optional	6	43 or 62	B7	B8	B9
38	None	Optional	13	40 or 65	B12*	B13*	B14*

Straight (Ball Bearing Roller)

38	None	Centre	7	51	B16 (22mm diameter)		
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Offset

38	10	Inside Offset	6	51	C1	C2	C3
		Outside Offset	6	33 or 71	D1	D2	D3
48	21	Outside Offset	6	21 or 83	E4	E5	E6
		Inside Offset	6	40 or 64	F4	F5	F6

90° Forked

38	None	Rollers on same side	6	43 or 62	X1	X2	
		R.H. Roller on opp. side	6	43 and 62	Y1	Y2	
		L.H. Roller on opp. side	6	43 and 62	Z1	Z2	

120° Forked

38	None	Rollers on same side	6	43 or 62	J1	J2	
		R.H. Roller on opp. side	6	43 and 62	K1	K2	
		L.H. Roller on opp. side	6	43 and 62	N1	N2	

Rod Or Key Stock

37	None	Optional	6	60 or 79	R18†	R19†	R20†
42	18	None	None		R17		

One Way Roller

38	10	Outside Offset	6	71	D4		
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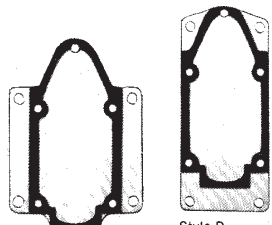
Weld On

89	None	None	None		G10		
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* Two 6mm Wide Rollers

† Roller head assembly for use with R17 arm and 6mm Key Stock.

Base Plates for Types T and FT



Style C (Style F with Manifold)

Style D (Style G with Manifold)

Style	Mounting Holes	Order Class 9007 Type...
A	None •	2934-D32-G1 †
B	End	2934-D14-G1 †
C	Side	2934-D33-G1 †
D	End	2934-D34-G1 †

• No mounting holes in base plate. Side mounting holes in switch case must be used.

† Base plate without manifold.

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Ordering Instructions
State... Class and Type
Eg: Class 9007 Type B1

Technical Data and Replacement Parts Kits

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Replacement Parts and Accessories

Use With Device Type	Description	Order Class 9998 Type...
T and FT	Replacement Contact kit for Types TS, TU, FTS and FTU	E2934-S923-G1
T and FT	Replacement Spring kit for Types Nos. 1 to 11	E2934-S925-G1
T and FT	Replacement Gasket kit	E2934-S926-G1
T	Replacement Shaft kit for Type TU	E2934-S928-G1
T	Replacement Shaft kit for Type TS	E2934-S929-G1
FT	Replacement Shaft kit Type FTU	E2934-S931-G1
T and FT	Accessory Conduit Seal (5 hole)	Class 9007 Type 31032-488-01

Technical Data

Mechanical Data

Operating Characteristics

The overtravel figures shown are maximum values. It is recommended that 5 to 10 degrees overtravel be used to obtain the optimum mechanical life from the limit switch. The overtravel shown is a feature of the switch that allows for set up adjustment and emergency operation where excessive operating arm travel is encountered or required.

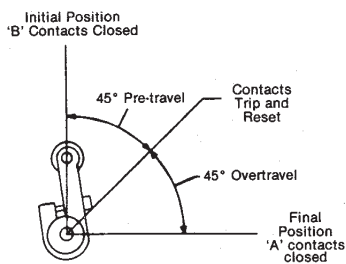
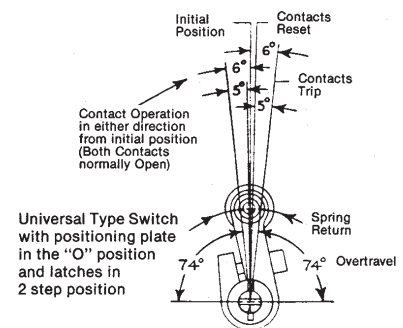
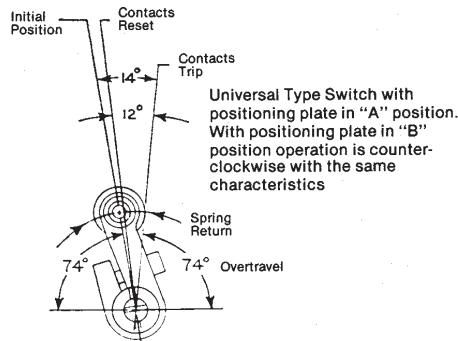
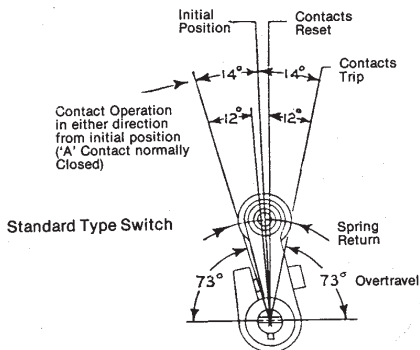
The location of the operating arm may reduce the actual amount of overtravel due to interference with the switch enclosure.

Type of Switch	Operating Force to Trip	Repeat Accuracy With Arm Length mm	Accuracy mm	Overtravel
Standard	10cm-kg	38	±0.05	73° †
Universal	12cm-kg*	38	±0.05	74° †

* Except TU-7 & 8 which require 2.9cm-kg and TU-12 which require 9cm-kg.

† Nominal value. Overtravel varies with operating sequence.

Cam Track Data



Standard and Universal Type Switches Operating Sequence No. 12

Operating Sequence No. 12 maintained contact action. All positions can be reversed. Clockwise operation, counter-clockwise reset shown.

Note: Electrical ratings apply when switch is operated with quick make and break contact action. If latches are removed to obtain slow make and break action the switch has the following pilot duty rating: 20-125 volts A.C. of 6 amperes and 125-600 volts A.C. of 720 VA.

Electrical Ratings

Contact Arrangement	AC Volts	AC Pilot Duty Amperes		DC Volts	DC Pilot Duty Amps
		Break ●	Make ●●		
Single Pole	120	20	150	125	5.0
Double Throw	240	12.5	75	250	1.0
	480	6.25	37.5	600	0.2
	600	5	30		

● A.C. Pilot duty rating is based on a 0.35 power factor.

●● D.C. Pilot duty rating is based on inductive loads such as coils and solenoids.

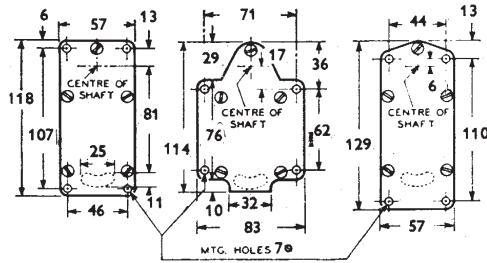
Ordering Instructions

State... Class and Type

Eg: Class 9998 Type E2934-S925-G1

Dimensions - Limit Switches

Limit Switches Types T and FT Base Plate Dimensions

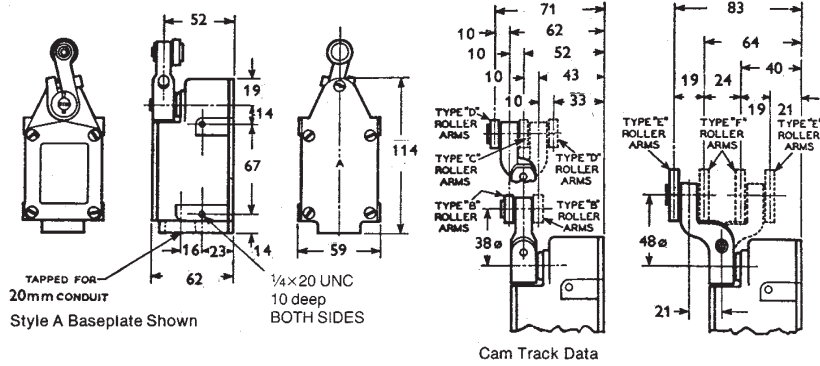


Style "B"
(Style "E" with Manifold Opening)

Style "C"
(Style "F" with Manifold Opening)

Style "D"
(Style "G" with Manifold Opening)

Limit Switches Types T

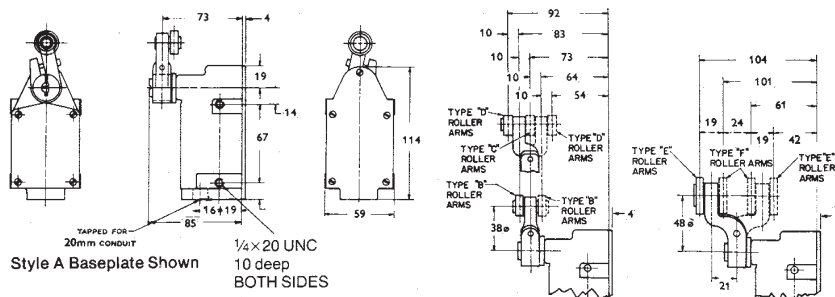


TAPPED FOR 20mm CONDUIT
Style A Baseplate Shown

1/4x20 UNC
10 deep
BOTH SIDES

Cam Track Data

Limit Switches Type FT



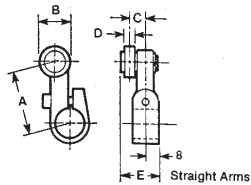
TAPPED FOR 20mm CONDUIT
Style A Baseplate Shown

1/4x20 UNC
10 deep
BOTH SIDES

Dimensions in mm

Dimensions - Lever Arms

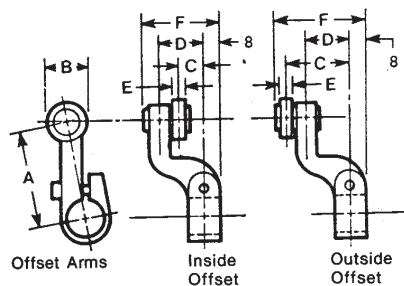
Straight Arms



Arm Type	A	B	C	D	E
B1	38	19	10	6	23
B2	38	25	10	6	23
B3	38	35	10	6	23
B7	64	19	10	6	23
B8	64	25	10	6	23
B9	64	35	10	13*	23
B12	38	19	13	13*	29
B13	38	25	13	13*	29
B14	38	35	13	13*	29

* Two 6mm wide rollers

Offset Arms



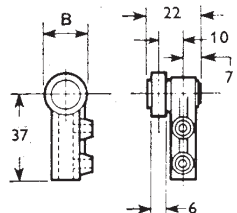
Inside Offset

Arm Types	A	B	C	D	E	F
C1	38	19	0	10	6	25
C2	38	25	0	10	6	25
C3	38	35	0	10	6	25
F4	48	19	12	21	6	37
F5	48	25	12	21	6	37
F6	48	35	12	21	6	37

Outside Offset

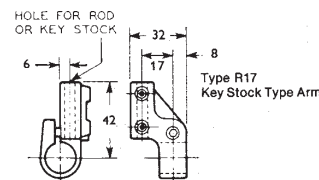
Arm Types	A	B	C	D	E	F
D1	38	19	19	10	6	33
D2	38	25	19	10	6	33
D3	38	35	19	10	6	33
E4	48	19	31	21	6	44
E5	48	25	31	21	6	44
E6	48	35	31	21	6	44

Type R18, R19, R20 Arms

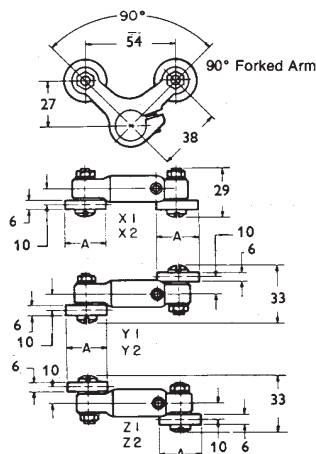


Arm Type	Dimension B
R18	19
R19	25
R20	35

Type R17 Key Stock Type Arm



90° Forked Arms

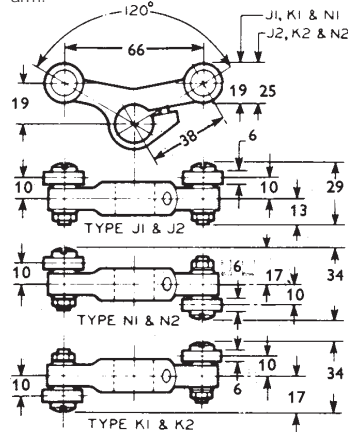


Type	Dimension A
X1, Y1, Z1	19
X2, Y2, Z2	25

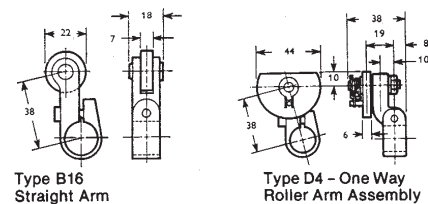
All Dimensions in Millimetres

120° Forked Arms

Note: Rollers are removable making it possible to reverse their position on the arm.



Types B16 & D4 Arms



Type G10 Weld-On Arm

