



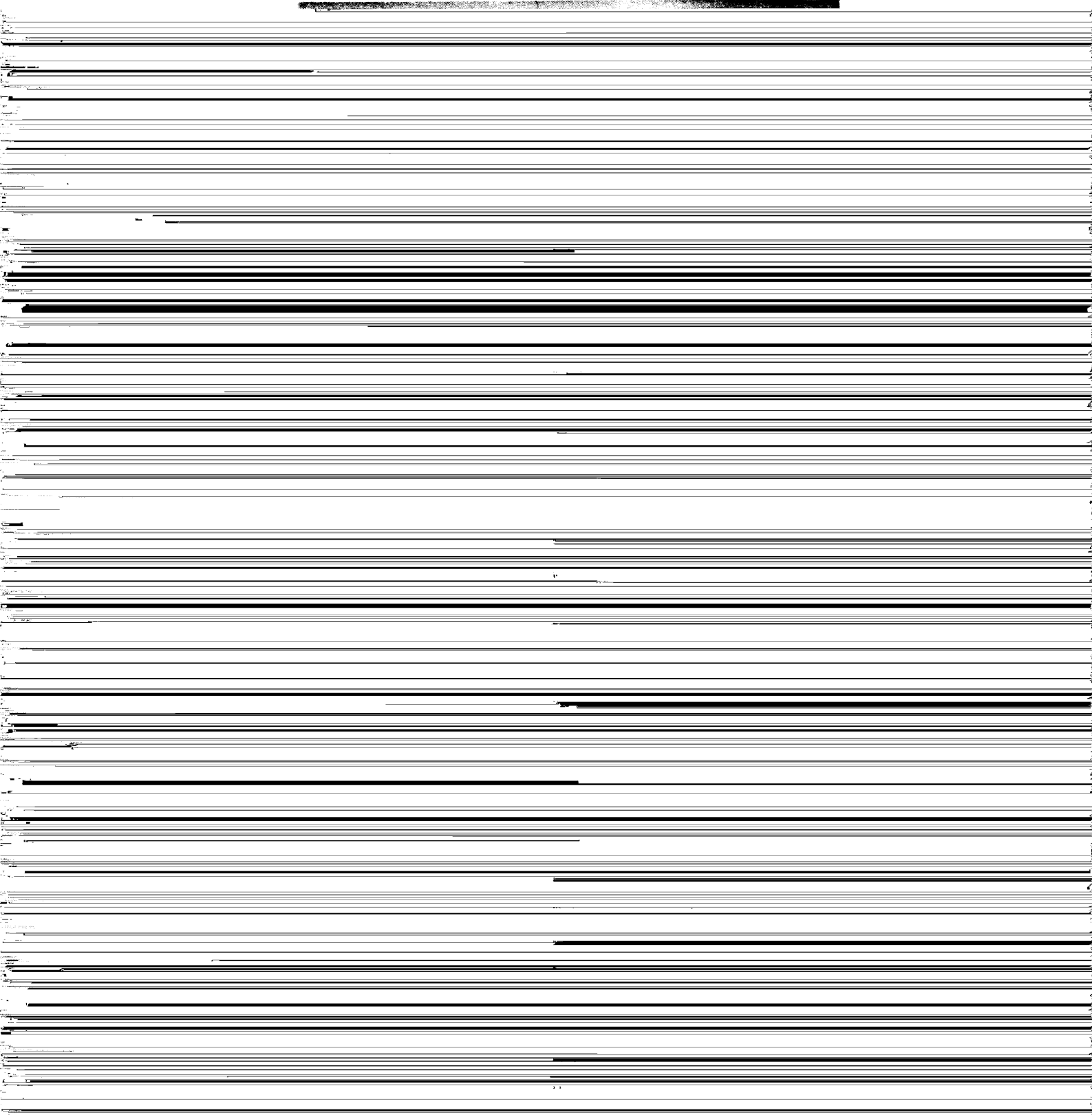
**ENGINEERING BULLETIN**

**June 1971**

**Bulletin No. 6**

**NSF ROTARY WAFER SWITCHES**  
**Models JKM and JKB**

J TYPE MECHANISM  
(KM & KB WAFER OBSOLETE)



**INSULATION.**

Stators and Rotors: Highest grades of punching quality S.R.B.P. materials to B.S. 2076 Grade L. Tropical grade material to B.S. 2076 grade H is available at extra cost, if desired.

**FINISH.**

Standard : All ferrous parts plated ; non-ferrous parts clean.  
Special : Special finishes to withstand tropical conditions are available when specified.

**MOUNTING DETAILS.**

Unless otherwise specified, each switch is supplied with one fixing nut  $\frac{3}{8}$ " thick, .525" across flats, threaded  $\frac{3}{8}$ " x 32 T.P.I. Whitworth form and one  $\frac{3}{8}$ " internal tooth steel lock-washer. Various methods of mounting may be provided to meet customers' special requirements. Panel and spindle sealing is available if required.

**CONSTRUCTION.**

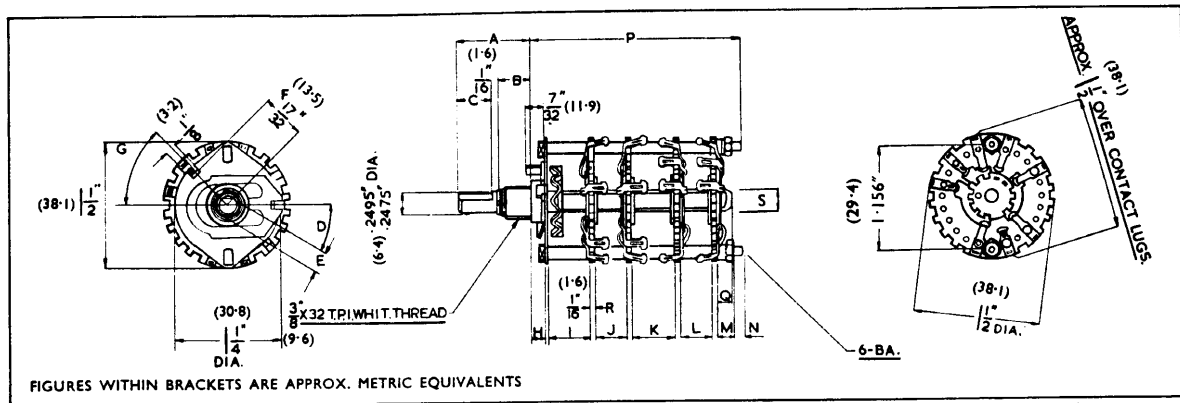
The switch sections are spaced by tubular metal spacers and held in place with a positive relationship to the index mechanism assembly by side strut screws.

**STANDARD CONTACT ARRANGEMENTS.**

Please refer to Engineering Bulletin No. 7 for details of standard contact arrangements and use these whenever possible.

**MAIN SWITCHES**

JKM only. — Switches, rated at 1 amp., 250 volt, A.C. or D.C., are available in SPST, DPST, SPD, or 3-way (making 3 contacts when thrown). A.C. switches are attached to end of shaft and may be arranged to operate at any given position through the rotation of the switch.



**KEY TO DIMENSIONAL DIAGRAM.**

- |   |   |
|---|---|
| <p>A. Shaft length : Optional <math>\pm \frac{1}{8}</math>". Diameter : .2475" —.2495" (after plating).</p> <p>B. Bushing Thread length : Standard <math>\frac{1}{4}</math>" or <math>\frac{3}{8}</math>". Special lengths if necessary. Threads <math>\frac{3}{8}</math>" x 32 T.P.I. Whitworth form.</p> <p>C. Flat length : Standard not more than <math>\frac{5}{8}</math>", in no case closer than <math>\frac{1}{16}</math>" to end of bushing. Tolerance <math>\pm \frac{1}{64}</math>". Special shaft terminations may be provided to meet customers' particular requirements.</p> <p>D. Angle of flat : as desired <math>\pm 2^\circ</math>. Specify position of switch in which flat is shown—fully counter clockwise.</p> <p>E. Flat thickness : Standard .195" <math>\pm .005</math>" for grub screws, .195" <math>\pm .002</math>" for push-on knobs.</p> <p>F. Distance of locating lug from centre of shaft (centre line to centre line) <math>\frac{17}{32}</math>". Alternative, <math>\frac{3}{8}</math>".</p> <p>G. Angles available, <math>\frac{17}{32}</math>" lug: <math>0^\circ, 45^\circ, 135^\circ, 180^\circ, 225^\circ, 315^\circ</math>. With <math>\frac{3}{8}</math>" lug, angles as above plus <math>15^\circ</math> or <math>195^\circ</math>.</p> <p>H. Bushing shoulder : Standard <math>\frac{5}{32}</math>" (<math>\frac{7}{32}</math>" if sealed bush specified). Special lengths provided above this dimension where required.</p> <p>I. First Spacer : <math>\frac{1}{4}</math>" min. with lugs facing front* of first section. <math>\frac{3}{32}</math>" min. with lugs facing rear of first section. May be any length (within switch limitations) over these min. dimensions.</p> | <p>J-K-L. Spacers : <math>\frac{7}{16}</math>" min. with lugs facing each other ; <math>\frac{1}{4}</math>" min. with lugs facing same direction as adjoining sections ; <math>\frac{3}{32}</math>" min. with lugs facing away from each other. No max. limit (within switch limitations.)</p> <p>M. If no spacer, <math>\frac{1}{8}</math>" min. any length spacer desired may be inserted at this point ; <math>\frac{1}{8}</math>" Standard.</p> <p>N. Thread extension : <math>\frac{1}{8}</math>"—6BA., any length desired.</p> <p>P. Specify maximum overall length, if important.</p> <p>Q. Shaft extension at rear : nominal <math>\frac{1}{4}</math>" to <math>\frac{1}{2}</math>" Dimension (after plating) : dia. .2475"/.2495" ; across flats .187"/.188" (4-8)</p> <p>R. Standard <math>\frac{1}{16}</math>" bakelite sections.</p> <p>S. Rear Shaft Dimensions, JKM: Dia. 0.250"(6.4); across flats, 0.181" (4.0); JKB: Dia. 0.187" (4.0); across flats. 0.125" (3.2).</p> <p>ROTOR BLADES : Standard switches are made before break "shorting" type in which connection is maintained with one contact until after the next contact is made. Break before make "non-shorting" switches, which break connection with one contact before the next contact is made, are available to order.<br/>*"Front" is when switch viewed from the knob end.</p> |
|---|---|

MU INDEXING  
 MA WAFERS

# Engineering Bulletin No.29

## Rotary Wafer switch - model MU-MK.

**General Information** These switches have 32mm (1.26") diameter moulded wafers with 22 contact positions providing up to 12 switching positions. The stators are moulded from glass fibre loaded diallylphthalate. Optional features include concentric shafts, panel and spindle seals and rigid termination's for printed circuit connections.

**Characteristics. Electrical, Maximum working voltage** 300Vac/dc.

**Contact rating,**

- Current carrying 5amp continuous.
- Current breaking with a resistive/non-reactive load.
  - 60mA at 250Vdc.
  - 150mA at 250Vac (rms).
  - 500mA at 30Vac/dc (rms).

**Proof Voltage.** 1000Vrms at sea level.

**Insulation resistance.** Not less than 2 Gohms.  
 (between any 2 parts requiring electrical insulation)

**Contact resistance (initial).** 10 milliohms maximum.  
 100mA. max.

**Maximum Switching.**

No. of Poles.	30° MU-MK		
1 Pole.	2 to 12 ways	5 Pole.	2 to 3 ways
2 Pole.	2 to 9 ways	6 Pole.	2 ways
3 Pole.	2 to 5 ways	7 Pole.	2 ways
4 Pole.	2 to 4 ways		

**Standard Contact Arrangements.**

Please refer to Engineering Bulletins RW25a for details of standard contact arrangements and use these whenever possible.

**Index Mechanism.**

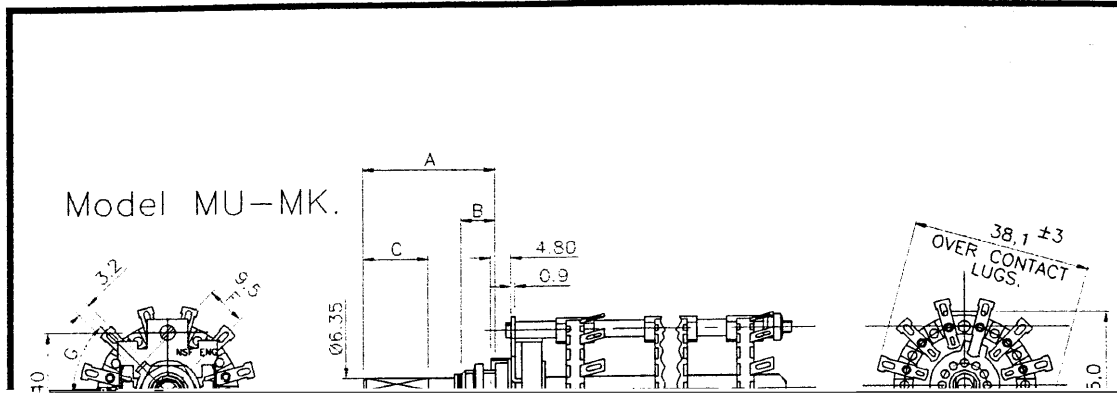
The preferred mechanism used with the MK wafers is the Type MU providing indexing angles of 30°, 45° and 60°, (see Bulletin RW36 for full technical details). Torque ranges available are:-

Light 7 to 14 x 10<sup>-2</sup> Nm (10 to 20 oz. ins.)      Medium 14 to 28 x 10<sup>-2</sup> Nm (20 to 40 oz. ins.)

Other mechanisms which may be used as alternatives are:-  
 Heavy Duty (Bulletin RW11) when torque in excess of 0.25 Nm up to 0.63Nm (90 oz.in.) is required or where

locating pins are preferred to lugs, on 15,1mm (0.6") radius.  
 Type 'U' (Bulletin RW27) when torque values up to 0.49Nm (70 oz.in.) are required.  
 Type 'J' (Part of Bulletin RW 6) where additional locating lug angles of 0°, or 180° are specified, also where radius of 13,5mm (0.53") is required.

**Contacts &** Standard. - Silver plated brass.



**General Information** These versatile miniature switches have 25.4 mm diameter moulded wafers and are available in 2 versions, 36° indexing - having 18 clip positions and 30° indexing - having 22 such positions. 15°, 45° and 60° indexing are variations of the latter. Optional features include concentric shafts, panel and spindle seals, printed circuit termination's and momentary contact models.

**Characteristics.** Electrical, Maximum working voltage, 300Vdc/ac (rms).  
 Contact rating, Current carrying 2amp continuous.  
 Current breaking with a resistive/non-reactive load. 50mA at 300Vdc/ac (rms).  
 500mA at 30Vdc/ac (rms).  
 Proof Voltage. 1000Vrms at sea level.  
 Insulation resistance. Not less than 500 megohms at 500Vdc.  
 (between any 2 parts requiring electrical insulation)  
 Contact resistance (initial). 10 milliohms maximum at 100mV (rms). 100mA.max.  
 Mechanical.  
 End stop strength. 0,8 ± 0,1 Nm (114oz.in.)  
 Temperature range. -40°C. to +100°C.

**Maximum Switching.**

No. of Poles.	36° MU-MA (b)	30° MU-MA (a)	45° MU-MA (c)	60° MU-MA (d)	15° MU-MG
	10 Positions.	12 Positions.			2 wafers
1 Pole.	2 to 10 ways	2 to 12 ways	2 to 8 ways	2 to 6 ways	providing 1 pole
2 Pole.	2 to 5 ways	2 to 7 ways	(fixed stop at	2 to 6 ways	24 way
3 Pole.	2 to 4 ways	2 to 5 ways	positions 3, 5,	2 or 3 ways	switching.
4 Pole.	2 or 3 ways	2 to 4 ways	and 7 ways)	2 or 3 ways	
5 Pole.	-	2 to 3 ways		2 ways only	
6 Pole.	-	2 ways only		on-off	
7 Pole.	-	2 ways only		-	

**Standard Contact Arrangements.**

Please refer to Engineering Bulletins RW25a (30° and 45°) or RW25b (36°) for details of standard contact arrangements and use these whenever possible.

**Index Mechanism.**

The Type MU mechanism provides indexing angles of 30°, 36°, 45° and 60°, (see Bulletin RW36 for full technical details). The low friction moulded cam followers in the assembly ensures a smooth indexing action. Balance pressure springs provide consistent and readily reproducible total switch torque values within the following ranges.

Light 7 to 18 x 10<sup>-2</sup> Nm (10 to 26 oz, ins,) Medium 14 to 32 x 10<sup>-2</sup> Nm (20 to 46 oz, ins.)  
 High 28 to 56 x 10<sup>-2</sup> Nm (40 to 80 oz, ins.)

Type A indexing mechanism may also be used as an alternative where a simpler, space saving mechanism is required. The switch then becomes model A-MA. 30° indexing only.

**Contacts & Termination's.**

Standard. - Silver plated brass.  
 Alternatives. - Hard gold plated or silver contacts are available at extra cost as are contacts with gold flash.  
 Termination's. - Forward, standard: Straight, alternative.

**Rotor Blades.**

Standard. - Shorting. (make before break. MBB.)  
 Alternative. - Non-shorting. (break before make. BBM.)

**Insulation.**

Stator. - Moulded glass fibre loaded diallylphthalate (DAP)  
 Rotor. - Polycarbonate.

**Finish.**

Index Springs, Stainless steel: other metal parts, passivated zinc plated. Finishes to order.

**Mounting Details.**

Imperial (standard). Metric (alternative)  
 Bush 3/8" x 32TPI (Whit.) M10 x 0.75.  
 Shaft 0.25" dia. 6mm, dia.  
 Nut 0.525" A/F. 14mm A/F.  
 The alternative is optional in each case.  
 Unless otherwise specified, each switch is supplied with an internal tooth steel lock washer.

**Construction.**

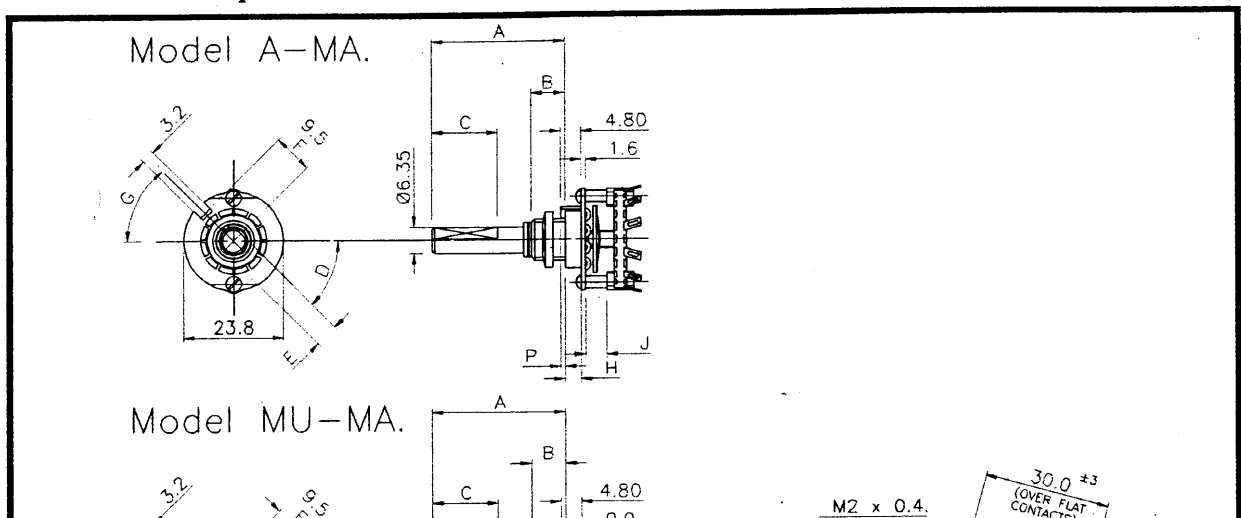
The switch wafers are spaced by tubular metal spacers and held in place, with a positive relationship to the index mechanism, by side strut screws.

Engineering Bulletin No.34  
Rotary Wafer Switch Type MSD.

**General Information** The MSD is essentially a Heavy Duty rotary switch which is rated at 6amps. at 250Vac. Designed to handle higher currents than is possible with normal types of leaf clip wafer switches. It is eminently suitable for use in a wide variety of electronic and domestic equipment.  
Developed by NSF technical service to incorporate modern materials and techniques which give the switch a greatly extended life at its full current rating.

Variations. 1. Biased indexing is available giving momentary contact on positions 8 to 7, 5 to 4, 4 to 3, 3 to 2 and 2 to 1 as well

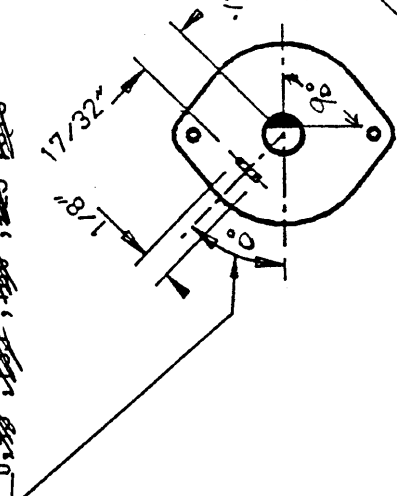
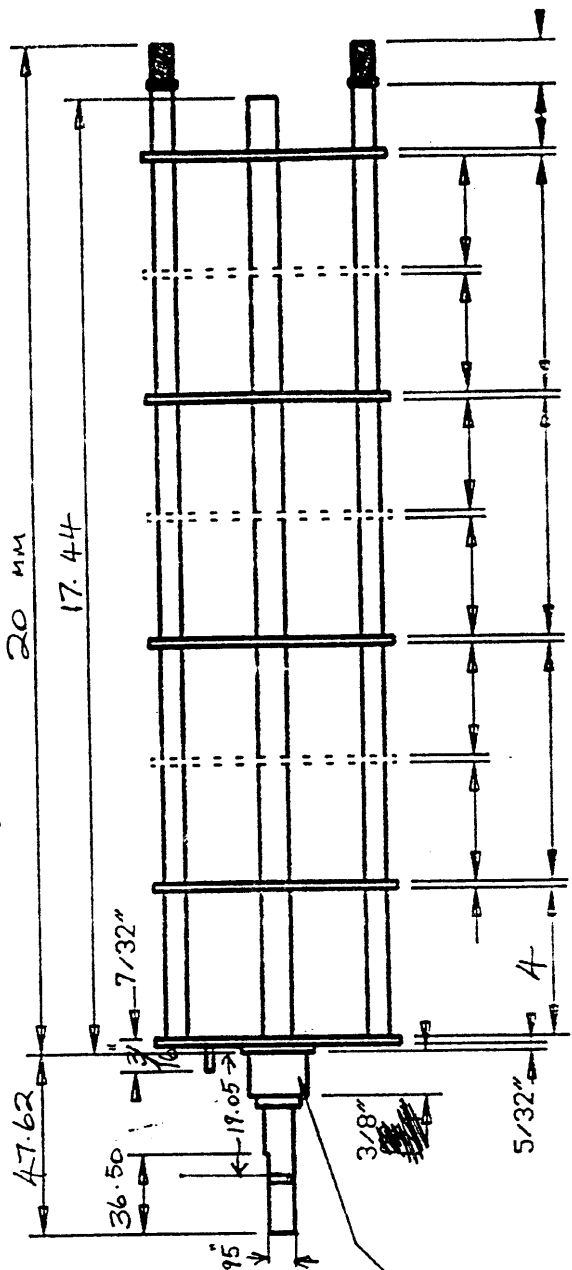
- (Not available for 36° indexing).
3. Insulated shafts.
  4. Electrostatic shields.
  5. Printed circuit termination's - 2 types are available giving a variation in mounting height of the wafer above the P.C. board.
  6. Adjustable stops - 2 types are available.  
Front - can be set without dismantling the switch and are available on models MU-MA (a),(d) and A-MA with imperial bush.  
Rear - for use with all other indexing variations both Imperial and Metric versions.
  7. Panel and spindle seals can be fitted 1cm<sup>3</sup>/hr. The latter are not available on concentric shaft models.



N.S.F. MODEL ~~40646~~ JMK SWITCH

N.S.F. SPEC No. 459103 JMK1

SECRET  
1 OF 3

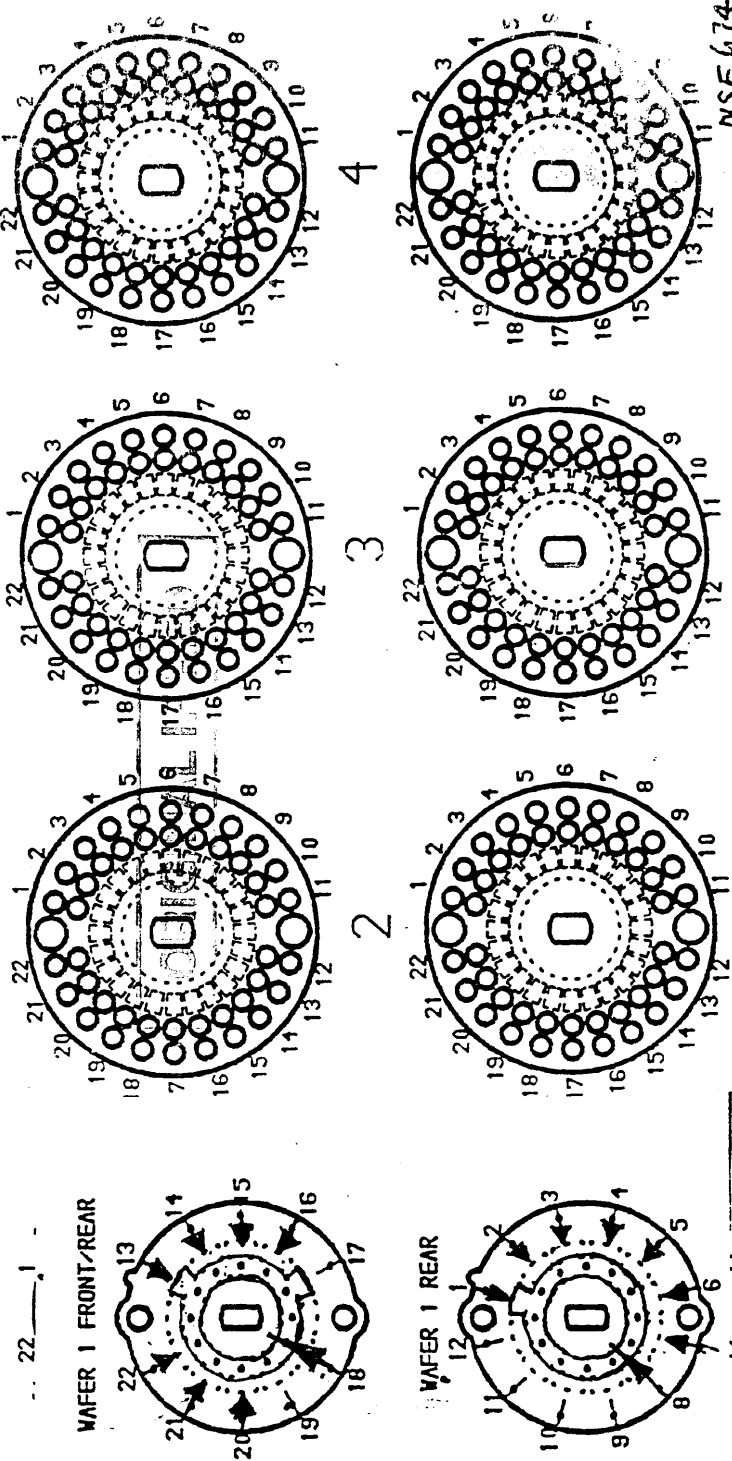


3/8" x 32 T.P.I. WHIT THREAD

NOTES

No OF SECTIONS	1
No OF POSITIONS	2 TO 7 ADJ. STOPS
STAMP PART No	NON SHORTING
TORQUE	TROPICAL 101500/COMMERCIAL
SPRING	
SHAFT	SHAFT END TO BE
DEPTH	1/32 WIDE X 1/16 DEEP

ERONI



CHANGES

ISSUE	DATE	CHANGE

RAISED: *YQ* CHECKED: DATE: *5/54*  
 CUSTOMER WAS 40646 JMK1  
 PART No.

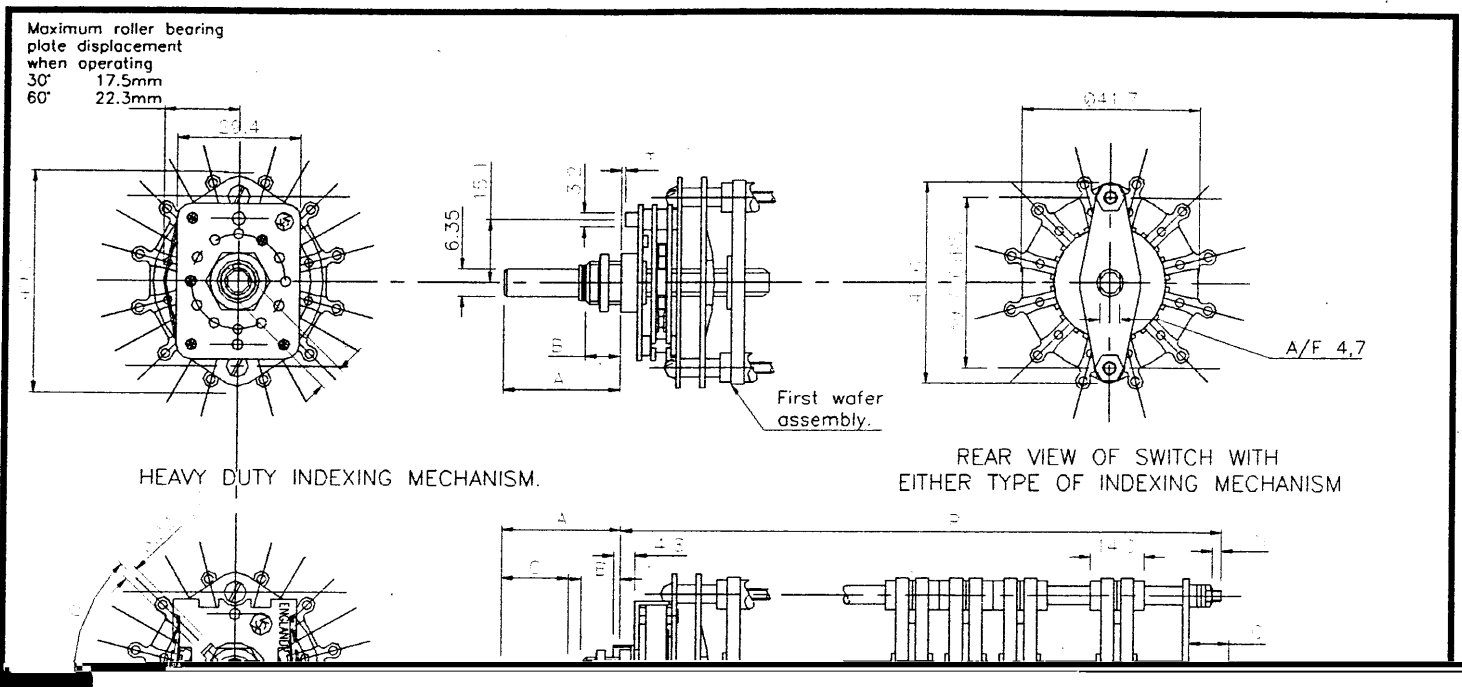
N.S.F. SPEC No. 459103 JMK1

NSF 674



**Construction.**

The switch wafers are spaced by tubular metal spacers and held in place, with a positive relationship to the index mechanism assembly, by side strut screws.



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