HVR PENTAGON TOROSTAT
TECHNICAL DATASHEET

HVR PENTAGON TOROSTAT
For use as Rheostats or Potentiometers.

Introduction

The range of HVR PENTAGON Torostats have been developed to provide an extensive and reliable solution for industrial and scientific applications with a broad array of special features available as open, closed, hand or motor operated for single or gang use. Torostats can be used as Rheostats or Potentiometers, suitable for the most arduous service and can be confidently specified whenever variable control of electrical energy by resistive means is required.

Ordering Procedure

HVR PENTAGON Torostats—Specify: Part No, Ohmic Value E.g. PR25 - 10R

Applications

The following are typical applications:

- Generator field control.
- Lamp dimming.
- Vibrator control.
- Heater and oven temperature control.
- Motor speed control.
- Potentiometer applications.
- Rectifier control.
- Voltage regulation.
- Fan speed control etc.

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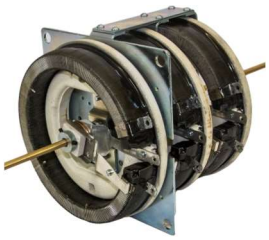

Design Features

- Conservatively rated for long life. The temperature rise at the hottest point is indicated in **figs 1 and 2** based on continuous operation.
- The toroidal winding is of high grade resistance alloy wire or tape wound onto the ceramic former and secured in position by the specially formulated vitreous enamel.
- The vitreous enamel assists in the dissipation of heat and prevents detrimental “hot spots”.
- Strong bond between former and base.
- Wide flat brush track.
- Brush of copper graphite or silver graphite (according to circumstances); special mounting and ensures perfect contact with minimum back- lash and negligible wear to the winding.
- Components are of generous proportions for high current carrying capacity with negligible wear. Pressure setting of the centre contact is independent of brush pressure.
- Corrosion resistant materials are used throughout.
- High strength ceramic base, with shaft insulation of 5 kV r.m.s.

Special Features & Accessories

In addition to those listed HVR PENTAGON are also able to offer a number of alternative accessories, knobs & dials, as well as Torostats with special features. For details please contact our technical staff or see our website.

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Ratings & Ohmic Values

Type	PR25	PR50	PR100	PR150	PR225	PR300	PR500
Nominal Rating at 20°C ambient	25 watts	50 watts	100 watts	150 watts	225 watts	300 watts	500 watts
Rating at 70°C ambient	20 watts	40 watts	80 watts	120 watts	167 watts	225 watts	350 watts
Temperature rise at full loading	220°C	240°C	255°C	255°C	320°C	310°C	300°C
Max No of sections for graded windings	-	3	4	4	5	6	6
Standard tolerance of total resistance value	±10%	±10%	±10%	±10%	±10%	±10%	±10%
Angle of rotation between stops	300°	300°	300°	300°	320°	320°	320°
Angle of rotation on winding	270°	272°	278°	280°	310°	310°	310°
Operating Torque	0.029 Nm.	0.064 Nm.	0.078 Nm.	0.1 Nm.	0.34 Nm.	0.4 Nm.	0.4 Nm.
Approx weight without Knob	85 gm.	170 gm.	340 gm.	540 gm.	1.13 gm.	1.47 gm.	2.16 gm.

Preferred Ohmic Values and Current Ratings

	PR25	PR50	PR100	PR150	PR225	PR300	PR500
1 ohm	5.00	7.08	10.00	12.30	-	-	-
1.5 ohms	4.08	5.75	8.15	10.00	-	-	-
2.2 ohms	3.36	4.76	6.75	8.25	10.10	11.70	15.10
3.3 ohms	2.75	3.89	5.50	6.75	8.25	9.50	12.30
4.7 ohms	2.31	3.26	4.62	5.65	6.92	8.00	10.30
6.8 ohms	1.92	2.70	3.83	4.70	5.75	6.64	8.60
10 ohms	1.58	2.23	3.16	3.87	4.75	5.50	7.10
15 ohms	1.29	1.82	2.58	3.16	3.90	4.50	5.80
22 ohms	1.06	1.51	2.13	2.61	3.20	3.70	4.80
33 ohms	0.87	1.23	1.74	2.13	2.61	3.00	3.90
47 ohms	0.73	1.03	1.46	1.78	2.20	2.53	3.30
68 ohms	0.60	0.85	1.21	1.48	1.82	2.10	2.71
100 ohms	0.50	0.71	1.00	1.25	1.50	1.73	2.24
150 ohms	0.41	0.58	0.82	1.00	1.23	1.41	1.83
220 ohms	0.34	0.48	0.67	0.82	1.00	1.17	1.51
330 ohms	0.27	0.38	0.55	0.67	0.83	0.95	1.23
470 ohms	0.23	0.32	0.46	0.57	0.70	0.80	1.03
680 ohms	0.19	0.27	0.38	0.47	0.57	0.66	0.86
1 K ohms	0.16	0.22	0.32	0.39	0.47	0.55	0.71
1.5 K ohms	0.13	0.18	0.26	0.32	0.39	0.45	0.58
2.2 K ohms	0.11	0.15	0.21	0.26	0.32	0.37	0.48
3.3 K ohms	0.08	0.12	0.17	0.21	0.26	0.30	0.39
4.7 K ohms	0.07	0.10	0.14	0.18	0.22	0.25	0.33
6.8 K ohms	-	0.08	0.12	0.15	0.18	0.21	0.27
10 K ohms	-	-	0.10	0.12	0.15	0.17	0.22
15 K ohms	-	-	-	0.10	-	-	0.18

Tolerances and Ohmic Values

Ratings are given in Amps in the above table at 20°C ambient temperature for continuous operation. The standard tolerance is ±10% of ohmic value.

Maximum Operating Voltages

Torostats can be operated at voltage up to 1 kV provided the power rating is not exceeded.

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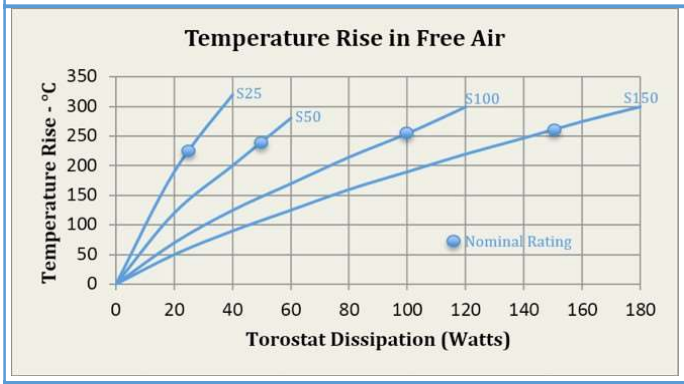
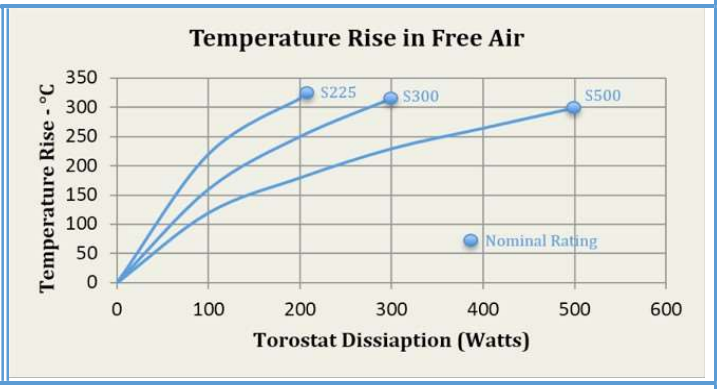
Temperature Curves

Ratings—continuous duty

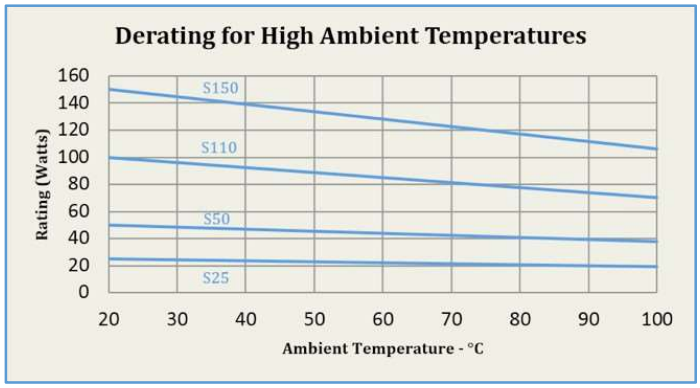
The ratings given for each type of Torostat in the table on page 2 are based on a continuous duty in free air at 20°C. The temperature rise will then be as indicated in the graphs shown below. When the temperature rise has to be limited to a given temperature then the Torostat must be suitably de-rated.

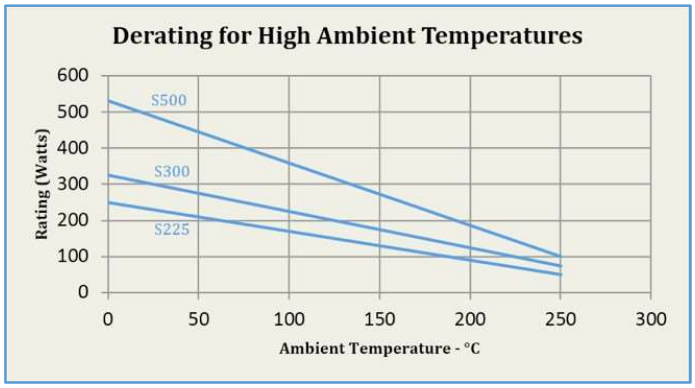




Derating—Operation in ambient temperatures above 20°C

When the ambient temperature exceeds 20°C then Torostats should be de-rated in accordance with the two graphs shown below. This will ensure that the operating temperature is not excessively high.





Ratings—short time

For applications where continuous duty is not required a higher short-time rating may be considered. This rating will be based on the temperature rise being limited by time rather than the current. A sufficient cooling time must be allowed before repeating the "on" period.

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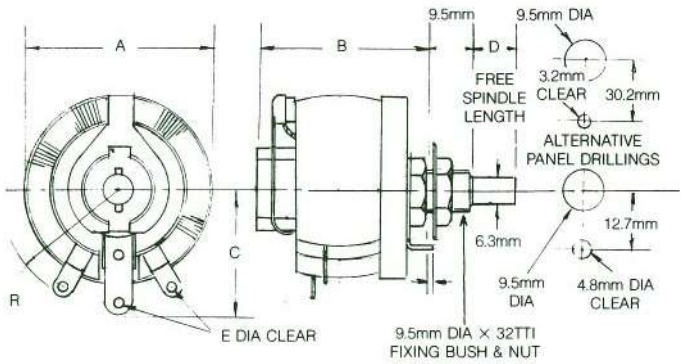
Dimensions

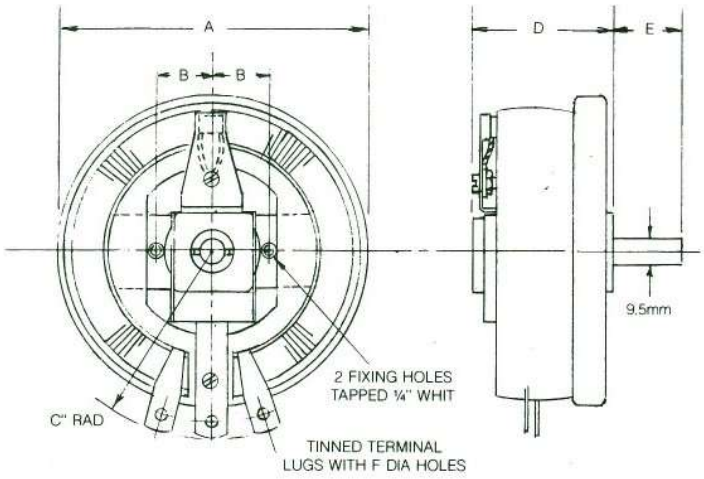
Single Open

PR25, PR50, PR100, PR150



Type	A	B	C	D	E	R
PR25	42.8	36.5	25.4	9.5	2.9	28.5
PR50	61.0	36.5	38.1	9.5	3.7	39.7
PR100	81.0	44.5	47.6	12.7	3.7	50.8
PR150	101.0	47.6	57.2	12.7	3.7	60.3

PR225, PR300, PR500



Type	A	B	C	D	E	F
PR225	127.0	22.2	76.2	57.1	31.7	5.1
PR300	152.0	30.1	88.9	57.1	31.7	5.1
PR500	203.0	38.1	114.0	57.1	31.7	5.1

Torostats are supplied without knobs & dials. Suitable knobs & dials are shown on page 10and the appropriate part numbers must be quoted when ordering.

Standard Torostats are designed to suit 6.4mm thick panels. A 1.6mm washer is supplied, to be fitted behind the panel for 4.8mm panels. When the panel is thinner than this, the thickness must be specified on ordering so that a suitable washer plate can be supplied (SP9363/1).

Sleeve nuts can be supplied for thicker panels as follows:

- SP9312-1 for panels 8mm to 12.7mm thick
- SP9312-2 for panels 14.3mm to 19mm thick
- SP9312-3 for panels 20.6mm to 25.4mm thick

Sleeve nuts for panels up to 50.8mm thick can be supplied to special order.

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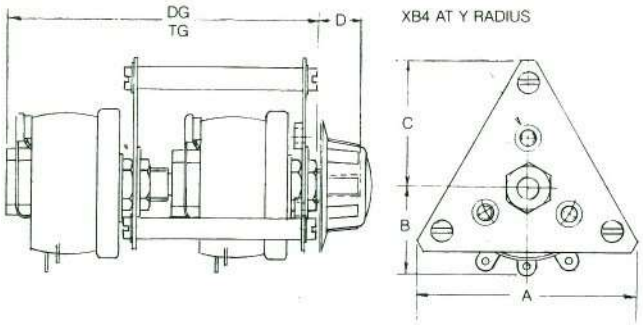
Dimensions

Double Ganged Assemblies: DG

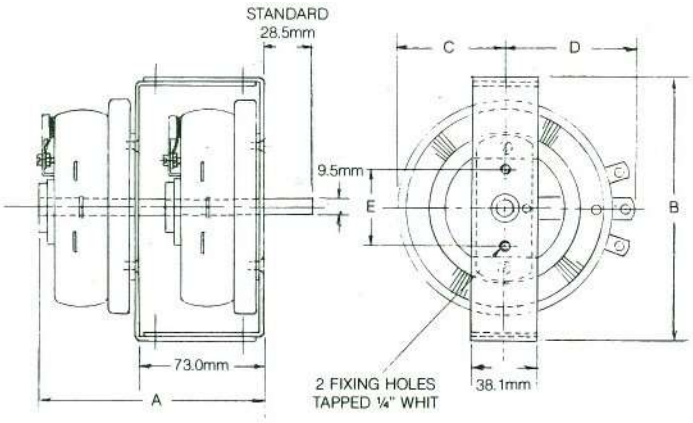
Triple Ganged Assemblies: TG

PR25, PR50, PR100, PR150



Type	A	B	C	DG	TG	D	X	Y
PR25	63.5	25.4	36.5	90.5	138.0	23.8	101.0	14.2
PR50	89.0	38.1	49.2	90.5	138.0	28.8	50.8	25.4
PR100	114.0	47.6	62.0	106.0	162.0	23.8	50.8	25.4
PR150	127.0	57.2	68.2	111.0	165.0	23.8	50.8	25.4

PR225, PR300, PR500



Type	A (DG)	B (TG)	B	C	D	E
PR225	146.0	219.0	150.0	63.5	76.2	44.4
PR300	146.0	219.0	175.0	76.2	89.0	60.3
PR500	146.0	219.0	225.0	101.0	114.0	76.2

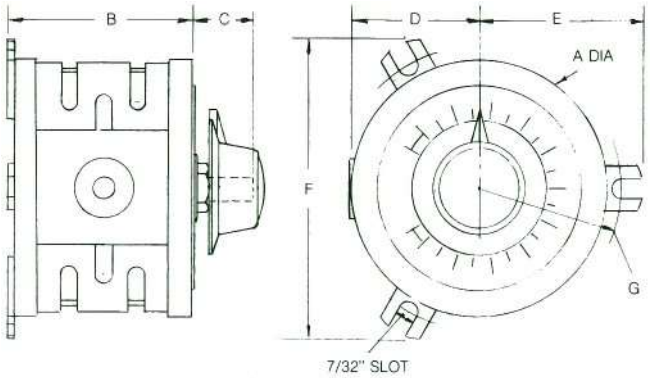
Dimensions

Enclosed

The full range of Torostats can be supplied as front-of-board , back-of-board or bench-mounted models. Please contact our technical staff who will provide further details or discuss any specific requirements.

Front of Board Mounting

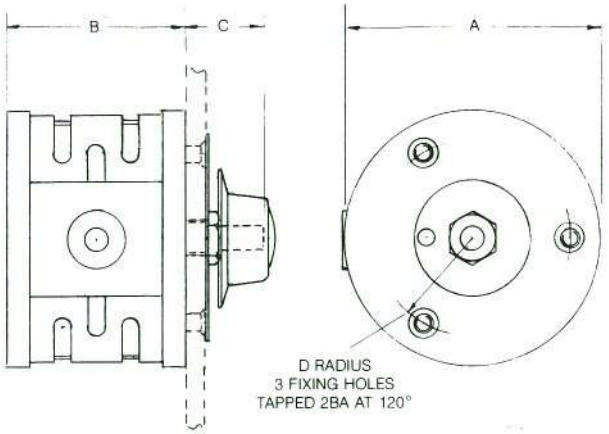
FB types are supplied with knob, dial and feet as standard. Back-of-board mounting can be effected on 3.2mm panels by removing the feet and reversing the Torostat within the case.



Type	A	B	C	D	E	F	G
PR25FB	71.4	51.6	17.4	38.0	46.0	82.5	39.7
PR50FB	93.6	51.6	17.4	49.2	57.2	101.0	50.8
PR100FB	112.0	61.0	20.6	57.2	66.6	117.0	60.3
PR150FB	131.0	61.0	20.6	68.2	76.2	135.0	69.8

Back of Board Mounting

BB types are designed for mounting onto 6.4mmpanels—other thicknesses can be accommodated if specified on order. All enclosures are enamelled steel with cable entry. Due to the conservative rating of the Torostat there is no need to de-rate in normal conditions.

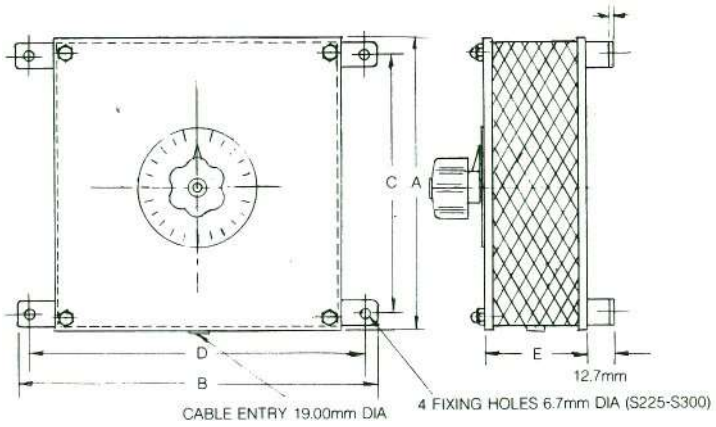


Type	A	B	C	D
PR25BB	71.4	49.2	20.6	27.0
PR50BB	93.6	49.2	20.6	38.1
PR100BB	112.0	58.7	23.8	47.6
PR150BB	131.0	58.7	23.8	57.2

Dimensions

Front of Board Mounting

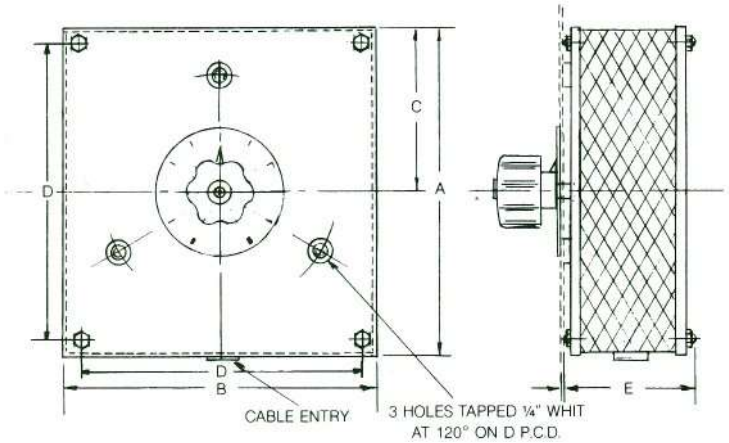
FB and BB types are supplied with knobs and dials in steel enclosures with cable entries. The full rating of the Torostat in a standard enclosure can be achieved due to the conservative rating of the basic Torostat.



Type	A	B	C	D	E
PR225FB	228.0	298.0	200.0	273.0	104.0
PR300FB	228.0	298.0	200.0	273.0	104.0
PR500FB	292.0	349.0	260.0	323.0	104.0

Back of Board Mounting

PR225, PR300, PR500



Type	A	B	C	D	E
PR225BB	228.0	228.0	108.0	165.0	124.0
PR300BB	228.0	228.0	108.0	165.0	124.0
PR500BB	292.0	279.0	140.0	216.0	124.0

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Special Features

Torostat with graded windings

The graph to the right shows how linearity of control can be improved when necessary by the use of graded windings. The guage of wire or tape is changed and it is thus possible to obtain higher resistance values as the current falls.

The maximum number of sections available for each type of Torostat is given in the table on page 2.

Torostat with OFF position section

The circuit is opened as the brush passes off the contact band at the end of the winding onto an insulated section at the same level. This facility can be provided at either end of the winding.

Torostat with bridged gap

The rotation stops are omitted and a run-off plate is fitted to enable continuous rotation of the brushgear.

Torostats with automatic switches

A cam-operated toggle or micro-switch can be mounted onto the Torostat to operate at any pre-determined position of the brush.

A toggle switch arranged to be operated at any position of the brush, but within minimum rotation of the spindle. Standard switches are rated at 2 amps, 250v, single pole.

Torostat with shaft locking head

The shaft can be locked in a set position by a small locking head. A device for locking the shaft at a pre-set position. Shafts can be supplied projecting 3.2mm to 50.8mm with or without a screwdriver slot.

Torostat with adjustable limiting stop

The angle of rotation and thus the resistance value limits can be pre-set by the user.

Torostats with switching lugs

Utilising lugs as tap switches at the end of the winding makes it possible to achieve the effect of a special graded winding, when connected with HVR PENTAGON vitreous enamelled fixed resistors.

Torostats with special spindles

Torostats can be supplied customised with spindles having flats, radial holes or to special lengths.

Torostats with fixed tappings

Torostats can be supplied with taps similar to the terminal contact bands at any point on the winding.

Motorised Torostats

Suitable for applications where remote control is required. Please consult our technical staff for further details.

HVR PENTAGON Torostats
Knobs & Dials

Knobs & Dials – For use with the range of HVR PENTAGON Torostats

Introduction

The range of HVR PENTAGON Torostats can be used as Rheostats or Potentiometers and are supplied without knobs & dials unless specified when ordering. They are RoHS Compliant.

Ordering Procedure

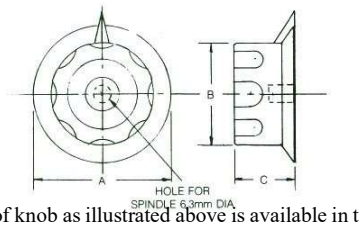
Knobs & Dials—Specify: Part Numbers. E.g. SP6942-3 & SP8381-1 (For use with S25 Torostats)

General Notes

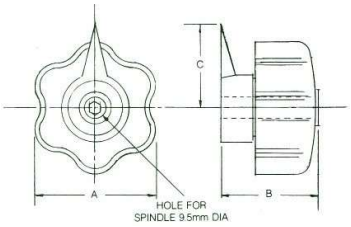
Knobs

The Knobs have a precision Collet System, locked by the turn of an Allen Key on SP8009-1 and chisel type screwdriver on SP6942-3 & SP6942-2. They are easy to fix and handle. An attractive range of add-on pointers are also available which simply push on to the knob in any position through 360° by means of a spline location of pointer/knob. Types SP6942-2 & 3 have a small pointer moulded into the knob.

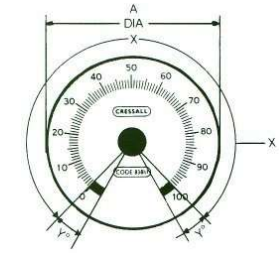
Knob Part No.	For Torostats	A	B	C
SP6942-3	S25 and S50	50	38	24
SP6942-2	S100 and S150	50	38	24
SP8009-1	S225, S300 and S500	60	39	38

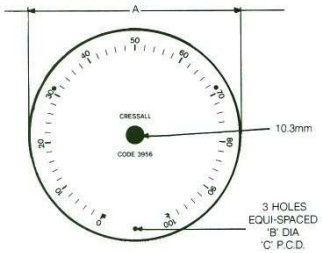


The style of knob as illustrated above is available in two sizes, both suitable for Torostats with 6.3mm shafts (S25—S150).



Knob for Torostats with 9.5mm shafts (S225—S500).





DIALS

Dial Part No.	For Torostats	X	Y	A
SP8381-1	PR25 and PR50	274°	13°	57.2
SP8382-1	PR100 and PR150	280°	10°	79.4

Dial Part No.	For Torostat	X	Y	A
SP8010-1	PR225, PR300 and PR500	146	2.4	108

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