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**Transilluminated
Knobs**

Transilluminated Knobs

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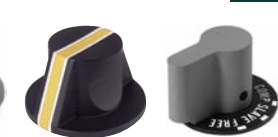
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GENERAL

Electronic Hardware has been a manufacturer of transilluminated knobs for aircraft crew stations and related equipment for over 40 years. We are QPL approved to MIL-K-25049 and manufacture our knobs in accordance with SAE-AS-7788, NASM3926, MIL-L-85762, NVIS Green A and NVIS Green B. We are a major supplier to airframe manufacturers and their avionics equipment suppliers. We also supply directly to the government and the FAA.

Electronic Hardware Company's total capability to manufacture transilluminated knobs to your requirements starts with a complete review of your requirements. Our in-house capabilities include engineering, mold design, tooling, fabrication, marking, finishing and light testing. Our quality system is in accordance with MIL-1-45208 and certified to ISO 9001-2008. We have over 25,000 square feet dedicated to knob manufacture. Our unique molding method provides low cost tooling for your requirement. We utilize cellular manufacturing for assembly and finishing which provides superior quality and efficiency, and results in lower costs to you, our customer. The knobs shown are made to industry and or MIL standards. The shaft depth counter bore depth, diameter, set screw position, marking, and color can be altered by request.

ILLUMINATION

Shall be shown as a percent of transmittance, defined as the percentage ratio of the brightness of the marking to the brightness of the light source applied at the bottom of the knob.

These readings are determined through the use of a light source which presents an evenly diffused circular lighted area. The shaft hole of the knob under test shall be plugged with an opaque material and the knob shall be placed concentrically over the circle of light and shall overlap it by .06 inch on all sides.

Light measurements shall be at five points along the index line, except over the metal insert on the top of the knob.

MARKINGS

To enhance lighting and angle of visibility, knurling or flutes in the area of marking may be removed. We utilize laser engraving, pad printing, and hot stamping to provide excellent definition of marking while maintaining cost effectiveness.

SPECIFICATIONS

Plastic: Thermoplastic molding compound, clear for transilluminated knobs and colored for non-illuminated knobs. The material used meets the requirements of SAE-AS-7788, MIL-L-85762, and NASM3926.

Inserts: Brass in accordance with QQ-B-626 (or equivalent).

Set Screws: Style to be NASM51021.

Finish: Knob Colors:

White, Color Number 37875 per FED-STD-595 reflectance may be reduced to 50% minimum. Markings shall meet daylight contrast of 9 minimum.

Gray, Color Number 36231 per FED-STD-595.

Black, Color Number 37038 per FED-STD-595.

Other colors are available upon request.

Bottom surface of illuminated knobs shall have no coating and shall be clear.

Inserts:

Nickel plated per QQ-N-290, Grade G, Class 2.

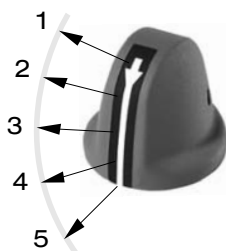
Tolerances: Dimensions are in inches.

Three-place decimal $\pm .010$

Two-place decimal $\pm .02$

Angles $\pm 2^\circ$

Illumination: Unless specified, illumination ratio to be $.05 \pm 25\%$, ex. Type III NVIS



This illustration is the method we utilize in obtaining brightness ratios. A uniformly illuminated source set to a specific brightness in foot lamberts. Photometric measurements are taken at 5 equally spaced locations along the marking, no readings are taken in the area above the metal insert. The average of the measurements (1-5) is the percentage of the brightness of markings to the brightness of the source. This is the brightness ratio, expressed as a decimal.

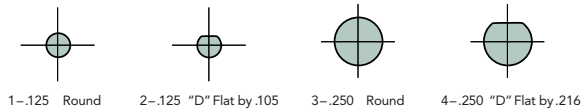
TRANSILLUMINATED

GENERAL INFORMATION

- SERIES** See bottom of page for series designation.
- STYLE NUMBER** See catalog page for assigned style number.
- INDICIA CONFIG.** Refer to table on page 4T. Special marking available, but not limited to.
- ILLUMINATION**
 0- knob backlighted in accordance with military specifications or customer requirements
 1- knob without illuminated markings
 NOTE: Lighting requirements must be specified separately.
- COLOR OF KNOBS**
 B- black lusterless, color number 37038 of FED-STD-595
 G- gray lusterless, color number 36231 of FED-STD-595
 metal finish, anodize in accordance with MIL-A-8625
 See table on page 4T for additional colors.
 NOTE: White markings on all knobs to be lusterless, 37875 of FED-STD-595.

SHAFT SIZE

- 1-.125 Round
 2-.125 "D" Flat by .105
 3-.250 Round
 4-.250 "D" Flat by .216



NOTE:
 Other sizes
 available by
 custom part
 number.

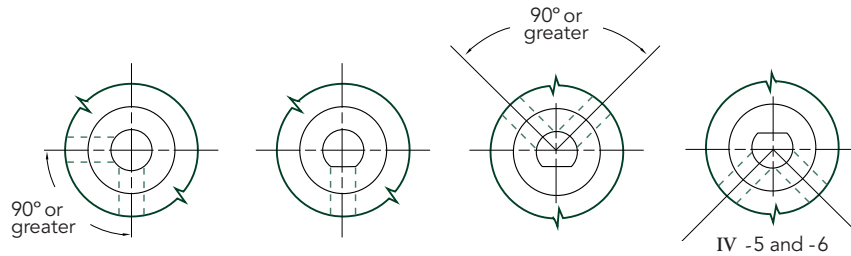
NOTE: Round shafts are not recommended for use in aircraft. "D" flat perpendicularity to be $\pm 1^\circ$

SET SCREWS

STANDARD SET SCREWS

"K" Shaft Hole Size "K" Round	"K" Flat	Thread	Length of Set Screw							Spec.
0.128	0.108	4-40 UNC-3A	1/8	3/16	1/4	5/16	3/8	7/16	1/2	MS51021 MS18064 AN565
0.128	NONE	4-40 UNC-3A								
-	-	-								
0.253	0.223	8-32 UNC-3A								
0.253	NONE	8-32 UNC-3A								

STANDARD SET SCREWS LOCATIONS



PART NUMBER DESIGNATION

I Series	II Knob Style Number	III Type	IV Shaft Size	V Color	VI Indicia Style Figure	VII Set Screws
TL- Tactile Large TS- Tactile Small PR- Pointer Round PB- Pointer Bar RE- Round RC- Round Concentric FRB- Round Bar FPB- Pointer Bar DBP- Dbl. Bar Pointer SPK- Pencil Knobs 3600- Pointer Bar	see catalog page for assigned style no.	0- Illuminated 1- NonIlluminated 2- Metal (Alum.) 3- NVIS	1- .125 Round 2- .125 D 3- .250 Round 4- .250 D 5- Reverse .125 D Flat and Set Screws 6- Reverse .250 D Flat and Set Screws	B- Black G- Gray See table on pg. 4T for more choices.	A1-A4 B1-B3 C1-C2 D1-D2 See chart on pg. 4T	S1- Set screws w/o Nyloc S2- Spline Soc. w/ Nyloc S3- Spline Soc. w/o Nyloc

See color table on the following page for FED-STD 595 colors and special colors.

EXAMPLE: PR8402-04 G A2

Knob Type	Shaft Hole Diam.	Color	Marking
Illuminated	1/4" "D" Flat	Gray knob	Black background/White line
PR8402-	0	G	A2

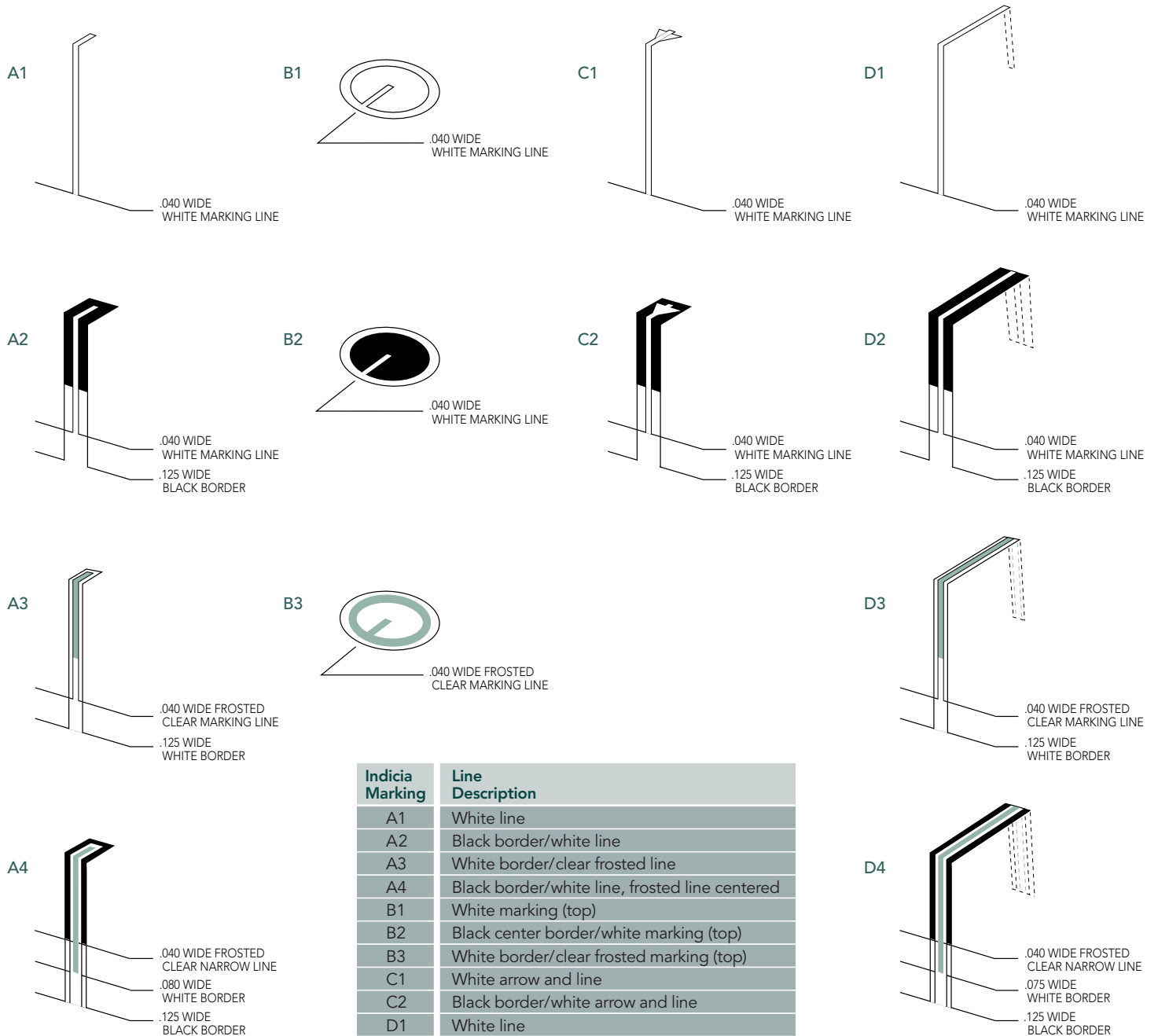
All backlighted knobs come with 2 self-locking set screws, unless noted per VII above. Set screw locations can vary according to customer requirements.



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GENERAL INFORMATION

INDICIA CONFIGURATIONS



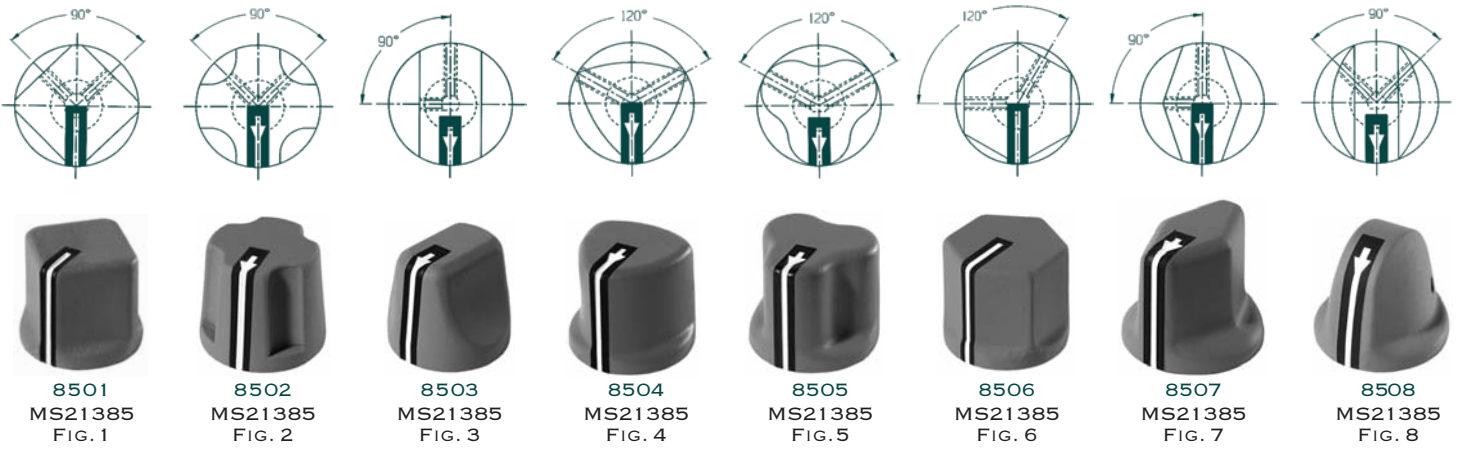
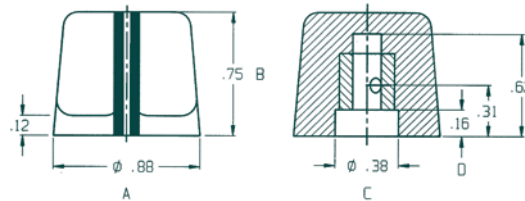
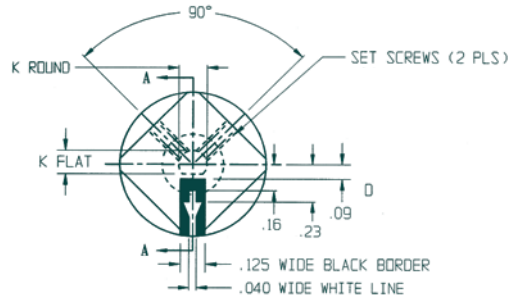
Indicia Marking	Line Description
A1	White line
A2	Black border/white line
A3	White border/clear frosted line
A4	Black border/white line, frosted line centered
B1	White marking (top)
B2	Black center border/white marking (top)
B3	White border/clear frosted marking (top)
C1	White arrow and line
C2	Black border/white arrow and line
D1	White line
D2	Black border/white line
D3	White border/clear frosted line
D4	Black border/white line, frosted line centered
N	No marking

Special markings are available upon request.

Color	FED-STD 595 Color Number
B	Black #37038
B1	Black #17038
G	Gray #36231
G1	Gray #36440
G2	Gray #36463
G3	Gray #36118
OD	Olive Drab #34088

Color	Special Colors
BB	Beige #8925
BG	Gray #705





TL SERIES

Style Number	A Base Diameter	B Height	C Nut Clearance Diameter	D Nut Clearance Depth	Set Screws	
					1/8	1/4
8501	0.88	0.75	0.38	0.16	MS51021-102	MS51021-132
8502	0.88	0.75	0.38	0.16	MS51021-102	MS51021-132
8503	0.88	0.75	0.38	0.16	MS51021-102	MS51021-132
8504	0.88	0.75	0.38	0.16	MS51021-102	MS51021-132
8505	0.88	0.75	0.38	0.16	MS51021-102	MS51021-132
8506	0.88	0.75	0.38	0.16	MS51021-102	MS51021-132
8507	0.88	0.75	0.38	0.16	MS51021-102	MS51021-132
8508	0.88	0.75	0.38	0.16	MS51021-102	MS51021-132

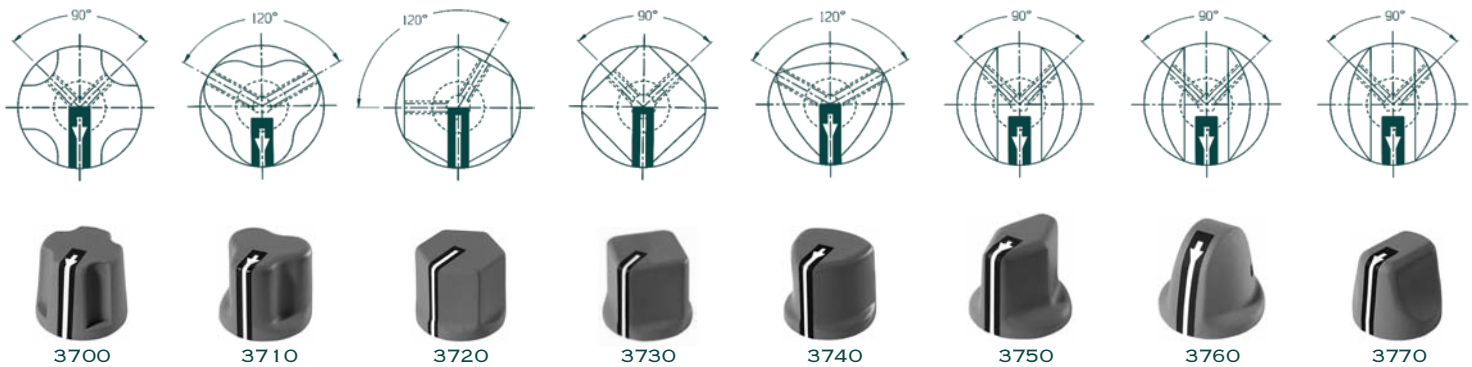
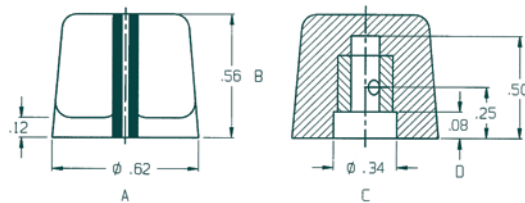
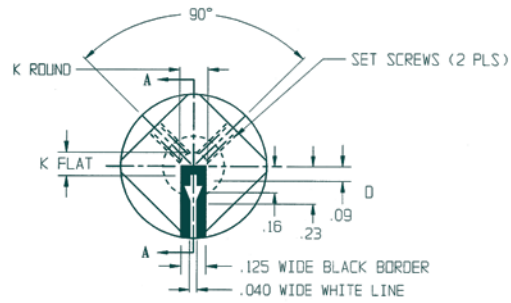
Design Variations

- Part 8507 is available with or without "Grip/Pull" serrations on the sides
- Set screw locations can vary
- Markings and color can vary (see page 4T)
- Nut clearance depth and diameter can vary
- See part number system for shaft hole designation

Detailed drawings are available for each style

All of our backlighted knobs can be manufactured for night vision use. Our night vision knobs meet NVIS "Green A" requirements.

TRANSILLUMINATED TS SERIES



TS SERIES

Style Number	A Base Diameter	B Height	C Min. Nut Clearance Diameter	D Nut Clearance Depth	Set Screws	
					1/8	1/4
3700	0.62	0.56	0.34	0.08	MS51021-101	MS51021-101
3710	0.62	0.56	0.34	0.08	MS51021-102	MS51021-102
3720	0.62	0.56	0.34	0.08	MS51021-102	MS51021-102
3730	0.62	0.56	0.34	0.08	MS51021-101	MS51021-101
3740	0.62	0.56	0.34	0.08	MS51021-102	MS51021-102
3750	0.62	0.56	0.34	0.08	MS51021-101	MS51021-101
3760	0.62	0.56	0.34	0.08	MS51021-101	MS51021-101
3770	0.62	0.56	0.34	0.08	MS51021-102	MS51021-102

Design Variations

- Set screw locations can vary
- Markings and color can vary (see page 4T)
- Nut clearance depth and diameter can vary
- See part number system for shaft hole designation

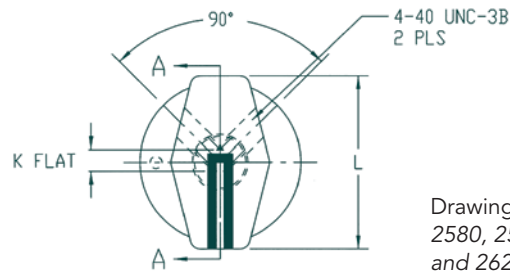
Detailed drawings are available for each style

All of our backlighted knobs can be manufactured for night vision use. Our night vision knobs meet NVIS "Green A" requirements.

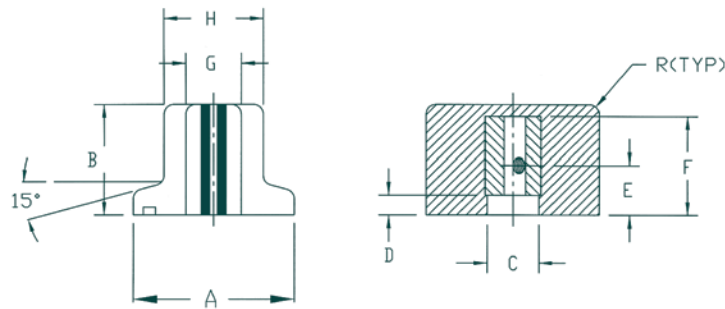


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DBP SERIES



Drawings for style numbers
2580, 2590, 2600, 2610,
and 2620.



DBP SERIES

Style Number	A Base Diameter	B Height	C Nut Clearance Diameter		D Nut Clearance Depth	E Shaft Screw Height	F Hole Depth	G	H	L	Set Screws	
			1/8	1/4							1/8	1/4
2580	0.81	0.56	0.26	–	0.10	0.25	0.50	0.28	0.50	0.88	MS51021-101	MS51021-131
2590	0.94	0.62	0.26	0.39	0.16	0.31	0.53	0.28	0.56	1.00	MS51021-101	MS51021-131
2600	1.06	0.69	0.26	0.39	0.16	0.31	0.59	0.32	0.62	1.12	MS51021-102	MS51021-132
2610	1.12	0.78	–	0.39	0.16	0.31	0.68	0.36	0.69	1.25	MS51021-102	MS51021-132
2620	1.38	0.88	–	0.39	0.16	0.31	0.78	0.38	0.75	1.50	MS51021-102	MS51021-133

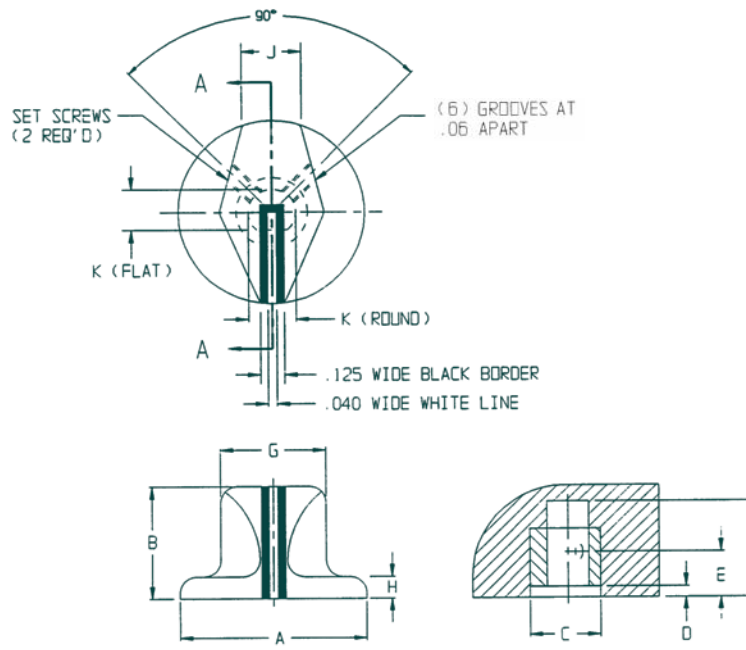
Design Variations

- Set screw locations can vary
- Markings and color can vary (see page 4T)
- Nut clearance depth and diameter can vary
- See part number system for shaft hole designation

Detailed drawings are available for each style

All of our backlighted knobs can be manufactured for night vision use. Our night vision knobs meet NVIS "Green A" requirements.





PR SERIES

Style Number	A Base Diameter	B Height	C Nut Clearance Diameter		D Nut Clearance Depth	E Set Screw Height	F Shaft Hole Depth	G	H	J	With Grooves	Set Screws	
			1/8	1/4								1/8	1/4
2460	0.88	0.56	0.26	0.38	0.10	0.25	0.50	0.50	0.12	0.28	w/o	MS51021-101	MS51021-131
8401	1.00	0.62	0.26	0.38	0.16	0.31	0.53	0.50	0.12	0.31	w/o	MS51021-101	MS51021-131
8402	1.00	0.62	0.26	0.38	0.16	0.31	0.53	0.50	0.12	0.31	with	MS51021-101	MS51021-131
2480	1.12	0.60	0.26	0.38	0.16	0.31	0.59	0.56	0.12	0.31	w/o	MS51021-101	MS51021-131
2539	1.25	0.80	-	0.50	0.24	0.40	0.73	0.62	0.16	0.50	w/o	MS51021-102	AN565D8H8
1338	1.50	0.80	-	0.50	0.24	0.35	0.73	0.62	0.16	0.50	w/o	MS51021-102	MS51021-132
3670	1.50	0.88	-	0.38	0.16	0.31	0.78	0.62	0.16	0.50	w/o	MS51021-102	MS51021-132

Design Variations

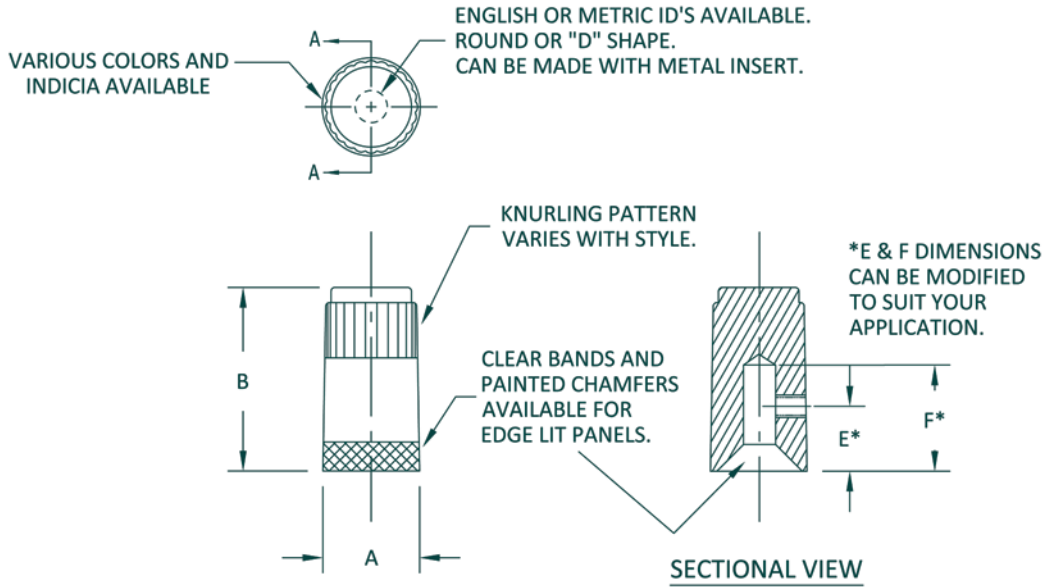
- All parts are available with or without "Grip/Pull" serrations on the sides
- Set screw locations can vary
- Markings and color can vary (see page 4T)
- Nut clearance depth and diameter can vary
- See part number system for shaft hole designation

Detailed drawings are available for each style

All of our backlighted knobs can be manufactured for night vision use. Our night vision knobs meet NVIS "Green A" requirements.

TRANSILLUMINATED

SPK SERIES



SPK SERIES

Style Number	A Base Diameter	B Height	E Set Screw Height	F Shaft Hole Depth
6140	0.36	0.88	w/o	0.51
737	0.37	0.57	0.28	0.52
566	0.38	0.65	0.34	0.54
551	0.38	0.88	0.13	0.21
691	0.38	0.88	0.30	0.50
4740	0.38	0.88	0.12	0.61
7250	0.39	0.63	w/o	0.32
4790	0.39	0.73	w/o	0.42
537	0.40	0.68	0.15	0.62
7510	0.40	1.03	0.50	0.68
6060	0.46	0.76	0.23	0.59

Design Variations

- Set screw sizes and locations can vary
- Markings and color can vary according to customer specifications
- Multiple bands and colors are available
- Multiple shaft diameters are available with and without set screws

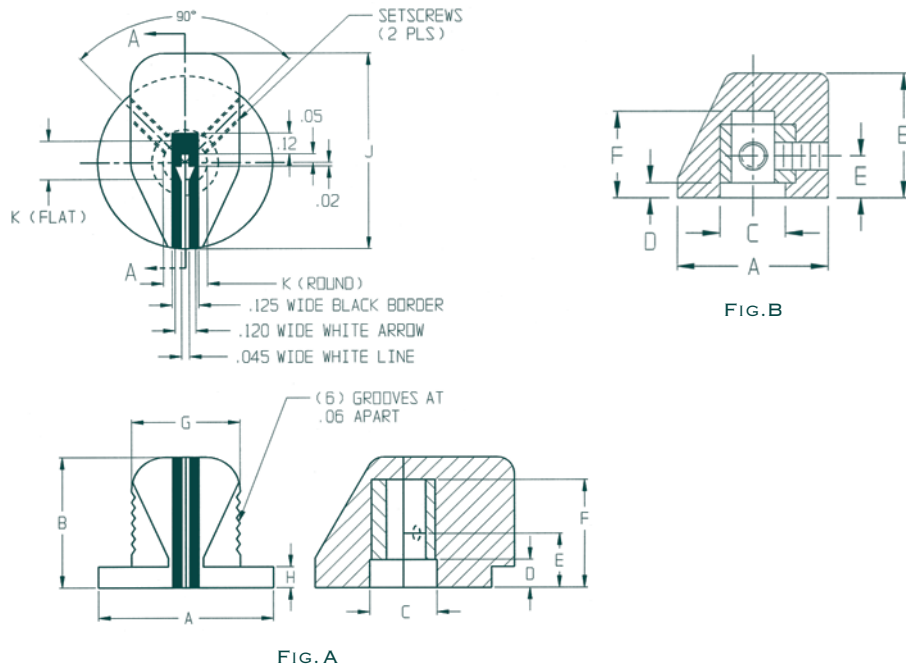
Detailed drawings are available for each style

All of our backlit knobs can be manufactured for night vision use. Our night vision knobs meet NVIS "Green A" requirements.



TRANSILLUMINATED

PB SERIES



PB SERIES

Style Number	A Base Diameter	B Height	C Nut Clearance Diameter		D Nut Clearance Depth	E Set Screw Height	F Shaft Hole Depth	G	H	J	With Grooves	Set Screws	
			1/8	1/4								1/8	1/4
2270	0.88	0.56	0.26	0.26	0.10	0.250	0.50	0.50	0.12	1.00	with	MS51021-102	MS51021-101
470	0.88	0.75	0.38	0.38	0.16	0.310	0.52	0.62	0.12	0.88	w/o	MS51021-102	MS51021-132
463	0.88	0.75	0.38	0.38	0.16	0.310	0.52	0.62	0.12	0.88	with	MS51021-102	MS51021-132
8404	1.00	0.75	0.38	0.38	0.16	0.310	0.61	0.62	0.12	1.13	with	MS51021-102	MS51021-132
8405	1.00	0.75	0.38	0.38	0.16	0.310	0.61	0.62	0.12	1.13	w/o	MS51021-102	MS51021-132
3674	1.00	0.75	0.63	0.63	0.09	0.375	0.56	0.53	0.13	1.13	w/o	MS51021-102	MS51021-132
3676	1.00	0.75	0.63	0.63	0.09	0.375	0.56	0.53	0.13	1.13	with	MS51021-102	MS51021-132
3610	1.00	0.762	0.26	0.38	0.16	0.310	0.53	0.56	0.12	1.12	with	MS51021-102	MS51021-132

Design Variations

- All parts are available with or without "Grip/Pull" serrations on the sides
- Set screw locations can vary
- Markings and color can vary (see page 4T)
- Nut clearance depth and diameter can vary
- See part number system for shaft hole designation

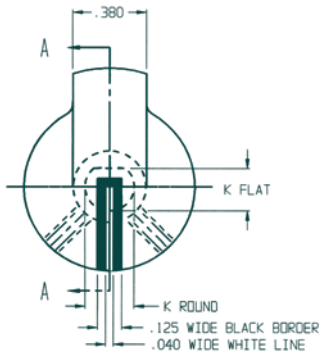
Detailed drawings are available for each style

All of our backlighted knobs can be manufactured for night vision use. Our night vision knobs meet NVIS "Green A" requirements.

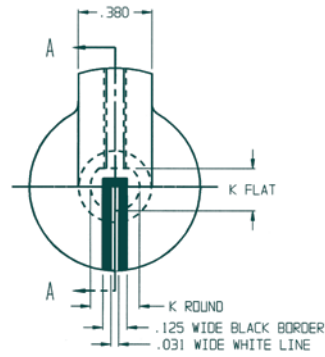


TRANSILLUMINATED

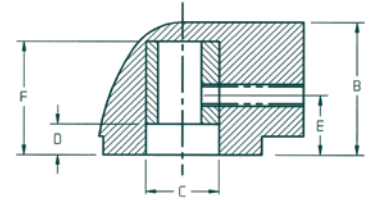
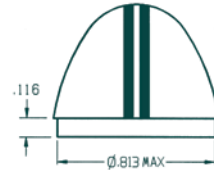
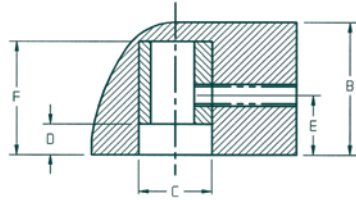
FRB SERIES



784



2566 AND 2567



784



2566
MS25169



2567
MS25170

FRB SERIES

Style Number	A Base Diameter	B Height	C Nut Clearance Diameter		D Nut Clearance Depth	E Set Screw Height	F Shaft Hole Depth	Set Screws	
			1/8	1/4				1/8	1/4
784	0.88	0.69	0.66	0.66	0.12	0.25	0.50	MS51021-102	MS51021-132
2566	0.88	0.69	0.66	0.66	0.12	0.25	0.50	MS51021-103	MS51021-133
2567	0.88	0.85	0.66	0.66	0.12	0.25	0.56	MS51021-103	MS51021-135

Design Variations

- Set screw locations can vary
- Markings and color can vary (see page 4T)
- Nut clearance depth and diameter can vary
- See part number system for shaft hole designation

Detailed drawings are available for each style

All of our backlighted knobs can be manufactured for night vision use. Our night vision knobs meet NVIS "Green A" requirements.



TRANSILLUMINATED FPB SERIES

All of our backlighted knobs can be manufactured for night vision use.
Our night vision knobs meet NVIS "Green A" requirements.

FIG. 2

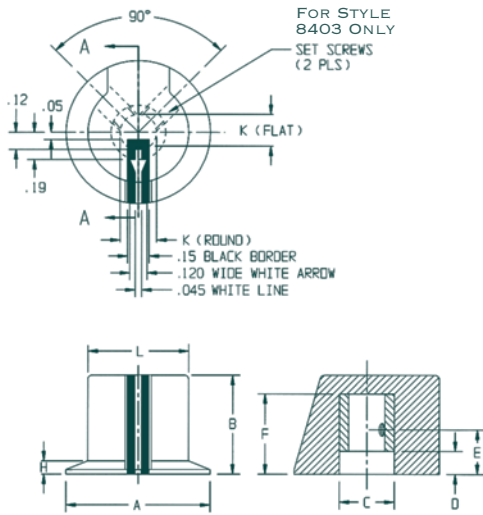
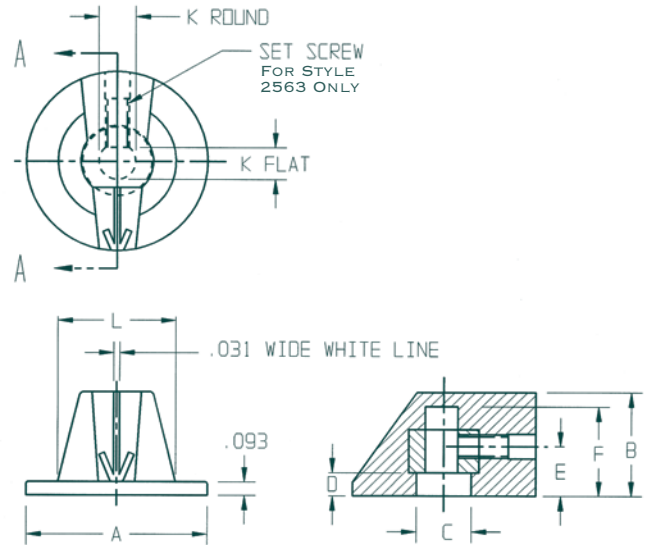


FIG. 5



1502

FIG. 1



8403
MS21384-3
FIG. 2



2562
MS25165
FIG. 3



2485
FIG. 4



2563
MS25166
FIG. 5

FPB SERIES

Style Number	A Base Diameter	B Height	C Nut Clearance Diameter		D Nut Clearance Depth		E Screw Height	F Shaft Hole Depth	L	Set Screws	
			1/8	1/4	1/8	1/4				1/8	1/4
1502	0.81	0.73	0.62	0.62	0.09	0.09	0.34	0.60	0.82	MS51021-102	MS51021-132
8403	1.00	0.69	0.38	0.38	0.16	0.16	0.31	0.56	0.70	MS51021-102	MS51021-132
2562	1.25	0.72	0.38	0.38	0.16	0.16	0.31	0.62	-	MS51021-102	MS51021-132
2485	1.25	0.72	0.38	0.38	0.16	0.16	0.31	0.62	-	MS51021-102	MS51021-132
2563	1.50	0.84	0.72	0.72	0.25	0.25	0.37	0.59	-	MS51021-102	MS51021-132

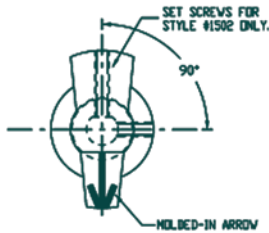


FIG. 1



FIG. 3

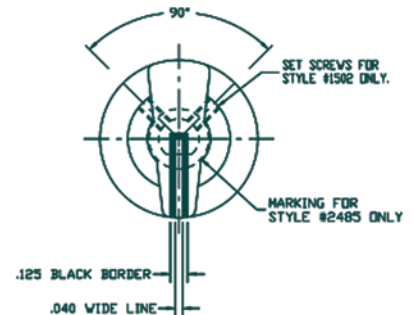


FIG. 4

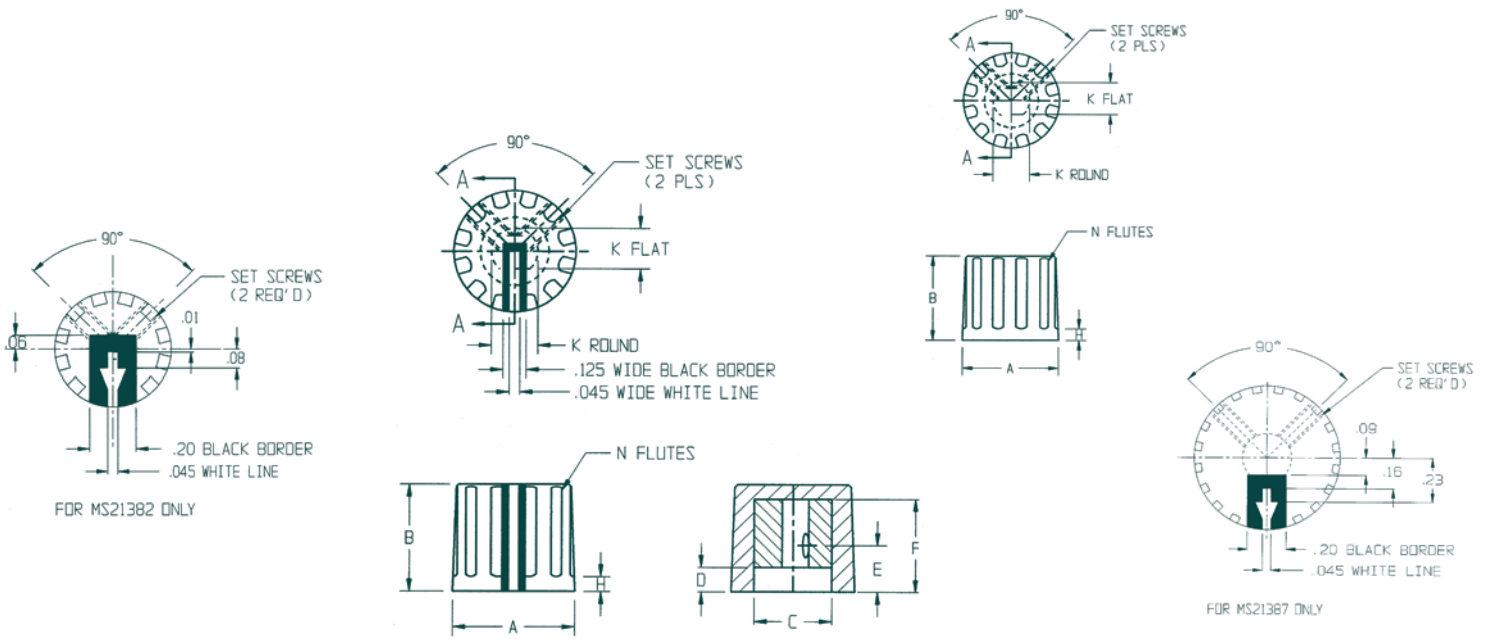
Design Variations

- Set screw locations can vary
- Markings and color can vary (see page 4T)
- Nut clearance depth and diameter can vary
- See part number system for shaft hole designation

Detailed drawings are available for each style



TRANSILLUMINATED RE SERIES



2380



8201
MS21382
FIG. 2



808



554



587



459



4460



8701
MS21387
FIG. 1



1836

RE SERIES

Style Number	A Base Diameter	B Height	C Nut Clearance Diameter		D Nut Clearance Depth	E Set Screw	F Shaft Hole Height	H Depth	N Number of Flutes	Set Screws	
			1/8	1/4						1/8	1/4
2380	0.50	0.44	0.26	—	0.08	0.19	0.34	0.06	8	MS51021-101	MS51021-101
8201	0.50	0.44	0.00	—	0.00	0.19	0.38	0.06	12	MS51021-101	MS51021-101
808	0.50	0.51	0.47	—	0.03	0.19	0.41	—	18	MS51021-101	MS51021-101
554	0.50	0.50	0.00	—	0.00	0.16	0.41	0.08	32	MS51021-101	MS51021-101
587	0.51	0.54	0.27	—	0.08	0.19	0.50	0.08	8	MS51021-101	MS51021-101
459	0.62	0.56	0.26	0.38	0.16	0.31	0.50	0.08	8	MS51021-102	MS51021-131
2564	0.62	0.72	—	0.38	0.09	0.25	0.56	0.09	12	MS51021-133	MS51021-133
4460	0.75	0.50	—	0.38	0.16	0.31	0.45	0.12	8	MS51021-132	MS51021-132
8701	0.75	0.62	—	0.50	0.00	0.19	0.45	0.16	18	MS51021-132	MS51021-132
1836	0.75	0.63	0.38	0.38	0.00	0.19	0.46	0.16	20	MS51021-102	MS51021-132

Design Variations

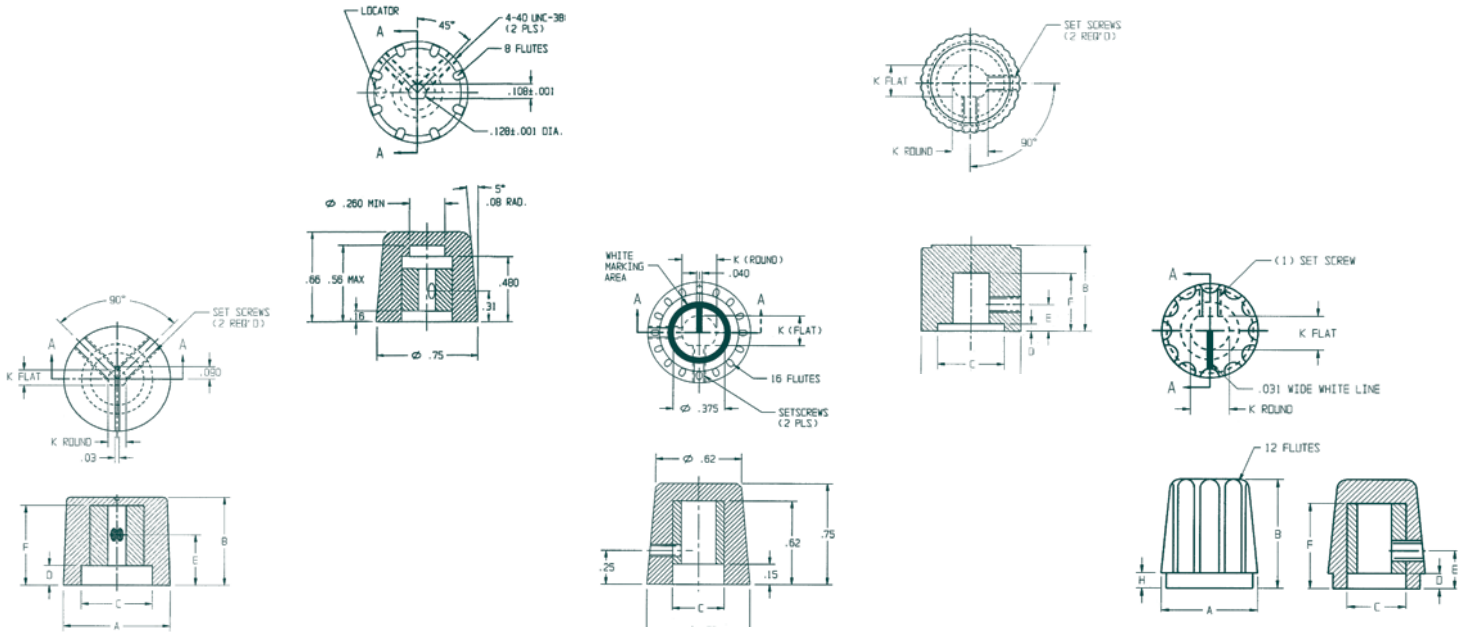
- Set screw locations can vary
- Markings and color can vary (see page 4T)
- Nut clearance depth and diameter can vary
- See part number system for shaft hole designation

Detailed drawings are available for each style

All of our backlighted knobs can be manufactured for night vision use. Our night vision knobs meet NVIS "Green A" requirements.



TRANSILLUMINATED RE SERIES



2400



456



8570



8509

MS21385
FIG. 9



2410



2420



2565

MS25168-P1
2564
MS25167-P1



8510

MS21385
FIG. 10



4620

RE SERIES

Style Number	A Base Diameter	B Height	C Nut Clearance Diameter		D Nut Clearance Depth	E Set Screw	F Shaft Hole Height	H Depth	N Number of Flutes	Set Screws	
			1/8	1/4						1/8	1/4
2400	0.75	0.66	0.26	0.38	0.16	0.31	0.56	0.09	8	MS51021-103	MS51021-132
456	0.75	0.75	0.38	0.38	0.16	0.19	0.46	0.16	16	MS51021-103	MS51021-132
8570	0.88	0.50	0.38	0.38	0.16	0.31	0.46	0.12	12	MS51021-103	MS51021-133
8509	0.88	0.75	0.38	0.38	0.16	0.31	0.62	0.12	12	MS51021-102	MS51021-132
2410	0.88	0.78	0.38	0.38	0.16	0.31	0.68	0.16	12	MS51021-103	MS51021-133
2565	1.00	0.84	—	0.66	0.12	0.25	0.56	0.09	12	MS51021-133	MS51021-133
2420	1.00	0.88	0.38	0.38	0.16	0.31	0.48	0.12	12	MS51021-103	MS51021-134
8510	1.12	0.75	0.38	0.38	0.16	0.31	0.62	0.12	12	MS51021-102	MS51021-132
4620	1.12	0.88	0.38	0.38	0.16	0.31	0.78	0.20	12	MS51021-103	MS51021-133

Design Variations

- Set screw locations can vary
- Markings and color can vary (see page 4T)
- Nut clearance depth and diameter can vary
- See part number system for shaft hole designation

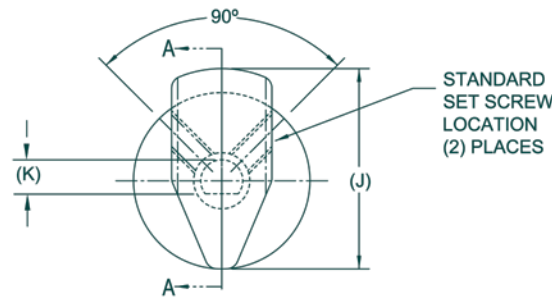
Detailed drawings are available for each style

All of our backlit knobs can be manufactured for night vision use. Our night vision knobs meet NVIS "Green A" requirements.

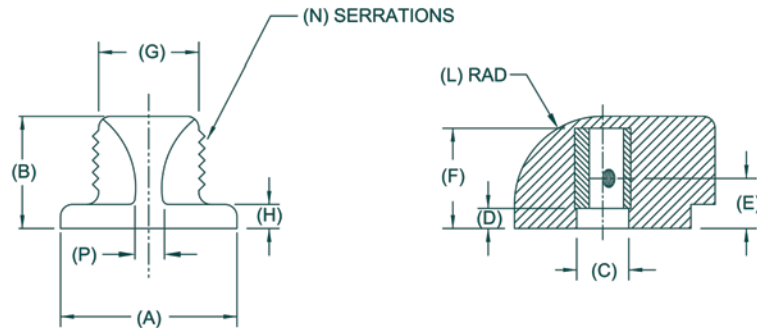


TRANSILLUMINATED

PG SERIES



SEE TECHNICAL DATA PAGE FOR SHAFT SIZES (K), AND INDICIA CONFIGURATIONS.



PG SERIES

Style Number	A Base Diameter	B Height	C Nut Clearance Diameter		D Nut Clearance Depth	E Set Screw Height	F Shaft Hole Depth	G	H	J Diameter	L	N	P	Set Screws		
			1/8	1/4										1/8	1/4	
3600	0.88	0.56	0.26	—	0.10	0.25	0.50	0.50	0.12	1.00	.44	5	.13	.06	MS51021-103	MS51021-132
3610	1.00	0.62	0.26	0.38	0.16	0.31	0.53	0.56	0.12	1.12	.50	5	.19	.08	MS51021-103	MS51021-132
3620	1.12	0.69	0.26	0.38	0.16	0.31	0.59	0.62	0.12	1.25	.56	5	.16	.12	MS51021-103	MS51021-132
3630	1.25	0.78	—	0.38	0.16	0.31	0.68	0.66	0.12	1.38	.62	6	.16	.12	MS51021-103	MS51021-133
3640	1.50	0.91	—	0.38	0.16	0.31	0.78	0.69	0.12	1.62	.75	7	.19	.12	MS51021-103	MS51021-134

Design Variations

- All parts are available with or without "Grip/Pull" serrations on the sides. Add a "G" to the end of the p/n for ordering parts from this series without serrations
- Set screw locations can vary
- Markings and color can vary (see page 4T)
- Nut clearance depth and diameter can vary
- See part number system for shaft hole designation

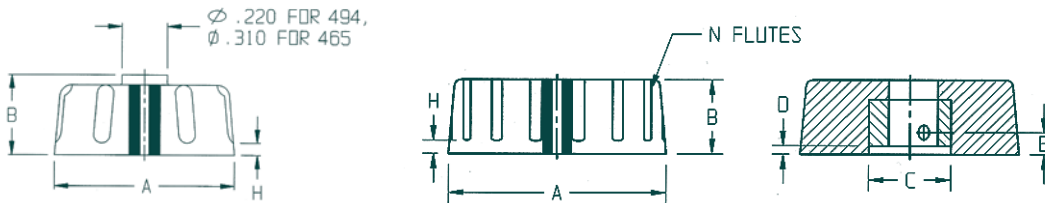
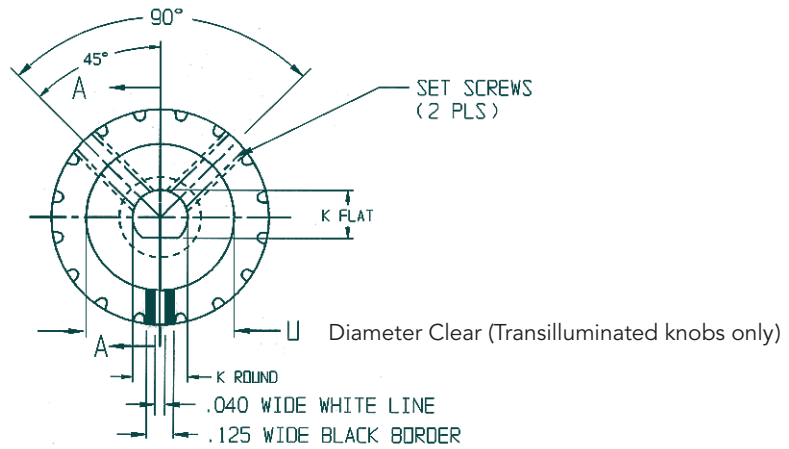
Detailed drawings are available for each style

All of our backlighted knobs can be manufactured for night vision use. Our night vision knobs meet NVIS "Green A" requirements.



TRANSILLUMINATED

RC SERIES



RC SERIES

Style Number	A Base Diameter	B Height	C Nut Clearance Diameter		D Nut Clearance Depth	E Set Screw	H Depth	U	N Number of Flutes	Set Screws	
			1/8	1/4						1/8	1/4
8601	0.75	0.35	-	-	-	0.10	0.06	-	16	MS51021-102	MS51021-102
4460	0.75	0.50	-	0.38	0.160	0.31	0.12	0.41	8	MS51021-102	MS51021-132
4480	0.87	0.50	-	0.38	0.160	0.31	0.12	0.53	12	MS51021-102	MS51021-133
494	0.88	0.40	-	0.38	0.055	0.16	0.06	0.53	7	MS51021-102	MS51021-103
8602	1.00	0.34	-	0.38	0.005	0.12	0.06	0.68	16	MS51021-103	MS51021-132
4420	1.00	0.44	-	0.38	0.030	0.25	0.17	0.53	12	MS51021-103	MS51021-134
465	1.00	0.46	-	0.38	0.080	0.25	0.17	0.53	12	MS51021-103	MS51021-134
4450	1.00	0.50	-	0.38	0.160	0.31	0.16	0.66	12	MS51021-103	MS51021-134

Design Variations

- Set screw locations can vary
- Markings and color can vary (see page 4T)
- Nut clearance depth and diameter can vary
- See part number system for shaft hole designation

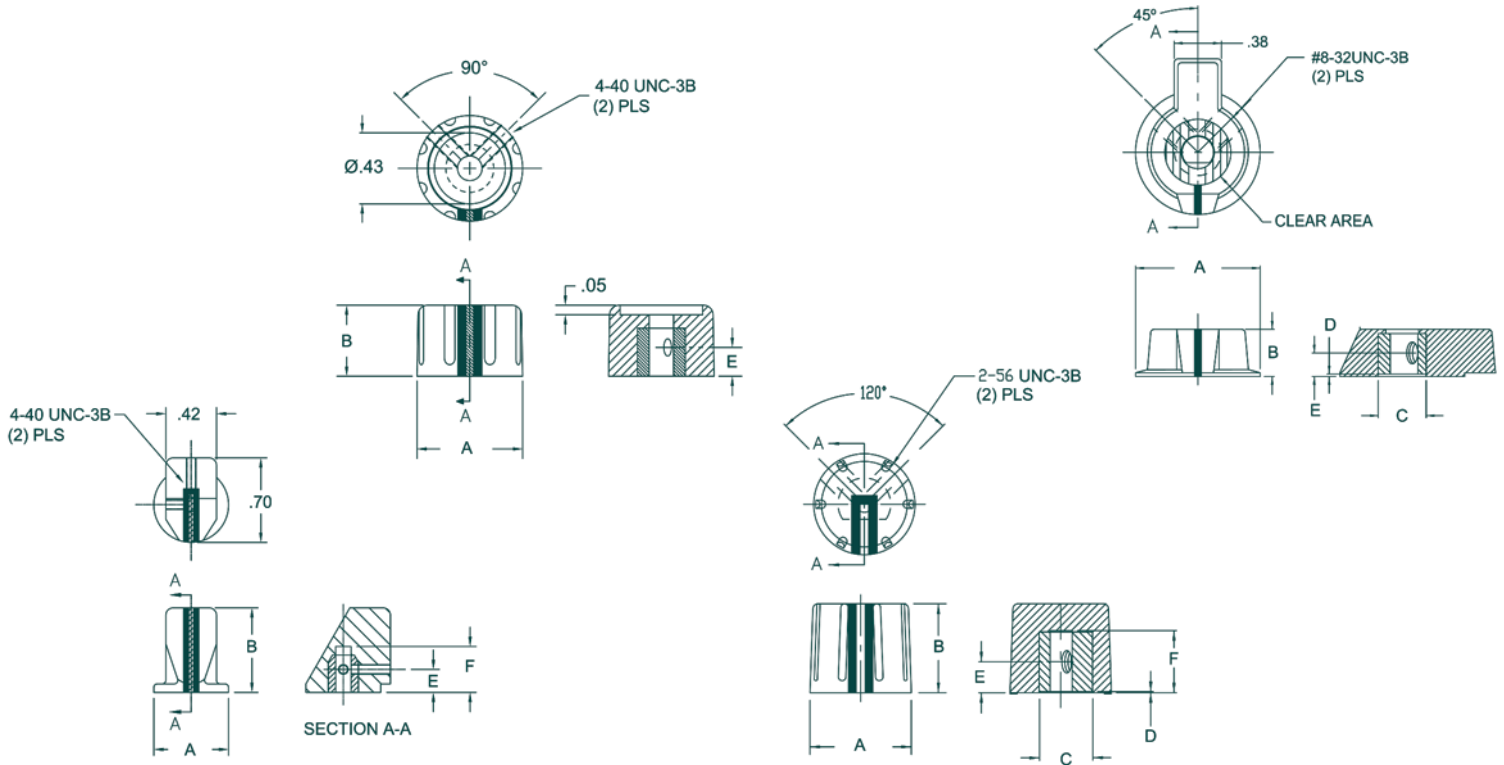
Detailed drawings are available for each style

All of our backlighted knobs can be manufactured for night vision use. Our night vision knobs meet NVIS "Green A" requirements.



TRANSILLUMINATED

CMK SERIES



29-01060-0



29-01063-0



29-01065-0



29-01068-0

CMK SERIES

Part Number	Style Number	A Base Diameter	B Height	C Nut Clearance Diameter	D Nut Clearance Depth	E Set Screw	F Shaft Hole Height	N Number of Flutes	Set Screws
29-01060-0	8950	0.62	0.70	N/A	N/A	0.19	0.38	N/A	MS51021-101 & 103
29-01063-0	8930	0.55	0.37	N/A	N/A	0.15	THRU	8	MS51021-101
29-01065-0	8940	0.40	0.43	0.38	0.01	0.15	0.26	6	MS51021-9
29-01068-0	3020	1.00	0.38	0.38	0.03	0.19	THRU	N/A	MS51021-133

Design Variations

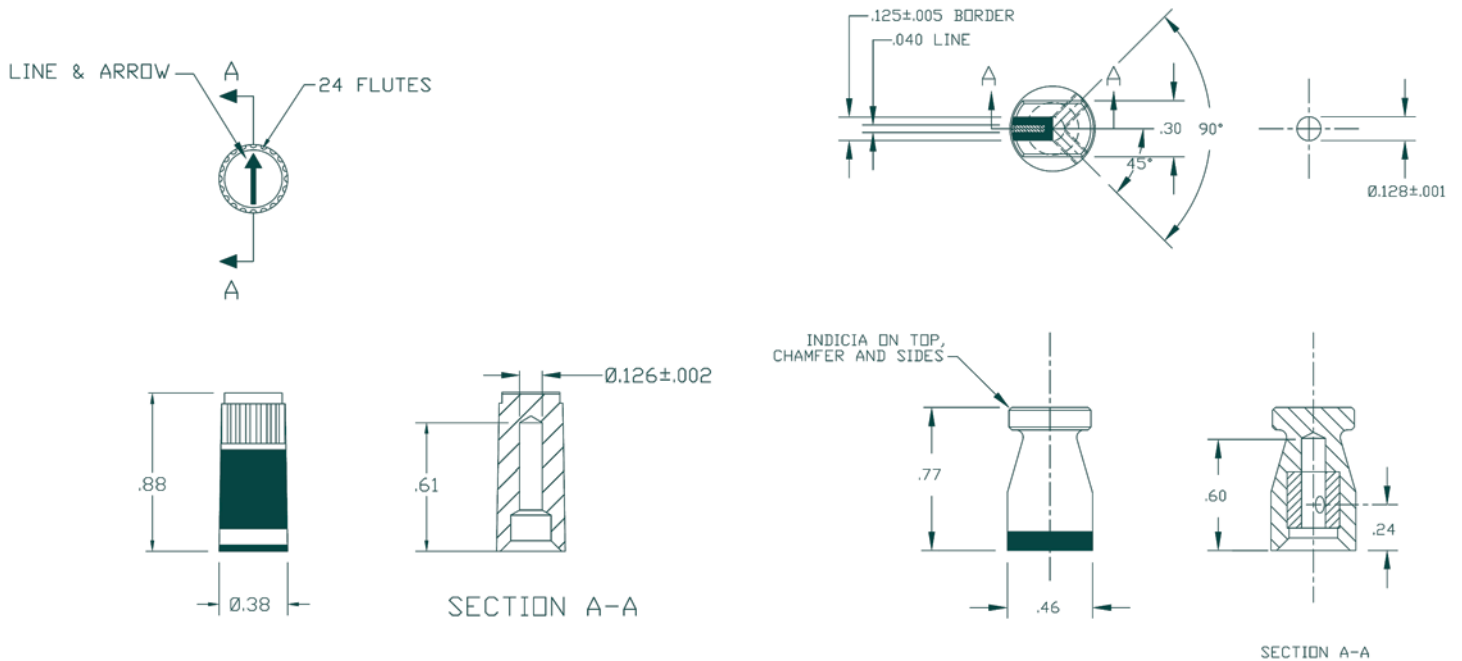
- Set screw locations can vary
- Markings and color can vary (see page 4T)
- Nut clearance depth and diameter can vary
- See part number system for shaft hole designation

Detailed drawings are available for each style

All of our backlighted knobs can be manufactured for night vision use. Our night vision knobs meet NVIS "Green A" requirements.



TRANSILLUMINATED CPK SERIES



CPK SERIES

Style Number	A	B	E	F	Set Screws
	Base Diameter	Height	Set Screw Height	Shaft Hole Depth	1/8
29-01059	0.38	0.88	w/o	0.61	-
29-01061	0.38	0.88	w/o	0.61	-
29-01067	0.38	0.88	w/o	0.61	-
29-01064	0.46	0.77	0.15	0.60	MS51021-101

Design Variations

- Set screw locations can vary
- Markings and color can vary according to customer specifications (see page 4T)
- Multiple stripes and colors are available
- Multiple shaft diameters are available with and without set screws

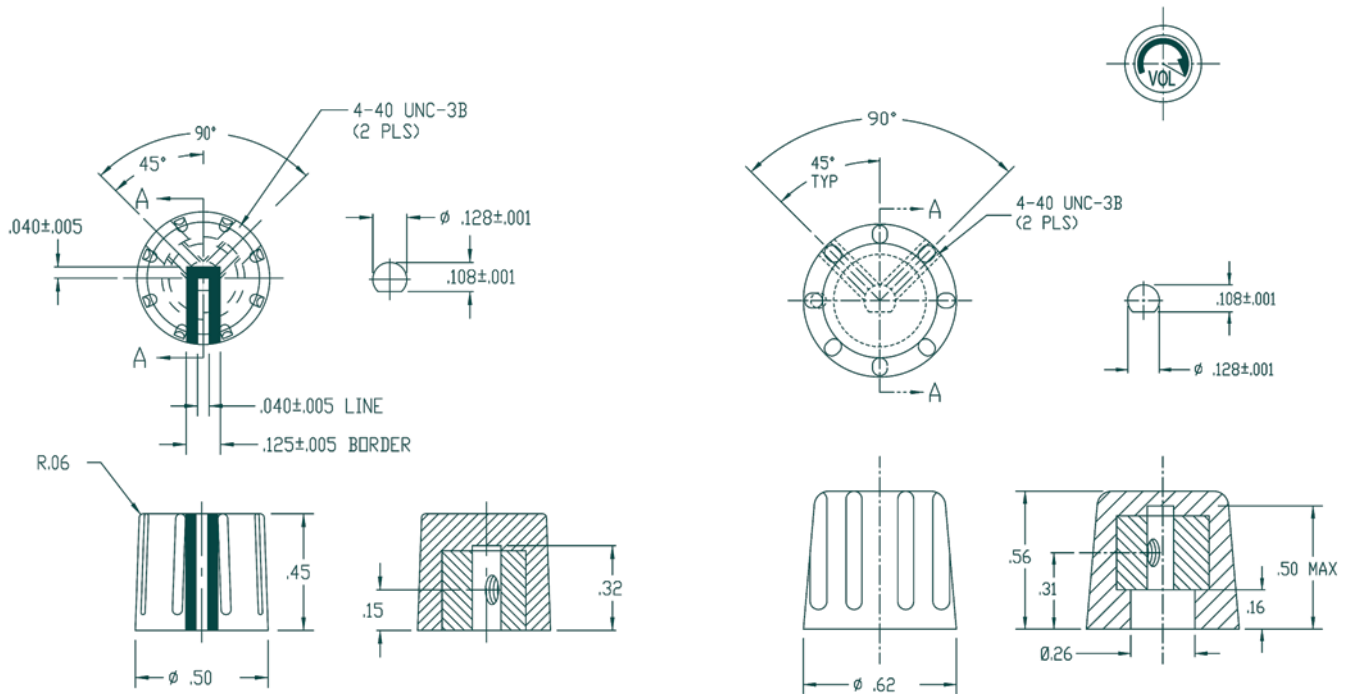
Detailed drawings are available for each style

All of our backlighted knobs can be manufactured for night vision use. Our night vision knobs meet NVIS "Green A" requirements.



TRANSILLUMINATED

CRK SERIES



29-01062



29-01066

CRK SERIES

Style Number	A Base Diameter	B Height	C Nut Clearance Diameter		D Nut Clearance Depth	E Set Screw	F Shaft Hole Height	N Number of Flutes	Set Screws	
			1/8	1/4					1/8	1/4
29-01062	0.50	0.45	—	—	—	0.15	0.32	8	MS51021-101	MS51021-131
29-01066	0.62	0.56	0.26	0.26	0.16	0.31	0.50	8	MS51021-102	MS51021-131

Design Variations

- Set screw locations can vary
- Markings and color can vary (see page 4T)
- Nut clearance depth and diameter can vary
- See part number system for shaft hole designation

Detailed drawings are available for each style

All of our backlighted knobs can be manufactured for night vision use. Our night vision knobs meet NVIS "Green A" requirements.



TRANSILLUMINATED SPECIALS

x= outer diameter
y= height



737
x=.37
y=.57



542
x=.45
y=.54



489
x=.50
y=.46



489
x=.50
y=.46



587
x=.50
y=.54



771
x=.52
y=.62



631
x=.58
y=.58



751
x=.59
y=.70



752
x=.59
y=.83



752
x=.59
y=.83



61B
x=.62
y=.44



4870
x=.62
y=.72



543
x=.65
y=.75



769
x=.75
y=.52



507
x=.75
y=.98



557
x=.77
y=.65



4014
x=.88
y=.75



548
x=.90
y=.85



3142
x= 1.00
y= .56



3840
x= 1.00
y= .87



3180
x= 1.00
y= .91



760
x= 1.00
y= 1.35



1992
x= 1.06
y= .75



2899
x= 1.12
y= .81



2175
x= 1.12
y= .81



780
x= 1.12
y= .81



586
x= 1.15
y= .67

All of our backlit knobs can be manufactured for night vision use. Our night vision knobs meet NVIS "Green A" requirements.



SPECIAL KNOBS

x= outer diameter
y= height



228
x=.35
y=.51



688
x=.44
y=.78



489
x=.50
y=.46



432
x=.52
y=.72



1047
x=.90
y=1.03



458
x=.69
y=.40



3214
x=.70
y=.50



352
x=.83
y=.64



2685
x=.90
y=.52



2066
x=1.07
y=.83



3283
x=1.26
y=.86



705
x=1.33
y=1.26



3680
x=1.52
y=.86



2271538
A125
x=.82
y=.51



3081
x=.51
y=.77



2580
x=.87
y=.36



850



494
x=.88
y=.39



706 D21
x=.90
y=.70



696 M32
x=1.00
y=.80



1803 D31



708 M32
x=1.02
y=.88



68-00013-0
x=1.25
y=.72



707 M43
x=1.25
y=.72



1599 D42

All of our backlighted knobs can be manufactured for night vision use. Our night vision knobs meet NVIS "Green A" requirements.



TRANSILLUMINATED

SPECIALS

x= outer diameter
y= height



788
x=.43
y=.79



808
x=.50
y=.50



FNA 39193
x=1.26
y=.86



785
x=.94
y=.50



FNA 3797-1
x=1.15
y=.25



FNA 2055/2059
x=.88
y=.81



2408 D51
x=2.00
y=.70



65D 13295-2
x=.75
y=.75



FNA 17151 3014
x=1.78
y=.80



1735
x=1.15
y=1.25



FNA 3216/3217
x=.94
y=.50



FNA 3292
x=1.68
y=.60



696
x=1.39
y=.55



FNA 2592
x=1.68
y=.31



FNA 2040
x=1.68
y=.60



4110
x=1.50
y=1.00



527
x=.81
y=.81



730
x=.62
y=.47



731
x=.63
y=.50



733
x=.40
y=.50



830
x=1.22
y=1.10



571
x=1.06
y=.69



840
x=.84
y=.91



854
x=.88
y=.70



856
x=1.50
y=.70

All of our backlighted knobs can be manufactured for night vision use. Our night vision knobs meet NVIS "Green A" requirements.



MATERIALS

Resins—much of the growth of the injection molding industry is due to the continuing ability of resin suppliers to offer new and improved engineering materials. Today resins can meet specifications for mechanical, thermal, electrical and impact demands increasingly competitive in performance to metal at reduced processing costs.

EHC's participates in an ongoing evaluation process of new resins. Moldability, ease of processing and decoration are some of the analysis conducted. This process provides for a continuing effort to improve current production needs and prepare for future program demands.

- Good Mechanical Strength and Illumination are of primary concern when choosing our materials. strength is needed numerous reinforcements are used including glass fibers, mineral fillers, glass microspheres, all products that improve impact resistance.
- Electrical Resistance or Insulation make the use of EHC plastic products especially suited in electro-mechanical environments.

The plastic materials used in EHC parts have been carefully selected to meet the functional and aesthetic requirements of each product.

Thermoplastic – Materials with technical characteristics such as polycarbonate unless otherwise requested by customers.

MATERIAL SPECIFICATIONS

INSPECTION

Standard

Parts are considered commercially non-acceptable if an imperfection is visible when viewed at arm's length distance under normal lighting conditions. Parts will be viewed for a period not to exceed 3-5 seconds in daylight (or fluorescent light of approximately 70 foot candles) with the unaided eye at normal viewing distance of 24 inches, in the normal viewing plane.

Special

Jewelry-type inspection will be reflected in a higher unit-cost. Customer to provide EHC with written notice in advance of placement of order.

CHEMICAL RESISTANCE

Contact manufacturer for resistance factors prior to usage with chemicals.

Surface Finish

1. Gloss: Parts produced from a highly polished mold, or
2. Satin: Parts produced from a textured mold to remove glossiness,
3. Textured: Parts produced from a pattern etched mold, or
4. Matte-finish: Parts produced from a secondary operation that provides a non-reflective plastic surface.

Appearance

Parts to be free of shrinkage in excess of .009" IN/IN on top surface and sides of molded knob, mold flow marks or "cold" spots, molding flash, chips or cracks, excessive gate marks and colors (for knob and skirt assemblies) to be consistent in shade and density for each order lot or release.

MARKINGS

Adhesion:

Markings cannot be removed from plastic surface by an adhesive material comparable to scotch tape.

Inspection: See opening paragraph.

Appearance:

All characters, lettering, border, and backgrounds must be complete and all lettering must be clear, visible, and legible. Colors to be consistent in shade and density for each order lot or release.

SET SCREWS

Hexagon Socket

1. Material: high grade alloy steel
2. Finish: Corrosion resistant/coating with clear or black finish
3. Hardness: Case hardened
4. Finish: Clear corrosion resistant coating
5. Point Style: Cup point

Location (nominal) of Screw(s) (if applicable)

Two (2) set screws at 45° from 12 o'clock or 90° and 180° from indicator.

Thread

Class 3A

Screw Size and Length

Determined by manufacturer.

INSERTS

1. Material: Aluminum or half-hard brass alloy.
2. Finish Options: Nickel plate on brass or Anodized on aluminum.

Thread

Thread Fit: 2B gauge

PACKAGING

All products are packaged to insure that quality is not jeopardized during transit. Relative to the complexity of the part, product is:

- A. Individual bags, or
- B. Egg crate box w/ foam pads on top and bottom

MECHANICAL TOLERANCES

PRODUCT DIMENSIONS: XX = $\pm .02$ " and XXX = $\pm .010$ " unless otherwise specified.

PRODUCT CONCENTRICITY: .020" TIR

SHAFTHOLE DIAMETERS

Round Shaft Hole: $\pm .002$ "

Round Shaft Hole with Flat: $\pm .0035$ "

Knurled Shaft Hole:

Solid Shaft: $\pm .002$ "

Split Shaft: $\pm .0035$ "

TORQUE SPECIFICATIONS

Torque is defined as the number of pounds required to strip molded-in inserts and stud heads from molded plastic part, flatten metal spring clip, strip serration of knurled plastic shaft hole or strip head of set screw.

Spring Diameter	Stripping Torque Inch Lbs.
.125	10
.187	17
6 mm	25
.250	25

Knurled Type Shaft Hole: All types 15 inch lbs.

Screw Size	Threads Per In.	Head Stripping Torque Inch Lbs.
#3	48	3-1/2
#4	40	4-3/4
#6	32	8-3/4
#8	32	18
#10	32	32

SHAFT HOLE SPECIFICATIONS

Shaft hole fit per customer specifications can be provided for an additional charge. Sample shaft and tension requirements must be forwarded to manufacturer.

INSERTS WITH THREADED I.D.

(Standard Series and Selected Combinations – Unified Screw Threads)

Thread Fit: 2B Gauge

Thread Type
#6-32 UNC 2B
#8-32 UNC 2B
#10-32 UNF 2B
1/4-20 UNC 2B
5/16-18 UNC 2B
3/8-16 UNC 2B
7/16-14 UNC 2B
1/2-13 UNC 2B

SALES TERMS & AGREEMENTS

- TERMS:** Our terms of sale are 1/10 net 30 FOB Farmingdale, NY. Terms on tooling are 50% with order balance upon sample approval.
- RETURNS:** All returns must be approved by EHC and be assigned an EHC RMA number.
- QTY VARIANCE:** We reserve the right to over or under ship 10% on orders for non-standard parts.
- SHIPMENTS:** Usually UPS or FedEx prepaid and added, unless otherwise specified.
- DELIVERY:** Immediate and just-in-time delivery is available on most standard items.

SPECIFICATIONS FOR NON-STANDARD PRODUCTS MUST BE APPROVED BY EHC. SPECIFICATIONS WHICH CALL FOR CLOSER TOLERANCES, ENHANCED PHYSICAL PROPERTIES, OR MORE STRINGENT VISUAL REQUIREMENTS THAN THOSE PREVIOUSLY LISTED MUST HAVE SPECIFIC APPROVAL OF EHC'S SALES AND MANUFACTURING ORGANIZATIONS.

NOTE: SHRINKAGE, TOOLMAKERS VARIATIONS FROM CAVITY, LIFE-CYCLE OF TOOLING, MATERIALS FROM MULTIPLE VENDORS, HUMIDITY, ETC. ALL HAVE AN EFFECT ON THE NORMAL DIMENSIONS OF PLASTIC PARTS. A PREMIUM CHARGE WILL BE ADDED TO THE UNIT-COST FOR THOSE CUSTOMERS REQUIRING EXACT TOLERANCES AND APPEARANCE. CONTACT MANUFACTURER FOR ADDITIONAL CHARGES.

STORAGE OF CUSTOMER OWNED ARTWORK PREPARATION, RAW MATERIALS AND SUPPLIES, AND TOOLING.

CUSTOMER SHALL NOTIFY EHC OF DISCONTINUANCE OF PRODUCT FOR WHICH CUSTOMER HAS PURCHASED ITEMS SO THAT ARRANGEMENTS CAN BE MADE TO RETURN OR DISCARD THEM. OUR STANDARD PRACTICE ASSUMES THAT ITEMS NOT USED BY THE CUSTOMER FOR A PERIOD OF TWO YEARS WILL BE CONSIDERED OF NO VALUE AND CUSTOMER WILL BE NOTIFIED OF OUR DECISION. FAILURE OF CUSTOMER TO RESPOND TO INQUIRY LEAVES DISBURSEMENT OF ITEMS AT THE DISCRETION OF EHC (AT NO CHARGE OR OBLIGATION).



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