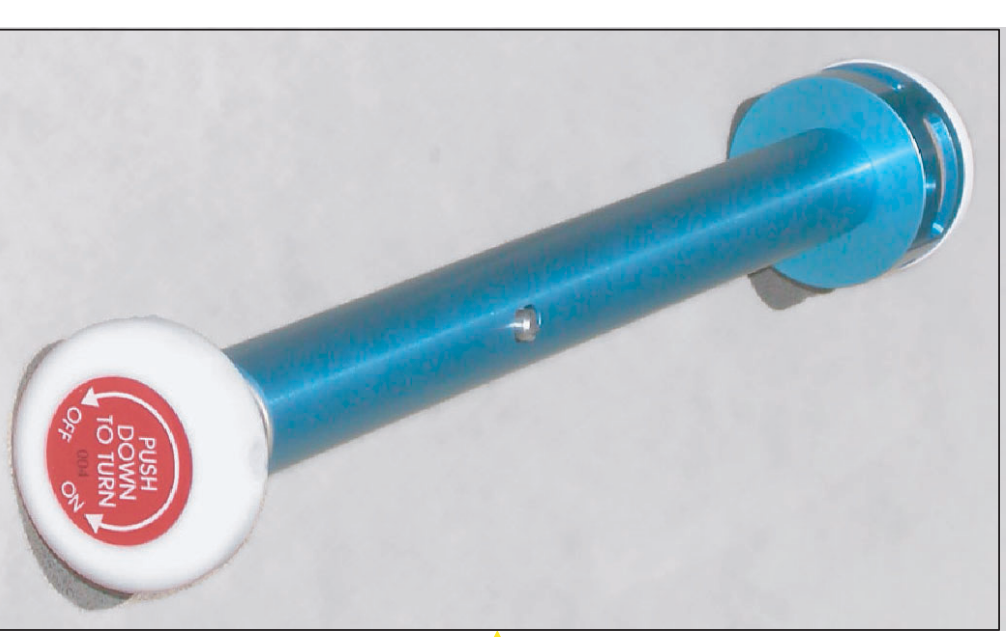


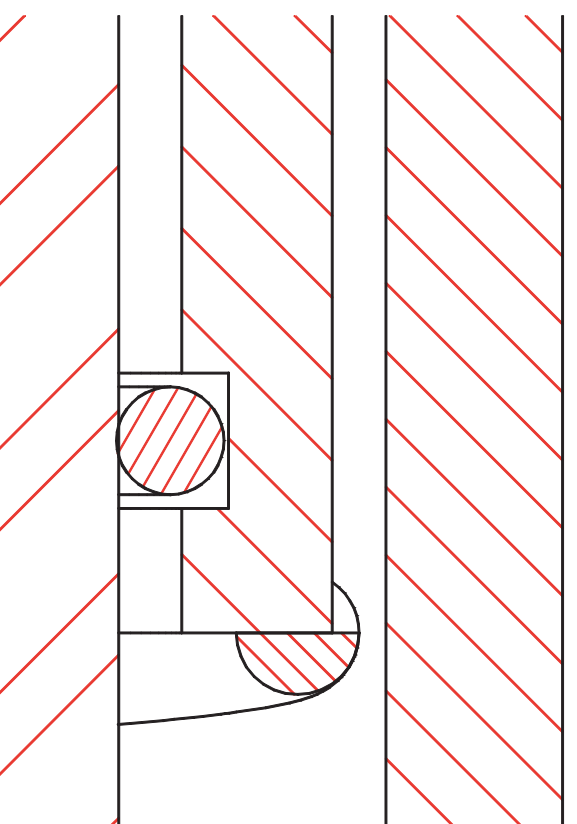
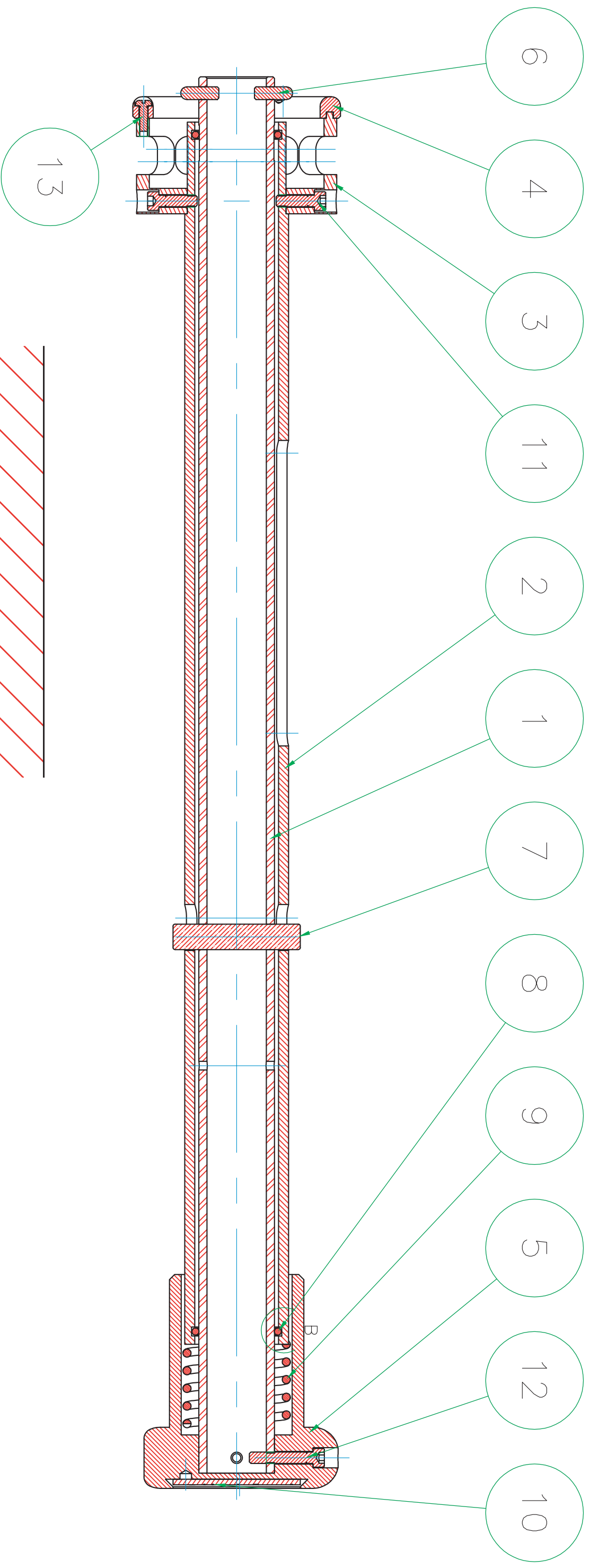
SECTION A-A



FILE NAME Transfer-Handel-RevB.dwg
 CONTRACT NO -
 DRAWN 07.30.2003 Mitch Miller
 CHECK
 APPR.
 ISSUED

JCSG / SMB / SSR/L / SLA/C
 CASSETTE TRANSFER HANDLE
 ASSEMBLY OVERVIEW

SIZE	FSCM NO	DWG NO	REV
AM_B	-	-	B
SCALE	1:2	WEIGHT	SHEET 1 OF 14



DETAIL B
SCALE 8:1

FILE NAME	Transfer-Handel-RevB.dwg		
CONTRACT NO	-		
DRAWN	07.30.2003	Mitch	Miller
CHECK			
APPR.			
ISSUED			
JCSG / SMB / SSRLL / SLAC			
CASSETTE TRANSFER HANDLE			
CROSS SECTION OF ASSEMBLY			
SIZE	FSCM NO	DWG NO	REV
B	-	-	B
SCALE 1:1	WEIGHT	SHEET 2 OF 14	

Parts List

Item Qty	Description 2	Description	Material	Vendor	Note
1	1	INNER SS TUBE	3/4 OD STAINLESS STEEL TUBE - 0.083 WALL	STAINLESS STEEL	
2	1	OUTER AL PIPE	AL 6061 SCH 40 PIPE	AI 6061 PIPE	ANODIZE BLUE
3	1	BOTTOM CUP		ALUMINUM 6061	ANODIZE BLUE
4	1	TEFLON RING		TEFLON	
5	1	TEFLON HANDLE		TEFLON	
6	2	MODIFIED DOWEL	MODIFIED 1/8 x 3/8 DOWEL PIN	MSC 67600122 or EQUIV.	PRESSED & WELDED TO SS TUBE
7	1	DOWEL PIN	PIN - GROUND DOWEL, 1/4 x 1 1/4	MSC 67601047 or EQUIV.	BRIGHT FINISH, CHAMFER OK
8	2	O-RING	AS 568 - 018	MSC 31955313 or EQUIV.	TIGHTER TOLERANCES THAN ASS68A
9	1	SPRING	COMPRESSION .975 x .072 x 1.5	MSC 03309218 or EQUIV.	
10	1	ENGRAVED LABEL	0.056" THK. ROWMARK RED/WHITE	ACRYLIC	LASERMARK ENGRAVING STOCK
11	2	SCREW #4-40 x 3/8	HEXAGON SOCKET HEAD CAP SCREW	MSC 05664040 or EQUIV.	
12	2	SCREW #4-40 x 5/8	HEXAGON SOCKET HEAD CAP SCREW	MSC 05664065 or EQUIV.	
13	3	SCREW #2-56 x 1/4	SLOTTED PAN HEAD MACHINE SCREW	MSC 67568725 or EQUIV.	

FILE NAME	Transfer-Handel-RevB.dwg
CONTRACT NO	-
DRAWN	07.30.2003 Mitch Miller
CHECK	
APPR.	
ISSUED	

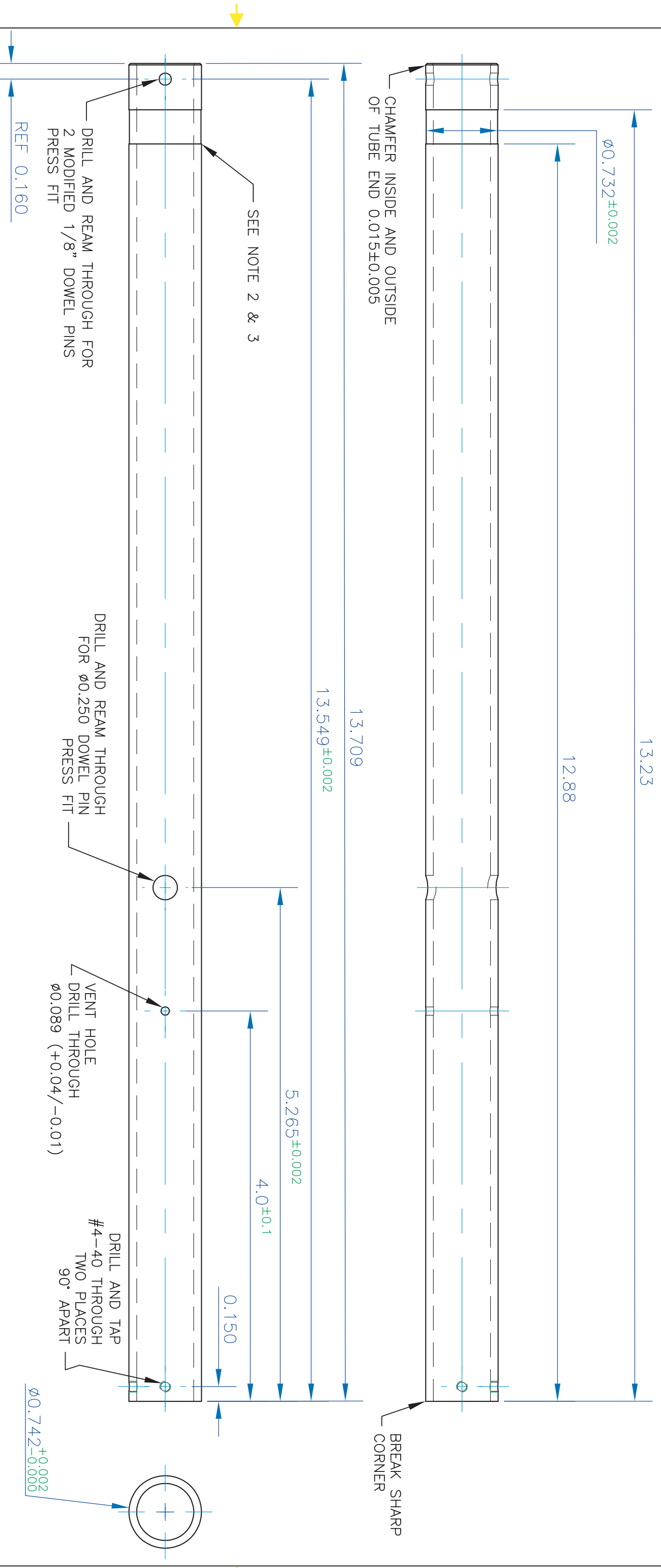
JCSG / SMB / SSRP / SLAC

CASSETTE TRANSFER HANDLE

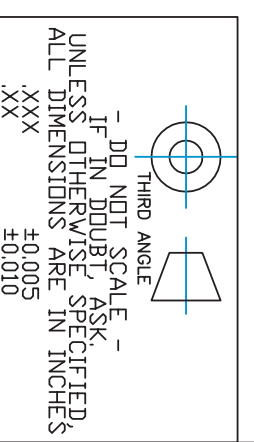
PARTS LIST

SIZE	FSCM NO	DWG NO	REV
B	-	-	B
SCALE	1:1	WEIGHT	SHEET 3 OF 14

#	DESCRIPTION	DATE	APPROVED
B	ADJUSTED LENGTH AND D/P PLACEMENT TO ADJUST SPRING TENSION & ADDED NOTES.	05/29/2003	mmiller

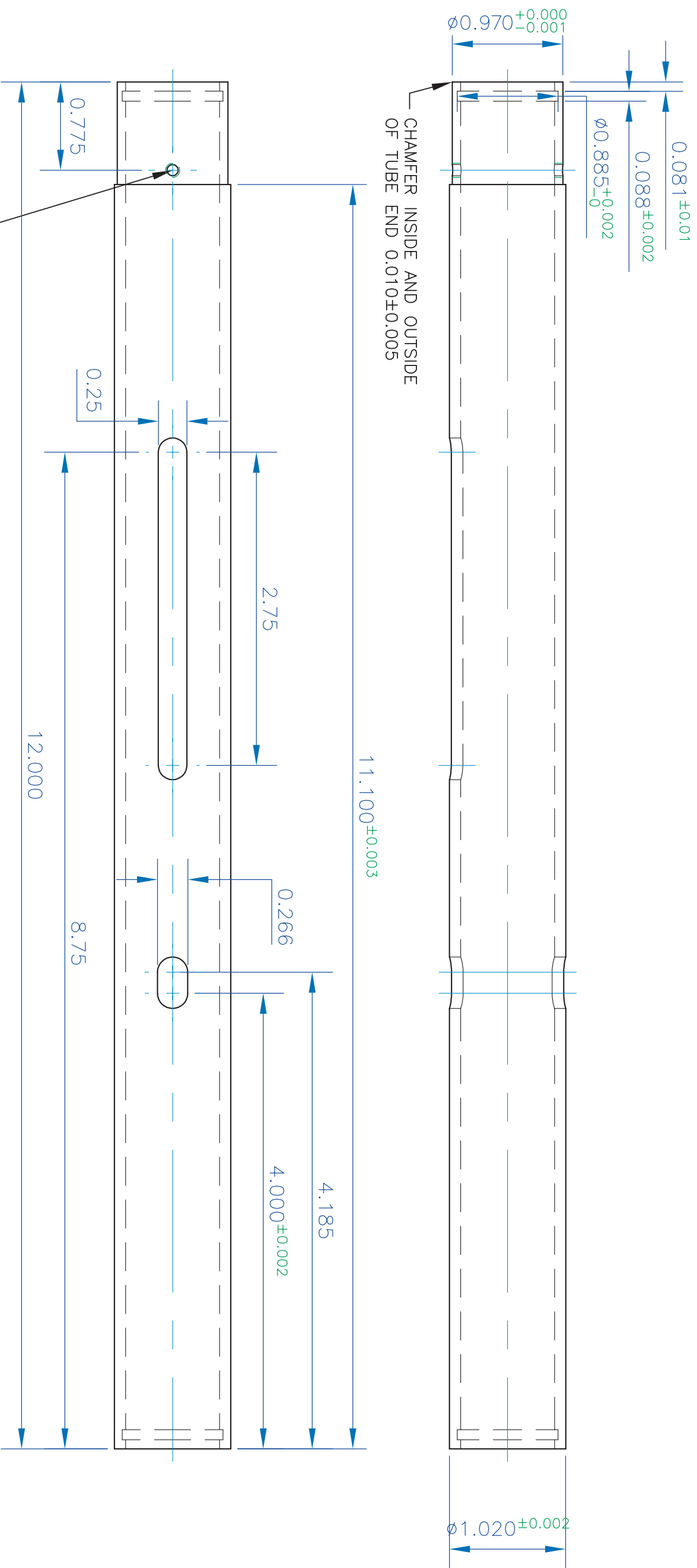


- Notes:
1. RAW MATERIAL - 3/4" OD x 0.083 WALL STAINLESS STEEL TUBE (304 or 316, WELDED or SEAMLESS)
 2. BLEND TRANSITIONS BETWEEN $\phi 0.732$ AND $\phi 0.743$ 45°±10°
 3. THE OD OF THE TUBE IS TO BE $\phi 0.743 \pm 0.001$ AT BOTH ENDS. THE 0.65" LONG $\phi 0.732$ OD SECTION IS TO ALLOW O-RING TO SLIDE UNDER LIQUID NITROGEN (-196° C).
 4. ALL HOLES ARE ALIGNED ON THE SAME AXIS (AS SHOWN) ±2°
 5. SURFACE FINISH, GENERAL 63 MICRONS RMS OR BETTER.
 6. PART TO BE FREE OF BURRS
 7. ASSEMBLY: SEE SHEETS 11 AND 14

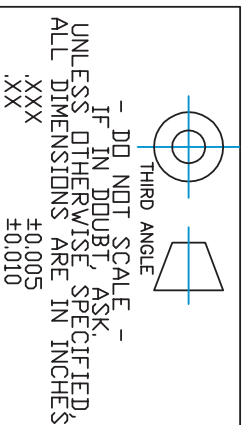


FILE NAME	Transfer-Handel-RevB.dwg		
CONTRACT NO	-		
DRAWN	07.30.2003	Mitch	Miller
CHECK			
APPR.			
ISSUED			
JCSG / SMB / SSRLL / SLAIC CASSETTE TRANSFER HANDLE INNER SS TUBE			
SIZE	FSCM ND	DWG ND	REV
B	-	-	B
SCALE	1:1	WEIGHT	SHEET 4 OF 14

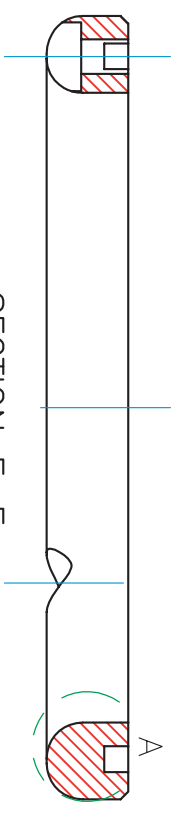
#	DESCRIPTION	DATE	APPROVED
B	CORRECTED O-RING DEPTH ERROR	05/29/2003	mmiller



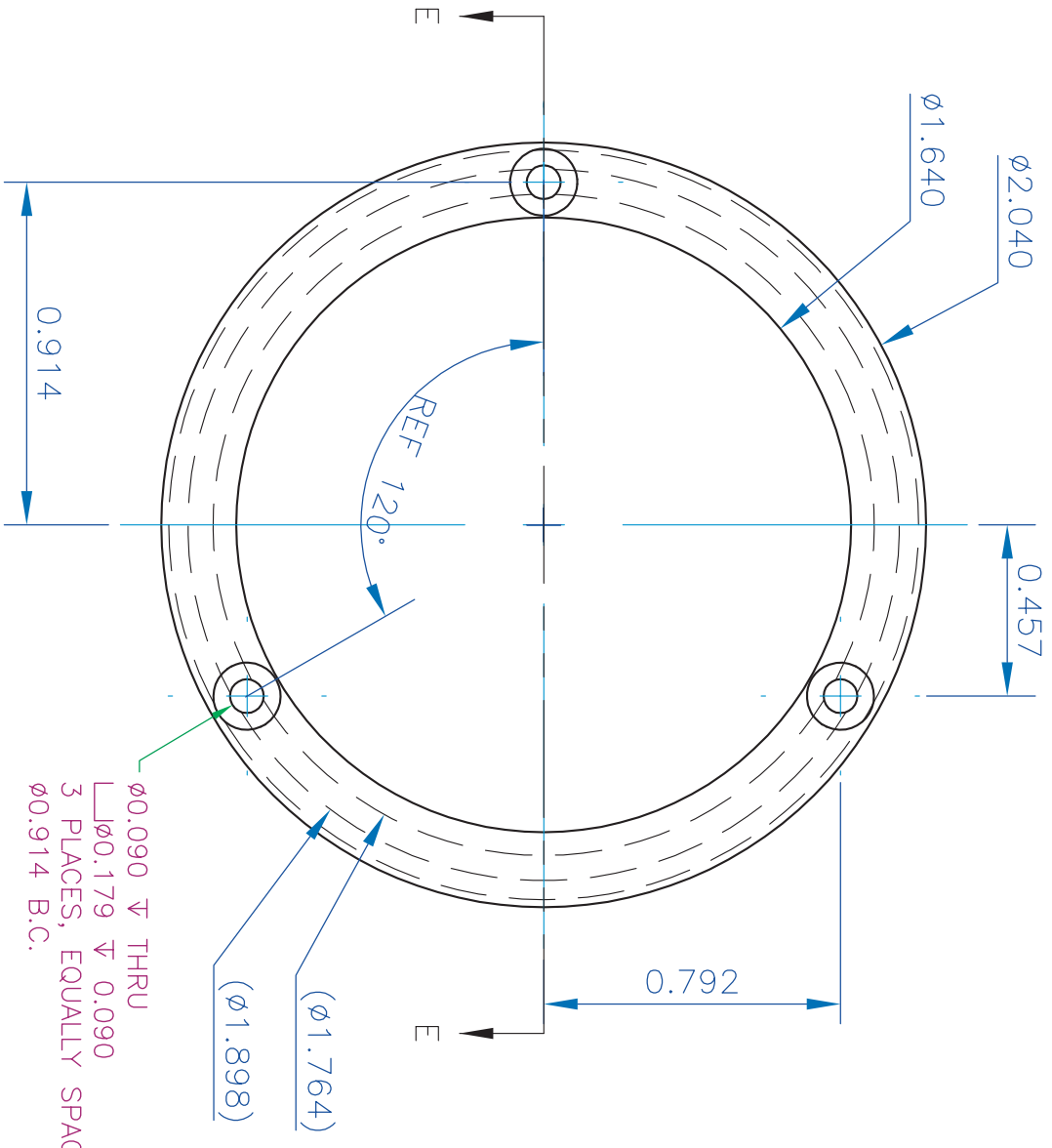
- Notes:
1. RAW MATERIAL - 3/4" SCHEDULE 40 ALUMINUM 6061 PIPE (O.D. 1.05±0.01, NOMINAL WALL 0.113)
 2. EXTERIOR IS A BRUSHED COSMETIC FINISH, 63 MICRONS RMS OR BETTER
 3. O-RING GROOVE IS THE SAME AT BOTH ENDS. O-RING SIDE WALLS MAY BE ANGLED 0° - 8°.
 4. THIS PART AND THE BOTTOM CUP ARE TO BE ANODIZED BLUE.
 5. ASSEMBLY: SEE SHEETS 13 AND 14.



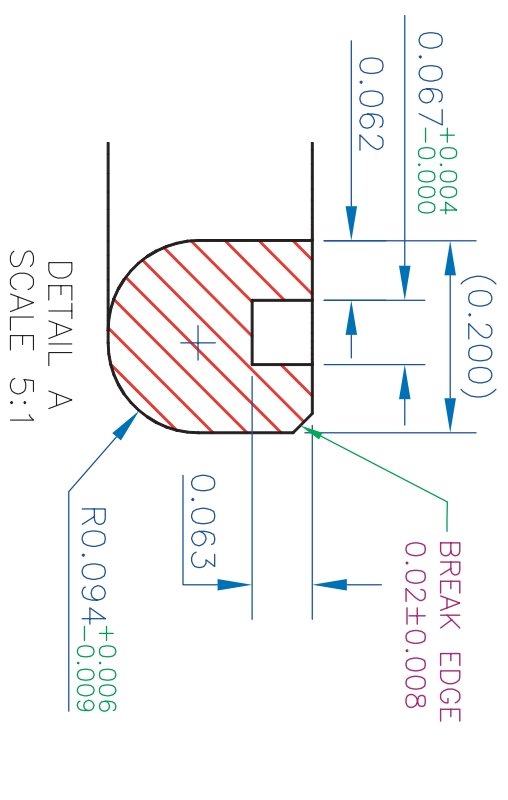
FILE NAME	Transfer-Handle-RevB.dwg		
CONTRACT NO	-		
DRAWN	07.30.2003	Mitch	Miller
CHECK			
APPR.			
ISSUED			
JCSG / SMB / SSRLL / SLAIC			
CASSETTE TRANSFER HANDLE			
OUTER AL PIPE			
SIZE	FSCM NO	DWG NO	REV
B	-	-	B
SCALE	1:1	WEIGHT	SHEET 5 OF 14



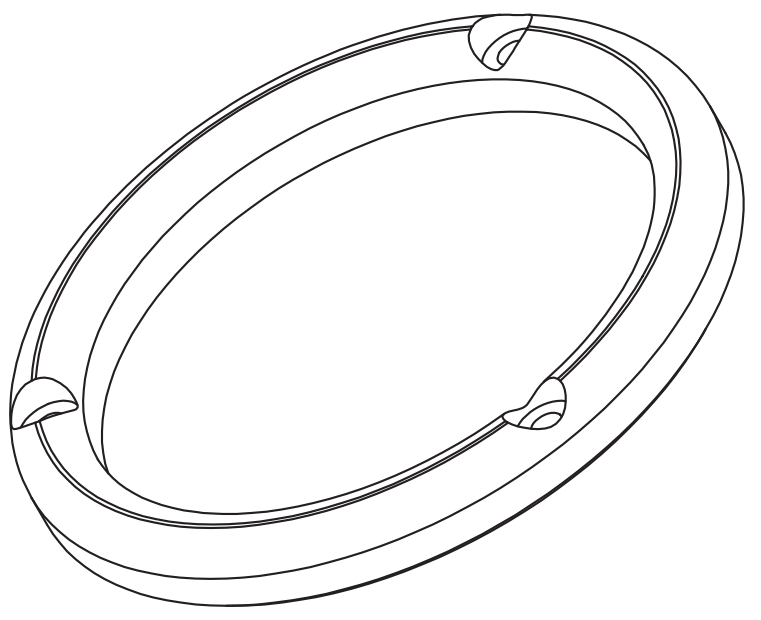
SECTION E-E



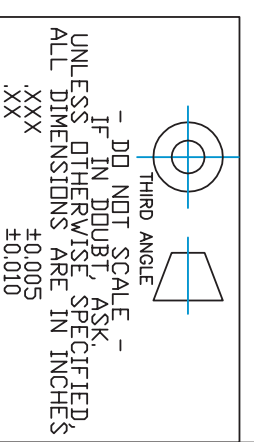
$\phi 0.090 \pm$ THRU
 $\perp \phi 0.179 \pm 0.090$
 3 PLACES, EQUALLY SPACED
 $\phi 0.914$ B.C.



DETAIL A
SCALE 5:1



- Notes:
1. RAW MATERIAL – MECHANICAL GRADE PTFE – TEFLON
 2. PART IS TO BE FREE OF BURRS
 3. ASSEMBLY: SEE SHEET 13.



FILE NAME	Transfer-Handle-RevB.dwg
CONTRACT NO	-
DRAWN	07.30.2003 Mitch Miller
CHECK	
APPR.	
ISSUED	

#	DESCRIPTION	DATE	APPROVED
B	MADE RING C.S. THICKER TO RESIST BREAKAGE & FIXED C'BORE FOR SCREWS	05/29/2003	mmiller

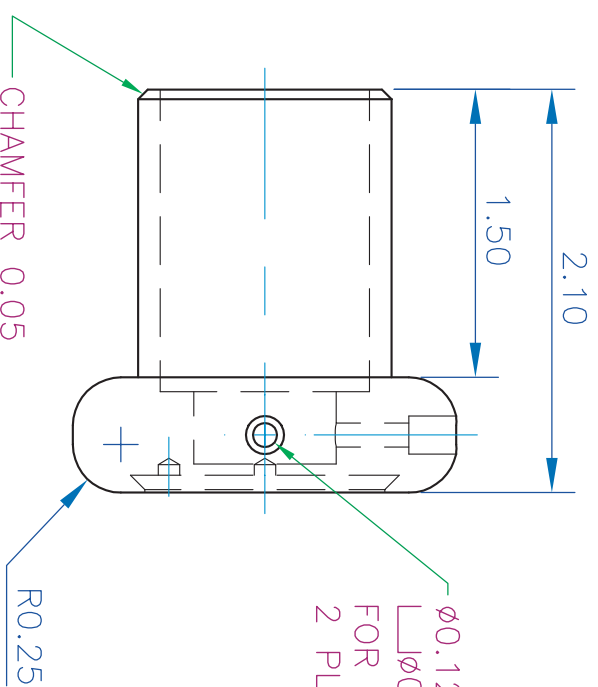
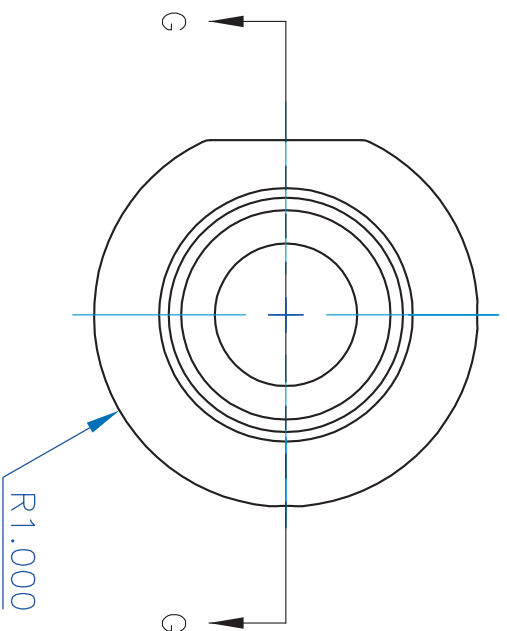
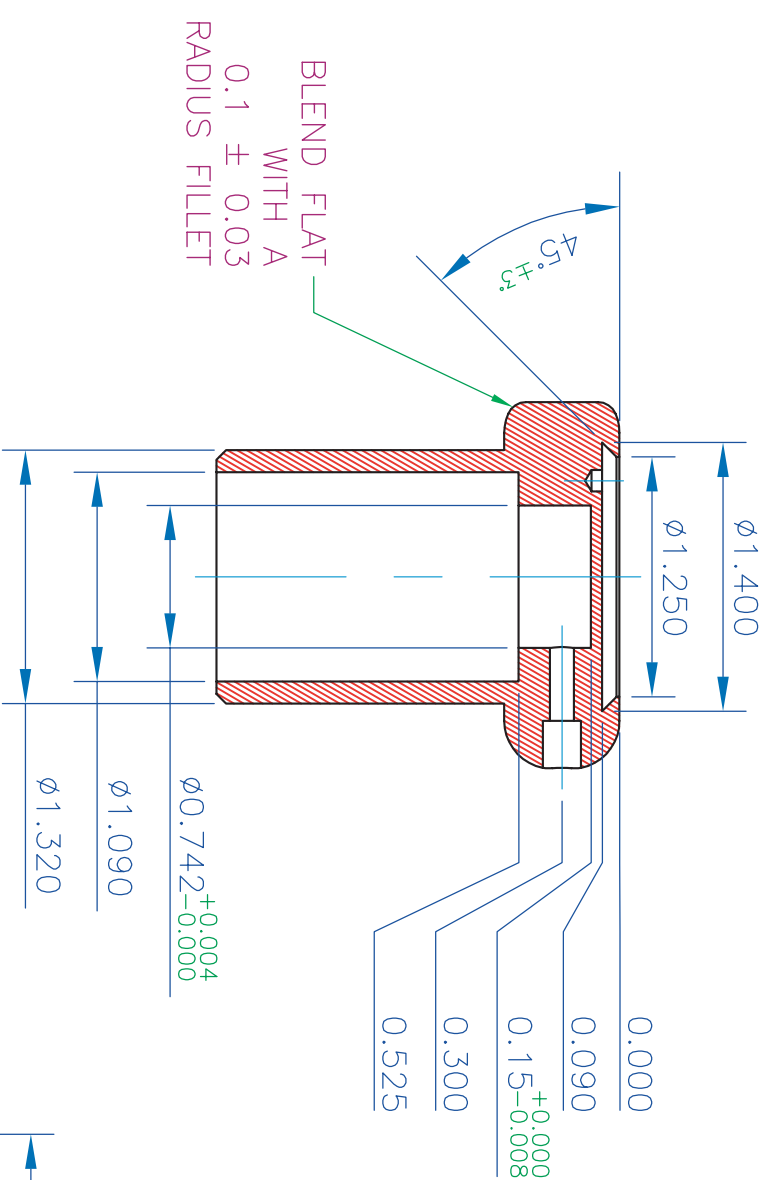
JCSG / SMB / SSRP / SLAC

**CASSETTE TRANSFER HANDLE
TEFLON RING**

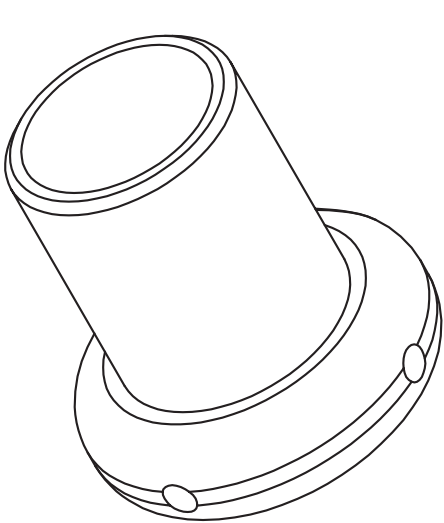
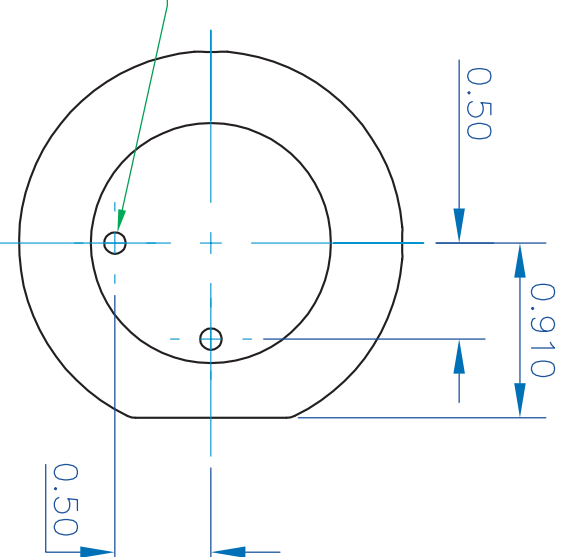
SIZE	FSCM NO	DWG NO	REV
B	-	-	B

SCALE 2:1 WEIGHT SHEET 7 OF 14

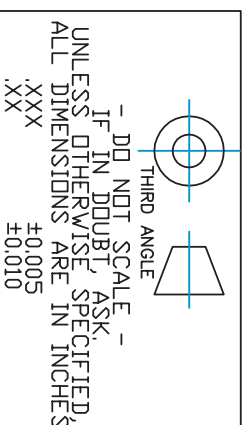
SECTION G-G



$\phi 0.125 \nabla 1$
 $\perp \phi 0.198 \nabla 0.25$
 FOR #4-40 SCREW
 2 PLACES, 90° APART
 $\phi 0.112 \nabla 0.055$
 2 PLACES, 90° APART
 DO NOT BREAK THRU



- Notes:
1. RAW MATERIAL – MECHANICAL GRADE PTFE – TEFLON
 2. PART IS TO BE FREE OF BURRS
 3. EDGES OF THE FLAT SURFACE ON THE SIDE ARE TO BE BLENDED WITH A 0.1 ± 0.03 INCH RADIUS FILLET.
 4. FIT TO END OF STAINLESS STEEL TUBE SHOULD BE TIGHT AND NOT WOBBEL WHEN ASSEMBLED
 5. ASSEMBLY: SEE SHEETS 12 AND 14.



FILE NAME	Transfer-Handle-RevB.dwg
CONTRACT NO	-
DRAWN	07.30.2003 Mitch Miller
CHECK	
APPR.	
ISSUED	

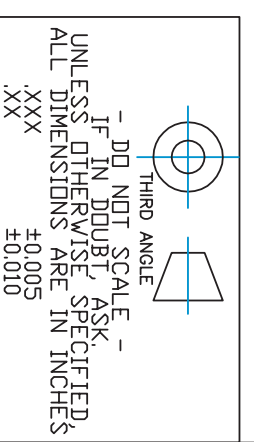
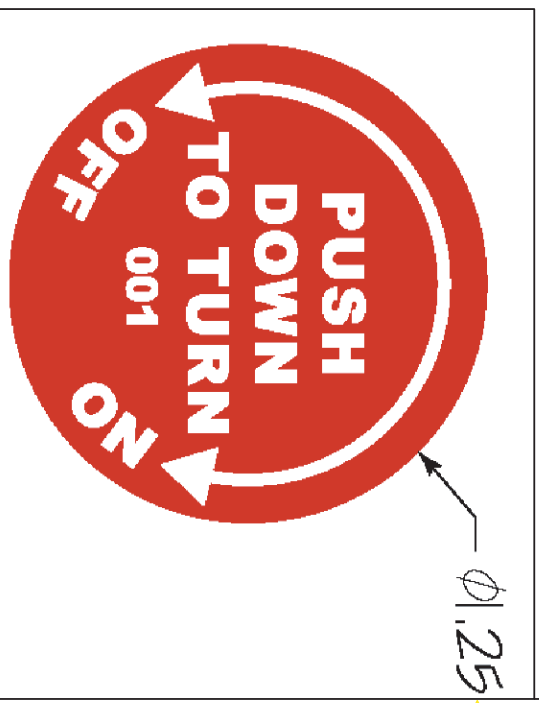
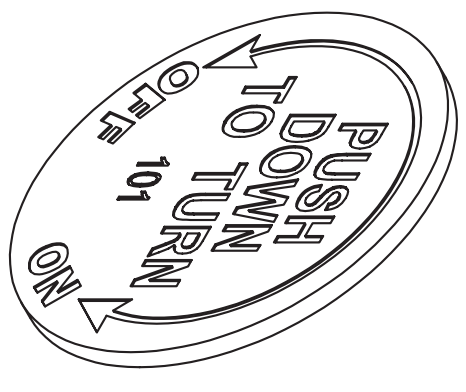
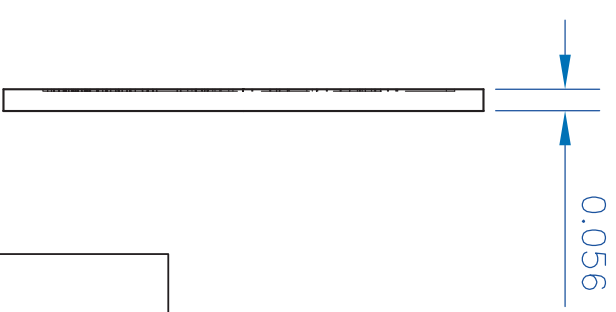
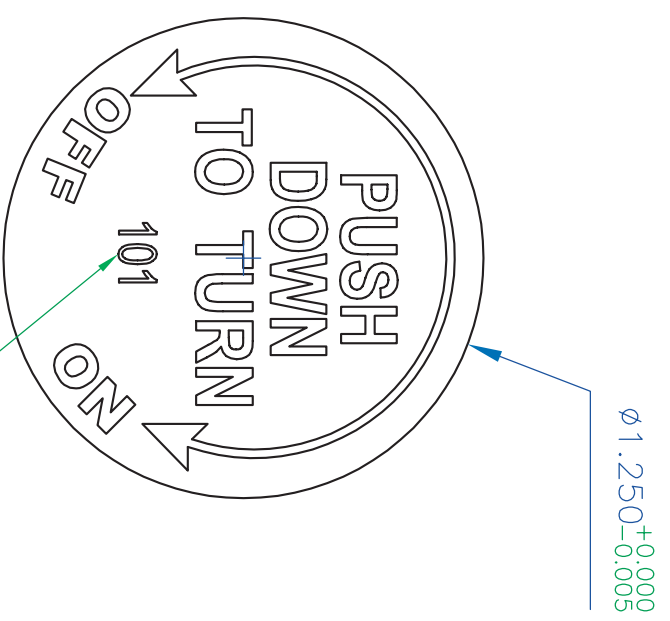
#	DESCRIPTION	DATE	APPROVED
B	TIGHTENED THE DIAMETER TO MATE TO THE STAINLESS STEEL TUBE TO PREVENT WOBBEL & CORRECTED DEPTH OF RECESS.	06/06/2003	mmiller

JCSG / SMB / SSRL / SLAC
 CASSETTE TRANSFER HANDLE
 TEFLON HANDLE

SIZE	FSCM NO	DWG NO	REV
B	-	-	B

SCALE 1:1 WEIGHT SHEET 8 OF 14

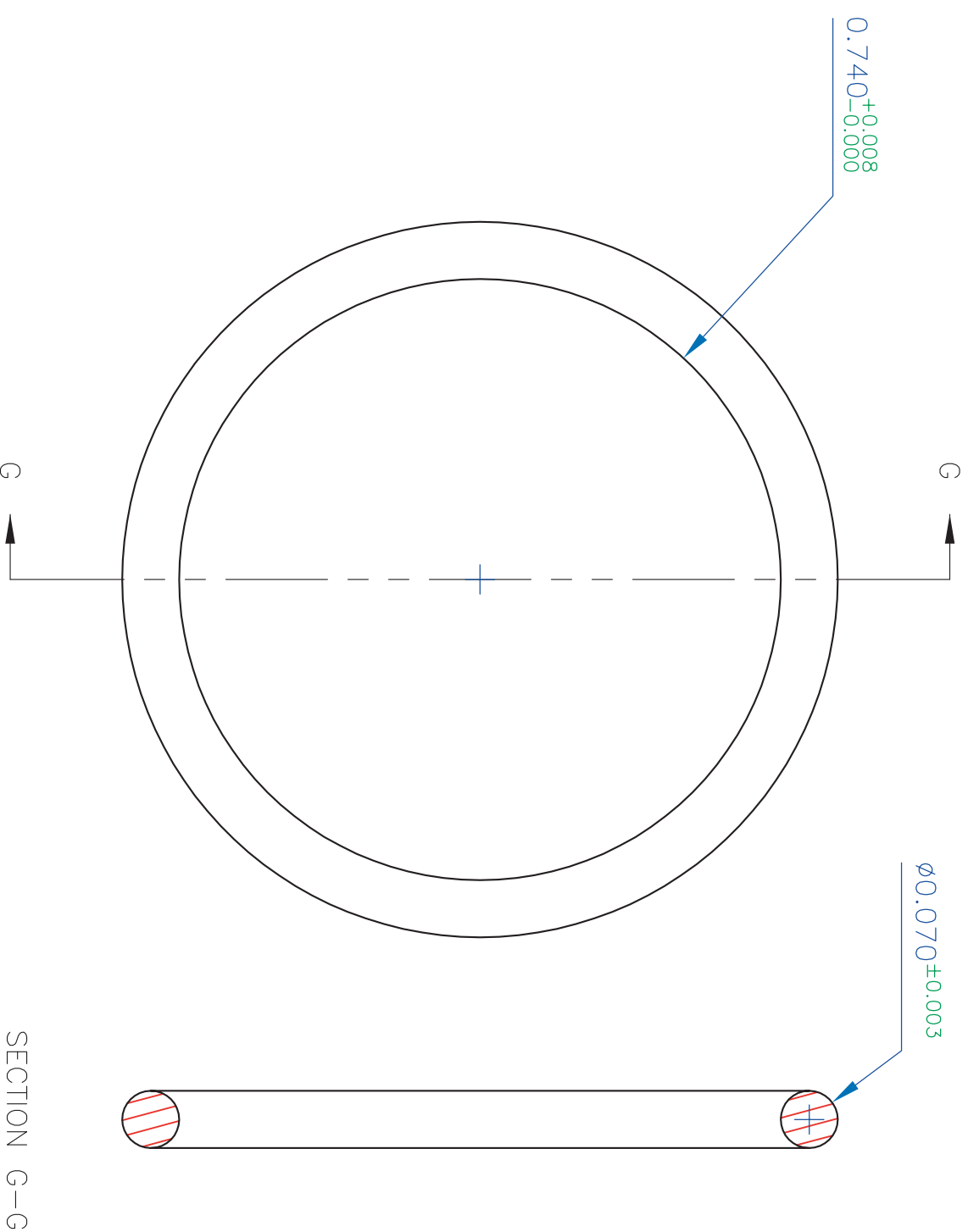
- Notes:
1. RAW MATERIAL – 0.056” THK. ROWMARK ACRYLIC ENGRAVING STOCK. RED BACKGROUND WITH WHITE LETTERS.
 2. TEXT SAYS “PUSH DOWN TO TURN” WITH AN ARROW INDICATING THE DIRECTION FOR “OFF” AND “ON”. A 3-DIGIT SERIAL NUMBER IS ENGRAVED IN A SMALLER FONT UNDER “TO TURN”.
 3. LARGER TEXT HEIGHT IS TO BE 11±0.5 POINTS (0.153±0.007”)ENGRAVED IN A SAN SERIF BOLD FONT (E.G. ARIAL BLACK OR ARIAL NARROW BOLD).
 4. THE SERIAL NUMBER TEXT HEIGHT IS TO BE 7.5±0.5 POINTS (0.104±0.007”) ENGRAVED USING A SAN SERIF FONT OF THE SAME TYPE FAMILY (E.G. ARIAL OR ARIAL NARROW).
 5. LAYOUT APPROVAL IS REQUIRED IF USING DIFFERENT FONTS FROM THOSE LISTED ABOVE.
 6. AN ADOBE ILLUSTRATOR OR AUTOCAD .DWG FILE CAN BE SUPPLIED WITH THE TEXT IF REQUESTED (PLEASE SPECIFY VERSION).
 7. ALWAYS CONFIRM THE BEGINNING AND ENDING SERIAL NUMBERS BEFORE STARTING THE RUN.
 8. ASSEMBLY: SEE SHEET 12



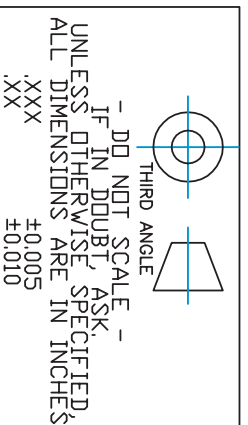
FILE NAME	Transfer-Handle-RevB.dwg
CONTRACT NO	-
DRAWN	07.30.2003 Mitch Miller
CHECK	
APPR.	
ISSUED	

<i>JCSG / SMB / SSRLL / SLAIC</i>			
CASSETTE TRANSFER HANDLE			
ENGRAVED LABEL			
SIZE	FSCM NO	DWG NO	REV
AM_B	-	-	B
SCALE	2:1	WEIGHT	SHEET 9 OF 14

- Notes:
1. RAW MATERIAL – MECHANICAL GRADE PTFE – TEFLON
 2. I.D. TOLERANCE IS TIGHTER THAN AS-568A SPEC.
 3. SPECS FOR AS-568A-018 O-RINGS
 I.D. NOMINAL 3/4" I.D. 0.739±0.009
 C.S. NOMINL 1/16" C.S. 0.070±0.003
 O.D. NOMINAL 7/8"
 4. WE FOUND THAT WE ONLY REJECTED APPROX. 40-50 % OF THE O-RINGS IN A PACKAGE OF AS-568A-018 TEFLON O-RINGS (MSC PART# 31955313).
 5. WE TESTED THE O-RINGS ON A GO/NO-GO TESTER. O-RINGS WERE ACCEPTED IF THE MOVED FREELY OVER A Ø0.741 OD TUBE.
 6. IF THE ID OF THE O-RINGS IS TOO SMALL, THE HANDEL WILL SEIZE WHEN USED UNDER LIQUID NITROGEN WHEN THE TEFLON CONTRACTS AGAINST THE WALLS OF THE STAINLESS STEEL TUBE.
 7. WE MADE OUR TESTER FROM A SHORT PIECE OF 3/4" STAINLESS STEEL TUBING WHICH HAD BEEN TURNED DOWN. MOST OF THE TUBE WAS TURNED DOWN TO Ø0.741 WITH ONE END TAPERING DOWN TO Ø 0.735. THE OTHER END WAS LEFT FULL SIZE. THIS ALLOWED US TO QUICKLY TEST O-RINGS. IF THEY MOVED EASILY ACROSS THE Ø0.741 SECTION, THEY COULD BE RETAINED ON THE TUBE BY THE FULL DIAMETER SECTION. ONES THAT DID NOT MOVE FREELY OVER THE Ø 0.741 SECTION WERE PLACED IN A SEPARATE BIN.
 8. ASSEMBLY: SEE SHEET 14



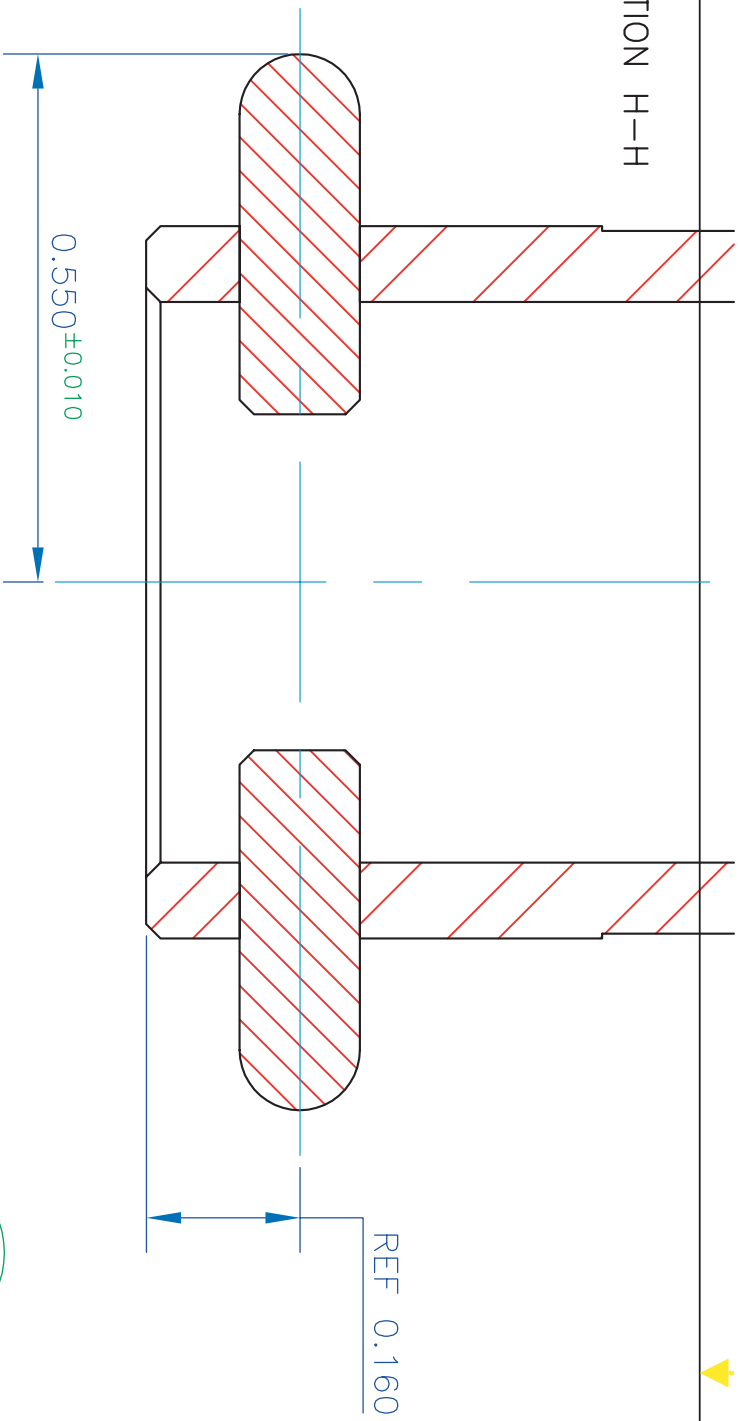
SECTION G-G



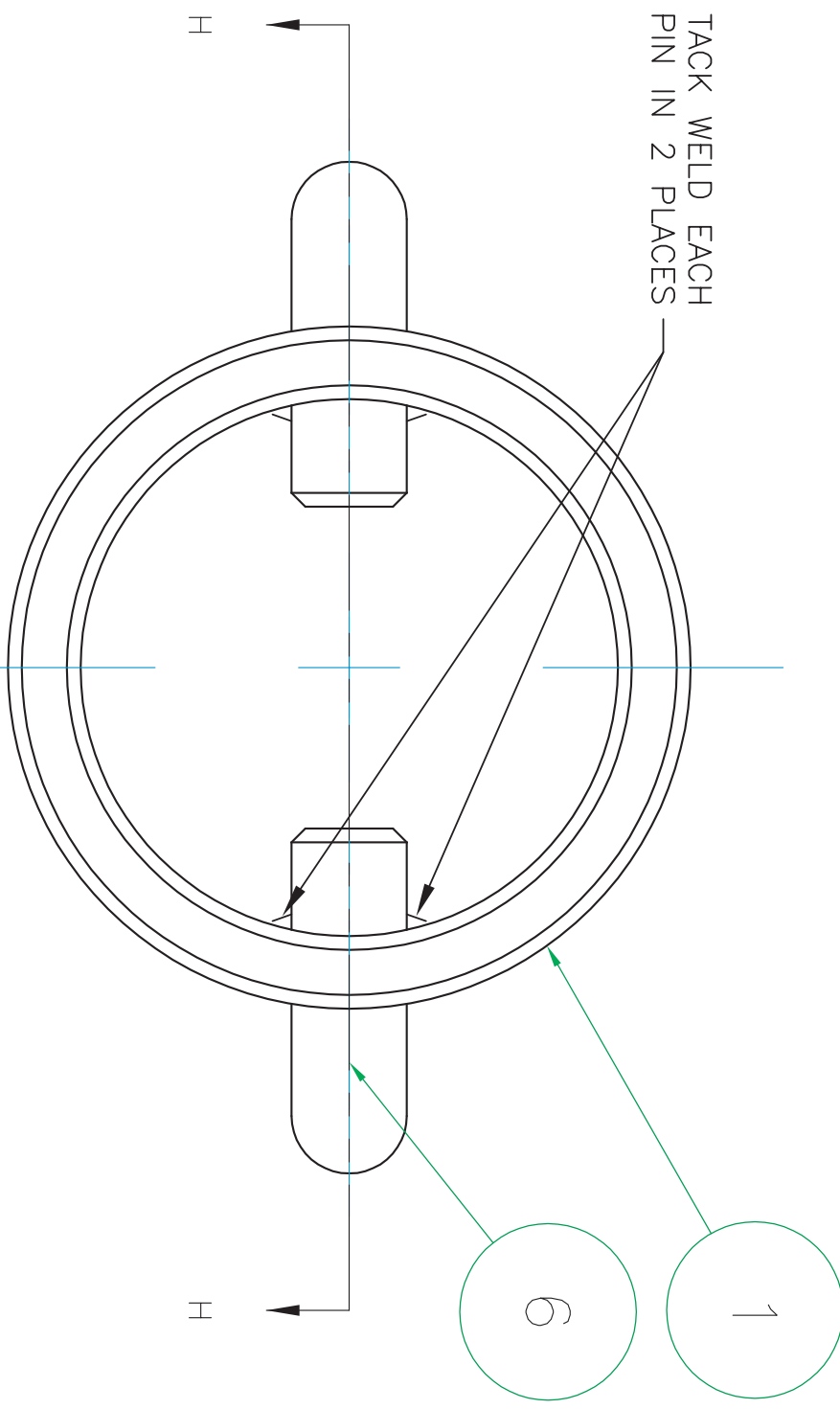
- DD NDT SCALE -
 IF IN DOUBT, ASK
 UNLESS OTHERWISE SPECIFIED,
 ALL DIMENSIONS ARE IN INCHES
 ±0.005
 .XXX
 XX

FILE NAME	Transfer-Handle-RevB.dwg		
CONTRACT NO	-		
DRAWN	07.30.2003	Mitch	Miller
CHECK			
APPR.			
ISSUED			
SIZE	FSCM	NO	DWG NO
AM_B	-		-
SCALE	5:1		WEIGHT
JCSG / SMB / SSR L / SLAIC			
CASSETTE TRANSFER HANDLE			
TEFLON O-RING -018			
SHEET	10	OF	14
REV			B

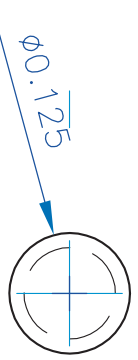
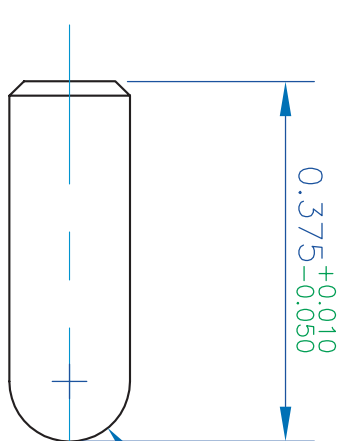
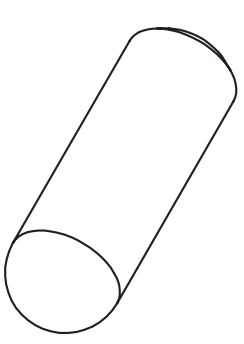
SECTION H-H




TACK WELD EACH PIN IN 2 PLACES



- Notes:
1. RAW MATERIAL - STAINLESS STEEL GROUND DOWEL, $\phi 1/8 \times 3/8$
 2. ONE END IS TO BE TURNED SPHERICAL
 3. ASSEMBLY: PRESS INTO HOLES IN STAINLESS STEEL TUBE AND TACK WELD AS SHOWN ON LEFT.



 THIRD ANGLE
 - DD NOT SCALE -
 - IF IN DOUBT, ASK -
 UNLESS OTHERWISE SPECIFIED,
 ALL DIMENSIONS ARE IN INCHES
 ±0.005
 .XXX
 XX

FILE NAME *Transfer-Handle-RevB.dwg*
 CONTRACT NO -
 DRAWN 07.30.2003 Mitch Miller
 CHECK
 APPR.
 ISSUED

JCSG / SMB / SSR/L / SLA/C
 CASSETTE TRANSFER HANDLE
 MODIFIED 1/8 DOWEL PIN

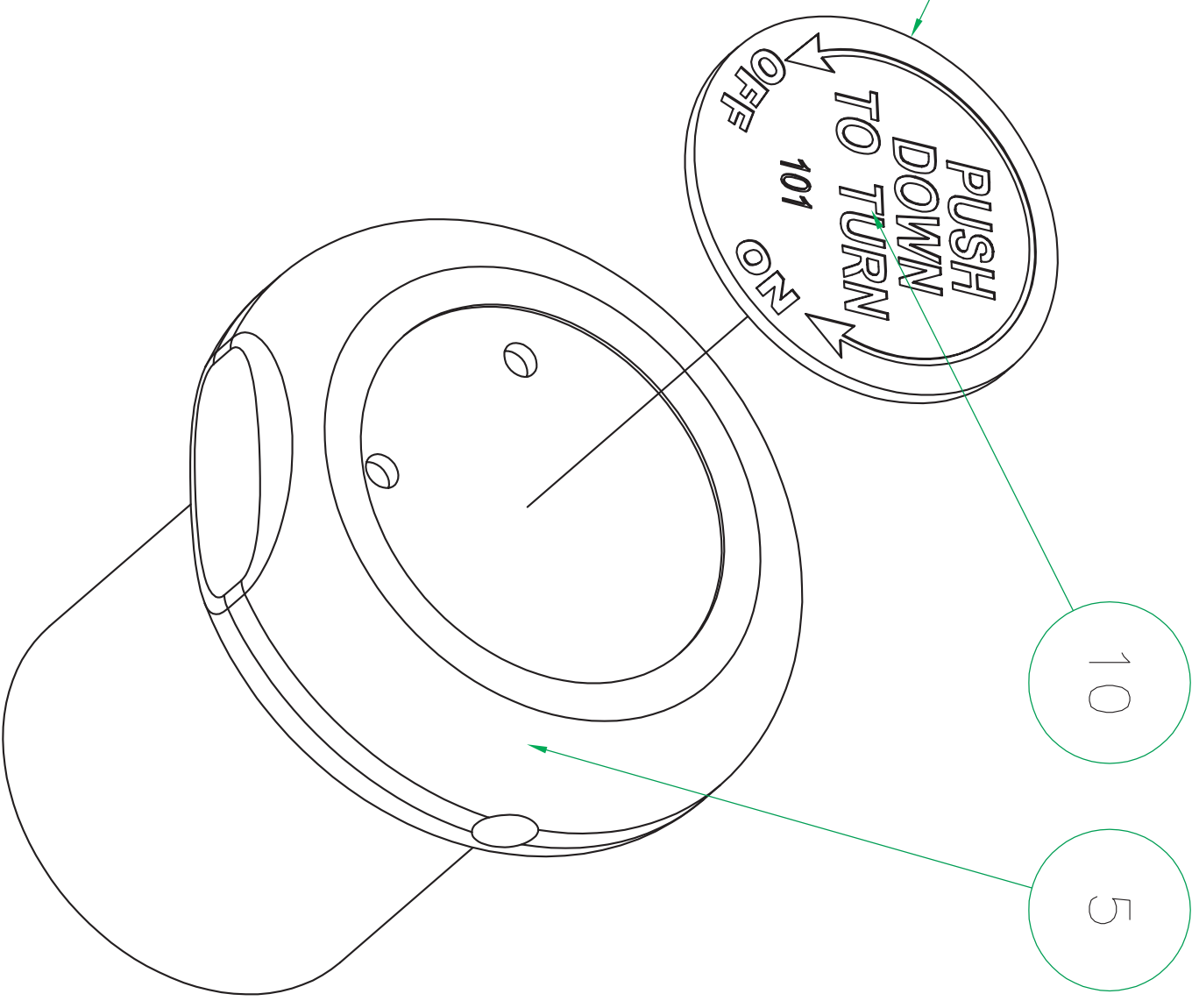
SIZE	FSCM NO	DWG NO	REV
B	-	-	B

SCALE 5:1 SHEET 11 OF 14

ASSEMBLY NOTES:
ASSEMBLY OF THE ENGRAVED LABEL INTO THE TEFLON HANDLE IS AS FOLLOWS:

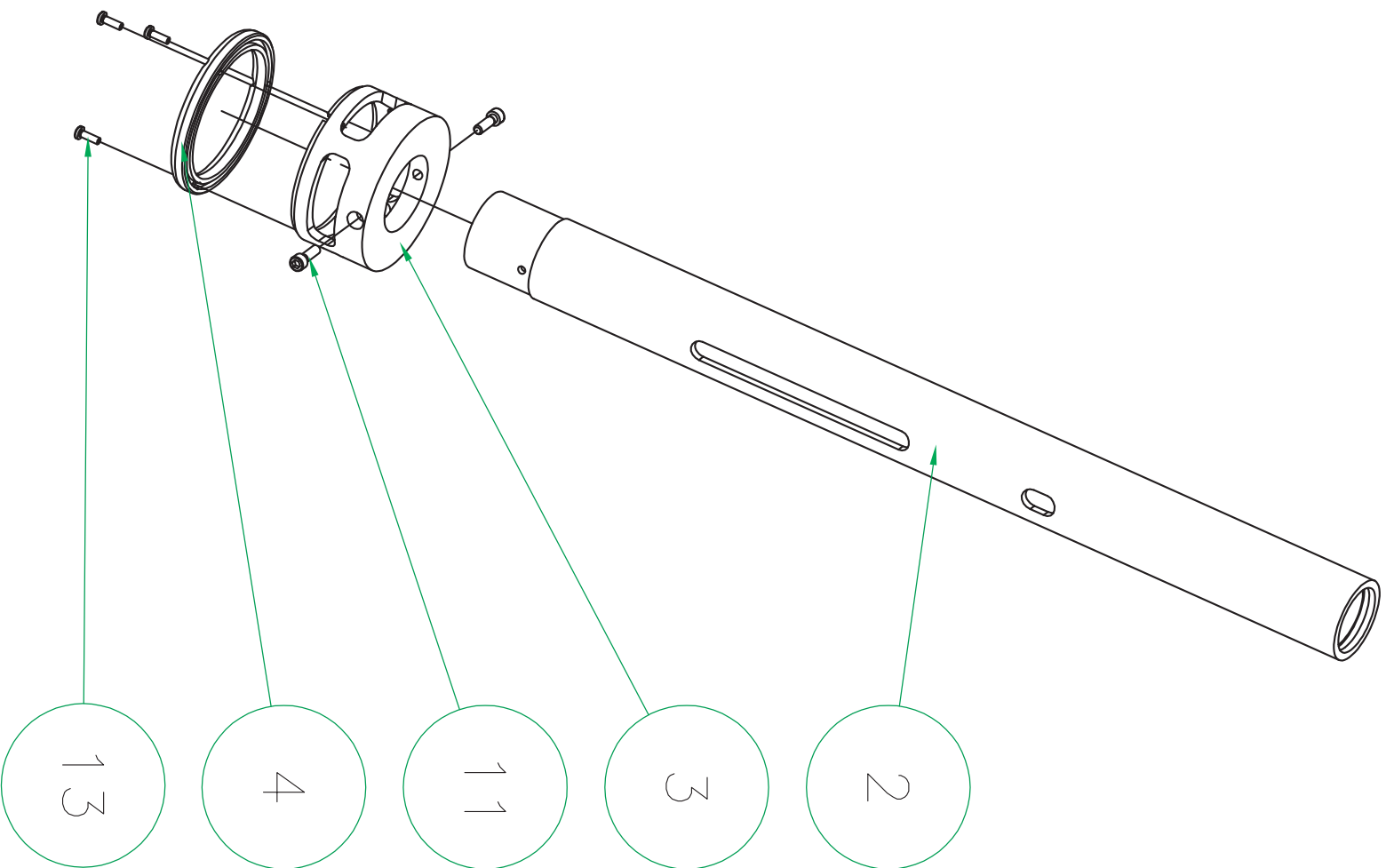
1. THE ENGRAVED LABEL (10) IS TO BE EMBEDDED INTO THE TOP OF THE TEFLON HANDLE (5) WITH LOCTITE HYSOL E-30CL ADHESIVE (50 ML CARTRIDGE IS LOCTITE #29329). THIS EPOXY BASED ADHESIVE HAS A 30 MINUTE POT LIFE.
2. AIR MUST BE PURGED FROM MIXING NOZZLE BEFORE BEGINNING ASSEMBLY. CARE MUST BE USED WHEN APPLYING THE EPOXY TO MINIMIZE THE INTRODUCTION OF AIR BUBBLES.
3. FIRST APPLY A SMALL AMOUNT OF ADHESIVE INTO THE TOP OF THE TEFLON HANDLE (5). THIS IS TO FILL THE BLIND HOLES AND UNDER THE LIP OF THE DOVETAIL.
4. NEXT PRESS THE ENGRAVED LABEL INTO RECESS IN THE TEFLON HANDLE. WORK AROUND SLIGHTLY TO ALLOW EPOXY TO COME UP OVER THE EDGES OF THE LABEL AND FILL DOVETAIL.
5. THE INSERT IS TO BE LEFT CLOSE TO CENTERED IN THE RECESSED OPENING WITH THE ENGRAVED LABEL ROTATED SUCH THAT FLAT IN THE HANDLE IS BELOW THE TEXT AND THE #40-40 CLEARANCE HOLES IN THE TEFLON HANDLE ARE PERPENDICULAR TO THE TEXT DIRECTION FROM ABOVE AND PARALLEL TO THE TEXT DIRECTION TO THE RIGHT AND THE BLIND HOLES TO THE BOTTOM AND LEFT (AS SHOWN).
6. NOW FILL EPOXY OVER THE TOP OF THE LABEL UNTIL A SLIGHT POSITIVE MENISCUS IS FORMED. CARE SHOULD BE TAKEN TO AVOID THE INTRODUCTION OF AIR BUBBLES. A COUPLE (0-3) SMALL AIR BUBBLES MAY BE UNAVOIDABLE, BUT LARGE NUMBERS OR LARGE SIZE AIR BUBBLES ARE NOT ACCEPTABLE.
7. SET ASIDE TO CURE. NOTE THAT THE POT LIFE IS 30 MINUTES BUT IT TAKES OVER 24 HOURS FOR IT TO CURE. ALSO WE FOUND THAT THE SURFACE TAKES LONGER TO CURE FULLY. THE CLARITY OF THE SURFACE CAN BE DAMAGED BY FINGERPRINTS, OILS, OR PRESSURE FOR 3-7 DAYS. THE PARTS CAN BE HANDLED BEFORE THIS TIME WITH CARE NOT TO TOUCH THE EPOXY SURFACE. WE TYPICALLY MAKE AN EPOXY TEST PIECE TO DETERMINE WHEN THE PARTS HAVE CURED SUFFICIENTLY FOR HANDLING. CURING CAN BE ENHANCED IN LOW HUMIDITY ENVIRONMENTS AND AT ELEVATED TEMPERATURES (NOT TO EXCEED 176°F / 80°C).
8. MAKE SURE EPOXY IS CURED BEFORE COMPLETING ASSEMBLY STEPS SHOWN ON SHEET 14.
9. IF YOU HAVE ANY QUESTIONS ABOUT THE PROCESS, PLEASE ASK. WE CAN LOAN YOU A SAMPLE TO DEMONSTRATE THE FINISHED EPOXY EMBEDDING IF NECESSARY.

SEE NOTE 5.
ORIENTATION OF LABEL
TO HOLE PATTERN AND
FLAT SURFACE ON SIDE



FILE NAME	Transfer-Handle-RevB.dwg
CONTRACT NO	-
DRAWN	07.30.2003 Mitch Miller
CHECK	
APPR.	
ISSUED	

<i>JCSG / SMB / SSR/L / SLA/C</i>			
CASSETTE TRANSFER HANDLE			
EXPLODED VIEW - HANDLE LABEL			
SIZE	FSCM NO	DWG NO	REV
AM_B	-	-	B
SCALE	2:1	WEIGHT	SHEET 12 OF 14



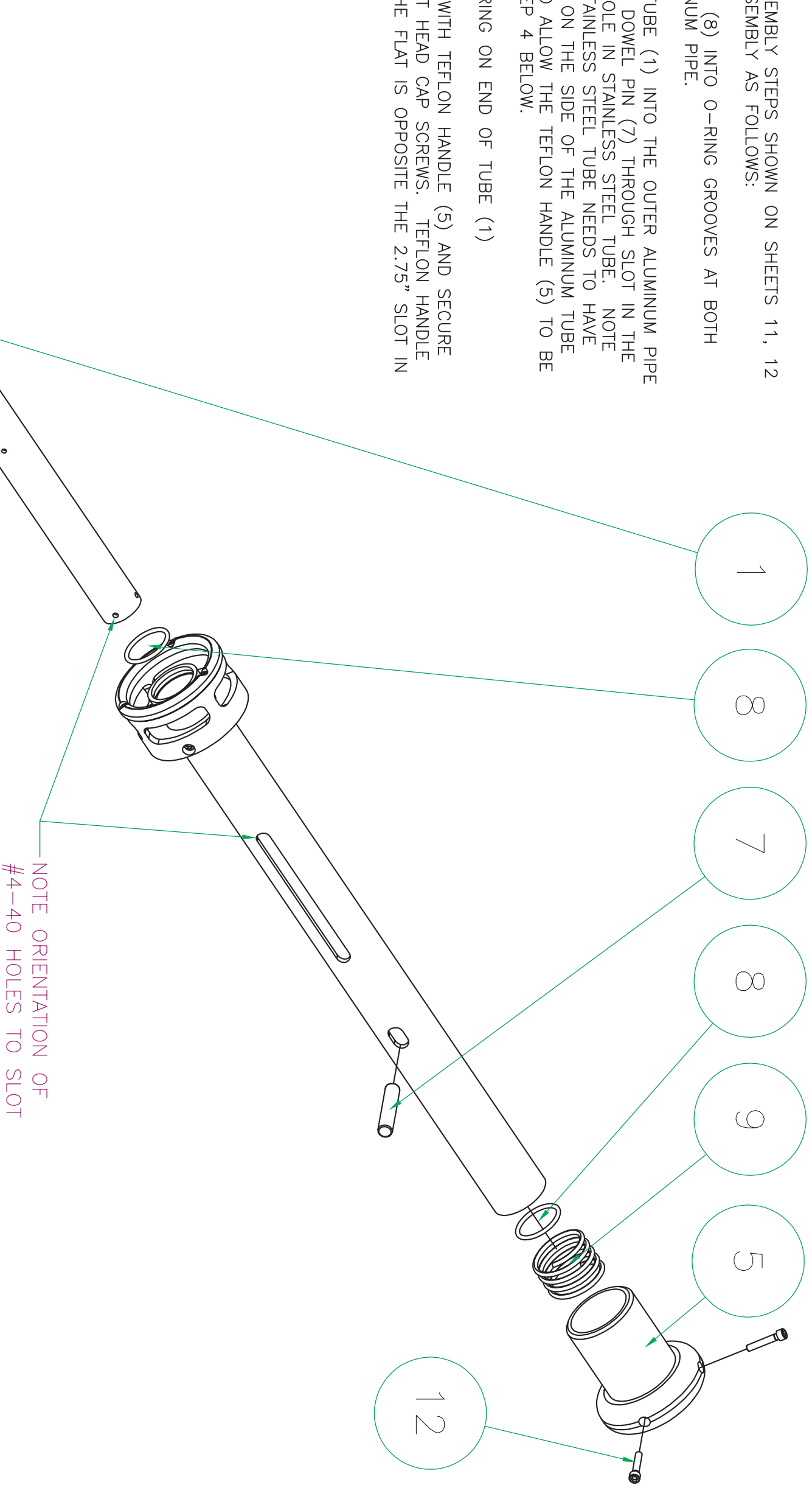
ASSEMBLY NOTES – OUTER TUBE:

1. PRESS TEFLON RING (4) ONTO BOTTOM CUP (3) AND ATTACH WITH #2-56 x 1/4" SLOTTED PAN HEAD MACHINE SCREW (13).
2. SLIDE BOTTOM CUP (3) ONTO OUTER ALUMINUM PIPE (2) AND ATTACH WITH #4-40 x 3/8" SOCKET HEAD CAP SCREWS (11).

FILE NAME		Transfer-Handle-RevB.dwg	
CONTRACT NO		-	
DRAWN		07.30.2003 Mitch Miller	
CHECK			
APPR.			
ISSUED			
<i>JCSG / SMB / SSR / SLAC</i>			
CASSETTE TRANSFER HANDLE EXPLODED VIEW - OUTER ASSEMBLY 1			
SIZE	FSCM NO	DWG NO	REV
B	-	-	B
SCALE	1:2	WEIGHT	SHEET 13 OF 14

ASSEMBLY NOTES:
 AFTER COMPLETING THE ASSEMBLY STEPS SHOWN ON SHEETS 11, 12 AND 13, COMPLETE THE ASSEMBLY AS FOLLOWS:

1. INSTALL TEFLON O-RINGS (8) INTO O-RING GROOVES AT BOTH ENDS OF THE OUTER ALUMINUM PIPE.
2. SLIDE INNER STAINLESS TUBE (1) INTO THE OUTER ALUMINUM PIPE AND PRESS 1/4" x 1 1/4" DOWEL PIN (7) THROUGH SLOT IN THE ALUMINUM PIPE AND INTO HOLE IN STAINLESS STEEL TUBE. NOTE THE ORIENTATION OF THE STAINLESS STEEL TUBE NEEDS TO HAVE ONE OF THE #4-40 HOLES ON THE SIDE OF THE ALUMINUM TUBE WITH THE SLOT. THIS IS TO ALLOW THE TEFLON HANDLE (5) TO BE ORIENTED CORRECTLY IN STEP 4 BELOW.
3. PLACE COMPRESSION SPRING (9) ON END OF TUBE (1)
4. COMPRESS SPRING (9) WITH TEFLON HANDLE (5) AND SECURE WITH #4-40 X 5/8" SOCKET HEAD CAP SCREWS. TEFLON HANDLE SHOULD BE ORIENTED SO THE FLAT IS OPPOSITE THE 2.75" SLOT IN THE ALUMINUM OUTER PIPE.



FILE NAME	Transfer-Handle-RevB.dwg	<i>JCSG / SMB / SSR L / SLAIC</i>	
CONTRACT NO	-		
DRAWN	07.30.2003 Mitch Miller	CASSETTE TRANSFER HANDLE	
CHECK		EXPLODED VIEW - ASSEMBLY 2	
APPR.		ISSUED	
SIZE	FSCM NO	DWG NO	REV
B	-	-	B
SCALE	1:2	WEIGHT	SHEET 14 OF 14