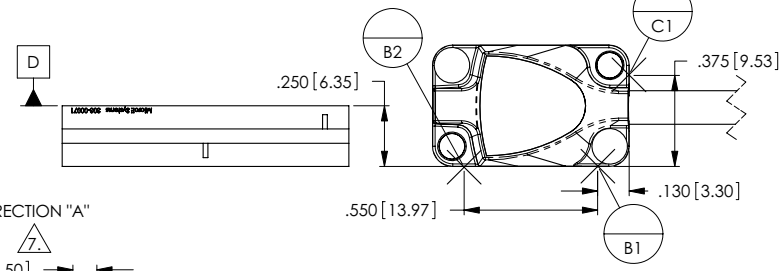
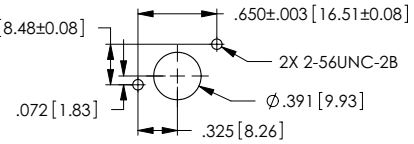
Mercury 2000, 3000 & 3500 Encoder System
Interface Drawing: Short Linear Scales

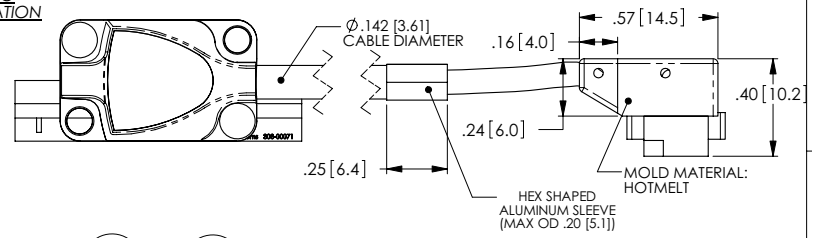
THESE DRAWINGS AND SPECIFICATIONS ARE THE PROPERTY OF MicroE Systems Corp.
AND SHALL NOT BE REPRODUCED OR COPIED OR USED AS THE BASIS FOR MANUFACTURE OR SALE OF
APPARATUS WITHOUT EXPRESS WRITTEN AUTHORIZATION FROM MicroE Systems Corp.

REVISIONS				
LTR	ECO	DESCRIPTION	DATE	APPROVED
A	879	RELEASE TO PRODUCTION	6/6/02	MF
B	900	UPDATED CABLE LENGTH, ADDED TABLE 2.	6/27/02	MF
C	946	UPDATED NOTE 1, ADDED MAX. TORQUE NOTE	8/14/02	MF
D	960	ADDED M3500, SNOUT DIMS TO REF., SCALE THK REF. .037	9/24/02	MF
E	979	UPDATED PIN 3 (COS+) WAS GND. SEE ECO.	11/19/02	MF
F	1426	MODEL UPDATED WITH SHRUNKEN HYBRID. ADDED NOTE 8.	5/31/05	SB
G	1517	NOTE CHANGES, NOTE 2. SEE ECO	11/22/05	VB
H	1939	CHANGED CABLE CONNECTOR, ADDED HOTMELT. SEE ECO	11/30/07	MF

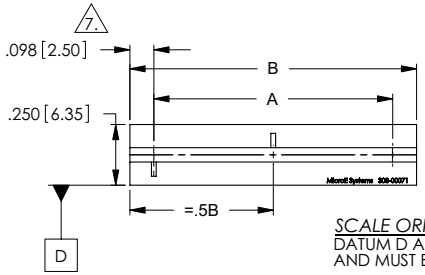


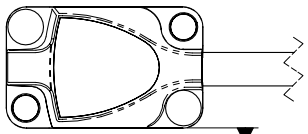


SENSOR MOUNTING PLATE RECOMMENDATION
SCALE: 1:1



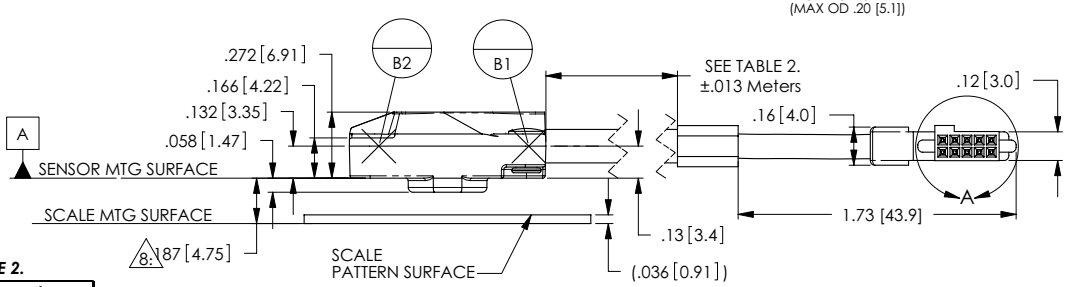
DIRECTION "A"





SCALE ORIENTED FOR CENTER INDEX
DATUM D AND DATUM B ARE COPLANER
AND MUST BE MAINTAINED WITHIN ±.005

SCALES SHOWN IN THESE VIEWS TRANSLATED IN X AXIS
OUT OF OPERATING RANGE FOR CLARITY



NOTE:
1. RECOMMENDED MOUNTING HARDWARE:
   2-56 OR M2 SCREWS w/ 4 FLAT WASHERS (2 ON EACH SCREW) (OD OF WASHER NOT TO EXCEED .150 [3.81]).
   MAX. TORQUE: 3.3 in. lbs
2. FOR APPLICATIONS USING THE SMARTPRECISION ELECTRONICS THIS CONNECTOR (FCI p/n 87012-605 or SAMTEC p/n SFM-105-03-S-D) IS INSIDE THE ENCLOSURE (see Interface drawings). ADDITIONAL STRAIN RELIEF MUST BE PROVIDED IF MICROE SUPPLIED ELECTRONICS IS NOT USED. RECOMMENDED MATING CONNECTOR: FCI p/n 87407-105/SAMTEC p/n TFM series OR EQUIVALENT.
3. IF BENCHING PINS ARE TO BE USED, PINS MUST BE PLACED ALONG DATUM EDGES OF BOTH THE SENSOR AND THE SCALE FOR PROPER ALIGNMENT. (REFERENCE DATUMS B1,B2 AND C1 FOR SENSOR BENCHING PINS)
4. HEIGHT OF SENSOR BENCHING PINS MUST BE A MINUMUM OF .170 [4.32] IN HEIGHT FROM DATUM A.
5. HEIGHT OF SCALE BENCHING PINS NOT TO EXCEED THE THICKNESS OF THE SCALE.
6. RECOMMENDED SENSOR MOUNTING PLATE THICKNESS:
   MINIMUM- 4 SCREW THREADS
   MAXIMUM- ALLOW CLEARANCE TO SCALE AND SCALE MOUNTING HARDWARE (BENCHING SURFACES, CLAMPS, HUBS, ETC.)

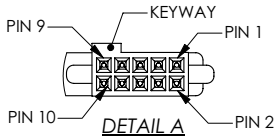
7. WHEN SCALE MOVES IN DIRECTION "A" WITH RESPECT TO A STATIONARY READHEAD, OUTPUT SIGNAL COS+/B+ (PIN 5/PIN 9) LEADS OUTPUT SIGNAL SIN+/A+ (PIN 1/PIN 5).

8. FOR SCALES ATTACHED WITH ADHESIVE TAPE (LXX-T), THE SCALE MOUNTING SURFACE MUST BE .006" FURTHER AWAY FROM SENSOR MOUNTING SURFACE FOR NOMINAL Z HEIGHT. DIM = .193[4.90]

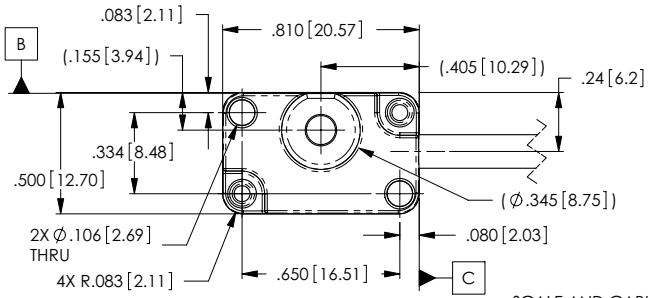
TABLE 2.

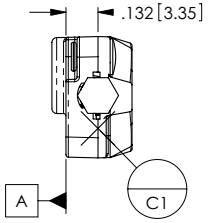
Cable Length	
(1500H)	(2000/3000/3500)
1 Meter	.5 Meter
2 Meter	1 Meter
5 Meter	2 Meter

SEE TABLE 1. FOR PINOUT FUNCTIONS (SEE NOTE 2)



DETAIL A
SCALE: 3:1





SCALE AND CABLE NOT SHOWN FOR CLARITY

SCALE IDENTIFICATION AND SIZE

Scale Identification #	Dim A. Measured Length	Dim B. Scale Length
LXX	XXmm-5mm	XXmm
L30	30mm-5mm = 25mm	30mm
(max) L130	130mm-5mm = 125mm	130mm

THESE ARE EXAMPLES

TABLE 1.

5x2, .050" PITCH HEADER		
PIN	Function (2000/3000/3500)	Function (1500H)
1	SIN+	SIN+
2	INDEX WINDOW-	INDEX WINDOW-
3	SIN-	COS+
4	GND	GND
5	COS+	A+
6	INDEX WINDOW+	INDEX WINDOW+
7	COS-	A-
8	+5V	+5V
9	N/C	B+
10	N/C	B-

UNLESS OTHERWISE SPECIFIED
ALL DIMENSIONS ARE IN INCHES [millimeters]
DIM. APPLY AFTER PROCESSING
INTERPRET ALL GEOMETRIC TOLS.
PER ANSI Y14.5M-1994

TOLERANCES ARE:
DECIMALS: .XX [.X] ±.01 [.25] .XXX [.XX] ±.005 [.13]
ANGULAR: ±30 MIN.

APPROVALS		DATE
DRAWN	S.BUTURLIA	4/18/01
CHECKED		
ENGRG.	DON GRIMES	6/5/02
MFG ENG	M.SKWIRA	6/6/02
QA	J.FARNAM	6/6/02

UNITS: .in [mm]

MicroE Systems
Division of GSI
8 Erie Drive
Natick, MA 01760

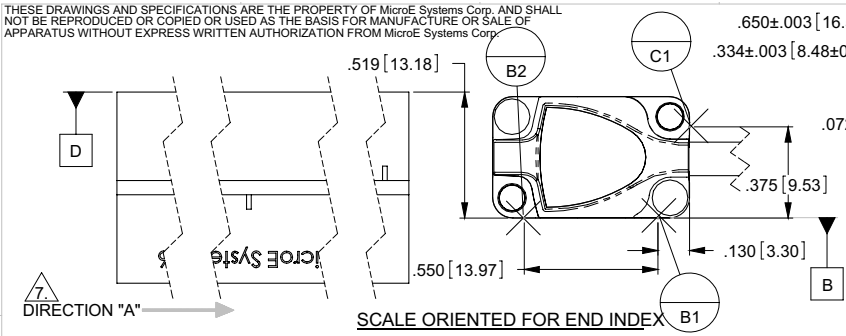
DESCRIPTION:
INTERFACE, ENCODER, 20um,
SHORT LINEAR, CABLE OUT, MERCURY
1500H/2000/3000/3500 SENSOR

SIZE B | DWG. NO. ID-00200 | REV. H
SCALE: 2:1 | CAD FILE: | 3rd ANGLE PROJECTION | SHEET 1 OF 1

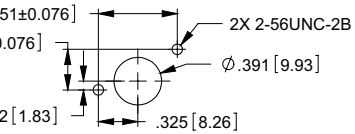
Mercury 2000, 3000 & 3500 Encoder System
Interface Drawing: Long Linear Scales

THESE DRAWINGS AND SPECIFICATIONS ARE THE PROPERTY OF MicroE Systems Corp. AND SHALL NOT BE REPRODUCED OR COPIED OR USED AS THE BASIS FOR MANUFACTURE OR SALE OF APPARATUS WITHOUT EXPRESS WRITTEN AUTHORIZATION FROM MicroE Systems Corp.

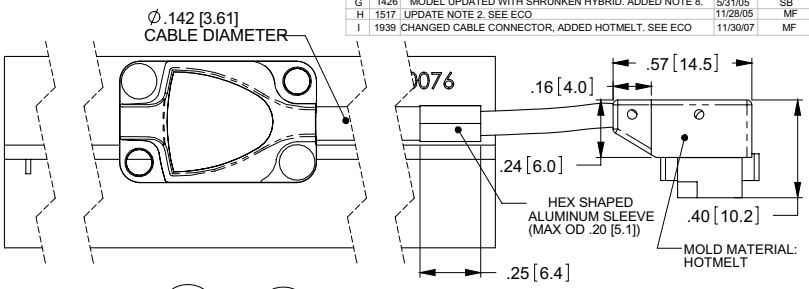
REVISIONS				
LTR	ECO	DESCRIPTION	DATE	APPROVED
A	879	RELEASE TO PRODUCTION	6/6/02	MF
B	900	UPDATED CABLE LENGTHS, ADDED TABLE 2.	6/27/02	MF
C	946	UPDATED NOTE 1., ADDED MAX. TORQUE NOTE	8/14/02	MF
D	960	ADDED M3500, SNOUT DIMS REFERENCE.	9/24/02	MF
E	979	UPDATED TABLE 1, PIN 3 (COS+) WAS GND	11/19/02	MF
F	1270	FIXED SCALE DIMENSIONS. REVERSED "A" AND "B". SEE ECO	4/13/04	MF
G	1426	MODEL UPDATED WITH SHRUNKEN HYBRID. ADDED NOTE 8.	5/31/05	SB
H	1517	UPDATE NOTE 2. SEE ECO	11/28/05	MF
I	1939	CHANGED CABLE CONNECTOR, ADDED HOTMELT. SEE ECO	11/30/07	MF

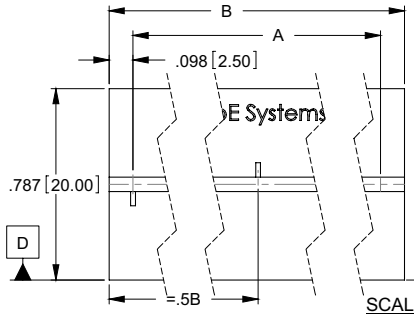


SCALE ORIENTED FOR END INDEX

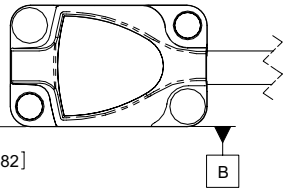


SENSOR MOUNTING PLATE RECOMMENDATION
SCALE: 1:1

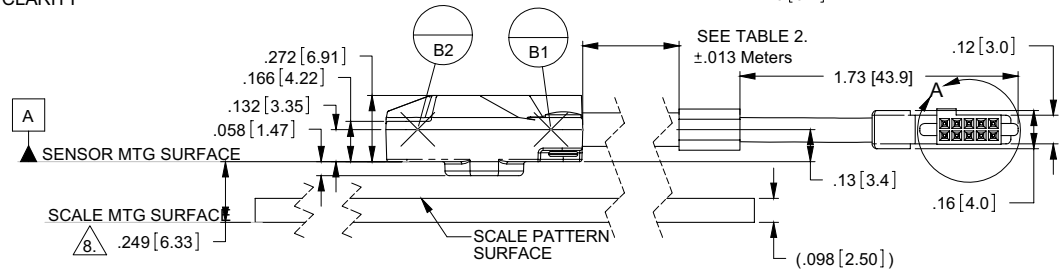




SCALES SHOWN IN THESE VIEWS TRANSLATED IN X AXIS OUT OF OPERATING RANGE FOR CLARITY



SCALE ORIENTED FOR CENTER INDEX



NOTES:

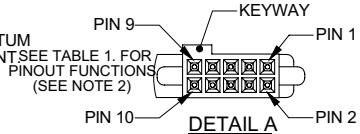
1. RECOMMENDED MOUNTING HARDWARE: 2-56 OR M2 SCREWS w/ 4 FLAT WASHERS (2 ON EACH SCREW) (OD OF WASHER NOT TO EXCEED .150 [3.81]). MAX. TORQUE: 3.3 in. lbs
2. FOR APPLICATIONS USING THE SMARTPRECISION ELECTRONICS THIS CONNECTOR (FCI p/n 87012-605 or SAMTEC p/n SFM-105-03-S-D) IS INSIDE THE ENCLOSURE (see Interface drawings). ADDITIONAL STRAIN RELIEF MUST BE PROVIDED IF MICROE SUPPLIED ELECTRONICS IS NOT USED. RECOMMENDED MATING CONNECTOR: FCI p/n 87407-105/SAMTEC p/n TFM SERIES OR EQUIVALENT.
3. IF BENCHING PINS ARE TO BE USED, PINS MUST BE PLACED ALONG DATUM EDGES OF BOTH THE SENSOR AND THE SCALE FOR PROPER ALIGNMENT. (REFERENCE DATUMS B1, B2 AND C1 FOR SENSOR BENCHING PINS)
4. HEIGHT OF SENSOR BENCHING PINS MUST BE A MINIMUM OF .170 [4.32] IN HEIGHT FROM DATUM A.
5. HEIGHT OF SCALE BENCHING PINS NOT TO EXCEED THE THICKNESS OF THE SCALE.
6. RECOMMENDED SENSOR MOUNTING PLATE THICKNESS: MINIMUM- 4 SCREW THREADS MAXIMUM- ALLOW CLEARANCE TO SCALE AND SCALE MOUNTING HARDWARE (BENCHING SURFACES, CLAMPS, HUBS, ETC.)

7. WHEN SCALE MOVES IN DIRECTION "A" WITH RESPECT TO A STATIONARY READHEAD, OUTPUT SIGNAL COS+/B+ (PIN 5/PIN 9) LEADS OUTPUT SIGNAL SIN+/A+ (PIN 1/PIN 5).

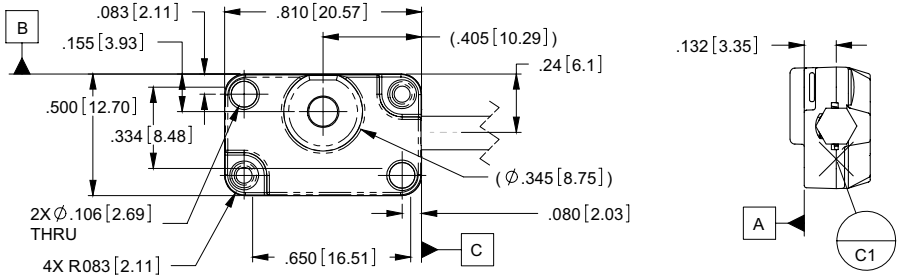
8. FOR SCALES ATTACHED W/ADHESIVE TAPE (LXX-T), THE SCALE MOUNTING SURFACE MUST BE .006" FURTHER AWAY FROM SENSOR MOUNTING SURFACE FOR NOMINAL Z HEIGHT. DIM = .255[6.48]

TABLE 2.

Cable Length	
(1500H)	(2000/3000/3500)
1 Meter	.5 Meter
2 Meter	1 Meter
5 Meter	2 Meter



DETAIL A
SCALE: 3:1



SCALE AND CABLE NOT SHOWN FOR CLARITY

TABLE 1.

5x2, .050" PITCH HEADER		
PIN	Function	Function
	(2000/3000/3500)	(1500H)
1	SIN+	SIN+
2	INDEX WINDOW-	INDEX WINDOW-
3	SIN-	COS+
4	GND	GND
5	COS+	A+
6	INDEX WINDOW+	INDEX WINDOW+
7	COS-	A-
8	+5V	+5V
9	N/C	B+
10	N/C	B-

SCALE IDENTIFICATION AND SIZE

Scale Identification #	Dim A. Measured Length	Dim B. Scale Length
LXX	XXmm-5mm	XXmm
L155	155mm-5mm = 150mm	155mm
(max) L2025	2025mm-5mm = 2020mm	2025mm

THESE ARE EXAMPLES

UNLESS OTHERWISE SPECIFIED
ALL DIMENSIONS ARE IN INCHES [millimeters]
DIM. APPLY AFTER PROCESSING
INTERPRET ALL GEOMETRIC TOLS.
PER ANSI Y14.5M-1994

TOLERANCES ARE:
DECIMALS: .XX [.X] ±.01 [.25] .XXX .XX± .005 [.13]
ANGULAR: ±30 MIN.

APPROVALS		DATE
DRAWN	S.BUTURLIA	4/18/01
CHECKED		
ENGRG.	DON GRIMES	6/5/02
MFG ENG	M.SKWIRA	6/6/02
QA	J.FARNAM	6/6/02

UNITS: .in [mm]

MicroE Systems
Division of GSI
8 Erie Drive
Natick, MA 01760

DESCRIPTION:
INTERFACE, ENCODER, 20um, LONG LINEAR, CABLE OUT, MERCURY 1500H/2000/3000/3500 SENSOR

SIZE B | DWG. NO. ID-00201 | REV. I

SCALE: 2:1 | CAD FILE: | 3rd ANGLE PROJECTION | SHEET 1 OF 1

Mercury 2000, 3000 & 3500 Encoder System
Interface Drawing: Rotary Scales with Hub

THESE DRAWINGS AND SPECIFICATIONS ARE THE PROPERTY OF MicroE Systems Corp. AND SHALL NOT BE REPRODUCED OR COPIED OR USED AS THE BASIS FOR MANUFACTURE OR SALE OF APPARATUS WITHOUT EXPRESS WRITTEN AUTHORIZATION FROM MicroE Systems Corp.

NOTE:

1. RECOMMENDED MOUNTING HARDWARE:
   2-56 OR M2 SCREWS w/ 4 FLAT WASHER (2 ON EACH SCREW)
   (OD OF WASHERS NOT TO EXCEED .150 [3.81]).
   MAX TORQUE: 3.3 in. lbs
2. FOR APPLICATIONS USING THE SMARTPRECISION ELECTRONICS THIS CONNECTOR (FCI p/n 87012-605 or SAMTEC p/n SFM-105-03-S-D) IS INSIDE THE ENCLOSURE (see Interface drawings). ADDITIONAL STRAIN RELIEF MUST BE PROVIDED IF MICROE SUPPLIED ELECTRONICS IS NOT USED. RECOMMENDED MATING CONNECTOR: FCI p/n 87407-105/SAMTEC p/n TFM SERIES OR EQUIVALENT.
3. IF BENCHING PINS ARE TO BE USED, PINS MUST BE PLACED ALONG DATUM EDGES OF SENSOR FOR PROPER ALIGNMENT. (REFERENCE DATUMS B1, B2 AND C1).
4. HEIGHT OF SENSOR BENCHING PINS MUST BE A MINUMUM OF .170 [4.32] IN HEIGHT FROM DATUM A.
5. RECOMMENDED SENSOR MOUNTING PLATE THICKNESS:
   MINIMUM- 4 SCREW THREADS
   MAXIMUM- ALLOW CLEARANCE TO SCALE AND SCALE MOUNTING HARDWARE (BENCHING SURFACES, CLAMPS, HUBS, ETC.)

6. WHEN SCALE MOVES IN DIRECTION "A" WITH RESPECT TO A STATIONARY READHEAD, OUTPUT SIGNAL COS+/B+ (PIN 5/PIN 9) LEADS OUTPUT SIGNAL SIN+/A+ (PIN 1/PIN 5).

REVISIONS				
LTR	ECO	DESCRIPTION	DATE	APPROVED
A	879	RELEASE TO PRODUCTION	6/6/02	MF
B	900	UPDATED CABLE LENGTHS, ADDED TABLE 2.	6/27/02	MF
C	945	ADDED MAX TORQUE SPEC. TO NOTES	8/9/02	MF
D	954	CORRECTED DIMS IN TABLE (Dim D), mm CONVERSION INCORRECT	8/29/02	MF
E	960	ADDED M3500, ADDED R1206 TO TABLE, SNOUT DIMS REF.	9/24/02	MF
F	979	UPDATED TABLE 1, PIN 3 (COS+) WAS GND, SEE ECO	11/19/02	MF
G	1124	UPDATED SCALE TABLE, ADDED HUB ID., HEIGHT TO R1206, DIM L.	6/23/03	MF
H	1159	UPDATED SCALE THICKNESS TOLERANCE, WAS ±.008 [.090"], SEE ECO	3/8/04	MF
I	1357	ADDED DIMENSION IN ZONE D4, .405±.003[10.29±0.08]	9/16/04	SB
J	1517	UPDATED NOTE 2 SEE ECO	11/23/05	MF
K	1939	CHANGED CABLE CONNECTOR, ADDED HOTMELT. SEE ECO	11/30/07	MF

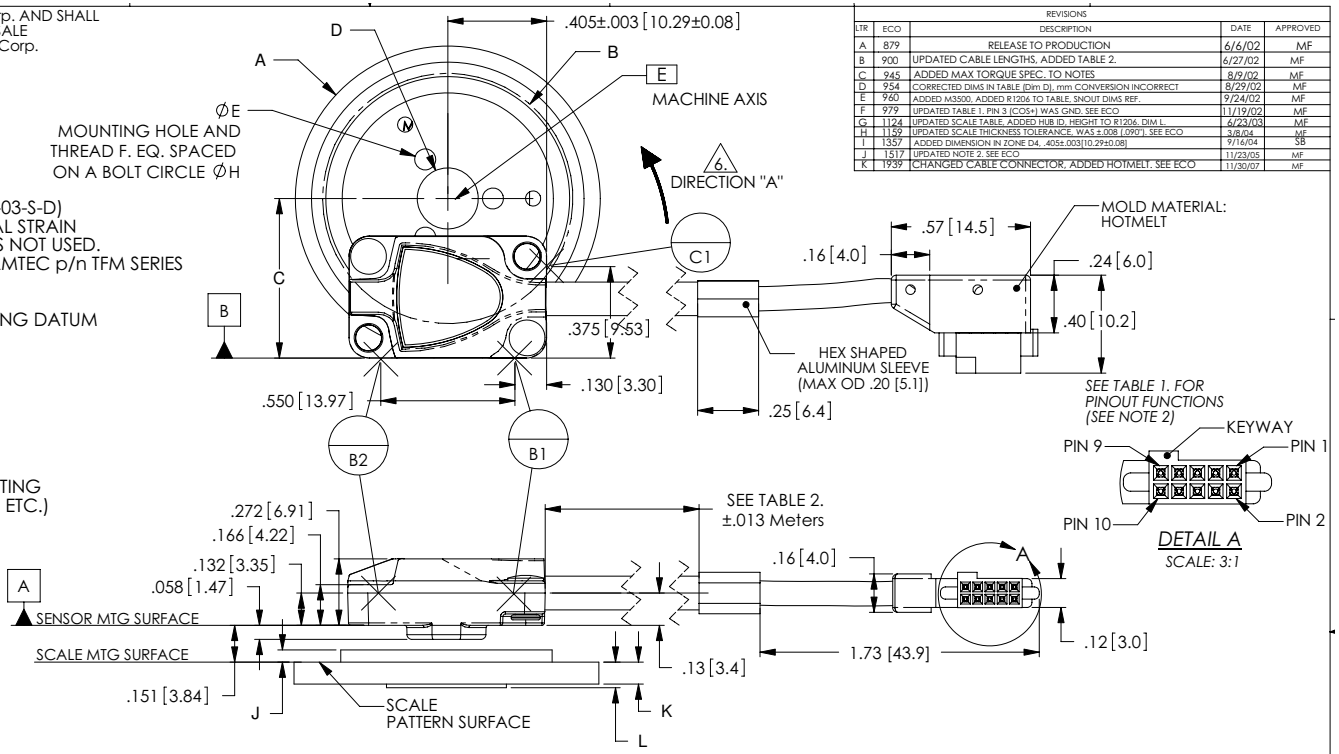
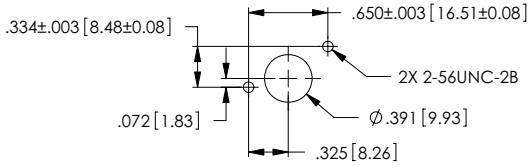
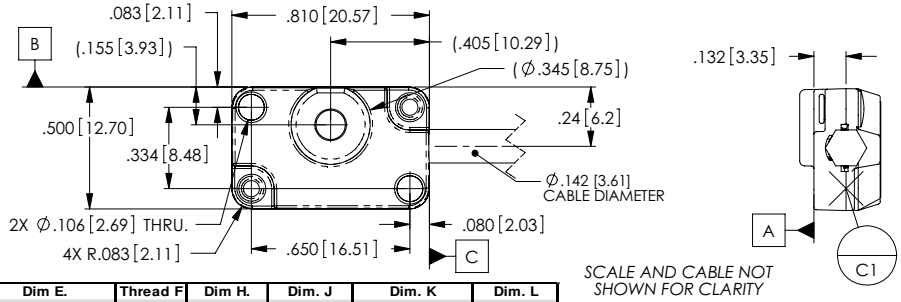


TABLE 2.

Cable Length	
(1500H)	(2000/3000/3500)
1 Meter	.5 Meter
2 Meter	1 Meter
5 Meter	2 Meter



SENSOR MOUNTING PLATE RECOMMENDATION
SCALE: 1:1



SCALE AND CABLE NOT SHOWN FOR CLARITY

TABLE 1.

5x2, .050" PITCH HEADER		
PIN	Function (2000/3000/3500)	Function (1500H)
1	SIN+	SIN+
2	INDEX WINDOW-	INDEX WINDOW-
3	SIN-	COS+
4	GND	GND
5	COS+	A+
6	INDEX WINDOW+	INDEX WINDOW+
7	COS-	A-
8	+5V	+5V
9	N/C	B+
10	N/C	B-

SCALE IDENTIFICATION AND SIZE. DIMENSIONS IN INCHES [MILLIMETERS]

Scale Identification	Counts/ Rev	Dim. A Scale O.D.	Scale I.D.	Dim. B Optical Dia.	Dim. C Mounting Dim.	Dim D. Hub I.D.	Dim E. Mounting Hole Dia.	Thread F	Dim H. Bolt Circle	Dim. J Hub Height	Dim. K Scale Thickness	Dim. L Hub Relief
R1206	1,650	0.472	.250+/-.005	0.413	0.348+/-.002	0.1253+.0005/-.0000	N/A	N/A	N/A	0.040	.036+/-.002	0.045
		[12.00]	[6.35+/-.13]	[10.50]	[8.84+/-.05]	[3.182+.013/-.000]				[1.02]	[.91+/-.05]	[1.14]
R1910	2,500	0.750	.375+/-.005	0.627	0.454+/-.002	0.1253+.0005/-.0000	0.047		0.250	0.040	.090+/-.004	0.105
		[19.05]	[9.53+/-0.13]	[15.92]	[11.53+/-.05]	[3.182+.013/-.000]	[1.19]	0-80	[6.35]	[1.02]	[2.29+/-.10]	[2.67]
R3213	4,096	1.250	.500+/-.005	1.027	0.654+/-.002	0.2503+.0005/-.0000	0.070		0.370	0.050	.090+/-.004	0.105
		[31.75]	[12.70+/-0.13]	[26.08]	[16.62+/-.05]	[6.357+.013/-.000]	[1.78]	2-56	[9.40]	[1.27]	[2.29+/-.10]	[2.67]
R5725	8,192	2.250	1.000+/-.005	2.053	1.168+/-.002	0.5003+.0005/-.0000	0.136		0.750	0.060	.090+/-.004	0.105
		[57.15]	[25.40+/-0.13]	[52.15]	[29.66+/-.05]	[12.707+.013/-.000]	[3.45]	8-32	[19.05]	[1.52]	[2.29+/-.10]	[2.67]
R10851	16,384	4.250	2.000+/-.005	4.106	2.194+/-.002	1.0003+.0005/-.0000	0.136		1.375	0.080	.090+/-.004	0.105
		[107.95]	[50.80+/-0.13]	[104.30]	[55.73+/-.05]	[25.408+.013/-.000]	[3.45]	8-32	[34.93]	[2.03]	[2.29+/-.10]	[2.67]

UNITS: .in [mm]

UNLESS OTHERWISE SPECIFIED
ALL DIMENSIONS ARE IN INCHES [millimeters]
DIM. APPLY AFTER PROCESSING
INTERPRET ALL GEOMETRIC TOLS. PER ANSI Y14.5M-1994

TOLERANCES ARE:
DECIMALS: .XX [.X] ±.01 [.25], .XXX [.XX] ±.005 [.13]
ANGULAR: ±30 MIN.

APPROVALS		DATE
DRAWN	S.BUTURLIA	4/20/01
CHECKED		
ENGRG.	DON GRIMES	6/5/02
MFG.ENG	M.SKWIRA	6/6/02
QA	J.FARNAM	6/6/02

MicroE Systems
Division of GSI
8 Erie Drive
Natick, MA 01760

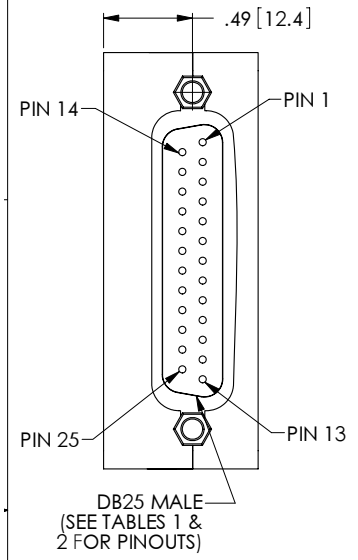
DESCRIPTION:
INTERFACE, ENCODER, 20um, ROTARY w/HUB, CABLE OUT, MERCURY 1500H/2000/3000/3500 SENSOR

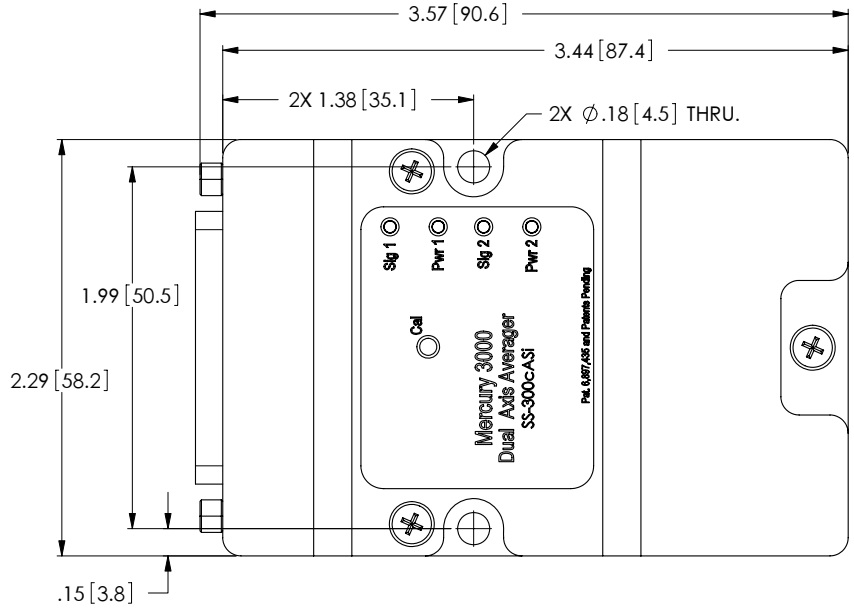
SIZE B | DWG. NO. ID-00202 | REV K
SCALE: 2:1 | CAD FILE: | SHEET 1 OF 1

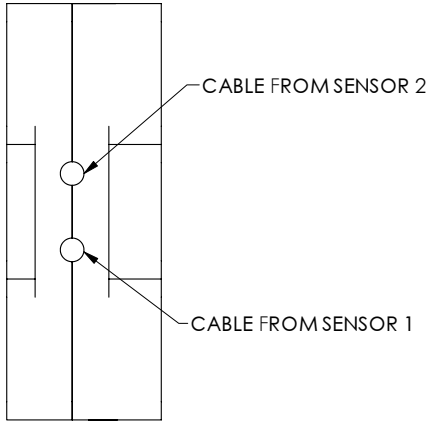
Mercury 3000 Dual Axis Averager
Interface Drawing: SmartPrecision Electronics Module (Interpolator)

THESE DRAWINGS AND SPECIFICATIONS ARE THE PROPERTY OF MicroE Systems Corp. AND SHALL NOT BE REPRODUCED OR COPIED OR USED AS THE BASIS FOR MANUFACTURE OR SALE OF APPARATUS WITHOUT EXPRESS WRITTEN AUTHORIZATION FROM MicroE Systems Corp.

REVISIONS				
LTR	ECO	DESCRIPTION	DATE	APP'D
S1		PRELIMINARY	3/29/04	
S2	1397	ADDED DIMENSIONS, NOTES, TABLES 1, 2 & 3 AND DETAILS FOR MOUNTING SCREWS AND THRU HOLES.	2/16/05	SB
A	1727	RELEASE TO PRODUCTION	11/13/06	SB
B	1847	COVER MODIFIED, CHANGED LENGTH OF JACKSCREWS, ADDED DIMENSIONS. LABEL RESIZED DUE TO COVER CHANGE.	4/3/08	VB







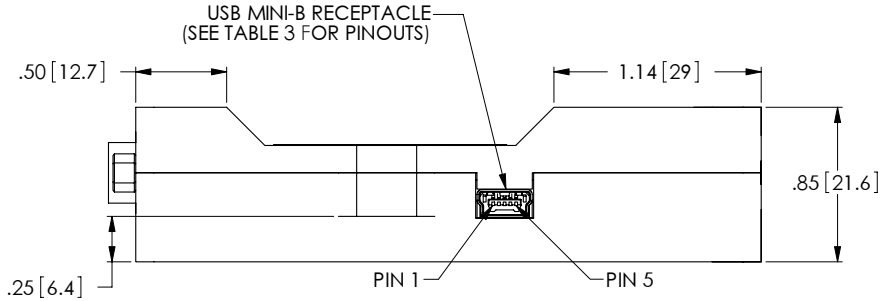


TABLE 1

SS-300cA DB25 PINOUTS			
1	A1+	14	A3-
2	A1-	15	B3+
3	B1+	16	B3-
4	B1-	17	I3+
5	I1+	18	I3-
6	I1-	19	N/C
7	A2+	20	N/C
8	A2-	21	TXD/D-
9	B2+	22	RXD/D+
10	B2-	23	ALARM
11	I2+	24	+5V
12	I2-	25	GND
13	A3+		

TABLE 2

SS-300cASi DB25 PINOUTS			
1	SD01+	14	SD03-
2	SD01-	15	CS3+
3	CS1+	16	CS3-
4	CS1-	17	SCLK3+
5	SCLK1+	18	SCLK3-
6	SCLK1-	19	FBCLK+
7	SD02+	20	FBCLK-
8	SD02-	21	TXD/D-
9	CS2+	22	RXD/D+
10	CS2-	23	ALARM
11	SCLK2+	24	+5V
12	SCLK2-	25	GND
13	SD03+		

TABLE 3

USB CONNECTOR PINOUTS			
1	VBUS	4	N/C
2	D-	5	GND
3	D+		

NOTES:

1. RECOMMENDED MOUNTING HARDWARE 8-32 UNC OR M4 SCREWS WITH FLAT WASHERS (OD OF WASHER NOT TO EXCEED .320[8.13])
2. THIS DRAWING APPLIES TO BOTH MODEL NUMBERS SS-300cA AND SS300-cASi.

UNLESS OTHERWISE SPECIFIED
ALL DIMENSIONS ARE IN INCHES[millimeters]
DIM. APPLY AFTER PROCESSING
INTERPRET ALL GEOMETRIC TOLS.
PER ANSI Y14.5M-1994

TOLERANCES ARE:
DECIMALS: .XX[.X] ±.01[.25] .XXX[.XX] ±.005[.13]
ANGULAR: ±30 MIN.

APPROVALS		DATE
DRAWN	PAUL DEVINE	1/19/04
CHECKED		
ENGRG.	CJ	11/13/06
MFG ENG	THOMAS GARCIA	11/13/06
QA	A. VILLARROEL	11/13/06

MicroE Systems
Division of GSI
8 Erie Drive
Natick, MA 01760

DESCRIPTION: INTERFACE, INTERPOLATOR, DUAL AXIS AVERAGER

SIZE B | DWG. NO. ID-00283 | REV. B
SCALE: 1.5 | CAD FILE: | THIRD ANGLE PROJECTION | SHEET 1 OF 1