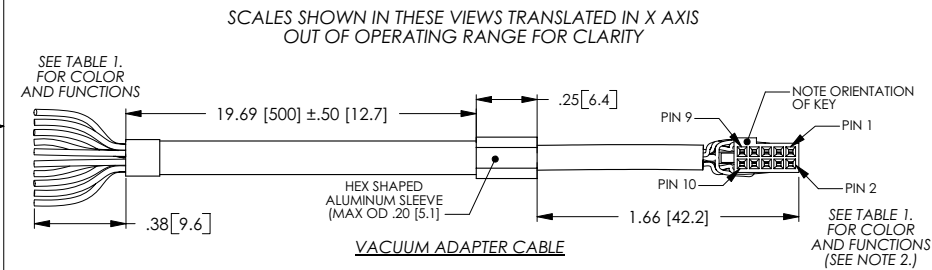
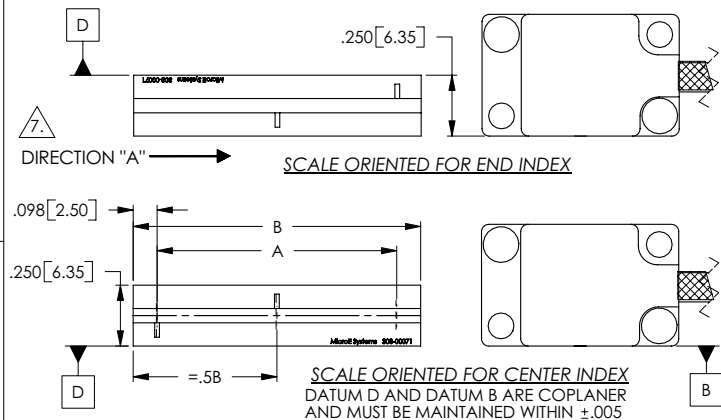


Mercury 2000V, 3000V Encoder System Interface Drawing: Short Linear Scales

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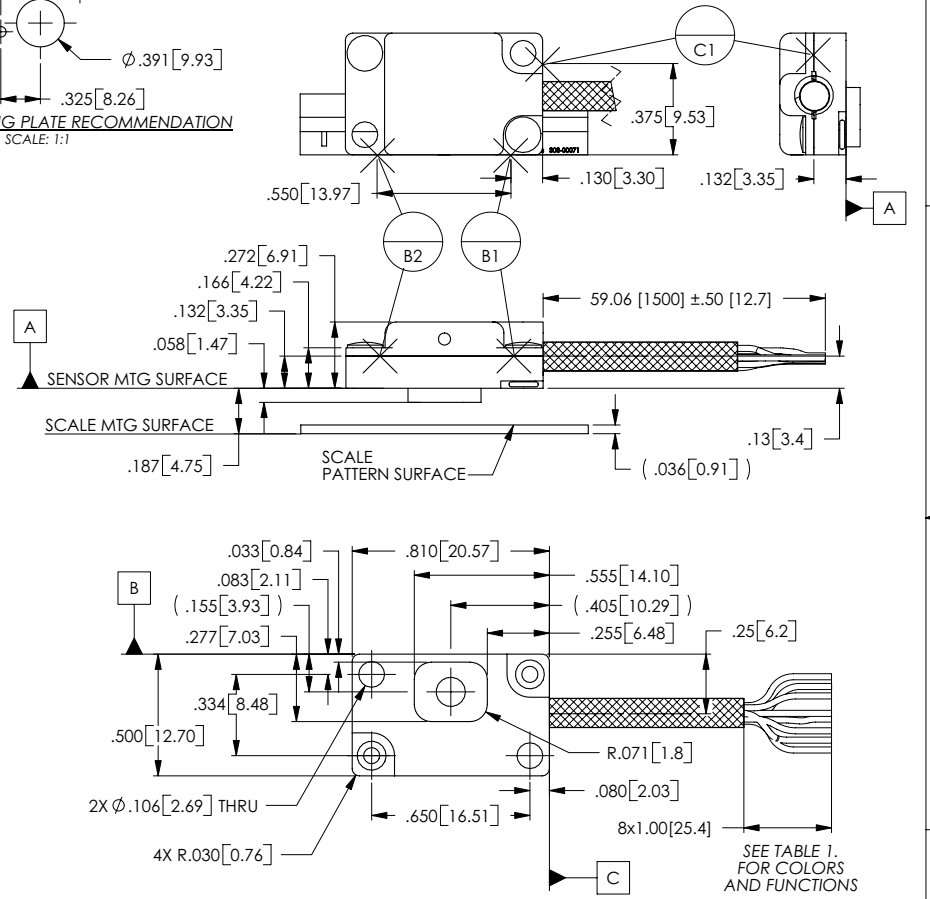
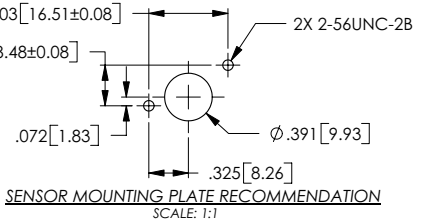


- NOTES:
- RECOMMENDED MOUNTING HARDWARE:
2-56 OR M2 SCREWS w/ 4 FLAT WASHERS (2 ON EACH SCREW)
(OD OF WASHER NOT TO EXCEED .150 [3.81])
 - THIS CONNECTOR (FCI p/n 87012-605) IS INSIDE THE SMARTPRECISION ELECTRONICS ENCLOSURE (see interface drawings).
 - IF BENCHING PINS ARE TO BE USED, PINS MUST BE PLACED ALONG DATUM EDGES OF BOTH THE SENSOR AND THE SCALE FOR PROPER ALIGNMENT. (REFERENCE DATUMS B1, B2 AND C1 FOR SENSOR BENCHING PINS).
 - HEIGHT OF SENSOR BENCHING PINS MUST BE A MINIMUM OF .170 [4.32] IN HEIGHT FROM DATUM A.
 - HEIGHT OF SCALE BENCHING PINS NOT TO EXCEED THE THICKNESS OF THE SCALE.

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



LT#	ECO	DESCRIPTION	DATE	APP'D
A		RELEASE TO PRODUCTION	7/8/02	MF
B	940	SNOUT DIMS REF. SCALE THK WAS .037. REF.	9/24/02	MF
C	1426	UPDATED MODEL WITH SHRUNKEN HYBRID, ADDED NOTE B.	5/31/05	SB
D	1492	REMOVED NOTE B.	10/5/05	SB
E	1517	UPDATED NOTE 2. SEE ECO	11/28/05	MF

TABLE 1.

Wire Color	Function	Pin
Yellow	SIN+	1
Green	SIN-	3
Brown	COS+	5
Orange	COS-	7
Blue	INDEX WINDOW -	2
Red	+5V	8
Violet	INDEX WINDOW +	6
Black	GND	4
Gray	N/C	9
White	N/C	10

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]
ANGULAR: .XXX [XX] ±.005 [13] ±30 MIN.

APPROVALS: DRAWN S.BUTURLIA, DATE 6/24/02, CHECKED, ENGRG. D.GRIMES, DATE 7/3/02, MFG ENG. G.ANGELOPOULOS, DATE 7/3/02, GA J.FARNAM, DATE 7/3/02

UNITS: .in [mm]

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

DESCRIPTION: INTERFACE, ENCODER, 200um, SHORT LINEAR, MERCURY 2000/3000 VACUUM SENSOR

SIZE: B DWG. NO.: ID-00237 REV. E

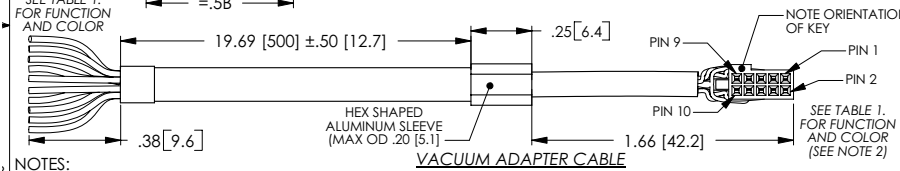
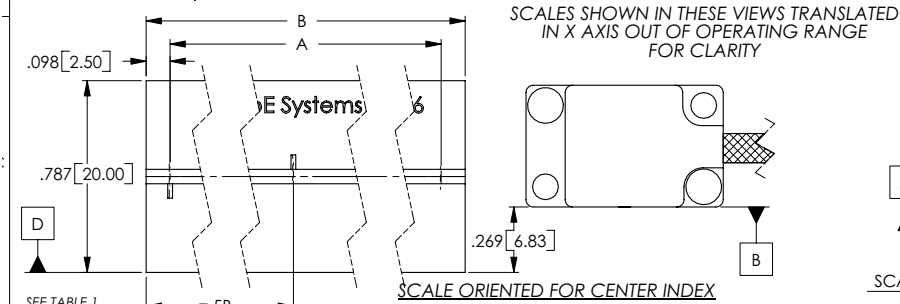
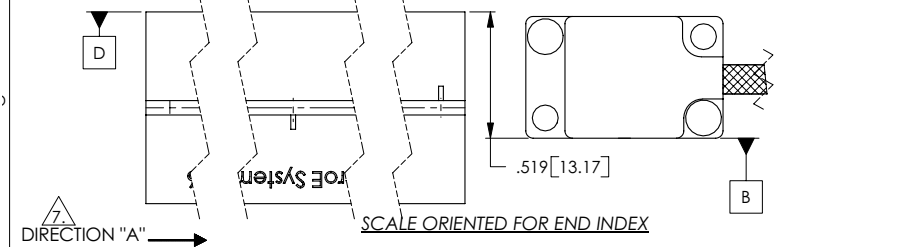
SCALE: 2:1 CAD FILE: SHEET 1 OF 1

7. WHEN SCALE MOVES IN DIRECTION "A" WITH RESPECT TO A STATIONARY READHEAD, OUTPUT SIGNAL COS+ (BROWN [PIN 5]) LEADS OUTPUT SIGNAL SIN+ (YELLOW [PIN 1]).

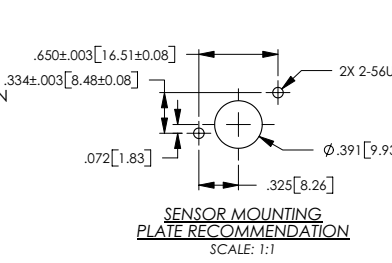
Mercury 2000V, 3000V Encoder System Interface Drawing: Long Linear Scales

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LT#	ECO	DESCRIPTION	DATE	APPD
A	---	RELEASE TO PRODUCTION	7/8/02	MF
B	960	SNOUT DIMS CHANGED TO REF.	9/24/02	MF
C	1426	MODEL UPDATED WITH SHRUNKEN HYBRID, ADDED NOTE B.	5/25/05	SB
D	1492	REMOVED NOTE B.	10/5/05	SB
E	1517	UPDATED NOTE 2. SEE ECO	11/23/05	MF



- NOTES:
- 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])
 - THIS CONNECTOR (FCI p/n 87012-605) IS INSIDE THE SMARTPRECISION ELECTRONICS ENCLOSURE (see interface drawings).
 - 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).
 - HEIGHT OF SENSOR BENCHING PINS MUST BE A MINIMUM OF .170 [4.32] IN HEIGHT FROM DATUM A.
 - HEIGHT OF SCALE BENCHING PINS NOT TO EXCEED THE THICKNESS OF THE SCALE.
 - RECOMMENDED SENSOR MOUNTING PLATE THICKNESS:
MINIMUM- 4 SCREW THREADS
MAXIMUM- ALLOW CLEARANCE FOR SCALE AND SCALE MOUNTING HARDWARE (BENCHING SURFACES, CLAMPS, HUBS, ETC.)



SCALE IDENTIFICATION AND SIZE.

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

THESE ARE EXAMPLES

7. WHEN SCALE MOVES IN DIRECTION "A" WITH RESPECT TO A STATIONARY READHEAD, OUTPUT SIGNAL COS+ (BROWN [PIN 5]) LEADS OUTPUT SIGNAL SIN+ (YELLOW [PIN 1]).

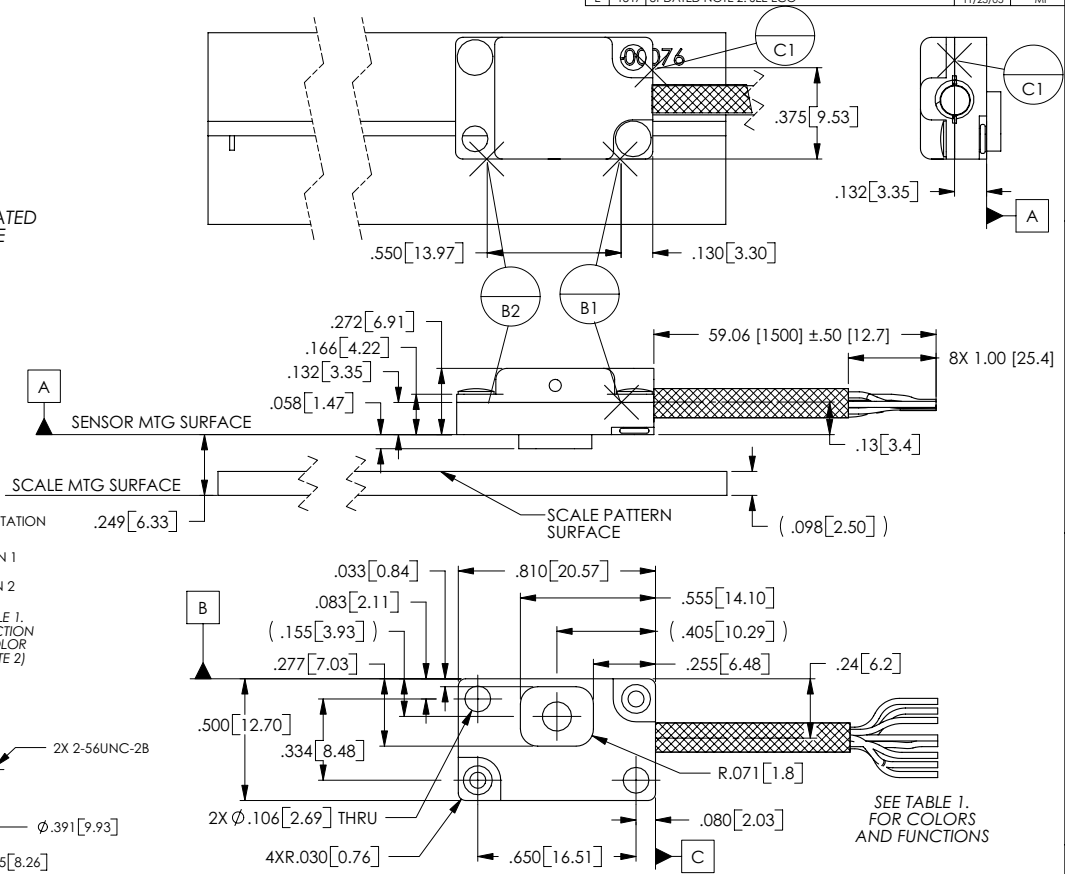


TABLE 1.

Wire Color	Function	Pin
Yellow	SIN+	1
Green	SIN-	3
Brown	COS+	5
Orange	COS-	7
Blue	INDEX WINDOW -	2
Red	+5V	8
Violet	INDEX WINDOW +	6
Black	GND	4
Gray	N/C	9
White	N/C	10

UNLESS OTHERWISE SPECIFIED
ALL DIMENSIONS ARE IN INCHES (millimeters)
DIM. APPLY AFTER PROCESSING
INTERPRET ALL GEOMETRIC TOOLS.
PER ANSI Y14.5M-1994

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

ANGULAR: ±30 MIN.

APPROVALS	DATE
DRAWN S.BUTURLIA	6/24/02
CHECKED	
ENGRG. D.GRIMES	7/3/02
DESIGNED G.ANGELOPOULOS	7/3/02
GA. J.FARNAM	7/3/02

UNITS: .in [mm]

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

DESCRIPTION:
INTERFACE, ENCODER, 20um,
LONG LINEAR, MERCURY
2000/3000 VACUUM SENSOR

SEE DWG. NO. ID-00238

SCALE: 2:1 CAD FILE: SHEET 1 OF 1

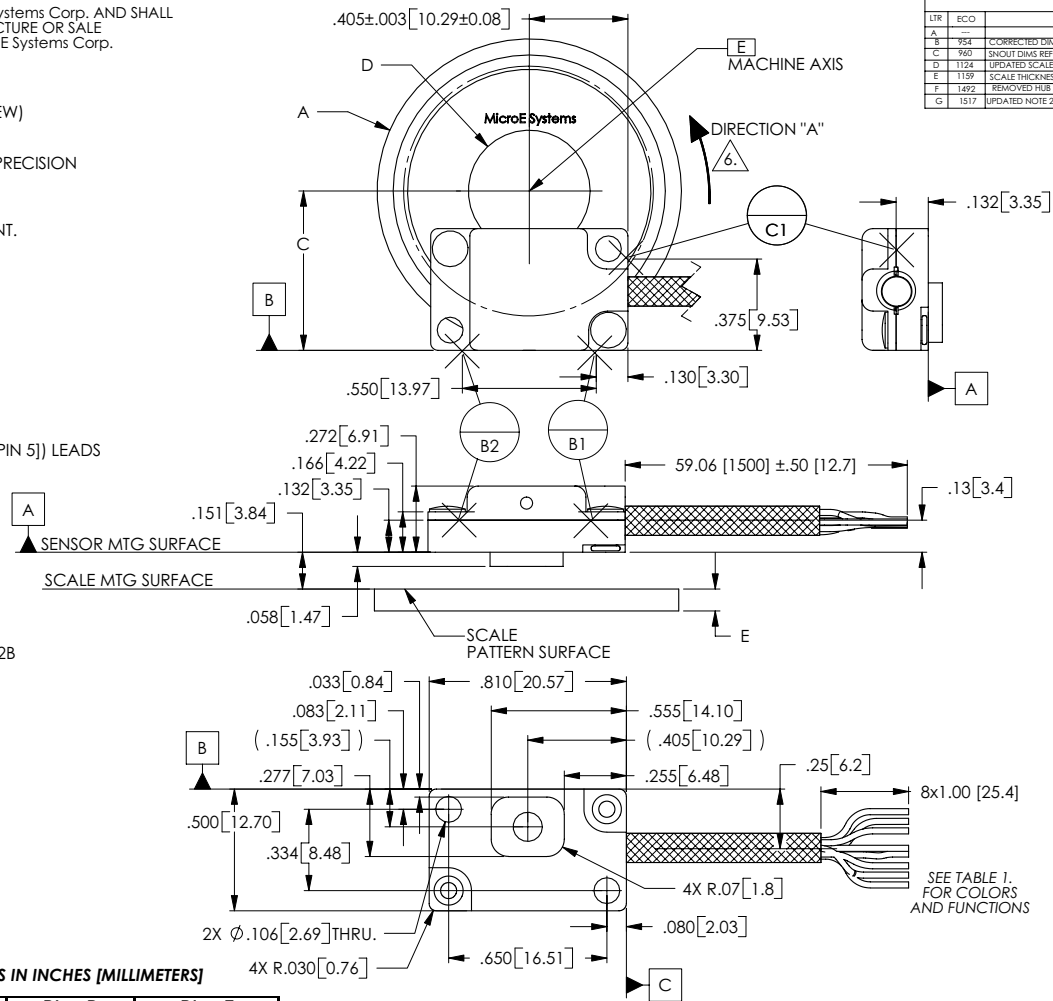
Mercury 2000V, 3000V Encoder System Interface Drawing: Rotary Scales with Hub

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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])
2. THIS CONNECTOR (FCI p/n 87012-605) IS INSIDE THE SMARTPRECISION ELECTRONICS ENCLOSURE (see Interface drawings).
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 MINIMUM OF .170 [4.32] IN HEIGHT FROM DATUM A.
5. RECOMMENDED SENSOR MOUNTING PLATE THICKNESS:
MINIMUM- 4 SCREW THREADS
MAXIMUM- ALLOW CLEARANCE FOR SCALE AND SCALE MOUNTING HARDWARE (BENCHING SURFACES, CLAMPS, HUBS, ETC.)

⚠ WHEN SCALE MOVES IN DIRECTION "A" WITH RESPECT TO A STATIONARY READHEAD, OUTPUT SIGNAL COS+ (BROWN [PIN 5]) LEADS OUTPUT SIGNAL SIN+ (YELLOW [PIN 1]).



REVISIONS				
LTR	ECO	DESCRIPTION	DATE	APPROVED
A	---	RELEASE TO PRODUCTION	7/8/02	MF
B	954	CORRECTED DIMS IN TABLE (DIM D), TYPICAL CONVERSION INCORRECT	8/29/02	MF
C	960	SNOUT DIMS REF. ADDED R1206 TO TABLE	9/24/02	MF
D	1124	UPDATED SCALE TABLE, ADDED HUB I.D., AND HEIGHT TO R1206. SEE ECO	6/26/03	MF
E	1139	SCALE THICKNESS TOLERANCE WAS ±.008, SEE ECO	3/8/04	MF
F	1492	REMOVED HUB AND UPDATED TABLE.	10/5/05	SB
G	1517	UPDATED NOTE 2, UPDATED TITLE BLOCK, SEE ECO	11/28/05	MF

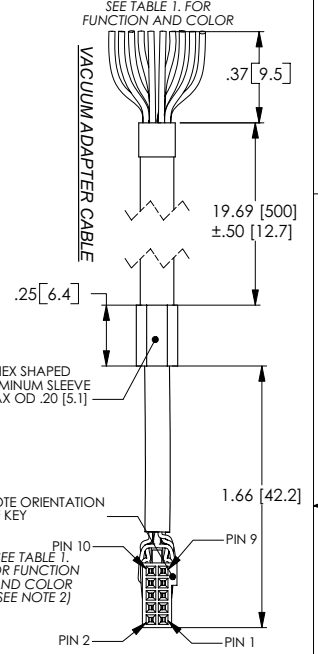


TABLE 1.
SEE TABLE 1, FOR FUNCTION AND COLOR (SEE NOTE 2)

Wire Color	Function	Pin
Yellow	SIN+	1
Green	SIN-	3
Brown	COS+	5
Orange	COS-	7
Blue	INDEX WINDOW -	2
Red	+5V	8
Violet	INDEX WINDOW +	6
Black	GND	4
Gray	N/C	9
White	N/C	10

SCALE SIZE AND MOUNTING OPTIONS. DIMENSIONS IN INCHES [MILLIMETERS]

Scale Identification	Counts/Rev	Dim. A Scale O.D.	Dim. B Optical Dia.	Dim. C Mounting Dim.	Dim. D Scale I.D.	Dim. E Scale Thickness
R1206	1,650	0.472 [12.00]	0.413 [10.50]	0.348+/-0.002 [8.84+/-0.05]	.250+/-0.005 [6.35+/-0.13]	.036+/-0.002 [.91+/-0.05]
R1910	2,500	0.750 [19.05]	0.627 [15.92]	0.454+/-0.002 [11.53+/-0.05]	.375+/-0.005 [9.53+/-0.13]	.090+/-0.004 [2.29+/-0.10]
R3213	4,096	1.250 [31.75]	1.027 [26.08]	0.654+/-0.002 [16.62+/-0.05]	.500+/-0.005 [12.70+/-0.13]	.090+/-0.004 [2.29+/-0.10]
R5725	8,192	2.250 [57.15]	2.053 [52.15]	1.168+/-0.002 [29.66+/-0.05]	1.000+/-0.005 [25.40+/-0.13]	.090+/-0.004 [2.29+/-0.10]
R10851	16,384	4.250 [107.95]	4.106 [104.30]	2.194+/-0.002 [55.73+/-0.05]	2.000+/-0.005 [50.80+/-0.13]	.090+/-0.004 [2.29+/-0.10]

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: DRAWN: S.BUTURLIA, CHECKED: [Signature], ENGR: D.GRIMES, MFG ENG: G.ANGELOPOULOS, GA: J.FARNAM, DATE: 6/24/02, 7/3/02, 7/3/02

UNITS: .in [mm]

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Division of GSI
8 Erie Drive
Natick, MA 01760

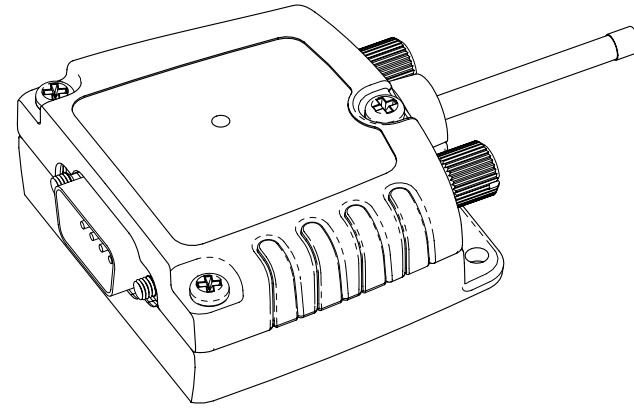
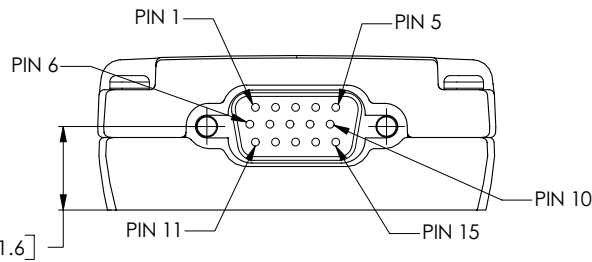
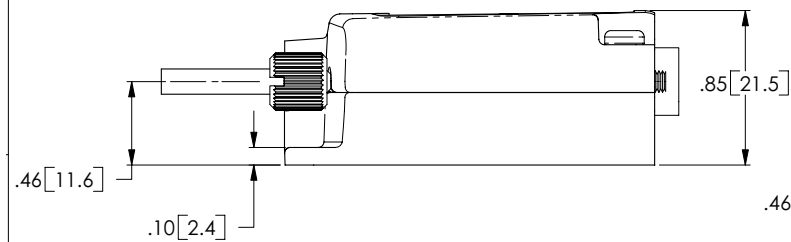
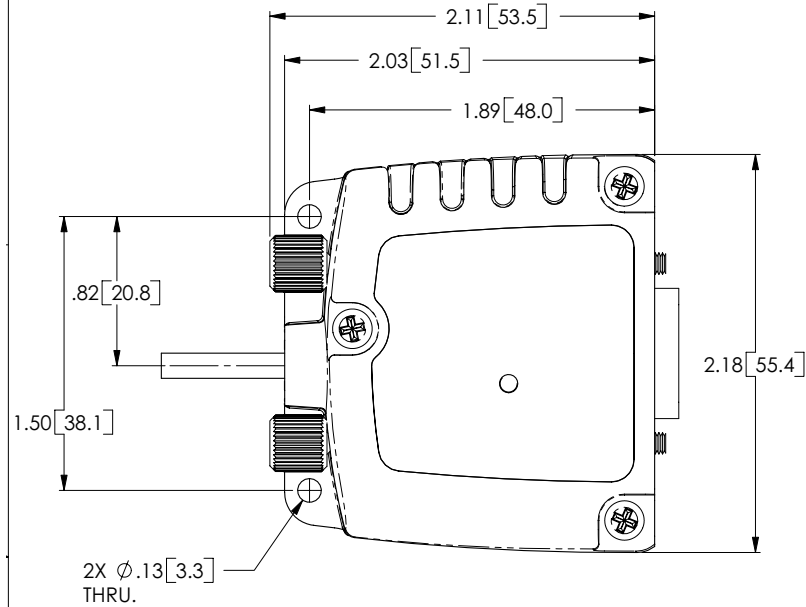
DESCRIPTION:
INTERFACE, ENCODER, 20um,
ROTARY, MERCURY,
2000/3000 VACUUM SENSOR

SCALE: 2:1 CAD FILE: ID-00239 SHEET 1 OF 1

Mercury 2000V, 3000V Encoder System

Interface Drawing: SmartPrecision Electronics Module (Interpolator)

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REVISIONS				
LTR	ECO	DESCRIPTION	DATE	APPROVED
A	—	RELEASE TO PRODUCTION	1/23/02	PD
B	862	UPDATED ENCLOSURE HEIGHT	5/14/02	PD
C	879	CREATED ONE INTERFACE, UPDATED TABLE 1. SEE ECO	6/5/02	MF
D	969	ADDED SS350c TO TABLE, ADDED NOTES PIN 4 AND PIN 10	9/24/02	MF
E	1058	ADDED SS300c TO TABLE, SEE ECO	7/14/03	MF
F	1156	ADDED NOTE 1	9/5/03	SB
G	1317	CHANGED SMARTSIGNAL TO SMARTPRECISION.	11/28/03	MF

TABLE 1.

DB15-HD PINOUTS				
Pin	Functions (SS200c)	Functions (SS300c/SS350c)	Functions (SS300cSI)	Functions (SS350cSI)
1	GND	GND	GND	GND
2	Transmit	Transmit	Transmit	Transmit
3	Receive	Receive	Receive	Receive
4	A-	A-	SDO-	SDO-
5	A+	A+	SDO+	SDO+
6	Reserved	Reserved	Reserved	Reserved
7	Reserved	Reserved	N_CS+	N_CS+
8	Reserved	Reserved	N_CS-	N_CS-
9	B-	B-	Trigger-	SCK_FBK-
10	B+	B+	Trigger+	SCK_FBK+
11	Reserved	Alarm	Alarm	Alarm
12	+5V	+5V	+5V	+5V
13	GND	GND	GND	GND
14	Index+	Index+	SCK+	SCK+
15	Index-	Index-	SCK-	SCK-

NOTES:

1. PIN 1 IS A "RESERVED" PIN THAT SHOULD BE GROUNDED FOR PROPER SYSTEM PERFORMANCE. THE GROUND CONNECTION SHOULD BE MADE TO PIN 13 IN THE MATING CONNECTOR.

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] ±0.1 [25]
.XXX [XX] ±.005 [13]
ANGULAR: ±30 MIN.

APPROVALS	DATE
DRAWN: PAUL DEVINE	1/10/02
CHECKED:	
ENGRG: PAUL REMILLARD	1/23/02
RFCS ENG: MIKE SKWIRA	1/23/02
GA: JACK FARNAM	1/23/02

UNITS: .in [mm]

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

DESCRIPTION:
INTERFACE, SMARTPRECISION INTERPOLATOR

SIB	DWG. NO.	REV
B	ID-00220	G

SCALE: 1X CAD FILE: SHEET 1 OF 1