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# APPROVAL REPORT

## LOAD CELLS FOR USE IN HAZARDOUS (CLASSIFIED) LOCATIONS (RE-EXAMINATION)

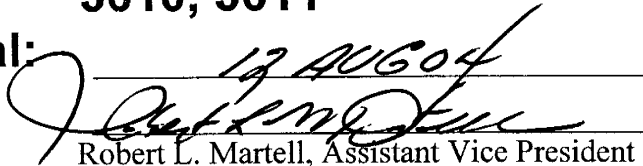
Prepared for:

Revere Transducers  
14192 Franklin Ave.  
Tustin, CA 92780

Project ID: 3016706  
Supercedes: 1T0H1.AX, 2W5A4.AX,  
0X6A6.AX, 5W5A3.AX,  
2T7A5.AXX, 3X6A4.AX,  
5B7A5.AX, 3002389, 3006080,  
3009073, 3009511  
Class: 3610, 3611

Date of Approval:

Authorized by:

17 AUG 04  
  
Robert L. Martell, Assistant Vice President

FM Approvals  
1151 Boston-Providence Turnpike  
PO Box 9102  
Norwood, MA 02062

**LOAD CELLS  
FOR USE IN  
HAZARDOUS (CLASSIFIED) LOCATIONS  
(RE-EXAMINATION)**

from

**REVERE TRANSDUCERS  
14192 FRANKLIN AVE.  
TUSTIN, CA 92780**

**I INTRODUCTION**

- 1.1 Revere Transducers Requested a Reexamination of their product line of load cells, BSP, CBU, CP, CSP, GOZINTA, HPS, HSB, KB, LPC, LTO, RLC, MWP, SHB, SSB, SSS, UEP, UMP, UPF, USP, USPF, TO, TSP, 42, 43,62H, 63H, 82, 92, 93, 182, 263A, 263C, 263D, 363, 392A, 392B, 392C, 462, 562, 562A, 612, 642, 652, 662, 662A, 692B, 693A, 792, 933,942, 943, 953, 962, 963, 992, 993, 5102, 5103, 5112, 5123, 5203, 5222, 5223, 5303, 5323, 5352, 5423, 5503, 5723, 6762, 7062, 7064,9102, 9103, 9123, 9203, 9223, 9303, 9323, 9332, 9363, 9403, 9423, 9523, 9603, 9723, 9803, and 9903 to the latest editions (1999) of FM 3610 and FM 3611.
- 1.2 This report supercedes FM Approval Reports 1T0H1.AX, 2W5A4.AX, 0X6A6.AX, 5W5A3.AX, 2T7A5.AXX, 3X6A4.AX, 5B7A5.AX, 3002389, 3006080, 3009073, 3009511 and any subsequent revision reports.
- 1.3 This Report may be freely reproduced only in its entirety and without modification.
- 1.4 **Standards**

<b>Title</b>	<b>Class Number</b>	<b>Date</b>
Electrical Equipment for Use in Hazardous (Classified) Locations, General Requirements	3600	November 1998
Intrinsically Safe Apparatus and Associated Apparatus for Use in Class I, II, and III Division 1 Hazardous (Classified) Locations	3610	October 1999
Nonincendive Electrical Equipment for Use in Class I and II, Division 2, and Class III, Division 1 and 2, Hazardous (Classified) Locations	3611	October 1999
Electrical and Electronic Test, Measuring and Process Control Equipment	3810 Including Supplement #1	March 1989 July 1995
Enclosures for Electrical Equipment	ANSI/NEMA 250	1991

- 1.5 **Listing:** The product will appear in the FM Approval Guide as follows:

*Revere Transducers Inc 14192 Franklin Ave Tustin CA 92680*

*ACLC, BSP, CBU, CP, CSP, GOZINTA, HPS, HSB, KB, LPC, LTO, RLC, MWP, SHB, SSB, SSS, UEP, UMP, UPF, USP, USPF, TO, TSP, 42, 43, 62H, 63H, 82, 92, 93, 182, 263A, 263C, 263D, 363, 392A, 392B, 392C, 462, 562, 562A, 612, 642, 652, 662, 662A, 692B, 693A, 792, 933, 942, 943, 953, 962, 963, 992, 993, 5102, 5103, 5112, 5123, 5203, 5222, 5223, 5303, 5323, 5352, 5423, 5503, 5723, 6762, 7062, 7064, 8301330-10, 8301380-10, 8301385-10, 9102, 9103, 9123, 9203, 9223, 9303, 9323, 9332, 9363, 9403, 9423, 9523, 9603, 9723, 9803, 9903, 146165, 146170, 146175, 153665. Load Cells.*

Note: The above models include the following options: a-b-c-defgh

IS / I, II, III / 1 / \*CDEFG / T4 - 29184, 29215, 29313; Entity; NI / I / 2 / ABCD / T4 - 29224; S / II / 2 / FG / T4-29224, S / III / 2 / T4 - 29224.

Entity Parameters:

Positive Excitation Barrier:  $V_{max} = +12\text{ V}$ ,  $I_{max} = 179\text{ mA}$ ,  $P_{max} = 0.54\text{ W}$ ,  $C_i = 0$ ,  $L_i = 0$ .

Positive Sense Barrier:  $V_{max} = +16\text{ V}$ ,  $I_{max} = 50\text{ mA}$ ,  $P_{max} = 0.20\text{ W}$ ,  $C_i = 0$ ,  $L_i = 0$

Negative Sense Barrier:  $V_{max} = -16\text{ V}$ ,  $I_{max} = 50\text{ mA}$ ,  $P_{max} = 0.20\text{ W}$ ,  $C_i = 0$ ,  $L_i = 0$

Positive Signal Barrier:  $V_{max} = +16\text{ V}$ ,  $I_{max} = 50\text{ mA}$ ,  $P_{max} = 0.20\text{ W}$ ,  $C_i = 0$ ,  $L_i = 0$

Negative Signal Barrier:  $V_{max} = -16\text{ V}$ ,  $I_{max} = 50\text{ mA}$ ,  $P_{max} = 0.20\text{ W}$ ,  $C_i = 0$ ,  $L_i = 0$

a = Load direction C, T, U, No. of bridge or blank.

b = Accuracy designation A00-Z99 or 000-999 or blank.

c = Capacity 1.0 lb — 500,000 lb (0.45 kg — 227 t).

d = Cable length in ft 01-99 or A0-B9 or blank.

e = Connector and wiring C1-C9 or blank.

f = Specification variations, No. of bridge, conduit fitting A-Z, P, D or blank.

g = Wiring, paint color, customer label 1-9 or blank.

h = Mechanical variation not related to intrinsic safety AA-ZZ or 1A-9Z or blank.

*\* Special Conditions of Use:*

*1. When only positive barriers are used, this apparatus is Intrinsically Safe for Class I, Division 1, Groups A, B, C, D, E, F, and G.*

## II DESCRIPTION

- 2.1 The load cells are transducers which produce an output signal proportional to the weight or force applied. The conversion of load measurements to electrical signals is made through the use of encapsulated strain gauges. These are arranged in a balance bridge configuration so that deflection of the strain gauge causes a change in the resistance and unbalances the bridge circuit. For a given input voltage, the output of the bridge will vary with applied load or pressure. The junction boxes are used within the Hazardous (Classified) Location for connection of multiple load cell installations.
- 2.2 The Hazardous (Classified) Location mounted transducers are connected to control room equipment via intrinsic safety barriers mounted in an unclassified location. These barriers supply an electrical signal which limits the transfer of energy to the hazardous location to intrinsically safe levels.

### III EXAMINATIONS AND TESTS

- 3.1 Samples were submitted for examination and testing under the previous projects as reviewed in this examination.. The samples were considered to be representative of the product line and were examined, tested, and compared to the manufacture's drawings. All data is on file at FM Approvals along with other documents and correspondence applicable to this program.
- 3.2 Intrinsic Safety Evaluation: The following verifies the above listed load cells are intrinsically safe for Class I, II, III, Division 1, Groups A, B, C, D, E, F, and G when installed in accordance with drawings 29184, and 29215.
- 3.2.1 Resistive Assessment: Power to the apparatus is supplied through intrinsic safety barriers. Examination determined field wiring between the power source and the load cells is considered to be resistively safe when the apparatus is installed in accordance with the control drawing. In the event that there are negative potential barriers present, it is possible for the combined connections to result in a condition that is suitable only for Groups C, D, E, F, and G. This is noted on the control drawing 29215.
- 3.2.2 Capacitive Assessment: There are no capacitors in any of the strain gauges, therefore  $C_i = 0$ .
- 3.2.3 Inductive Assessment: There are no inductors in any of the strain gauges, therefore  $L_i = 0$ .
- 3.2.4 Creepage and Clearance Assessment: Analysis determined the creepage and clearances of these devices are satisfactory as these devices were evaluated on a mass fault basis.
- 3.2.5 Temperature Assessment: Analysis determined that all components meet the requirements for a T4 rating in a maximum ambient of 40°C by comparison to table 9.3 of FM 3610. Comparison of the wire size with table 9.2 verifies this is suitable for T4.
- 3.2.6 Protective Components Assessment: There are no protective components within the strain gauges.
- 3.3 Nonincendive Evaluation: The following verifies the above listed load cells are nonincendive for Class I, Division 2, Groups A, B, C, and D, when installed in accordance with drawings 29224.
- 3.3.1 Make/Break Assessment: There are no make/break components in the strain gauges.
- 3.3.2 Connections Assessment: All connections are mechanically secure and require the use of a tool for access. This is satisfactory.
- 3.3.3 Temperature Assessment: A T4 rating at an ambient temperature of 40°C is assigned based on the intrinsic safety temperature assessment which is a more onerous evaluation.
- 3.4 Class II and III Division 1 and 2 Evaluation: The load cells meet the requirements for Class II and III locations in that they are either encapsulated to exclude the presence of dust, enclosed in a dust-tight enclosure, or are constructed such that the ingress of dust does not result in a hazardous condition.
- 3.5 Protection Against Shock, Fire, and Injury Evaluation: The following verifies the above listed load cells as having suitable protection from electrical shock, fire, or injury.

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- 3.5.1 Protection Against Electric Shock: The load cells operate at voltages which are not hazardous live as defined by ANSI/ISA S82.02.01 and therefore there is no potential for electric shock.
- 3.5.2 Protection Against Fire: The device operates from a limited power supply as defined by ANSI/ISA S82.02.01 and therefore there is no potential for fire.
- 3.5.3 Protection Against Mechanical Hazards: Examination verifies there are no mechanical hazards associated with the load cells.

#### IV MARKING

The following information appears on the apparatus identified in Section 1.5 and meets Standard requirements:

- Manufacturer's name and manufacturing location.
- Type number and date code
- Maximum input and output ratings
- Maximum ambient temperature
- Control Drawing Reference
- The FM Approval Mark
- Hazardous Location Ratings

#### V REMARKS

- 5.1 Installations shall comply with the relevant requirements of the National Electrical Code (ANSI/NFPA 70).
- 5.2 Control room equipment connected to intrinsically safe associated apparatus should not use or generate more than 250 V rms or DC.
- 5.3 See ANSI/ISA RP12.06.01, Installation of Intrinsically Safe Systems for Hazardous (Classified) Locations for guidance on the installation of intrinsically safe apparatus and systems.

#### VI FACILITIES AND PROCEDURES AUDIT

The manufacturing site in Tustin, CA is subject to follow-up audit inspections. The facilities and quality control procedures in place have been found to be satisfactory to manufacture product identical to that examined and tested as described in this report.

#### VII MANUFACTURERS RESPONSIBILITIES

- 7.1 Documentation considered critical to this Approval is on file at FM Approvals and listed in the Documentation File, Section VIII of this report. No changes of any nature shall be implemented unless notice of the proposed change has been given and written authorization obtained from FM Approvals. The Approved Product Revision Report, Form 797, shall be forwarded to FM Approvals as notice of proposed changes.
- 7.2 The manufacturer shall make available to users of the subject equipment installation drawings 29184, 29215, and 29224. The manufacturer shall make additional copies available upon request.

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**VIII DOCUMENTATION**

The following drawings describe the various FM Approved load cells manufactured by Revere Transducers and are filed under Project 3016706.

<b>Drawing</b>	<b>Title</b>	<b>Revision</b>
146485	UPF -- LOAD CELL UNIVERSAL SINGLE & DOUBLE BRIDGE	K
148296	TO -- LOAC CELL ASSEMBLY TRIPLE BRIDGE	D
150780	LTO -- LOAD CELL ASSEMBLY COMPRESSION	E
154635	UMP -- LOAD CELL ASSEMBLY	N
157334	LPC -- LOAD CELL ASSEMBLY LOW PROFILE	H
158205	CBU -- LOAD CELL ASSY CANTILEVER BEAM UNIVERSAL	T
161849	SSS -- LOAD CELL ASSEMBLY	M
26296	182 -- LOAD CELL ASSEMBLY MINIATURE CAP 10 -300 LBS	P
27468	693A -- LOAD CELL ASSEMBLY	L
27527	263A,B,C -- LOAD CELL ASSEMBLY 100LB THRU 1K CAP	T
27557	392A -- LOAD CELL ASSEMBLY	K
27717	62H/63H -- LOAD CELL ASSEMBLY	N
27718	42/43H -- LOAD CELL ASSEMBLY CAP 3K - 250K LB	M
27730	92/93 -- LOAD CELL ASSEMBLY	W
27731	992/993 -- LOAD CELL ASSEMBLY	N
27732	962/963 -- LOAD CELL ASSEMBLY	H
27739	562 -- LOAD CELL ASSEMBLY	L
27742	942/943 -- LOAD CELL ASSEMBLY	H
27768	5102 -- LOAD CELL ASSEMBLY CAP 50 - 15,000 LBS	V
27769	392B -- LOAD CELL ASSEMBLY CAP 10K - 500K LBS	U
27773	562A -- LOAD CELL ASSEMBLY	F
27784	662 -- LOAD CELL ASSEMBLY CA LBS 10 -100	G
27797	692B -- LOAD CELL ASSEMBLY CAP 10K - 500K LBS	L
27822	5112 -- LOAD CELL ASSEMBLY CAP LBS 100 - 50 K	E
27829	263D -- LOAD CELL ASSEMBLY 25-3K LBS	H
27838	392C -- LOAD CELL ASSEMBLY CAP LBS 50 K	D
27846	5503 -- LOAD CELL ASSEMBLY	G
27847	82 -- LOAD CELL ASSEMBLY 82-D1-XXK-C2R1	B
27858	662A -- LOAD CELL ASSEMBLY	F
27878	5123 -- LOAD CELL ASSEMBLY CAP LBS 1K TO 10 K	K
27879	5223 -- ASSEMBLY CAP 50K - 200K	U
27880	5352 -- LOAD CELL ASSEMBLY CAP 200KG, 500 KG, 1000 KG	K
27891	363 -- LOAD CELL ASSEMBLY ALL CAPACITIES	M
27895	5723 -- LOAD CELL ASSEMBLY CAP IN LBS 1K - 10K	F
27896	9363 -- LOAD CELL ASSEMBLY ALL OPTIONS ALL CAP	N
27897	9123 -- ASSEMBLY CAP 250 - 2K LBS	T
27902	6762 -- LOAD CELL ASSEMBLY CAP (LBS) 100 THRU 1,000	C
27912	9332 -- LOAD CELL ASSEMBLY CAP 500 KG & 1000 KG	B
27923	9103 -- ASSEMBLY CAP 5K TO 250K LBS	V
27928	9523 -- ASSEMBLY TOP LEVEL CAP 1K TO 10K LBS	L
27951	5222 -- LOAD CELL ASSEMBLY CAP 20T, 30T, 45T	H
27977	7062 -- LOAD CELL ASSEMBLY CAP LBS 50 THRU 1,000	E
27978	7064 -- LOAD CELL ASSEMBLY CAP LBS 50 THRU 1,000	E

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<b>Drawing</b>	<b>Title</b>	<b>Revision</b>
146485	UPF -- LOAD CELL UNIVERSAL SINGLE & DOUBLE BRIDGE	K
27986	462 -- LOAD CELL ASSEMBLY	J
27987	792 -- ASSEMBLY CAP 50K TO 200K LBS	M
27990	5423 -- LOAD CELL ASSEMBLY	NC
28050	933 -- LOAD CELL ASSEMBLY	K
28057	642 -- LOAD CELL ASSEMBLY CAP 10 TO 200 LBS	G
28072	612 -- LOAD CELL ASSEMBLY	D
28082	953 -- LOAD CELL ASSEMBLY MODEL 953-A5/B10/D3	G
28091	5103 -- LOAD CELL ASSEMBLY CAP 5K TO 250K LBS	M
28093	652 -- LOAD CELL ASSEMBLY CAP 50 - 500 KG	G
28154	5203 -- LOAD CELL ASSEMBLY CAP 1K TO 75K LBS	F
28155	9203 -- ASEMBLY CAP 1K TO 75K LBS	F
28165	SSB -- LOAD CELL ASSEMBLY CAP 1K TO 10K LBS	H
28166	5303 -- ASSEMBLY CAP 25K TO 200K LBS	G
28168	5323 -- ASSEMBLY CAP 25K TO 125K LBS	C
28178	CSP -- ASSEMBLY TOP LEVEL CAP 10K TO 500K LBS	B
28201	MWP -- ASSY TOP LEVEL MOBILE WEIGHING POINT TP 73	B
28203	9903 -- ASSEMBLY TOP LEVEL CAP 50K TO 100 K LBS	F
28204	9803 -- ASSEMBLY TOP LEVEL CAP 25K TO 100K LBS	D
28207	9423 -- ASSEMBLY TOP LEVEL CAP 10K TO 75 K LBS	D
28208	9323 -- ASSEMBLY TOP LEVEL CAP 10K TO 75 K LBS	E
28213	9223 -- ASSEMBLY TOP LEVEL CAP 50K TO 150K LBS	E
28217	9303 -- ASSEMBLY TOP LEVEL CAP 10K TO 125K LBS	E
28220	9403 -- ASSEMBLY TOP LEVEL CAP 5K TO 50K LBS	D
28228	9102 -- ASSEMBLY CAP 200 TO 2.5 K LBS	NC
28229	RLC -- ASSEMBLY CAP 500 TO 10,000 KG	NC
28234	SSB -- ASSEMBLY DIGITAL LOAD CELL	A
28235	CSP -- ASSEMBLY DIGITAL LOAD CELL ALL CAP	A
28247	9603 -- ASSEMBLY TOP LEVEL CP 40K TO 50K LBS	B
29184	INTRINSIC SAFETY INSTALLATION PLAN ALL	P
29215	ENTITY FM APPROVL VARIOUS MODEL	D
29216	FM APPROVAL LC-VARIOUS MODEL	J
29224	FM APPROVAL INSTALLATION PLAN W/OUT USING BAR	A
29313	INTRINSIC SAFETY INSTALLATION PLAN, NEGATIVE	A
30310	STRAIN GAGE	S
30346	LABEL FACTORYMUTUAL SYSTEM	H
30380	STRAIN GAGE	D
30487	STRAIN GAGE 060 GAGE LENGTH	NC
31001	GAGE STRAIN .125 SHEAR	A
31002	STRAIN GAGE BENDING 0.125 ANY	NC
31003	STRAIN GAGE TENSION COMPRESSION ANY MODEL	NC
600578	TSP -- LOAD CELL ASSEMBLY	K
601840	KB -- LOAD CELL ASSEMBLY KG-2.3-L-53	
603201	GAGE, STRAIN FULLY ANNEALED FOIL	U
604483	GAGE STRAIN FOIL	AR
604691	SHB -- BEAM BENDING ASSEMBLY HERMETIC SEAL	H
605017	USPF -- LOAD CELL ASSEMBLY USP - FATIGUE	F
605636	GOZINTA -- SENSOR ASSEMBLY	K

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Drawing	Title	Revision
146485	UPF -- LOAD CELL UNIVERSAL SINGLE & DOUBLE BRIDGE	K
700024	CP -- LOAD CELL ASSEMBLY SINGLE BRIDGE	C
700038	HPS -- LOAD CELL ASSEMBLY 6KG AND 15KG, 25, 50, & 100	A
700047	BSP -- LOAD CELL ASSEMBLY CAP 0.10, 0.25, 0.50 & 1K	B
700061	USP -- LOAD CELL ASSEMBLY CAP LBS 100 TO 1000 LBS	B
700066	USP -- LOAD CELL ASSEMBLY CAP LBS 50K TO 300K -LB	B
700175	STRAIN GAGE	A
700219	STRAIN GAGE	B
701001	STRAIN GAGE	NC
701002	STRAIN GAGE	NC
701003	STRAIN GAGE	NC
701004	STRAIN GAGE	C
701007	STRAIN GAGE	A
702004	STRAIN GAGE	L
702013	933 -- STRAIN GAGE	D
702014	953 -- STRAIN GAGE	D

**IX CONCLUSION**

The apparatus described in 1.5 meets FM Approvals requirements. Since a duly signed Master Agreement is on file for this manufacturer, Approval is effective the date of this report.

**RE-EXAMINATION AND TESTING BY: Kevin Fletcher**

**PROJECT DATA RECORD: 3016706**

**ORIGINAL TEST DATA: Lab Test Notebooks 1T0H1.AX, 4H4A9.AX, 0J8A0.AX**

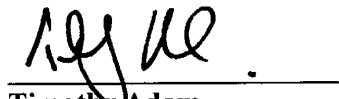
**ATTACHMENTS: Control drawings: 29184, 29215, 29224 and 29313.  
List of approved load cells: 29216  
Label drawing: 30346**

**REPORT BY:**

**REPORT REVIEWED BY:**



**Kevin Fletcher  
Engineer  
Hazardous Locations**



**Timothy Adam  
Technical Team Manager  
Hazardous Locations**



REVISIONS				
REV	DESCRIPTION	BY	DATE	DATE RELEASED
P	REVISED PER E02004-118	DAP	4/30/04	

NOTES:

- INSTALLATION WIRING TO BE IN ACCORDANCE WITH ANSI/ISA RP 12.6 "INSTALLATION OF INTRINSICALLY SAFE INSTRUMENTS SYSTEMS IN CLASS 1 HAZARDOUS LOCATION".
- ELECTRICAL EQUIPMENT CONNECTED TO BARRIERS SHOULD NOT USE OR GENERATE MORE THAN 250 VOLTS.
- THE FOLLOWING LOAD CELL MODELS ARE FACTORY MUTUAL RESEARCH APPROVED:

Model No.	FM Job I.D.	Date Approved
42,43,62H,63H,82,92,93, 92B,182,263A,263C,263D, 363,392A,392B,392C,462, 492,562,562A,662,692B, 693A,5102,5103,5112.	J.I. 0E9A5.AX (3610)	07/17/81
662A,5123,5223,5352,5503, 5723,9123,9363.	J.I. 0M7A2.AX (3610)	08/21/85
6762	J.I. 1N0A8.AX (3610)	03/31/86
942,943,962,963,992,993, 5222,5423,9103,9332.	J.I. 1Q8A6.AX (3610)	03/01/89
7062,7064.	J.I. 2R3A1.AX (3610)	08/03/89
792,9523.	J.I. 2T7A5.AX (3610)	08/30/90

Part Number Definitions: XXXXa-b-c-defgh  
 XXXX - model number  
 a - load direction C,T,U or blank.  
 b - accuracy designation A00-Z99 or 000-999 or blank.  
 c - capacity 1.0 lb-500,000 lbs.  
     (0.45 kg-227 t)  
 d - cable length in feet 01-99 or A0-B9 or blank.  
 e - connector & wiring C1,C2,C3 or blank.  
 f - specification variations, number of bridge, conduit fitting A-Z or blank.  
 g - wiring, paint color, customer label 1-9 or blank.  
 h - mechanical variations not related to intrinsic safety AA-ZZ or 1A-9Z or A1-Z9 or 00-99 or blank.

- SINGLE LOAD CELL BARRIER SYSTEMS ARE SHOWN ON THE FOLLOWING SHEETS. ADDITIONAL LOAD CELLS CAN BE CONNECTED IN PARALLEL AT JUNCTION BOX. WHENEVER EXCITATION VOLTAGE PASSES THROUGH A BARRIER, THERE IS A SUBSTANTIAL VOLTAGE DROP TO THE LOAD CELL. THIS VOLTAGE DROP WILL INCREASE AS ADDITIONAL CELLS ARE ADDED AND CONNECTED IN PARALLEL AT THE JUNCTION BOX. CONTACT BARRIER MANUFACTURER FOR DETAILS OF BARRIER CHARACTERISTICS.

Manufacturers (barriers)  
 MTL Inc.  
 1483 Old Bridge Road, Suite 3  
 Woodbridge, VA 22192  
 U.S.A.  
 Ph: 703-494-6009  
 Fax: 703-494-6068  
 R. Stahl, Inc.  
 150-L New Boston Street  
 Woburn, MA 01801  
 U.S.A.  
 Ph: 800-782-4357, 800-782-7233  
 Fax: 617-933-7896

Test Agency:  
 Factory Mutual Research  
 1151 Boston Providence Turnpike  
 Norwood, MA 02062  
 Ph: 617-762-4300  
 Telex: 92-4415  
 FAX: 617-769-8239

NO CHANGES ARE TO BE MADE TO THIS DRAWING WITHOUT WRITTEN APPROVAL OF FACTORY MUTUAL RESEARCH COMPANY.

NOTES: UNLESS OTHERWISE SPECIFIED

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UNLESS OTHERWISE SPECIFIED:		DRAWN BY: JSP	7/10/90
DIMENSIONS ARE IN INCHES.		CHECKED BY:	
TOLERANCES:		APPR. BY:	
.X ± .10		DO NOT SCALE DRAWING	
.XX ± .01		MATERIAL:	
.XXX ± .005			
ANGLES ± 10' 0"			
SURFACE FINISH: 125		FINISH:	
REMOVE BURRS AND BREAK SHARP EDGES .010 MAX.			
ALL DIAMETERS ON COMMON AXIS CONCENTRIC WITHIN .005 T.I.R.			
ALL DIMENSIONS AND FITS APPLY AFTER FINISH AND HEAT TREAT.			
DIMENSIONING AND TOLERANCING PER ASME Y14.5M-1994			
NEXT ASSY.	USED ON	SIZE CODE IDENT NO. DRAWING NO.	
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		SHEET: 1 OF 5	

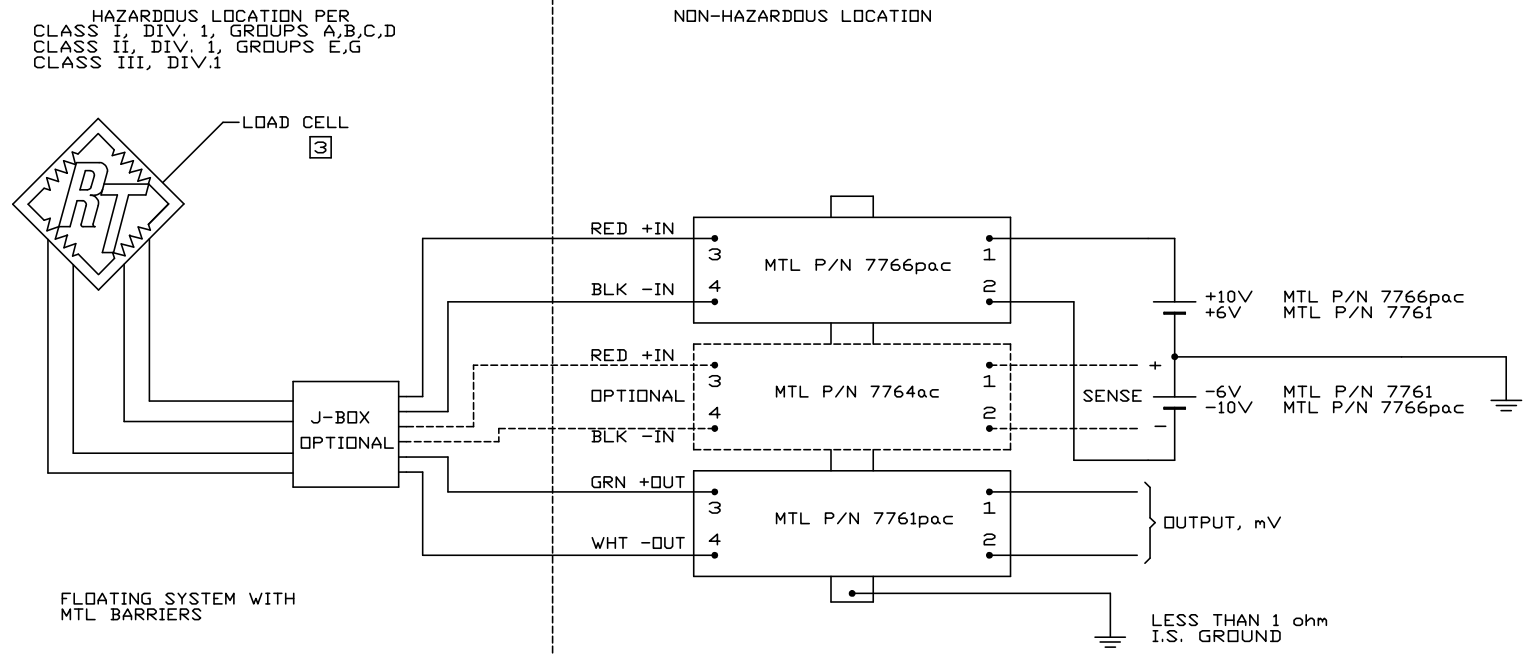
INTRINSIC SAFETY  
 INSTALLATION PLAN USING  
 FM APPROVED BARRIERS

REVERE  TRANSDUCERS  
 TUSTIN CALIFORNIA, U.S.A.

SIZE CODE IDENT NO. DRAWING NO.  
 C 23796 29184

SCALE: NONE RELEASED BY: SHEET: 1 OF 5

REVISIONS				
REV	DESCRIPTION	BY	DATE	DATE RELEASED
P	REVISED PER E02004-118	DAP	4/30/04	



HAZARDOUS LOCATION PER  
 CLASS I, DIV. 1, GROUPS A,B,C,D  
 CLASS II, DIV. 1, GROUPS E,G  
 CLASS III, DIV.1

NON-HAZARDOUS LOCATION

FLOATING SYSTEM WITH  
 MTL BARRIERS

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SEE SHEET 1 OF 5 FOR APPLICATION NOTES.

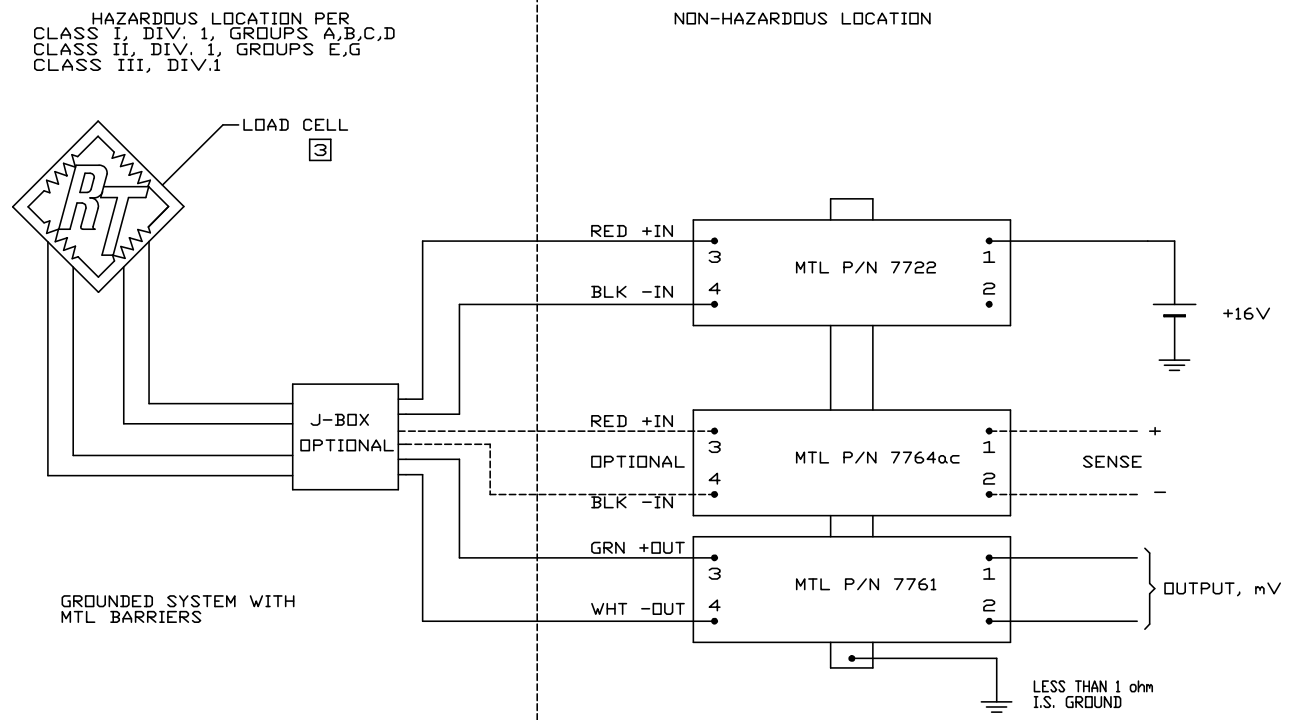
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 APPARATUS OR DEVICES WITHOUT THE WRITTEN APPROVAL OF REVERE TRANSDUCERS INC.

	UNLESS OTHERWISE SPECIFIED:	DRAWN BY: JSP	2/28/01
	DIMENSIONS ARE IN INCHES.	CHECKED BY:	
	TOLERANCES:	APPR. BY:	
	.X ±.10	DO NOT SCALE DRAWING	
	.XX ±.01	MATERIAL:	
	.XXX ±.005		
	ANGLES ±10° 0'	FINISH:	
	SURFACE FINISH: 125/		
	REMOVE BURRS AND BREAK SHARP EDGES .010 MAX.		
	ALL DIAMETERS ON COMMON AXIS CONCENTRIC WITHIN .005 T.I.R.		
	ALL DIMENSIONS AND FITS APPLY AFTER FINISH AND HEAT TREAT.		
NEXT ASSY.	USED ON		
	APPLICATION		

INTRINSIC SAFETY INSTALLATION PLAN USING FM APPROVED BARRIERS			
REVERE  TRANSDUCERS TUSTIN CALIFORNIA, U.S.A.			
SIZE	CODE IDENT NO.	DRAWING NO.	REV
C	23796	29184	P
SCALE: NONE			RELEASED BY:
			SHEET: 2 OF 5

REVISIONS				
REV	DESCRIPTION	BY	DATE	DATE RELEASED
P	REVISED PER E02004-118	DAP	4/30/04	



HAZARDOUS LOCATION PER  
CLASS I, DIV. 1, GROUPS A,B,C,D  
CLASS II, DIV. 1, GROUPS E,G  
CLASS III, DIV.1

NON-HAZARDOUS LOCATION

GROUNDING SYSTEM WITH  
MTL BARRIERS

NO CHANGES ARE TO BE MADE TO THIS  
DRAWING WITHOUT WRITTEN APPROVAL OF  
FACTORY MUTUAL RESEARCH COMPANY.

SEE SHEET 1 OF 5 FOR APPLICATION NOTES.

NOTES: UNLESS OTHERWISE SPECIFIED

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APPARATUS OR DEVICES WITHOUT THE WRITTEN APPROVAL OF REVERE TRANSDUCERS INC.

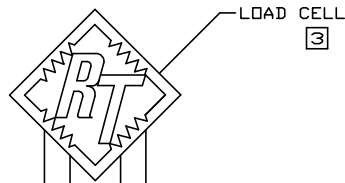
UNLESS OTHERWISE SPECIFIED:	DRAWN BY: JSP	2/28/01
DIMENSIONS ARE IN INCHES.	CHECKED BY:	
TOLERANCES:	APPR. BY:	
.X ± .10	DO NOT SCALE DRAWING	
.XX ± .01	MATERIAL:	
.XXX ± .005		
ANGLES ± 10' 0"	FINISH:	
SURFACE FINISH:		
REMOVE BURRS AND BREAK SHARP EDGES .010 MAX.		
ALL DIAMETERS ON COMMON AXIS CONCENTRIC WITHIN .005 T.I.R.		
ALL DIMENSIONS AND FITS APPLY AFTER FINISH AND HEAT TREAT.		
DIMENSIONING AND TOLERANCING PER ASME Y14.5M-1994		
NEXT ASSY.	USED ON	
	APPLICATION	

INTRINSIC SAFETY INSTALLATION PLAN USING FM APPROVED BARRIERS		
REVERE  TRANSDUCERS TUSTIN CALIFORNIA, U.S.A.		
SIZE	CODE IDENT NO. DRAWING NO.	REV
C	23796 29184	P
SCALE: NONE	RELEASED BY:	SHEET: 3 OF 5

REVISIONS				
REV	DESCRIPTION	BY	DATE	DATE RELEASED
P	REVISED PER E02004-118	DAP	4/30/04	

HAZARDOUS LOCATION PER  
 CLASS I, DIV. 1, GROUPS A,B,C,D  
 CLASS II, DIV. 1, GROUPS E,G  
 CLASS III, DIV.1

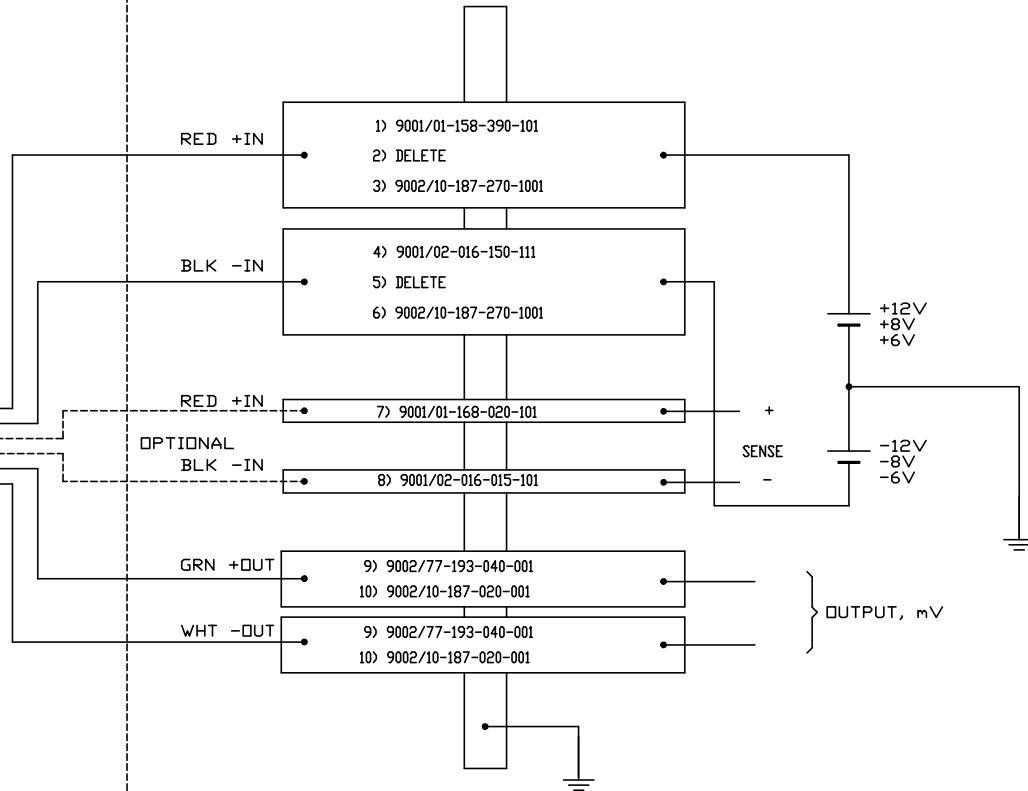
NON-HAZARDOUS LOCATION



LOAD CELL  
 3

J-BOX  
 OPTIONAL

FLOATING SYSTEM WITH  
 STAHL BARRIERS



NO CHANGES ARE TO BE MADE TO THIS  
 DRAWING WITHOUT WRITTEN APPROVAL OF  
 FACTORY MUTUAL RESEARCH COMPANY.

SEE SHEET 1 OF 5 FOR APPLICATION NOTES.

NOTES: UNLESS OTHERWISE SPECIFIED

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 APPARATUS OR DEVICES WITHOUT THE WRITTEN APPROVAL OF REVERE TRANSDUCERS INC.

	UNLESS OTHERWISE SPECIFIED:	DRAWN BY: JSP	6/20/90
	DIMENSIONS ARE IN INCHES.	CHECKED BY:	
	TOLERANCES:	APPR. BY:	
	.X ± .10	DO NOT SCALE DRAWING	
	.XX ± .01	MATERIAL:	
	.XXX ± .005	FINISH:	
	ANGLES ± 10° 0'	APPLICATION	
	SURFACE FINISH: 125	NEXT ASSY. USED ON	
	REMOVE BURRS AND BREAK SHARP EDGES .010 MAX.		
	ALL DIAMETERS ON COMMON AXIS CONCENTRIC WITHIN .005 T.I.R.		
	ALL DIMENSIONS AND FITS APPLY AFTER FINISH AND HEAT TREAT.		
	DIMENSIONING AND TOLERANCING PER ASME Y14.5M-1994		

INTRINSIC SAFETY  
 INSTALLATION PLAN USING  
 FM APPROVED BARRIERS

REVERE TRANSDUCERS  
 TUSTIN CALIFORNIA, U.S.A.

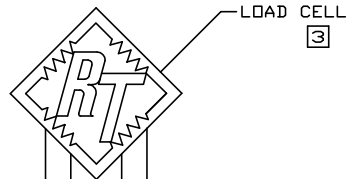
SIZE CODE IDENT NO. DRAWING NO. REV  
 C 23796 29184 P

SCALE: NONE RELEASED BY: SHEET: 4 OF 5

REVISIONS				
REV	DESCRIPTION	BY	DATE	DATE RELEASED
P	REVISED PER E02004-118	DAP	4/30/04	

HAZARDOUS LOCATION PER  
CLASS I, II, III, Div. 1 & 2, Groups C-G

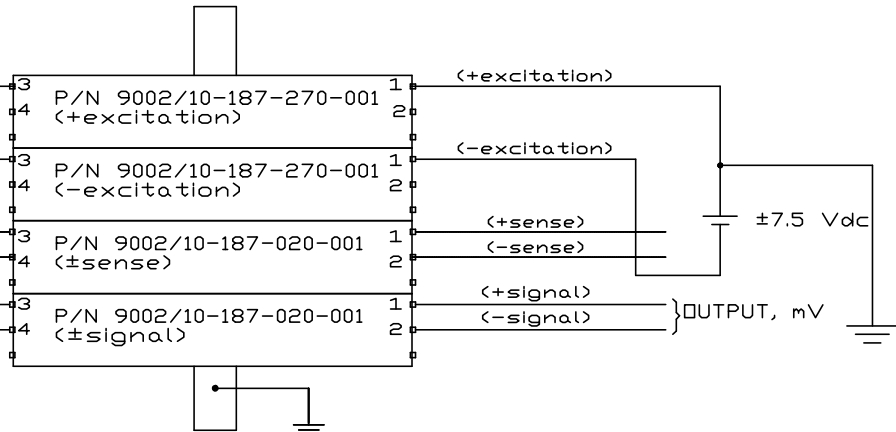
NON-HAZARDOUS LOCATION



LOAD CELL  
③

J-BOX  
OPTIONAL

SENSE (OPTIONAL)



FLOATING SYSTEM WITH  
STAHL BARRIERS

OUTPUT, mV

NO CHANGES ARE TO BE MADE TO THIS  
DRAWING WITHOUT WRITTEN APPROVAL OF  
FACTORY MUTUAL RESEARCH COMPANY.

SEE SHEET 1 OF 5 FOR APPLICATION NOTES.

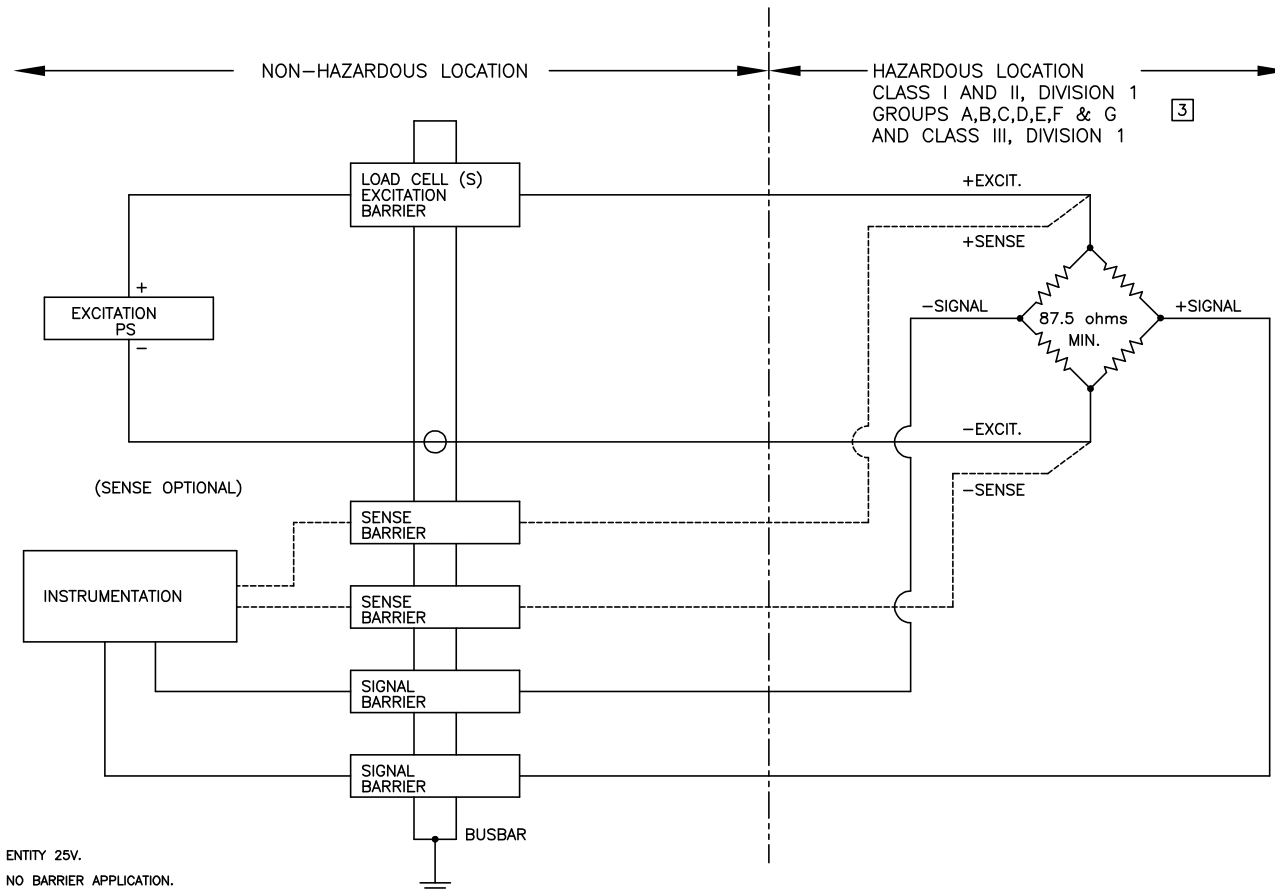
NOTES: UNLESS OTHERWISE SPECIFIED

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TRANSDUCERS INC., AND SHALL NOT BE REPRODUCED, COPIED OR USED FOR MANUFACTURE OR SALE OF  
APPARATUS OR DEVICES WITHOUT THE WRITTEN APPROVAL OF REVERE TRANSDUCERS INC.

	UNLESS OTHERWISE SPECIFIED:	DRAWN BY: JSP	7/1/92	INTRINSIC SAFETY INSTALLATION PLAN USING FM APPROVED BARRIERS
	DIMENSIONS ARE IN INCHES.	CHECKED BY:		
	TOLERANCES: .X ±.10 .XX ±.01 .XXX ±.005 ANGLES ±10° 0'	APPR. BY:		
	SURFACE FINISH: REMOVE BURRS AND BREAK SHARP EDGES .010 MAX.	DO NOT SCALE DRAWING		
	ALL DIAMETERS ON COMMON AXIS CONCENTRIC WITHIN .005 T.I.R. ALL DIMENSIONS AND FITS APPLY AFTER FINISH AND HEAT TREAT.	MATERIAL:		REVERE  TRANSDUCERS TUSTIN CALIFORNIA, U.S.A.
	DIMENSIONING AND TOLERANCING PER ASME Y14.5M-1994	FINISH:		SIZE CODE IDENT NO. DRAWING NO. REV
NEXT ASSY.	USED ON			C 23796 29184 P
APPLICATION				SCALE: NONE RELEASED BY: SHEET: 5 OF 5

POSITIVE EXCITATION BARRIER:	Vmax. = +12V	Imax. = 179 mA	C: = 0	L: = 0	Pi = 0.54W
POSITIVE SENSE BARRIER:	Vmax. = +16V	Imax. = 50 mA	C: = 0	L: = 0	Pi = 0.20W
NEGATIVE SENSE BARRIER:	Vmax. = -16V	Imax. = 50 mA	C: = 0	L: = 0	Pi = 0.20W
POSITIVE SIGNAL BARRIER:	Vmax. = +16V	Imax. = 50 mA	C: = 0	L: = 0	Pi = 0.20W
NEGATIVE SIGNAL BARRIER:	Vmax. = -16V	Imax. = 50 mA	C: = 0	L: = 0	Pi = 0.20W

REVISIONS				
REV	DESCRIPTION	BY	DATE	DATE RELEASED
D	REVISED PER E02004-118	D.PARTIDA	2/3/04	



8. SEE DRAWING 29302 FOR ENTITY 25V.  
 7. SEE DRAWING 29224 FOR NO BARRIER APPLICATION.  
 6. SEE DRAWING 29184 FOR SYSTEM APPROVAL.  
 5. APPARATUS LOCATED IN THE HAZARDOUS AND THE ASSOCIATED APPARATUS IN THE NON-HAZARDOUS LOCATIONS MUST HAVE AN ENTITY APPROVAL.  
 4. UP TO FOUR (4) LOAD CELLS AT 350 OHMS MIN. EACH IN PARALLEL (SEE DRAWING 29216 FOR APPROVED LOAD CELLS).  
 3. WHEN ALL BARRIERS ARE POSITIVE POTENTIAL, IT IS SUITABLE FOR GROUPS IS/1,II,III/1/ABCDEF.  
 2. V<sub>L</sub> AND I<sub>T</sub> OF THE BARRIERS MUST NOT EXCEED THOSE WHICH ARE STATED ON CHART ABOVE.  
 1. MAXIMUM SAFE AREA VOLTAGE NOT TO EXCEED 250 VAC.  
 NOTES: UNLESS OTHERWISE SPECIFIED

11. INSTALLATION SHALL BE IN ACCORDANCE WITH NEC ARTICLES 504 AND 505 AND ISA RP 12.06.01.  
 10. TO CALCULATE IN DISTANCE OF A GIVEN CABLE LENGTH USE: Cc = 0.20 mH/ft (200 p F/M).  
 9. TO CALCULATE CAPACITANCE OF A GIVEN CABLE LENGTH USE: Cc = 60 pF/ft (200 pF/M).

NO CHANGES ARE TO BE MADE TO THIS DRAWING WITHOUT WRITTEN APPROVAL OF FACTORY MUTUAL RESEARCH COMPANY.

THIS DOCUMENT CONTAINS INFORMATION CONSIDERED TO BE CONFIDENTIAL AND PROPRIETARY BY REVERE TRANSDUCERS INC. AND SHALL NOT BE REPRODUCED, COPIED OR USED FOR MANUFACTURE OR SALE OF APPARATUS OR DEVICES WITHOUT THE WRITTEN APPROVAL OF REVERE TRANSDUCERS INC.

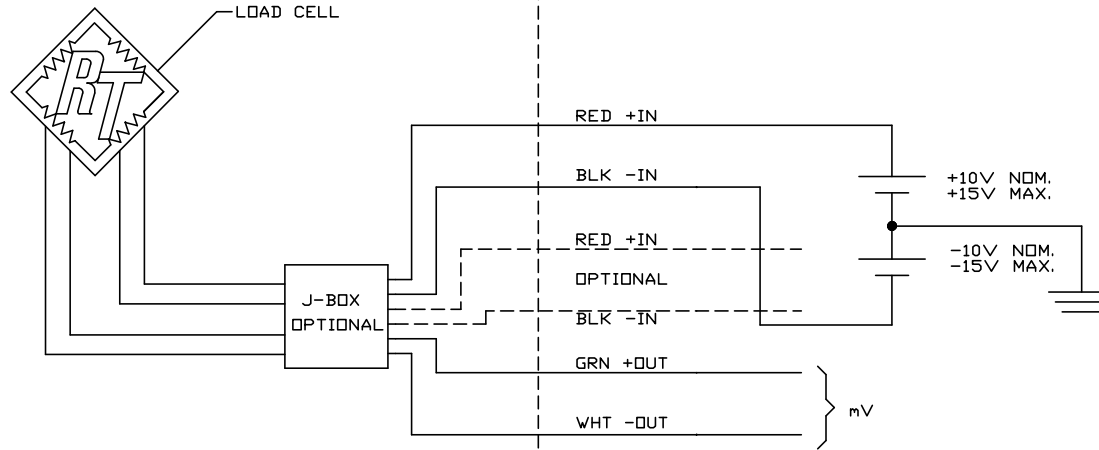
UNLESS OTHERWISE SPECIFIED:		DRAWN BY: BERT P.	3/9/93
DIMENSIONS ARE IN INCHES. TOLERANCES:		CHECKED BY:	
.X ±.03		APPR. BY:	
.XX ±.01		DO NOT SCALE DRAWING	
.XXX ±.005		MATERIAL:	
ANGLES ± 0° 30'		FINISH:	
SURFACE FINISH: 125 / REMOVE BURRS AND BREAK SHARP EDGES .010 MAX.		ALL DIAMETERS ON COMMON AXIS CONCENTRIC WITHIN .005 T.I.R.	
ALL DIMENSIONS AND FITS APPLY AFTER FINISH AND HEAT TREAT.		DIMENSIONING AND TOLERANCING PER ASME Y14.5M-1994	
NEXT ASSY.	USED ON	APPLICATION	

INTRINSIC SAFETY INSTALLATION PLAN, POSITIVE POTENTIAL (ENTITY FM APPROVED)			
REVERE		TRANSDUCERS	
TUSTIN		CALIFORNIA, U.S.A.	
SIZE	CODE IDENT NO.	DRAWING NO.	REV
C	23796	29215	D
SCALE: NONE		RELEASED BY:	SHEET: 1 OF 1

REVISIONS				
LTR	DESCRIPTION	DATE	APPROVED	RELEASED BY
A	REVISED PER ED2004-033	2/3/04		

HAZARDOUS LOCATION  
CLASS I,II,III, DIV. 2,  
GROUPS ABCDG

NON-HAZARDOUS LOCATION



10. TO DETERMINE CABLE INDUCTANCE, USE: .20uH/ft (.66uH/M)
9. TO DETERMINE CABLE CAPACITANCE, USE: 60pF/ft (200pF/M)
8.  $L_a \leq L_l + L_{cable}$
7.  $C_a \leq C_l + C_{cable}$
6.  $V_{max} \leq V_{oc} \text{ OR } V_t$
5. SEE DRAWING 29184 FOR SYSTEM OR LOOP FM APPROVAL.
4. SEE DRAWING 29215 FOR ENTITY FM APPROVAL.
3. SEE DRAWING 29216 FOR LIST OF FM APPROVED LOAD CELLS.
2. ELECTRICAL EQUIPMENT CONNECTED TO LOAD CELLS NOT USE OR GENERATE MORE THAN 250 VOLTS.
1. INSTALLATION WIRING TO BE IN ACCORDANCE WITH ANSI/ISA RP 12.6 "INSTALLATION OF INTRINSICALLY SAFE INSTRUMENTS SYSTEMS IN CLASS II HAZARDOUS LOCATION".

NO CHANGES ARE TO BE MADE TO THIS DRAWING WITHOUT WRITTEN APPROVAL OF FM APPROVALS.

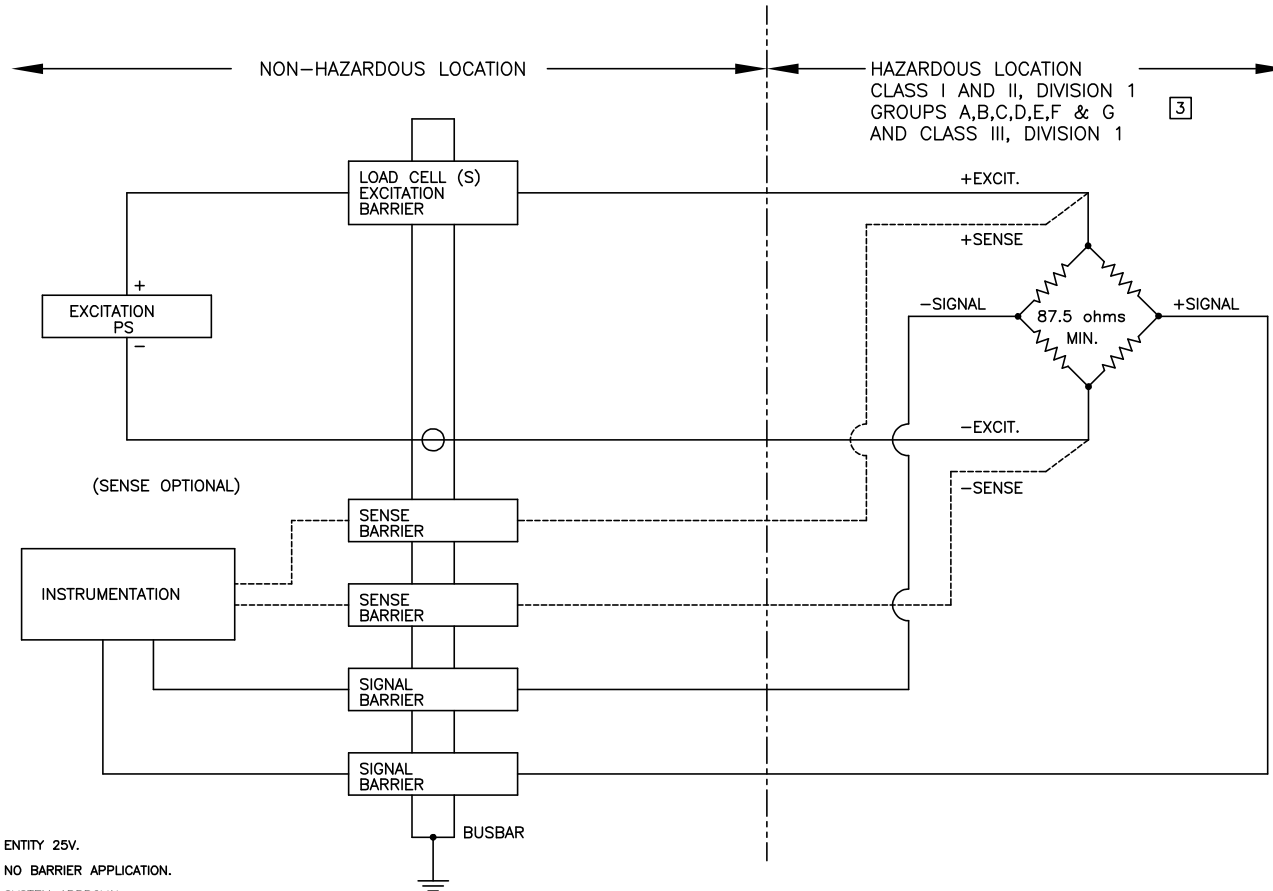
NOTES: UNLESS OTHERWISE SPECIFIED

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QTY. REQUIRED PER ASSEMBLY		PART NO.	NOMENCLATURE	ITEM NO.
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES X ±.015 XX ±.010 XXX ±.005 ANGULAR ±0°30'		LIST OF MATERIALS		
MATERIAL:		REVERE TRANSDUCERS INC. CERRITOS, CALIFORNIA		
FINISH:		FM APPROVED INSTALLATION PLAN WITHOUT USING BARRIERS		
NEXT ASSY		OTHER APPROVAL:	SIZE	CODE IDENT NO.
USED ON		OTHER APPROVAL:	C	23796
APPLICATION		OTHER APPROVAL:	SCALE	NONE
				29224
				SHEET: 1 OF 1

POSITIVE EXCITATION BARRIER:	Vmax. = +12V	Imax. = 179 mA	C: = 0	L: = 0	Pi = 0.54W
POSITIVE SENSE BARRIER:	Vmax. = +16V	Imax. = 50 mA	C: = 0	L: = 0	Pi = 0.20W
NEGATIVE SENSE BARRIER:	Vmax. = -16V	Imax. = 50 mA	C: = 0	L: = 0	Pi = 0.20W
POSITIVE SIGNAL BARRIER:	Vmax. = +16V	Imax. = 50 mA	C: = 0	L: = 0	Pi = 0.20W
NEGATIVE SIGNAL BARRIER:	Vmax. = -16V	Imax. = 50 mA	C: = 0	L: = 0	Pi = 0.20W

REVISIONS				
REV	DESCRIPTION	BY	DATE	DATE RELEASED
A	REVISED PER E02004-118	D.PARTIDA	5/6/04	



8. SEE DRAWING 29302 FOR ENTITY 25V.
  7. SEE DRAWING 29224 FOR NO BARRIER APPLICATION.
  6. SEE DRAWING 29184 FOR SYSTEM APPROVAL.
  5. APPARATUS LOCATED IN THE HAZARDOUS AND THE ASSOCIATED APPARATUS IN THE NON-HAZARDOUS LOCATIONS MUST HAVE AN ENTITY APPROVAL.
  4. UP TO FOUR (4) LOAD CELLS AT 350 OHMS MIN. EACH IN PARALLEL (SEE DRAWING 29216 FOR APPROVED LOAD CELLS).
  3. WHEN FIRST 3 BARRIERS ARE POSITIVE POTENTIAL AND THE REST ARE NEGATIVE POTENTIAL, IT IS SUITABLE FOR GROUPS IS/I,II,III/1,C/DEFG.
  2. V<sub>L</sub> AND I<sub>L</sub> OF THE BARRIERS MUST NOT EXCEED THOSE WHICH ARE STATED ON CHART ABOVE.
  1. MAXIMUM SAFE AREA VOLTAGE NOT TO EXCEED 250 VAC.
- NOTES: UNLESS OTHERWISE SPECIFIED

11. INSTALLATION SHALL BE IN ACCORDANCE WITH NEC ARTICLES 504 AND 505 AND ISA RP 12.06.01.
10. TO CALCULATE IN DISTANCE OF A GIVEN CABLE LENGTH USE: Cc = 0.20 mH/ft (200 p F/M).
9. TO CALCULATE CAPACITANCE OF A GIVEN CABLE LENGTH USE: Cc = 60 pF/ft (200 pF/M).

NO CHANGES ARE TO BE MADE TO THIS DRAWING WITHOUT WRITTEN APPROVAL OF FACTORY MUTUAL RESEARCH COMPANY.

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UNLESS OTHERWISE SPECIFIED:	DRAWN BY: D.PARTIDA	5/6/04
DIMENSIONS ARE IN INCHES.	CHECKED BY:	
TOLERANCES:	APPR. BY:	
.X ±.03	DO NOT SCALE DRAWING	
.XX ±.01	MATERIAL:	
.XXX ±.005	FINISH:	
ANGLES ± 0° 30'		
SURFACE FINISH: 125/		
REMOVE BURRS AND BREAK SHARP EDGES .010 MAX.		
ALL DIAMETERS ON COMMON AXIS CONCENTRIC WITHIN .005 T.I.R.		
ALL DIMENSIONS AND FITS APPLY AFTER FINISH AND HEAT TREAT.		
DIMENSIONING AND TOLERANCING PER ASME Y14.5M-1994		
NEXT ASSY. USED ON		
APPLICATION		

INTRINSIC SAFETY INSTALLATION PLAN, NEGATIVE POTENTIAL (ENTITY FM APPROVED)		
REVERE  TRANSDUCERS TUSTIN CALIFORNIA, U.S.A.		
SIZE	CODE IDENT NO. DRAWING NO.	REV
C	23796 29313	A
SCALE: NONE		RELEASED BY:
		SHEET: 1 OF 1



LOAD CELL MODELS:

ACLC, BSP, CBU, CP, CSP, GOZINTA, HPS, HSB, KB, LPC,  
 LTO, MWP, SHB, SSB, SSS, RLC, UEP, UMP, UPF, USP, USPF, TO, TSP,  
 42, 43, 62H, 63H, 82, 92, 93, 182, 263A, 263C, 263D, 363,  
 392A, 392B, 392C, 462, 562, 562A, 612, 642, 652, 662, 662A,  
 692B, 693A, 792, 933, 942, 943, 953, 962, 963, 992, 993, 5102,  
 5103, 5112, 5123, 5203, 5222, 5223, 5303, 5323, 5352,  
 5423, 5503, 5723, 6762, 7062, 7064, 8301330-10, 8301380-10,  
 8301385-10, 9102, 9103, 9123, 9203, 9223, 9303, 9323, 9332,  
 9363, 9403, 9423, 9523, 9603, 9723, 9803, 9903.

AIRCRAFT CELL MODELS:

145910, 146170, 146165, 146175, 156915, AND 143595

LOAD CELL SPECIAL:

153665 (UNIVERSAL DUAL BRIDGE)  
 600484 (SHEAR BEAM)  
 601078 (SHEAR BEAM)

MODEL DEFINITION: BSPa-b-c-defgh

- where
- a = Load direction C,T,U, No. of bridge or blank.
  - b = Accuracy designation A00-Z99 or 000-999 or blank.
  - c = Capacity 1.0 lb. - 500,000 lbs. (0.45 kg - 227t).
  - d = Cable length in ft. 01-99 or A0-B9 or blank.
  - e = Connector & wiring C1-C9 or blank.
  - f = Specification variations, No. of bridge, Conduit fitting A-Z or blank.
  - g = Wiring, paint color, customer label 1-9 or blank.
  - h = Mechanical variation not related to intrinsic safety AA-ZZ or 1A-9Z or blank.

REVISIONS				
REV	DESCRIPTION	BY	DATE	DATE RELEASED
J	REVISED PER E02004-033	D.PARTIDA	2/3/04	

BARRIER MANUFACTURERS:

MTL INC.  
 8576 WELLINGTON ROAD  
 P.O. BOX 1690  
 MANASSAS, VA 22110-1690  
 U.S.A.  
 PHONE: (703) 361-0111  
 FAX: (703) 368-1029

R. STAHL, INC.  
 150-L NEW BOSTON STREET  
 WOBURN, MA 01801  
 U.S.A.  
 PHONE: (800) 782-4357, (800) 782-7233  
 FAX: (617) 933-7896


TEST AGENCY:

FM APPROVALS  
 1151 BOSTON PROVIDENCE TURNPIKE  
 NORWOOD, MA 02062  
 PHONE: (781) 762-4300  
 TELEX: 92-4415  
 FAX: (781) 762-9375

NO CHANGES ARE TO BE MADE TO THIS DRAWING WITHOUT WRITTEN APPROVAL OF FM APPROVALS.

1. SEE DWG. NO. 29184, 29215, 29224, & 29302 FOR INSTALLATION PLANS.

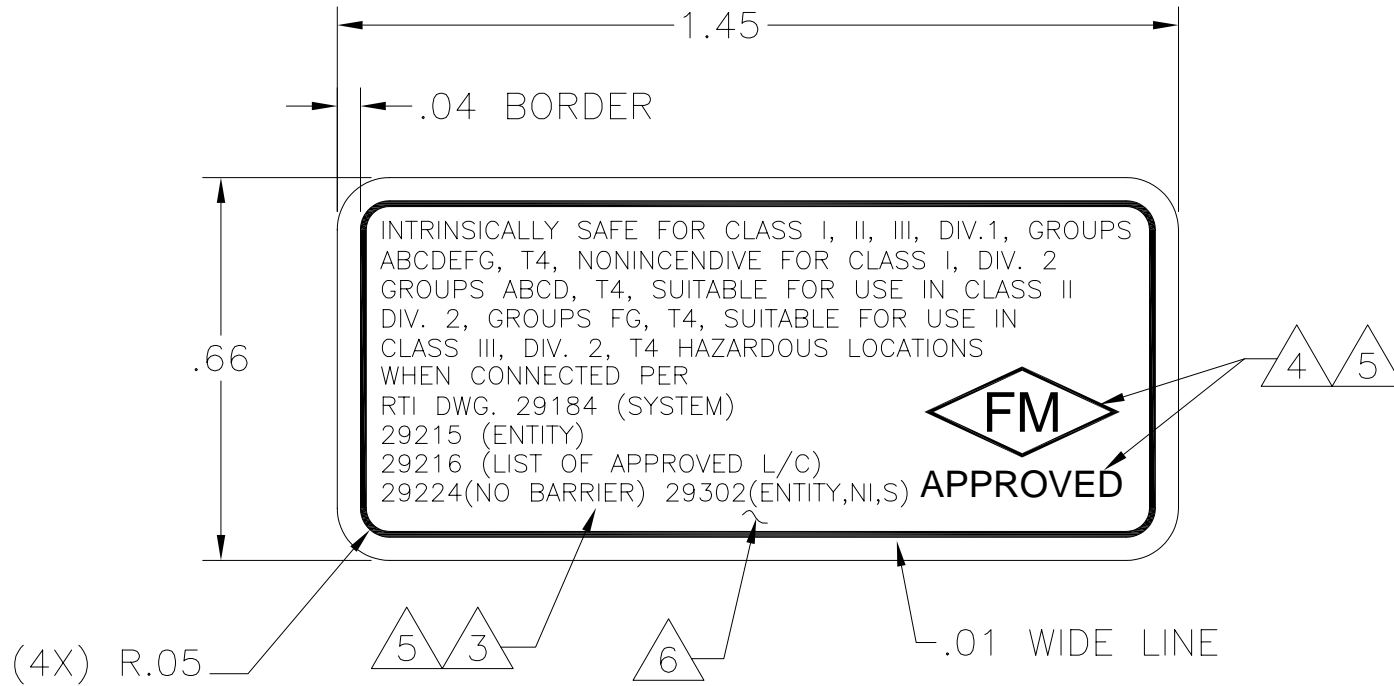
NOTES: UNLESS OTHERWISE SPECIFIED

		UNLESS OTHERWISE SPECIFIED:	DRAWN BY: BERT P.	1/21/97	FM APPROVED LOAD CELLS  REVERE TRANSDUCERS TUSTIN CALIFORNIA, U.S.A.						
		DIMENSIONS ARE IN INCHES.	CHECKED BY:					SIZE	CODE IDENT NO.	DRAWING NO.	REV
		TOLERANCES:	APPR. BY:					B	23796	29216	J
		.X ± .03 .XX ± .01 .XXX ± .005 ANGLES ± 0° 30'	DO NOT SCALE DRAWING					SCALE: NONE		RELEASED BY:	SHEET: 1 OF 1
		SURFACE FINISH: $\sqrt{125}$	MATERIAL:								
		REMOVE BURRS AND BREAK SHARP EDGES .010 MAX.	FINISH:								
FM2001-001	FM FORM	ALL DIAMETERS ON COMMON AXIS CONCENTRIC WITHIN .005 T.I.R.									
NEXT ASSY.	USED ON	ALL DIMENSIONS AND FITS APPLY AFTER FINISH AND HEAT TREAT.									
APPLICATION		DIMENSIONING AND TOLERANCING PER ASME Y14.5M-1994									

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SUGGESTED VENDOR:  
TOPFLIGHT CORP.  
277 Commerce Drive  
Glen Rock Pennsylvania 17327.8625  
Telephone 717.227.5400  
Fax 717.227.1415


REVISIONS				
REV	DESCRIPTION	BY	DATE	DATE RELEASED
J	REVISED PER E02004-406	JP	12/21/04	



NO CHANGES ARE TO BE MADE TO THIS DRAWING WITHOUT WRITTEN APPROVAL OF FACTORY MUTUAL RESEARCH COMPANY.

- 6 BACKGROUND TO BE BLACK COLOR.
  - 5 ALL CHARACTERS, LOGO & BORDER TO BE SATIN ALUMINUM (CLEAR).
  - 4 LOGO TO BE SUPPLIED BY R.T.I.
  - 3 ALL LETTERS .03 HIGH GOTHIC CONDENSED.
2. PROOF MUST BE SUBMITTED TO QUALITY CONTROL FOR APPROVAL.
- 1 BASE MATL:  
.002 WHITE POLYESTER, (P/N 2945) WITH VOID DESTRUCT/ADHESIVE 300  
OVERLAY: .001 CLEAR POLYESTER/ACRYLIC ADHESIVE.
- NOTES: UNLESS OTHERWISE SPECIFIED

		UNLESS OTHERWISE SPECIFIED:	DRAWN BY: JPARGAS	5/18/92
		DIMENSIONS ARE IN INCHES.	CHECKED BY:	
		TOLERANCES:	APPR. BY:	
		.X ± .03	DO NOT SCALE DRAWING	
		.XX ± .01	MATERIAL:	
		.XXX ± .005		
		ANGLES ± 0° 30'		
		SURFACE FINISH: 125 ✓	FINISH:	
		REMOVE BURRS AND BREAK SHARP EDGES .010 MAX.		
		ALL DIAMETERS ON COMMON AXIS CONCENTRIC WITHIN .005 T.I.R.		
		ALL DIMENSIONS AND FITS APPLY AFTER FINISH AND HEAT TREAT.		
		DIMENSIONING AND TOLERANCING PER ASME Y14.5M-1994		
NEXT ASSY.	USED ON			
APPLICATION				

LABEL FACTORY MUTUAL SYSTEM			
REVERE  TRANSDUCERS TUSTIN CALIFORNIA, U.S.A.			
SIZE	CODE IDENT NO.	DRAWING NO.	REV
B	23796	30346	J
SCALE: NONE		RELEASED BY:	SHEET: 1 OF 1

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