TELEDYNE ANALYTICAL INSTRUMENTS

ENGINEERING CHANGE ORDER (ECO)

ECO No. 14-0110

ECR No. 14-0109

SH. 1 OF 1

FAMILY:	MODEL:	PREPARED BY:	RESP. ENGINEER:	CHANGE CATEGORY
	R22AHJR	Vincent Figueroa 2/13/15	OK MG 2/18/15 Michael Gonzalez	M1 M2 (M3) REC

REASON FOR CHANGE:
Initial release of new R-Series 0.360 dia cathode sub-assembly with a thicker Rhodium plating (30 micro-inch). Also, initial release of the new R22AHJR O2 sensor for Viamed's customer (Jikco Ltd): PN C44611-R22AHJR. The new sensor is to be assembled using the new cathode in the new dry/wet sub-assemblies.

CAUSE CODE
1 2 3 4 5 6 7 (8) 9 10

SUB-CONTRACT
(YES) OR NO

RE-TRAINING REQ.
YES OR NO

AFFECTED DOCUMENTS	INCORP.	REVISION WAS	REVISION IS	MATERIAL DISPOSITION N=N/A U=USE R=REWORK S=SCRAP: ON ORDER	STOCK	ASSY	TEST	FIN. GOODS	FIELD	NOTIFIED BODY NOTIFICATION [ ] / MANUFACTURING EFFECTIVITY
C44611-R22AHJR	X	-	0	N					N	2/20/15
C44611-R22AHJR-RS	X	-	0	N					N	
A92253	X	-	0	N					N	
A92253-RS	X	-	0	N					N	
B92254	X	-	0	N					N	
B92254-RS	X	-	0	N					N	
B92255	X	-	0	N					N	
C92256	X	-	0	N					N	
A92257	X	-	0	N					N	2/20/15

DESCRIPTION OF CHANGE:

C44611-R22AHJR, FINAL ASSY, CLASS R22AHJR
C44611-R22AHJR-RS, ROUTE SHEET
A92253, CATHODE CORE
A92253-RS, ROUTE SHEET, CATHODE CORE
B92254, CATHODE PLATING
B92254-RS, ROUTE SHEET, CATHODE PLATING
B92255, DRY SUBASSEMBLY
C92256, WET SUBASSEMBLY
A92257, BAG LABEL, CLASS R22AHJR
-Production Release

Compliance Matrix, Class C44611-R22AHJR
-To be file in document control

TELEDYNE
Analytical Instruments
Configuration Management
ECO Release Copy

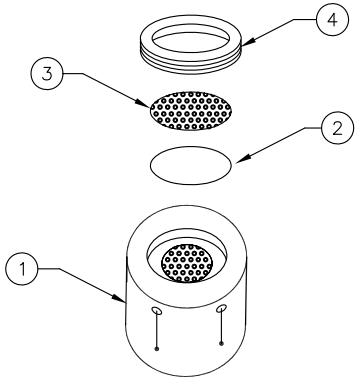
CHANGE CONTROL BOARD (CCB)

ENGINEERING:	QUALITY:	SALES:	GENERAL MANAGER:
SIGNATURE: DATE: 2/13/15	SIGNATURE: DATE: 2-13-15	SIGNATURE: DATE: 2/18/15	SIGNATURE: DATE:
PRINT NAME: MANH NGUYEN	PRINT NAME: Rogen Stadlin	PRINT NAME: LOEN NIL	PRINT NAME:
TEST:	**PRODUCTION CONTROL:**	**CONFIGURATION**	**E.H.S.:**
SIGNATURE: DATE: 2/13/15	SIGNATURE: DATE: 2/13/15	SIGNATURE: DATE: 2/13/15	SIGNATURE: DATE:
PRINT NAME: ZHEMIE SUN	PRINT NAME: HUMBERTO LANDEROS	PRINT NAME: VINCENT FIGUEROA	PRINT NAME:

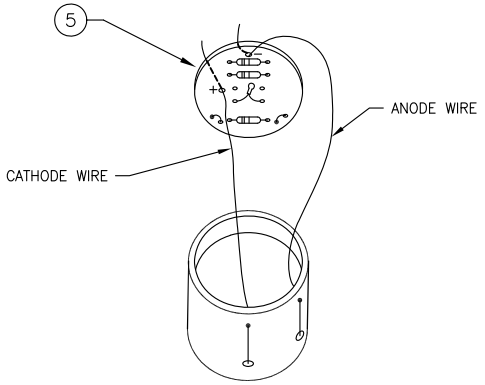
NOTES: UNLESS OTHERWISE SPECIFIED.

1. REFER TO MANUFACTURING PROCEDURE MP-D61679 FOR ASSEMBLY & TESTING.
2. SUBSTITUTE ITEM 12 FOR ITEM 5 AS REQUIRED BY ITEM 1 CURRENT OUTPUT.
3. TEST LIMITS: SAME AS R22AHJ WITH AIR OUTPUT OF 10.5-13.5 MV.
4. SPEC. CONTROL DWG.: B-73203

REVISIONS				
REV	DESCRIPTION	DATE	APP.	REV. BY
0	INITI REL ECO 14-0110	09/15/14	MG	VF



STEP 1



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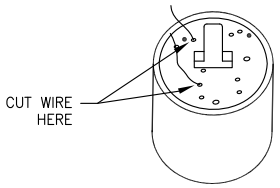

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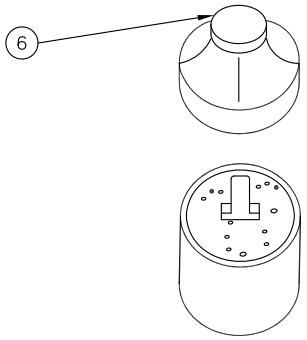

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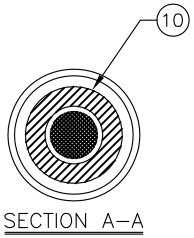
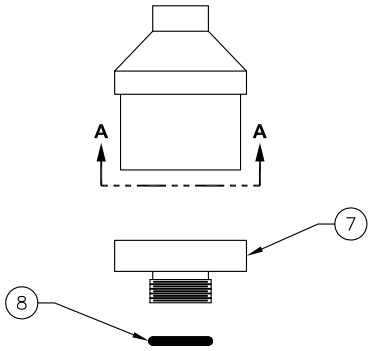
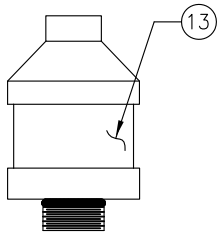


SECTION A-A



STEP 5



STEP 6

ITEM	QTY	PART NO.	DESCRIPTION
16	REF	B-73203	SPEC CONTROL DWG
15	1	B-173	BAG (NOT SHOWN)
14	1	A-92257	LABEL, BAG (NOT SHOWN)
13	1	A-83257	LABEL, R22AHJR
(2) 12	REF	C65452-D	P.C. BOARD ASSEMBLY OPT'L (MED OUTPUT SENSOR)
11	REF	MPD-61679	MANUFACTURING PROCEDURE
10	1	A59557	DOUBLE SIDED ADHESIVE WASHER
9	REF	C44611-R22AHJ-RS	ROUTE SHEET
8	1	O 26	O-RING
7	1	A52074	DIVERTER CAP
6	1	A43983	CONTACT CAP
(2) 5	1	C65452-B	P.C. BOARD ASSEMBLY (HIGH OUTPUT SENSOR)
4	1	A59160	CLAMP RETAINER RING
3	1	A55791	CLAMP WIRE MESH
2	1	A40956	CUSHION CLAMP
1	1	C-92256	WET SUBASSEMBLY

BILL OF MATERIAL

DO NOT SCALE DRAWING

UNLESS OTHERWISE SPECIFIED
ALL DIMENSIONS IN INCHES
TOLERANCE
LINEAR .X = ±.1, .XX = ±.02, .XXX = ±.010
ANGULAR ±1/2°

TELEDYNE INSTRUMENTS
Analytical Instruments
A Teledyne Technologies Company
City of Industry, California, 91748, USA

S/	SIGNATURES	DATE
I/	DRFT: MGONZALEZ	09/15/14
N/	CHK:	
P/	APPR:	
O/	ENGR: MGONZALEZ	
F/	C.O.	
REFERENCE	CAD ID C44611-R22AHJR-0	

TITLE
FINAL ASSEMBLY
OXYGEN SENSOR
CLASS R-22AHJR

SCALE ---
SIM
SHEET 1 OF 1

MATL. AS LISTED
DWG NO. C-44611-R22AHJR
REV 0

ROUTE SHEET MEXICO/USA MICRO FUEL CELL	ECO # 14-0110	REV 0	TELEDYNE *Analytical Instruments*
PART # C44611-R22AHJR	S/O:		W/O:
DESCRIPTION: R22AHJR SENSOR			QTY:

SEQ. NO.	PROCESSES	EMPL.	ACC.	REJ.	DATE
	DOCUMENTATION INFORMATION				
10	**Dry Operation**				
	Bxxxxx REV._____ _____ REV._____				
	MPD61679 REV._____ _____ REV._____				
	_____ REV._____ _____ REV._____				
	_____ REV._____ _____ REV._____				
	_____ REV._____ _____ REV._____				
	_____ REV._____ _____ REV._____				
	_____ REV._____ _____ REV._____				
	Wet Operation				
	Cxxxxx REV._____ _____ REV._____				
	MPD61679 REV._____ _____ REV._____				
	_____ REV._____ _____ REV._____				
	_____ REV._____ _____ REV._____				
	_____ REV._____ _____ REV._____				
	_____ REV._____ _____ REV._____				
	_____ REV._____ _____ REV._____				
	Final Operation				
	C44611-R22AHJR REV._____ _____ REV._____				
	MPD61679 REV._____ _____ REV._____				
	_____ REV._____ _____ REV._____				
	_____ REV._____ _____ REV._____				
	_____ REV._____ _____ REV._____				
	_____ REV._____ _____ REV._____				
	_____ REV._____ _____ REV._____				
	Testing Operation (Includes labeling and packaging)				
	C44611-R22AHJR REV._____ _____ REV._____				
	MPD61679 REV._____ _____ REV._____				
	B49230 REV._____ _____ REV._____				
	_____ REV._____ _____ REV._____				
	_____ REV._____ _____ REV._____				
	_____ REV._____ _____ REV._____				
	_____ REV._____ _____ REV._____				
	_____ REV._____ _____ REV._____				
	Part Number Information				
	_____ REV._____ _____ REV._____				
	_____ REV._____ _____ REV._____				
	_____ REV._____ _____ REV._____				
	_____ REV._____ _____ REV._____				
	_____ REV._____ _____ REV._____				
	_____ REV._____ _____ REV._____				

OPERATIONAL ROUTE SHEET - MICRO FUEL CELL

TELEDYNE
Analytical Instruments

PART # C44611-R22AHJR	S/O:	W/O:
DESCRIPTION: R22AHJR SENSOR		QTY.

PROCESSES

SEQ. NO.		EMPL.	ACC.	REJ.	DATE
20	PERFORM THE DRY ASSEMBLY OPERATION USING THE DOCUMENTS LISTED ON SEQUENCE 10.				

SEQ. NO.										
30	PERFORM THE SENSOR WET ASSEMBLY OPERATION USING THE DOCUMENTS LISTED IN SEQUENCE 10.									
	DATE	SENSOR CLASS	QTY. OF SCRAP	INTO LEAK	OUT OF LEAK	QTY. OF REWORK	EMPL.	ACC.	REJ.	DATE

REWORK PROCESSES

SEQ. NO.										
35	REWORKING SENSOR DISCREPANCIES FROM THE INITIAL LEAK TESTING PROCESS USING DOCUMENTS LISTED ON SEQUENCE 10.									
	DATE	SENSOR CLASS	QTY. OF REWORK	QTY. OF SCRAP	QTY PASSED	QC DISCRP./ NR #	REWORKED BY	ACC.	REJ.	DATE

OPERATIONAL ROUTE SHEET - MICRO FUEL CELL

TELEDYNE
Analytical Instruments

PART # C44611-R22AHJR	S/O:	W/O:
DESCRIPTION: R22AHJR SENSOR		QTY.

PROCESSES

SEQ. NO. 40 — **PERFORM FINAL ASSEMBLY OPERATION USING THE DOCUMENTS LISTED IN SEQUENCE 10.**

DATE	SENSOR CLASS	QTY. OUT OF LEAK	QTY. OF LEAK TEST REWORK	QTY. OF FINAL SCRAP	QTY. OF FINAL REWORK	QTY. PASSED	EMPL.	ACC.	REJ.	DATE

REWORK PROCESSES

SEQ. NO. 45 — **REWORKING SENSORS DISCREPANCIES FROM THE FINAL ASSEMBLY AREA INTO**

DATE	SENSOR CLASS	QTY. OF REWORK	QTY SCRAP	QTY PASSED	QC DISCRP./ NR #	EMPL.	ACC.	REJ.	DATE

OPERATIONAL ROUTE SHEET - MICRO FUEL CELL

TELEDYNE
Analytical Instruments

PART # C44611-R22AHJ	S/O:	W/O:
DESCRIPTION: R22AHJ SENSOR		QTY.

SEQ. NO.	PROCESSES	EMPL.	ACC.	REJ.	DATE
50	PERFORM THE TESTING OPERATION USING THE DOCUMENTS LISTED IN SEQUENCE 10. THIS OPERATION ALSO INCLUDES THE LABEL MAKING, PLACEMENT, AND SENSOR PACKAGING.				
	DATE				

NOTES: UNLESS OTHERWISE SPECIFIED

1) RAW MATERIAL IS NOMINALLY 11 MIL THICKNESS BEFORE PLATING.

(2) REFER TO MP-A69876 STEP 4.2 FOR BRASS SHEET INSPECTION. BEFORE PUNCHING IS STARTED, MARK ALL DEFECTIVE/DOUBLE ROWS TO IDENTIFY THEM BEFORE PUNCHING. USE A RED MARKER TO MAKE A LINE ALL THE WAY DOWN ALL DEFECTIVE ROWS. PUNCH THE ENTIRE SHEET. ALL CORES WITH NO RED MARKS ARE GOOD. IMPORTANT: ALL CORES WITH RED MARKS SHOULD BE SEPARATED.

(3) ADJUST RADIUS OF PUNCHING TOOL (A-44776) AS REQUIRED TO PRODUCT THE SPECIFIED DIMENSION.

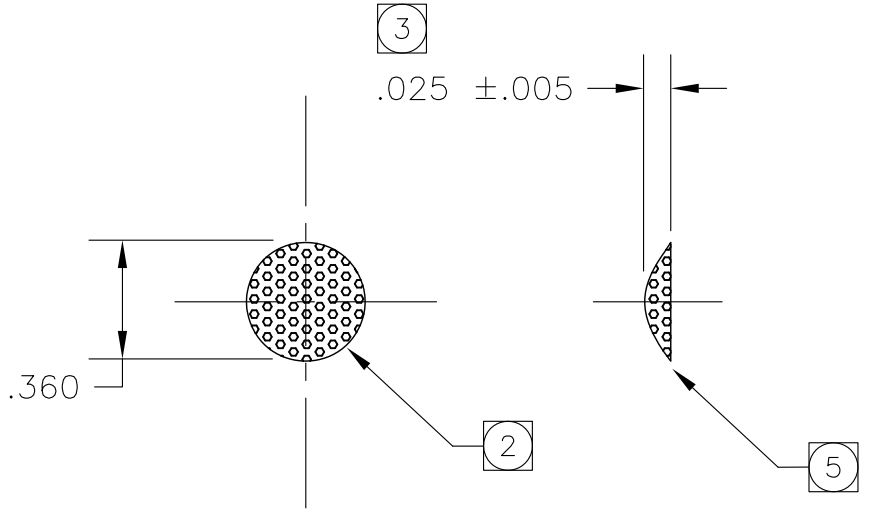
4) FOR DEBURRING, SEND PUNCHED PARTS FOR OUTSIDE PROCESS FOR MACHINE TUMBLING TO REMOVE BURRS FROM EDGES.

(5) VISUALLY CHECK AND THEN FEEL THE EDGE TO ASCERTAIN THE DEBURRING PROCESS AND REMOVAL OF THE SHARPE EDGES WHILE NOTING THE .025±.005 DIMENSION. DO NOT OVER-DEBURR.

6) AFTER THE CLEANING PROCESS, CATHODE CORES FROM THE SAME WORK ORDER ARE TO BE INSPECTED. IMPORTANT: ALL DIRT PARTICLES/RESIDUES SHOULD BE GONE. IF THEY CAN BE SEEN, REPEAT CLEANING PROCESS.

7) WHEN CORES PASS THE INSPECTION PROCESS, THEY ARE TO BE BAGGED IN PLASTIC BAG(S) FOR STORAGE.

REVISIONS				
REV	DESCRIPTION	DATE	APP.	REV. BY
0	PROD. REL. ECO 14-0110	09/15/14	MG	VF



ITEM	QTY	PART NO.	DESCRIPTION
1	REF	A92253-RS	ROUTE SHEET

BILL OF MATERIAL

DO NOT SCALE DWG.

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCE : ANGULAR ±1/2°
LINEAR [.X = ±.1, .XX = ±.02, .XXX = ±.010]

TELEDYNE
Analytical Instruments
A Teledyne Technologies Company, Inc
City of Industry, California, 91748, USA

S/	SIGNATURES	DATE
N/ B92254	DRFT: MGONZALEZ	09/15/14
P/	CHK:	
I/	APPR:	
F/	ENGR: MGONZALEZ	
O/	C.O.:	
REFERENCE	CAD I.D. A92253-0	

TITLE
CATHODE CORE
CATHODE, .360"
OXYGEN SENSOR

SCALE NTS
SIM A74484
SHEET 1 OF 1

MATL. BRASS SHEET 28 GA BR-SP28GA-STR
DWG NO. **A-**92253
REV 0

ROUTE SHEET

ECO	REV
14-0110	0

TELEDYNE
Analytical Instruments

PART # **A92253**	S/O:	W/O:
DESCRIPTION: Cathode, Core Detail, .360" Dia		
DOCUMENTS REQUIRED: A92253, MP-A69876		QTY:

SEQ. NO.	OPERATION LOCATION	PROCESS INSTRUCTIONS	EMPL.	QTY.	DATE
	PRODUCTION	A. RECORD THE WORK ORDER QUANTITY **NOTE**: WHEN SPLITTING THE QUANTITY, CONTACT QC INSPECTOR SPLIT A B C D E F QTY ___ ___ ___ ___ ___ ___ DATE ___ ___ ___ ___ ___ ___ B. RECORD REVISION LEVELS: A-92253 **REV.**____ MP-A69876 **REV.**____ C. INSPECTIONS ARE PERFORMED USING THE CRITERIA CALLED OUT IN THE MANUFACTURING PROCEDURE (MP) OPERATION PERFORMED MUST BE SIGNED OFF AND DATED BY THE OPERATOR.			
10	STOCKROOM	KIT BRASS SHEET: BR SP28 STR			
20	PRODUCTION	SEND OUT TO DEGREASE THE SHEET.			
30	QC	QC RECEIVING INSPECTION PER **QA401 REV**____ INSPECT BRASS SHEET FOR CLEANLINESS: REMOVAL OF GRIT AND OIL: **IMPORTANT: INSPECT BRASS SHEET FOR DEFECTIVE AND DOUBLE ROWS PER MP-A69876 SECTION 4.2.** ROUTE INSPECTED MATERIAL TO MACHINE SHOP			
40	PRODUCTION	LOCATE MATERIAL, SMOOTH SIDE DOWN FOR PUNCHING SET UP AND PUNCH BRASS SHEET TO .360 DIAMETER. USE PUNCH & DIE P/N A44776. SPC TO CHECK EVERY 5 SHEETS PUNCHED TO VERIFY BURRS ARE TO A MINIMUM. SHARPEN PUNCHING TOOL AS NECESSARY. IF ANY, SORT OUT AND DISCARD PUNCHED CORES MARKED BY QC. **IMPORTANT: REFER TO MP-A69876 SECTION 4.3 FOR BRASS SHEET ALIGNMENT AND HOLE POSITION PARAMETER SETTING INFORMATION.**			

ROUTE SHEET

ECO	REV
14-0110	0

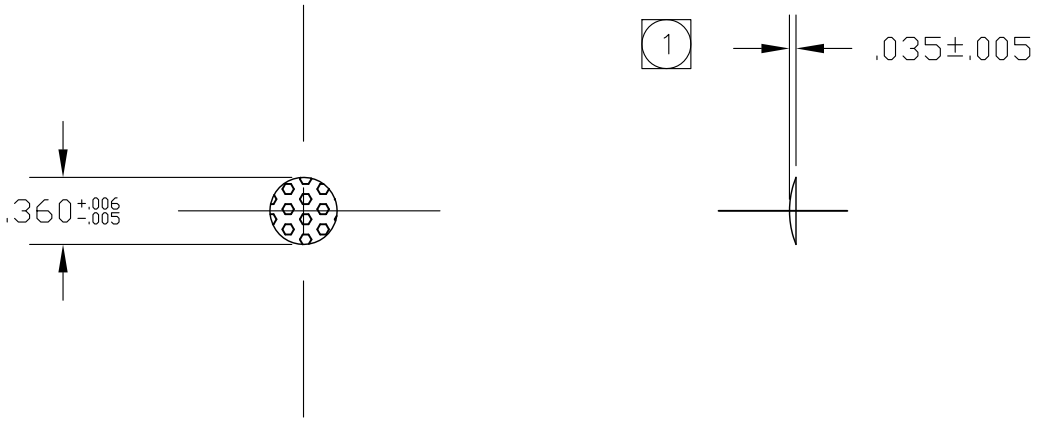
TELEDYNE
Analytical Instruments

PART # **A92253**	S/O:	W/O:
DESCRIPTION: Cathode, Core Detail, .360" Dia		
DOCUMENTS REQUIRED: A92253, MP-A69876		QTY:

SEQ. NO.	OPERATION LOCATION	PROCESS INSTRUCTIONS	EMPL.	QTY.	DATE
50	QC	QC MACHINE SHOP INSPECTION PER **QA402 REV**____ AND PER DRAWING A-92253. VERIFY DIAMETER AND CURVITURE OF CATHODE CORES AND MINIMUM BURRS ON EDGES.			
60	PRODUCTION	SEND OUT FOR OUTSIDE PROCESS FOR MACHINE TUMBLING TO DEBURR EDGES PER MP-A 69876 SECTION 4.4. **IMPORTANT: <u>DO NOT OVER-DEBURR</u>. DEBURR CORES TO REMOVE SHARP EDGES WHILE KEEPING THE .025 ±.005 DIMENSION AS INDICATED IN DWG A-92253**.			
70	QC	QC RECEIVING INSPECTION PER **QA401 REV.**____ AND DRAWING A-92253. INSPECT CORES FOR REMOVAL OF BURRS. NOTE THAT THE .025 ±.005 DIMENSION IS STILL VALID AS INDICATED IN DWG A-92253. IF THIS DIMENSION IS NOT VALID, NOTIFY SENSOR DEPT SUPERVISOR AND/OR SENSOR ENGINEERING.			
80	PRODUCTION	SEND OUT CORES FOR CLEANING PER MP-A 69876 SECTION 4.5; CLEAN WITH MC DERMID BCB OR EQUIVALENT BRASS CLEANER BRIGHT DIP TO REMOVE ANY FOREIGN MATERIAL.			
90	QC	INSPECT PER **QA 401 REV**_____ INSPECT CATHODE CORES FOR CLEANLINESS, REMOVAL OF GRIT AND OILS. APPEARANCE SHOULD BE A BRIGHT COLOR.			
100	PRODUCTION	ROUTE A-92253 CORES TO OUTSIDE PLATER FOR BARREL PLATING WITH ELECTROLYSES NICKEL PER MIL-C-26174C CLASS 1 .0025 TO .0030" THICK.			
110	QC	AFTER PLATING, INSPECT PER **QA 401 REV**_____ **DO NOT HANDLE CORES WITH BARE HANDS** VERIFY THAT THE PLATING IS COVERING THE ENTIRE CORE AND APPEARANCE IS SMOOTH WITH A BRIGHT COLOR. RECORD THE PLATING LOT NUMBER_____ ROUTE NICKEL PLATED CORES TO STOCK AS PN: A-92253.			

REVISIONS				
REV	DESCRIPTION	DATE	APP.	REV. BY
0	PROD REL ECO 14-0110	09/15/14	MG	VF

STEP 1: NICKEL PLATING



BARREL PLATE WITH ELECTROLESS NICKEL PER MIL-C-26074
CLASS 1, 0.0025 TO 0.0030" THICK.

2	REF	B92254-RS	ROUTE SHEET
1	1	A-92253	CATHODE CORE SUBASSY, R-SERIES, .360" DIA
ITEM	QTY	PART NO.	DESCRIPTION

BILL OF MATERIAL

DO NOT SCALE DWG.

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCE : ANGULAR ±1/2°
LINEAR .X = ±.1, .XX = ±.02, .XXX = ±.010

TELEDYNE INSTRUMENTS
Analytical Instruments
A Teledyne Technologies Company
City of Industry, California, 91748, USA

SIGNATURES	DATE
DRFT: MGONZALEZ	09/15/14
CHK:	
APPR: M.GONZALEZ	09/015/14
ENGR: MGONZALEZ	
C.O.:	
CAD I.D. B92254-0	

TITLE
CORE DETAIL
CATHODE, DIA 0.360
ELECTROLESS NICKEL PLATING

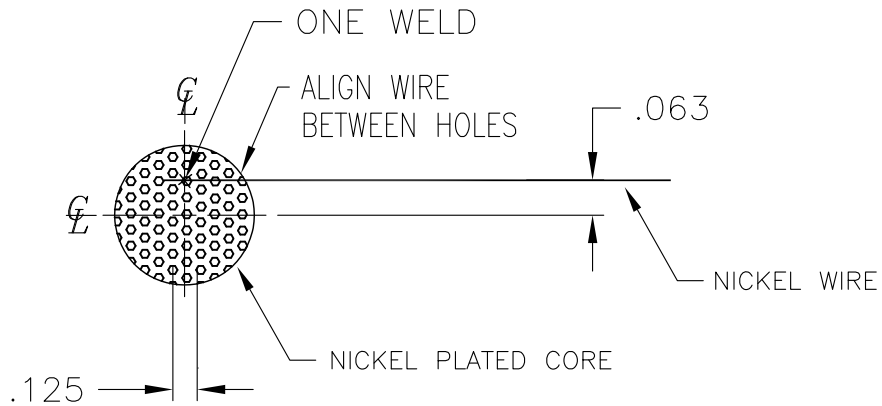
SCALE NTS
SIM -----
SHEET 1 OF 3

MATL. LISTED
DWG NO. B-92254
REV 0

REVISIONS
SEE SHEET 2 OF 3

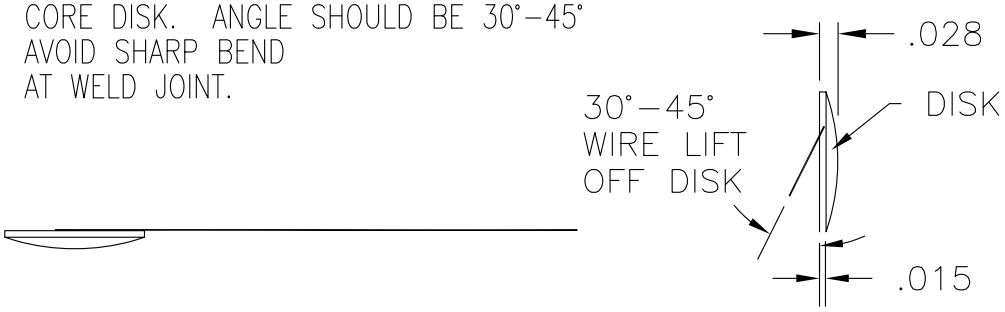
STEP 2: WELDING AND PULL TESTING

I. WELD



II. LIFT WIRE

NOTES: LIFT THE WIRE AWAY FROM THE
CORE DISK. ANGLE SHOULD BE 30°–45°
AVOID SHARP BEND
AT WELD JOINT.



REFER TO MP–A48236 AND P–48402 FOR WELDING; ONE WELD. 30°–50° ANGLE

REFER TO MP–A56148 TO PERFORM THE WELD PULL TEST

ITEM	QTY	PART NO.	DESCRIPTION
3	1	NKW.015–72	WIRE, PURE NICKLE, ø0.015 X 4.50 ±0.06 ANNEALED

DO NOT SCALE DWG.

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCE :
ANGULAR ±1/2°
LINEAR .X = ±.1, .XX = ±.02, .XXX = ±.010

TITLE: WELDED SUBASSEMBLY
CATHODE, DIA 0.360
R–SERIES SENSOR

SCALE: NTS

SHEET: 2 OF 3

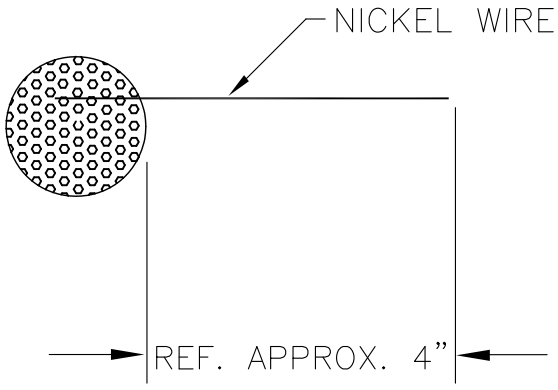
MATL.: LISTED

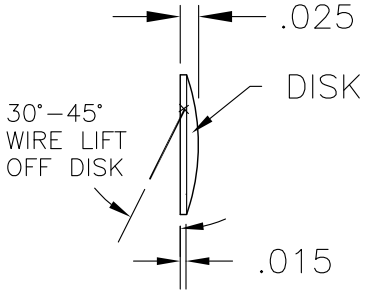
DWG NO.: B-92254

REV: 0

REVISIONS
SEE SHEET 3 OF 3

STEP 3: SILVER/RHODIUM PLATING





BEFORE PLATING

1. BEFORE PLATING CATHODES MUST BE LIFTED OFF WIRE AS SHOWN SO THAT PLATING BRIDGE DOES NOT FORM BETWEEN CATHODE AND WIRE.
2. ANGLE SHOULD BE BETWEEN 30° - 45° AVOID SHARP BEND AT WELD JOINT.
3. NO MASKING REQUIRED.
4. PLATE WITH E-2 SILVER BATH PER MIL QQ-S 365C, TYPE III (VERY BRIGHT), GRADE B, 0.0003-.0005 THICK (.0004+/-.0001).
5. PLATE WITH RHODIUM PER MIL-R-46085B, TYPE I, 30 MICRO-INCHES (0.000030) MIN THICKNESS. **Note:** the plating vendor is required to measure plating thickness on 5% of randomly selected samples from each batch. A "lot" is defined as follows: anytime the bath is replenished with anything, i.e. fresh brightener or metal, a new "lot" is created. Keep each lot separate and identify by assigning numbers. The vendor must certify:
   1. The thickness of silver and rhodium plating.
   2. The uniformity of plating thickness.
   3. The complete coverage of the core without pin holes.
6. AFTER THE CATHODES ARE PLATED, DO NOT HANDLE WITH BARE HANDS. **Note:** Always use clean gloves!!
7. REMOVE THE MASKING MATERIAL.
8. HEAT TREAT ASSEMBLY (IN AIR WITH CIRCULATION) AT 400 ° FAHRENHEIT FOR TWO HOURS WITHIN 3 HRS. AFTER PLATING.
9. THE PLATING SHOULD NOT FLAKE OFF AFTER THE WIRES ARE BENT ONCE AT 180 ° ON A 0.015" DIA MANDREL.
10. WHEN SHIPPING BACK TO TAI, THE VENDOR MUST KEEP EACH LOT SEPARATE AND NUMBERED.

ITEM	QTY	PART NO.	DESCRIPTION

DO NOT SCALE DWG.

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCE :
ANGULAR ±1/2°
LINEAR .X = ±.1, .XX = ±.02, .XXX = ±.010

TITLE: CATHODE SUBASSEMBLY
CATHODE, DIA 0.360
SILVER/RHODIUM–PLATED

SCALE: NTS

SHEET: 3 OF 3

MATL.: LISTED

DWG NO.: B- 92254

REV: 0

ROUTE SHEET- MEXICO/USA	ECO# 14-0110	REV 0	**TELEDYNE** *Analytical Instruments*

PART # **B92254**	S/O:	W/O:
DESCRIPTION: Silver/Rhodium Plated Cathode, R-Series, Sub-Assembly		
DOCUMENTS REQUIRED: *A92253,* B92254, MP-A48236, P-48402, MP-A56148		QTY:

SEQ. NO.	OPERATION LOCATION	PROCESS INSTRUCTIONS	EMPL.	QTY.	DATE
10	PRODUCTION	A. RECORD THE WORK ORDER FOR SOURCE INFORMATION BELOW. **SOURCE INFORMATION:** **A-92253 REV.___ WO_____ DATE._____** **NOTE**: WHEN SPLITTING THE QUANTITY, CONTACT QC INSPECTOR SPLIT A B C D E F QTY ___ ___ ___ ___ ___ ___ DATE ___ ___ ___ ___ ___ ___ B. RECORD REVISION LEVELS: DRAWINGS: **B-92254 REV.____** **P-48402 REV.____** **MP-A48236 REV.____** **MP-A56148 REV.____** C. INSPECTIONS ARE PERFORMED USING THE CRITERIA CALLED OUT IN THE WORKMANSHIP MANUAL. **NOTE**: EACH OPERATION PERFORMED MUST BE SIGNED OFF AND DATED BY THE OPERATOR.			
20	STOCKROOM	KIT PER PICK LIST			
30	PRODUCTION CONTROL	1. PER DWG B-92254 STEP 1, ROUTE A-92254 CORES TO OUTSIDE PLATER FOR BARREL PLATING WITH ELECTROLESS NICKEL PER MIL-C-26074C CLASS 1, .0025 TO .0030" THICK. 2. PLATER SHOULD THEN IDENTIFY PLATED PART AS B92254 STEP 1.			
40	QC RECEIVING INSPECTION	INSPECT B-92254 STEP 1 PER **QA 401 REV**_____ **DO NOT HANDLE CORES WITH BARE HANDS** VERIFY THAT THE PLATING IS COVERING THE CORE AND SMOOTH.			
50	PRODUCTION	**NOTE**: THE FOLLOWING STEPS CAN BE PERFORMED OUT OF SEQUENCE. **NOTE**: ALL ASSEMBLIES TO BE IN ACCORDANCE WITH NOTES ON DRAWINGS. **NOTE**: MAKE SURE TO VERIFY ALL NOTES ON PRINT			

ROUTE SHEET- MEXICO/USA	ECO# 14-0110	REV 0	**TELEDYNE** *Analytical Instruments*

PART # **B92254**	S/O:	W/O:
DESCRIPTION: Silver/Rhodium Plated Cathode, R-Series, Sub-Assembly		
DOCUMENTS REQUIRED: *A92253,* B92254, MP-A48236, P-48402, MP-A56148		QTY:

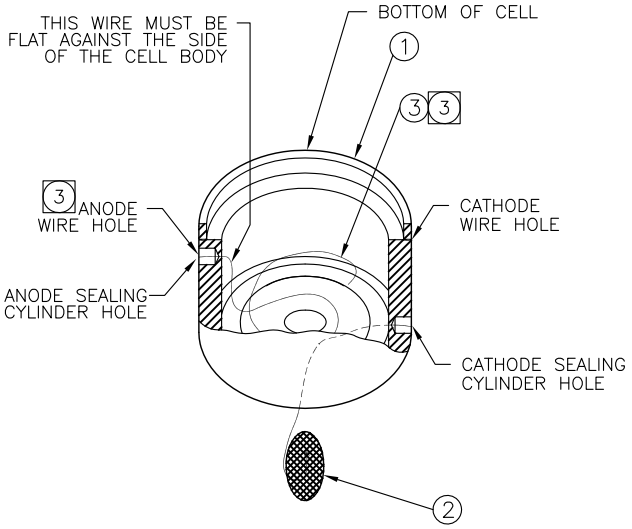
SEQ. NO.	OPERATION LOCATION	PROCESS INSTRUCTIONS	EMPL.	QTY.	DATE
		1. REFER TO DWG B-92254 STEP 2. 2. INSPECT CORE TO SEE THAT NO SHARP BURRS ARE PRESENT AND NO STAINS ON THE CATHODE CORES. IF PRESENT, NOTIFY DEPT SUPERVISOR AND/OR QA REP - SO THAT THE PARTS CAN BE RETURNED TO VENDOR FOR ADDITIONAL DEBURRING OR TO THE PLATER TO REMOVE STAINS. 3. SET WELD PARAMETERS PER MP-A48236 AND P-48402. 4. MAKE SURE WELD ELECTRODES ARE CLEAN AND WITHOUT SCRATCHES. IF NECESSARY CLEAN PER MP-A48236 AND P-48402. 5. ALIGN WIRE BETWEEN HOLES AT 30º-45º ANGLE PER DETAIL ON DWG B-92254 STEP 2. 6. WELD THE NICKEL WIRE TO CATHODE CORE. ONE WELD PER CORE APPROX 1/16" FROM THE CENTER. 7. BEND WIRE AS SHOWN ON DWG SO THAT THERE IS NO SHARP BEND AT THE WELD. KEEP WIRE AT LEAST 3/32" INSIDE FROM THE EDGE OF CATHODE CORE. PER PROCEDURE MP-A56148, PERFORM THE WELD PULL TEST.			
60	QC	IN-PROCESS INSPECTION PER **QA404 REV**_____			
70	PRODUCTION CONTROL	1. ROUTE WELDED SUB-ASSEMBLIES PER B-92254 STEP 3 TO OUTSIDE PLATER FOR SILVER AND RHODIUM PLATING. 2. BEFORE PLATING CATHODES MUST BE LIFTED OFF WIRE AS SHOWN SO THAT PLATING BRIDGE DOES NOT FORM BETWEEN CATHODE AND WIRE. 3. ANGLE SHOULD BE BETWEEN 30° - 45° AVOID SHARP BEND AT WELD JOINT. 4. NO MASKING REQUIRED. 5. PLATE WITH E-2 SILVER BATH PER MIL QQ-S 365C, TYPE III (VERY BRIGHT), GRADE B, 0.0003-.0005 THICK (.0004+/-.0001). 6. PLATE WITH RHODIUM PER MIL-R-46085B, TYPE I, 30 MICRO-INCHES (0.000030) MINIMUM THICKNESS.			

ROUTE SHEET- MEXICO/USA	ECO# 14-0110	REV 0	**TELEDYNE** *Analytical Instruments*

PART # **B92254**	S/O:	W/O:
DESCRIPTION: Silver/Rhodium Plated Cathode, R-Series, Sub-Assembly		
DOCUMENTS REQUIRED: *A92253,* B92254, MP-A48236, P-48402, MP-A56148		QTY:

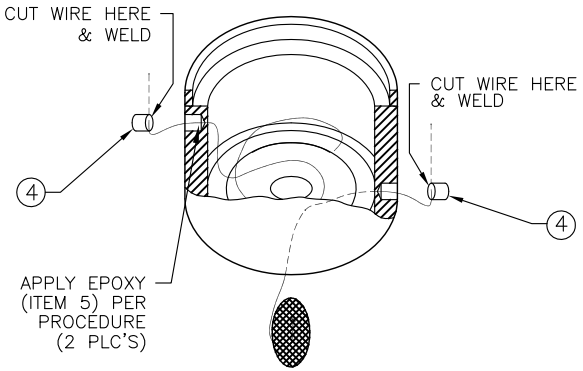
SEQ. NO.	OPERATION LOCATION	PROCESS INSTRUCTIONS	EMPL.	QTY.	DATE
		NOTE: THE PLATING VENDOR IS REQUIRED TO MEASURE PLATING THICKNESS ON 5% OF RANDOMLY SELECTED SAMPLES FROM EACH BATCH. A "LOT" IS DEFINED AS FOLLOWS: ANYTIME THE BATH IS REPLENISHED WITH ANYTHING, I.E. FRESH BRIGHTENER OR METAL, A NEW "LOT" IS CREATED. KEEP EACH LOT SEPARATE AND IDENTIFY BY ASSIGNING NUMBERS. THE VENDOR MUST CERTIFY: 1. THE THICKNESS OF SILVER AND RHODIUM PLATING. 2. THE UNIFORMITY OF PLATING THICKNESS. 3. THE COMPLETE COVERAGE OF THE CORE WITHOUT PIN HOLES. 7. AFTER THE CATHODES ARE PLATED, DO NOT HANDLE WITH BARE HANDS. **NOTE:** ALWAYS USE CLEAN GLOVES!! 8. REMOVE THE MASKING MATERIAL (IF ANY). 9. HEAT TREAT ASSEMBLY (IN AIR WITH CIRCULATION) AT 400° FAHRENHEIT FOR TWO HOURS WITHIN 3 HRS. AFTER PLATING. 10. THE PLATING SHOULD NOT FLAKE OFF AFTER THE WIRES ARE BENT ONCE AT 180° ON A 0.015" DIA MANDREL. 11. WHEN SHIPPING BACK TO TAI, THE VENDOR MUST KEEP EACH LOT SEPARATE AND NUMBERED. 12. PLATER SHOULD THEN IDENTIFY AND LABEL PLATED PARTS AS B-92254 STEP 3.			
80	QC RECEIVING INSPECTION	INSPECT B-92254 STEP 3 PER **QA 401 REV**_____ **DO NOT HANDLE CORES DIRECTLY WITH BARE HANDS. OPTION: HANDLING BY THE WIRE ENDS IS FINE.** VERIFY THAT THE FINAL PLATING IS COVERING THE ENTIRE CORE AND IS SMOOTH WITHOUT ROUGHNESS.			
90	QC RECEIVING INSPECTION	INPUT TO STOCK AS CATHODE SUB-ASSY PART NUMBER, B-92254.			

NOTES: UNLESS OTHERWISE SPECIFIED.



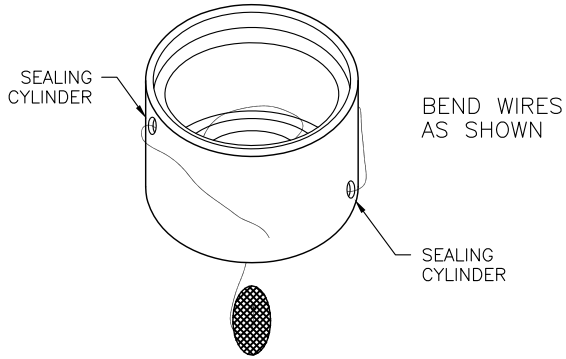
VIEW 1

CATHODE & ANODE INSERTION



VIEW 2

WELDING SEALING CYLINDERS



VIEW 3

MFC CELL BODY DRY SUB-ASSEMBLY

NOTE: DO NOT THREAD WIRES THRU HOLES.

REVISIONS				
REV	DESCRIPTION	DATE	APP.	REV. BY
0	PROD REL ECO 14-0110	09/15/14	MG	VF

NOTES: UNLESS OTHERWISE SPECIFIED.

1.) CELL BODY MUST BE WASHED PRIOR TO USE !

2.) WEAR GLOVES WHEN HANDLING !

(3) COIL THE Ni WIRE AND INSERT INTO CELL BODY. THREAD ONE END OF THE WIRE THRU ANODE HOLE AND POSITION THE COIL APPROX. HALF WAY UP INSIDE THE BODY.

REFER TO MP-D61679 PARA 6.1

ITEM	QTY	PART No.	DESCRIPTION
5	A/R	ADCF3001	EPOXY, ADHESIVE,
4	2	A-53131	SEALING CYLINDER SUB-ASSEMBLY
(3) 3	1	NK-W.015-96	WIRE, NICKEL 0.015 DIA X 6.0 ±.06 ANNEALED
2	1	B-92254	CATHODE SUB-ASSEMBLY, RHODIUM PLATED
1	1	C43021	CELL BODY, MACHINED

BILL OF MATERIAL

DO NOT SCALE DRAWING

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCE:
ANGULAR ±1/2° LINEAR .X = ±.1, .XX = ±.02, .XXX = ±.010

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Analytical Instruments
A Business Unit of Teledyne Instruments, Inc.
City of Industry, California 91748, USA

	SIGNATURES	DATE
S/		
N/	DRFT:	09/15/14
I/	CHK:	
P/	APPR: M. GONZALEZ	09/15/14
O/	ENGR: MGONZALEZ	
F/	C.O.:	
REFERENCE	CAD I.D. B92255-0	

TITLE
DRY SUBASSEMBLY SENSOR BODY, R-SERIES OXYGEN SENSOR

SCALE NONE

SIM B77133

SHEET 1 OF 1

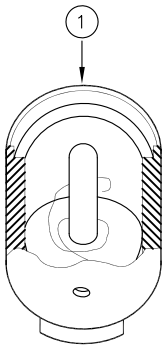
MATL. - LISTED -

DWG NO. **B-** 92255

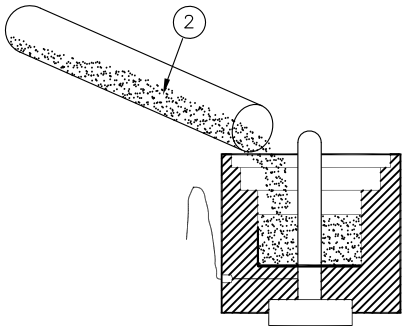
REV 0

NOTES: UNLESS OTHERWISE SPECIFIED.

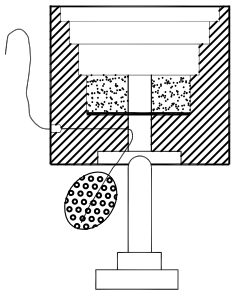
NOTE: USE ANODE FORMING TOOL A-40965.



VIEW 1
INSERT ANODE FORMING TOOL

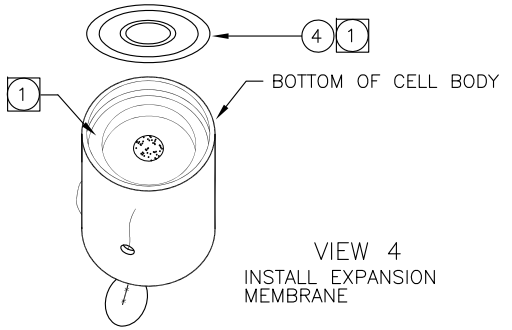


VIEW 2
POUR & SINTER LEAD

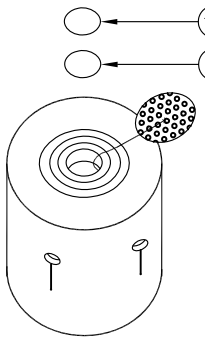


VIEW 3
REMOVE ANODE FORMING TOOL

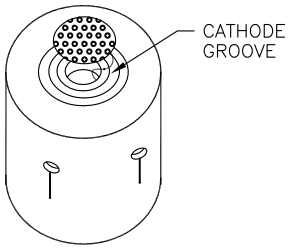
REVISIONS				
REV	DESCRIPTION	DATE	APP.	REV. BY
0	PROD REL ECO 14-0110	09/15/14	MG	VF



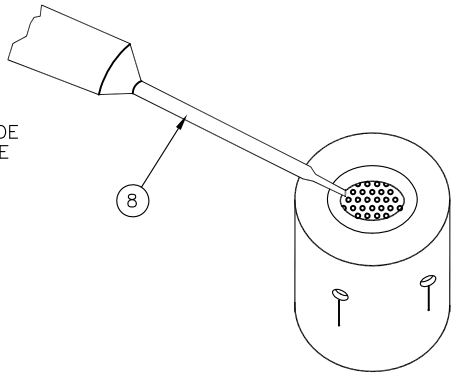
VIEW 4
INSTALL EXPANSION MEMBRANE



VIEW 5
INSERT FILTER PAPER



VIEW 6
CLOSING CATHODE

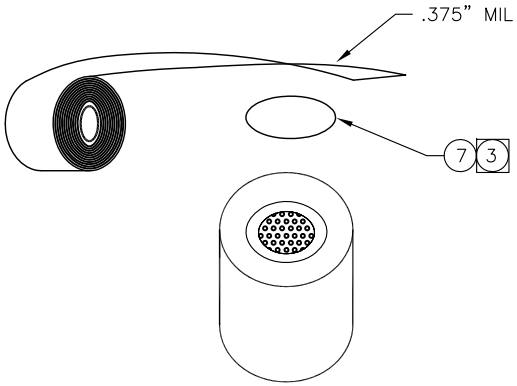


VIEW 7 FILL ELECTROLYTE AND ELIMINATE BUBBLES

(1) HEAT-SEAL EXPANSION MEMBRANE TO CELL BODY GROOVE (PER P-48401).

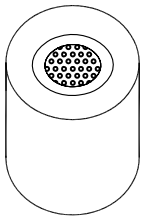
(2) REFER TO DRAWING A-43776 FOR INSTALLATION OF ITEMS 9 AND 10.

(3) ITEM 6 IS TO BE USED TO LOWER THE CURRENT OUTPUT WHEN THE PRIMARY MEMBRANE GIVES HIGH CURRENT OUTPUTS.



NOTE: 1. REFER TO MP-D61679.
2. USE SENSING MEMBRANE SEALING HEAD B-69170.

VIEW 8
SEALING SENSING MEMBRANE



VIEW 9
ADD GASKET AND ZITEX DISK

	ITEM	QTY	PART NO.	DESCRIPTION
(2)	10	1	A-82882B	DISK, POROUS, ø0.280
(2)	9	1	A-82882A	DISK, POROUS, ø0.312
	8	A/R	A-48509E	ELECTROLYTE TYPE E
	7	1	A-43691	SENSING MEMBRANE
(3)	6	REF	A-85611	SENSING MEMBRANE (OPTIONAL)
	5			
(1)	4	1	A-61141	EXPANSION, MEMBRANE
	3			
	2	14gm	LD-G-L95	GRANULAR LEAD
	1	1	B-92255	DRY SUBASSEMBLY

BILL OF MATERIAL

DO NOT SCALE DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCE: LINEAR .X = ±.1, .XX = ±.02, .XXX = ±.010
ANGULAR ±1/2°

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City of Industry, California 91748, USA

	SIGNATURES	DATE
S/		
I/	DRFT: MGONZALEZ	09/15/14
N/	CHK:	
P/	APPR:	
O/	ENGR: MGONZALEZ	
F/	C.O.	
REFERENCE	CAD ID C92256-0	

TITLE
WET SUBASSEMBLY
AUTOMOTIVE
OXYGEN SENSOR

SCALE NTS
SIM -----
SHEET 1 OF 1

MATL. LISTED
DWG NO. C- 92256
REV 0

NOTES: UNLESS OTHERWISE SPECIFIED

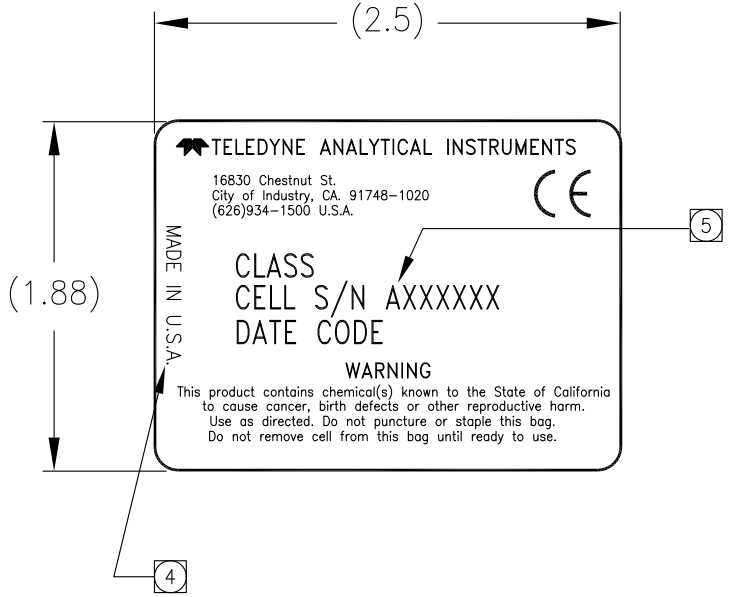
1. MATERIAL: WEBER PAPER LABEL #L-06132 OR EQUAL.
   BACKGROUND COLOR: WHITE
   PRINTING: BLACK
2. PRINTED IN SENSOR DEPT. ON THERMAL TRANSFER PRINT.
3. SENSOR CLASS, CELL S/N AND DATE CODE TO BE PRINTED IN THE DESIGNATED AREAS.

(4) FILL IN COUNTRY OF MANUFACTURE.

(5) ADD AN "A" IN FRONT OF THE 6 DIGIT SERIAL NUMBER.

– NO SHORTING DEVICE

REVISIONS				
REV	DESCRIPTION	DATE	APP.	REV. BY
0	PROD. REL PER ECO 14-0110	09/15/14	MG	VF



ITEM	QTY	PART NO.	DESCRIPTION
BILL OF MATERIAL			

DO NOT SCALE DWG.

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCE : ANGULAR ±1/2°
LINEAR .X = ±.1, .XX = ±.02, .XXX = ±.010

TELEDYNE
Analytical Instruments
A Teledyne Technologies Company, Inc
City of Industry, California, 91748, USA

	SIGNATURES	DATE
S/		
N/	DRFT:	09/15/14
P/	CHK:	
I/	APPR: MGONZALEZ	
F/	ENGR: MGONZALEZ	
O/	C.O.:	
REFERENCE	CAD I.D. A92257-0	

TITLE: BAG LABEL
OXYGEN SENSOR
CLASS R22AHJR

SCALE 1:1
SIM A89728
SHEET 1 OF 1

MATL. – NOTED –
DWG NO. **A-**92257
REV 0