

**MODEL 100A MOISTURE SENSING MODULE
WITH WCO OR WCOF MOISTURE SENSOR**



SPECIFICATIONS

SAMPLE FLOW RATE:	0 TO 20 L/M
MAXIMUM INLET TEMPERATURE:	212 DEGREES F. (100 C.)
INLET AND OUTLET SAMPLE CONNECTIONS:	1/4" FNPT
INPUT VOLTAGE REQUIREMENT:	90-132, 180-264 VAC 50/60 Hz, Or 12 VDC, USER SELECTABLE
INPUT POWER REQUIREMENT:	5 WATTS MAXIMUM
ELECTRICAL CLASSIFICATION:	GENERAL PURPOSE, NEMA 1
DIMENSIONS OF ELECTRONIC MODULE:	6.3" x 3.2" x 2.2" HWD
WEIGHT OF ELECTRONIC MODULE:	LESS THAN ONE POUND

DESCRIPTION

The Model 100A Moisture Sensor Module is a stand-alone electronics package which powers a moisture sensor or any two electrode element to activate a relay in the presence of water condensate. It can be used to interrupt the power to a gas sample pump if water condensate forms on the contacts of the WCO (Drawing P0006) or WCOF (Drawing P0018) moisture sensors mounted in the gas sample tubing ahead of an analyzer. The contacts of the internal relay are protected with MOV's and have the capacity to start and stop a sample pump having a 1/10 HP motor. A second set of relay contacts are brought out to the Output Terminal Strip to allow connections to an annunciator panel or I/O module for a computer or distributed control system.

The Model 100A can also be installed as a two point level control to control the removal from a condensate pot at the base of a gas sample cooler/dehydrator heat exchanger, ("fill and dump technique"). One type of such pot is illustrated in Drawing P0021 which is appended. Note that there must be a method provided to overcome the vacuum which will exist if the sample pump is located after the sample cooler to remove the condensate from the pot. This can be a peristaltic pump or an eductor or aspirator.

All of the Universal Analyzers Thermoelectric Sample Coolers contain the electronic capability of the Model 100A. The usual deployment of the Model 100A is with other manufacturer's sample coolers or where there is no sample cooler, with sample coolers based on the vortex principle (non electric), or where the fill and dump technique is used to remove the condensate from the heat exchanger.

INSTALLATION INSTRUCTIONS

The terminal strips used in the Model 100A are spring clip type terminals which are easy to operate once one knows how. They can be frustrating if the installer is not familiar with the technique required to open the spring terminal. Inserting a small screwdriver having a blade no wider than 0.010" into the slot above the wire entry point opens the spring to accept wires up to size 14. Removing the screwdriver allows the spring to capture the wire in a very positive manner. The wires may be removed in a similar manner.

The sensor to be used should be mounted in the gas sample line in a position which will allow moisture to fall on the electrodes if condensation occurs. Ideally, the sensor will be within two feet of the Model 100A Moisture Sensing Module to avoid the necessity of extending the cable from the sensor. If the cable requires extending, a shielded cable should be used. It can be extended up to twenty feet if properly connected as follows. The red wire in the sensor cable should be connected to a conductor within the shielded extension cable. The shield within the sensor cable carries the signal from the second electrode and should be connected to the shield of the extension cable. There is a black wire within the sensor cable which is not connected and does not need to be extended. Be sure that the connections which are made to the sensor input terminals are made with the shield connected to the "COM" terminal and the red wire connected the "PROBE" terminal.

The mounting holes for the Model 100A enclosure are hidden behind the cover of the module. Remove the cover and the mounting holes can be seen at each corner outside the molded cover o-ring seal. Number 8 wood, sheet metal, or machine screws can be slipped into the cavity and used to mount the enclosure to a bulkhead or bracket. Drawing P0001 shows the location and mounting dimensions for the mounting holes.

Power should be brought to the Model 100A and the wires installed according to the power drawing depending on the power source available. Be sure to use the technique described above to open the terminal springs to accept the wires.

The relay contacts should be brought out to perform the desired function by accessing TB2 after referring to the schematic and the Circuit Board Detail section below. The spring terminal strip is used for these connections also.

START UP PROCEDURE

Dry the electrodes by removing the holding pin from the WCO sensor body and withdraw the o-ring sealed sensor. Wipe the electrodes with a dry cloth or absorbent paper. In the case of the WCOF, moisture electrodes are to be accessed inside the bottom of the bowl.

Reinstall the moisture sensor and apply power to the Model 100A. The relay will be powered if the sensor is dry and if the jumper on TB3 (Drawing E0014) is in place. If a manual reset button is used, it will require depressing to initially put the Model 100A in a “dry” state.

CIRCUIT BOARD DETAILS

A schematic and parts layout is provided with this manual as Drawings E0008 and E0014 respectively.

The power supply to the Model 100A circuitry is a dual primary transformer which can accept either 115VAC or 230VAC depending on which primary windings are energized. The full wave rectifier on the secondary provides 12VDC for the circuitry. A terminal is provided to allow the user to supply the 12VDC from an external source, bypassing the power transformer, for battery operation. There is a diode which protects the circuitry from the effect of connecting the 12VDC with the polarity reversed. The Model 100A will not function with the polarity reversed, but it will also not be adversely affected.

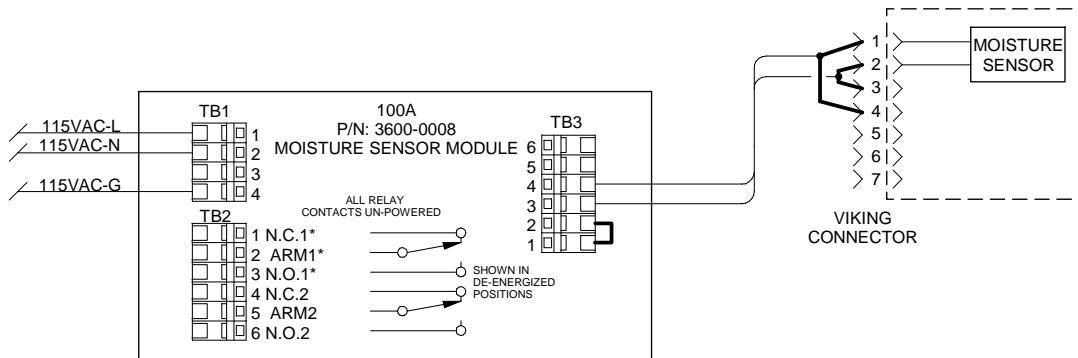
The LM1830N integrated circuit is designed specifically for the application which we have employed in the Model 100A. It provides for the application which we have employed in the Model 100A. It provides a small AC signal to the electrodes in the moisture sensor and delivers a high or low output depending on whether current flows between the electrodes. It is a sensitive device which will detect the smallest amount of slightly conductive liquid present between the electrodes. It will probably be necessary to dry the electrodes with a cloth once liquid is detected to cause the LM1830N to again indicate a dry sample.

The jumper on TB3 is supplied in place and is to be left there for the application where the Model 100A is desired to automatically reset itself when the sensor detects moisture and then dries out. If the installation requirements are for a manual reset to be required to put the Model 100A back into the “dry” state, a reset switch must be supplied and installed according to the appended drawing. In that case the jumper on TB3 is to be removed and one set of the relay contacts used to accomplish the manual reset function.

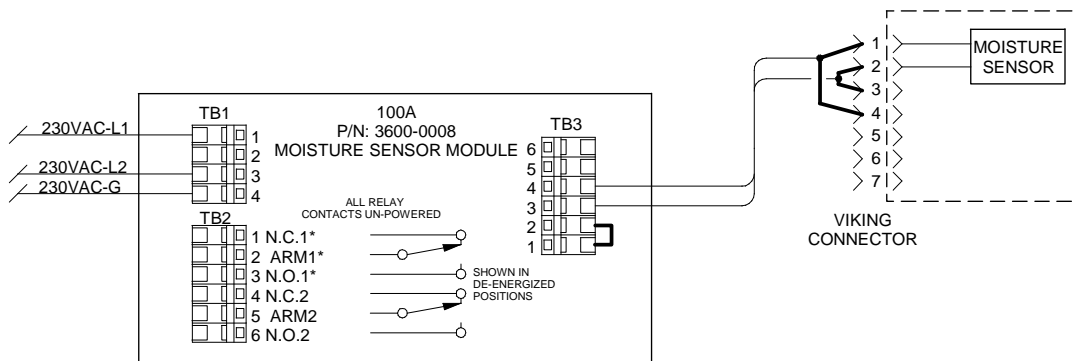
A two color LED is mounted on the circuit board to serve as a visual indication of the state of the moisture sensor. When it is green, the moisture sensor is in a dry state. When it is red, the moisture sensor is wet. The relay may or may not be in that state depending on whether a manual reset switch has been incorporated into the installation. The LED can be green if the sensor is dry but the relay will still be in the “wet” position until the manual reset switch is activated.

All six contacts from the relay are brought out to the terminal strip, TB2. For use as needed. There are no power connections to any of the contacts from within the Model 100A . They are “dry” and power may be applied from outside sources. The NC and NO notation on the circuit board refer to the condition of the relay in it’s de-energized state. The relay is powered when the sensor is dry and therefore the NC contact is open in the dry state and closed if moisture is present. This is done as a fail-safe technique to insure that the Model 100A only indicates a dry sample when it has power applied to the module. The output relay is in the “wet” position if the module has no power applied.

MOV protection for the one set of Form C contacts on the relay allow the relay to absorb the inductive spikes from turning on and off the 1/10 HP motor on a sample pump.



115VAC WIRING SCHEMATIC

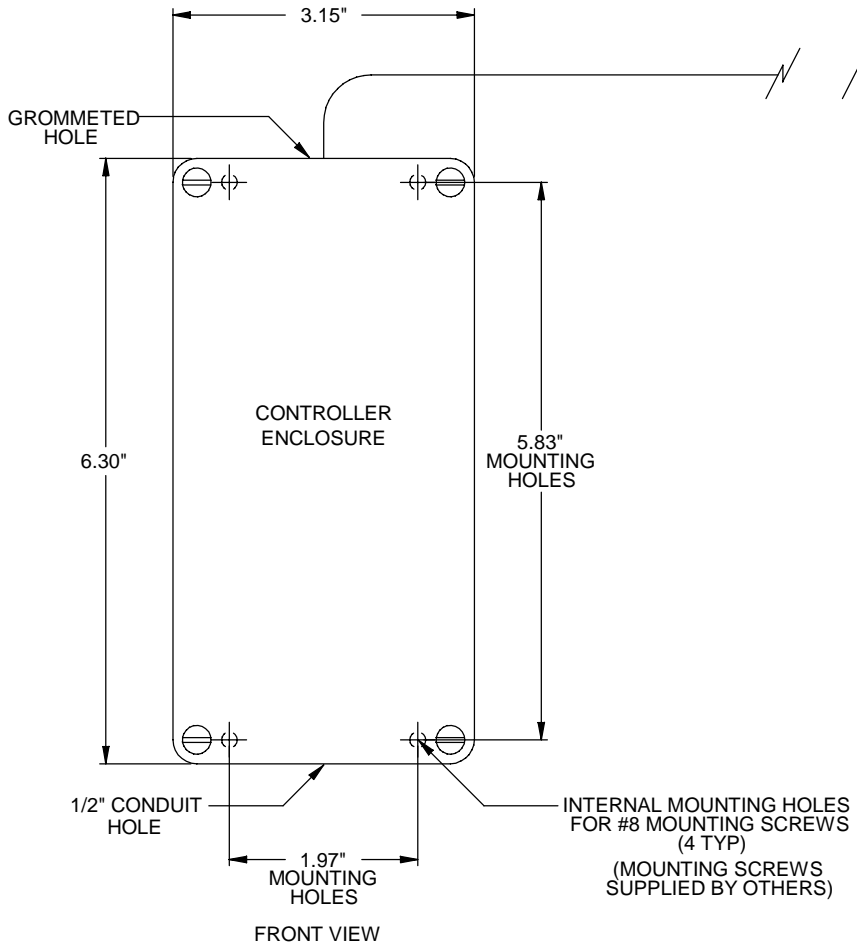
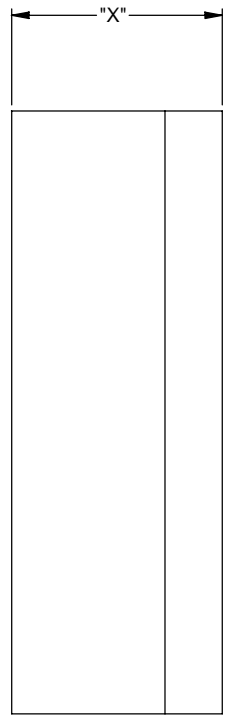
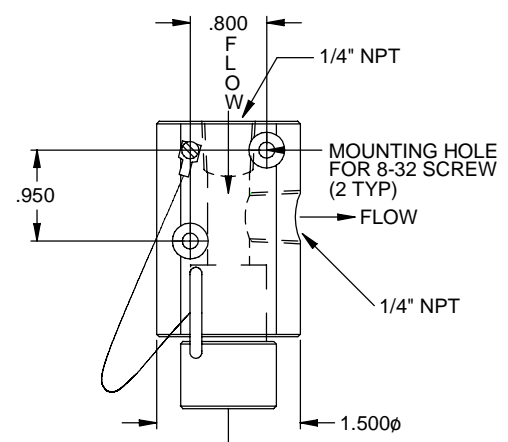
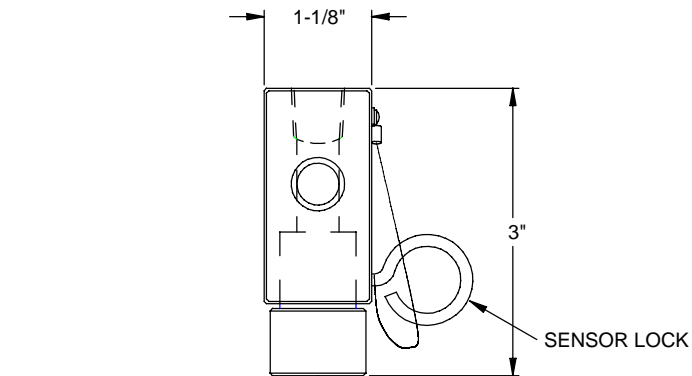


230VAC WIRING SCHEMATIC

8 | 7 | 6 | 5 | 4 | 3 | 2 | 1

D
C
B
A

D
C
B
A



24" CABLE

BOX SIZE TABLE	
"X" DIMENSION	MODEL
2.20"	100A WITHOUT SOLID STATE RELAY
3.35"	110A WITH SOLID STATE RELAY

C	02/09/99	ADD TABLE FOR "X" DIMENSION ON BOX	EAM	
REV	DATE	DESCRIPTION	DWN	APVD
REVISIONS				
MODEL 100A WATER CARRY OVER ALARM MODULE				
PART NO.		FOR INSTRUMENT		
NOT ISSUED				
UNIVERSAL ANALYZERS INC.				
1771 South Sutro Terrace Carson City, Nevada 89706 USA				
DRAWN BY H. MITCHELL		DRAWING NO P0001		
APVD BY T. BARBEN II				
DATE	SCALE	SIZE	SHEET	
02/20/91	NONE	C	1 OF 1	

8 | 7 | 6 | 5 | 4 | 3 | 2 | 1

SIDE VIEW

FRONT VIEW

CONTROLLER ENCLOSURE

5.83" MOUNTING HOLES

1/2" CONDUIT HOLE

1.97" MOUNTING HOLES

INTERNAL MOUNTING HOLES FOR #8 MOUNTING SCREWS (4 TYP)
(MOUNTING SCREWS SUPPLIED BY OTHERS)

GROMMETED HOLE

6.30"

3.15"

1-1/8"

3"

SENSOR LOCK

.800
FLOW

1/4" NPT

MOUNTING HOLE FOR 8-32 SCREW (2 TYP)

FLOW

1/4" NPT

1.500φ

.950

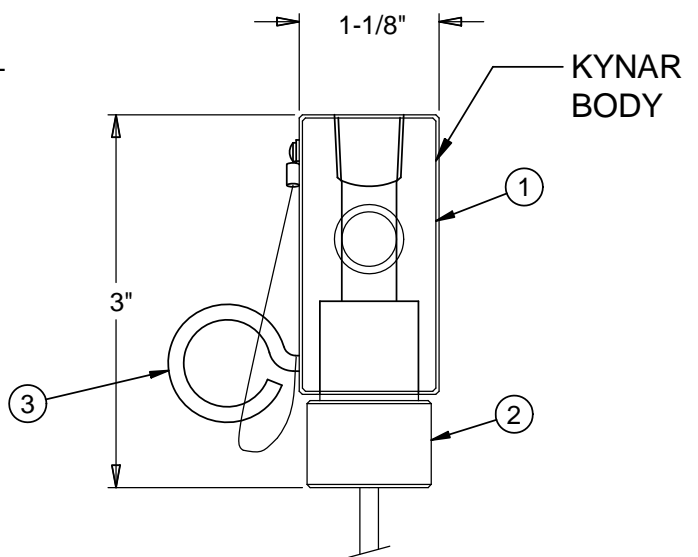
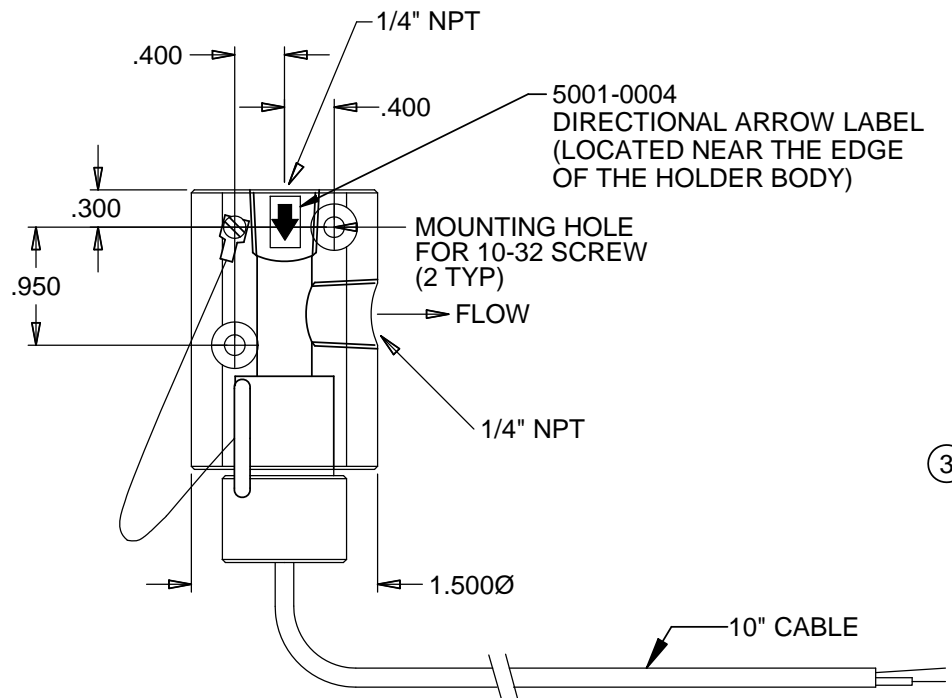
8 | 7 | 6 | 5 | 4 | 3 | 2 | 1

D

C

B

A



D

C

B

A

8 | 7 | 6 | 5 | 4 | 3 | 2 | 1

FINAL ASSEMBLY PART NUMBER TABLE			
SHEET	PART NUMBER	MATERIAL	MODEL
1 OF 2	6020-0001	KYNAR	W.C.O.
2 OF 2	6020-0002	316SS	W.C.O.S.S.

PART NUMBER TABLE		
ITEM	DESCRIPTION	PART
1	HOLDER FLOW THRU BODY-KYNAR	5101-0002
2	KYNAR MOISTURE SENSOR ASSY	5101-0001
3	SENSOR LOCK ASSY KIT	5205-0007

D	10/01/08	Revised P/N & Material Of Item 1, & Cable Length	MW	DA
REV	DATE	DESCRIPTION	DWN	APVD
REVISIONS				

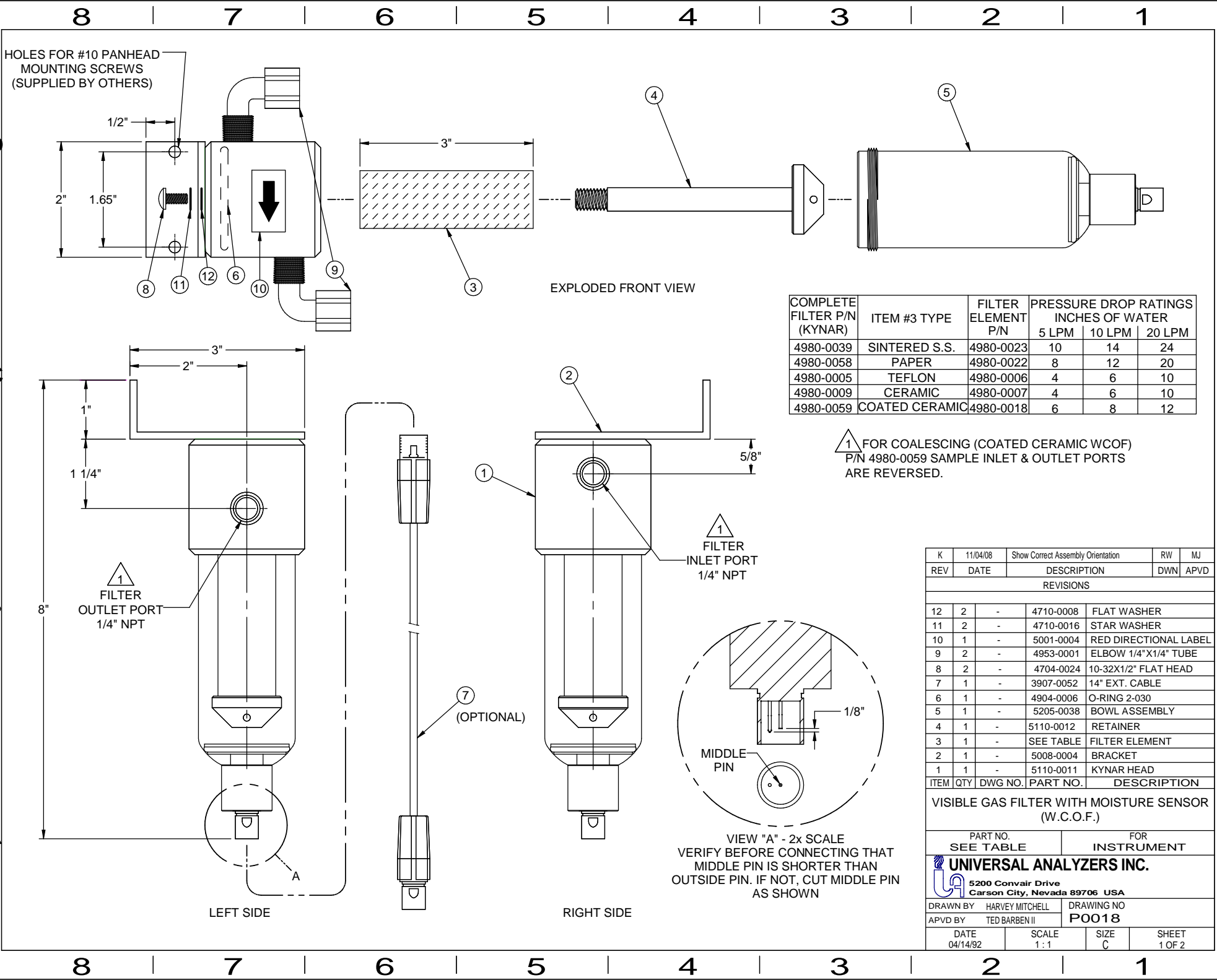
**WATER CARRY OVER
MOISTURE SENSOR WITH
FLOW THRU ADAPTER**

PART NO. FOR
SEE TABLE W.C.O.

UNIVERSAL ANALYZERS INC.
5200 Convir Drive
Carson City, Nevada 89706 USA

DRAWN BY H. MITCHELL DRAWING NO
APVD BY TED BARBEN II P0006

DATE 10/08/1991	SCALE 1:1	SIZE B	SHEET 1 OF 2
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HOLES FOR #10 PANHEAD MOUNTING SCREWS (SUPPLIED BY OTHERS)

EXPLODED FRONT VIEW

COMPLETE FILTER P/N (KYNAR)	ITEM #3 TYPE	FILTER ELEMENT P/N	PRESSURE DROP RATINGS INCHES OF WATER		
			5 LPM	10 LPM	20 LPM
4980-0039	SINTERED S.S.	4980-0023	10	14	24
4980-0058	PAPER	4980-0022	8	12	20
4980-0005	TEFLON	4980-0006	4	6	10
4980-0009	CERAMIC	4980-0007	4	6	10
4980-0059	COATED CERAMIC	4980-0018	6	8	12

△ 1 FOR COALESCING (COATED CERAMIC WCOF) P/N 4980-0059 SAMPLE INLET & OUTLET PORTS ARE REVERSED.

K	11/04/08	Show Correct Assembly Orientation	RW	MJ
REV	DATE	DESCRIPTION	DWN	APVD
REVISIONS				
12	2	-	4710-0008	FLAT WASHER
11	2	-	4710-0016	STAR WASHER
10	1	-	5001-0004	RED DIRECTIONAL LABEL
9	2	-	4953-0001	ELBOW 1/4"X1/4" TUBE
8	2	-	4704-0024	10-32X1/2" FLAT HEAD
7	1	-	3907-0052	14" EXT. CABLE
6	1	-	4904-0006	O-RING 2-030
5	1	-	5205-0038	BOWL ASSEMBLY
4	1	-	5110-0012	RETAINER
3	1	-	SEE TABLE	FILTER ELEMENT
2	1	-	5008-0004	BRACKET
1	1	-	5110-0011	KYNAR HEAD
ITEM	QTY	DWG NO.	PART NO.	DESCRIPTION

VISIBLE GAS FILTER WITH MOISTURE SENSOR (W.C.O.F.)

PART NO. FOR SEE TABLE INSTRUMENT

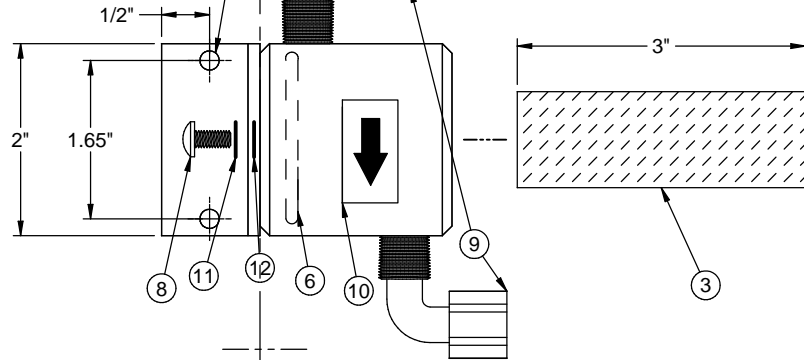
UNIVERSAL ANALYZERS INC.
5200 Convar Drive
Carson City, Nevada 89706 USA

DRAWN BY HARVEY MITCHELL DRAWING NO P0018
APVD BY TED BARBEN II

DATE 04/14/92 SCALE 1:1 SIZE C SHEET 1 OF 2

VIEW "A" - 2x SCALE
VERIFY BEFORE CONNECTING THAT MIDDLE PIN IS SHORTER THAN OUTSIDE PIN. IF NOT, CUT MIDDLE PIN AS SHOWN

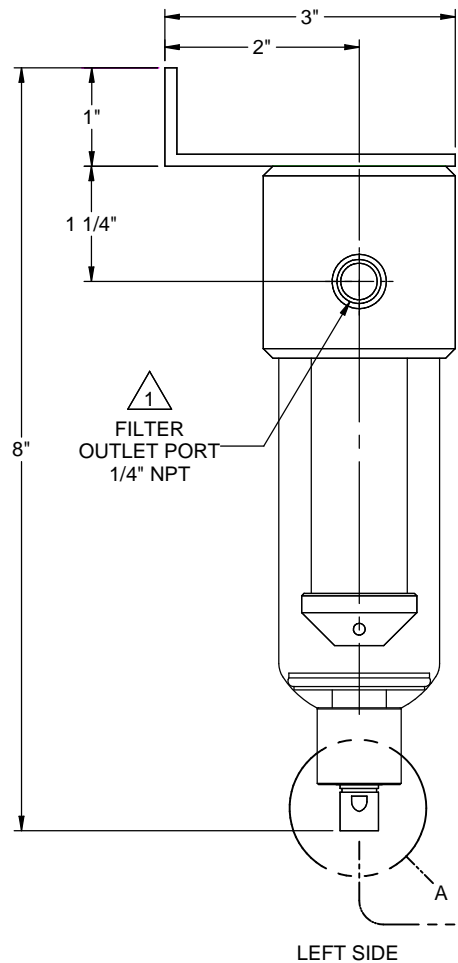
HOLES FOR #10 PANHEAD MOUNTING SCREWS (SUPPLIED BY OTHERS)



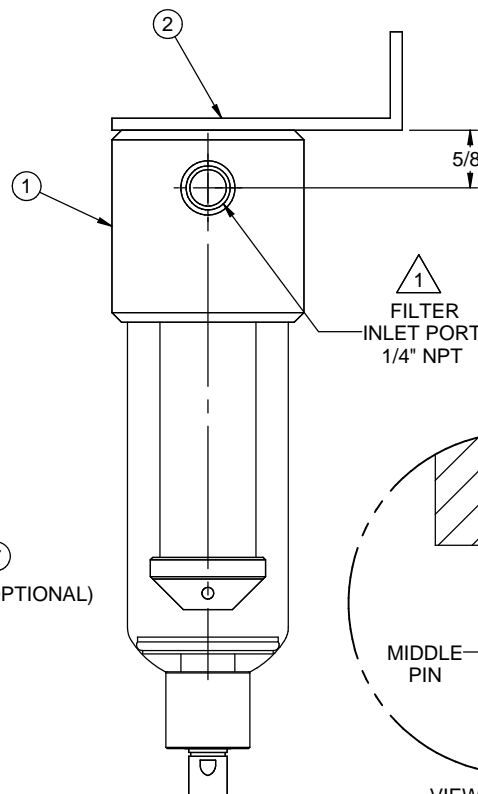
EXPLODED FRONT VIEW

COMPLETE FILTER P/N (316SS)	ITEM #3 TYPE	FILTER ELEMENT P/N	PRESSURE DROP RATINGS INCHES OF WATER		
			5 LPM	10 LPM	20 LPM
4980-1012	SINTERED S.S.	4980-0023	10	14	24
4980-1013	PAPER	4980-0022	8	12	20
4980-1014	TEFLON	4980-0006	4	6	10
4980-1015	CERAMIC	4980-0007	4	6	10
4980-1016	COATED CERAMIC	4980-0018	6	8	12

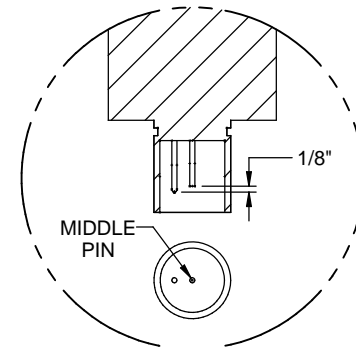
⚠️ 1 FOR COALESCING (COATED CERAMIC WCOF) P/N 4980-0059 SAMPLE INLET & OUTLET PORTS ARE REVERSED.



LEFT SIDE



RIGHT SIDE



VIEW "A" - 2x SCALE
VERIFY BEFORE CONNECTING THAT MIDDLE PIN IS SHORTER THAN OUTSIDE PIN. IF NOT, CUT MIDDLE PIN AS SHOWN

K	11/04/08	Show Correct Assembly Orientation	RW	MJ
REV	DATE	DESCRIPTION	DWN	APVD
REVISIONS				
12	2	-	4710-0008	FLAT WASHER
11	2	-	4710-0016	STAR WASHER
10	1	-	5001-0004	RED DIRECTIONAL LABEL
9	2	-	4953-0001	ELBOW 1/4"X1/4" TUBE
8	2	-	4704-0024	10-32X1/2" FLAT HEAD
7	1	-	3907-0052	14" EXT. CABLE
6	1	-	4904-0006	O-RING 2-030
5	1	-	5205-0038	BOWL ASSEMBLY
4	1	-	5110-0012	RETAINER
3	1	-	SEE TABLE	FILTER ELEMENT
2	1	-	5008-0005	BRACKET
1	1	-	5150-1015	CHAMBER UPPER 316SS
ITEM	QTY	DWG NO.	PART NO.	DESCRIPTION

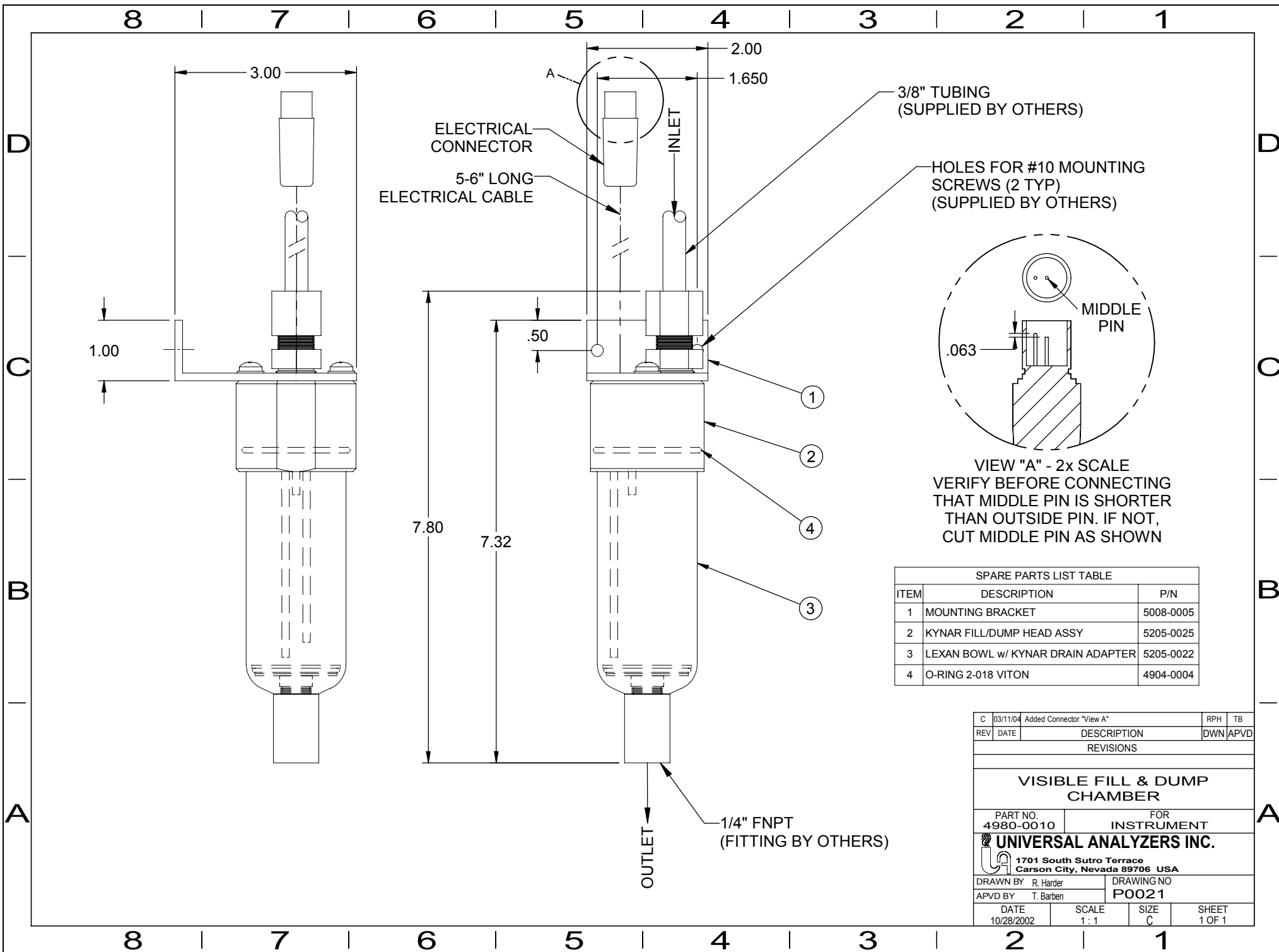
VISIBLE GAS FILTER WITH MOISTURE SENSOR (W.C.O.F.S.S.)

PART NO. SEE TABLE FOR INSTRUMENT

UNIVERSAL ANALYZERS INC.
1701 South Sutro Terrace
Carson City, Nevada 89706 USA

DRAWN BY HARVEY MITCHELL DRAWING NO P0018
APVD BY TED BARBEN II

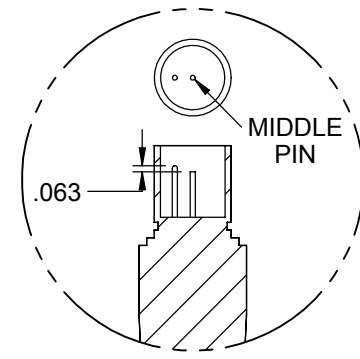
DATE 04/14/92 SCALE 1:1 SIZE C SHEET 2 OF 2



ELECTRICAL CONNECTOR
 5-6" LONG ELECTRICAL CABLE

3/8" TUBING
 (SUPPLIED BY OTHERS)

HOLES FOR #10 MOUNTING
 SCREWS (2 TYP)
 (SUPPLIED BY OTHERS)



VIEW "A" - 2x SCALE
 VERIFY BEFORE CONNECTING
 THAT MIDDLE PIN IS SHORTER
 THAN OUTSIDE PIN. IF NOT,
 CUT MIDDLE PIN AS SHOWN

SPARE PARTS LIST TABLE		
ITEM	DESCRIPTION	P/N
1	MOUNTING BRACKET	5008-0005
2	KYNAR FILL/DUMP HEAD ASSY	5205-0025
3	LEXAN BOWL w/ KYNAR DRAIN ADAPTER	5205-0022
4	O-RING 2-018 VITON	4904-0004

C	03/11/04	Added Connector "View A"	RPH	TB
REV	DATE	DESCRIPTION	DWN	APVD
REVISIONS				

VISIBLE FILL & DUMP CHAMBER

PART NO. 4980-0010 FOR INSTRUMENT

UNIVERSAL ANALYZERS INC.
 1701 South Sutro Terrace
 Carson City, Nevada 89706 USA

DRAWN BY R. Harder DRAWING NO P0021
 APVD BY T. Barben

DATE	SCALE	SIZE	SHEET
10/28/2002	1:1	C	1 OF 1