

SUPERPRESSURE

OIL-IN-COMPRESSED-GAS DETECTOR

MODEL NO.: 47-16015-5 (15K PSI)
47-16015-6 (30K PSI)

Customer Name: _____

Purchase Order No.: _____

Sales Order No.: _____

Serial No.: _____

Date of Manufacture: _____

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MODEL NO.	DRAWING NO.	DESCIRPTION
47-16015-5	62113016000 & Material List 62113016900	Pressure Cell Assy 15K PSI Pressure Cell, Light Source 15K
47-16015-6	62113016000 & Material List 62113017000	Pressure Cell Assy 30K PSI Pressure Cell, Light Source 30K

SUPPLY 47-1622x MANUAL WITH UNIT

I. INTRODUCTION

A. SCOPE

This manual contains instructions for the installation and operation of the 47-16015-5 and 47-16015-6 Oil-In Compressed-Gas Detectors.

B. APPLICATION

The Detector is designed to detect the presence of oil leaks in oil-operated compressor systems and to turn off the compressor or close an electric valve to prevent further contamination of the system. The oil to be detected must contain naphthalene quinoline. This compound is contained in all oil processed from continental-shelf petroleum. If synthetic lubricants are to be used, Newport Scientific, Inc. will suggest types and amounts of additives to render the lubricant detectable with this instrument.

C. PRINCIPLE OF OPERATION

Oil entering the system is carried by the gas stream through a high pressure optical cell. The oil coats the surface of a flat target in the cell. The target is illuminated by ultraviolet light from a mercury lamp which causes the deposited oil to fluoresce. This fluorescent light is detected by a photometer which incorporates a control circuit to turn off the compressor motor or close an electric valve.

D. SPECIFICATIONS

100 / 130 VAC, 1.1 AMPS, 60 HZ

Decade Ranges: 100, 10, 1, 0.1

Operating Ambient: 60° to 90° F, 10% to 60% RH

Millivolt Output Impedance: 5K Typical

II. CONTROLS AND CONNECTORS

A. PANEL CONTROLS

MICROPHOTOMETER CONTROLS		
CONTROL	FUNCTION	PRELIMINARY SETTING
POWER ROCKER SWITCH	ON: Energizes instrument; Closes the control relay contact, thereby energizing the external motor starter or valve solenoid. Applies 700V to the photomultiplier tube. OFF: De-energizes unit and removes power from connected circuits.	OFF
MULTIPLIER DIAL	When turned indicate full scale value of meter (100, 10, 1, .1)	.1
SENSITIVITY ADJUST	Increases meter sensitivity. When rotated sets meter from 0-100.	Approximate Center of Rotation
ZERO ADJUST	Applies an internally generated current to amplifier input to subtract from, or add to, PM tube current. Allows one to measure low light levels, or to cancel out a signal.	

B. CHASSIS REAR PANEL CONNECTORS

NAME	FUNCTION	RATING
LINE CORD	Connects Microphotometer to power source	Model dependent
HIGH VOLTAGE	Connects PM tube cable to Microphotometer. Cable routes 700V to PM tube. PM tube output signal to be measured by Microphotometer.	700V
OUTPUT	Relays signal for compressor turn off.	NC/NO contacts

III. INSTALLATION

1. Before mounting the Detector in the compressor system, be certain all piping on the high-pressure side is clean and oil free. Use Isopropanol Alcohol#2 or other suitable de-greasing agent to remove all traces of oil.
2. The Detector is connected in-line between the compressor and the pressurized system, or on a suitable bypass line which will divert a portion of the main flow through the Detector. It should be connected downstream from the compressor after cooler to prevent heating of the photomultiplier tube. The photomultiplier tube can be damaged by temperatures above 70°C.

3. The Detector should be protected from vibration by mounting to a solid support not attached to the compressor frame and connected to the piping by flexible lines. If this is not practical, shockmount the Detector on the base of the compressor and use flexible lines.
4. Connections to the Detector are for 9/16" tubing with ends prepared for Superpressure 45-11360 Connectors.
5. The Detector requires 115V, 60Hz power. Detectors can be supplied on special order for 220V, 50Hz or 110/220V, 50Hz. See Figure 2 for suggested electrical connection of Detector to Compressor, shut-off valve or alarm.

IV. ALIGNMENT

1. Make sure that Microphotometer POWER switch is OFF.
2. Check that lamp is secure in its socket. Access to lamp is obtained by removing nuts holding top of lamp housing.

NOTE

Explosion-resistant lamp housings are supplied on some models on special order. Access to the lamp on these models is through a side panel held by four nuts.

3. Slip the PM tube holder into the PM tube housing. Tighten screw to secure holder into housing.
4. Filter is permanently installed on all models with mirror side toward light source.
5. Put fluorescence filter (yellow) into filter holder on PM tube housing.
6. Refer to Drawing #47-16015-5. Plug Microphotometer line cord into outlet.
7. Plug lamp ballast line cord into outlet.
8. Connect cable between mercury lamp housing and lamp ballast.
9. Connect cable from PM tube to PMT receptacle High Voltage at rear of Microphotometer.
10. Close shutter on PM tube housing by turning until plunger springs up.
11. Turn Microphotometer POWER to ON.

NOTE

Lamp requires fifteen (15) minutes warm-up time to reach full brilliance. When lamp is turned OFF, it must be allowed to cool before it will restart.

12. Remove Superpressure 9/16" tubing connector assembly from port next to photomultiplier tube housing.
13. Remove the Allen set-screw from the corner of cell. A 6-32 tapped hole is provided in back of target for easy target removal. Remove target and place a smear of Solnus 150 or 300 oil on target face. Replace target and reinstall the set-screw.
14. Sight down port. A bright blue line should be seen on the target.

WARNING:

**DO NOT LOOK AT IMAGE FOR LONG PERIODS.
ULTRAVIOLET LIGHT IS HARMFUL TO THE EYES.**

15. If line is more than 1/8" off center or does not cover the full length of the target, adjust with lamp adjustment nuts. Raising or lowering the lamp base moves the line along its length. In raising or lowering the image, rotate all nuts in the same direction. Tilting the lamp base to left or right moves the line from side to side. To tilt, tighten or loosen both nuts on one side of base. When adjustment is finished, tighten all nuts.
16. Remove target and rinse thoroughly with Isopropanol Alcohol #2. Replace target and Allen set-screw.
17. Replace Superpressure 9/16" tubing connector assembly and tighten all pressure connections to optical cell.

V. OPERATION

CAUTION: Do not expose PM tube to intense light (such as ambient light) while high voltage is ON. Always turn POWER to OFF before removing PM tube from housing (in the OFF position, high voltage is removed from the PM tube)

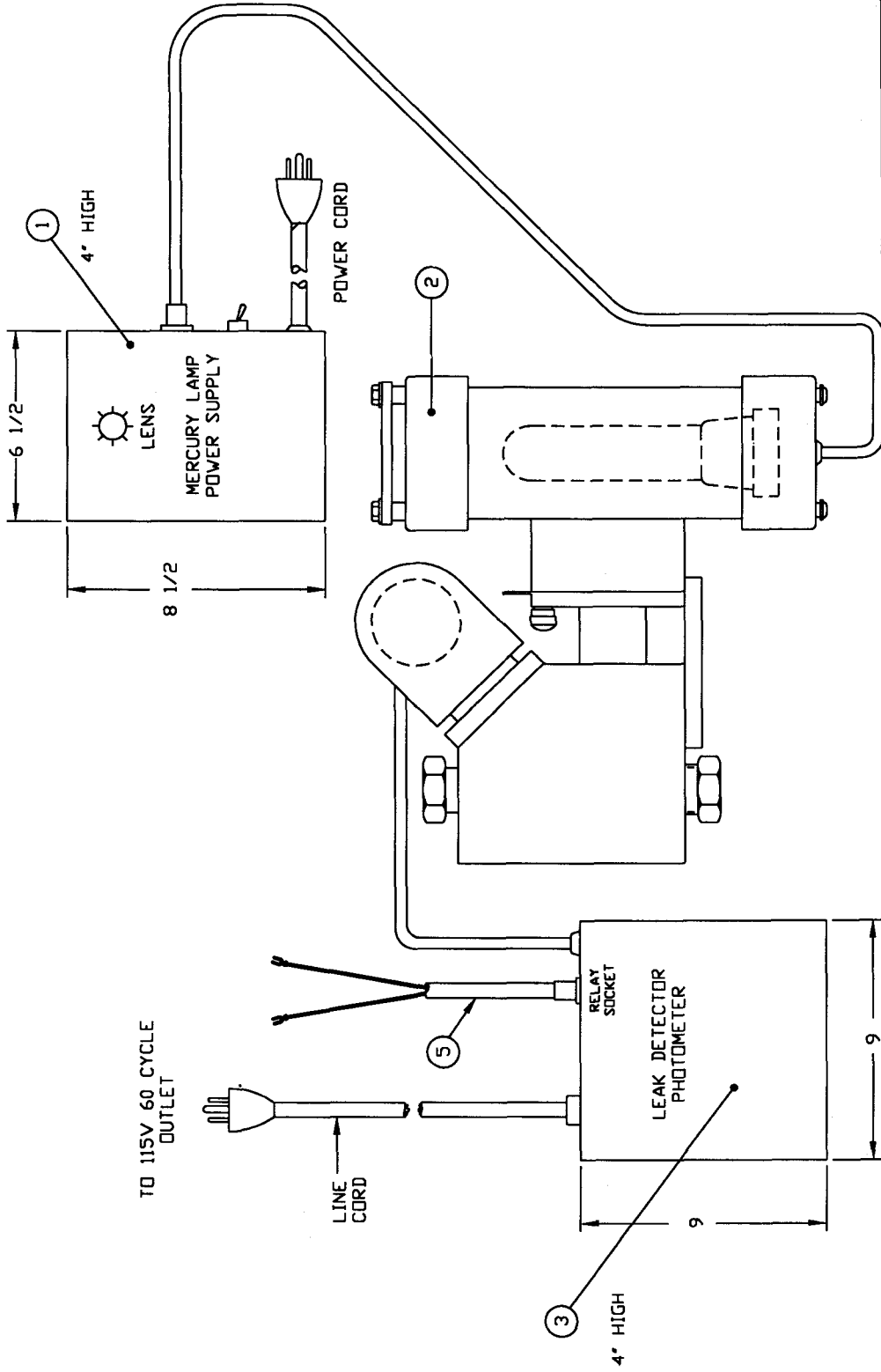
1. See that lamp is aligned and perform the following:
 - a. Microphotometer POWER switch OFF. (Pushbutton OUT)
 - b. Excitation and fluorescence filters are installed.
 - c. Cables are connected (Except compressor starter cable).
 - d. Shutter is closed.
2. Turn Microphotometer POWER to ON: Multiplier to .1. The power light will illuminate, indicating that the relay circuit in the Microphotometer is energized. Make sure lamp ballast line cord is plugged in.
3. Allow about fifteen (15) minutes for instrument to stabilize. When the lamp has warmed up, open shutter by pressing plunger and turning one-quarter turn to lock.
4. Adjust the Digital Meter Reading to approximately 50.0 by turning the necessary Multiplier to (100,10, or 1) and rotating the Zero Adjust Control Knob, and Sensitivity Adjust.
5. Alarm should be off (red light off).
6. The Alarm settings are built into the electronics and are not adjustable. The high setting is 75 and the low setting is 25.
7. Adjust Sensitivity and/or Zero Adjust to 25 and observe Alarm light on.
8. Adjust Sensitivity and/or Zero Adjust to 75 and observe Alarm light on.

9. Readjust the meter reading to approximately 50.0.
10. Connect compressor starter cable to receptacle at rear of Microphotometer (output) Figure 2. At this point the compressor may be started by turning its main start switch ON.
11. In general, the lower meter contact has caused shutdown, if there is mercury lamp failure or a fault in the Microphotometer, consult the Microphotometer instructions for trouble shooting directions. If the high limit contact has caused shutdown, contamination has occurred.
12. After a leak, all lines connected to the Detector and the Detector itself must be thoroughly cleaned of oil, using Isopropanol Alcohol #2, or another suitable de-greasing agent.

WARNING:

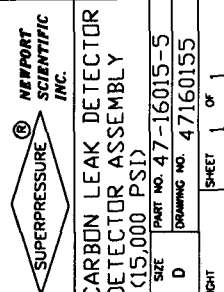
During operation of the Detector, the PM tube should never be removed from its housing when the POWER is in any position other than OFF. Failure to comply will result in damage to the PM tube. Equal care should be exercised to ensure that the shutter on the PM tube housing is never removed from its frame during operation unless the POWER switch is in the OFF position.

REVISIONS		DATE	APPROVED
SYM	DESCRIPTION	3/7/06	P. ZIEG
A	REMOVED NOTE #2		



UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES		TOLERANCES:	
FRACTIONS ±		DECIMALS ±	
ANGLES ±		REMOVE ALL BURRS AND SHARP EDGES	
DO NOT SCALE THIS DRAWING		FINISH:	
BY:	NAME	DATE	
CHECKED			
ENGR/DSGN			
APPROVED			
MATERIAL			
SEE PARTS LIST			
CODE IDENT. NO.	59505	SIZE	D
PART NO.	47-16015-5	DRAWING NO.	47160155
SCALE	NONE	WEIGHT	
			SHEET 1 OF 1

PROPRIETARY
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TITLE		HYDROCARBON LEAK DETECTOR LEAK DETECTOR ASSEMBLY (15,000 PSI)	
SCALE	NONE	WEIGHT	

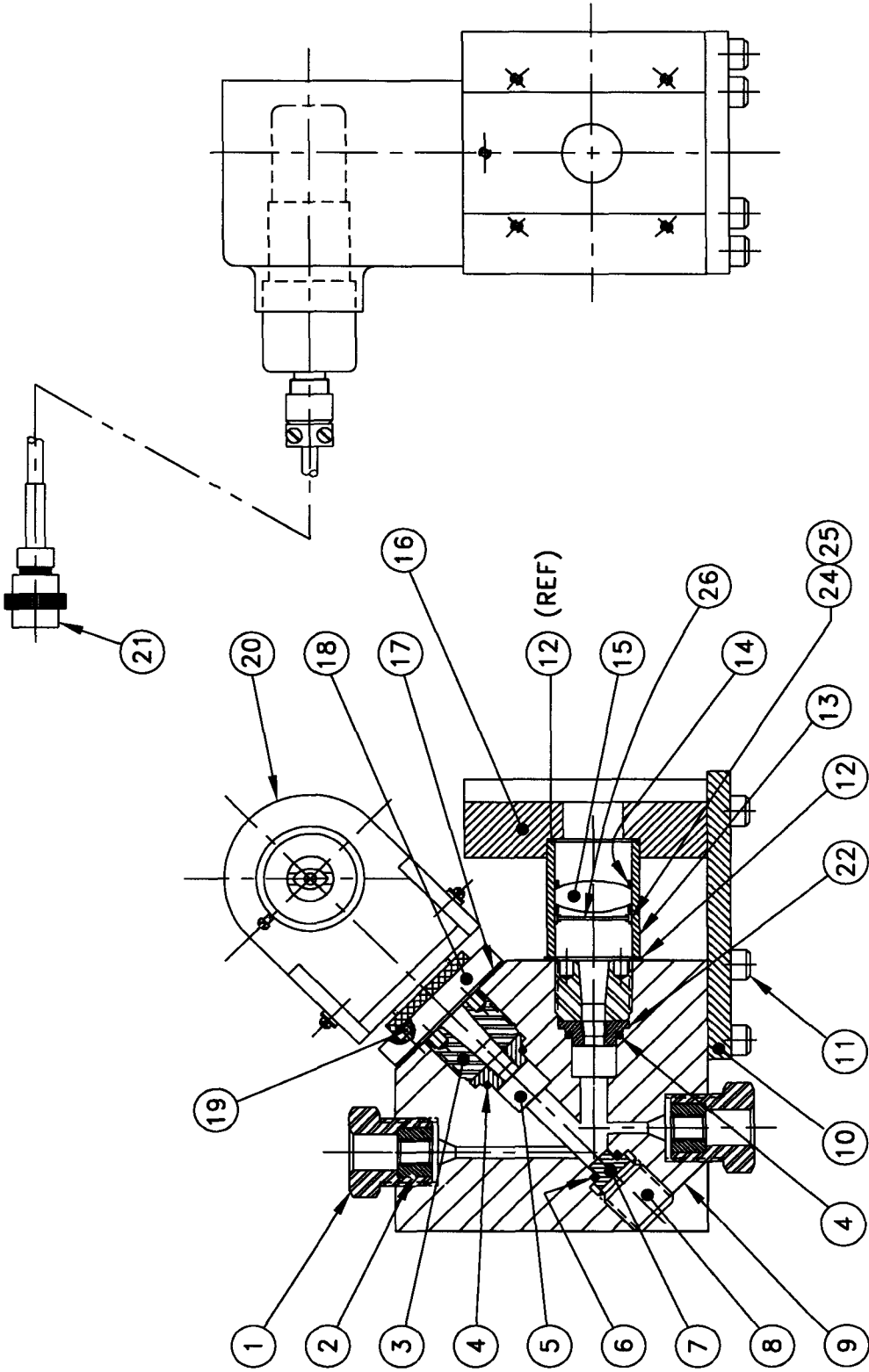
NOTES:
 1. THE LIGHT SOURCE ASS'Y 62113010600 MUST BE MOUNTED VERTICALLY AT ALL TIMES, TUBE UP.

ITEM	QTY.	DESCRIPTION	PART NO.
5	1	CABLE	62113022100
4		NOTE: NOT USED	
3	1	PHOTOMULTIPLIER MICRO PHOTO METER	47-16224
2	1	HYDROCARBON LEAK DETECTOR	62113016900
1	1	MERCURY LAMP POWER SUPPLY	62113022400
PARTS LIST			

TO 115V 60 CYCLE OUTLET	
LINE CORD	
RELAY SOCKET	
LEAK DETECTOR PHOTOMETER	
MERCURY LAMP POWER SUPPLY	
POWER CORD	
APPLICATION	
USED ON	
NEXT ASSY	

REVISIONS

LTR	DESCRIPTION	DATE
A	ADDED ITEMS 14, 25 THRU 27 ADDED NOTE 2	2/06



NOTE:

1. ITEM 5 (WINDOW) AND ITEM 22 (BACK-UP DISC) ARE NORMALLY FURNISHED AS A CEMENTED SUB-ASSEMBLY AS PER DRAWING 62113017100.
2. INSTALL U.V. FILTER WITH MIRROR SIDE NEAREST TO LAMP.

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES:

FRACTIONS ±
DECIMALS ±
ANGLES ±

REMOVE ALL BURRS AND SHARP EDGES

DO NOT SCALE THIS DRAWING

BY	DATE	FINISH:
PREPARED		
CHECKED		
DRG/750M		
APPROVED		
MATERIAL		

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**LEAK DETECTOR 15,000 PSI
PRESSURE CELL ASSEMBLY**

CODE	WGHT. NO.	SIZE	PART NO.	DRAWING NO.
	59505		62113016000	16062113

ITEMS MARKED WITH * ARE NOT SHOWN IN ASSEMBLY

ITEM #	REQ'D #	DESCRIPTION	PART NO.	PART NO.	MATERIAL
26	1	FILTER	P1809008500		AS PER DETAILS
25	1	FILTER HOLDER	62113007800		ALUMINUM
24	1	FILTER RETAINER	62113007700		ALUMINUM
23*	1	WRENCH, ADJUSTABLE FACE SPANNER	P1869001600		STEEL
22	2	BACK-UP-DISC	62113016100		TYPE 416 SS
REF 21	1	PHOTOMULTIPLIER TUBE	47-16216		AS PER DETAILS
20	1	TUBE AND FILTER HOUSING ASSEMBLY	62113006700		AS PER DETAILS
19	4	SCREW, 6-32NC-2A SKT. HD. CAP, 9/16 LONG	Q4651001917		STEEL
18	1	ADAPTER, HOUSING	62113006400		ALUMINUM
17	1	GASKET	62113006500		FELT
16	1	SUPPORT, LAMP HOUSING	62113003600		ALUMINUM
15	1	LENS	62113002500		QUARTZ
14	3	RING, LENS RETAINER	62113002600		STEEL
13	1	HOLDER, LENS	62113001300		ALUMINUM
12	2	WASHER	62113001800		FELT
11	6	SCREW, 5/16 - 18 UNC-2A, SOCKET HEAD, 1" LONG	Q4650023526		STEEL
10	1	PLATE, CELL MOUNTING	62113003700		ALUMINUM
9	1	BODY - 15,000 PSI	62113016200		TYPE 316 SS
8	1	SCREW, 7/8 - UNC-3A SKT. HEX HEAD	P4833071600		STEEL
7	1	REFLECTOR	62113006900		BRASS/ BLACK NICKLE PLATE
6	1	"O"- RING GASKET	P1604026600		VITON
5	2	WINDOW	62113000500		QUARTZ
REF 4	2	"O"- RING GASKET	P1604026500		VITON
3	2	NUT, WINDOW RETAINER	62113000400		17-4PH H900
2	2	INNER SLEEVE	45-11366		TYPE 416 SS
1	2	GLAND NUT	45-11363		TYPE 416 SS
ITEM #	REQ'D #	DESCRIPTION	PART NO.	PART NO.	MATERIAL
		LEAK DETECTOR 15,000 PSI PRESSURE CELL ASSEMBLY	PART NO. 62113016000		

CODE IDENT. NO. 59505

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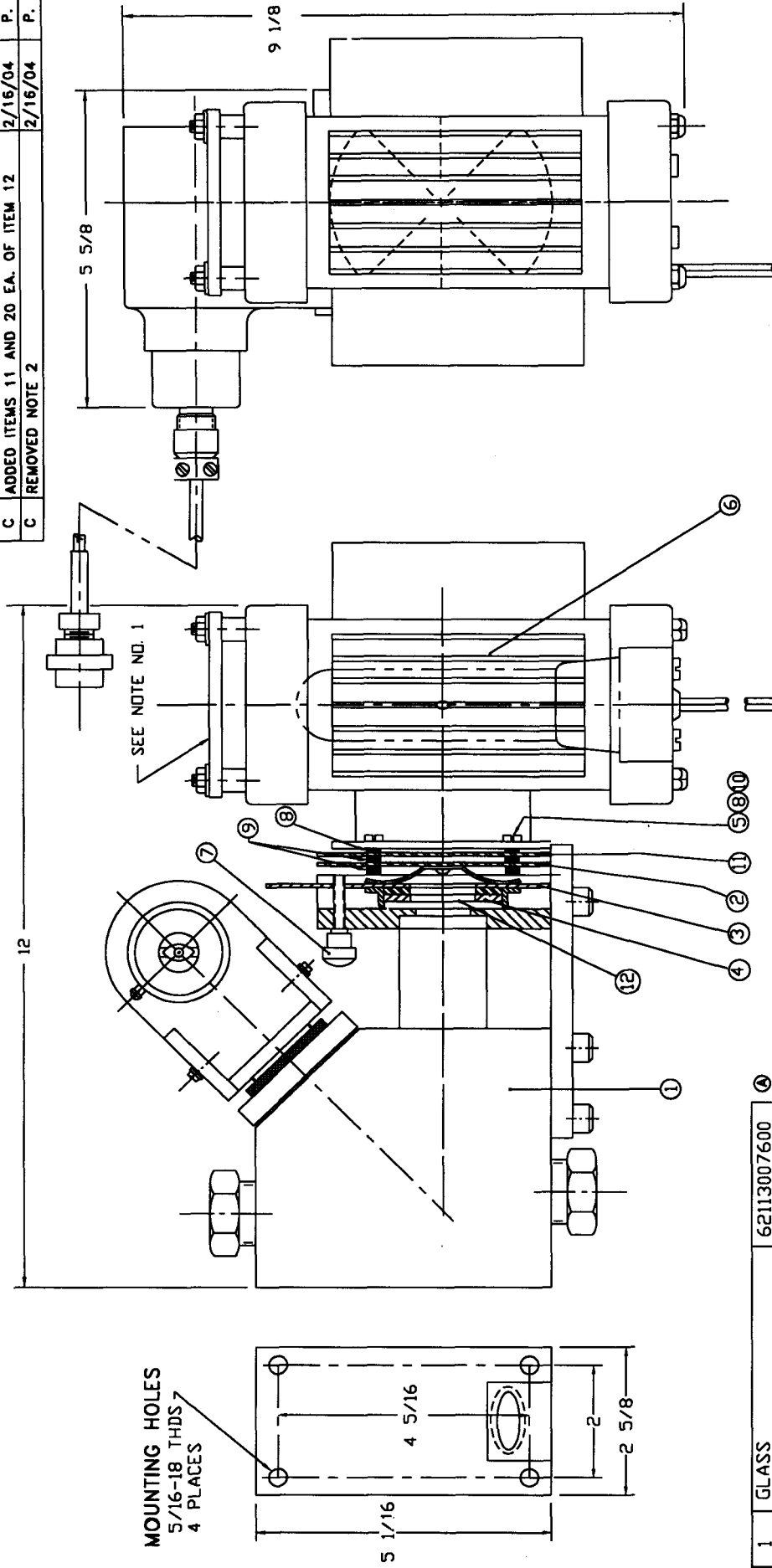
CHECKED BY/DATE:

NEWPORT SCIENTIFIC, INC. (formerly AMINCO)
8045 E SANDY COURT
BESSUP, MARYLAND 20794
HQ:ADMIN/DWGS/62113016000

SHEET 2 OF 2

REVISIONS

SYM	DESCRIPTION	DATE	APPROVED
A	RELOCATED FILTER TO 62113016900 AND REPLACED WITH ITEMS 4 & 12	2/16/04	P. ZIEG
C	ADDED ITEMS 11 AND 20 EA. OF ITEM 12	2/16/04	P. ZIEG
C	REMOVED NOTE 2	2/16/04	P. ZIEG



MOUNTING HOLES
5/16-18 THDS
4 PLACES

ITEM	QTY.	DESCRIPTION	PART NO.
12	1	GLASS	62113007600
11	1	FILTER HOUSING COVER	62113003800
10	4	LOCK WASHER #8	R1061003400
9	24	FLAT WASHER #8	R1065010700
8	8	NUT 8-32UNC THDS	R1050005600
7	1	THUMB SCREW ASSEMBLY	62113004600
6	1	LIGHT SOURCE ASSEMBLY	62113010600
5	4	SCREW, 8-32 UNC-2A x 1 3/4 LG. BIND. HEAD MACH.	00801002238
4	1	SPACER	62113008000
3	1	HOLDER, FILTER	62113003900
2	1	FILTER HOUSING COVER ASSEMBLY	62113020700
1	1	HIGH PRESSURE CELL ASSEMBLY	62113016000
ITEM	QTY.	DESCRIPTION	PART NO.

NOTES:

1. THE LIGHT SOURCE 62113010600 MUST BE MOUNTED VERTICALLY AT ALL TIMES, TUBE UP.

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES:
FRACTIONS ±
DECIMALS ±
ANGLES ± 0° - 30°
REMOVE ALL BURRS AND SHARP EDGES
DO NOT SCALE THIS DRAWING

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TITLE: HYDROCARBON LEAK DETECTOR (15,000 PSI) PRESSURE CELL & LIGHT SOURCE ASSEMBLY
CODE DEPT. NO.: 59505
PART NO.: 62113016900
DRAWING NO.: 16962113
SCALE: NONE
WEIGHT: 1
SHEET: 1 OF 1

BY	NAME	DATE	FINISH:
PREPARED			
CHECKED			
ENGR/DSCM			
APPROVED			
MATERIAL			

47-16015-5	USED ON	APPLICATION
	SEE PARTS LIST	

PARTS LIST