

WATERS MANUFACTURING ASSEMBLY PROCEDURE**PAGE 1 OF 20**
279002476 REV P
DATE
12/20/07ITEM NUMBER
279002476DESCRIPTION
ASSY, INTEGRATED DETECTOR, 2475WRITTEN BY
Wendy Harrop**REVISION RECORD**

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OPER OPERATION DESCRIPTION

TOOL NUMBER/DESCRIPTION

Find all cables in cable kit 205000657

1.0 BEZEL ASSEMBLY

NOTE: LCD and keypad glass should be free of dust and particulates, using only a clean, lint free cloth and deionized air.

DEIONIZED AIR GUN

- a) Remove clear film from front and back of keypad glass and LCD.
- b) Place a spacer 405001395 over each of the 4 keypad studs.
Place the LCD gasket WAT081353 on the keypad 420000124 matching the cutouts in the gasket and keypad.
- c) Place the LCD 279000426 on top of the spacers, with the cable towards bottom
Secure LCD to the keypad, (3) studs with (1) nylon washer 410000803 (1) star washer WAT240534 and (1) nut WAT072368 each. Leave the stud with the grounding strap for last.
- d) Flip the grounding tab over the stud and secure with (1) flat washer WAT240533, star washer WAT240534 and (1) nut WAT072368.
- e) Remove all the adhesive backs from the grounding tabs of keypad and place it on the front panel 279000327.
Press the grounding tabs onto the front panel as shown.
- f) Place with (2) spring clips WAT081316 over the top locations and place the retainer keyboard bracket WAT081229 on the bottom.
Secure the keypad in using (4) screws WAT081325. Make sure keypad is tight

<u>PART #</u>	<u>QTY</u>	<u>DESCRIPTION</u>
405001395	4	Spacer, LCD
WAT081353	1	Gasket, LCD 1/16"
420000124	1	Keypad, Detector
279000426	1	Assy, Display, LCD LED Backlight
WAT240533	1	Washer, .188 X .089 X .028, SS
WAT240534	4	Washer, Star Ex. NO-2 410SS
WAT072368	4	Nut, Hex 2-56 3/16 SS
279000327	1	Assy, Front Panel, 2475
WAT081229	1	Bracket, Keyboard Retain Bottom
WAT081316	2	Clip, Spring, 2487
WAT081325	4	Screw, Thd-Form #4-24
410000803	3	Washer, Nylon

Ground Strap



Figure 1

OPER OPERATION DESCRIPTION TOOL NUMBER/DESCRIPTION

- 1.1 Assemble the EMI foam to the front door (4 1/4 ") and the P-shape to the sides of the front panel.

<u>PART #</u>	<u>QTY</u>	<u>DESCRIPTION</u>
425000263	1	Foam, EMI Gasket
425000261	2	Gasket, EMI, "P" Shape



Figure 2

- 2.0 Chassis Assy

- 2.1 Assemble fuses to the drawer, and then slide into the power entry module.

<u>PART #</u>	<u>QTY</u>	<u>DESCRIPTION</u>
330000136	2	FUSE,3.15A,250V,5X20MM FAST-ACTING UL
WAT207063	1	Power Entry Module, Filtered
WAT055426	1	CBM, Fuse Drawer, AC

<u>OPER</u>	<u>OPERATION DESCRIPTION</u>	<u>TOOL NUMBER/DESCRIPTION</u>
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2.2 Assemble the ground wire and the AC Power Mod cable to power module. L = Brown, N = Blue

<u>PART #</u>	<u>QTY</u>	<u>DESCRIPTION</u>
WAT081335	1	Assy, Ground Wire 2487
WAT081255	1	Assy, Cable AC Mod-Pwr Switch

2.3 Assemble the power entry module to the chassis.

<u>PART #</u>	<u>QTY</u>	<u>DESCRIPTION</u>
400002824	1	Chassis, Detector, 2475
WAT271142	2	Screw, M3 X 10mm
WAT207063	1	Power Entry Module



Figure 3

2.4 Assemble the RS232 Cable to the chassis.

<u>PART #</u>	<u>QTY</u>	<u>DESCRIPTION</u>
441000256	1	Assy, Cable, RS232, 2414
WAT089113	2	Standoff, DP3000

2.5 Snap the Ethernet cable into the cutout located in the chassis. Orient the connector as shown.

<u>PART #</u>	<u>QTY</u>	<u>DESCRIPTION</u>
441001280	1	Assy, Cable Ethernet

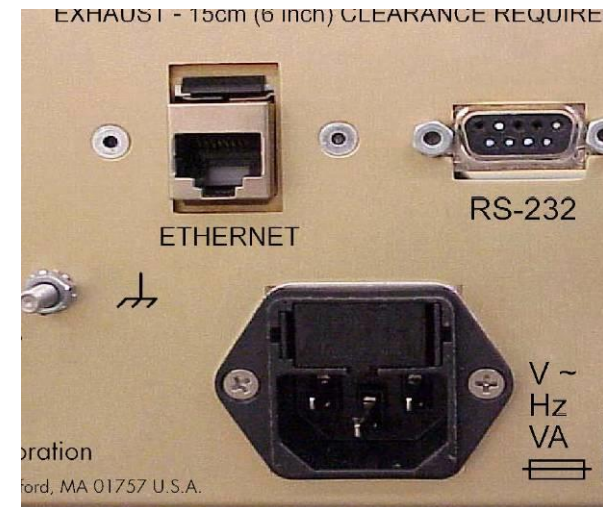


Figure 4

OPER OPERATION DESCRIPTION

TOOL NUMBER/DESCRIPTION

3.0 Assemble the guards to the fans.

<u>PART #</u>	<u>QTY</u>	<u>DESCRIPTION</u>
279000330	3	Fan, 24VDC, 3.15 SQ
WAT098174	3	Guard, Fan, Rotran 3in Dia.
WAT025249	12	Snap Rivet (.256)

3.1 Assemble the fans using the rivets in the orientation shown.
Flow direction is toward the back of the chassis (out).

<u>PART #</u>	<u>QTY</u>	<u>DESCRIPTION</u>
WAT025249	12	Snap Rivet (.256)

3.2 Assemble the EMI foam as shown.

<u>PART #</u>	<u>QTY</u>	<u>DESCRIPTION</u>
425000264	1	Foam, EMI 7"

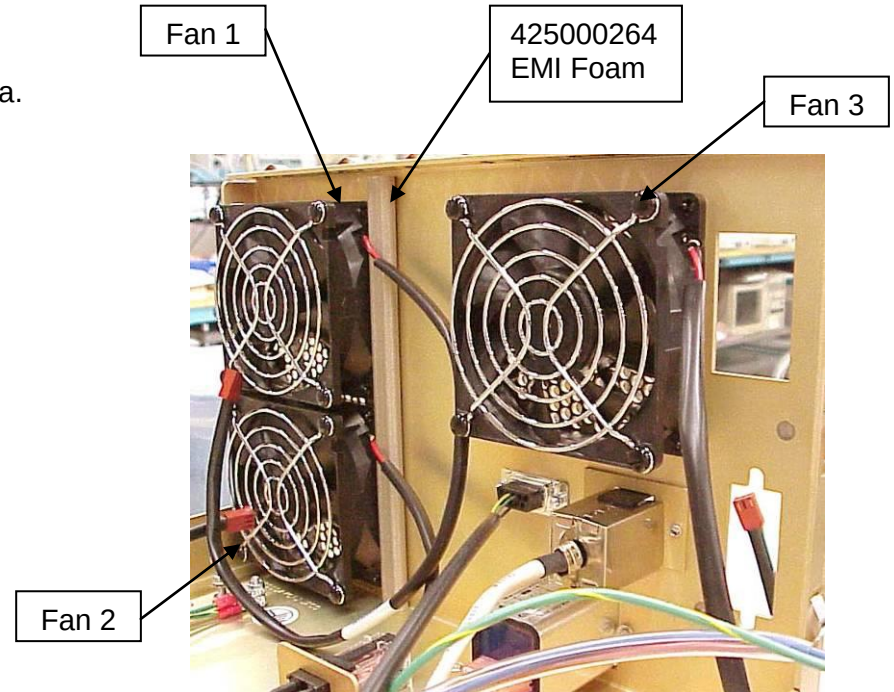


Figure 5

<u>OPER</u>	<u>OPERATION DESCRIPTION</u>	<u>TOOL NUMBER/DESCRIPTION</u>
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4.0 GROUND STACK UP

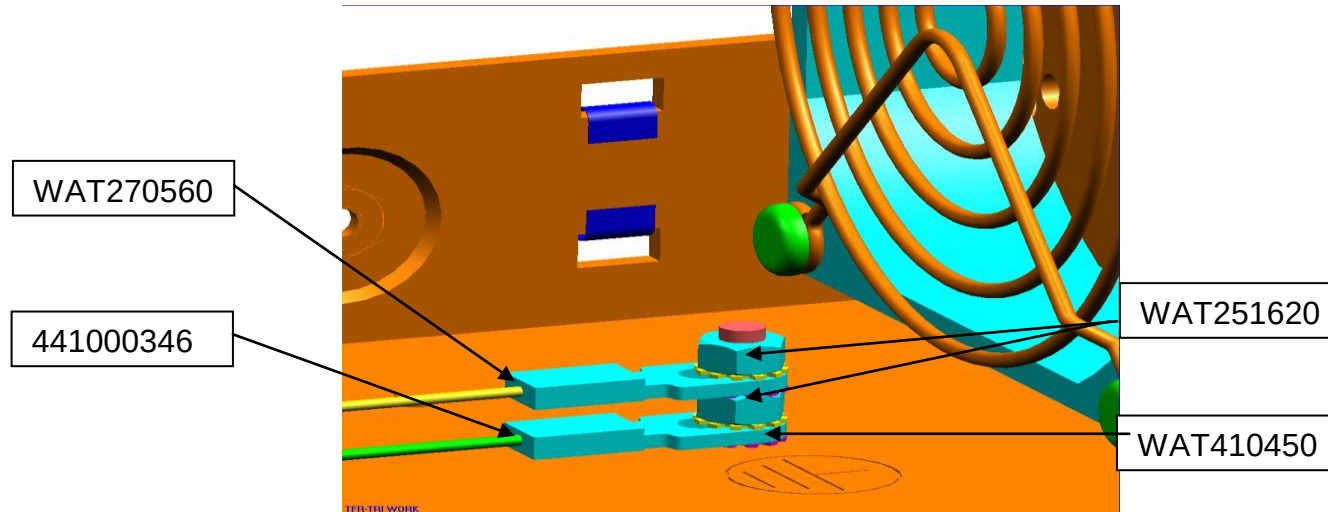
4.1	Place washer onto the ground stud, add the 10" ground wire lug and secure with lock nut.	7mm Nut Driver
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<u>PART #</u>	<u>QTY</u>	<u>DESCRIPTION</u>
WAT410450	1	Washer, Metric Ext Tooth, M4
WAT251620	1	Lock Nut, M4
441000346	1	Assy, Ground Wire

4.2	Place washer on top of the lock nut, add the 15" ground wire lug onto the stud. Secure with lock nut.
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<u>PART #</u>	<u>QTY</u>	<u>DESCRIPTION</u>
WAT410450	1	Washer, Metric, Ext Tooth, M4
WAT251620	1	Lock Nut M4
WAT270560	1	Assy, Ground Wire 15"

Figure 6



<u>OPER</u>	<u>OPERATION DESCRIPTION</u>	<u>TOOL NUMBER/DESCRIPTION</u>
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5.0	Slide the AC Harness/Interlock through the relay mount bracket, wires first and tab side up. Use a small screw driver to lock the tabs in place. Snap the relay into the connector.	
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<u>PART #</u>	<u>QTY</u>	<u>DESCRIPTION</u>
441000528	1	Assy, Cable AC Harness/Interlock
400002569	1	Bracket, Relay Mount
343000100	1	Relay 5A Contacts DPDT 24VDC Coil Plug

Small Regular Screw Driver

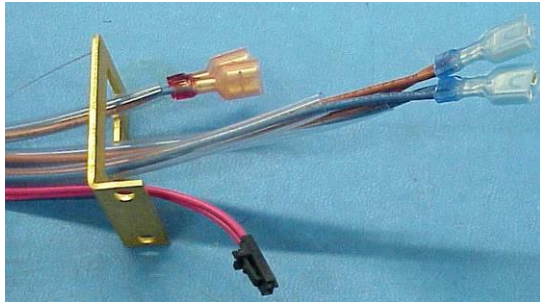


Figure 7

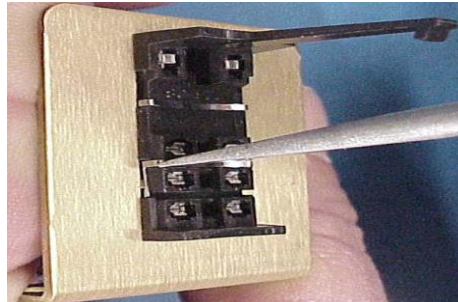


Figure 8

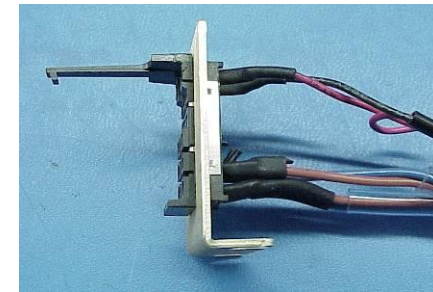


Figure 9

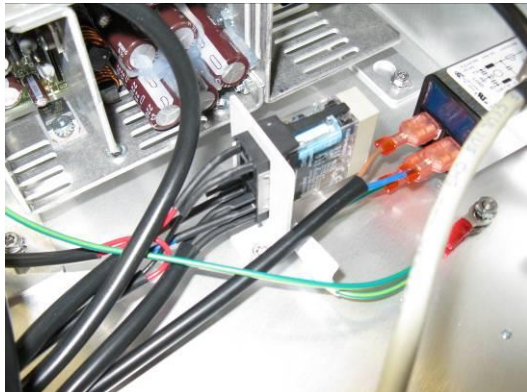


Figure 10

OPER OPERATION DESCRIPTION TOOL NUMBER/DESCRIPTION

5.1 Assemble the relay bracket to the chassis; route and twist-lock the cables (Figure 11a)

<u>PART #</u>	<u>QTY</u>	<u>DESCRIPTION</u>	
410000419	2	Screw, M4 X 10mm, SEMS	T20 Torx Drive

NOTE: P/N: 441000528 denotes ASSY, CABLE AC HARNESS/INTERLOCK which is made up of different cables

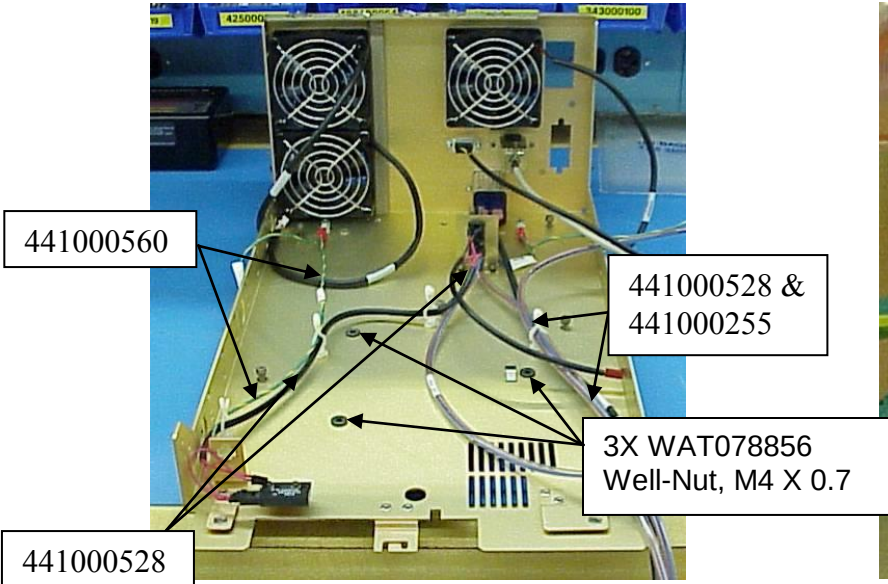


Figure 11a

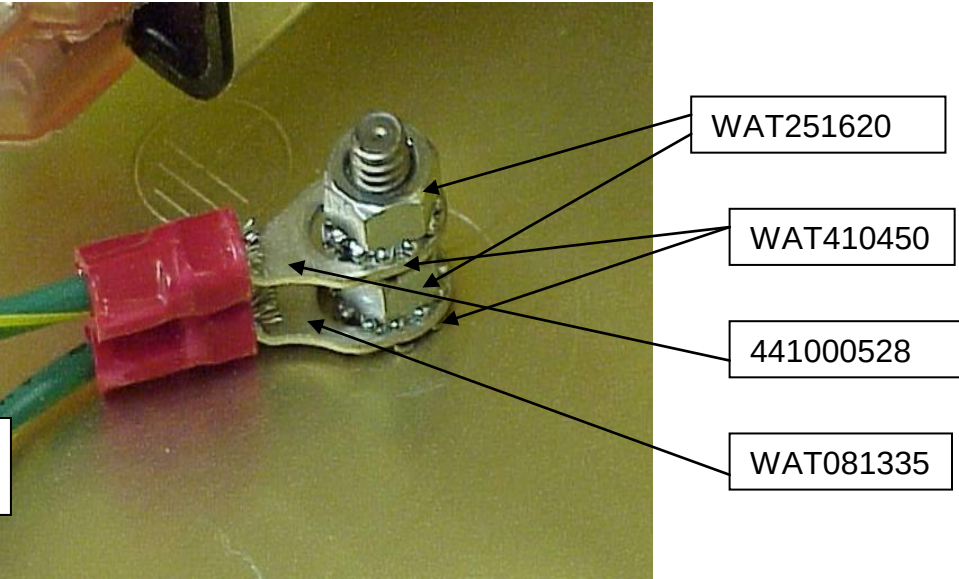


Figure 11b

5.2 Place washer onto the ground stud. Add the Gnd Wire Assy lug and secure with lock nut. (Figure 11b)

7mm Nut Driver

<u>PART #</u>	<u>QTY</u>	<u>DESCRIPTION</u>
WAT410450	1	Washer, Metric Ext Tooth, M4
WAT251620	2	Lock Nut, M4
WAT081335	1	Assy, Gnd Wire

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<u>OPER</u>	<u>OPERATION DESCRIPTION</u>	<u>TOOL NUMBER/DESCRIPTION</u>
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5.3 Place washer on top of the lock nut. Add the ground wire lug from the AC Cable Assy onto the stud and secure with lock nut. (Figure 11b)

<u>PART #</u>	<u>QTY</u>	<u>DESCRIPTION</u>
WAT410450	1	Washer, Metric, Ext Tooth, M4
WAT251620	1	Lock Nut M4
441000528	1	Assy, Cable AC Harness/Interlock

7mm Nut Driver

6.0 Insert the well-nuts into the chassis(see Fig. 11a)

<u>PART #</u>	<u>QTY</u>	<u>DESCRIPTION</u>
WAT078856	3	Well-Nut, M4 X 0.7

6.1 Assemble the reed switch to the bracket located at the front of the chassis. Slide switch all the way to the right. (Figure 12)

<u>PART #</u>	<u>QTY</u>	<u>DESCRIPTION</u>
279000254	1	Reed Switch, Magnetic
410000272	2	Screw, M3 X 8 SEMS



Figure 12

OPER OPERATION DESCRIPTION

TOOL NUMBER/DESCRIPTION

7.0 DC POWER SUPPLY

NOTE: When handling any PCB assemblies, proper ESD equipment shall be worn, and ESD procedures followed.

7.1 Assemble the DC power supply to the mounting bracket. (Figure 13)

<u>PART #</u>	<u>QTY</u>	<u>DESCRIPTION</u>
279000380	1	Power Supply, DC Tested
400000432	1	Bracket, Mounting Power Supply
410000272	4	Screw, M3 X 8 SEMS
400002466	1	Shield, power supply



Figure 13

7.2 Slide the DC power supply onto the chassis, and tighten screw at rear of power supply. Leave the front screw loose.

<u>PART #</u>	<u>QTY</u>	<u>DESCRIPTION</u>
410000419	4	Screw, M4 X 10 SEMS
WAT043095	1	Label, access

Slide shield under tab of bracket and secure with M4X10 SEMS. Attach label



Secure screw
beyond the keyway.

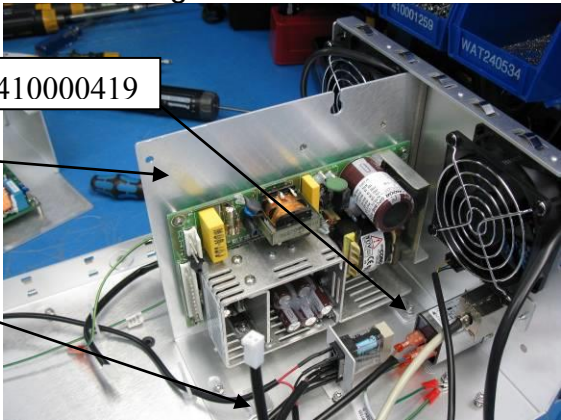
Figure 14

Rear screw 410000419

Bracket 400000432

tab

Shield 400002466



OPER OPERATION DESCRIPTION

TOOL NUMBER/DESCRIPTION

7.3 Attach the AC Harness cable (441000528) to J1 on the power supply and attach DC power cable (441000249) to J2 on the power supply.

PART #	QTY	DESCRIPTION
441000249	1	Cable, DC Power
441000528	1	AC Harness Cable

Optics Bench to DC PSU bracket screw
WAT271463



WAT411416
Screw, M4 X 16 3X

8.0 **OPTICS BENCH INTEGRATION**

Slide the optics bench drain tubing through the hole located in the front of the chassis and assemble the optics bench to the chassis. Keep screw M4 x 16 loose at this time.

PART #	QTY	DESCRIPTION
WAT411416	3	Screw, M4 X 16
WAT271463	1	Screw, M3 X 06
279000400	1	Assy, Optics Bench, Fluor

279000400
Assy,
Optics
Bench,
Fluor

Figure 15a

8.1 Attach the cables from the power module and the AC Harness to the front panel power switch, using tool 119646. (Figure 15b)

TOOL #119646

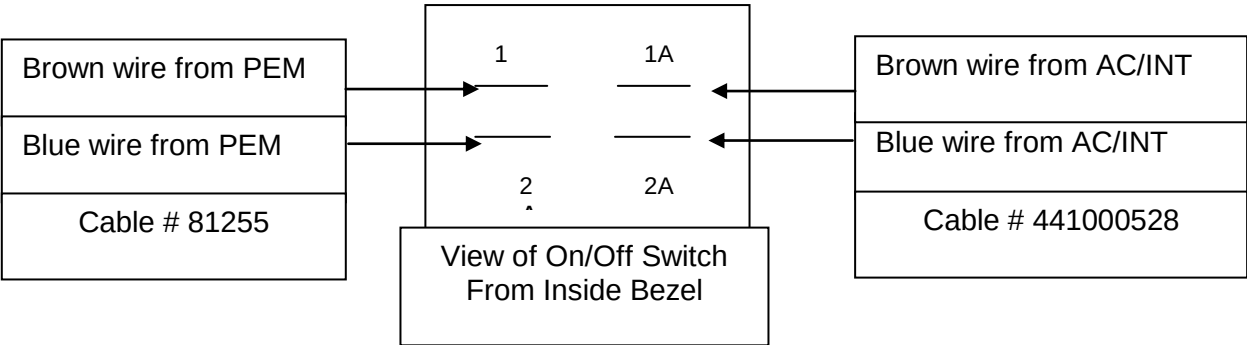


Figure 15b

<u>OPER</u>	<u>OPERATION DESCRIPTION</u>	<u>TOOL NUMBER/DESCRIPTION</u>
8.2	Secure the front panel with screw WAT271142. Install flow cell alignment tool into bench. Tighten the three bench mount screws (WAT411416). Tighten power supply screw (41000419). Remove alignment tool. Attach flat cable clamp to side of optics bench.	T20 Torx Driver 999027459 flow cell alignment tool

<u>PART #</u>	<u>QTY</u>	<u>DESCRIPTION</u>
WAT072736	1	Clamp, Flat Cable ADH 1X1
WAT271142	4	Screw M3 X 10MM Flat Hd X-recess
410000419	2	Screw, M4 X 10, SEMS



Figure 16a

Flow cell alignment tool

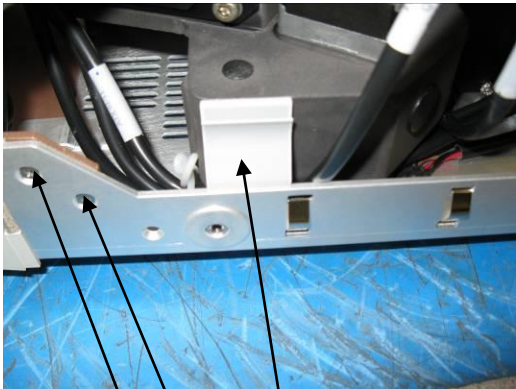


Figure 16b

WAT072736 Clamp, Flat Cable ADH 1X1

WAT271142 Screw M3 X 10MM Flat Hd X-recess

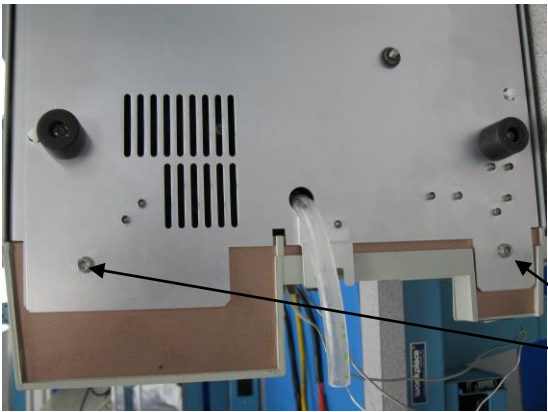


Figure 16c

410000419 Screw, M4 X 10, SEMS

OPERATION DESCRIPTION

TOOL NUMBER/DESCRIPTION

9.0 LAMP POWER SUPPLY

NOTE: When handling any PCB assemblies, proper ESD equipment shall be worn, and ESD procedures followed.

9.1 Assemble the grommet to the hole in the mounting bracket. (Figure 17)

<u>PART #</u>	<u>QTY</u>	<u>DESCRIPTION</u>
425000251	1	Grommet, .375 I.D.
400000731	1	Bracket, Power Supply Mounting

9.2 Assemble the lamp power supply to the mounting bracket.

<u>PART #</u>	<u>QTY</u>	<u>DESCRIPTION</u>
279001352	1	Power Supply Mercury Xenon Lamp 150W
WAT081265	4	Screw, M3 X 10 SEMS

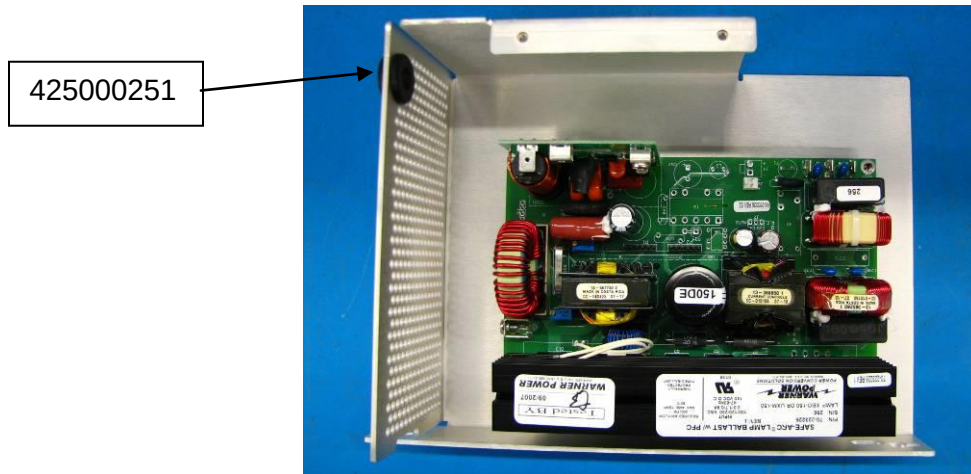


Figure 17

<u>OPER</u>	<u>OPERATION DESCRIPTION</u>	<u>TOOL NUMBER/DESCRIPTION</u>
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9.3 Assemble the HV Anode cable to the connector mount bracket.

<u>PART #</u>	<u>QTY</u>	<u>DESCRIPTION</u>
441000392	1	Assy, Cable, HV Anode
405002908	1	Bracket, Connector Mount (RED)
410000419	2	Screw, M4 X 10mm

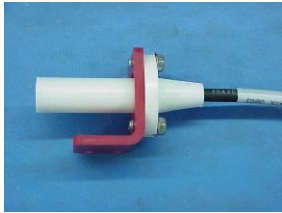


Figure 18

9.4 First thread the blue HV cathode wire, fastener side first through the grommet. Slide the wire onto (J5A) connector located next to the heatsink on the power supply Board. Tie-wrap the blue cathode wire to the vent holes of the power supply mounting bracket approximately 3.5 inches from the bottom. Second thread the HV anode cable through the grommet and attach the terminal onto the "POS HV OUT" (J3B) terminal located on the upper left hand side of the striker board of the lamp power supply. See figure 19.

<u>PART #</u>	<u>QTY</u>	<u>DESCRIPTION</u>
441000281	1	Assy, Cable, HV Cathode

<u>OPER</u>	<u>OPERATION DESCRIPTION</u>	<u>TOOL NUMBER/DESCRIPTION</u>
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9.5 Snap ferrite beads around the Anode, and Cathode cable just before the grommet. Add Tie-wraps as shown.

<u>PART #</u>	<u>QTY</u>	<u>DESCRIPTION</u>
347000104	1	Suppressor, Ferrite
WAT027033	2	Tie-wrap
347000110	1	Suppressor, Ferrite

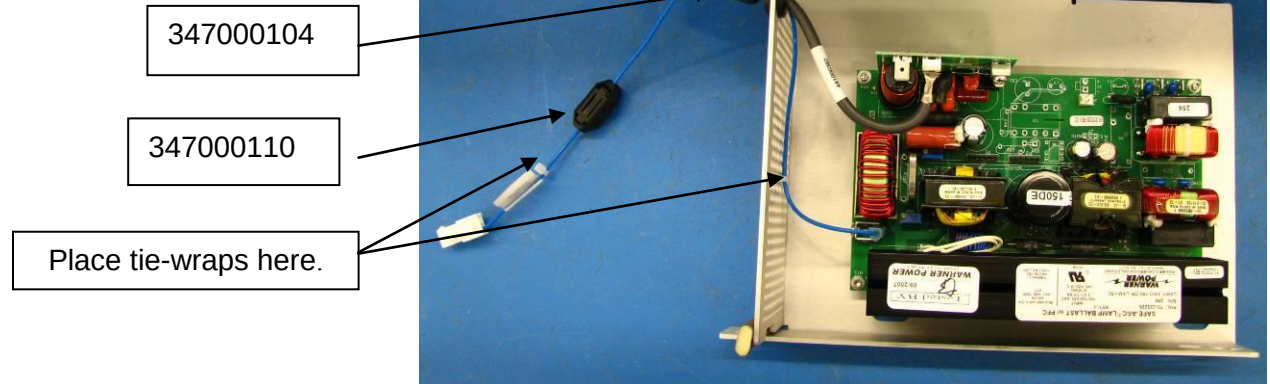


Figure 19a

9.6 Assemble the power supply insulator to the mounting bracket.

<u>PART #</u>	<u>QTY</u>	<u>DESCRIPTION</u>
415000294	1	Insulator, Power Supply
WAT411308	2	Screw, M3 x 8 mm
WAT410350	2	Washer, Metric, M3, Ext Star

T10 Torx Driver

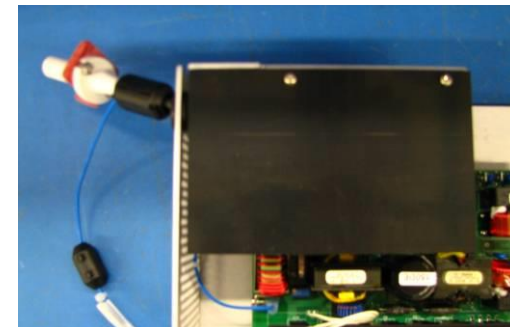


Figure 19b

OPER OPERATION DESCRIPTION

TOOL NUMBER/DESCRIPTION

- 9.7 Attach the EMI foam pieces and the Danger label to the mounting bracket.

<u>PART #</u>	<u>QTY</u>	<u>DESCRIPTION</u>
425000259	2	Foam, EMI Gasket
WAT055309	1	Label, Danger High Voltage

Note: Place foam as far down as possible.



Figure 20a

- 9.8 Start two screws in the chassis and slide the lamp power supply assy into place, and secure. Plug the HV Cathode (Blue) cable into the bracket in the front of the chassis. Connect the lamp cable (BLACK) and secure the bracket to the optics bench heatsink.

T20 Torx Driver

<u>PART #</u>	<u>QTY</u>	<u>DESCRIPTION</u>
410000419	4	Screw, M4 X 10 SEMS

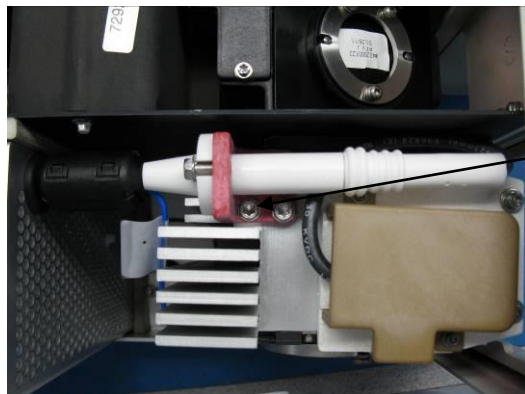


Figure 20b

410000419 Screw. M4 X 10 SEMS

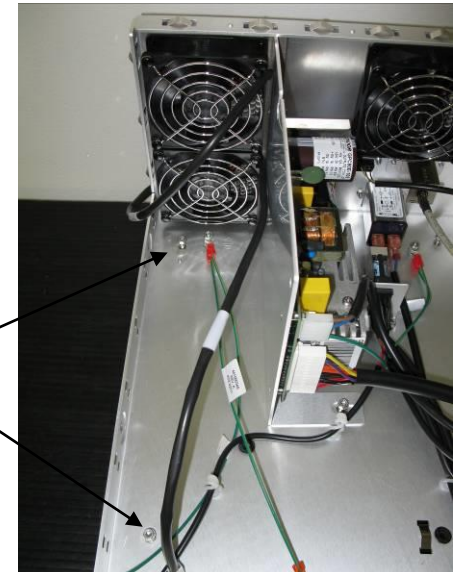


Figure 20c

<u>OPER</u>	<u>OPERATION DESCRIPTION</u>	<u>TOOL NUMBER/DESCRIPTION</u>
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9.9 Start screw and washer in the hole located on the side of the optics bench heat sink. Slide the ground fork (WAT270560) between the screw, and washer. Tighten the screw. Connect cable from the optics bench to the connector mounted in the bracket. Connect the two red cables from the relay harness assy to the heatsink and reed switch.
Note: It is acceptable to plug either cable into either connector.

<u>PART #</u>	<u>QTY</u>	<u>DESCRIPTION</u>
WAT410450	1	Lock washer, Serrated, Ext. Metric
410000419	1	Screw, M4 X 10 SEMS

9.10 Attach the ground cable, and the brown/blue cable (part of AC Harness/Interlock cable assy), to the lamp power supply.

Brown Wire	to	"L"
Ground Wire	to	"E"
Blue Wire	to	"N"

9.11 Assemble cable 441000334 to J8 on lamp P/S board.

<u>PART #</u>	<u>QTY</u>	<u>DESCRIPTION</u>
441000334	1	Cable Assy, LPS I/O

10.0 CPU ASSEMBLY

10.1 Assemble the standoff to the personality card bracket. Press bumper grommet into bracket with grommet flat on same side as standoff.

<u>PART #</u>	<u>QTY</u>	<u>DESCRIPTION</u>
405001111	1	Standoff, Hex, Female, M3 X 0.5
400002571	1	Bracket, Personality Card
410002143	1	Bumper Grommet

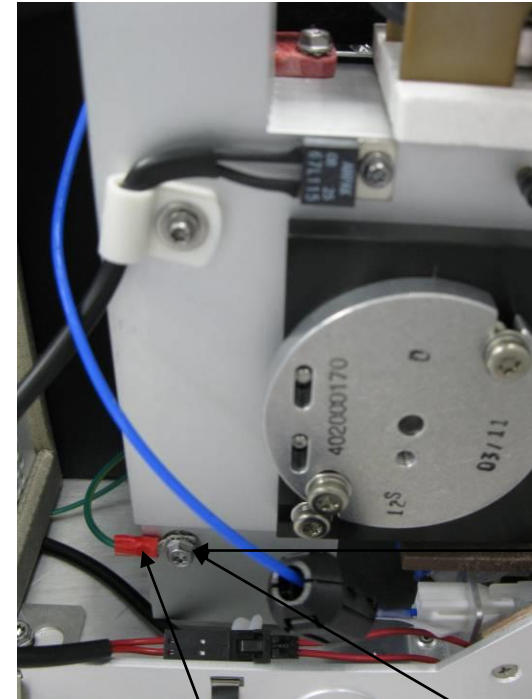


Figure 21

WAT410450

WAT270560

410000419

<u>OPER</u>	<u>OPERATION DESCRIPTION</u>	<u>TOOL NUMBER/DESCRIPTION</u>
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10.2	Snap the (3) standoffs into the personality PCB, using tool 009026419 and attach to bracket.	009026419 STANDOFF PRESS
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<u>PART #</u>	<u>QTY</u>	<u>DESCRIPTION</u>
410000452	3	Standoff, PCB, .625 Long
210000316	1	Assy, PCB, Acquity FLR Personality
410000272	4	Screw, M3 X 8 SEMS

10.3	Assemble the CPU to the personality card, using tool 009026419 Remove the plastic tab from under battery on the 3VCCPU PCB. Ensure that battery is seated properly.	009026419 STANDOFF PRESS
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<u>PART #</u>	<u>QTY</u>	<u>DESCRIPTION</u>
210000691	1	ASSY, PCB, 3VCCPU with ESD caps
410000272	1	Screw, M3 X 8 SEMS

10.4	Attach the keyboard and LCD cables from the front panel to J30 and J31 on the CPU PCB.
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10.5	While holding the personality/CPU assy alongside the chassis, connect the following cables.
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FROM CABLE	TO PCB
441000256 RS232	J1 (CPU)
441001280 Ethernet	J3 (CPU)
441000584 Pre-amp	J25 (Personality)
441000249 DC P/S	J26 (Personality)

410000452 Standoff 3X

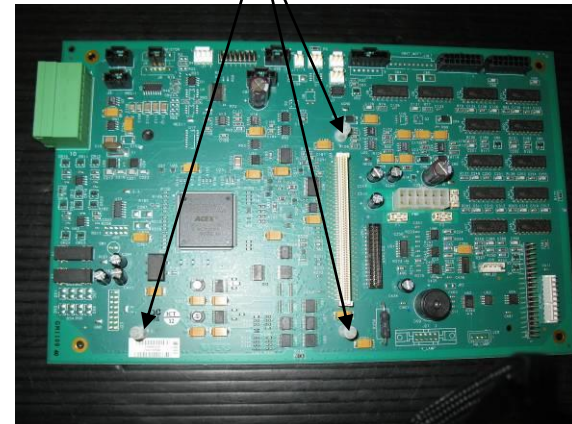


Figure 22a



CPU PCB (picture taken for an older model CPU)

Figure 22b

OPER **OPERATION DESCRIPTION**

TOOL NUMBER/DESCRIPTION

10.6 Start the CPU bracket screws. Slide the CPU/Personality PCB bracket onto the chassis, and secure the screws.

7mm Nut Driver

<u>PART #</u>	<u>QTY</u>	<u>DESCRIPTION</u>
410000419	2	Screw, M4 X 10 SEMS

10.7 Connect the remaining cables to the CPU board (See Figure 22).

FROM CABLE	TO PERSONALITY PCB
Front Motor (Optics Bench)	J20
Back Motor (Optics Bench)	J19
Red/Black (AC Harness)	J11
279000330 Fan, 24VDC, 3.15 Sq (Fan 1)	J12
279000330 Fan, 24VDC, 3.15 Sq (Fan 2)	J13
279000330 Fan, 24VDC, 3.15 Sq (Fan 3)	J16
279000322 Gear motor, Filter	J14
279000363 Assy, Photomultiplier Socket	J9
279000368 Assy, Excitation Home Sensor	J3
279000367 Assy, Emission Home Sensor	J1
441000334 Assy, Cable, LPS I/O (J8 Lamp P/S)	J7

Cable Ties WAT027033

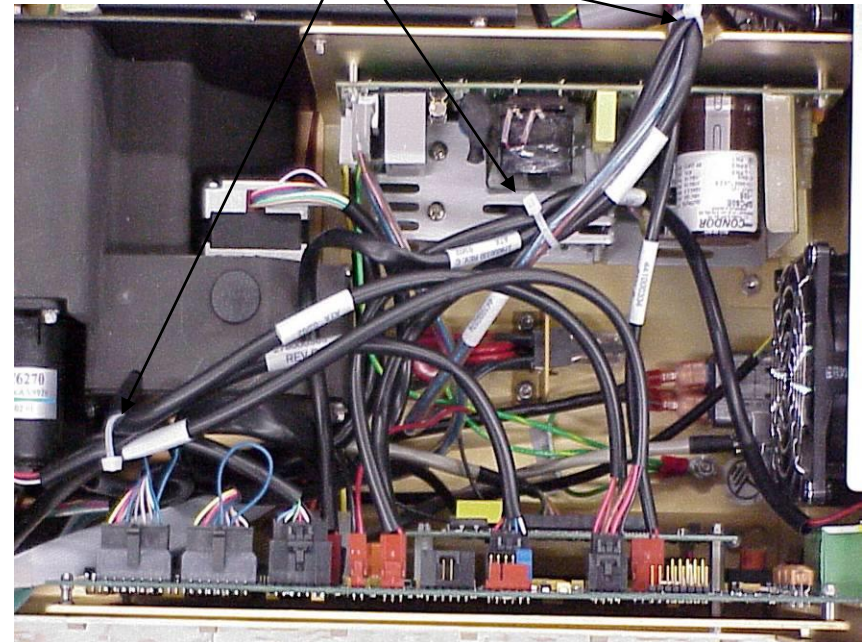


Figure 23

10.8 Ty-wrap the cables as shown.

NOTE: Do not add additional ty-wraps or route the cables differently than shown!

<u>PART #</u>	<u>QTY</u>	<u>DESCRIPTION</u>
WAT027033	2	Tie, Cable Miniature

OPER OPERATION DESCRIPTION

TOOL NUMBER/DESCRIPTION

- 11.0 Note: Target marks indicate where to place the Serial Number Label.
Apply the ETL label as shown in the photo.
Apply Kep Nuts to PEM studs on back of the chassis.

<u>PART #</u>	<u>QTY</u>	<u>DESCRIPTION</u>
400002824	1	Chassis, Detector 2475
615003826	1	Label, Reg, ETL
WAT251620	2	Nut, M4 X 0.7, KEPS

Place ETL
label here

Place Serial
Number label
here

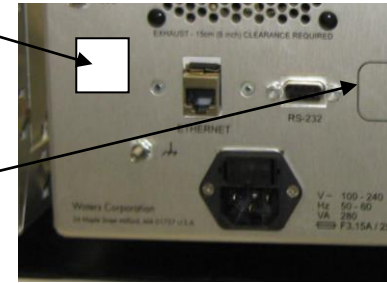


Figure 24

- 12.0 Test assembly as per procedure number WAT046538.
Apply Serial number label.

<u>PART #</u>	<u>QTY</u>	<u>DESCRIPTION</u>
WAT024406	1	Label, Serial Number

- 13.0 Apply the EMI foam to the masked area of the detector cover.

<u>PART #</u>	<u>QTY</u>	<u>DESCRIPTION</u>
400000661	1	Cover, Detector
425000250	1	Foam, EMI Gasket
425000259	1	Foam, EMI Gasket

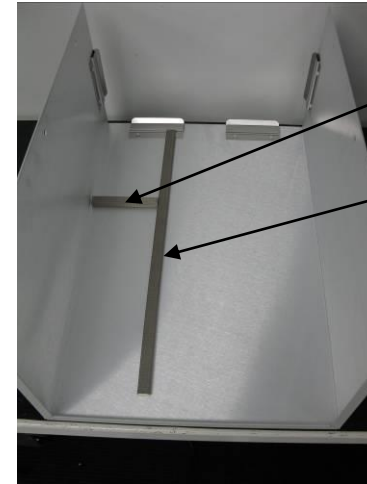


Figure 25

- 14.0 Place cover over assembly.

- 15.0 Attach flow cell assembly.

<u>Part Number</u>	<u>Qty</u>	<u>Description</u>
289000512 1		Assy, 2475 Flow Cell Holder

Insert the 2475 Flow Cell Holder Assy (289000512) into the Optics Housing and secure using captive thumb screws. The Front End Board Data sheet, with the completed Optics Assy, to be included with the system level test/configuration sheets. Test per procedure 735000589 and 735000615.

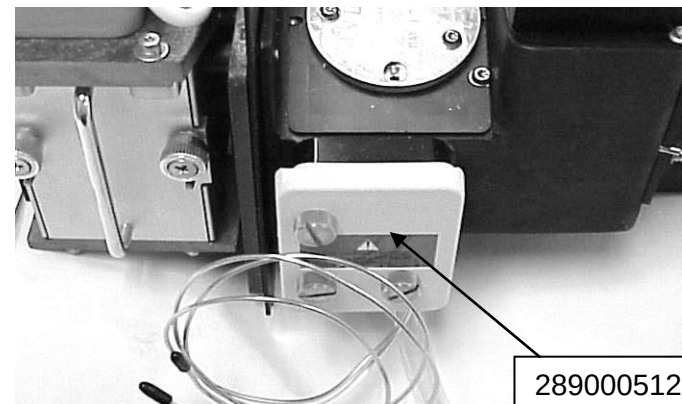


Figure 26