5D Thermal Aerosol Generator

Service Manual

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ATI Air Techniques INTERNATIONAL

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1. Disclaimers & Warnings

1.1. Disclaimer

The purpose of this document is to provide authorized service personnel with the information necessary to service, repair and test the 5D Thermal Aerosol Generator.

In order for a generator to be serviced correctly, the service engineer or technician should have a good knowledge of the operation of the instrument and its application in the field. It is strongly recommended that all users and service engineers or technicians of the thermal generator participate in a training course on the testing of HEPA filters.

Air Techniques International has ensured, so far as is possible, that the information presented herein is correct.

This document is intended to be used in conjunction with information found in the Document List. In the event that two documents contain conflicting information or instructions; the document with the highest authority shall be considered correct. The order of precedence is provided in the Document List.

1.2. Document List

The following documents shall be used in addition to following the instructions in this procedure:

- 20-00490-120: 5D Assembly drawing for 120V
- 20-00490-240: 5D Assembly drawing for 240V
- 31-00451-001: Electrical schematic
- 32-00303-001: Pneumatic diagram
- 20-00421-001: Compressed gas inlet assembly
- 20-00420-001: DIN Rail assembly
- 20-00308-120: Heater block sub-assembly for 120V
- 20-00308-240: Heater block sub-assembly for 240V
- 73-00453-001: 5D Operator manual

1.3 Warnings

In servicing the 5D generator, the service engineer may become exposed to electrical and chemical hazards. It is important that the engineer observe all safety requirements appropriate for the job being carried out, and in particular, health and safety regulations.

⚠ WARNING

Fire Hazard

Failure to follow the prescribed procedures may result in a hazardous situation.

The generator must only be placed and used on firm, stable, and level surfaces. Tipping of the unit may cause liquid aerosol reagent spillage that can lead to BURNS OR FIRE.

NEVER move the generator once it is producing aerosol.
Take caution against liquid aerosol reagent spillage. Always use a funnel. In case of spillage clean up contamination immediately.

DO NOT USE OXIDIZING OR FLAMMABLE GASES SUCH AS HYDROGEN. NEVER operate the unit with anything except INERT GAS such as nitrogen, carbon dioxide, or argon. Make sure all the compressed gas connections are secure.

DO NOT drain the liquid aerosol reagent until the generator has completely cooled to ambient conditions.

DO NOT open the Fill Cap until pressure has been removed at the source and the Purge Button has been used to completely purge the generator.

DO NOT USE liquid aerosol reagents other than those specified. Contact ATI Customer/Technical Service for questions regarding use of other liquid aerosol reagents.

⚠ WARNING

Burn Hazard

Severe burns may occur if in contact with the output collar. DO NOT perform any maintenance until the generator has completely cooled to ambient conditions.

⚠ CAUTION

Hot Surfaces

The output collar at the back of the unit may be HOT and dangerous if in contact with flammable objects.

⚠ WARNING

High Pressure Gas Hazard

Always allow gas in the line to DEPRESSURIZE before disconnecting the gas line at the generator.

⚠ WARNING

Electrical Hazard

There are dangerous voltages inside the instrument. NEVER access the internal components of the generator while it is plugged into the mains supply.

2. Overview

2.1. Theory of Operation

The ATI 5D Thermal Aerosol Generator operates on a condensation principal. The liquid aerosol reagent is vaporized upon entering the heater block assembly. Vaporization occurs in the presence of an inert gas. After vaporization, the vapor is expelled from the heater block and allowed to rapidly cool to ambient temperatures.

The vapor condensation (also referred to as quenching) occurs immediately at the 5D output collar before sufficient ambient atmosphere is present to enable combustion. This quenching requirement, inherent in thermal condensation generators, makes an air-gap necessary between the aerosol output and the system the aerosol is entering for testing. The 5D has built-in air quenching holes behind the output collar that should never be closed off or covered by introduction ports.

There are several conditions that must be met in order for the 5D to able to produce aerosol:

- The 5D must have electrical power
- The main power switch must be ON
- The heater block must have reached operating temperature
- Adequate inert gas pressure must be connected to the generator
- The aerosol switch must be ON
- The metering valve must be open

If any one of these conditions is not met, the 5D will not produce aerosol.

The 5D has several internal protection devices. These devices, if active will prevent the 5D from producing aerosol since they affect the conditions listed above.

2.2. Detailed Working

- The inert gas propellant is supplied from an external bottle, with a suitable regulator, at a pressure of 3.5 Bar (50 PSI).
- Gas is fed through a pressure regulator within the instrument, which reduces the pressure to a working level of 1.6 Bar (23 PSI).
- A Pressure Relief Valve ensures excessive pressures are not present under fault conditions. A suitable oil is contained within a specifically designed aluminum tank.
- The tank is pressurized to assist oil flow through the system.
- The oil and propellant are mixed, to a pre-set level, and fed through a heat exchanger.
- A user operated concentration valve varies the amount of oil mixed with the propellant, to set the aerosol output to the required level.
- The temperature of the heat exchanger is regulated by a programmable controller and thermocouple to the correct temperature for the type of oil used.
- Interlocks ensure oil is only fed to the heat exchanger while it is at the correct temperature and inert gas is connected with a suitable pressure.
- The aerosol is ejected from a nozzle at the back of the instrument.
- On completion of use, a manual ‘Purge’ button is supplied to allow the user to depressurize the unit and expel oil from the heat exchanger supply lines.

2.3. Service Requirements

The 5D Thermal Aerosol Generator requires very little servicing in normal use. It is, however, recommended that customers return their 5D for annual inspection and service.

Servicing will normally be restricted to checking for leaks, electrical hazards or defective components, unless a fault condition exists. The following should be performed when receiving a 5D for this service:

- Remove the side panel and visually inspect the interior for signs of cable and tubing distress (fraying, kinking, heat, brittleness, etc.), liquid build-up, and corrosion.
- Replace cables or tubing sections that are damaged or distressed.
- Clean/wipe excess liquid buildup from interior.
- Check and inspect condition of fuses. Install new fuses as necessary.
- Check condition of the fill cap for cracks and missing or damaged gasket.
- Inspect the output nozzle orifice for signs of blockage. Use a 1.5 mm ± 0.5 mm (0.059 ±0.019 inch) diameter metal pin or wire to clean out the blockage.
- Inspect the heater block fittings for wetness, looseness or cracks in the insulation blocks. If needed, remove the heater block assembly from the back panel and inspect for further signs of damage. Repair as necessary.
- Check for loose or missing hardware. Tighten as necessary or replace any missing hardware.
- Perform electrical safety, mechanical and aerosol test per in “Testing and Adjustment”.

2.4. Electrical System

The 5D will operate at either 120 VAC or 240 VAC rating depending on the model. The only physical differences are the installation of the two fuses and the fuse holder inside the Power Entry Module and the cartridge inside the heater block assembly. Supplying an incorrect power will produce the following:

- Powering a 120 V unit with 240 V will overheat the cartridge and risk damaging it. The protective thermal switch will open and will need to be manually reset.
- Powering a 240 V fused unit with 120 V will under-power the heater cartridges and the temperature controller will show a very slow rise in the temperature. If a "Ready" state is achieved, operation will cause the temperature to drop down until a non-ready state occurs.

2.5. Power Supply

The 5D uses a universal input power supply to convert line AC voltage to DC voltage and power the electrical system controller display.

The power supply output of 24VDC can be verified and measured across the two output terminals.

2.6. Relays

The 5D uses one solid state relay to power the heater cartridge with AC power. That relay is controlled by the temperature controller. If either AC or DC power drops out, the relay will open and the heater cartridge will not be powered.

2.7. Solenoid Valves

The 5D has two 24 VDC solenoids with normally closed valves to control the flow of gas and reagent. When energized, the valves open and allow gas and reagent to flow to the heater block. The solenoid valves are energized by switching the aerosol switch to ON if the inert gas pressure is adequate and the heater block has reached the operating temperature. If any of those two conditions are not met, the valves will not energize.

2.8. Aerosol Switch

The aerosol switch located on the top of the 5D controls the aerosol production with an ON and OFF switch. The switch is functional only when all the conditions for aerosol production are met. The switch can be used before or after setting the metering valve. Once the metering valve is set, the switch provides ON/OFF control of aerosol production without changing concentration.

2.9. Temperature Controller

The temperature controller (OMRON E5DC-QX2DSM-000) is set up to indicate temperature in degrees Celsius. The set point is 370°C. The 5D uses the controller alarm relay output to allow the solenoid valves to open and enable liquid flow. The alarm is set to become active at 90°C above and 80°C below the set point temperature. The controller must therefore indicate a temperature between 290°C and 460°C before the solenoid valves can be energized and the Ready Light turns green.

If inspecting or replacing the temperature controller, refer to the set-up procedure in Section 6.9.

3. Pneumatic System

3.1. Inert Gas Flow

Gas flow is controlled at the source (bottle) by the operator. Once the source is connected to the 5D, and the gas turned on, gas will flow through the generator and pressurize the liquid reservoir.

The inert gas line or tube is connected to the ¼ inch outer diameter tube fitting at the back panel. Gas flow is initially regulated to 3.5 Bar (50 PSI) at the source. An internal regulator further reduces the pressure to about 1.5 Bar (23 PSI). If both the internal regulator and the source regulator were to fail, an internal pressure relief valve will open. This protects the 5D from excessive pressure to the regulator (see Internal Protective Devices).

3.2. Regulator

At the gas input, a pressure regulator is set to allow flow in the tank and heater block. Enough flow is required to pressurize the tank, so liquid will flow.

Gas flow is routed simultaneously to the tank, the inert gas solenoid valve and the mechanically actuated purge valve.

4. Internal Protective Devices

4.1. High Pressure Relief Valve

At the gas input the 5D has a high-pressure relief valve set to open at 2.8 Bar (40 PSI). This pressure relief valve will open in the event the internal regulator fails. This feature protects the internal pneumatic components and the liquid reservoir.

4.2. Thermal Cut-out Switch

A thermal cut-out switch is mounted on side of the heater block metal panel. The thermal cut-out switch senses the temperature of the heater panel surface and is set to open at 93°C. If the panel surface exceeds 93°C the switch opens and breaks power to the heater cartridge. The switch has a manual reset button at the center. The surface temperature will have to cool enough to allow the switch to be re-set. Once re-set, the heater can be powered, however an investigation as to why the switch opened should be conducted prior to placing back in service.

4.3. Output Collar

The output collar has a perforated tube between the collar and the rear panel. The perforations provide quench air to the aerosol stream. The design allows the operator to clamp an un-vented hose to the output collar and maintain quench air to the vapor stream. The perforations should always be clear of any blockage to prevent the risk of fire.

5. Tools & Test Equipment

5.1. Tools

#	Description	Purpose
1	Allen wrench 4mm	Remove feet
2	Allen wrench 3mm	Remove most hardware
3	Allen wrench 2.5mm	Remove liquid reservoir
4	Allen wrench 2mm	Remove Power Entry Module
5	Nut driver 7mm	Remove solid state relay
6	Nut driver 8mm	Remove most nuts
7	Nut driver extension	Remove DIN rail assembly
8	Flat head screw driver 0.6 x 3.5 mm	Remove wires from DIN rail assembly

5.2. Calibrated Test Equipment

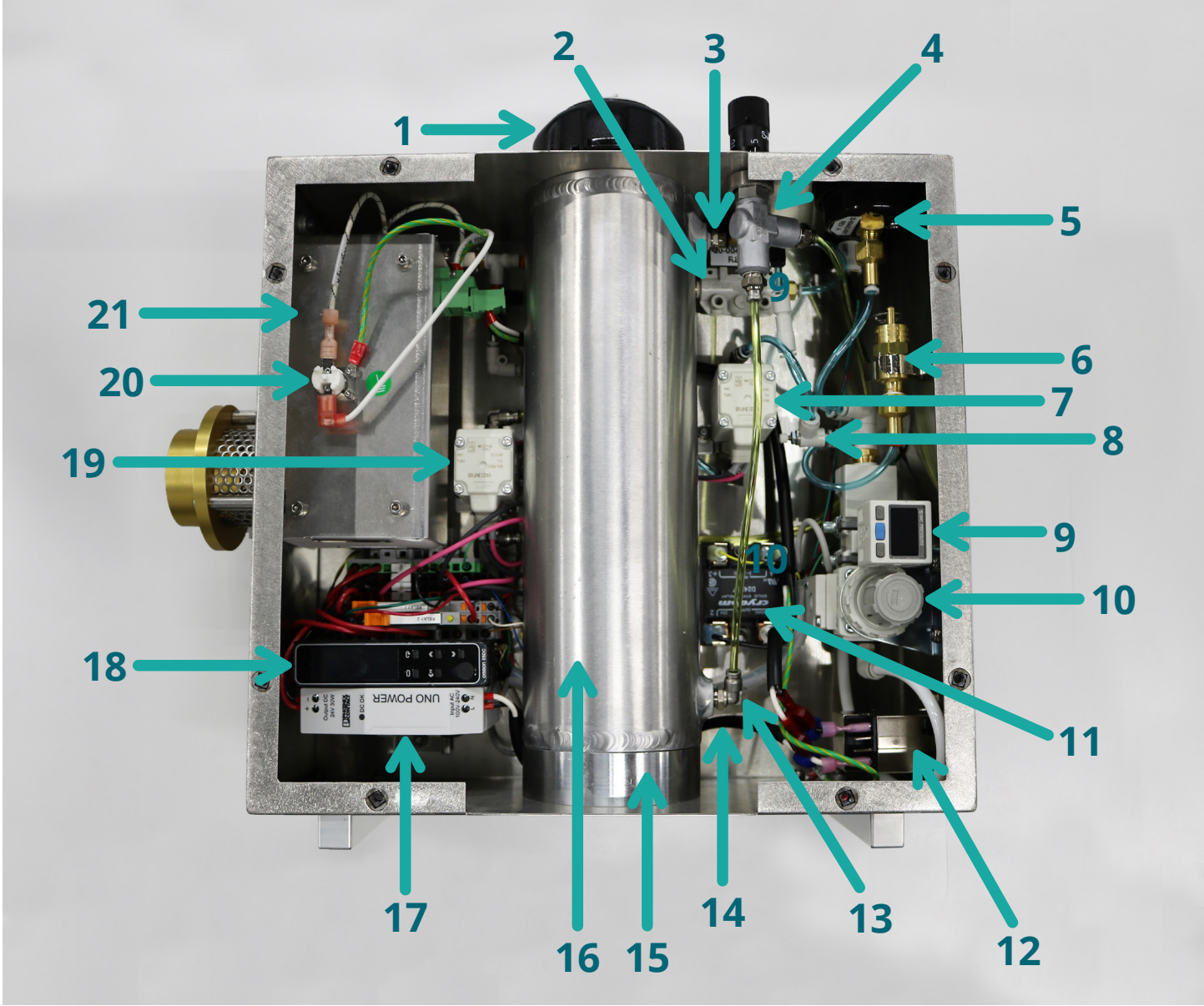
#	Description	Purpose
1	Flow meter up to 10L/min	Adjust carrier gas flow rate
2	Thermometer up to 500°C	Measure nozzle and heater block temperature
3	Digital Voltmeter (DMV) with 3.5 digits minimum	Measure voltages inside the instrument
4	High Pot and Ground Bond tester	Perform Electrical Safety test

5.3. Other Test Equipment

#	Description	Purpose
1	Liquid Aerosol Reagent 500 mL	Aerosol verification
2	Smoke Extraction System	Removal of aerosol during testing
3	Heat Gun	Verify proper operation of thermal cut-off switch

5.4. Common Spare Parts

#	Description	Part Number
1	Heat exchanger assembly 110V	20-00308-120
2	Heat exchanger assembly 220V	20-00308-220
3	Vernier handle kit	63-00228-002
4	Carry handle	10-00221-001
5	Reservoir cap	65-00244-001
6	Solenoid valve assembly for liquid oil	20-00425-001
7	Solenoid valve assembly for inert gas	20-00424-001
8	DIN mounted power supply	41-00257-001
9	Omron temperature controller	41-00498-001
10	Fuse 5x20 mm 10A (110V instrument)	41-00466-010
11	Fuse 5x20 mm 5A (220V instrument)	41-00466-005
12	Socket head cap screw M5x16mm	3300425
13	Socket head cap screw M4x8mm	70-00268-001
14	Button head socket cap screw M5x10mm	70-00267-001
15	Button head socket cap screw M4x6mm	70-00271-001
16	M5 Nut	3100152
17	M4 Nut	3100155
18	M3 Nut	3100153
19	M4 Lock washer	3200173
20	M5 Flat washer	3200167
21	M4 Flat washer	3200169



5.5. Identifying 5D Components

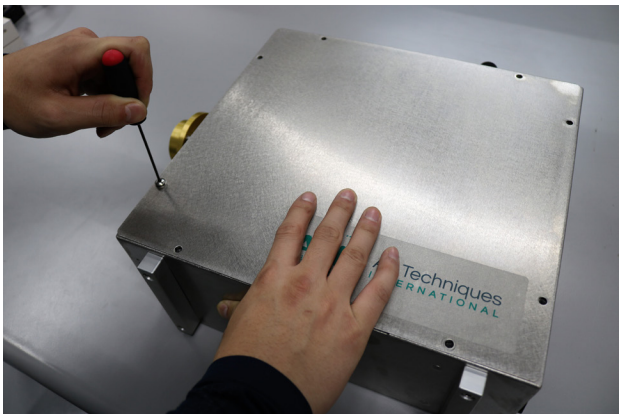
#	Component
1	Level Gauge Cap
2	Purge Valve
3	Tank Fitting (Top)
4	Metering Valve
5	Pressure Gauge
6	Pressure Relief

#	Component
7	Solenoid Valve (Compressed Gas)
8	Small Inline Valve
9	Pressure Indicator
10	Regulator
11	Relay Switch
12	Power Module
13	Tank Fitting (Bottom)
14	Power Harness Cable
15	Liquid Reservoir
16	Tank Mount (2)
17	24 VDC Power Supply
18	Temperature Controller
19	Solenoid Valve (Oil)
20	Thermal Cut-off
21	Heat Exchanger

6. Service Procedures

6.1. Initial Inspection & Startup

- Check exterior of unit for any visible damage.

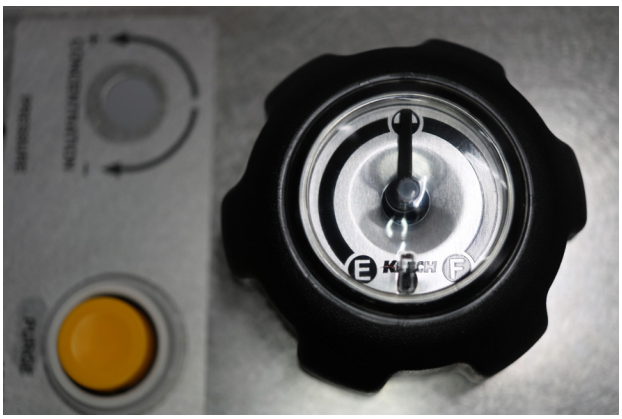


Tool Needed: 4mm Allen wrench

- Remove the 8 screws and washers holding the side panel to the instrument.
- Set panel aside.

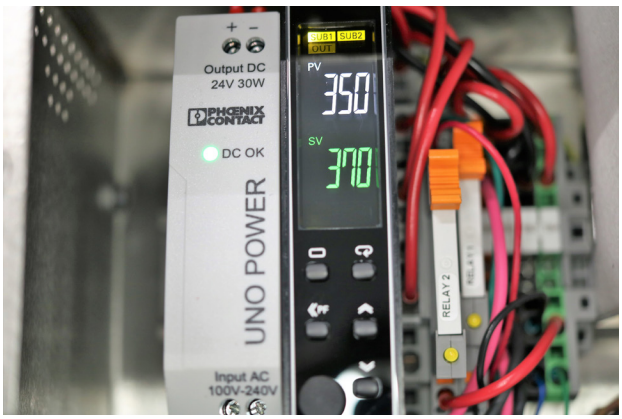
Shown: 5D with side panel removed.

- Perform visual inspections as outlined in Section 6.3.



- Add an approved liquid reagent to the reservoir. Fill the tank at least half-way as indicated on the Level Gauge Cap.

- Connect an inert gas source and adjust regulator to 50psi.
- Power on the unit.



- Verify that the temperature to the Heater Block is increasing.

The Set Value (SV) is programmed to 370 °C at the factory as the final output temperature.

- Verify that the pressure indicator is reading 24 PSI (+/- 1) and that the unit's pressure gauge matches the indicator display.

- Wait until the unit’s ready light is green.
- Turn Aerosol On/Off switch to the ON position.

- Adjust the metering valve 2 turns counter clockwise to start flow.

If the unit is functioning properly, it will begin to produce aerosol.

6.2. Initial Inspection Shutdown

- When shutting down the unit, turn the metering valve clockwise until fully closed.
- Press the Purge button repeatedly until all aerosol has been expelled.
- Turn Aerosol switch off and shut off inert gas source.
- Press Purge button again until the pressure gauge reaches “0”.
- Disconnect cables and hoses and allow the generator to cool.
- Reattach the side panel.
- Drain the instrument of oil.

6.3. Visual Inspection

- Remove the top panel and visually inspect the interior for signs of cable and tubing distress (fraying, kinking, heat, brittleness, etc.), liquid build-up, and corrosion.
- Replace cables or tubing sections that are damaged or distressed.
- Clean/wipe excess liquid buildup from interior.
- Check and inspect condition of fuses. Install new fuses as necessary.
- Check condition of the fill cap for cracks and missing or damaged gasket.
- Inspect the output nozzle orifice for signs of blockage. Use a 0.060 ±0.002 inch (1.5 mm ± 0.05 mm) diameter metal pin or wire to clean out the blockage.
- Inspect the heater block fittings for wetness, looseness or cracks in the insulation blocks. If needed, remove the heater block assembly from the back panel and inspect for further signs of damage.
- Check for loose or missing hardware. Tighten as necessary or replace any missing hardware. Inspect the instrument to ensure all cables and hoses are correctly fitted and in good condition.
- Correct any faults found.

6.4. Checking for Leaks

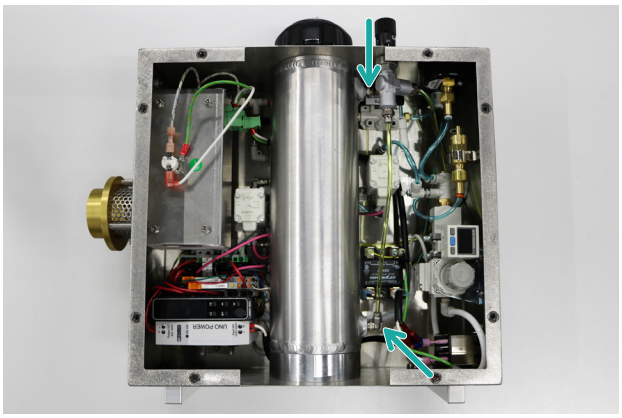
- With the side cover removed, run the instrument using gas, but not oil.
- Using a leak seeking product e.g. Snoop, and a small brush, apply a small amount of the product to each joint in turn and ensure there are no leaks. DO NOT apply liquid to electrical components
- Switch off the instrument and purge the gas.

6.5. Removing the Oil Tank

Step 1.

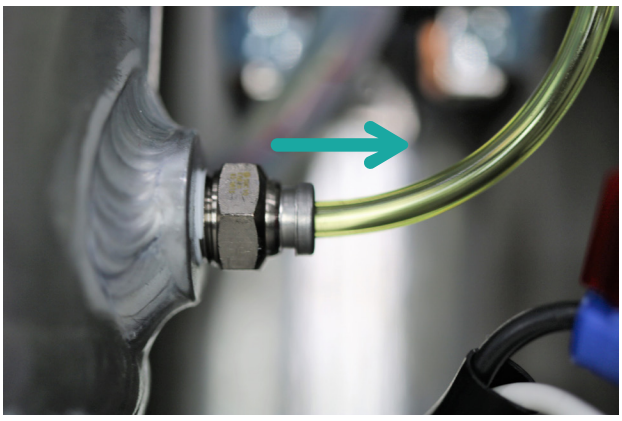
Remove Level Gauge Cap.

Note: Oil should be drained before proceeding. It is common for a small amount of oil to remain inside the reservoir.



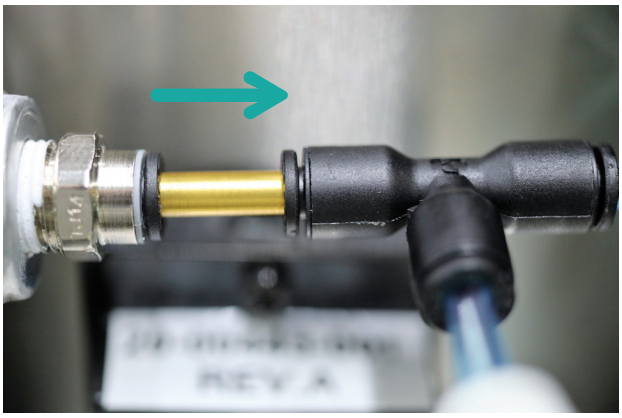
Step 2.

Remove side panel and locate tank fittings.



Step 3.

Disconnect yellow oil tube from bottom of tank fitting. There may be some oil in this line.



Step 4.

Disconnect brass tube from top oil tank fitting. This is located behind the metering valve.

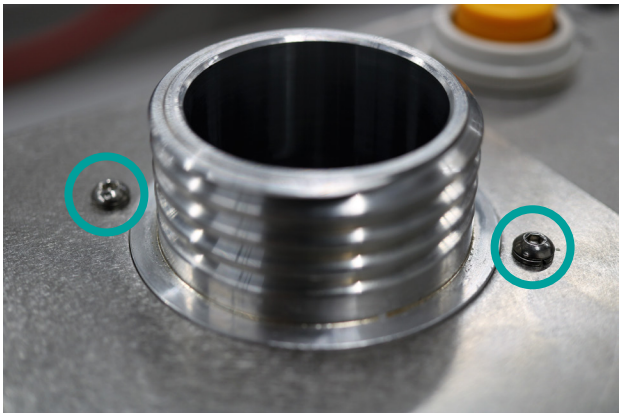
Step 5.

Tool Needed: 2.5mm Allen wrench

Using the allen wrench. Remove the 4 screws from the bottom of the unit that hold the tank mounts in place.

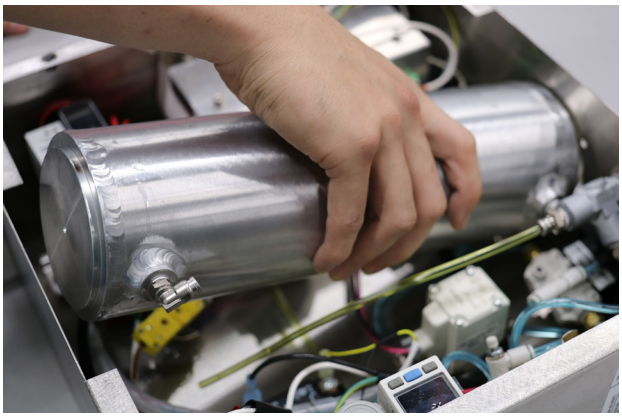
Step 6.

Slide the 2 tank mounts out from underneath the tank.



Step 7.

Remove the top 2 screws from the oil tank.



Step 8.

Lift up and slide the tank out from the port at the top the unit.

Liquid Reservoir is now removed and can be set aside.

6.6. Replacing the Fuses

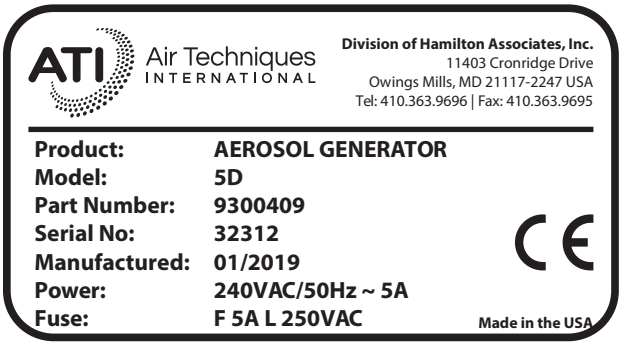
The 5D Thermal Aerosol Generator is equipped with 2 anti-surge fuses. Both the Live and Neutral line are fused. If unit continues to blow fuses, contact ATI.

5D Model	Fuse Type
ATI P/N 9300408 (120V)	ATI P/N 41-00466-010, 5X20mm, 10A, 250V, FAST BLO
ATI P/N 9300409 (240V)	ATI P/N 41-00466-005, 5X20mm, 5A, 250V, FAST BLO

Step 1.

Switch the main power switch off.

Disconnect the mains IEC plug from the instrument socket.

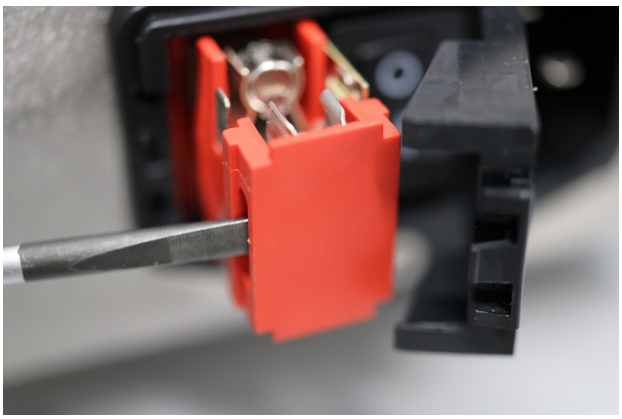


Step 2.

Identify the voltage rating to determine correct replacement fuses. This can be found on the product label located above the power module.

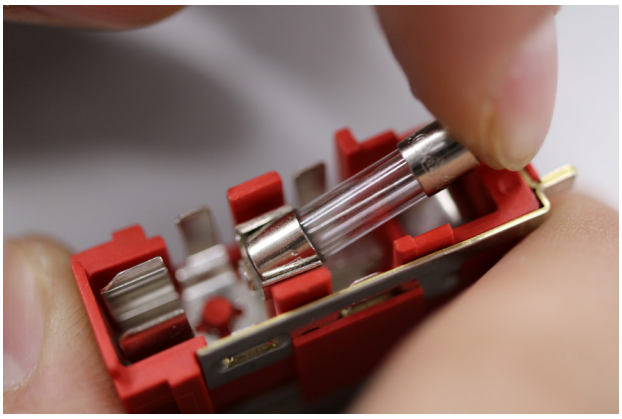
Step 3.

Using a terminal flat head screwdriver lift open the fuse cover door.



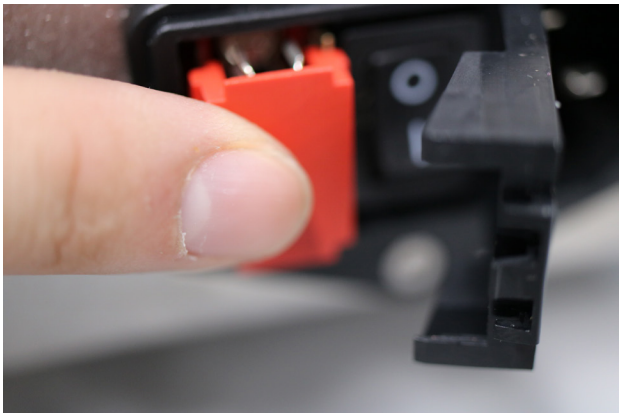
Step 4.

Using a terminal flat head screwdriver pull the fuse drawer out as shown.



Step 5.

Inspect fuses to see if they are blown. Replace fuses as needed. Refer to table below for correct voltage.



Step 6.

Push the fuse holder back into the power module until it is fully-seated.

Step 7.

Close the fuse cover until it clicks into place.

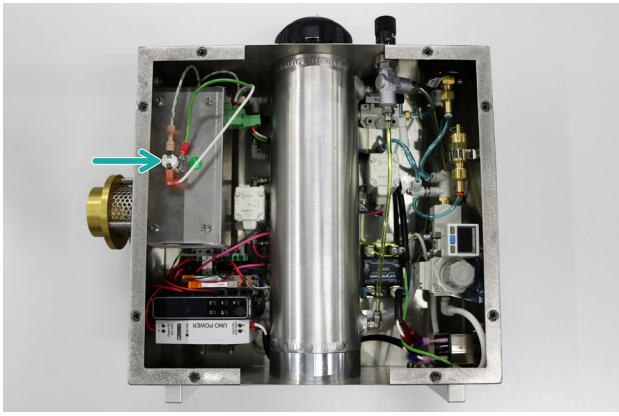
6.7. Resetting the Thermal Cut-Off

The thermal cut-off acts as a safety over-ride if the Temperature Controller should fail in the ON position. Power to the heat exchanger is cut-off, to protect the generator from damage.

⚠ **WARNING:** Heat Exchanger operates at high temperatures and will produce serious burns if handled while hot. DO NOT modify the generator wiring to bypass the Temperature Controller or the Thermal Cut-off.

Step 1.

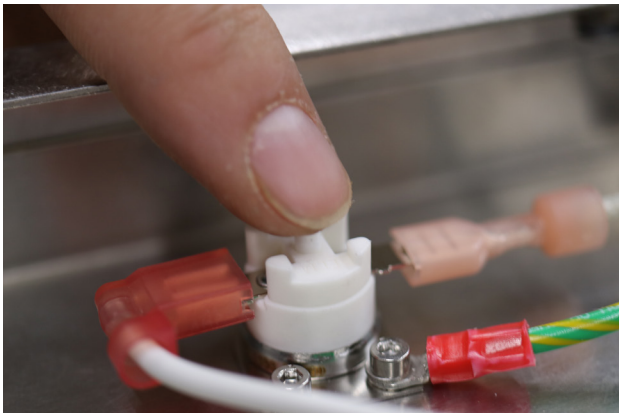
Turn the aerosol generator off, and unplug the unit from the power supply. Allow unit to cool if needed.



Step 2.

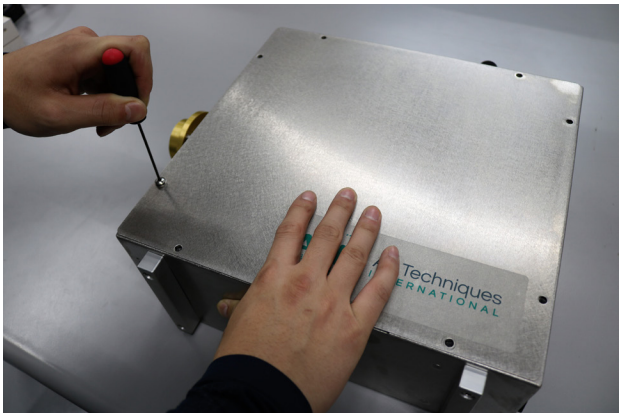
Remove the side panel of the generator.

The thermal cut-off is located at the front of the generator on the side of the Heat Exchanger.



Step 3.

Press the button on the thermal cut-off to reset.



Step 4.

Replace the side panel and turn the aerosol generator on.

Note: If the thermal cut-off continues to shut the generator down, the problem must be located and corrected before continuing.

6.8. Programming of the Pressure Switch

The following are the current settings for the pressure switch. Follow the guide below to enter those settings in a new pressure switch.

- Display unit: psi
- Display color: ON: Green, OFF: Red (linking to OUT1)
- Response time: 2.5 ms
- OUT1 Output mode: Window comparator
- Reversed output: Normal output
- Set value P1L: 22.5 psi
- Set value P1H: 26 psi
- Hysteresis H1: 2 psi
- OUT2 Output mode: Window comparator
- Reversed output: Normal output
- Set value P2L: 22.5 psi
- Set value P2H: 26 psi
- Hysteresis H2: 2 psi

Programming Guide for the SMC model# ISE30A-01-A-P:

Mode	Display	Operation Procedure
Preparation, measurement mode	0.0	Connect 12 to 24 VDC power supply. Go to measurement mode.
Function selection mode	F 0	Hold the Ⓢ button for 2 seconds or longer in measurement mode. [F 0] will be displayed. Go to function selection mode.
Display unit settings	Unl ↔ PSI	Display [F 0] by pressing the ▲ or ▼ button in function selection mode. Press the Ⓢ button once. Go to display unit settings.
	PSI	Press the ▲ or ▼ button to change the value (see left). Press the Ⓢ button once. Go to function selection mode.
Response time settings	r 35 ↔ 2.5	Display [F 3] by pressing the ▲ or ▼ button in function selection mode. Press the Ⓢ button once. Go to response time settings.
	2.5	Press the ▲ or ▼ button to change the value (see left). Press the Ⓢ button once. Go to function selection mode.
OUT1 settings	F 1	Display [F 1] by pressing the ▲ or ▼ button in function selection mode.
	oU1 ↔ HYS	Press the Ⓢ button once. Go to output mode settings for OUT1.
	u In	Press the ▲ or ▼ button to change the value (see left).

Mode	Display	Operation Procedure
	lot ↔ 1_P	Press the Ⓢ button once. Go to reversed output settings for OUT1.
		Press the ▲ or ▼ button to change the value (see left).
	P 1L ↔ 43.5	Press the Ⓢ button once. Go to the setting of set value [P1L] for OUT1.
	22.5	Press the ▲ or ▼ button to change the set value (see left).
	P 1H ↔ 87.0	Press the Ⓢ button once. Go to the setting of set value [P1H] for OUT1.
	26.0	Press the ▲ or ▼ button to change the set value (see left).
	H 1 ↔ 14.5	Press the Ⓢ button once. Go to hysteresis [H1] settings for OUT1.
	2.0	Press the ▲ or ▼ button to change the set value (see left).
	CoL ↔ SoG	Press the Ⓢ button once. Go to display color settings.
	SoG	Press the ▲ or ▼ button to change the set value (see left).
	F 1	Press the Ⓢ button once. Return to function selection mode.
OUT2 settings	F 2	Display [F 2] by pressing the ▲ or ▼ button in function selection mode.
	oU2 ↔ HYS	Press the Ⓢ button once. Go to output mode settings for OUT2.
	u In	Press the ▲ or ▼ button to change the value (see left).

Mode	Display	Operation Procedure
	2oL ↔ 2_P	Press the Ⓢ button once. Go to reversed output settings for OUT2.
	2_P	Press the ▲ or ▼ button to change the value (see left).
	P2L ↔ 43.5	Press the Ⓢ button once. Go to the setting of set value [P2L] for OUT2.
	22.5	Press the ▲ or ▼ button to change the set value (see left).
	P2H ↔ 87.0	Press the Ⓢ button once. Go to the setting of set value [P2H] for OUT2.
	26.0	Press the ▲ or ▼ button to change the set value (see left).
	H2 ↔ 14.5	Press the Ⓢ button once. Go to hysteresis [H2] settings for OUT2.
	2.0	Press the ▲ or ▼ button to change the set value (see left).
	F 2	Press the Ⓢ button once. Return to function selection mode.
Measurement mode	0.0	Hold the Ⓢ button for 2 seconds or longer in function selection mode. Return to measurement mode.
	Settings complete	
Zero-clear	0.0	Press the ▲ and ▼ buttons simultaneously for around 1 second under atmospheric pressure.
	0.0	Reset the displayed value to zero.

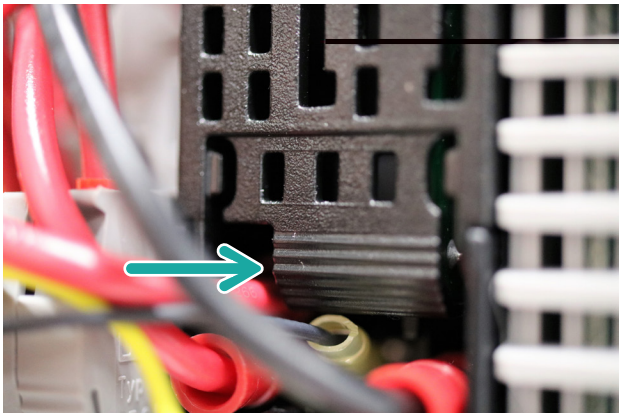
6.9. Replacing the Temperature Controller

- Remove oil tank. (Section 6.5)

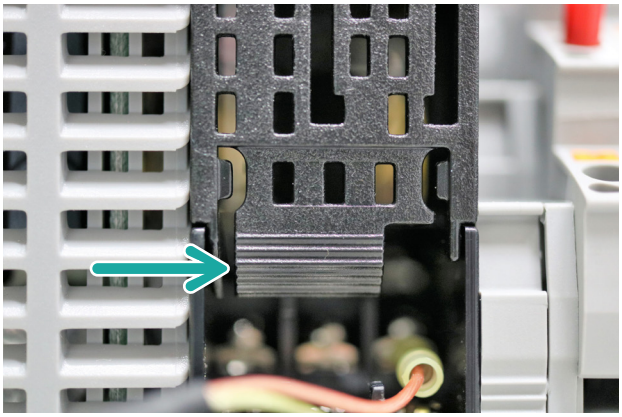
Note: It is highly recommended, but not necessary, to remove the oil tank prior to replacing the temperature controller as it provides ease of access.

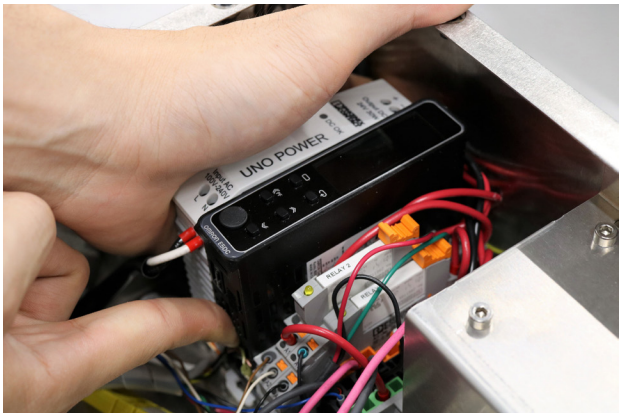
To remove the the Temeraure Controller from the unit, 2 pressure hooks located at the front and back must be pressed in simultaneously to release the controller. The front and rear clips are shown below.

Front

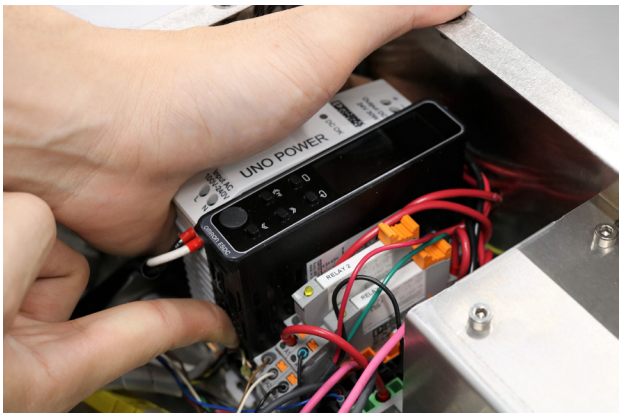


Rear





- Press in the 2 pressure hooks simultaneously and pull upward to remove the temperature controller cartridge from the terminal socket.



- Once the old temperature controller is removed, place the new cartridge on top of the terminal unit and firmly press down. Pressure hooks will click when correctly in place.

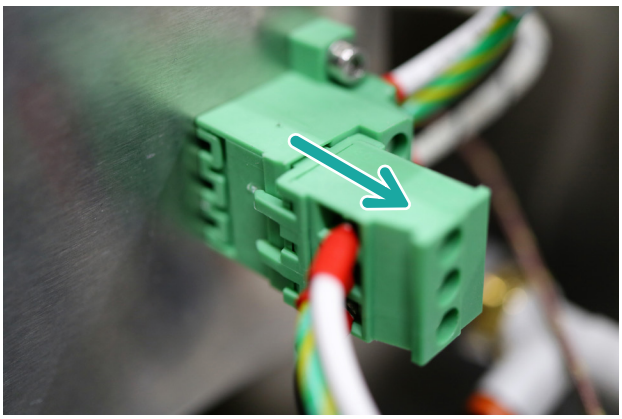
6.10. Programming the Temperature Controller

Needing to reprogram the 5D Temperature is extremely rare. Should this occur, call ATI for details.

The parameters that are changed from the factory settings are as follow:

Parameter	Factory Default Setting	ATI Setting	Unit
Set Point	0	370	°C
Alarm Value 1	0	-200	°C
Alarm Value Upper Limit 1	0	80	°C
Alarm Value Lower Limit 1	0	90	°C
Alarm Value Upper Limit 2	0	80	°C
Alarm Value Lower Limit 2	0	90	°C
SP0	0	370	°C
Proportional Band	8	70.3	°C
Integral Time	233	113	s
Derivative Time	40	19	s
PID ON/OFF	0	1	N/A
Alarm 1 Type	2	4	N/A
Alarm 2 Type	2	4	N/A

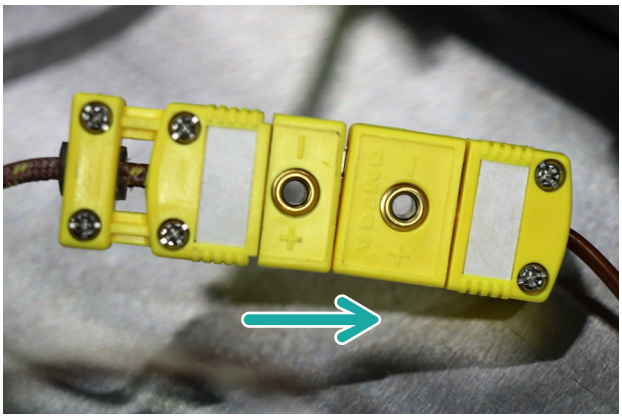
6.11. Replacing the Heat Exchanger Assembly



Step 1.

Disconnect the green connector on the top of the heater block

Note: Ensure the generator has had sufficient time to cool. The heat exchanger retains heat for several hours after operating.



Step 2.

Disconnect the yellow temperature sensor connector.

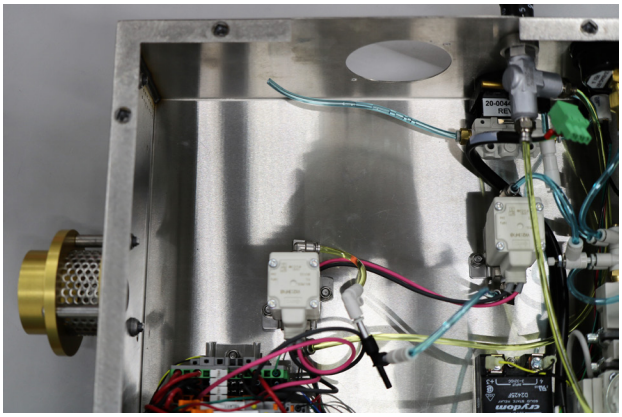
Step 3.

Gently separate the 4mm blue tubing and the black push-on ‘T’ connector from the 4mm steel tubing by depressing the release ring.

Step 4.

Tool Needed: 2.5mm Allen wrench

Remove the four (4) M4 screws and washers from the front of the instrument.



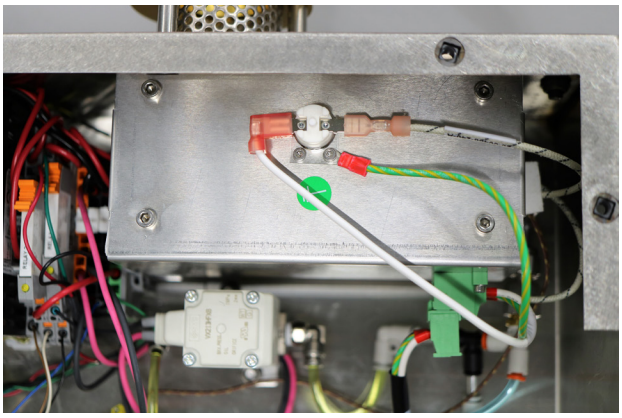
Step 5.

Remove the heat exchanger.

Shown: Unit with heat exchanger removed.

Step 6.

- Insert the new heat exchanger.
- Gently connect the push-on ‘T’ connector and the 4mm blue tubing. Ensure a good connection for each of them as it will be difficult to correct this later.
- Reattach the heat exchanger with the M4 socket head cap screw and the flat washer
- Connect the green connector power connector.
- Connect the yellow thermocouple connector.
- Electrically test to ensure the power leads are isolated from ground.
- Run the generator with gas, but without oil, and ensure the High temperature ‘T’ is sealed to the steel tube.
- Switch off, and purge the generator of gas.
- Replace the side panel



Shown: Unit with completed Heat Exchanger

6.12. Final Check Out Procedure

- Without oil in the system, or power to the unit, apply inert gas to the unit at a pressure of 3 Bar (43.5 PSI).
- Set the internal regulator so that the gauge needle is between the green markers.
- Switch on the generator, and allow time to reach operating temperature.
- When the green lamp lights, switch on the aerosol output.
- Reset the regulator so that the gauge needle is between the green markers with the output enabled. Tighten the locknut.
- Using a Rotameter on the output nozzle, set the small inline valve for 6 liters per minute output. Tighten the locknut.
- Switch off the output of the generator.
- Switch off the gas at the bottle and purge the generator to expel any gas
- Fill the generator with oil.
- Switch on the generator and allow time to reach operating temperature.
- Switch on the extraction system and apply inert gas to the unit at a pressure of 3 Bar (43.5 PSI).
- Switch on the generator output.
- Open the output valve by 2 turns, counter-clockwise.
- Allow the output to stabilize, and check for even, dry aerosol flow.
- Open the valve fully.
- Allow the output to stabilize, and check for even, dry aerosol flow.
- If all ok. Switch off the generator and allow time to cool.
- Turn off the gas at the bottle and purge the generator of all gas.
- Drain all oil and clean the generator.

7. Testing & Adjustment

7.1. Electrical Safety Tests (HiPot and Ground Bond Leakage)

The test requires an AC/DC HiPot with Insulation Resistance Tester, Quadcheck II Model 7564SA Electrical Safety Compliance Analyzer or equivalent, with calibration.

Set up the AC/DC HiPot tester with insulation resistance tester and configure the tester as follows:

AC Dielectric Voltage 1262V for 120V/60Hz or 1814V for 220V/50Hz

- Hi-Limit 20.00 mA
- Low Limit 0.0 mA
- Ramp time 2 sec.
- Dwell time 2 sec.

Ground Bond Current 25.0 A

- Voltage 8V
- Hi-Limit 100 milliohms
- Lo-Limit 0 milliohms
- Dwell Time 2 sec.
- Frequency 60 Hz

Using the power cord that will be shipped with the unit, plug in the 5D unit at the main power to the tester. See instruction sheet for connection method. For the chassis return, connect to the Gas Inlet Port on the front panel.

Switch the 5D unit main power switch to ON position. With the tester configured and connected to the 5D, initiate the test by pressing the green button. The tester will perform the AC Dielectric (Hi Pot) test first and Ground Bonding test last. The tester will stop at the first failure. A green light will illuminate if the unit passes. At completion of the test, record Pass/ Fail for each test and the resistance of the Ground Bond test in milliohms on the Test and Acceptance Record.

7.2. Over-Temperature Test

WARNING: Burn Hazard! HEATER BLOCK BECOMES HOT – DO NOT TOUCH

- Switch main power off and disconnect the power cord.
- Attach leads of DVM to thermal cut-out switch terminals. Set the DVM to Resistance (Ohms) and turn on DVM.
- Verify the DVM reads less than 1 Ohm.
- With a heat gun apply heat to top of heater block for approximately 60 seconds.
- When a “CLICK” is heard (the thermal switch has opened) stop the heat gun and verify the DVM reading is between 5 and 6 k-Ohms..
- Let the unit cool down for a few minutes.
- Press the thermal cut-out switch reset button and verify the DVM reads less than 1 Ohm.

7.3. Final Inspection Checklist

The following inspections shall be performed after all service and repair work and before re-attaching the side panel to the unit:

1. The output nozzle is clear of carbon build-up

2. Output collar hardware are securely fastened

3. The handle, foot pads and other hardware are securely fastened

4. All labels are legible and undamaged

5. The fill cap gasket is intact and undamaged

6. All electrical components are securely attached

7. There are no frayed wires on any cable

8. All wire connections are securely fastened (no loose terminals)

9. All pneumatic fitting connections are properly tightened

10. All pneumatic tubes are free of kinks or other distress

11. Unit was tested and adjusted per “Testing and Adjustment”

Troubleshooting

No Display on Controller after switch main power ON

Cause	Resolution
Controller wiring is not installed correctly or there is a faulty wiring harness.	Check wiring terminal installation is correct and/or replace wiring harness to temperature controller.
Fuses are blown or not installed.	Check fuses and replace if necessary.
Power Input module wiring is not properly contacting or may be damaged.	Check power module wiring harness for damage or loose connections.
Controller is defective.	Replace temperature controller.

Unit does not warm up (temperature does not increase) within 30 minutes

Cause	Resolution
Cartridge Heater(s) is defective.	Replace cartridge heater(s).
Temperature Cut-out switch is not installed correctly or wires are damaged.	Check temp cut-out wires. Replace temp cut-out if necessary.
Thermocouple wire is damaged or incorrectly installed.	Check thermocouple wiring termination. Replace thermocouple wire if necessary.
Fuses are not correctly installed.	Check fuses for correct installation.
Thermal cut-out switch is open.	Press switch re-set button or replace switch if it does not reset.
Aerosol switch is damaged or has failed.	Replace aerosol switch cable assembly.

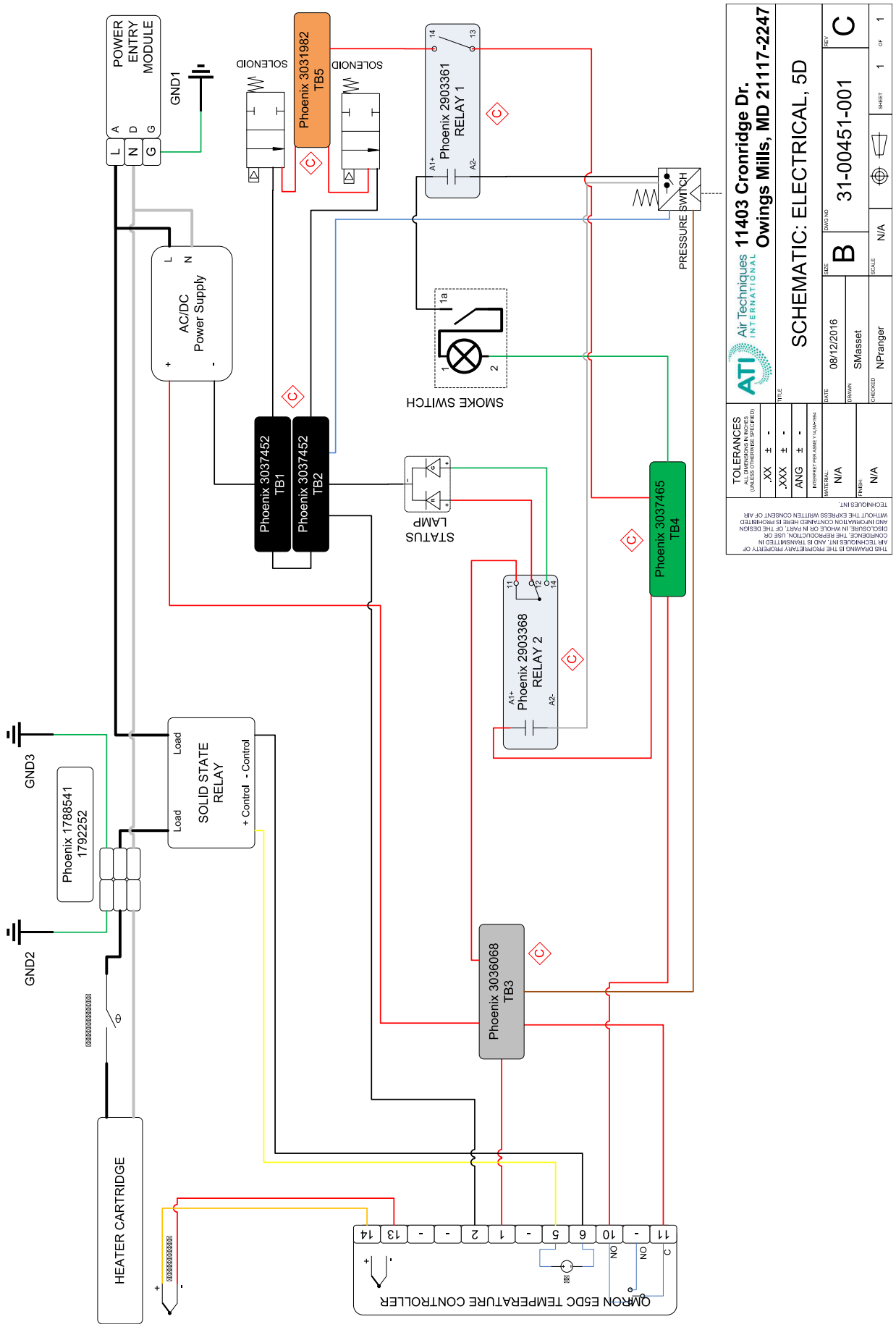
No aerosol output

Cause	Resolution
Liquid reservoir is empty.	Fill the liquid reservoir with the appropriate liquid reagent.
Aerosol Switch is in OFF position.	Move the Aerosol Switch to the ON position.
Improper inert gas pressure.	Verify that 50 psi of inert gas is being supplied to the unit.
Tank fill cap is leaking.	Tighten fill cap or replace if necessary.
Solenoid valve is not opening.	Check valve wires for proper installation. Check temperature on controller is with operating range (290 - 460° C).

Aerosol is generated when unit is hot

Cause	Resolution
Unit was not adequately purged before disconnecting inert gas.	Purge out aerosol in flow hood using inert gas.
Liquid is leaking around the heater block.	Inspect heater assembly for leaks in fittings. Disassemble heater assembly of replace heater block and fittings.

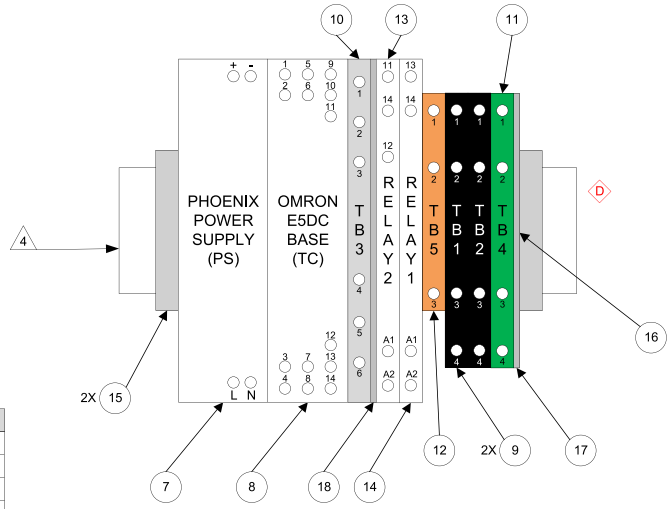
Appendix A: Electrical Schematic



Appendix B: DIN Rail Assembly

NOTES:

1. MANUFACTURE IN ACCORDANCE WITH IPC/WHMA-A-620A CLASS 2 AND IEC61340-5-1.
2. PART TO BE CLEAN AND FREE OF DIRT, DEBRIS, OIL AND GREASE.
3. PACKAGING TO FOLLOW SPECIFICATION MAT-034.
4. MARK PART APPROXIMATELY WHERE SHOWN, USING PRINTED LABEL. CHARACTERS SHALL BE LEGIBLE. FORMAT SHALL BE: PART NUMBER-# WHERE # IS THE CURRENT DRAWING REVISION LEVEL.
5. WIRE ACCORDING TO CONNECTION CHART.
6. ITEM 5 AND 6 NOT SHOWN FOR CLARITY.
7. BUILD CABLES ACCORDING TO CABLE CONSTRUCTION TABLE
8. EQUIVALENT PARTS MUST BE ROHS COMPLIANT.



CONNECTION CHART 5

FROM	TO	CABLE NUMBER / ITEM
POWER SUPPLY +	TB3 #1	CABLE #1
POWER SUPPLY -	TB1 #1	CABLE #2
TB2 #1	TB1 #2	CABLE #3
TC #1	TB3 #2	CABLE #4
TC #2	TB2 #2	CABLE #5
TC #5	-	ITEM #5, YELLOW
TC #6	-	ITEM #5, BLACK
TC #10	TB4 #1	CABLE #6
TC #11	TB3 #3	CABLE #7
TC #14	-	ITEM #6, YELLOW
TC #13	-	ITEM #6, RED
TB4 #2	RELAY1 #13	CABLE #8
TB5 #1	RELAY1 #14	CABLE #9
TB3 #4	RELAY2 #11	CABLE #10
TB4 #3	RELAY2 #A1	CABLE #11

CABLE CONSTRUCTION TABLE 7

CABLE NUMBER	TERMINATION A	WIRE	TERMINATION B	LENGTH
1	ITEM 3	ITEM 1	ITEM 3	4.50"
2	ITEM 3	ITEM 2	ITEM 3	4.50"
3	ITEM 3	ITEM 2	ITEM 3	2.50"
4	ITEM 4	ITEM 1	ITEM 3	4.50"
5	ITEM 4	ITEM 2	ITEM 3	5.00"
6	ITEM 4	ITEM 1	ITEM 3	4.00"
7	ITEM 4	ITEM 1	ITEM 3	5.00"
8	ITEM 3	ITEM 1	ITEM 3	3.50"
9	ITEM 3	ITEM 1	ITEM 3	3.50"
10	ITEM 3	ITEM 1	ITEM 3	5.00"
11	ITEM 3	ITEM 1	ITEM 3	3.50"

ITEM	QTY	DESCRIPTION	MFG	MFG P/N	HAMILTON P/N
18	1	CON: TERM, COVER END, GRAY	PHOENIX CONTACT	3036660	41-00564-001
17	1	CON: TERM, COVER END, GRAY	PHOENIX CONTACT	3030514	41-00427-001
16	1	DIN RAIL: 35MMX7.5MM SLOTTED	HAMILTON ASSOCIATES	10-00217-001	10-00217-001
15	2	CON: TERM, END CLAMP, DIN	PHOENIX CONTACT	3032350	41-00428-001
14	1	RLY: SPST-NO, 24VDC COIL, 6A, 250VAC, DIN	PHOENIX CONTACT	2903361	41-00563-001
13	1	RLY: SPDT, 24VDC COIL, 50mA, 36VDC, DIN	PHOENIX CONTACT	2903368	41-00562-001
12	1	CON: TERM, ORG, FEED THRU, 12-28AWG, DIN, 3POS	PHOENIX CONTACT	3031982	41-00414-ORG
11	1	CON: TERM, GRN, FEED THRU, 12-28AWG, DIN, 4POS	PHOENIX CONTACT	3037465	41-00415-GRN
10	1	CON: TERM, GRAY, FEED THRU, 12-28AWG, DIN, 6POS	PHOENIX CONTACT	3036068	41-00561-GRY
9	2	CON: TERM, BLK, FEED THRU, 12-28AWG, DIN, 4POS	PHOENIX CONTACT	3037452	41-00415-BLK
8	1	CONTROLLER: TEMPERATURE , 24VDC, DIN, BASE	OMRON	E5DC-SCT1S	41-0560-001
7	1	PSU: 85-264VAC, 24VDC, 30W, DIN	PHOENIX CONTACT	2902991	41-00257-001
6	1	ASSY: CABLE, THERMOCOUPLE, 5D	HAMILTON ASSOCIATES	20-00430-001	20-00430-001
5	1	ASSY: CABLE, RELAY CONTROL, 5D	HAMILTON ASSOCIATES	20-00429-001	20-00429-001
4	4	CON: SPADE TERMINAL, 16-22AWG, #4, 0.218" WIDTH, RED	PHOENIX CONTACT OR =	3240032	41-00559-RED
3	18	CON: FERRULE, 18AWG, DIN, 10mm PIN LENGTH, RED	PHOENIX CONTACT OR =	3200182	41-00537-001
2	10IN	WIRE: 18AWG, 16/30, BLACK, PVC, 600V	ALPHAWIRE OR =	3075	41-00438-BLK
1	33IN	WIRE: 18AWG, 16/30, RED, PVC, 600V	ALPHAWIRE OR =	3075	41-00438-RED

TOLERANCES
ALL DIMENSIONS IN INCHES (UNLESS OTHERWISE SPECIFIED)
.XX ± -
.XXX ± -
ANG ± -
INTERPRET PER ASME Y14.5M-1994

MATERIAL: N/A
FINISH: N/A

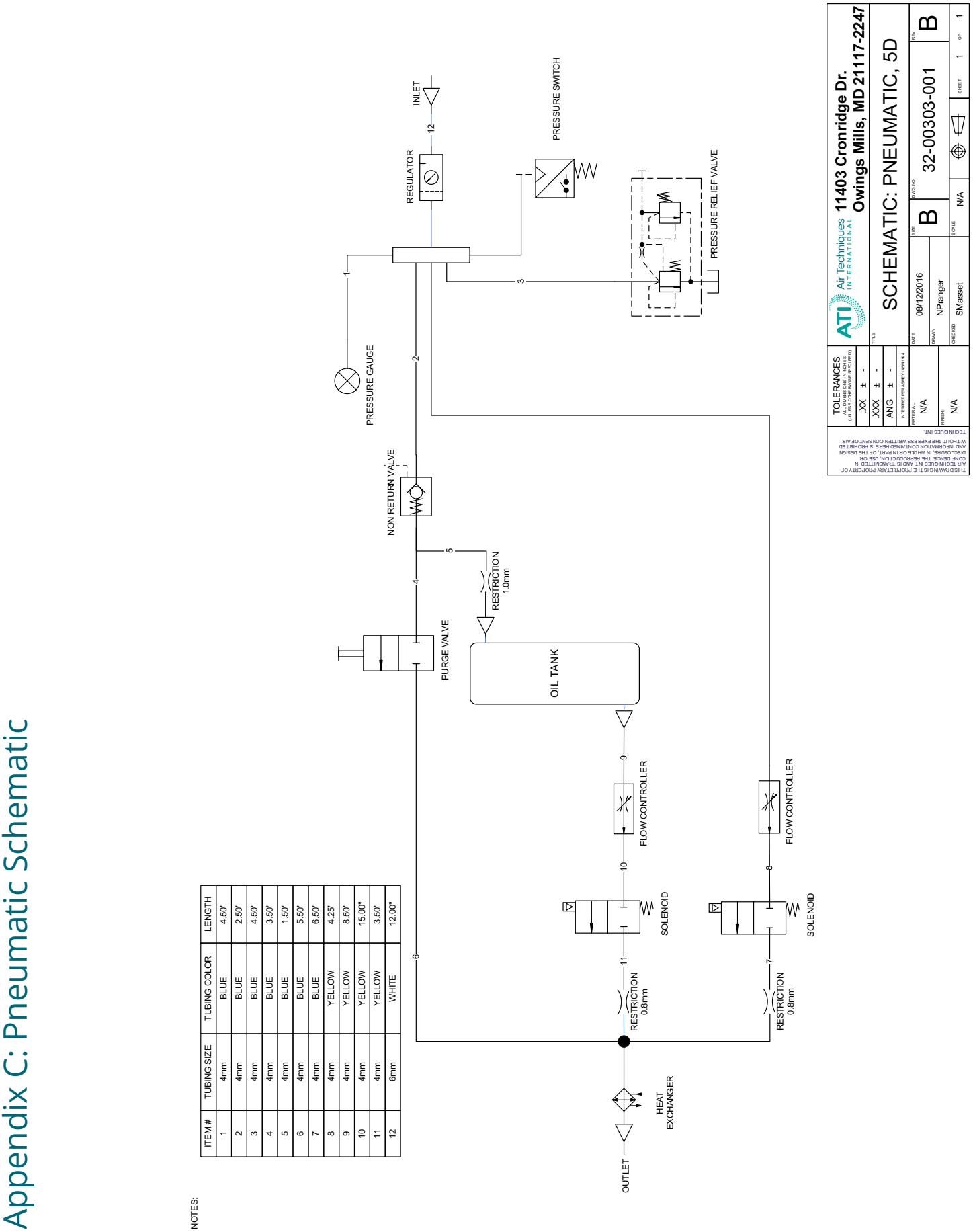
Air Techniques INTERNATIONAL
11403 Cronridge Dr.
Owings Mills, MD 21117-2247

TITLE: ASSY: DIN RAIL, 5D

DATE	SIZE	DWG NO	REV
3/24/2017	B	20-00420-001	D

DRAWN: S. MASSET
CHECKED: N. PRANGER
SCALE: N/A
SHEET 1 OF 1

Appendix C: Pneumatic Schematic



Appendix D: Unit Assembly 120V

MODEL #	MODEL DESCRIPTION
5D	ASSY: 5D, 120 VAC

OPERATION #	OPERATION DESCRIPTION:
10	SWITCH, LED & LABELS

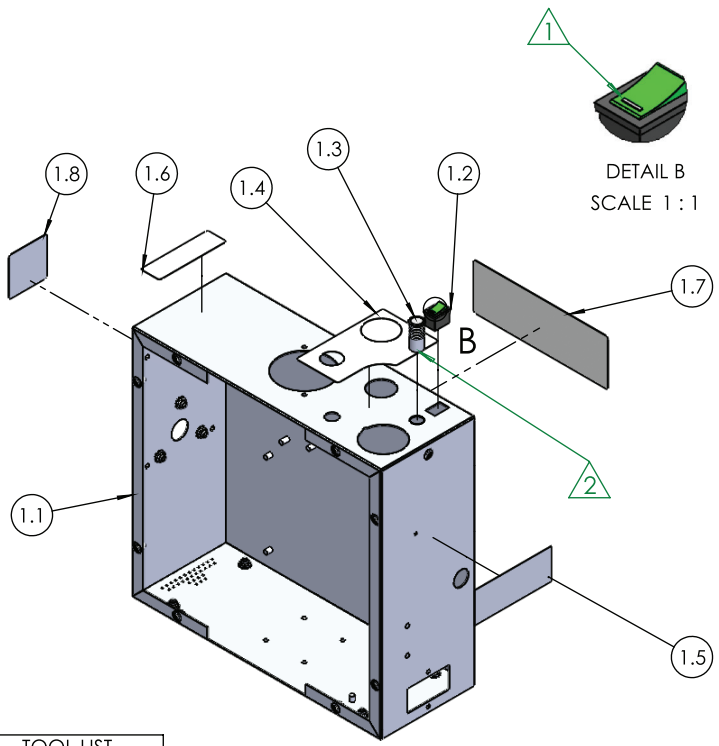
LEGEND: △ TQC ○ VERIFY □ WORK CONTENT

ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1.1	10-00220-001	CASE: 18 GA, 304 SS, 5D	1
1.2	20-00416-001	ASSY: CABLE, 5D AEROSOL SWITCH	1
1.3	20-00417-001	ASSY: CABLE, 5D READY LED	1
1.4	22-00350-001	LABEL: 5D, CONTROL PANEL	1
1.5	22-00450-001	LABEL: FIRE HAZARD, 5D	1
1.6	22-00351-001	LABEL: 5D, PRODUCT	1
1.7	22-00349-001	LABEL: 5D, ATI	1
1.8	22-00526-001	LABEL: HOT SURFACE	1

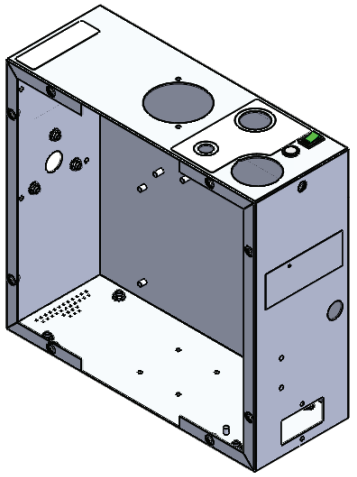
NOTES:

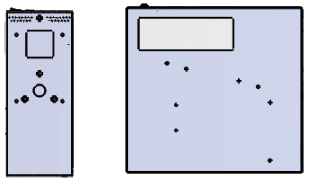
1. MATCH SWITCH ORIENTATION WITH LABEL; HAVE SIDE WITH TAB TOWARDS ON POSITION
2. TIGHTEN RETAINER NUT INSIDE OF CASE UNTIL ITEM 1.3 CANNOT ROTATE

REVISIONS					
ECN#	REV.	DESCRIPTION	DWN	DATE	APP
	A	INITIAL RELEASE	VC	SDM	04/30/2018
3252	B	BOM CORRECTION & IMAGE UPDATE	EKL	06/13/2019	EKL



DETAIL B
SCALE 1 : 1





SCALE 1 : 8

STEP	DESCRIPTION	TYPE
1	CLEAN OUTER SURFACES OF ITEM 1.1 WITH DENATURED ALCOHOL	□
2	APPLY ITEMS 1.4-1.8 AS SHOWN. USE PLASTIC BLADE TO PUSH OUT AIR BUBBLES	□
3	INSERT ITEM 1.2 INTO CASE. SEE NOTE 1	□
4	REMOVE RETAINER NUT & TIGHTEN TO INSERT ITEM 1.3 INTO CASE. SEE NOTE 2	□

TOOL LIST
11/16 WRENCH
PLASTIC BLADE

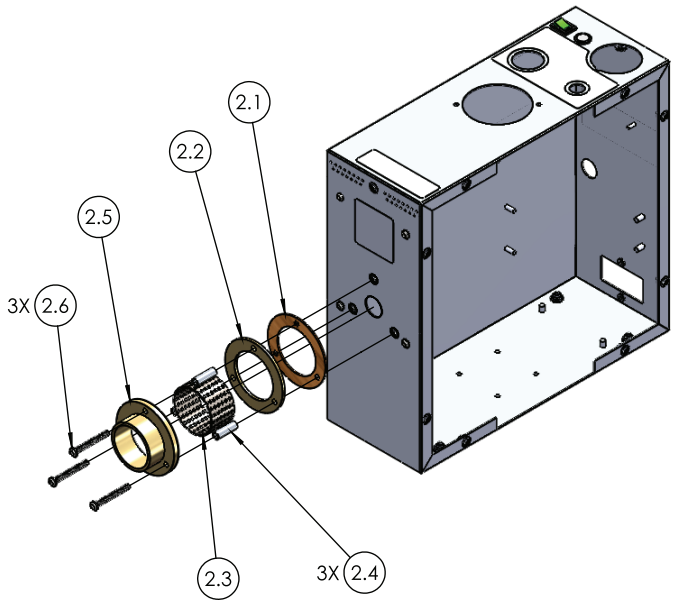
DATE	SIZE	DWG. NO.	REV
	B	20-00490-120	B
	SCALE: 1:4		SHEET 1 OF 18

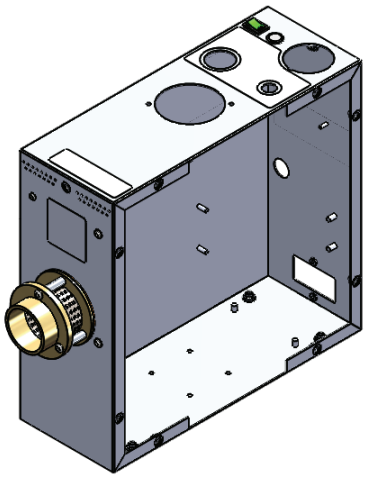
MODEL #	MODEL DESCRIPTION
5D	ASSY: 5D, 120VAC

OPERATION #	OPERATION DESCRIPTION:
20	OUTLET

LEGEND:
△ TQC ○ VERIFY □ WORK CONTENT

ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
2.1	T5B0-0945	GASKET GEN COLLAR	1
2.2	1000615	PLATE,NOZZLE,REAR, 5C OUTPUT	1
2.3	1000617	TUBE,NOZZLE, 5C OUTPUT	1
2.4	70-00286-001	SPCR: M5, 25MM, 8MM OD, SS	3
2.5	1000614	NOZZLE,FRONT,5C OUTPUT	1
2.6	70-00287-001	SCREW: M5X45MM, 18-8 SS, BH	3





STEP	DESCRIPTION	TYPE
1	PLACE ITEMS 2.1 TO 2.5	□
2	MOUNT WITH ITEM 2.6	□

TOOL LIST
3 MM HEX BIT
CORDLESS DRIVER

DATE	SIZE	DWG. NO.	REV
	B	20-00490-120	B
	SCALE: 1:4		SHEET 2 OF 18

MODEL #	MODEL DESCRIPTION
5D	ASSY: 5D, 120 VAC

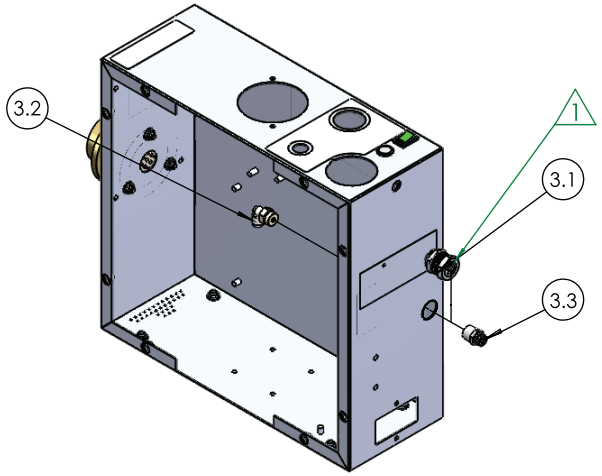
OPERATION #	OPERATION DESCRIPTION:
30	INLET

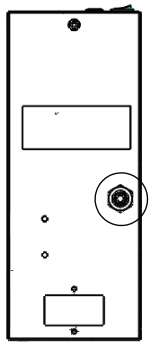
LEGEND:
△ TQC ○ VERIFY □ WORK CONTENT

ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
3.1	64-00243-001	COUPLING: THROUGH WALL, 1/4NPT, NPB	1
3.2	64-00224-001	FTG: 1/4 NPT TO 6MM, ELBOW UNION	1
3.3	64-00502-001	FTG: TUBE, HALF UNION, 1/4NPT TO 1/4"	1

NOTES:

1. USE 7/8 WRENCH AND IMPACT DRILL TO ENSURE WASHER BITES INTO INSIDE OF ITEM 3.1.





STEP	DESCRIPTION	TYPE
1	INSERT ITEM 3.1 INTO INLET HOLE OF CASE AND TIGHTEN WITH RETAINER NUT INSIDE OF CASE. SEE NOTE 1.	□
2	THREAD ITEM 3.2 INTO ITEM 3.1 AND TIGHTEN	□
3	THREAD ITEM 3.3 INTO ITEM 3.1 AND TIGHTEN	□

TOOL LIST
7/8 WRENCH
IMPACT DRILL
9/16 WRENCH
14 MM WRENCH

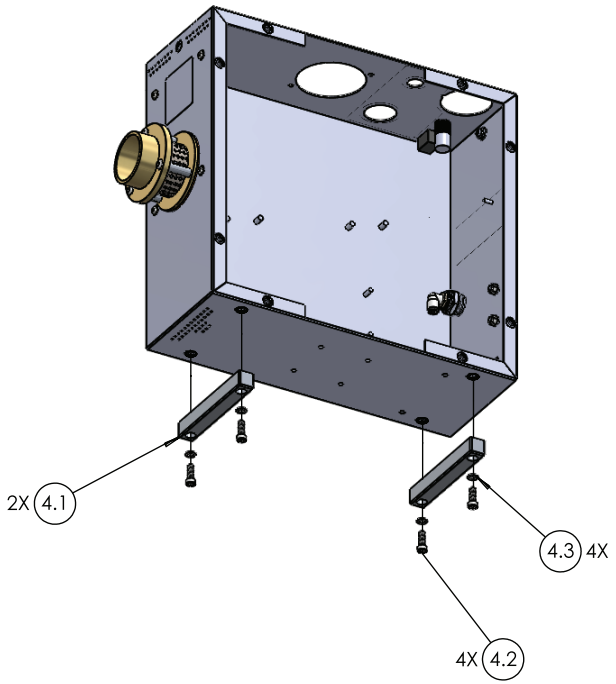
DATE	SIZE	DWG. NO.	REV
	B	20-00490-120	B
	SCALE: 1:4		SHEET 3 OF 18

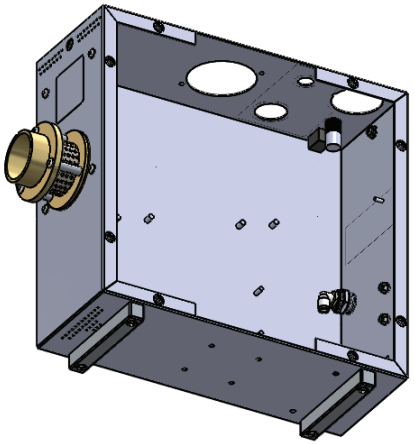
MODEL #	MODEL DESCRIPTION
5D	ASSY: 5D, 120VAC

OPERATION #	OPERATION DESCRIPTION:
40	FEET

LEGEND:
△ TQC ○ VERIFY □ WORK CONTENT

ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
4.1	10-00213-001	FOOT, ALUMINIUM, 5/8 X 5/8	2
4.2	3300425	SCR,SCH CAP,M5 X 16mm, SS	4
4.3	3200167	WSHR,FL,M5,SS	4





STEP	DESCRIPTION	TYPE
1	MOUNT ITEM 4.1 WITH FASTENERS 4.2 & 4.3	□

TOOL LIST
4 MM HEX BIT
CORDLESS DRIVER

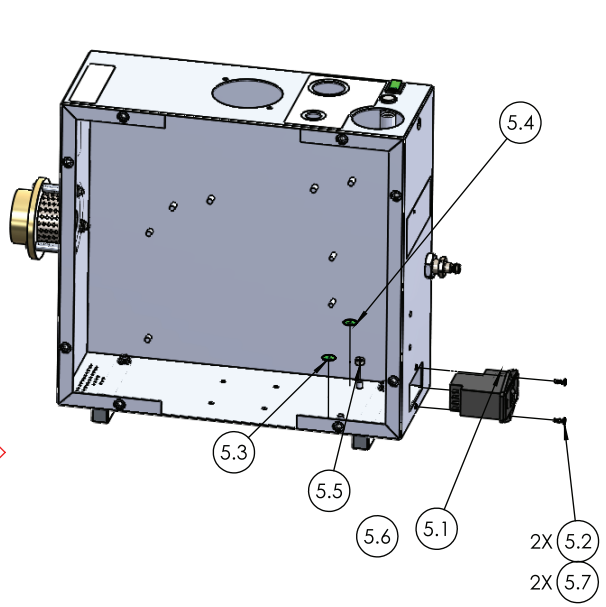
DATE	SIZE	DWG. NO.	REV
	B	20-00490-120	B
	SCALE: 1:4		SHEET 4 OF 18

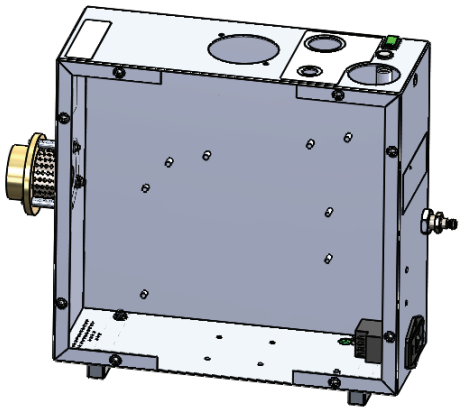
MODEL #	MODEL DESCRIPTION
5D	ASSY: 5D, 120 VAC

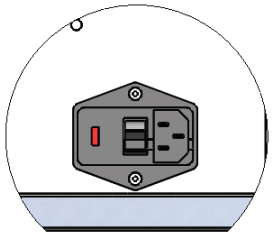
OPERATION #	OPERATION DESCRIPTION:
50	POWER MODULE

LEGEND:
△ TQC ○ VERIFY □ WORK CONTENT

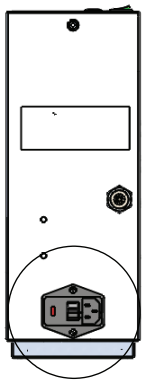
ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
5.1	6900116	POWER ENTRY CONNECTOR, FUSE	1
5.2	3300468	SCR,FH,M3X10mm,SCH,SS	2
5.3	1600309	LABEL, EARTH GROUND, 1/2 DIA.	1
5.4	1600213	LABEL, CHASSIS GROUND	1
5.5	3100152	NUT,HEX,LKG,M5,SS	1
5.6	20-00476-001	ASSY: CABLE, EARTH GROUND, 5D	1
5.7	41-00466-010	FUSE: 5MM X 20 MM, FAST. 250V, 10A	2







DETAIL P
SCALE 1 : 2



STEP	DESCRIPTION	TYPE
1	INSERT BOTH OF ITEM 5.7 INTO POWER MODULE	□
2	MOUNT POWER MODULE ONTO CASING WITH ITEM 5.2.	□
3	VERIFY RED TAB OF POWER MODULE FACES LEFT. SEE VIEW P.	○
4	APPLY ITEMS 5.3 & 5.4	□
5	ATTACH ITEM 5.6 FEMALE END ONTO POWER MODULE	□
6	TIGHTEN ITEM 5.5 ON TOP OF RING TERMINAL OF ITEM 5.6	□

TOOL LIST
2 MM HEX BIT
8 MM NUT DRIVER
CORDLESS DRIVER

DATE	SIZE	DWG. NO.	REV
	B	20-00490-120	B
	SCALE: 1:4		SHEET 5 OF 18

MODEL #	MODEL DESCRIPTION
5D	ASSY: 5D, 120 VAC

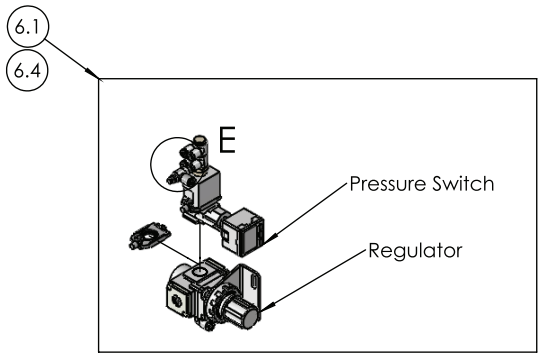
OPERATION #	OPERATION DESCRIPTION:
60	PRESSURE REG SUBASSY

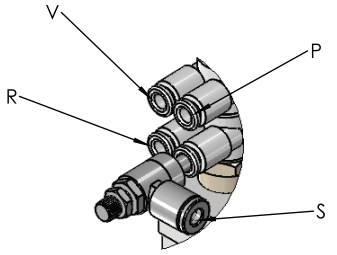
LEGEND:
△ TQC ○ VERIFY □ WORK CONTENT

ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
6.1	20-00421-001	ASSY: COMPRESSED GAS INLET, 5D	1
6.2	3100152	NUT,HEX,LKG,M5,SS	2
6.3	3200167	WSHR,FL,M5,SS	2
6.4	20-00471-001	ASSY: CABLE, PRESSURE SWITCH, ISE30A	1
6.5	5200215	TUBING, PEU, 4mmOD, 95A, CLEAR BLUE	4.5"
6.6	91-00468-001	TUBING: 6mmOD, 4mmID, PEU, WHITE	12"

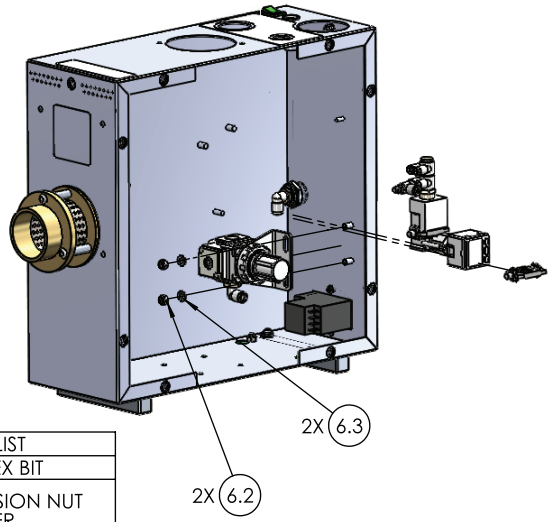
STEP	DESCRIPTION	TYPE
1	SEPERATE ITEM 6.1 INTO REGULATOR AND PRESSURE SWITCH	□
2	ENSURE PRESSURE SWITCH PROGRAMMING	○
3	ATTACH ITEM 6.4 TO PRESSURE SWITCH	□
4	SEE DETAIL VIEW E: CONNECT 2.50" BLUE TUBE FROM CHECK VALVE TO V, 4.50" BLUE TUBE FROM PRESSURE RELIEF VALVE TO R,4.50" BLUE TUBE FROM PRESSURE GAUGE TO P AND 4.50" OF ITEM 7.5 TO S	□
5	CONNECT ITEM 6.6 FROM INLET TO BOTTOM OF REGULATOR	□
6	MOUNT REGULATOR WITH FASTENERS 6.2 & 6.3	□
7	REINSTALL PRESSURE SWITCH	□
8	ENSURE THAT CONNECTIONS BETWEEN SWITCH AND REGULATOR ARE TIGHT	△

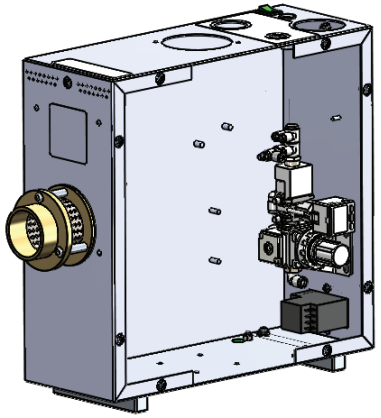
TOOL LIST
3 MM HEX BIT
8 MM EXTENSION NUT DRIVER
CORDLESS DRIVER





DETAIL E
SCALE 1 : 1





DATE	SIZE	DWG. NO.	REV
	B	20-00490-120	B
	SCALE: 1:4		SHEET 6 OF 18

MODEL #	MODEL DESCRIPTION
5D	ASSY: 5D, 120 VAC

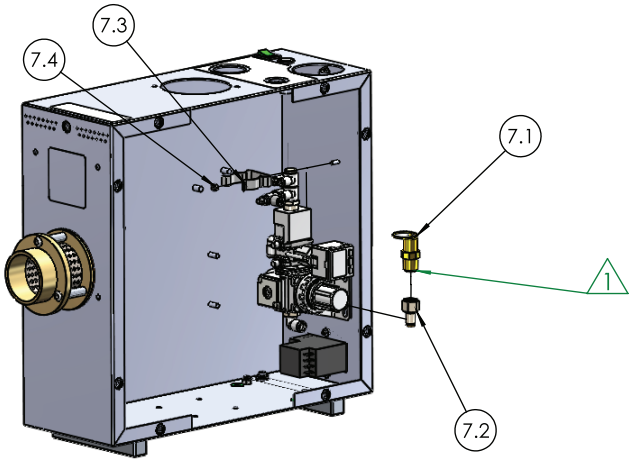
OPERATION #	OPERATION DESCRIPTION:
70	PRESSURE RELIEF VALVE

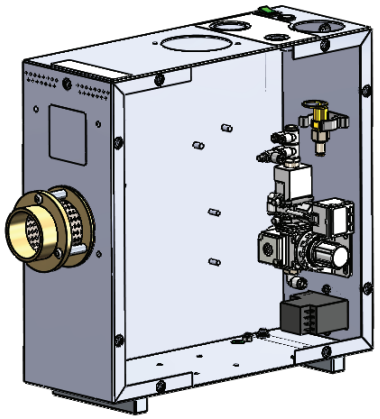
LEGEND:
△ TQC ○ VERIFY □ WORK CONTENT

ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
7.1	63-00241-001	VALVE: PRESSURE RELIEF, 40 PSI, 1/8NTP	1
7.2	64-00225-001	FTG: 1/8 NTP TO 5/32, FEMALE UNION	1
7.3	3000333	CLAMP,MNT,1/2OD, NI-ST	1
7.4	3100153	NUT,HEX,LKG,M3,SS	1
7.5	5200125	TUBING, PEU, 4mmOD, 95A, CLEAR BLUE	4.5"

NOTES:

1. APPLY 567 LOCTITE OR OTHER EQUIVALENT THREAD SEALANT





STEP	DESCRIPTION	TYPE
1	THREAD ITEM 7.1 INTO 7.2 AND TIGHTEN. SEE NOTE 1	□
	CONNECT 4.5" OF ITEM 7.5 TO BOTTOM OF ITEM 7.2	□
2	INSTALL ITEM 7.3 AND TIGHTEN WITH ITEM 7.4	□
3	INSERT RELIEF VALVE INTO CLAMP	□
4	ENSURE THAT TWO HOLES OF RELIEF VALVE ARE EXPOSED	△

TOOL LIST
5.5 MM NUT DRIVER
9/16 WRENCH
CORDLESS DRIVER

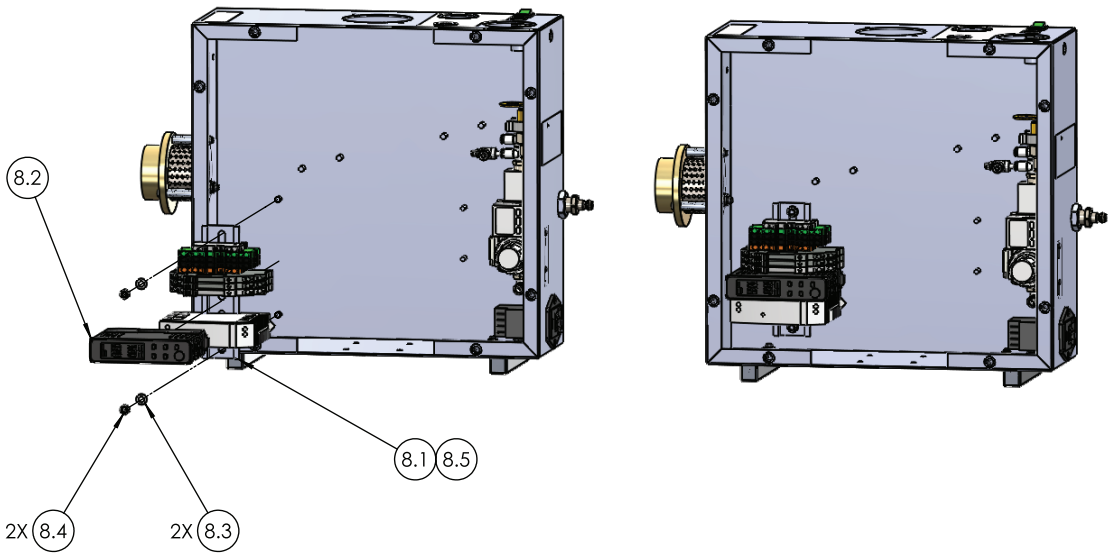
DATE	SIZE	DWG. NO.	REV
	B	20-00490-120	B
	SCALE: 1:4		SHEET 7 OF 18

MODEL #	MODEL DESCRIPTION
5D	ASSY: 5D, 120 VAC

OPERATION #	OPERATION DESCRIPTION:
80	DIN RAIL SUBASSY

LEGEND:
△ TQC ○ VERIFY □ WORK CONTENT

ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
8.1	20-00420-001	ASSY: DIN RAIL, 5D	1
8.2	41-00498-001	CONTROLLER: TEMP, 24VDC, DIN, TOP	1
8.3	3200167	WSHR,FL,M5,SS	2
8.4	3100152	NUT,HEX,LKG,M5,SS	2
8.5	3000100	SPIRAL WRAP TUBING, POLY	9"



STEP	DESCRIPTION	TYPE
1	MOUNT ITEM 8.2 ONTO ITEM 8.1	□
2	MOUNT ITEM 8.1 ONTO CASE WITH FASTENERS 8.3 & 8.4	□
4	ROUTE WIRES TOGETHER INSIDE OF ITEM 8.5	□
3	ATTACH WIRES FOR POWER SWITCH, READY LIGHT, SS RELAY, PRESSURE SWITCH & SOLENOID VALVES TO DIN RAIL. REFER TO DIN RAIL, 5D WIRING DIAGRAM (20-00420-001)	□

TOOL LIST
8 MM EXTENSION NUT DRIVER
CORDLESS DRIVER
SMALL FLATHEAD SCREWDRIVER

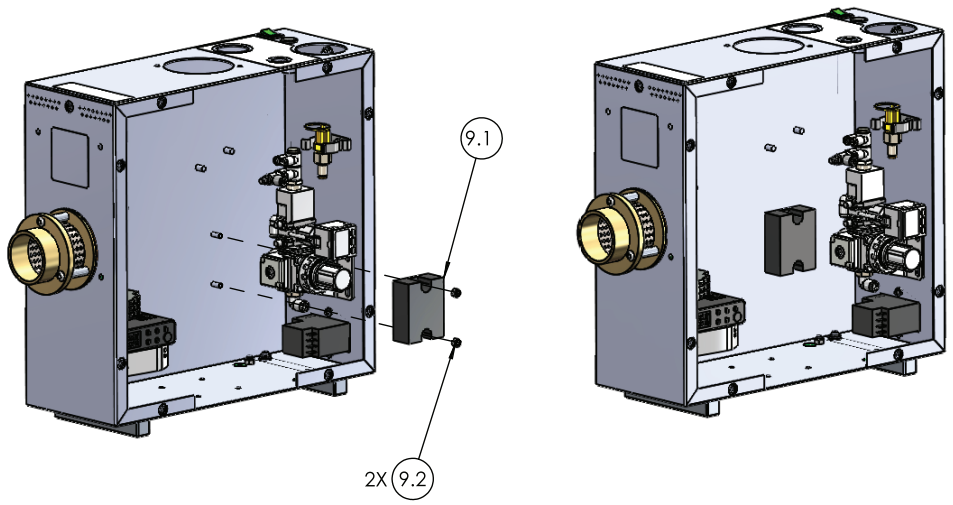
DATE	SIZE	DWG. NO.	REV
	B	20-00490-120	B
	SCALE: 1:4		SHEET 8 OF 18

MODEL #	MODEL DESCRIPTION
5D	ASSY: 5D, 120 VAC

OPERATION #	OPERATION DESCRIPTION:
90	SOLID STATE RELAY

LEGEND:
△ TQC ○ VERIFY □ WORK CONTENT

ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
9.1	41-00256-001	RELAY: SSR, 3-32VDC IN, 25A LOAD CURRENT	1
9.2	3100155	NUT,HEX,LKG,M4,SS	2



STEP	DESCRIPTION	TYPE
1	TIGHTEN ITEM 9.2 ONTO ITEM 9.1 WITH PINS 3 & 4 ON TOP	□

TOOL LIST
7 MM NUT DRIVER
CORDLESS DRIVER

DATE	SIZE	DWG. NO.	REV
	B	20-00490-120	B
	SCALE: 1:4		SHEET 9 OF 18

MODEL #	MODEL DESCRIPTION
5D	ASSY: 5D, 120 VAC

OPERATION #	OPERATION DESCRIPTION:
100	PURGE VALVE & PRESSURE GAUGE

LEGEND: △ TQC ○ VERIFY □ WORK CONTENT

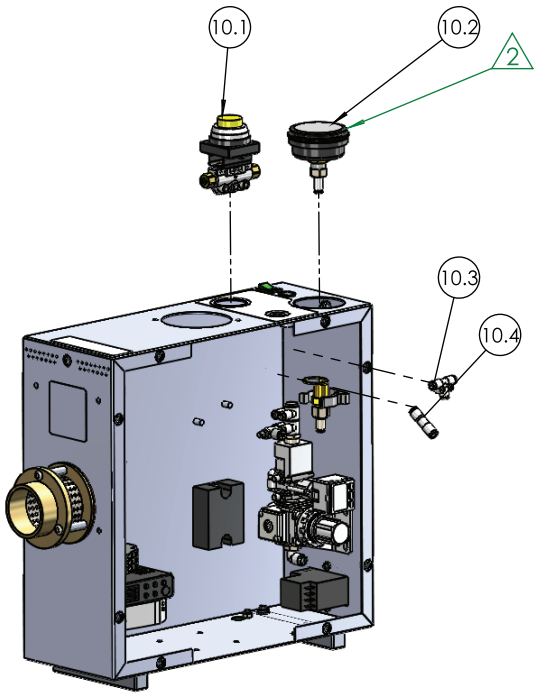
ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
10.1	20-00443-001	ASSY: PURGE VALVE, 2 PORT, PUSH BUTTON	1
10.2	20-00442-001	ASSY: GAUGE, 0.2 MPA, 30 PSI, 4mm	1
10.3	64-00230-001	FTG: UNION T, 4MM	1
10.4	63-00237-001	VALVE: CHECK, 4MM	1
10.5	5200215	TUBING, PEU. 4mmOD, 95A CLEAR BLUE	17.5"

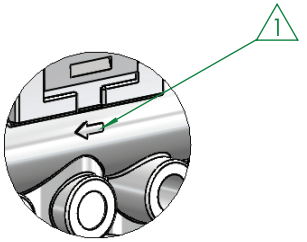
STEP	DESCRIPTION	TYPE
1	CONNECT 3.50" OF ITEM 10.5 TO RIGHTMOST FITTING OF ITEM 10.1AND RIGHTMOST FITTING OF ITEM 10.3. SEE NOTE 1	□
2	CONNECT 5.50" OF ITEM 10.5 TO LEFTMOST FITTING OF ITEM 10.1. SEE NOTE 1	□
3	REMOVE RETAINER NUT & HAND TIGHTEN ITEM 10.1 INTO CASE WITH RETAINER NUT ON TOP. SEE NOTE 1	□
4	CONNECT 4.50" OF ITEM 10.5 TO BOTTOM OF ITEM 10.2	□
5	REMOVE RETAINER NUT & HAND TIGHTEN ITEM 10.2 INTO CASE WITH RETAINER NUT INSIDE CASE. SEE NOTE 2	□
6	CONNECT 1.50" OF ITEM 10.5 TO BOTTOM OF ITEM 10.3 AND ITEM 10.4	□
7	CONNECT 2.50" OF ITEM 10.5 TO REMAINING END OF ITEM 10.4	□

NOTES

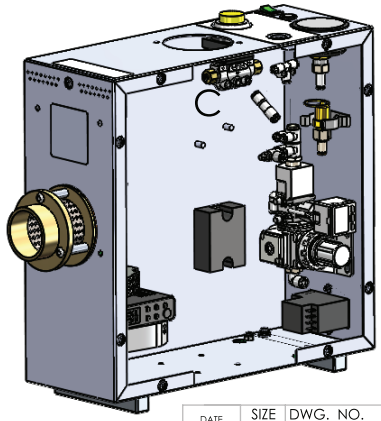
1. ENSURE ARROW FACES FROM RIGHT (ON/OFF SIDE) TO LEFT
2. KEEP TEXT ON GAUGE PARALLEL TO STICKER'S TEXT

BLUE	3.50", 5.50",4.50", 1.50", 2.50"





DETAIL C
SCALE 2 : 1



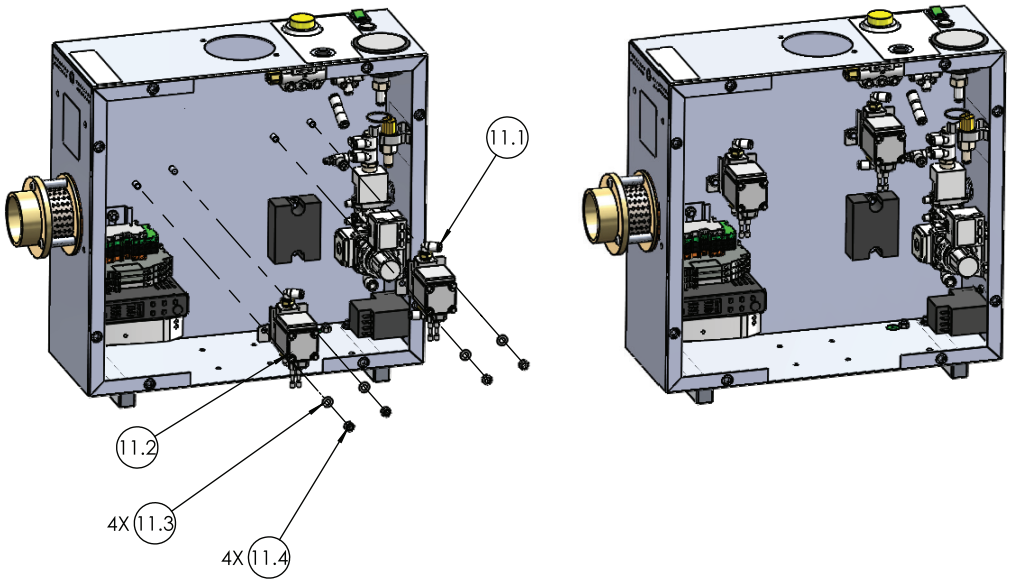
DATE	SIZE	DWG. NO.	REV
	B	20-00490-120	B
	SCALE: 1:4		SHEET 10 OF 13

MODEL #	MODEL DESCRIPTION
5D	ASSY: 5D, 120 VAC

OPERATION #	OPERATION DESCRIPTION:
110	SOLENOID VALVES

LEGEND:
△ TQC ○ VERIFY □ WORK CONTENT

ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
11.1	20-00424-001	ASSY: VALVE, COMPRESSED GAS, 5D	1
11.2	20-00425-001	ASSY: VALVE, OIL, 5D	1
11.3	3200167	WSHR,FL,M5,SS	4
11.4	3100152	NUT,HEX,LKG,M5,SS	4
11.5	5200214	TUBING, PEU, 4mmOD, 95A CLEAR YELLOW	3.5"
11.6	5200215	TUBING, PEU, 4mmOD, 95A CLEAR BLUE	6.5"



STEP	DESCRIPTION	TYPE
1	MOUNT ITEM 11.1 LOCATED RIGHT & WIRES FACING DOWNWARDWIH FASTENERS 11.3 & 11.4	□
2	MOUNT ITEM 11.2 LOCATED LEFT & WIRES FACING DOWNWARD WITH FASTENERS 11.3 & 11.4	□
3	CONNECT 15" YELLOW TUBE FROM RIGHTWARD FITTING OF METERING VALVE TO BOTTOM OF ITEM 11.2 AND 3.5" OF ITEM 11.5 TO TOP OF ITEM 11.2	□
4	CONNECT 6.5" OF ITEM11.6 TO BOTTOM OF ITEM 11.1	□

TOOL LIST
8 MM EXTENSION NUT DRIVER
CORDLESS DRIVER

DATE	SIZE	DWG. NO.	REV
	B	20-00490-120	B
	SCALE: 1:4		SHEET 11 OF 13

MODEL #	MODEL DESCRIPTION
5D	ASSY: 5D, 120 VAC

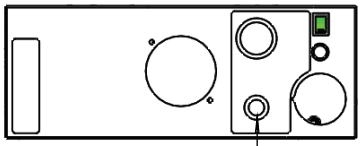
OPERATION #	OPERATION DESCRIPTION:
120	METERING VALVE SUBASSY

LEGEND:
△ TQC ○ VERIFY □ WORK CONTENT

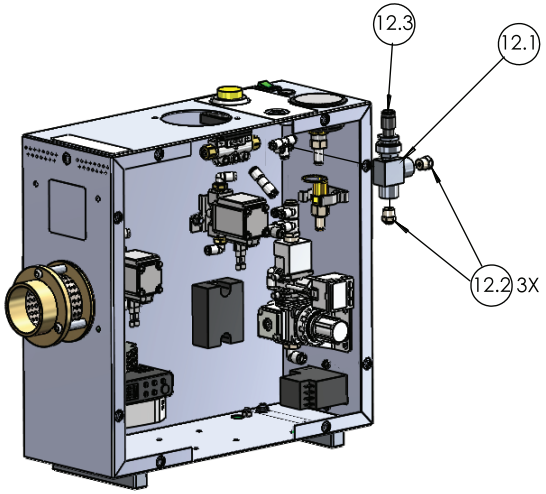
ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
12.1	63-00242-001	VALVE: METERING, 0.03CV, 1/4 NPT, 90DEG	1
12.2	64-00228-002	FTG: TUBE, STRAIGHT, 1/8NPT TO 5/32"	3
12.3	63-00249-001	VERNIER HANDLE KIT, MEDIUM FLOW VALVE	1
12.4	5200214	TUBING, PEU, 4mmOD, 95A CLEAR YELLOW	23.5"

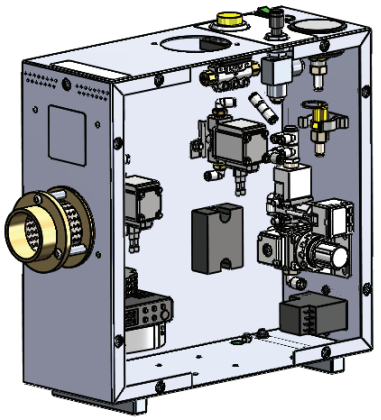
STEP	DESCRIPTION	TYPE
1	THREAD ITEM 12.2 INTO ENDS OF 12.1 AND TIGHTEN	□
2	INSTALL ITEM 12.1 ONTO CASE WITH PANEL MOUNT NUT. TIGHTEN SO THAT RIGHTMOST FITTING POINTS TO AND IN FRONT OF PRESSURE GAUGE	□
3	VERIFY THAT METERING VALVE IS FULLY CLOSED	○
4	DISSASSEMBLE ITEM 12.3 INTO BARREL, STEM EXTENSION, AND HANDLE	□
5	INSTALL BARREL WITH 0 FACING TOWARDS BOTTOM OF VIEW D	□
6	INSTALL STEM EXTENSION AND TIGHTEN	□
7	INSTALL HANDLE WITH 0 CENTERED TO 0 ON BARREL AND TIGHTEN	□
8	ENSURE HANDLE CAN TURN AT LEAST 10 TIMES	△
9	CONNECT 8.50" OF ITEM 12.4 TO BOTTOM FITTING OF ITEM 12.1	□
10	CONNECT 15" OF ITEM 12.4 TO RIGHTMOST FITTING OF ITEM 12.1	□

YELLOW	8.5", 15"



VIEW D
SCALE 1 : 4





TOOL LIST
5/64 HEX DRIVER
7/16 WRENCH
11/16 WRENCH

DATE	SIZE	DWG. NO.	REV
	B	20-00490-120	B
	SCALE: 1:4		SHEET 12 OF 18

MODEL #	MODEL DESCRIPTION
5D	ASSY: 5D, 120 VAC

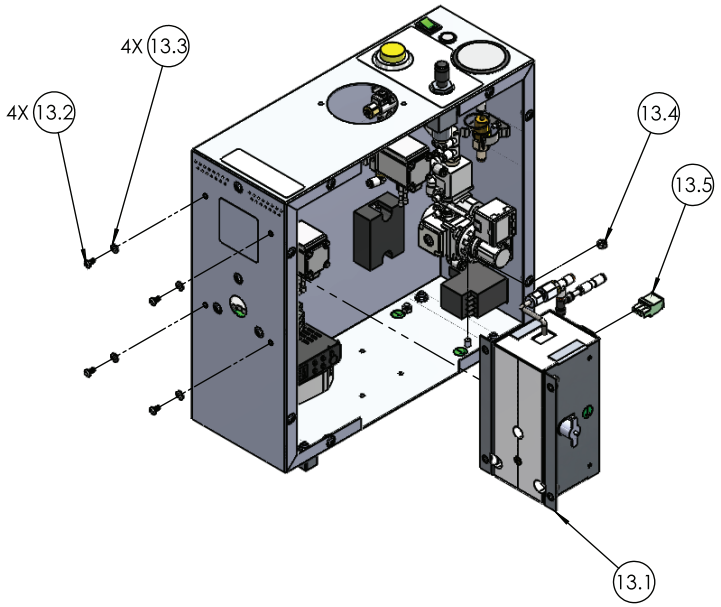
OPERATION #	OPERATION DESCRIPTION:
130	HEATER BLOCK

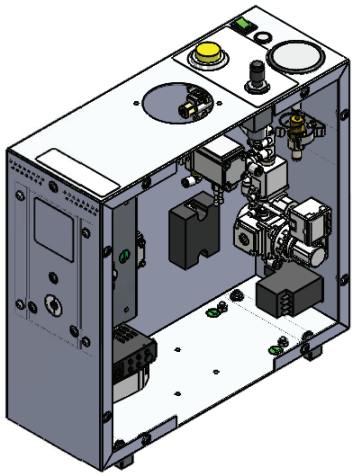
LEGEND:
△ TQC ○ VERIFY □ WORK CONTENT

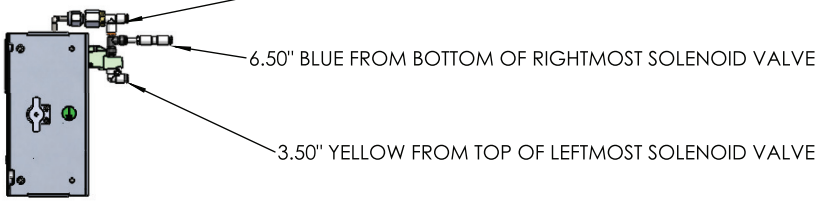
ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
13.1	20-00308-120	ASSY: HEAT EXCHANGER, 5D	1
13.2	70-00268-001	SCREW: M4X8mm, 316 SS, BHSS	4
13.3	3200169	WSHR,FL,M4,SS	4
13.4	3100152	NUT,HEX,LKG,M5,SS	1
13.5	20-00418-001	ASSY: CABLE POWER HARNESS, 5D	1

STEP	DESCRIPTION	TYPE
1	SLIDE ITEM 13.1 INTO PLACE	□
2	MOUNT ITEM 13.1 WITH FASTENERS 13.2 & 13.3	□
3	INSERT ITEM 13.5 INTO TERMINAL BLOCK ON ITEM 13.1	□
4	TIGHTEN ITEM 13.4 OVER RING TERMINAL WIRE OF ITEM 13.5	□
5	INSERT PINK TERMINALS OF ITEM 13.5 INTO POWER MODULE WITH BLACK WIRE ONTO PORT A AND WHITE WIRE ONTO PORT D	□
6	ATTACH BLUE TERMINALS OF ITEM 13.5 ONTO SS RELAY:CABLE WITH SHORTER SLEEVE ON PORT 1 & WIRE WITH LONGER SLEEVE ON PORT 2	□
7	CONNECT THERMOCOUPLE BETWEEN ITEM 13.1 & DIN RAIL SUBASSY	□
8	VERIFY ALL CONNECTIONS WITH ELECTRICAL SCHEMATIC (31-00451-001)	△
9	COMPLETE TUBE CONNECTIONS TO ITEM 13.1 AS SHOWN IN VIEW F	□

TOOL LIST
2.5 MM HEX BIT
8 MM NUT DRIVER
CORDLESS DRIVER







VIEW F
SCALE 1 : 4

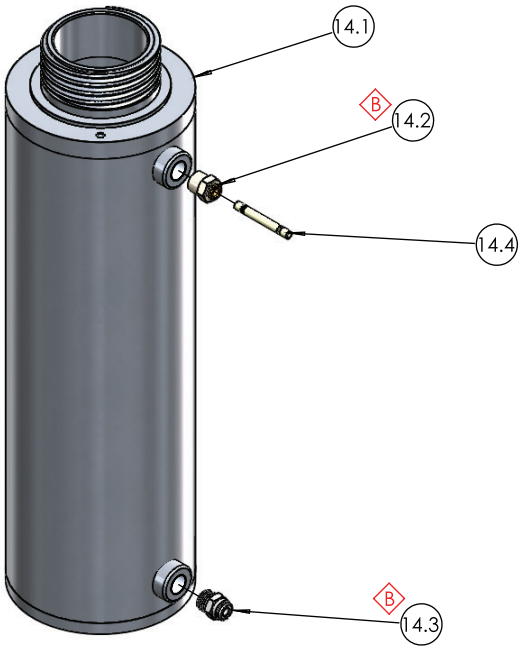
DATE	SIZE	DWG. NO.	REV
	B	20-00490-120	B
	SCALE: 1:4		SHEET 13 OF 18

MODEL #	MODEL DESCRIPTION
5D	ASSY: 5D, 120 VAC

OPERATION #	OPERATION DESCRIPTION:
140	TANK FITTINGS

LEGEND:
△ TQC ○ VERIFY □ WORK CONTENT

ITEM NO.	PART NUMBER	DESCRIPTION	QTY.	
14.1	10-00440-001	TANK: OIL RESERVOIR, 5D	1	
14.2	64-00228-001	FTG: TUBE, STRGHT UNION, 1/8 NPT TO 5/32"	1	B
14.3	64-00228-002	FTG: TUBE, STRAIGHT , 1/8 NPT TO 5/32"	1	B
14.4	10-00321-001	RESTRICTOR, 4mm OD, .8mm ORIFICE	1	



STEP	DESCRIPTION	TYPE
1	THREAD & TIGHTEN ITEM 14.2 TO TOP HOLE	□
2	THREAD & TIGHTEN ITEM 14.3 TO BOTTOM HOLE	□
3	ATTACH 14.4 TO ITEM 14.2 SO THAT SMALLER HOLE OF ITEM 14.4 FACES ITEM 14.2	□
4	PULL TO ENSURE THAT ITEM 14.4 IS SECURE IN 14.2	△

TOOL LIST
7/16 WRENCH

DATE	SIZE	DWG. NO.	REV
	B	20-00490-120	B
	SCALE: 1:2		SHEET 14 OF 18

MODEL #	MODEL DESCRIPTION
5D	ASSY: 5D, 120 VAC

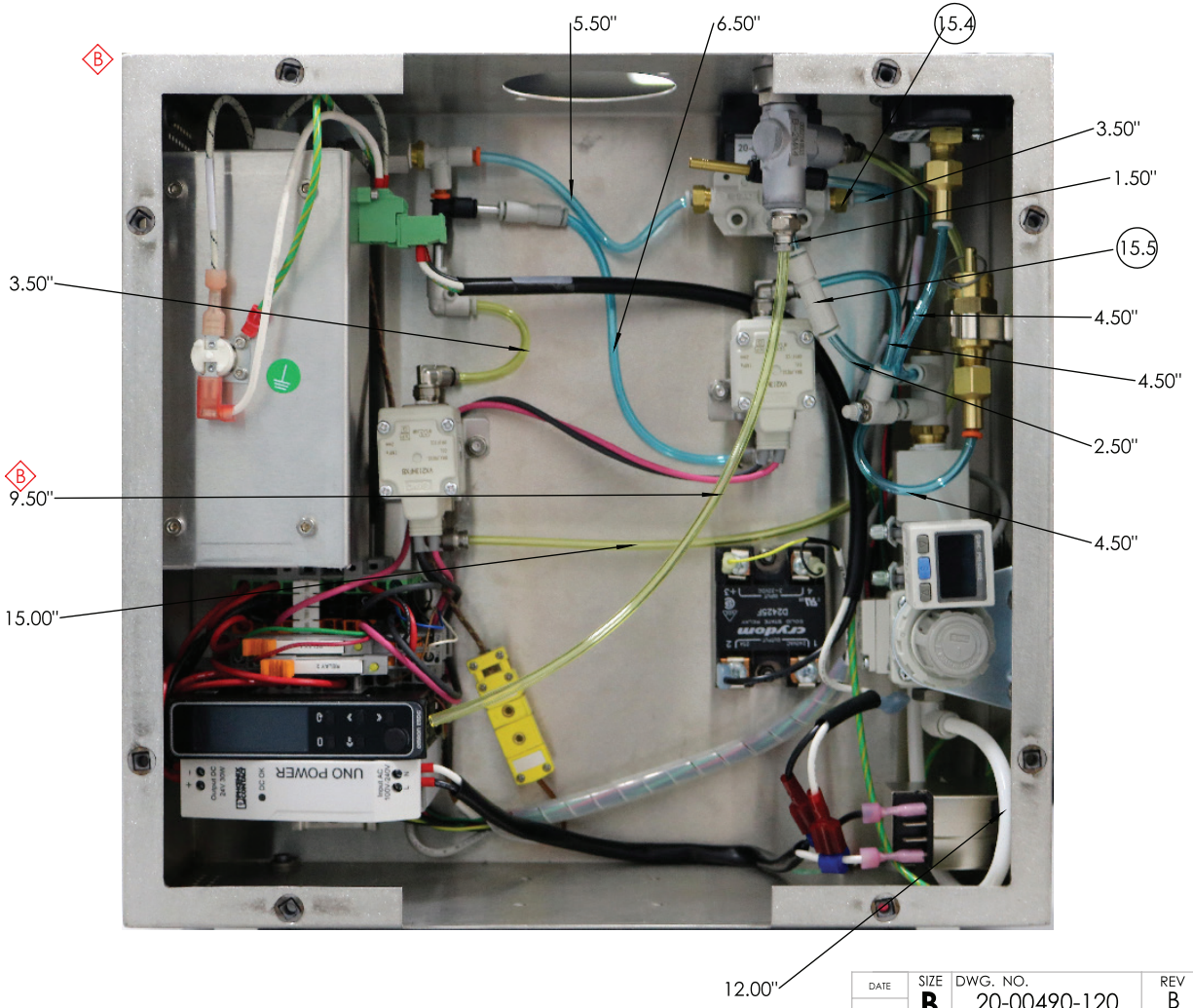
OPERATION #	OPERATION DESCRIPTION:
150	PNEUMATICS

LEGEND: △ TQC ○ VERIFY □ WORK CONTENT

ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
15.1	91-00468-001	TUBING: 6mmOD, 4mmID, PEU, WHITE	12"
15.2	5200214	TUBING, PEU, 4mmOD, 95A CLEAR YELLOW	27"
15.3	5200215	TUBING, PEU, 4mmOD, 95A CLEAR BLUE	33"
15.4	64-00230-001	FTG: TUBE, UNION T, 4MM	1
15.5	63-00237-001	VALVE: CHECK, 4MM	1

YELLOW	3.5", 9.5", 15"
BLUE	1.5", 2.5", 3.5", 3x 4.5", 5.5", 6.5"
WHITE	12"

STEP	DESCRIPTION	TYPE
1	ENSURE THAT ALL TUBES ARE INSERTED INTO APPROPRIATE FITTING. REFER TO PNEUMATIC DIAGRAM (32-00303-001)	△
2	TUG EACH TUBE TO ENSURE CONNECTIONS ARE SECURE	△



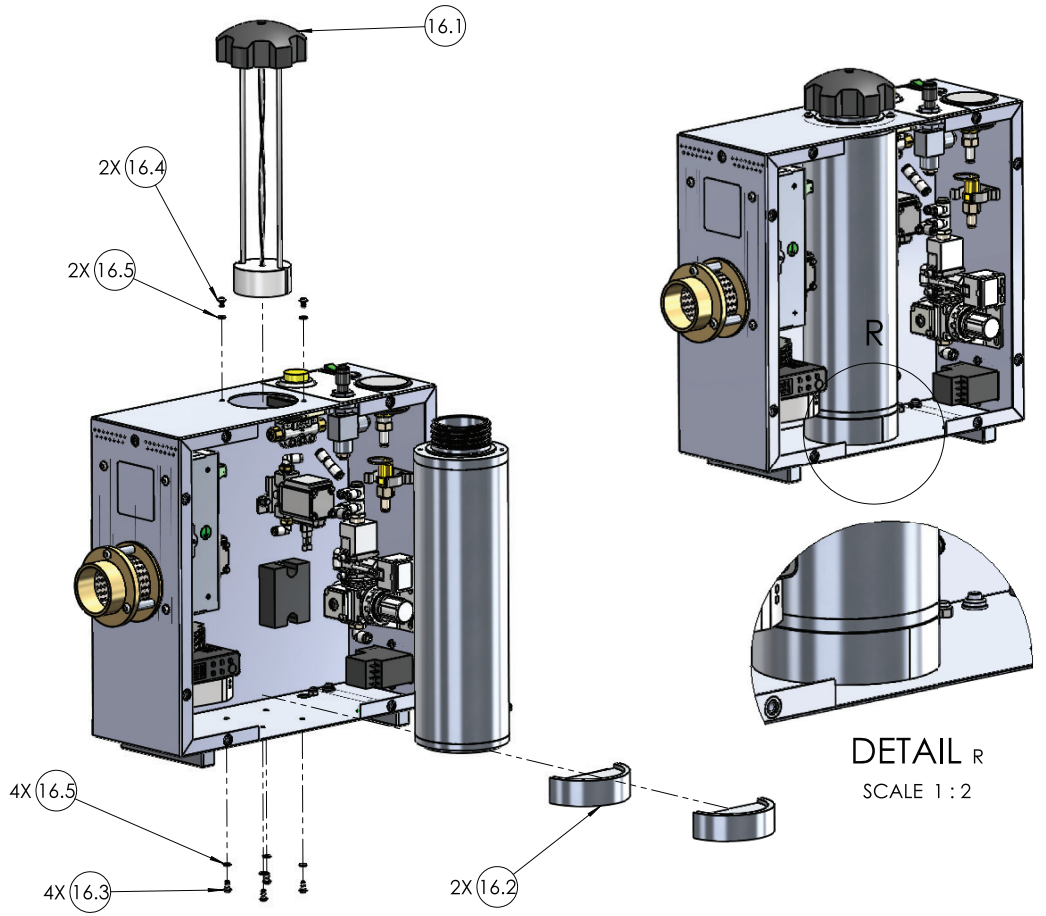
DATE	SIZE	DWG. NO.	REV
	B	20-00490-120	B
	SCALE: 1:4		SHEET 15 OF 18

MODEL #	MODEL DESCRIPTION
5D	ASSY: 5D, 120 VAC

OPERATION #	OPERATION DESCRIPTION:
160	CLOSED TANK

LEGEND:
△ TQC ○ VERIFY □ WORK CONTENT

ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
16.1	65-00244-001	CAP: RATCHET, LEVEL GAUGE, 2-1/4 THREAD	1
16.2	10-00207-001	SPACER: TANK, ALUMINUM, 5D	2
16.3	70-00268-001	SCREW: M4X8mm, 316 SS, BHSS	4
16.4	70-00271-001	SCREW: M4X6mm, 316 SS, BH	2
16.5	3200173	WSHR,LK,SPT,M4,SS	6



DETAIL R
SCALE 1 : 2

STEP	DESCRIPTION	TYPE
1	SLIDE TANK INTO ASSY	□
2	ATTACH TANK TO CASE WITH FASTENERS 16.4 & 16.5	□
3	INSERT ITEM 16.1 INTO TANK AND TURN UNTIL ONE CLICK IS HEARD	□
4	SLIDE ITEM 16.2 UNDERNEATH TANK AND ROTATE TO MATCH VIEW R	□
	ATTACH ITEM 6.2 WITH FASTENERS 16.3 & 16.5	□
5	CONNECT REMAINING TUBING TO TANK (UNION T TO TOP & YELLOW 8.50" TO BOTTOM)	□

TOOL LIST
2.5 MM HEX BIT
3 MM HEX BIT
CORDLESS DRIVER

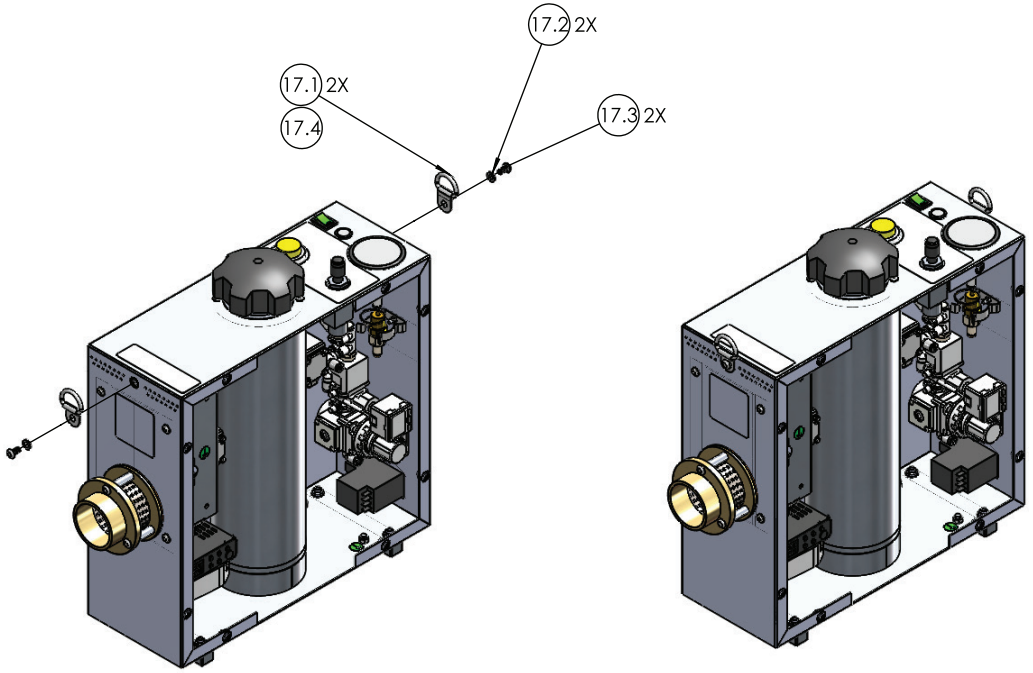
DATE	SIZE	DWG. NO.	REV
	B	20-00490-120	B
	SCALE: 1:4		SHEET 16 OF 18

MODEL #	MODEL DESCRIPTION
5D	ASSY: 5D, 120 VAC

OPERATION #	OPERATION DESCRIPTION:
170	HANDLE

LEGEND:
△ TQC ○ VERIFY □ WORK CONTENT

ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
17.1	11-00285-001	RING: TIE-DOWN, 316 SS	2
17.2	3200167	WSHR,FL,M5,SS	2
17.3	70-00267-001	SCREW: M5X10mm, 316 SS, BHSS	2
17.4	10-00221-001	STRAP: CARRY, NYLON WEBBING 1 IN, 5D	1



STEP	DESCRIPTION	TYPE
1	ATTACH ITEM 17.1 ONTO FRONT AND BACK OF CASING WITH FASTENERS 17.2 & 17.3	□
2	CLIP ON ITEM 17.4 TO ITEM 17.1	□

TOOL LIST
3 MM HEX BIT
CORDLESS DRIVER

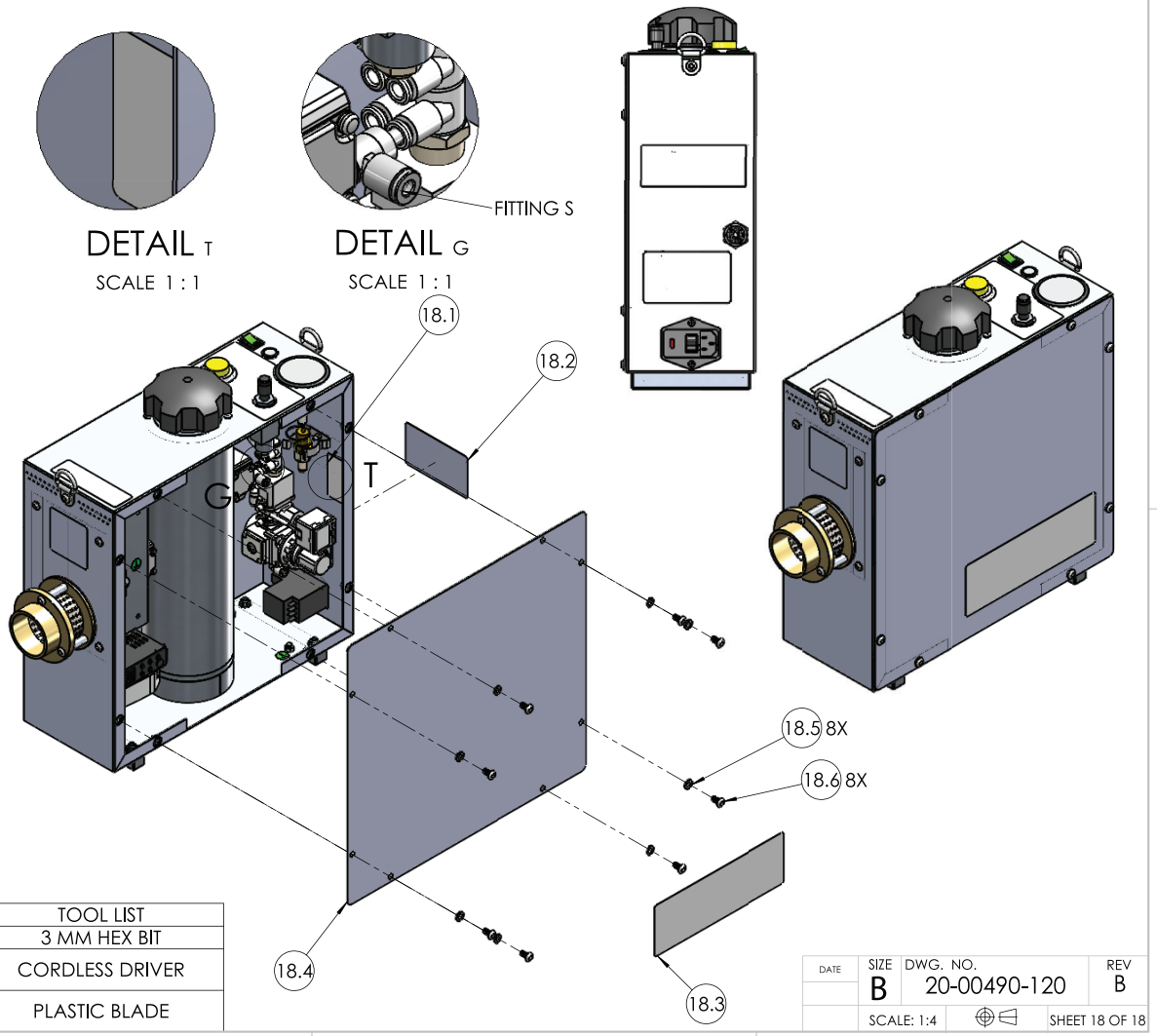
DATE	SIZE	DWG. NO.	REV
	B	20-00490-120	B
	SCALE: 1:4		SHEET 17 OF 18

MODEL #	MODEL DESCRIPTION
5D	ASSY: 5D, 120 VAC
OPERATION #	**OPERATION DESCRIPTION:**
180	COVER & SERIAL STICKERS

LEGEND:
△ TQC ○ VERIFY □ WORK CONTENT

ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
18.1	22-00478-001	LABEL: 5D, 120V, IDENTIFICATION	1
18.2	22-00446-001	LABEL: 5D, 120V, PAO, SERIAL	1
18.3	22-00349-001	LABEL: 5D, ATI	2
18.4	10-00222-001	5D: COVER, 18 GA, 304 SS	1
18.5	3200167	WSHR,FL,M5,SS	8
18.6	70-00267-001	SCREW: M5X10mm, 316 SS, BHSS	8

STEP	DESCRIPTION	TYPE
1	PERFORM PRESSURE FLOW CALIBRATION WITH REMAINING 4.50" BLUE TUBE FROM FITTING S. SEE DETAIL VIEW G	△
2	CONNECT 4.50" TUBE TO TOP OF RIGHTMOST SOLENOID	△
3	PERFORM FUNCTION TEST	△
4	EMPTY TANK	△
5	APPLY ITEMS 18.1 & 18.2 TO CASE AS SHOWN. SEE VIEW T.	□
6	CLEAN OUTER SURFACE OF ITEM 18.4 WITH DENATURED ALCOHOL	□
7	APPLY ITEM 18.3 TO ITEM 18.4 AS SHOWN. USE PLASTIC BLADE TO REMOVE AIR BUBBLES.	□
8	ATTACH ITEM 18.4 TO CASE WITH FASTENERS 18.5 & 18.6	□



TOOL LIST
3 MM HEX BIT
CORDLESS DRIVER
PLASTIC BLADE

DATE	SIZE	DWG. NO.	REV
	B	20-00490-120	B
	SCALE: 1:4		SHEET 18 OF 18

Appendix E: Heater Block Assembly 120V

MODEL #	MODEL DESCRIPTION
5D	SUBASSY:HEATER BLOCK,120 VAC
OPERATION # 10	OPERATION DESCRIPTION: HEAT EXCHANGER

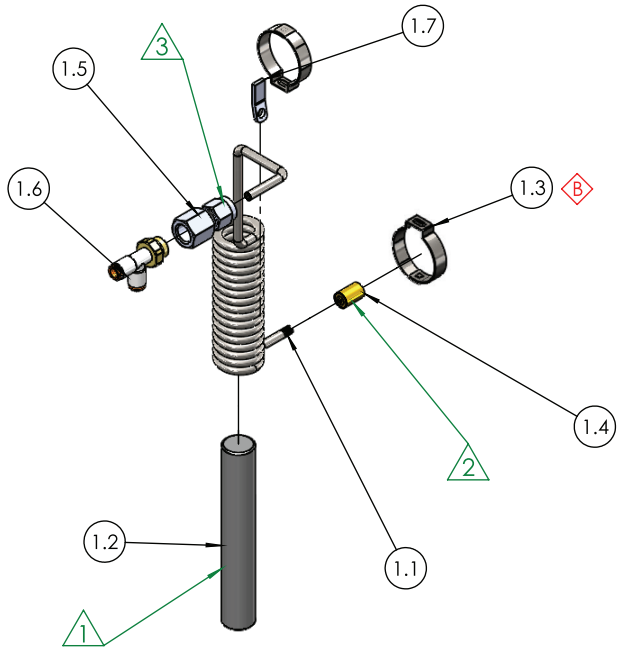
LEGEND: △ TQC ○ VERIFY □ WORK CONTENT

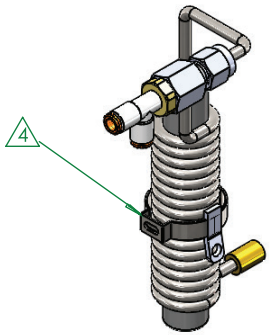
ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1.1	10-00214-001	COIL, MILD STEEL, 4mm OD, 2mm ID	1
1.2	20-00486-120	ASSY: HEATER, 4"L, 5/8"D, 1000W, 120VAC	1
1.3	11-00432-001	CLAMP: PINCH, SS, 1-1/16"ID	1
1.4	10-00215-001	NOZZLE: HEAT EXCHANGER, BRASS, 5D	1
1.5	64-00236-001	FTG: UNION, 1/8 NPT TO 4 MM, NPB	1
1.6	64-00233-001	FTG: Y MALE RUN TREE, 1/8NTP TO 5/32	1
1.7	41-00431-001	THERMOCOUPLE: TYPE K, SMPW MALE, 12"	1

NOTES:

1. USE SUPPLIED JIG TO SLIDE TO CORRECT DEPTH
2. APPLY 907TS GREEN THREAD LOCKING SEALANT
3. HAND TIGHTEN NUT THEN TIGHTEN BY THREE-QUARTERS TURN WITH 12MM AND 14MM WRENCHES
4. ORIENT IN DIRECTION SHOWN

REVISIONS					
ECN #	REV.	DESCRIPTION	DWN	APP	DATE
3116	A	INITIAL RELEASE	VC	SM	04/30/2018
3245	B	CHANGE ORIENTATION OF 11-00432-001	EKL	EKL	05/15/2019





SCALE 2 : 3

STEP	DESCRIPTION	TYPE
1	SLIDE ITEM 1.2 INSIDE ITEM 1.1 WITH WIRES TOWARDS THE TOP. SEE NOTE 1.	□
2	SLIDE ITEM 1.3 OVER NINTH COIL FROM TOP	□
3	PINCH ITEM 1.3 WITH ITEM 1.7 IN BETWEEN AND ORIENT AS SHOWN	□ B
4	THREAD ITEM 1.4 ONTO THREADED END OF ITEM 1.1 AND FULLY TIGHTEN. SEE NOTE 2.	□
5	TIGHTEN ITEM 1.5 ONTO UNTHREADED END OF ITEM 1.1. SEE NOTE 3.	□
6	THREAD ITEM 1.6 INTO ITEM 1.5 AND FULLY TIGHTEN	□

TOOL LIST
7/16 WRENCH
12 MM WRENCH
14 MM WRENCH
PINCH CLAMP PLIERS

DATE	SIZE	DWG. NO.	REV
	B	20-00308-120	B
	SCALE: 1:2		SHEET 1 OF 4

MODEL #	MODEL DESCRIPTION
5D	SUBASSY:HEATER BLOCK,120 VAC

OPERATION #	OPERATION DESCRIPTION:
20	INSULATION BLOCKS

LEGEND:
△ TQC ○ VERIFY □ WORK CONTENT

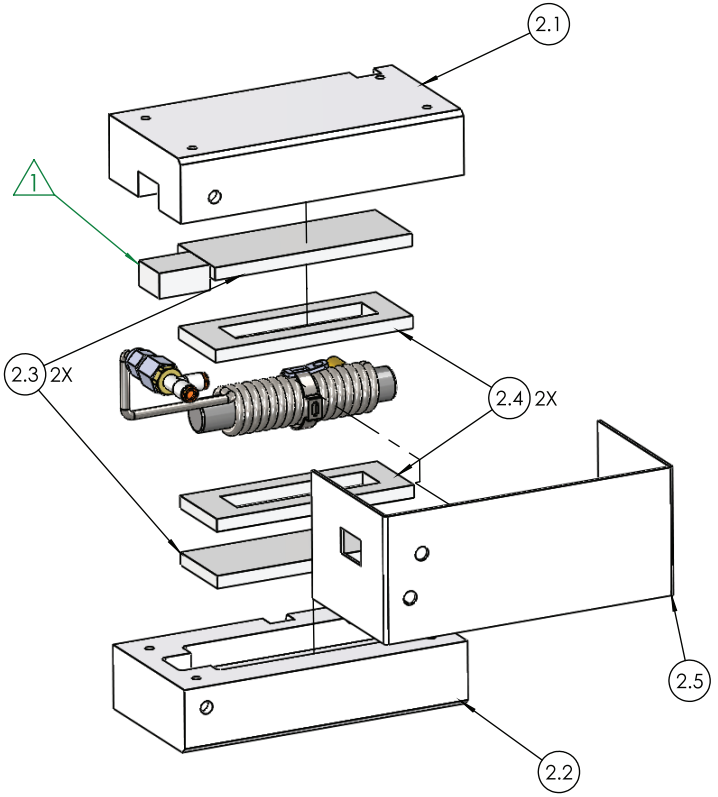
ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
2.1	10-00309-001	INSULATOR: MARINITE P, LEFT, 5D	1
2.2	10-00310-001	INSULATOR: MARINITE P, RIGHT, 5D	1
2.3	10-00483-001	INSULATION: BLANKET, BOTTOM, 5D	2
2.4	10-00485-001	INSULATION: BLANKET, BOTTOM CUTOUT, 5D	2
2.5	10-00524-001	INSULATION: ALUMINA OXIDE, 1/16IN	1

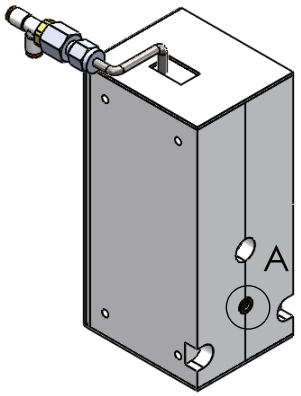
STEP	DESCRIPTION	TYPE
1	INSERT INSULATION BLANKETS INTO RESPECTIVE CAVITIES. SEE NOTE 1.	□
2	CLOSE HEATER COIL ASSY INSIDE OF BLOCKS	□
3	ENSURE BLOCKS ARE FULLY SEALEDAND NOTHING IS PINCHED	△
4	CLAMP TOGETHER ASSEMBLY	□
4	ENSURE THAT OUTER FACE OF NOZZLE IS AT LEAST TO THE EDGE OF INSULATOR BLOCKS. REFER TO DETAIL VIEW A	△

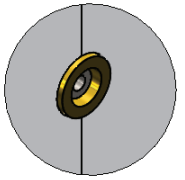
TOOL LIST
CARPENTER'S C-CLAMP

NOTES:

1. FOLD REMAINING MATERIAL OF BOTH OF ITEM 2.3 INTO BLOCK SHAPE







DETAIL A
SCALE 2 : 1

DATE	SIZE	DWG. NO.	REV
	B	20-00308-120	B
	SCALE: 1:2		SHEET 2 OF 4

MODEL #	MODEL DESCRIPTION
5D	SUBASSY:HEATER BLOCK,120 VAC

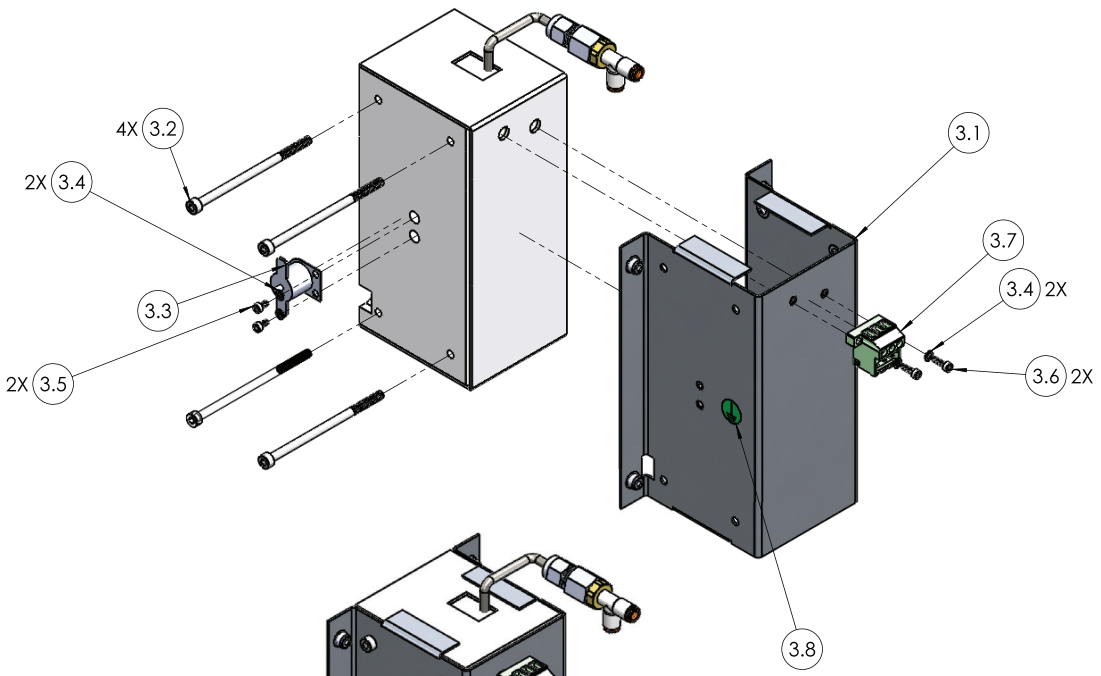
OPERATION #	OPERATION DESCRIPTION:
30	FULL HEATER BLOCK

LEGEND:
△ TQC ○ VERIFY □ WORK CONTENT

ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
3.1	10-00218-001	HEAT EXCHANGER: CASE, 18 GA, 6061 AL	1
3.2	70-00335-001	SCREW: M4X75MM, SS, SHCS	4
3.3	41-00258-001	THERMOSTAT: 93C, MANUAL RESET	1
3.4	70-00464-001	WASHER: M2.5, SPLIT LOCK, SS	4
3.5	70-00465-001	SCREW: M2.5X5mm, SHCS, SS	2
3.6	3300489	SCR,SCH CAP,M2.5 X 8mm,SS	2
3.7	20-00419-001	ASSY: CABLE, HEATER BLOCK, 5D	1
3.8	1600309	LABEL, EARTH GROUND, 1/2 DIA.	1

STEP	DESCRIPTION	TYPE
1	ATTACH ITEM 3.1 TO HEATER BLOCK SUBASSY USING FASTENER 3.2	□
2	ATTACH ITEM 3.7 ONTO ITEM 3.1 USING FASTENERS 3.4 & 3.6	□
3	ATTACH ITEM 3.3 TO ITEM 3.1 USING FASTENERS 3.4 & 3.5 WITH RING TERMINAL FROM ITEM 3.7 TIGHTENED IN BETWEEN ITEM 3.4 & ITEM 3.3 AT TOP MOST HOLE	□
4	ATTACH WHITE CABLE OF ITEM 3.7 TO BOTTOM TAB OF ITEM 3.3	□
5	ATTACH TERMINAL OF HEATER CARTRIDGE TO TOP TAB OF ITEM 3.3	□
6	INSERT FERRULE OF HEATER CARTRIDGE INTO ITEM 3.7	□
7	APPLY ITEM 3.8 NEXT TO ITEM 3.3	□

TOOL LIST
2 MM HEX BIT
3 MM HEX BIT
CORDLESS DRIVER
SMALL FLATHEAD SCREWDRIVER



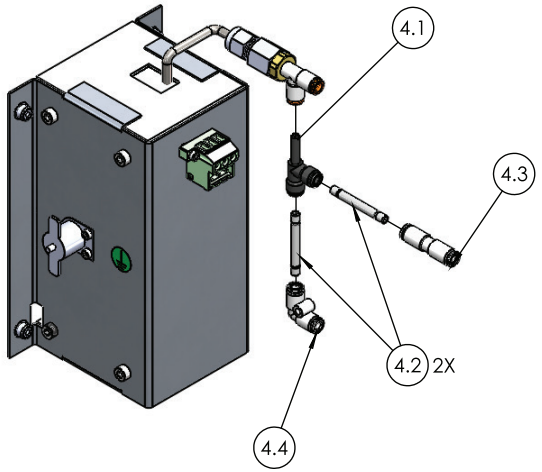
DATE	SIZE	DWG. NO.	REV
	B	20-00308-120	B
	SCALE: 1:2		SHEET 3 OF 4

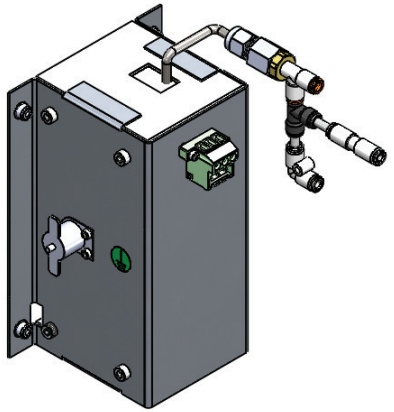
MODEL #	MODEL DESCRIPTION
5D	SUBASSY:HEATER BLOCK,120 VAC

OPERATION #	OPERATION DESCRIPTION:
40	HEATER BLOCK FITTINGS

LEGEND:
△ TQC ○ VERIFY □ WORK CONTENT

ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
4.1	64-00413-001	FTG: TUBE, Y MALE RUN TEE, 4MM TO 4MM	1
4.2	10-00321-001	RESTRICTOR, 4mm OD, .8mm ORIFICE	2
4.3	64-00284-001	FTG: STRAIGHT, 4MM	1
4.4	5100872	FTG: ELBOW, 4MM	1





STEP	DESCRIPTION	TYPE
1	INSERT ITEM 4.1 INTO THREADED TEE	□
2	INSERT ITEM 4.2 INTO 4.1. THE SMALLER HOLE OF ITEM 4.2 FACES ITEM 4.1.	□
3	INSERT ITEM 4.3 & 4.4 AS SHOWN	□
4	PULL ON FITTINGS TO ENSURE THEY ARE SECURE	△

DATE	SIZE	DWG. NO.	REV
	B	20-00308-120	B
	SCALE: 1:2		SHEET 4 OF 4

Appendix F: Unit Assembly 240V

MODEL #	MODEL DESCRIPTION
5D	ASSY: 5D, 240 VAC

OPERATION #	OPERATION DESCRIPTION:
10	SWITCH, LED & LABELS

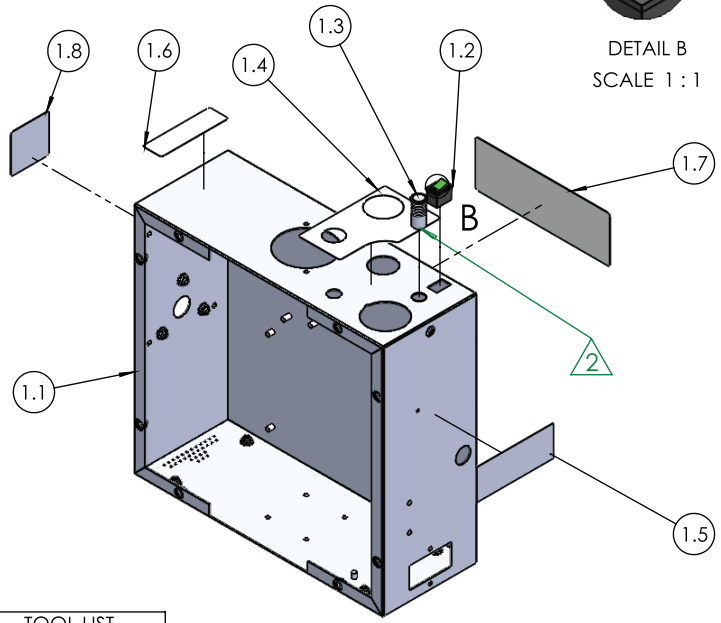
LEGEND: △ TQC ○ VERIFY □ WORK CONTENT

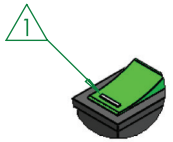
ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1.1	10-00220-001	CASE: 18 GA, 304 SS, 5D	1
1.2	20-00416-001	ASSY: CABLE, 5D AEROSOL SWITCH	1
1.3	20-00417-001	ASSY: CABLE, 5D READY LED	1
1.4	22-00350-001	LABEL: 5D, CONTROL PANEL	1
1.5	22-00450-001	LABEL: FIRE HAZARD, 5D	1
1.6	22-00351-001	LABEL: 5D, PRODUCT	1
1.7	22-00349-001	LABEL: 5D, ATI	1
1.8	22-00526-001	LABEL: HOT SURFACE	1

NOTES:

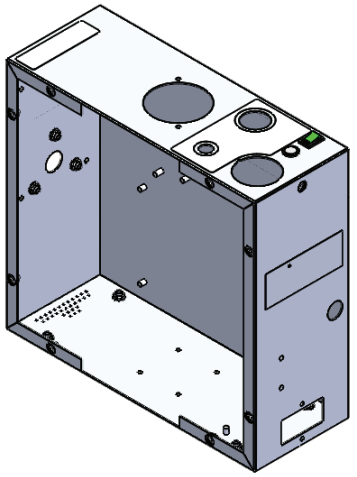
1. MATCH SWITCH ORIENTATION WITH LABEL; HAVE SIDE WITH TAB TOWARDS ON POSITION
2. TIGHTEN RETAINER NUT INSIDE OF CASE UNTIL ITEM 1.3 CANNOT ROTATE

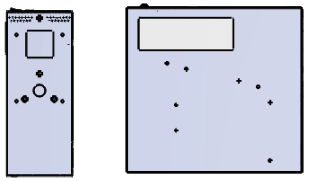
REVISIONS					
ECN#	REV.	DESCRIPTION	DWN	DATE	APP
	A	INITIAL RELEASE	EKL	05/15/2019	EKL
3252	B	BOM CORRECTION & IMAGE UPDATE	EKL	06/14/2019	EKL





DETAIL B
SCALE 1 : 1





SCALE 1 : 8

STEP	DESCRIPTION	TYPE
1	CLEAN OUTER SURFACES OF ITEM 1.1 WITH DENATURED ALCOHOL	□
2	APPLY ITEMS 1.4-1.8 AS SHOWN. USE PLASTIC BLADE TO PUSH OUT AIR BUBBLES	□
3	INSERT ITEM 1.2 INTO CASE. SEE NOTE 1	□
4	REMOVE RETAINER NUT & TIGHTEN TO INSERT ITEM 1.3 INTO CASE. SEE NOTE 2	□

TOOL LIST
11/16 WRENCH
PLASTIC BLADE

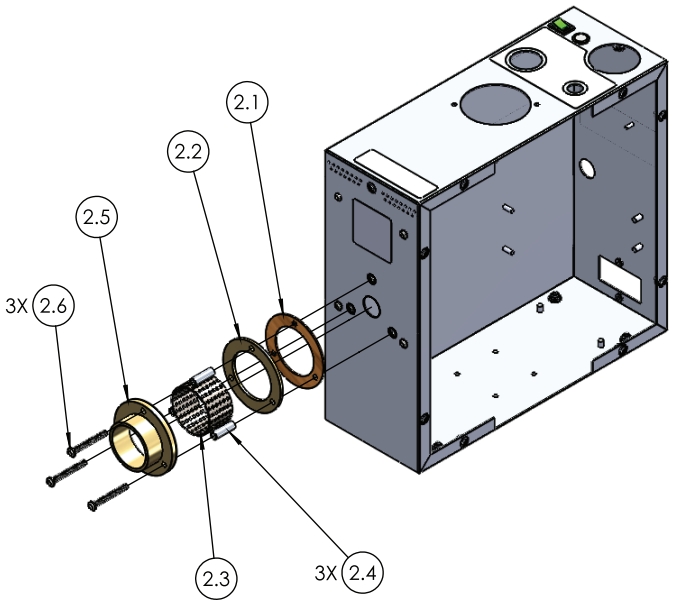
DATE	SIZE	DWG. NO.	REV
	B	20-00490-240	B
	SCALE: 1:4		SHEET 1 OF 18

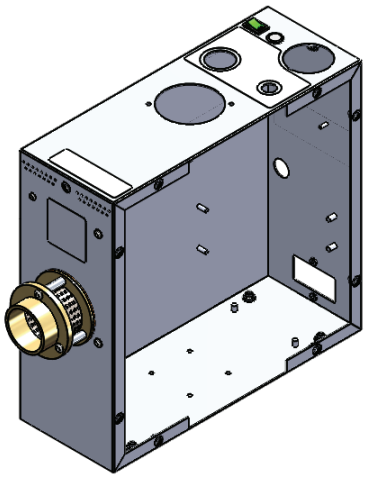
MODEL #	MODEL DESCRIPTION
5D	ASSY: 5D, 240VAC

OPERATION #	OPERATION DESCRIPTION:
20	OUTLET

LEGEND:
△ TQC ○ VERIFY □ WORK CONTENT

ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
2.1	T5B0-0945	GASKET GEN COLLAR	1
2.2	1000615	PLATE,NOZZLE,REAR, 5C OUTPUT	1
2.3	1000617	TUBE,NOZZLE, 5C OUTPUT	1
2.4	70-00286-001	SPCR: M5, 25MM, 8MM OD, SS	3
2.5	1000614	NOZZLE,FRONT,5C OUTPUT	1
2.6	70-00287-001	SCREW: M5X45MM, 18-8 SS, BH	3





STEP	DESCRIPTION	TYPE
1	PLACE ITEMS 2.1 TO 2.5	□
2	MOUNT WITH ITEM 2.6	□

TOOL LIST
3 MM HEX BIT
CORDLESS DRIVER

DATE	SIZE	DWG. NO.	REV
	B	20-00490-240	B
	SCALE: 1:4		SHEET 2 OF 18

MODEL #	MODEL DESCRIPTION
5D	ASSY: 5D, 240 VAC

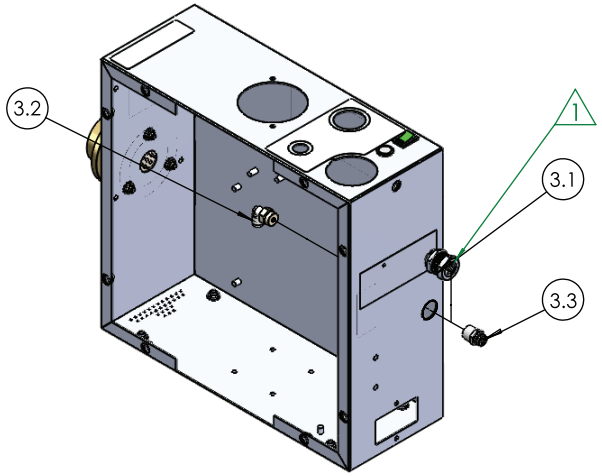
OPERATION #	OPERATION DESCRIPTION:
30	INLET

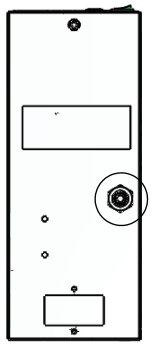
LEGEND:
△ TQC ○ VERIFY □ WORK CONTENT

ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
3.1	64-00243-001	COUPLING: THROUGH WALL, 1/4NPT, NPB	1
3.2	64-00224-001	FTG: 1/4 NPT TO 6MM, ELBOW UNION	1
3.3	64-00502-001	FTG: TUBE, HALF UNION, 1/4NPT TO 1/4"	1

NOTES:

1. USE 7/8 WRENCH AND IMPACT DRILL TO ENSURE WASHER BITES INTO INSIDE OF ITEM 3.1.





STEP	DESCRIPTION	TYPE
1	INSERT ITEM 3.1 INTO INLET HOLE OF CASE AND TIGHTEN WITH RETAINER NUT INSIDE OF CASE. SEE NOTE 1.	□
2	THREAD ITEM 3.2 INTO ITEM 3.1 AND TIGHTEN	□
3	THREAD ITEM 3.3 INTO ITEM 3.1 AND TIGHTEN	□

TOOL LIST
7/8 WRENCH
IMPACT DRILL
9/16 WRENCH
14 MM WRENCH

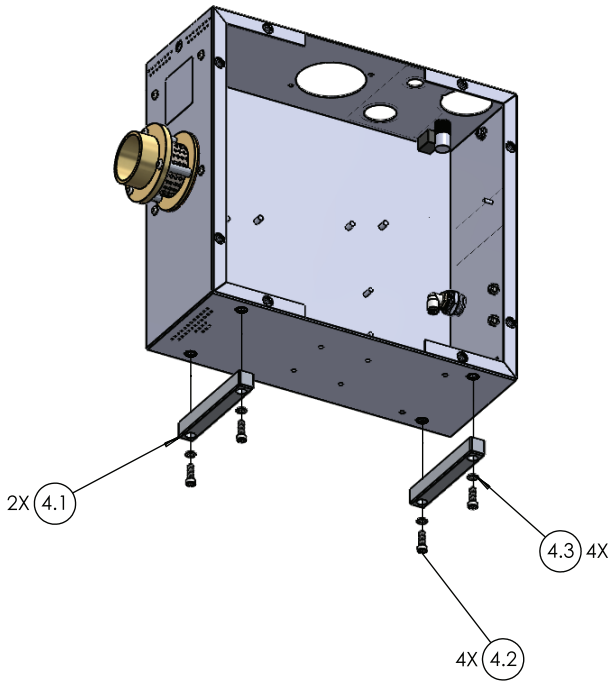
DATE	SIZE	DWG. NO.	REV
	B	20-00490-240	B
	SCALE: 1:4		SHEET 3 OF 18

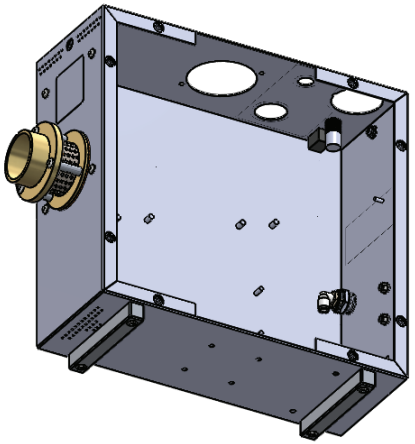
MODEL #	MODEL DESCRIPTION
5D	ASSY: 5D, 240VAC

OPERATION #	OPERATION DESCRIPTION:
40	FEET

LEGEND:
△ TQC ○ VERIFY □ WORK CONTENT

ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
4.1	10-00213-001	FOOT, ALUMINIUM, 5/8 X 5/8	2
4.2	3300425	SCR,SCH CAP,M5 X 16mm, SS	4
4.3	3200167	WSHR,FL,M5,SS	4





STEP	DESCRIPTION	TYPE
1	MOUNT ITEM 4.1 WITH FASTENERS 4.2 & 4.3	□

TOOL LIST
4 MM HEX BIT
CORDLESS DRIVER

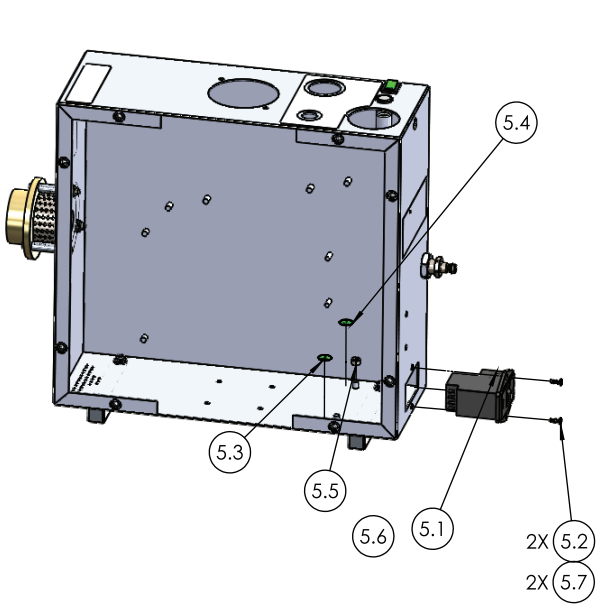
DATE	SIZE	DWG. NO.	REV
	B	20-00490-240	B
	SCALE: 1:4		SHEET 4 OF 18

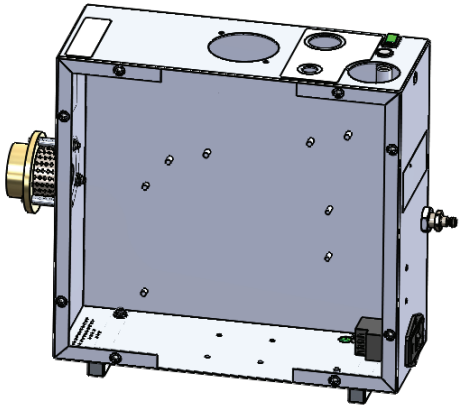
MODEL #	MODEL DESCRIPTION
5D	ASSY: 5D, 240 VAC

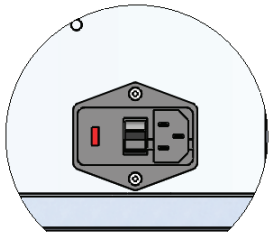
OPERATION #	OPERATION DESCRIPTION:
50	POWER MODULE

LEGEND:
△ TQC ○ VERIFY □ WORK CONTENT

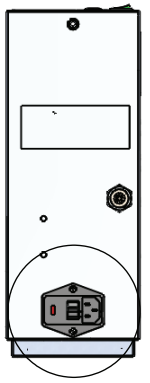
ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
5.1	6900116	POWER ENTRY CONNECTOR, FUSE	1
5.2	3300468	SCR,FH,M3X10mm,SCH,SS	2
5.3	1600309	LABEL, EARTH GROUND, 1/2 DIA.	1
5.4	1600213	LABEL, CHASSIS GROUND	1
5.5	3100152	NUT,HEX,LKG,M5,SS	1
5.6	20-00476-001	ASSY: CABLE, EARTH GROUND, 5D	1
5.7	41-00466-005	FUSE: 5MM X 20 MM, FAST. 250V, 5A	2







DETAIL P
SCALE 1 : 2



STEP	DESCRIPTION	TYPE
1	INSERT BOTH OF ITEM 5.7 INTO POWER MODULE	□
2	MOUNT POWER MODULE ONTO CASING WITH ITEM 5.2.	□
3	VERIFY RED TAB OF POWER MODULE FACES LEFT. SEE VIEW P.	○
4	APPLY ITEMS 5.3 & 5.4	□
5	ATTACH ITEM 5.6 FEMALE END ONTO POWER MODULE	□
6	TIGHTEN ITEM 5.5 ON TOP OF RING TERMINAL OF ITEM 5.6	□

TOOL LIST
2 MM HEX BIT
8 MM NUT DRIVER
CORDLESS DRIVER

DATE	SIZE	DWG. NO.	REV
	B	20-00490-240	B
	SCALE: 1:4		SHEET 5 OF 18

MODEL #	MODEL DESCRIPTION
5D	ASSY: 5D, 240 VAC

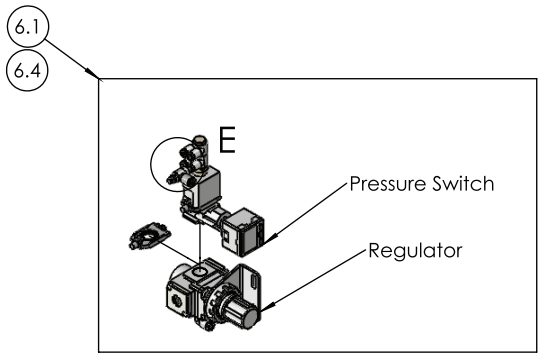
OPERATION #	OPERATION DESCRIPTION:
60	PRESSURE REG SUBASSY

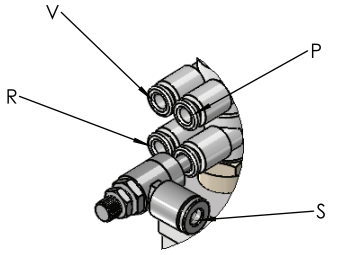
LEGEND:
△ TQC ○ VERIFY □ WORK CONTENT

ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
6.1	20-00421-001	ASSY: COMPRESSED GAS INLET, 5D	1
6.2	3100152	NUT,HEX,LKG,M5,SS	2
6.3	3200167	WSHR,FL,M5,SS	2
6.4	20-00471-001	ASSY: CABLE, PRESSURE SWITCH, ISE30A	1
6.5	5200215	TUBING, PEU, 4mmOD, 95A, CLEAR BLUE	4.5"
6.6	91-00468-001	TUBING: 6mmOD, 4mmID, PEU, WHITE	12"

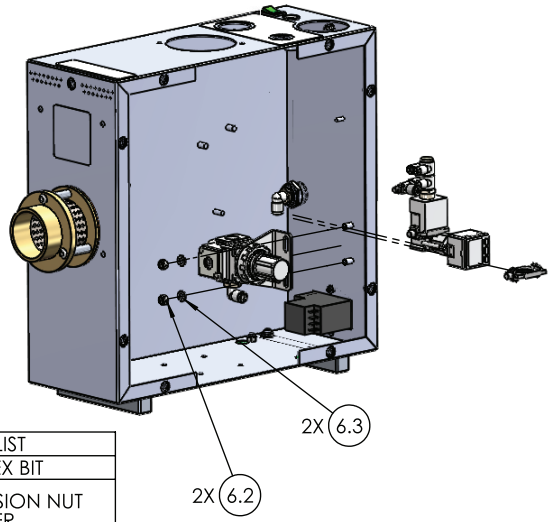
STEP	DESCRIPTION	TYPE
1	SEPERATE ITEM 6.1 INTO REGULATOR AND PRESSURE SWITCH	□
2	ENSURE PRESSURE SWITCH PROGRAMMING	○
3	ATTACH ITEM 6.4 TO PRESSURE SWITCH	□
4	SEE DETAIL VIEW E: CONNECT 2.50" BLUE TUBE FROM CHECK VALVE TO V, 4.50" BLUE TUBE FROM PRESSURE RELIEF VALVE TO R,4.50" BLUE TUBE FROM PRESSURE GAUGE TO P AND 4.50" OF ITEM 7.5 TO S	□
5	CONNECT ITEM 6.6 FROM INLET TO BOTTOM OF REGULATOR	□
6	MOUNT REGULATOR WITH FASTENERS 6.2 & 6.3	□
7	REINSTALL PRESSURE SWITCH	□
8	ENSURE THAT CONNECTIONS BETWEEN SWITCH AND REGULATOR ARE TIGHT	△

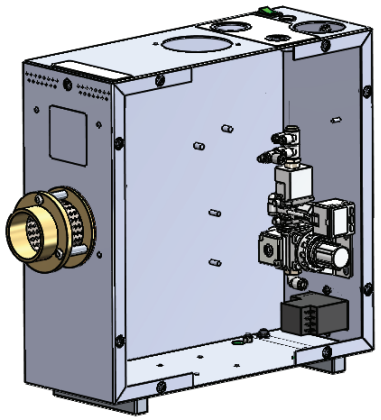
TOOL LIST
3 MM HEX BIT
8 MM EXTENSION NUT DRIVER
CORDLESS DRIVER





DETAIL E
SCALE 1 : 1





DATE	SIZE	DWG. NO.	REV
	B	20-00490-240	B
	SCALE: 1:4		SHEET 6 OF 18

MODEL #	MODEL DESCRIPTION
5D	ASSY: 5D, 240 VAC

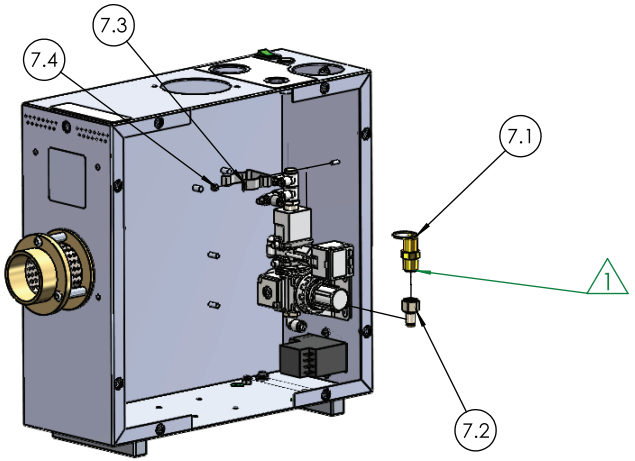
OPERATION #	OPERATION DESCRIPTION:
70	PRESSURE RELIEF VALVE

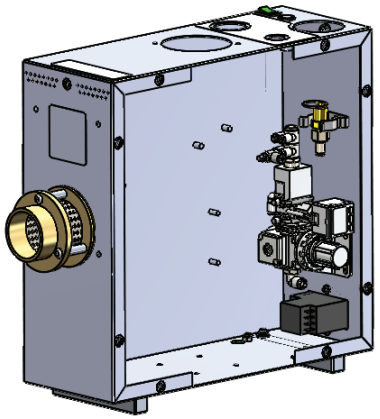
LEGEND:
△ TQC ○ VERIFY □ WORK CONTENT

ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
7.1	63-00241-001	VALVE: PRESSURE RELIEF, 40 PSI, 1/8NTP	1
7.2	64-00225-001	FTG: 1/8 NTP TO 5/32, FEMALE UNION	1
7.3	3000333	CLAMP,MNT,1/2OD, NI-ST	1
7.4	3100153	NUT,HEX,LKG,M3,SS	1
7.5	5200125	TUBING, PEU, 4mmOD, 95A, CLEAR BLUE	4.5"

NOTES:

△1 APPLY 567 LOCTITE OR OTHER EQUIVALENT THREAD SEALANT





STEP	DESCRIPTION	TYPE
1	THREAD ITEM 7.1 INTO 7.2 AND TIGHTEN. SEE NOTE 1	□
	CONNECT 4.5" OF ITEM 7.5 TO BOTTOM OF ITEM 7.2	□
2	INSTALL ITEM 7.3 AND TIGHTEN WITH ITEM 7.4	□
3	INSERT RELIEF VALVE INTO CLAMP	□
4	ENSURE THAT TWO HOLES OF RELIEF VALVE ARE EXPOSED	△

TOOL LIST
5.5 MM NUT DRIVER
9/16 WRENCH
CORDLESS DRIVER

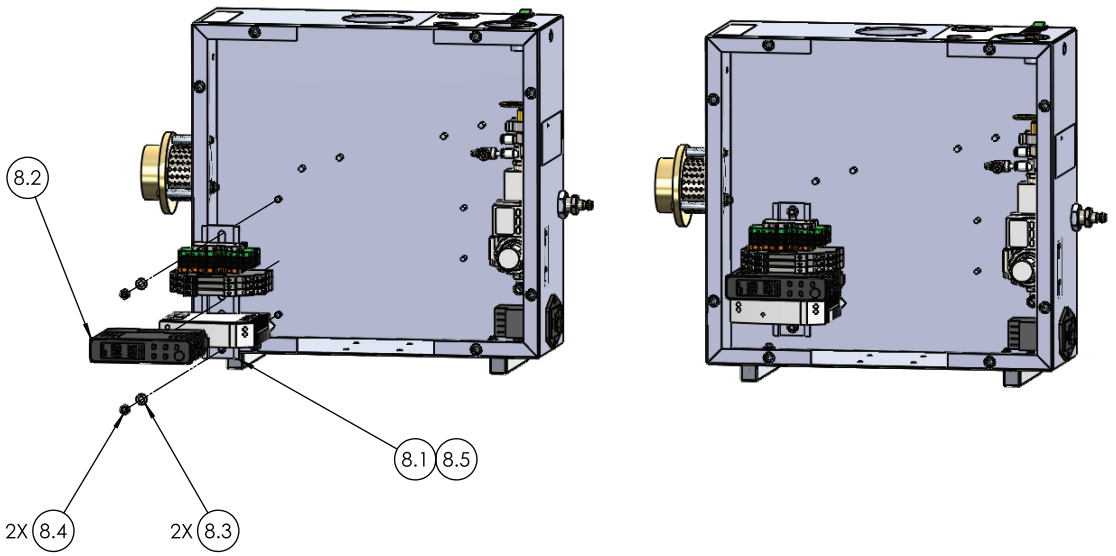
DATE	SIZE	DWG. NO.	REV
	B	20-00490-240	B
	SCALE: 1:4		SHEET 7 OF 18

MODEL #	MODEL DESCRIPTION
5D	ASSY: 5D, 240 VAC

OPERATION #	OPERATION DESCRIPTION:
80	DIN RAIL SUBASSY

LEGEND:
△ TQC ○ VERIFY □ WORK CONTENT

ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
8.1	20-00420-001	ASSY: DIN RAIL, 5D	1
8.2	41-00498-001	CONTROLLER: TEMP, 24VDC, DIN, TOP	1
8.3	3200167	WSHR,FL,M5,SS	2
8.4	3100152	NUT,HEX,LKG,M5,SS	2
8.5	3000100	SPIRAL WRAP TUBING, POLY	9"



STEP	DESCRIPTION	TYPE
1	MOUNT ITEM 8.2 ONTO ITEM 8.1	□
2	MOUNT ITEM 8.1 ONTO CASE WITH FASTENERS 8.3 & 8.4	□
4	ROUTE WIRES TOGETHER INSIDE OF ITEM 8.5	□
3	ATTACH WIRES FOR POWER SWITCH, READY LIGHT, SS RELAY, PRESSURE SWITCH & SOLENOID VALVES TO DIN RAIL. REFER TO DIN RAIL, 5D WIRING DIAGRAM (20-00420-001)	□

TOOL LIST
8 MM EXTENSION NUT DRIVER
CORDLESS DRIVER
SMALL FLATHEAD SCREWDRIVER

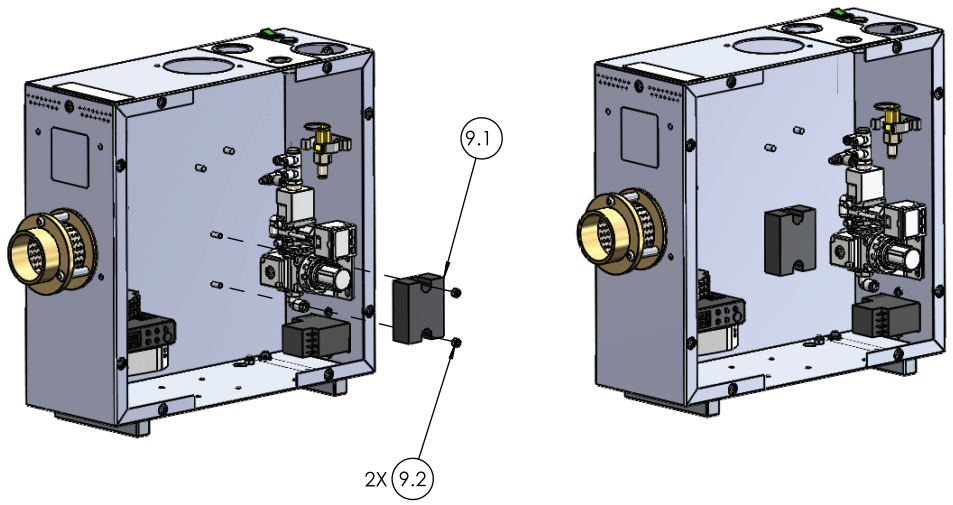
DATE	SIZE	DWG. NO.	REV
	B	20-00490-240	B
	SCALE: 1:4		SHEET 8 OF 18

MODEL #	MODEL DESCRIPTION
5D	ASSY: 5D, 240 VAC

OPERATION #	OPERATION DESCRIPTION:
90	SOLID STATE RELAY

LEGEND:
△ TQC ○ VERIFY □ WORK CONTENT

ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
9.1	41-00256-001	RELAY: SSR, 3-32VDC IN, 25A LOAD CURRENT	1
9.2	3100155	NUT,HEX,LKG,M4,SS	2



STEP	DESCRIPTION	TYPE
1	TIGHTEN ITEM 9.2 ONTO ITEM 9.1 WITH PINS 3 & 4 ON TOP	□

TOOL LIST
7 MM NUT DRIVER
CORDLESS DRIVER

DATE	SIZE	DWG. NO.	REV
	B	20-00490-240	B
	SCALE: 1:4		SHEET 9 OF 18

MODEL #	MODEL DESCRIPTION
5D	ASSY: 5D, 240 VAC

OPERATION #	OPERATION DESCRIPTION:
100	PURGE VALVE & PRESSURE GAUGE

LEGEND:
△ TQC ○ VERIFY □ WORK CONTENT

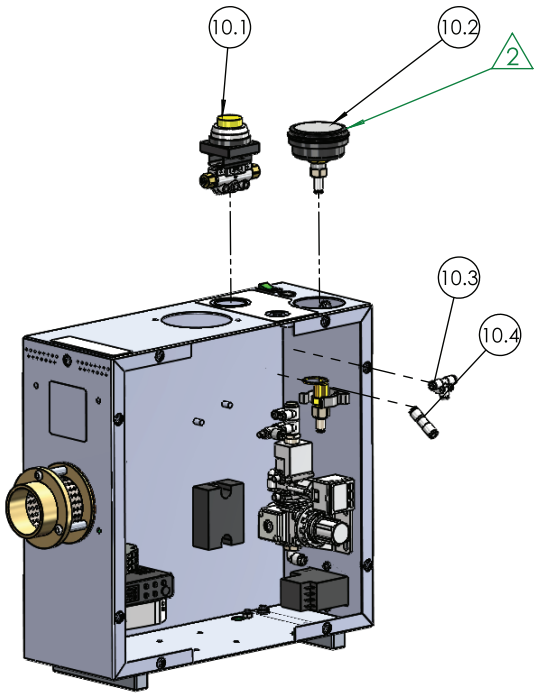
ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
10.1	20-00443-001	ASSY: PURGE VALVE, 2 PORT, PUSH BUTTON	1
10.2	20-00442-001	ASSY: GAUGE, 0.2 MPA, 30 PSI, 4mm	1
10.3	64-00230-001	FTG: UNION T, 4MM	1
10.4	63-00237-001	VALVE: CHECK, 4MM	1
10.5	5200215	TUBING, PEU. 4mmOD, 95A CLEAR BLUE	17.5"

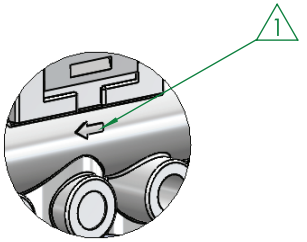
STEP	DESCRIPTION	TYPE
1	CONNECT 3.50" OF ITEM 10.5 TO RIGHTMOST FITTING OF ITEM 10.1AND RIGHTMOST FITTING OF ITEM 10.3. SEE NOTE 1	□
2	CONNECT 5.50" OF ITEM 10.5 TO LEFTMOST FITTING OF ITEM 10.1. SEE NOTE 1	□
3	REMOVE RETAINER NUT & HAND TIGHTEN ITEM 10.1 INTO CASE WITH RETAINER NUT ON TOP. SEE NOTE 1	□
4	CONNECT 4.50" OF ITEM 10.5 TO BOTTOM OF ITEM 10.2	□
5	REMOVE RETAINER NUT & HAND TIGHTEN ITEM 10.2 INTO CASE WITH RETAINER NUT INSIDE CASE. SEE NOTE 2	□
6	CONNECT 1.50" OF ITEM 10.5 TO BOTTOM OF ITEM 10.3 AND ITEM 10.4	□
7	CONNECT 2.50" OF ITEM 10.5 TO REMAINING END OF ITEM 10.4	□

NOTES

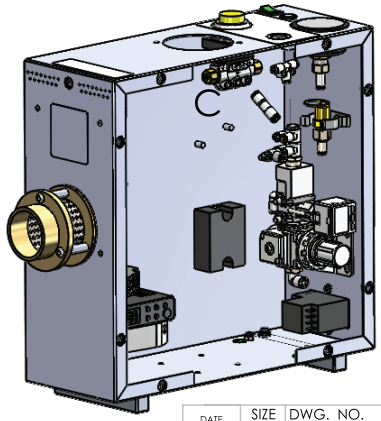
1. ENSURE ARROW FACES FROM RIGHT (ON/OFF SIDE) TO LEFT
2. KEEP TEXT ON GAUGE PARALLEL TO STICKER'S TEXT

BLUE	3.50", 5.50",4.50", 1.50", 2.50"





DETAIL C
SCALE 2 : 1



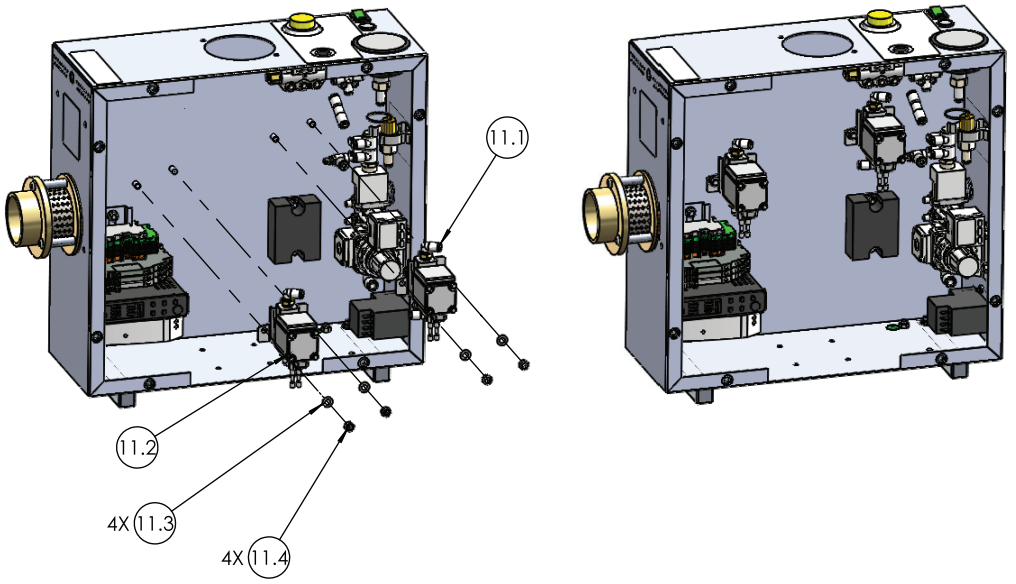
DATE	SIZE	DWG. NO.	REV
	B	20-00490-240	B
	SCALE: 1:4		SHEET 10 OF 13

MODEL #	MODEL DESCRIPTION
5D	ASSY: 5D, 240 VAC

OPERATION #	OPERATION DESCRIPTION:
110	SOLENOID VALVES

LEGEND:
△ TQC ○ VERIFY □ WORK CONTENT

ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
11.1	20-00424-001	ASSY: VALVE, COMPRESSED GAS, 5D	1
11.2	20-00425-001	ASSY: VALVE, OIL, 5D	1
11.3	3200167	WSHR,FL,M5,SS	4
11.4	3100152	NUT,HEX,LKG,M5,SS	4
11.5	5200214	TUBING, PEU, 4mmOD, 95A CLEAR YELLOW	3.5"
11.6	5200215	TUBING, PEU, 4mmOD, 95A CLEAR BLUE	6.5"



STEP	DESCRIPTION	TYPE
1	MOUNT ITEM 11.1 LOCATED RIGHT & WIRES FACING DOWNWARDWIH FASTENERS 11.3 & 11.4	□
2	MOUNT ITEM 11.2 LOCATED LEFT & WIRES FACING DOWNWARD WITH FASTENERS 11.3 & 11.4	□
3	CONNECT 15" YELLOW TUBE FROM RIGHTWARD FITTING OF METERING VALVE TO BOTTOM OF ITEM 11.2 AND 3.5" OF ITEM 11.5 TO TOP OF ITEM 11.2	□
4	CONNECT 6.5" OF ITEM11.6 TO BOTTOM OF ITEM 11.1	□

TOOL LIST
8 MM EXTENSION NUT DRIVER
CORDLESS DRIVER

DATE	SIZE	DWG. NO.	REV
	B	20-00490-240	B
	SCALE: 1:4		SHEET 11 OF 13

MODEL #	MODEL DESCRIPTION
5D	ASSY: 5D, 240 VAC

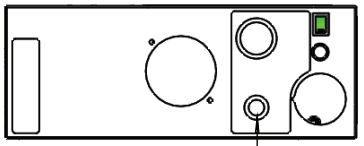
OPERATION #	OPERATION DESCRIPTION:
120	METERING VALVE SUBASSY

LEGEND:
△ TQC ○ VERIFY □ WORK CONTENT

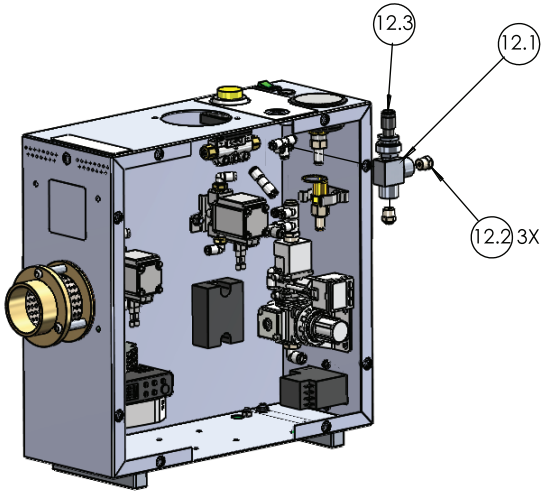
ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
12.1	63-00242-001	VALVE: METERING, 0.03CV, 1/4 NPT, 90DEG	1
12.2	64-00228-002	FTG: TUBE, STRAIGHT, 1/8NPT TO 5/32"	3
12.3	63-00249-001	VERNIER HANDLE KIT, MEDIUM FLOW VALVE	1
12.4	5200214	TUBING, PEU, 4mmOD, 95A CLEAR YELLOW	23.5"

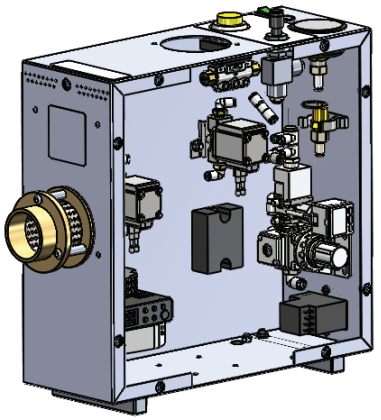
STEP	DESCRIPTION	TYPE
1	THREAD ITEM 12.2 INTO ENDS OF 12.1 AND TIGHTEN	□
2	INSTALL ITEM 12.1 ONTO CASE WITH PANEL MOUNT NUT. TIGHTEN SO THAT RIGHTMOST FITTING POINTS TO AND IN FRONT OF PRESSURE GAUGE	□
3	VERIFY THAT METERING VALVE IS FULLY CLOSED	○
4	DISSASSEMBLE ITEM 12.3 INTO BARREL, STEM EXTENSION, AND HANDLE	□
5	INSTALL BARREL WITH 0 FACING TOWARDS BOTTOM OF VIEW D	□
6	INSTALL STEM EXTENSION AND TIGHTEN	□
7	INSTALL HANDLE WITH 0 CENTERED TO 0 ON BARREL AND TIGHTEN	□
8	ENSURE HANDLE CAN TURN AT LEAST 10 TIMES	△
9	CONNECT 8.50" OF ITEM 12.4 TO BOTTOM FITTING OF ITEM 12.1	□
10	CONNECT 15" OF ITEM 12.4 TO RIGHTMOST FITTING OF ITEM 12.1	□

YELLOW	8.5", 15"



VIEW D
SCALE 1 : 4





TOOL LIST
5/64 HEX DRIVER
7/16 WRENCH
11/16 WRENCH

DATE	SIZE	DWG. NO.	REV
	B	20-00490-240	B
	SCALE: 1:4		SHEET 12 OF 13

MODEL #	MODEL DESCRIPTION
5D	ASSY: 5D, 240 VAC

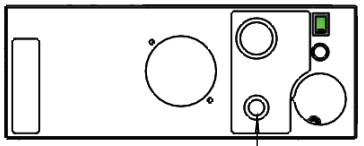
OPERATION #	OPERATION DESCRIPTION:
120	METERING VALVE SUBASSY

LEGEND:
△ TQC ○ VERIFY □ WORK CONTENT

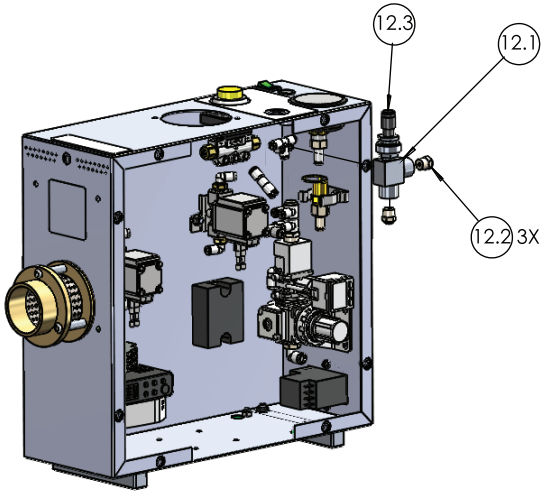
ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
12.1	63-00242-001	VALVE: METERING, 0.03CV, 1/4 NPT, 90DEG	1
12.2	64-00228-002	FTG: TUBE, STRAIGHT, 1/8NPT TO 5/32"	3
12.3	63-00249-001	VERNIER HANDLE KIT, MEDIUM FLOW VALVE	1
12.4	5200214	TUBING, PEU, 4mmOD, 95A CLEAR YELLOW	23.5"

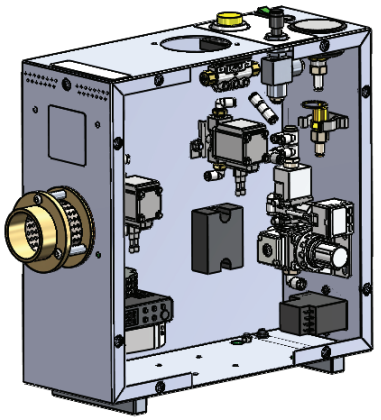
STEP	DESCRIPTION	TYPE
1	THREAD ITEM 12.2 INTO ENDS OF 12.1 AND TIGHTEN	□
2	INSTALL ITEM 12.1 ONTO CASE WITH PANEL MOUNT NUT. TIGHTEN SO THAT RIGHTMOST FITTING POINTS TO AND IN FRONT OF PRESSURE GAUGE	□
3	VERIFY THAT METERING VALVE IS FULLY CLOSED	○
4	DISSASSEMBLE ITEM 12.3 INTO BARREL, STEM EXTENSION, AND HANDLE	□
5	INSTALL BARREL WITH 0 FACING TOWARDS BOTTOM OF VIEW D	□
6	INSTALL STEM EXTENSION AND TIGHTEN	□
7	INSTALL HANDLE WITH 0 CENTERED TO 0 ON BARREL AND TIGHTEN	□
8	ENSURE HANDLE CAN TURN AT LEAST 10 TIMES	△
9	CONNECT 8.50" OF ITEM 12.4 TO BOTTOM FITTING OF ITEM 12.1	□
10	CONNECT 15" OF ITEM 12.4 TO RIGHTMOST FITTING OF ITEM 12.1	□

YELLOW	8.5", 15"



VIEW D
SCALE 1 : 4





TOOL LIST
5/64 HEX DRIVER
7/16 WRENCH
11/16 WRENCH

DATE	SIZE	DWG. NO.	REV
	B	20-00490-240	B
	SCALE: 1:4		SHEET 12 OF 13

MODEL #	MODEL DESCRIPTION
5D	ASSY: 5D, 240 VAC

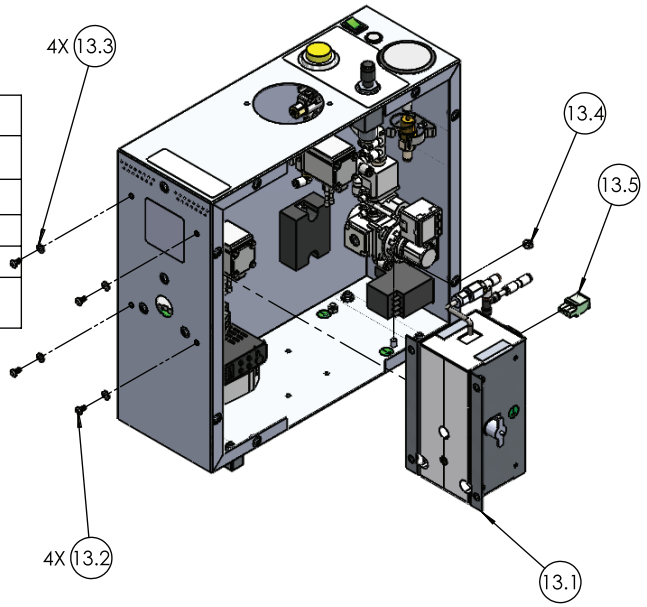
OPERATION #	OPERATION DESCRIPTION:
130	HEATER BLOCK

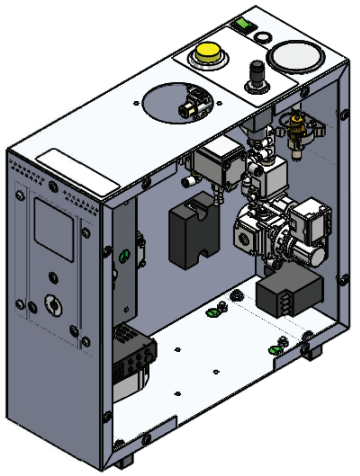
LEGEND:
△ TQC ○ VERIFY □ WORK CONTENT

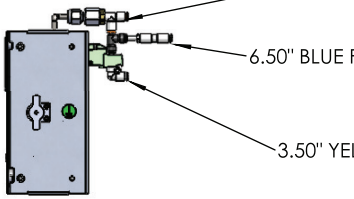
ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
13.1	20-00308-240	ASSY: HEAT EXCHANGER, 240VAC, 5D	1
13.2	70-00268-001	SCREW: M4X8mm, 316 SS, BHSS	4
13.3	3200169	WSHR,FL,M4,SS	4
13.4	3100152	NUT,HEX,LKG,M5,SS	1
13.5	20-00418-001	ASSY: CABLE POWER HARNESS, 5D	1

STEP	DESCRIPTION	TYPE
1	SLIDE ITEM 13.1 INTO PLACE	□
2	MOUNT ITEM 13.1 WITH FASTENERS 13.2 & 13.3	□
3	INSERT ITEM 13.5 INTO TERMINAL BLOCK ON ITEM 13.1	□
4	TIGHTEN ITEM 13.4 OVER RING TERMINAL WIRE OF ITEM 13.5	□
5	INSERT PINK TERMINALS OF ITEM 13.5 INTO POWER MODULE WITH BLACK WIRE ONTO PORT A AND WHITE WIRE ONTO PORT D	□
6	ATTACH BLUE TERMINALS OF ITEM 13.5 ONTO SS RELAY:CABLE WITH SHORTER SLEEVE ON PORT 1 & WIRE WITH LONGER SLEEVE ON PORT 2	□
7	CONNECT THERMOCOUPLE BETWEEN ITEM 13.1 & DIN RAIL SUBASSY	□
8	VERIFY ALL CONNECTIONS WITH ELECTRICAL SCHEMATIC (31-00451-001)	△
9	COMPLETE TUBE CONNECTIONS TO ITEM 13.1 AS SHOWN IN VIEW F	□

TOOL LIST
2.5 MM HEX BIT
8 MM NUT DRIVER
CORDLESS DRIVER







VIEW F
SCALE 1 : 4

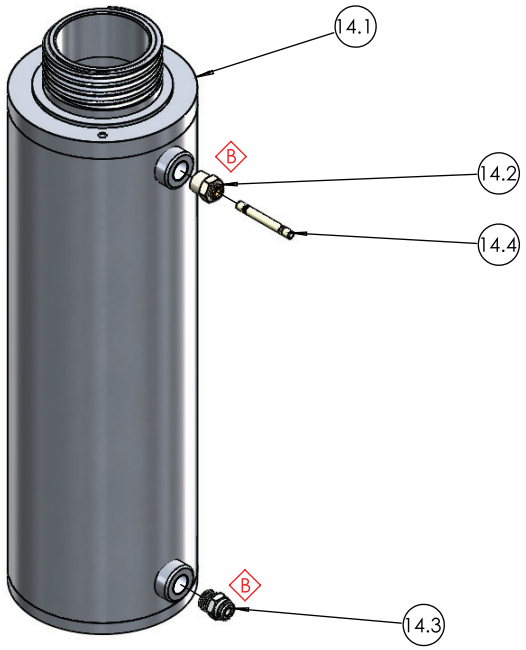
DATE	SIZE	DWG. NO.	REV
	B	20-00490-240	B
	SCALE: 1:4		SHEET 13 OF 18

MODEL #	MODEL DESCRIPTION
5D	ASSY: 5D, 240 VAC

OPERATION #	OPERATION DESCRIPTION:
140	TANK FITTINGS

LEGEND:
△ TQC ○ VERIFY □ WORK CONTENT

ITEM NO.	PART NUMBER	DESCRIPTION	QTY.	
14.1	10-00440-001	TANK: OIL RESERVOIR, 5D	1	
14.2	64-00228-001	FTG: TUBE, STRGHT UNION, 1/8 NPT TO 5/32"	1	B
14.3	64-00228-002	FTG: TUBE, STRAIGHT, 1/8 NPT TO 5/32"	1	B
14.4	10-00321-001	RESTRICTOR, 4mm OD, .8mm ORIFICE	1	



STEP	DESCRIPTION	TYPE
1	THREAD & TIGHTEN ITEM 14.2 TO TOP HOLE	□
2	THREAD & TIGHTEN ITEM 14.3 TO BOTTOM HOLE	□
3	ATTACH 14.4 TO ITEM 14.2 SO THAT SMALLER HOLE OF ITEM 14.4 FACES ITEM 14.2	□
4	PULL TO ENSURE THAT ITEM 14.4 IS SECURE IN 14.2	△

TOOL LIST
7/16 WRENCH

DATE	SIZE	DWG. NO.	REV
	B	20-00490-240	B
	SCALE: 1:2		SHEET 14 OF 18

MODEL #	MODEL DESCRIPTION
5D	ASSY: 5D, 240 VAC

OPERATION #	OPERATION DESCRIPTION:
150	PNEUMATICS

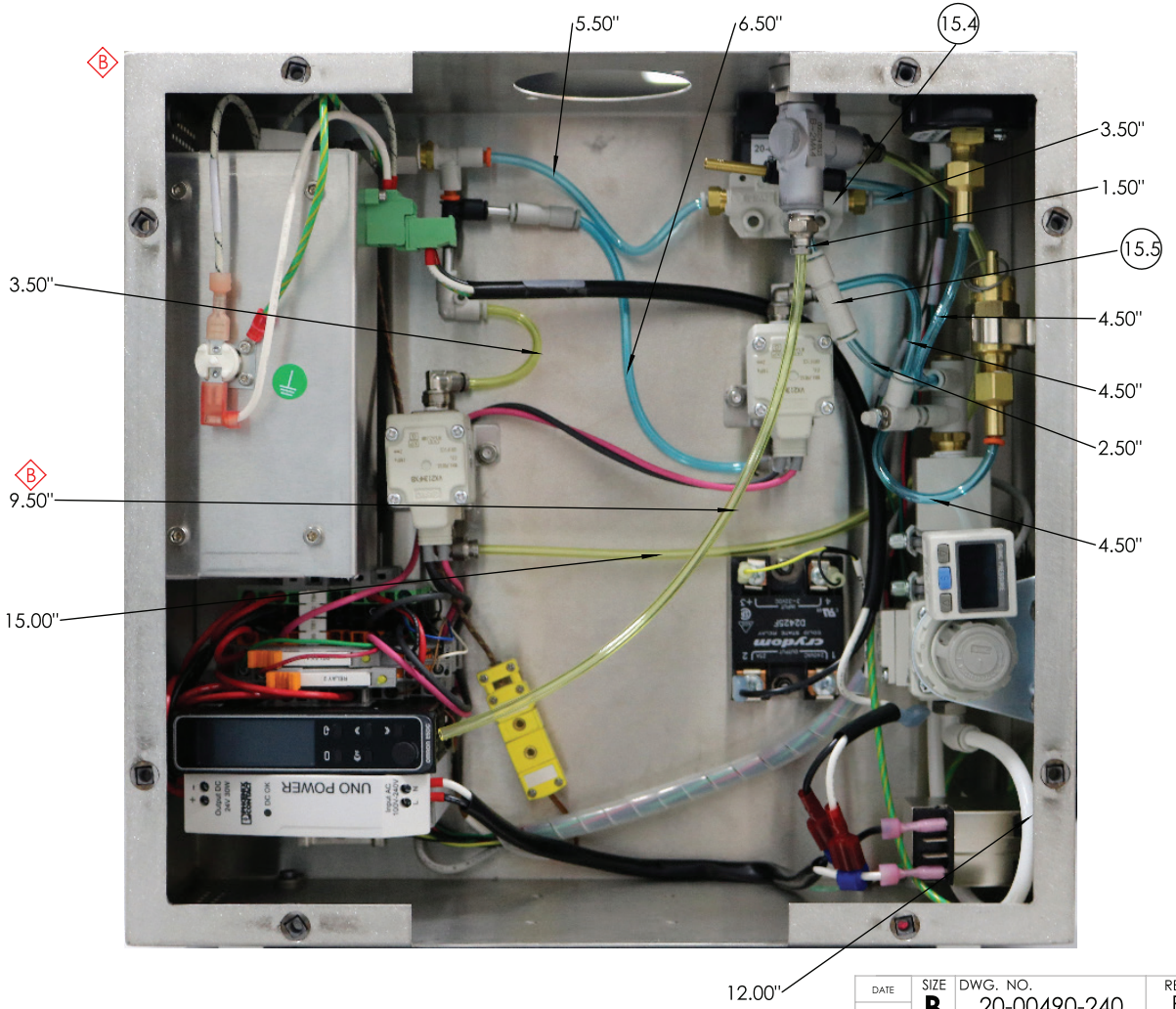
LEGEND:
△ TQC ○ VERIFY □ WORK CONTENT

ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
15.1	91-00468-001	TUBING: 6mmOD, 4mmID, PEU, WHITE	12"
15.2	5200214	TUBING, PEU, 4mmOD, 95A CLEAR YELLOW	27"
15.3	5200215	TUBING, PEU, 4mmOD, 95A CLEAR BLUE	33"
15.4	64-00230-001	FTG: TUBE, UNION T, 4MM	1
15.5	63-00237-001	VALVE: CHECK, 4MM	1

Ⓑ

YELLOW	3.5", 9.5", 15"
BLUE	1.5", 2.5", 3.5", 3x 4.5", 5.5", 6.5"
WHITE	12"

STEP	DESCRIPTION	TYPE
1	ENSURE THAT ALL TUBES ARE INSERTED INTO APPROPRIATE FITTING. REFER TO PNEUMATIC DIAGRAM (32-00303-001)	△
2	TUG EACH TUBE TO ENSURE CONNECTIONS ARE SECURE	△



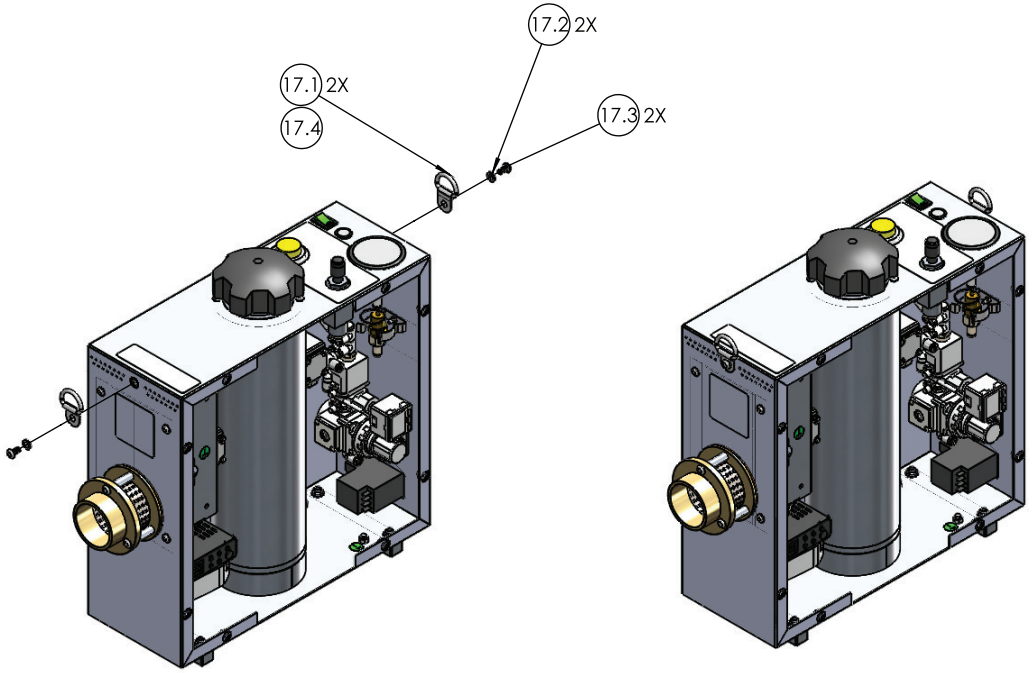
DATE	SIZE	DWG. NO.	REV
	B	20-00490-240	B
	SCALE: 1:4		SHEET 15 OF 18

MODEL #	MODEL DESCRIPTION
5D	ASSY: 5D, 240 VAC

OPERATION #	OPERATION DESCRIPTION:
170	HANDLE

LEGEND:
△ TQC ○ VERIFY □ WORK CONTENT

ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
17.1	11-00285-001	RING: TIE-DOWN, 316 SS	2
17.2	3200167	WSHR,FL,M5,SS	2
17.3	70-00267-001	SCREW: M5X10mm, 316 SS, BHSS	2
17.4	10-00221-001	STRAP: CARRY, NYLON WEBBING 1 IN, 5D	1



STEP	DESCRIPTION	TYPE
1	ATTACH ITEM 17.1 ONTO FRONT AND BACK OF CASING WITH FASTENERS 17.2 & 17.3	□
2	CLIP ON ITEM 17.4 TO ITEM 17.1	□

TOOL LIST
3 MM HEX BIT
CORDLESS DRIVER

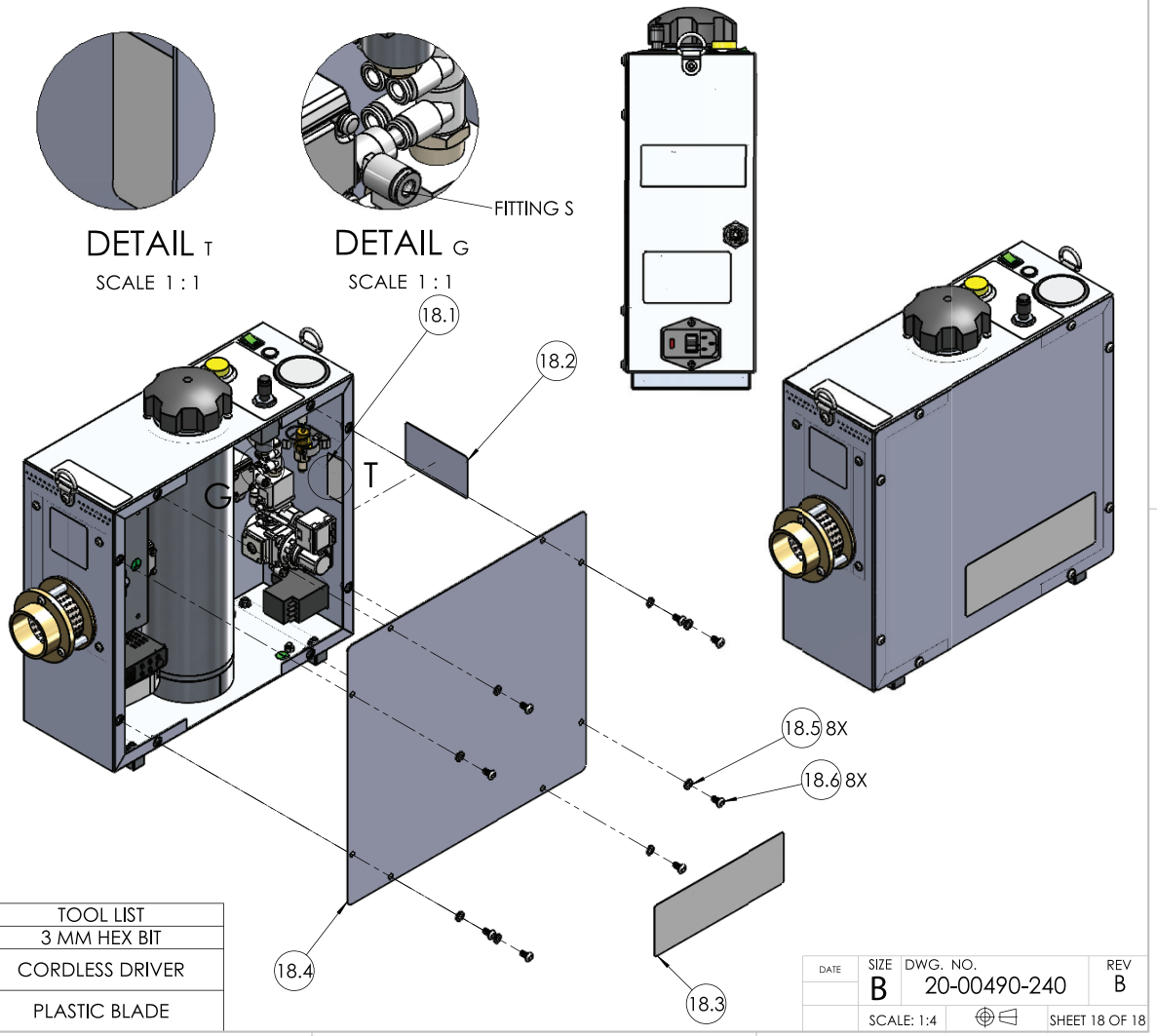
DATE	SIZE	DWG. NO.	REV
	B	20-00490-240	B
	SCALE: 1:4		SHEET 17 OF 18

MODEL #	MODEL DESCRIPTION
5D	ASSY: 5D, 240 VAC
OPERATION #	**OPERATION DESCRIPTION:**
180	COVER & SERIAL STICKERS

LEGEND:
△ TQC ○ VERIFY □ WORK CONTENT

ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
18.1	22-00479-001	LABEL: 5D, 240V, IDENTIFICATION	1
18.2	22-00447-001	LABEL: 5D, 240V, SERIAL	1
18.3	22-00349-001	LABEL: 5D, ATI	2
18.4	10-00222-001	5D: COVER, 18 GA, 304 SS	1
18.5	3200167	WSHR,FL,M5,SS	8
18.6	70-00267-001	SCREW: M5X10mm, 316 SS, BHSS	8

STEP	DESCRIPTION	TYPE
1	PERFORM PRESSURE FLOW CALIBRATION WITH REMAINING 4.50" BLUE TUBE FROM FITTING S. SEE DETAIL VIEW G	△
2	CONNECT 4.50" TUBE TO TOP OF RIGHTMOST SOLENOID	△
3	PERFORM FUNCTION TEST	△
4	EMPTY TANK	△
5	APPLY ITEMS 18.1 & 18.2 TO CASE AS SHOWN. SEE VIEW T.	□
6	CLEAN OUTER SURFACE OF ITEM 18.4 WITH DENATURED ALCOHOL	□
7	APPLY ITEM 18.3 TO ITEM 18.4 AS SHOWN. USE PLASTIC BLADE TO REMOVE AIR BUBBLES.	□
8	ATTACH ITEM 18.4 TO CASE WITH FASTENERS 18.5 & 18.6	□



TOOL LIST
3 MM HEX BIT
CORDLESS DRIVER
PLASTIC BLADE

DATE	SIZE	DWG. NO.	REV
	B	20-00490-240	B
	SCALE: 1:4		SHEET 18 OF 18

Appendix G: Heater Block Assembly 240V

MODEL #	MODEL DESCRIPTION
5D	SUBASSY:HEATER BLOCK, 240 VAC

OPERATION #	OPERATION DESCRIPTION:
10	HEAT EXCHANGER

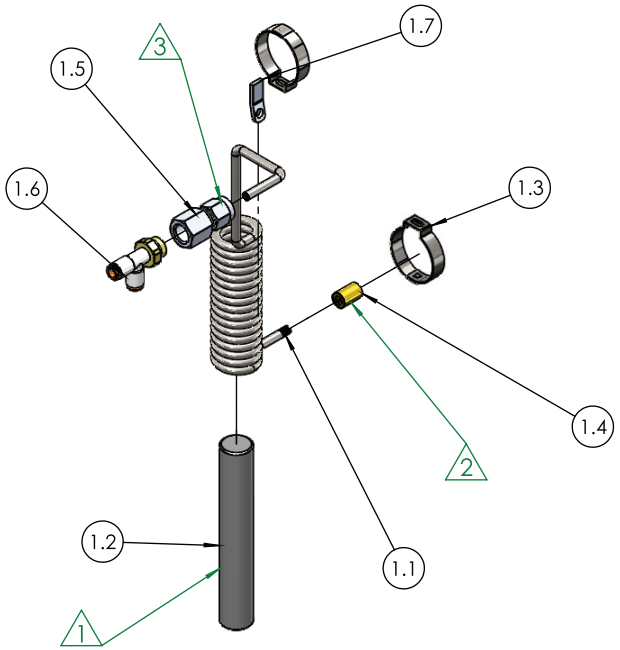
LEGEND: △ TQC ○ VERIFY □ WORK CONTENT

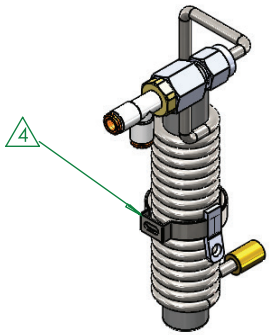
ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1.1	10-00214-001	COIL, MILD STEEL, 4mm OD, 2mm ID	1
1.2	20-00486-240	ASSY: HEATER, 4"L, 5/8"D, 1000W,240VAC	1
1.3	11-00432-001	CLAMP: PINCH, SS, 1-1/16"ID	1
1.4	10-00215-001	NOZZLE: HEAT EXCHANGER, BRASS, 5D	1
1.5	64-00236-001	FTG: UNION, 1/8 NPT TO 4 MM, NPB	1
1.6	64-00233-001	FTG: Y MALE RUN TREE, 1/8NTP TO 5/32	1
1.7	41-00431-001	THERMOCOUPLE: TYPE K, SMPW MALE, 12"	1

STEP	DESCRIPTION	TYPE
1	SLIDE ITEM 1.2 INSIDE ITEM 1.1 WITH WIRES TOWARDS THE TOP. SEE NOTE 1.	□
2	SLIDE ITEM 1.3 OVER NINTH COIL FROM TOP	□
3	PINCH ITEM 1.3 WITH ITEM 1.7 IN BETWEEN AND ORIENT AS SHOWN	□
4	THREAD ITEM 1.4 ONTO THREADED END OF ITEM 1.1 AND FULLY TIGHTEN. SEE NOTE 2.	□
5	TIGHTEN ITEM 1.5 ONTO UNTHREADED END OF ITEM 1.1. SEE NOTE 3.	□
6	THREAD ITEM 1.6 INTO ITEM 1.5 AND FULLY TIGHTEN	□

NOTES:

1. USE SUPPLIED JIG TO SLIDE TO CORRECT DEPTH
2. APPLY 907TS GREEN THREAD LOCKING SEALANT
3. HAND TIGHTEN NUT THEN TIGHTEN BY THREE-QUARTERS TURN WITH 12MM AND 14MM WRENCHES
4. ORIENT IN DIRECTION SHOWN





SCALE 2 : 3

TOOL LIST
7/16 WRENCH
12 MM WRENCH
14 MM WRENCH
PINCH CLAMP PLIERS

REVISIONS					
ECN #	REV.	DESCRIPTION	DWN	APP	DATE
3245	A	INITIAL RELEASE	EKL	EKL	05/15/2019

DATE	SIZE	DWG. NO.	REV
	B	20-00308-240	A
	SCALE: 1:2		SHEET 1 OF 4

MODEL #	MODEL DESCRIPTION
5D	SUBASSY:HEATER BLOCK, 240 VAC

OPERATION #	OPERATION DESCRIPTION:
20	INSULATION BLOCKS

LEGEND:
△ TQC ○ VERIFY □ WORK CONTENT

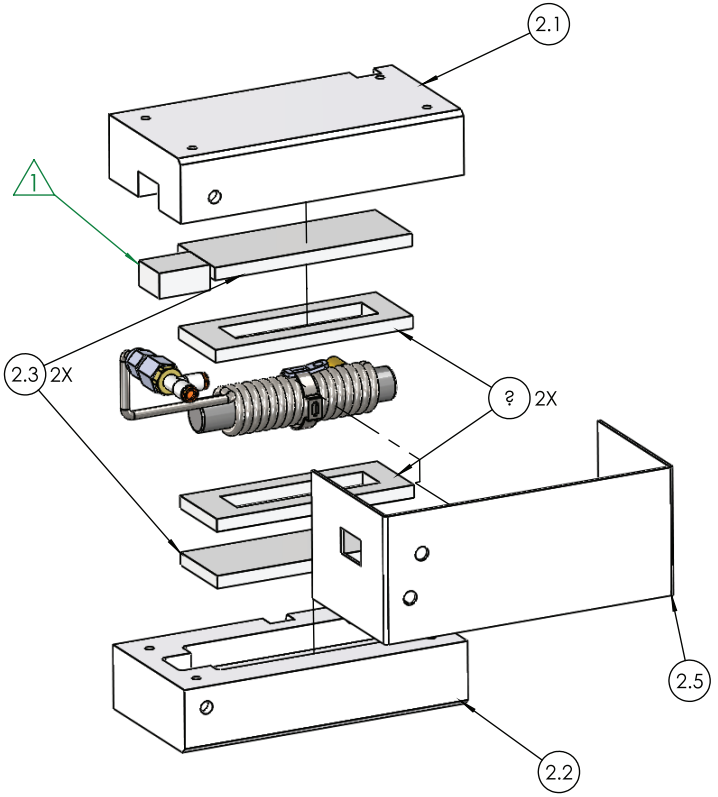
ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
2.1	10-00309-001	INSULATOR: MARINITE P, LEFT, 5D	1
2.2	10-00310-001	INSULATOR: MARINITE P, RIGHT, 5D	1
2.3	10-00483-001	INSULATION: BLANKET, BOTTOM, 5D	2
2.4	10-00485-001	INSULATION: BLANKET, BOTTOM CUTOUT, 5D	2
2.5	10-00524-001	INSULATION: ALUMINA OXIDE, 1/16IN	1

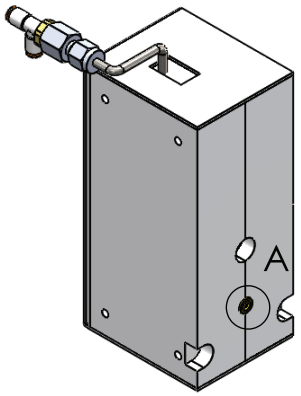
STEP	DESCRIPTION	TYPE
1	INSERT INSULATION BLANKETS INTO RESPECTIVE CAVITIES. SEE NOTE 1.	□
2	CLOSE HEATER COIL ASSY INSIDE OF BLOCKS	□
3	ENSURE BLOCKS ARE FULLY SEALEDAND NOTHING IS PINCHED	△
4	CLAMP TOGETHER ASSEMBLY	□
4	ENSURE THAT OUTER FACE OF NOZZLE IS AT LEAST TO THE EDGE OF INSULATOR BLOCKS. REFER TO DETAIL VIEW A	△

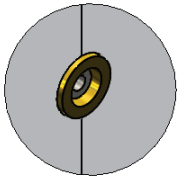
TOOL LIST
CARPENTER'S C-CLAMP

NOTES:

1. FOLD REMAINING MATERIAL OF BOTH OF ITEM 2.3 INTO BLOCK SHAPE







DETAIL A
SCALE 2 : 1

DATE	SIZE	DWG. NO.	REV
	B	20-00308-240	A
	SCALE: 1:2		SHEET 2 OF 4

MODEL #	MODEL DESCRIPTION
5D	SUBASSY:HEATER BLOCK, 240 VAC

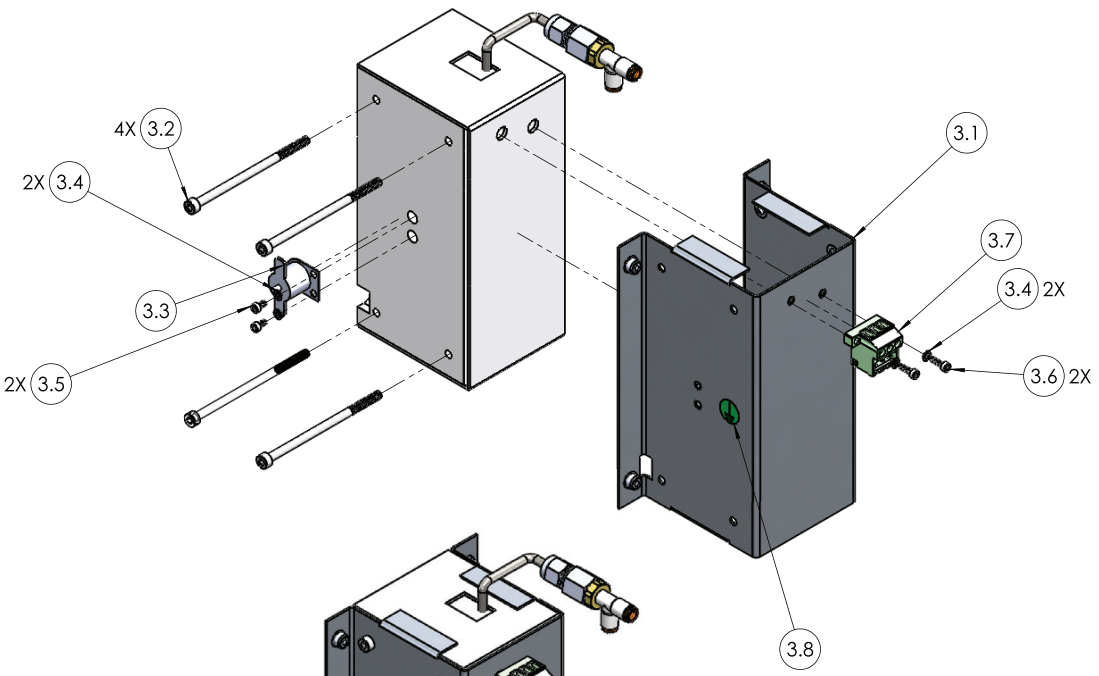
OPERATION #	OPERATION DESCRIPTION:
30	FULL HEATER BLOCK

LEGEND: △ TQC ○ VERIFY □ WORK CONTENT

ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
3.1	10-00218-001	HEAT EXCHANGER: CASE, 18 GA, 6061 AL	1
3.2	70-00335-001	SCREW: M4X75MM, SS, SHCS	4
3.3	41-00258-001	THERMOSTAT: 93C, MANUAL RESET	1
3.4	70-00464-001	WASHER: M2.5, SPLIT LOCK, SS	4
3.5	70-00465-001	SCREW: M2.5X5mm, SHCS, SS	2
3.6	3300489	SCR,SCH CAP,M2.5 X 8mm,SS	2
3.7	20-00419-001	ASSY: CABLE, HEATER BLOCK, 5D	1
3.8	1600309	LABEL, EARTH GROUND, 1/2 DIA.	1

STEP	DESCRIPTION	TYPE
1	ATTACH ITEM 3.1 TO HEATER BLOCK SUBASSY USING FASTENER 3.2	□
2	ATTACH ITEM 3.7 ONTO ITEM 3.1 USING FASTENERS 3.4 & 3.6	□
3	ATTACH ITEM 3.3 TO ITEM 3.1 USING FASTENERS 3.4 & 3.5 WITH RING TERMINAL FROM ITEM 3.7 TIGHTENED IN BETWEEN ITEM 3.4 & ITEM 3.3 AT TOP MOST HOLE	□
4	ATTACH WHITE CABLE OF ITEM 3.7 TO BOTTOM TAB OF ITEM 3.3	□
5	ATTACH TERMINAL OF HEATER CARTRIDGE TO TOP TAB OF ITEM 3.3	□
6	INSERT FERRULE OF HEATER CARTRIDGE INTO ITEM 3.7	□
7	APPLY ITEM 3.8 NEXT TO ITEM 3.3	□

TOOL LIST
2 MM HEX BIT
3 MM HEX BIT
CORDLESS DRIVER
SMALL FLATHEAD SCREWDRIVER



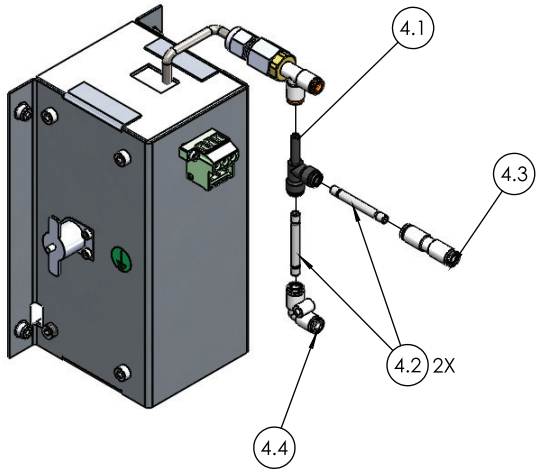
DATE	SIZE	DWG. NO.	REV
	B	20-00308-240	A
	SCALE: 1:2		SHEET 3 OF 4

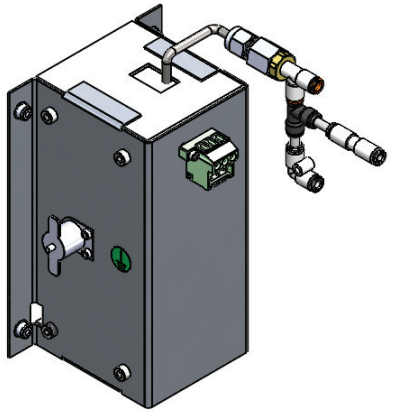
MODEL #	MODEL DESCRIPTION
5D	SUBASSY:HEATER BLOCK, 240 VAC

OPERATION #	OPERATION DESCRIPTION:
40	HEATER BLOCK FITTINGS

LEGEND:
△ TQC ○ VERIFY □ WORK CONTENT

ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
4.1	64-00413-001	FTG: TUBE, Y MALE RUN TEE, 4MM TO 4MM	1
4.2	10-00321-001	RESTRICTOR, 4mm OD, .8mm ORIFICE	2
4.3	64-00284-001	FTG: STRAIGHT, 4MM	1
4.4	5100872	FTG: ELBOW, 4MM	1





STEP	DESCRIPTION	TYPE
1	INSERT ITEM 4.1 INTO THREADED TEE	□
2	INSERT ITEM 4.2 INTO 4.1. THE SMALLER HOLE OF ITEM 4.2 FACES ITEM 4.1.	□
3	INSERT ITEM 4.3 & 4.4 AS SHOWN	□
4	PULL ON FITTINGS TO ENSURE THEY ARE SECURE	△

DATE	SIZE	DWG. NO.	REV
	B	20-00308-240	A
	SCALE: 1:2		SHEET 4 OF 4

Manual Revision History

Revision	Date	Notes
A	July 2019	Initial Release

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