Altrix™ Precision Temperature Management System

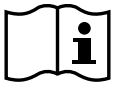
REF 8001

stryker®

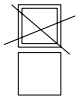
Maintenance Manual

CE 0086

Symbols

	Refer to instruction manual/booklet
	General mandatory action sign
	Consult instructions for use
	General warning
	Caution
	Warning; electricity
REF	Catalogue number / model
SN	Serial number
US Patents	For US Patents see www.stryker.com/patents
	Manufacturer
	Mass of equipment
	Direct current
~	Alternating current
	Product provides terminal for connection of a potential equalization conductor. The potential equalization conductor provides direct connection between the product and potential equalization busbar of the electrical installation.
	Protective earth ground
IPX1	Protection from dripping water from above the device
	Defibrillation proof type BF applied part
Rx ONLY	⚠ **CAUTION** Federal law (USA) restricts this device to sale by or on the order of a physician.

Symbols

	**⚠ CAUTION** Always use sterile distilled water or water that has been passed through a filter less than or equal to 0.22 microns with this product.
	In accordance with European Directive 2012/19/EU on Waste Electrical and Electronic Equipment, this symbol indicates that the product must not be disposed of as unsorted municipal waste, but should be collected separately. Contact your local distributor for disposal information.
 87VL Medical Electrical Equipment	Medical Equipment Classified by Underwriters Laboratories Inc. with Respect to Electric Shock, Fire, Mechanical and Other Specified Hazards Only in Accordance with IEC 60601-1:20 05 (3rd edition), ANSI/AAMI ES60601-1 (2005, 3rd edition), CAN/CSA C22.2 No. 60601-1:20 08, IEC 80601-2-35:2009, CAN/CSA C22.2 NO 80601-2-35:12, ISO 80601-2-56:2009, CAN/CSA C22.2 NO 80601-2-56:12, IEC 60601-1-8:2007, CAN/CSA C22.2 NO 60601-1-8-08, IEC 60601-1-10:2008, CAN/CSA C22.2 NO 60601-1-10-09, IEC 60601-1-6, CAN/CSA-C22.2 No. 60601-1-6:11
	Liquid level indicator
	Fragile, handle with care
	Keep dry
	Do not stack
	This way up

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Warning/Caution/Note Definition

The words **WARNING**, **CAUTION**, and **NOTE** carry special meanings and should be carefully reviewed.

WARNING

Alerts the reader about a situation which, if not avoided, could result in death or serious injury. It may also describe potential serious adverse reactions and safety hazards.

CAUTION

Alerts the reader of a potentially hazardous situation which, if not avoided, may result in minor or moderate injury to the user or patient or damage to the product or other property. This includes special care necessary for the safe and effective use of the device and the care necessary to avoid damage to a device that may occur as a result of use or misuse.

Note: Provides special information to make maintenance easier or important instructions clearer.

Summary of safety precautions

Carefully read and strictly follow the warnings and cautions listed on this page. Service only by qualified personnel.

⚠ CAUTION

- Do not modify the product or any components of the product. Modifying the product can cause unpredictable operation resulting in injury to patient or operator. Modifying the product also voids its warranty.
- Always use ESD protective equipment before opening antistatic bags and servicing electronic parts.
- Do not place unprotected circuit boards on the floor.
- Do not place your fingers in between the reservoir and the sides of the controller, to avoid the risk of pinching your fingers.
- Avoid the use of materials of good thermal conductivity, such as water, gel, or similar substances, with the **Altrix** system not powered on. This can decrease the temperature of the body of a patient.
- Do not apply thermal transfer devices to patients with ischemic limbs. This may result in harm to the patient.
- Do not use this product if the patient has a transdermal medication (patch) as this can result in increased drug delivery.
- Always pre-fill the thermal transfer device with sterile distilled water before you apply it to the patient. This is to reduce the risk of pressure ulcers.
- Always wear gloves when replacing the battery in case of battery leak.
- Do not put the unit on its side. You will not be able to put the product back into service for 24 hours.
- Do not store the product with water in the device.
- Always store the product within the specified environmental condition values.
- Always store the power cord, cables, and hoses before you transport the product to reduce the risk of trip hazard.
- Do not power wash this product.
- Do not use quaternaries that contain glycol ethers as they may damage the reusable accessories.
- Do not disinfect the internal water system with a thermal transfer device attached as this may cause a leak.
- Do not use bleach or any other cleaning or disinfectant agents for internal circuits. This could result in damage to the product. Only use approved disinfectant tablets.
- Always drain the product before disinfecting the internal water circuit. Failure to drain the product may reduce the effectiveness of the disinfection process.
- Always remove the product from use before servicing any components. Contact qualified service personnel for service.

Notes

- Disinfection of the **Altrix** internal water system was validated using *M. mucogenicum*.

This manual assists you with the maintenance of your Stryker product. Read this manual before maintaining this product. Set methods and procedures to educate and train your staff on the safe maintenance of this product.

CAUTION

Do not modify the product or any components of the product. Modifying the product can cause unpredictable operation resulting in injury to patient or operator. Modifying the product also voids its warranty.

Note: Stryker continually seeks advancements in product design and quality. This manual contains the most current product information available at the time of release. There may be minor discrepancies between your product and this manual. If you have any questions, contact Stryker Customer Service or Technical Support at 1-800-327-0770.

Theory of operation

The temperature management system circulates temperature controlled water via centrifugal pump through a configured combination of hoses connected to single or multiple thermal transfer devices which can be applied around, placed over or under a patient. Using a heater to increase water temperature and a refrigeration system to decrease water temperature, delivery and removal of thermal energy to and from the patient occurs at the contact point of the patient skin and thermal transfer device to raise or lower patient temperature. A patient temperature probe can also be used to provide closed-loop feedback patient temperature control capability or to monitor patient temperature.

System modes

The **Altrix** system has eight modes of operation. This section contains general descriptions of each of the modes.

Mode	Description
Sleep	Initial mode when the product is plugged into a Mains AC. System is active but not yet available for any therapy or user input other than to turn the product on into Standby Mode or Maintenance Mode.
Preparation	The system checks different subsystem statuses to make sure that it is ready to start therapy. This mode begins once Sleep Mode initiates, continues, and concludes before the system can move from Sleep to any other Mode.
Stand-by	Shows that the product is ready for therapy and presents the operator with the choice of starting one of the active therapies.
Maintenance	Allows the maintenance technician the ability to perform the following functions: • Review and clear the latest RFU code • Review the controller software versions • Test visual and audible indicators • Review the service log • Monitor the state of the system sensors
Remove from use (RFU)	The product enters this mode when there is a problem with the system providing adequate therapy. The operator will not be able to perform therapy and may be instructed to remove the product from use for qualified service personnel to evaluate.

System modes (Continued)

Therapy mode	Description
Manual	In this mode, the product will provide thermally treated water to the patient through the thermal transfer device as it is targeting operator input water temperature control setting. In this mode, the operator determines what the water temperature should be and as a result, a patient temperature probe is not necessary to have. No rate selection is necessary as the water controller will always use the maximum cooling/warming capacity of the product to achieve the final Water Temperature Control Setting. During Manual Mode the **Altrix** controller will utilize the pump to regulate the water flow to a prescribed target flow in order to obtain maximum heat transfer through the thermal transfer device(s). The water controller will also utilize the heater cartridge and refrigeration product to regulate the Water Temperature at the supply manifold to the Water Temperature Control Setting
Automatic	In this mode, the product will provide thermally treated water to the patient through thermal transfer device(s) as it is targeting a user input patient temperature control setting. In this mode, the CS determines what the water temperature should be according to the therapy rate chosen and what it takes to reach the desired patient temperature control setting. A patient temperature probe is necessary to have in this mode. The **Altrix** water controller provides an Automatic Mode to allow the caregiver to monitor and control the core body Patient Temperature. The **Altrix** water controller requires the caregiver to select the Final Patient Target Temperature and to select the warming or cooling rate. In Automatic Mode, the **Altrix** water controller will utilize the pump to regulate the water flow to obtain maximum heat transfer through the thermal transfer device(s). The water controller will also utilize the heater cartridge and refrigeration product to regulate the Primary Patient Temperature to the selected Final Patient Target Temperature by manipulating the water temperature of the supply ports. The **Altrix** water controller offers 3 cooling rates and 4 warming rates.
Monitor	The patient's temperature is monitored through a patient temperature probe. No thermally treated water is being provided to the patient through thermal transfer device (s).

System overview

The **Altrix** system includes the main controller, fluid management controller and a basic user interface controller. The system gathers input from the Human machine interface (HMI) system to determine the correct mode for the system.

The control system receives input from the following systems.

- Thermal management system
- Fluid system
- Patient interface
- Power system
- HMI system

Response of PCLCS

- Relative overshoot: 0.3˚ C
- Command overshoot: 0.3˚ C
- Steady state deviation: ±0.1˚ C

Specifications

Model		**8001-000-001**
Electrical Requirements - AC Voltage Input Current and Voltage Ratings		120VAC, 60Hz 12A
Physical dimensions		
Height	42.5 in.	107.9 cm
Width	15.0 in.	38.1 cm
Depth	23.0 in.	58.4 cm
Empty weight	150.0 lb	68.0 kg
Filled weight	160.5 lb	72.8 kg
Reservoir capacity	1.3 gal	5.0 L
Water temperature		
Control setting range	39.2˚ - 104.0˚ F	4.0˚ - 40.0˚ C
Control accuracy	±0.3˚ C (4.0˚ - 40.0˚ C)	
Display measurement accuracy	±0.2˚ C (4.0˚ - 40.0˚ C)	
Display / resolution setting	0.1˚ C	
Default setting	104.0˚ F	40.0˚ C
Patient temperature		
Control setting range	89.6˚ - 100.4˚ F	32.0˚ - 38.0˚ C
Control accuracy	±0.1˚ C (32˚ - 38˚ C)	
Measurement accuracy	±0.3˚ C (25.0˚ - 45.0˚ C)	
	±0.4˚ C (0.0˚ C - 24.9˚ C, 45.1˚ C - 50.0˚ C)	
Display / resolution setting	0.1˚ C	
Display range	32.0˚ - 122.0˚ F	0.0˚ - 50.0˚ C
Default setting	98.6˚ F	37.0˚ C
Controller		
Heater capacity, maximum	500 watts	
Circulating fluid	Sterile distilled water or water that has been passed through a filter less than or equal to 0.22 microns with this product	
Battery	9V Lithium	
Alarm tone range	75 - 85 dBA per standard IEC 60601-1-8	
Water flow rate in each hose port	Typical 1.2 lpm	

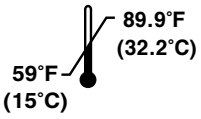
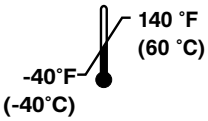
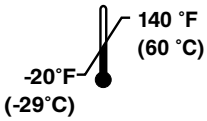
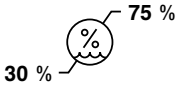
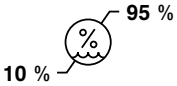
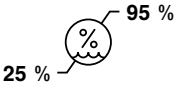
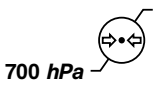
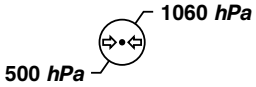
Specifications (Continued)

Controller		
Refrigerant type	R134a	
Power cord length	14 to 15 feet	4.2 - 4.5 meters
Clinical thermometer	Direct mode	
Equipment Class	Class I	
	Rated for continuous operation	

Note: The controller takes approximately 9 minutes to heat from 23.0±2˚ C (73.4˚ F) to 37.0˚ C (98.6˚ F) when not connected to a patient. Time will vary when connected to a patient.

Stryker reserves the right to change specifications without notice.

For more information about thermal transfer devices, cables, or probes, see the manufacturer's instructions for use.

Environmental conditions	Operation	Storage	Transportation
Ambient temperature			
Relative humidity (non-condensing)			
Atmospheric pressure			Not applicable

Specifications International

Model	8001-000-002	8001-000-003, 8001-000-006	8001-000-008, 8001-000-009, 8001-000-011	8001-000-013, 8001-000-015, 8001-000-016, 8001-000-017, 8001-000-018, 8001-000-019, 8001-000-021, 8001-000-022, 8001-000-023
Electrical Requirements - AC Voltage Input Current and Voltage Ratings	100VAC, 50/60Hz 12A	120V, 60Hz 12A	220V, 60Hz 6A	220-240V, 50Hz 6A

Physical dimensions		
Height	42.5 in.	107.9 cm
Width	15.0 in.	38.1 cm

Specifications International (Continued)

Physical dimensions		
Depth	23.0 in.	58.4 cm
Empty weight	150.0 lb	68.0 kg
Filled weight	160.5 lb	72.8 kg
Reservoir capacity	1.3 gal	5.0 L
Water temperature		
Control setting range	39.2˚ - 104.0˚ F	4.0˚ - 40˚ C
Control accuracy	±0.3˚ C (4.0˚ - 40.0˚ C)	
Display measurement accuracy	±0.2˚ C (4.0˚ - 40.0˚ C)	
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Display range	32.0˚ - 122˚ F	0.0˚ - 50˚ C
Default setting	98.6˚ F	37.0˚ C
Controller		
Heater capacity, maximum	500 watts	
Circulating fluid	Sterile distilled water or water that has been passed through a filter less than or equal to 0.22 microns with this product	
Battery	9V Lithium	
Alarm tone range	75 - 85 dBA per standard IEC 60601-1-8	
Water flow rate in each hose port	Typical 1.2 lpm	
Refrigerant type	R134a	
Power cord length	14 to 15 feet	4.2 - 4.5 meters
Clinical thermometer	Direct mode	
Equipment Class	Class I	
	Rated for continuous operation	

Note: The controller takes approximately 9 minutes to heat from 23.0±2˚ C (73.4˚ F) to 37.0˚ C (98.6˚ F) when not connected to a patient. Time will vary when connected to a patient.

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Specifications International (Continued)

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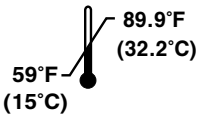
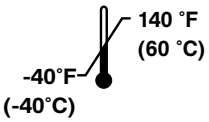
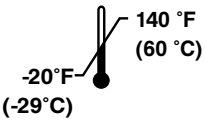
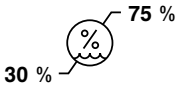
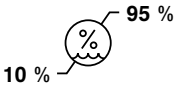
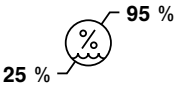
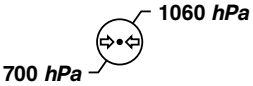
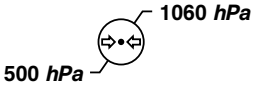
Ambient temperature			
Relative humidity (non-condensing)			
Atmospheric pressure			Not applicable

Service icons

Icon	Name
	RFU Code
	Service log
	System state
	Software version
	High thermal cutout
	High thermal cut out test

Product illustration

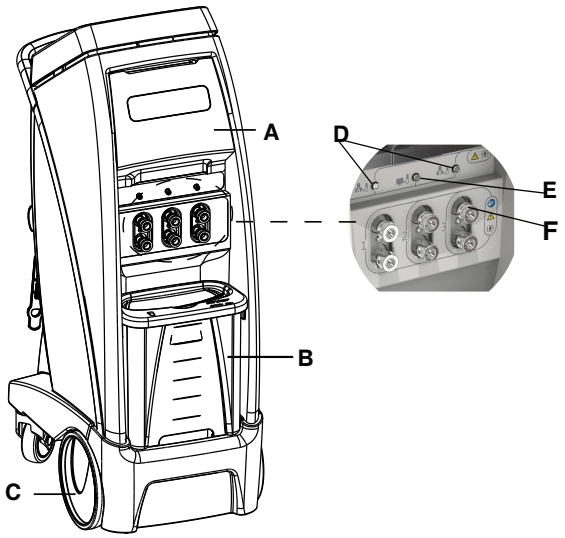


Figure 1: Controller, patient front

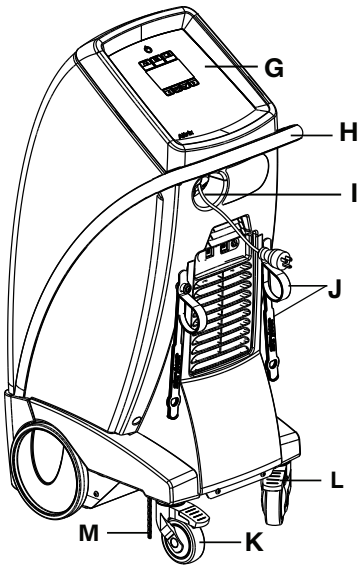


Figure 2: Controller, patient back

A	Storage compartment
B	Removable water reservoir
C	Front wheels
D	Patient probe ports
E	Patient temperature output port
F	Hose connection ports

G	Graphical user interface display
H	Handle
I	Power cord
J	Hose and power cord management straps
K	Swivel casters
L	Wheel locks
M	Ground chain

Stopping therapy or powering off the product

To stop therapy or power off the controller:

1. Press and hold the Stand-by button for two seconds.
2. Unplug the product from the wall outlet.

   Note: If storing the product, see Storing the controller on page 63.

Maintenance mode, RFU code

1. To gain access to the maintenance mode see LCD functionality, testing the visual and audible alarms on page 78. Complete steps 1 through 4.
2. To review the RFU codes tap **RFU Code** button (Figure 3 on page 14).

Figure 3: Maintenance Mode

3. To clear the RFU Codes, tap **Confirm** (Figure 4 on page 14).

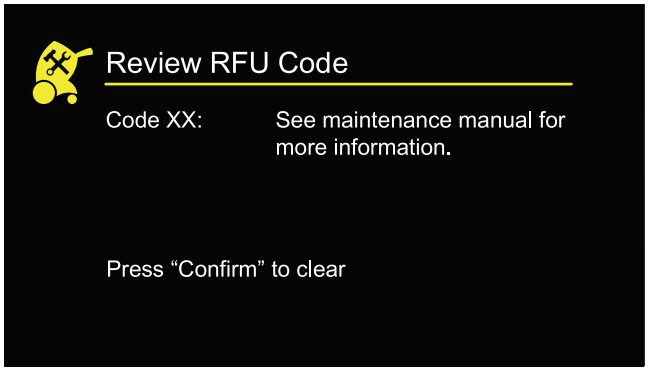


Figure 4: RFU Code

Service log

1. To gain access, see LCD functionality, testing the visual and audible alarms on page 78. Complete steps 1 though 4.

Service log (Continued)

2. Review the service log and clear. (Figure 5 on page 15).

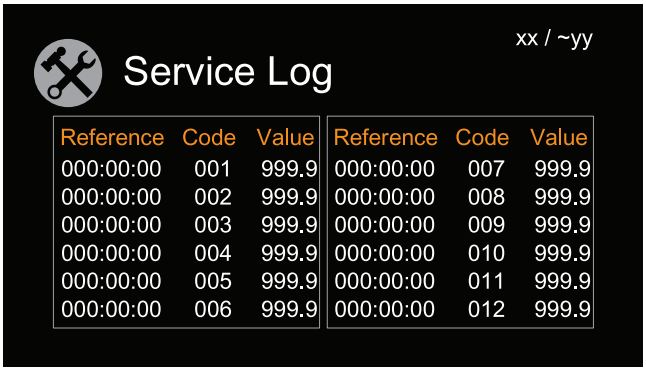


Figure 5: Service log

System state

1. To gain access, see LCD functionality, testing the visual and audible alarms on page 78. Complete steps 1 though 4.
2. The system state. (Figure 6 on page 15 sample screen)

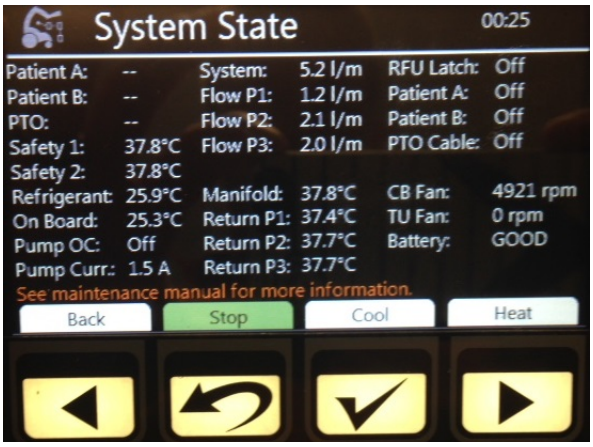


Figure 6: System state

Software versions

1. To gain access, see LCD functionality, testing the visual and audible alarms on page 78. Complete steps 1 though 4.

Software versions (Continued)

2. Displays controller software versions. (Figure 7 on page 16)

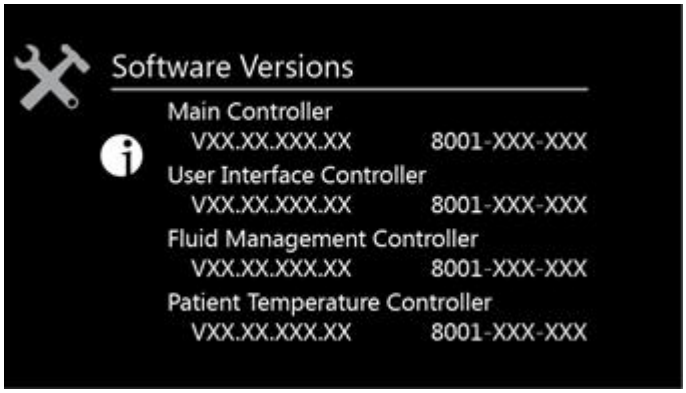


Figure 7: Software versions, sample screen

Protecting against Electrostatic Discharge (ESD)

⚠ CAUTION

- Always use ESD protective equipment before opening antistatic bags and servicing electronic parts.
- Do not place unprotected circuit boards on the floor.

Note: Always ship back circuit boards to Stryker in the same antistatic bags that the new boards were originally shipped in.

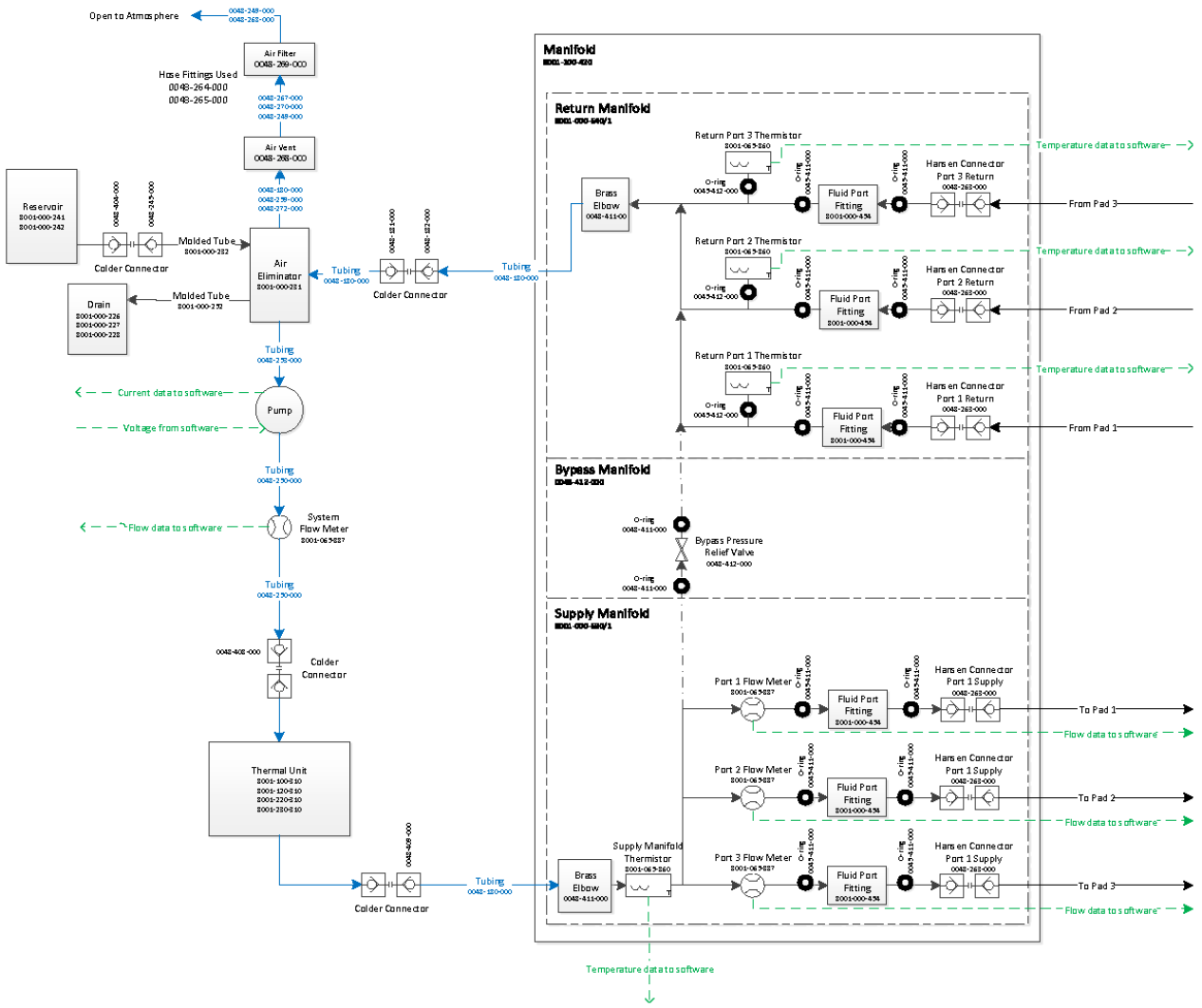
The electronic circuits in the product are completely protected from static electricity damage when factory assembled. Always use adequate static protection when servicing the electronic systems of the product. All service personnel must use static protection whenever they are touching wires.

Sample antistatic protection equipment includes:

- 1 antistatic wrist strap
- 1 grounding plug
- 1 test lead with a banana plug on one end and an alligator clip on the other end

Make sure that you follow the ESD manufacturer's instructions for appropriate protection against static discharge.

Water flow diagram



Removing and replacing the reservoir

The removable reservoir enables you to fill or drain the reservoir away from the controller without interrupting therapy. You will need to have the reservoir installed before starting a therapy.

⚠ CAUTION

Do not place your fingers in between the reservoir and the sides of the controller, to avoid the risk of pinching your fingers.

Removing and replacing the reservoir (Continued)

To remove the reservoir, pull forward at an angle, and lift out the reservoir (Figure 8 on page 18).

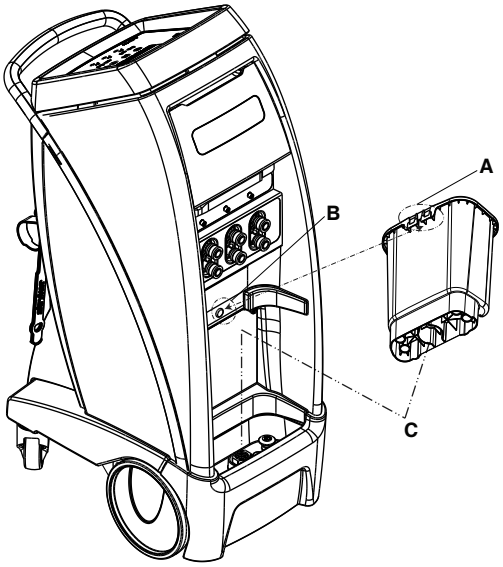


Figure 8: Removable reservoir

1. To replace the reservoir, align the base of the reservoir over the drain (C).
2. Align the notch on the back of the reservoir (A) with the hook on the controller (B) (Figure 8 on page 18)
3. Push the reservoir back into place. Make sure that the reservoir is secure to avoid water leakage.

Connecting and disconnecting thermal transfer devices

Read the operations manual for the individual thermal transfer devices for warnings, cautions, and safe operating instructions before use.

⚠ CAUTION

- Avoid the use of materials of good thermal conductivity, such as water, gel, or similar substances, with the **Altrix** system not powered on. This can decrease the temperature of the body of a patient.
- Do not apply thermal transfer devices to patients with ischemic limbs. This may result in harm to the patient.
- Do not use this product if the patient has a transdermal medication (patch) as this can result in increased drug delivery.
- Always use Stryker accessories. Failure to comply with these instructions may invalidate any or all warranties and may negatively affect the products EMC performance. This also protects the product from cardiac defibrillation.
- Do not use three or more adult Mul-T-Blanket products at the same time to avoid the risk of water overflow when the controller is powered off.
- Always pre-fill the thermal transfer device with sterile distilled water before you apply it to the patient. This is to reduce the risk of pressure ulcers.
- Avoid reduction in water flow. Do not connect two or more thermal transfer devices in series on a single port.
- Always clamp the hoses when disconnecting the thermal transfer devices.

Connecting and disconnecting thermal transfer devices (Continued)

To connect or disconnect the **Clik-Tite**® connectors (Figure 9 on page 19) to the insulated hoses.

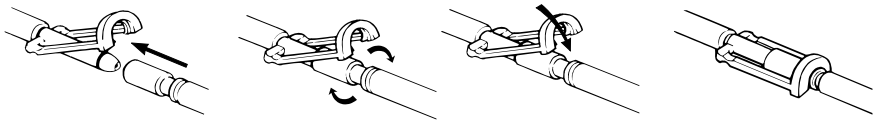


Figure 9: Clik-Tite

To connect or disconnect the Colder style (Figure 10 on page 19) to the insulated hoses.

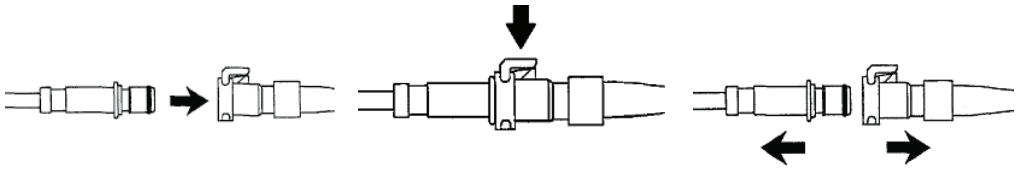


Figure 10: Colder style connectors

To close or open hose clamps (Figure 11 on page 19).

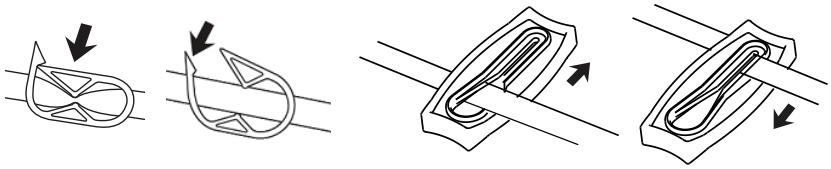


Figure 11: Hose clamps

Note: The term “thermal transfer devices” is used throughout this manual and is interchangeable with blankets and wraps, unless indicated otherwise.

Always clamp the hoses before disconnecting. See Draining the thermal transfer devices on page 64.

Disconnecting the insulated hoses

To disconnect the insulated hoses:

1. To disconnect, push back on the retaining collar of the port on the controller.
2. Pull the hose to disconnect.

Back cover removal

Tools required:

- T27 Torx

Procedure:

1. Apply the wheel locks.
2. Unplug the power cord.
3. Using a T27 Torx, remove and save the six screws that secures the back cover.

Back cover removal (Continued)

4. Remove and save the back cover by pulling outward and downward on the bottom of the back cover.

   Note: The power cord will remain attached to the controller. Allow the power cord to slide through the back cover.

Front cover removal

Tools required:

- T27 Torx
- T25 Torx
- 7/16” Socket
- 3/8” Drive ratchet

Procedure:

1. Apply the wheel locks.
2. Unplug the power cord.
3. Remove and save the water reservoir. See Removing and replacing the reservoir on page 17.
4. Using a T27 Torx, remove and save the top two screws inside the storage compartment that secures the front cover.
5. Using a T25 Torx, remove the three screws between the connection ports.
6. Using a T27 Torx, remove and save the two screws inside the water catch tray that secure the bumper.
7. Remove and save the bumper.
8. Using a 7/16” socket, remove and save the two nuts that secure the front cover to the product.
9. Pull outward on the bottom of the front cover so it lowers down. Remove and save the front cover.

Side cover removal (left or right)

Tools required:

- T25 Torx

Procedure:

1. Apply the wheel locks.
2. Remove the patient back cover. See Back cover removal on page 19.
3. Remove the patient front cover. See Front cover removal on page 20.
4. Using a T25 Torx, remove and save the nine screws that secure the side cover to the main frame.
5. Remove the side cover, by rotating forward on the top and lifting upward. Now tip the side cover toward the back. Remove and save the side cover.

   Note: Follow the same steps to remove the opposite side cover.

Back cover replacement

Tools required:

- #1 Phillips screwdriver

Procedure:

1. Remove the patient back cover. See Back cover removal on page 19.
2. Using a #1 Phillips loosen two screws on the Scrulock assembly and remove power cord and Scrulock from front cover.

Back cover replacement (Continued)

3. Discard the back cover.

   Note: When installing, install a new air filter.
4. Reverse the steps to reinstall.
5. Verify proper operation before returning the product to service.

Battery removal and replacement

CAUTION

Always wear gloves when replacing the battery in case of battery leak.

Tools required:

- ESD System

Procedure:

1. ESD Requirement. See Protecting against Electrostatic Discharge (ESD) on page 16.
2. Apply the wheel locks.
3. Remove the patient back cover. See Back cover removal on page 19.
4. Slide the battery cover toward the left and remove.
5. Remove and discard the battery following your local waste disposal policy.
6. Reverse steps to reinstall.

   Note: Replace with 9V Lithium battery.
7. Verify proper operation before returning the product to service.

Display assembly screen replacement

Tools required:

- T27 Torx
- Wire cutters
- ESD System

Procedure:

1. ESD Requirement. See Protecting against Electrostatic Discharge (ESD) on page 16
2. Remove the patient back cover. See Back cover removal on page 19
3. Using a T27 Torx, remove and save the two screws at the top of the display assembly screen that secures the display assembly screen to the product.
4. Push forward on the display assembly screen to unseat it from the top bracket.
5. Unscrew the two thumbscrews and cut the cable tie that secures the communication cable to the display assembly.
6. Remove and discard the display assembly screen.

   Note: Do not dispose of as unsorted municipal waste. See your local distributor for return or collection systems available in your country.
7. Reverse steps to reinstall.
8. Functional checks.
9. Verify proper operation before returning the product to service.

User interface replacement

Tools required:

- T27 Torx
- T20 Torx
- 3/8” Socket
- ESD System
- Wire cutters

Procedure:

1. ESD Requirement. See Protecting against Electrostatic Discharge (ESD) on page 16.
2. Remove the patient back cover. See Back cover removal on page 19.
3. Using a T27 Torx, remove and save the two screws at the top of the display assembly screen that secures the display assembly screen to the product.
4. Push forward on the display assembly screen to unseat it from the top bracket.
5. Using wire cutters, cut the cable tie that secures the communication cable to the display assembly.
6. Unscrew the two thumbscrews.
7. Unplug communication cable and remove display assembly.

   Note: Complete the following procedures with the display assembly removed from the product. Face display assembly down onto an ESD controlled workbench.
8. Using T20 torx remove and save the eight screws(C) (Display assembly on page) that secure the display bracket.
9. Using a 3/8” socket remove and save the hex nut (A) that secures the display bracket, and remove the bracket.
10. Using a T20 torx remove and save the two screws (D) that secure the Controller Communications Board (CCB) (R) to the User Interface.
11. Pull up on CCB to unplug it from the User Interface, set aside for reinstallation.
12. Remove the User Interface from the Bezel and discard.

    Note: Do not dispose of as unsorted municipal waste. See your local distributor for return or collection systems available in your country.
13. Reverse steps to reinstall.
14. Complete the LCD functionality, testing the visual and audible alarms on page 78
15. Verify proper operation before returning the product to service.

Front wheel replacement (left or right)

⚠ CAUTION

Do not put the unit on its side. You will not be able to put the product back into service for 24 hours.

Tools required:

- 3/4” Combination wrench
- 2” x 4” Board

Procedure:

1. Identify the side cover (left or right) that needs to be removed to replace the front wheel (left or right).
2. Remove the patient front cover. See Front cover removal on page 20.
3. Remove the patient back cover. See Back cover removal on page 19.
4. Remove the side cover based on the wheel you are replacing. See Side cover removal (left or right) on page 20.

Front wheel replacement (left or right) (Continued)

5. Slightly tip the product and place a 2” x 4” board under the front corner of the frame on the side you are replacing the front wheel (Figure 12 on page 23).

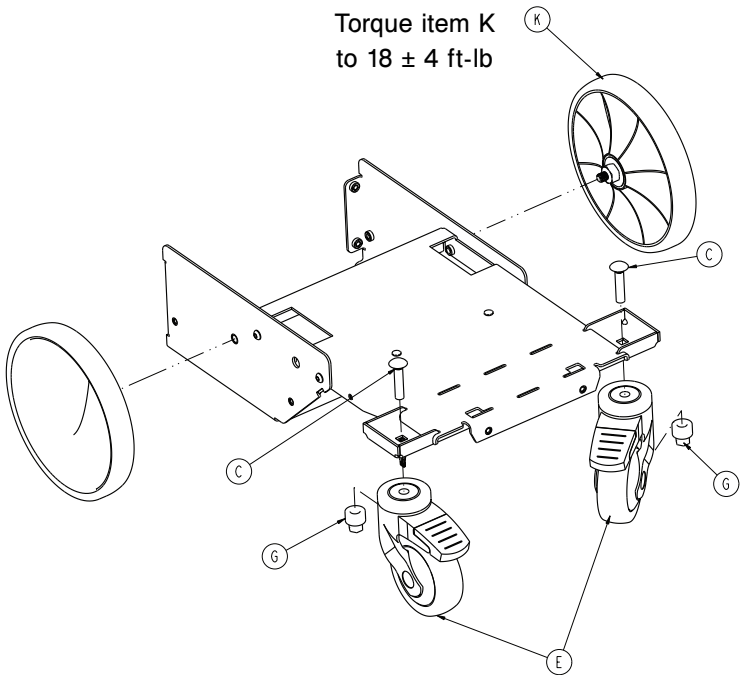


Figure 12: Front wheels

6. Using a 3/4” combination wrench, loosen the front wheel axle from the frame.
   a. To reinstall, apply loctite blue 242 to a minimum of 3 threads. 1-2 threads from the end of the bearing assembly.
7. Remove and discard the front wheel.
8. Reverse steps to reinstall.
9. Verify proper operation before returning the product to service.

Rear swivel lock caster replacement (left or right)

⚠ CAUTION

Do not put the unit on its side. You will not be able to put the product back into service for 24 hours.

Tools required:

- 9/16” Combination wrench
- 2” x 4” Board

Procedure:

1. Remove the back cover. See Back cover removal on page 19.
2. Slightly tip the product and place a 2” x 4” board under the front corner of the frame on the side you are replacing the rear swivel caster.
3. Using a 9/16” combination wrench, loosen and remove the nut that secures the rear swivel lock caster to the frame. Remove and discard the rear swivel lock caster (Figure 13 on page 24).

Rear swivel lock caster replacement (left or right) (Continued)

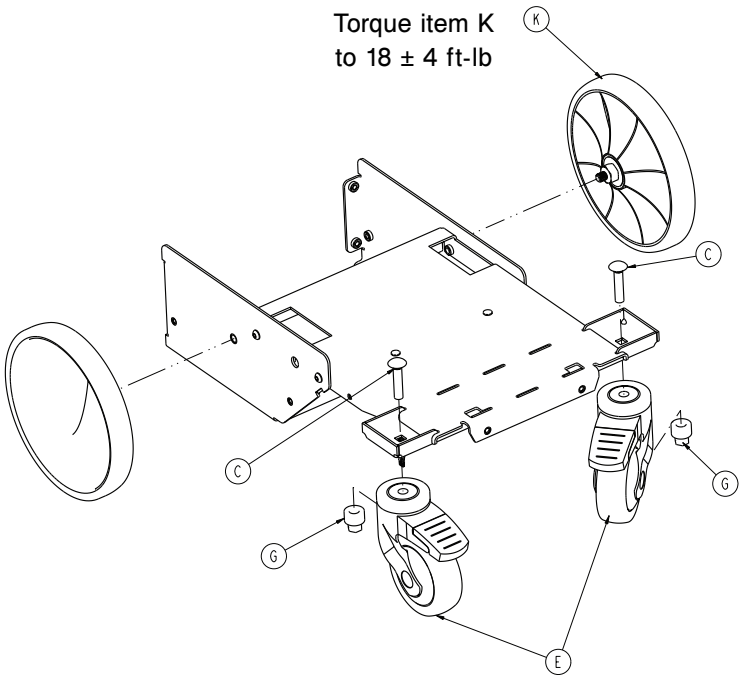


Figure 13: Rear swivel lock casters

a. To reinstall, apply loctite blue 242 to a minimum of 3 threads. 1 to 2 threads from the end of the carriage bolt.

4. Reverse steps to reinstall.
5. Verify proper operation before returning the product to service.

Power cord replacement

Tools required:

- T25 Torx
- #1 Phillips

Procedure:

1. Remove the patient back cover. See Back cover removal on page 19.
2. Remove the patient front cover. See Front cover removal on page 20.
3. Using a T25 torx, remove and save the screw and cable clamp that secure the power cord to the control box cover.

Power cord replacement (Continued)

4. Using a T25 torx, remove and save the two screws (C) and cable clamps (F) that secure the power cord to the top bracket (Figure 14 on page 25).

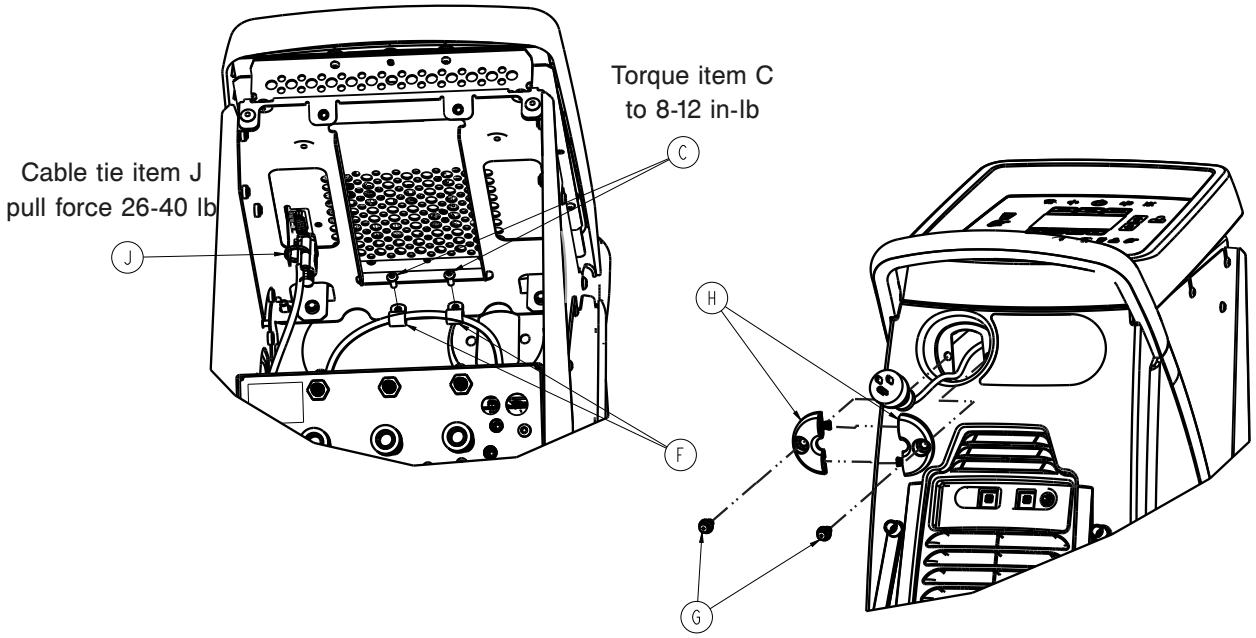


Figure 14: Power cord to the top bracket

5. Using a #1 Phillips loosen and save two screws on the Scrulock assembly.
6. Remove and save Scrulock from front cover.
7. Unplug and discard the power cord.
8. Reverse steps to reinstall.
9. Verify proper operation before returning the product to service.

Valved panel mount female coupling

Tools required:

- Needle nose pliers

Procedure:

1. See Draining water from the controller and hoses on page 64.
2. Remove the patient front cover. See Front cover removal on page 20.

Valved panel mount female coupling (Continued)

3. Using needle nose pliers, squeeze the hose clamp (AM) (Figure 15 on page 26) that secures the tube to the coupling (K) (Figure 16 on page 27).

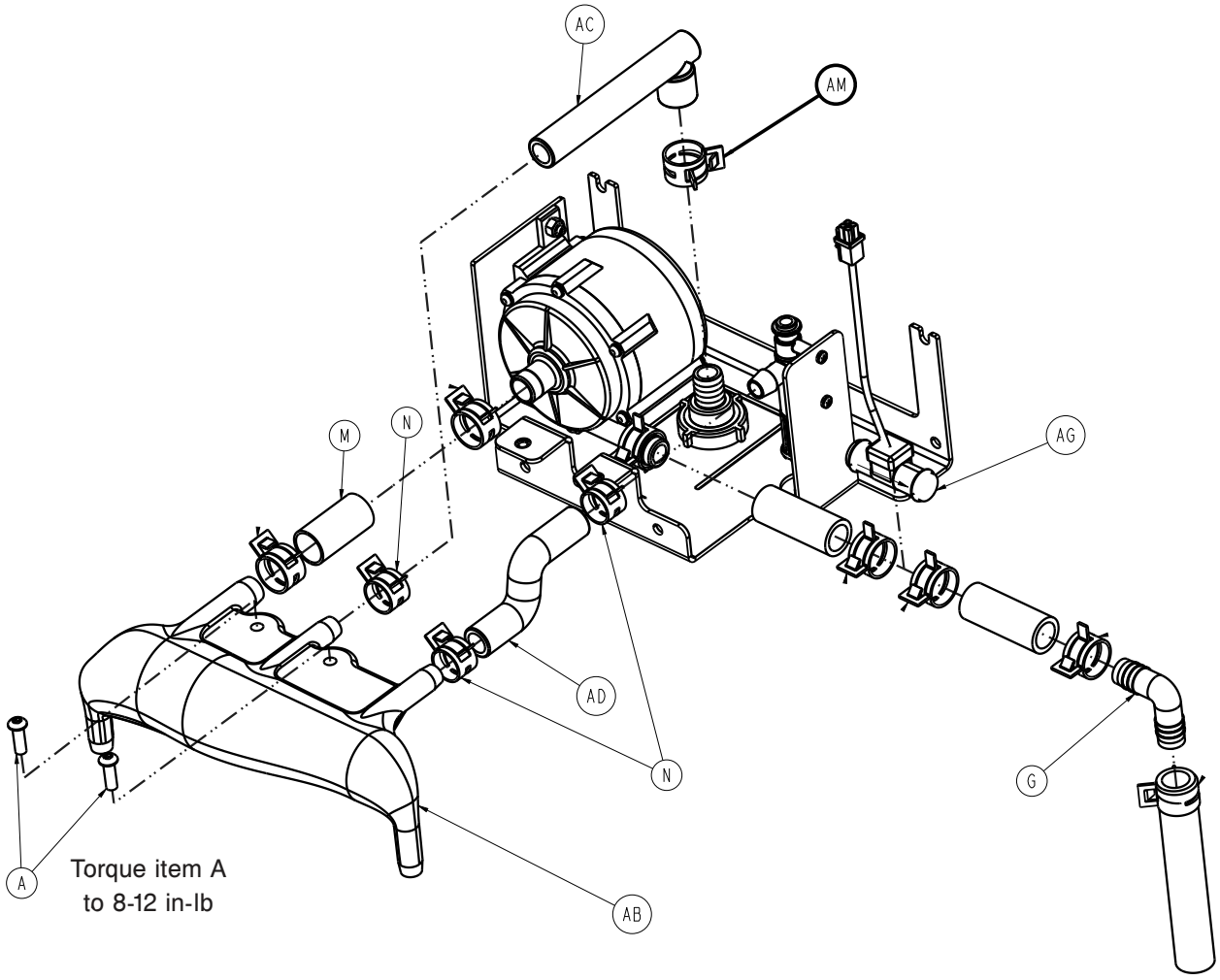


Figure 15: Hose clamp

Valved panel mount female coupling (Continued)

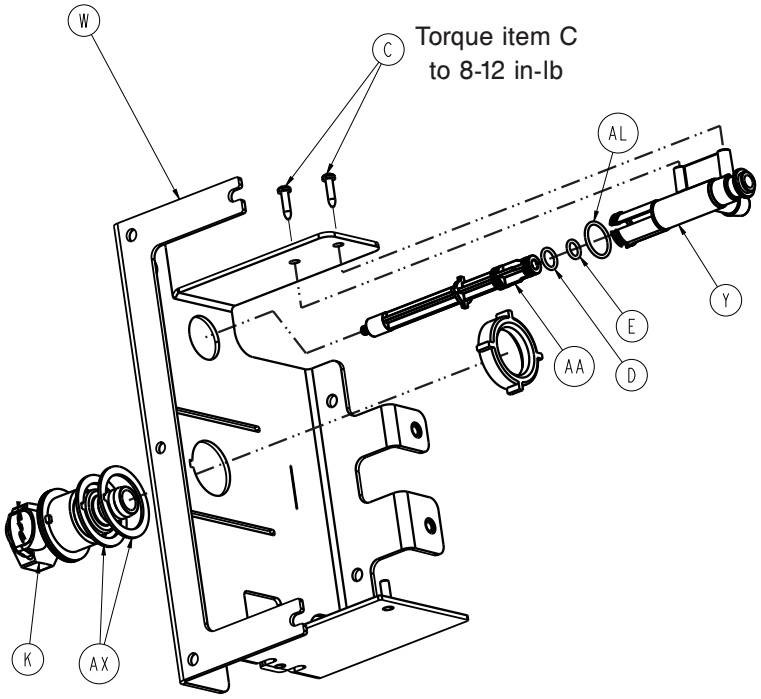


Figure 16: Coupling

4. Unscrew the coupling nut and pull coupling (K) out of the tube (AC).
5. Remove and discard the coupling, 1 coupling seal, and coupling nut. Save remaining 2 coupling seals (AX), for reinstall.

   Note: The new female coupling comes complete with 1 coupling seal and coupling nut.
6. Reverse steps to reinstall.

   Notes
   - If the replacement coupler has a locking pin, remove it before installing.
   - Proper orientation with alignment tab.
7. Check for leaks.
8. Verify proper operation before returning the product to service.

Drain valve body replacement

Tools required:

- T27 Torx
- T20 Torx
- Needle nose pliers

Procedure:

1. Remove the patient back cover. See Back cover removal on page 19.
2. Remove the patient front cover. See Front cover removal on page 20.
3. Remove the left side cover. See Side cover removal (left or right) on page 20.

Drain valve body replacement (Continued)

4. Using a T27 torx, remove the 2 top screws and loosen the 2 bottom screws that secure the fluid bracket to the frame, save screws.
5. Disconnect both tubes on the left side that are directly above the front left caster, utilizing the quick disconnect.
6. Using needle nose pliers, remove the 2 hose clamps (N) that secure the tubing to the reservoir.

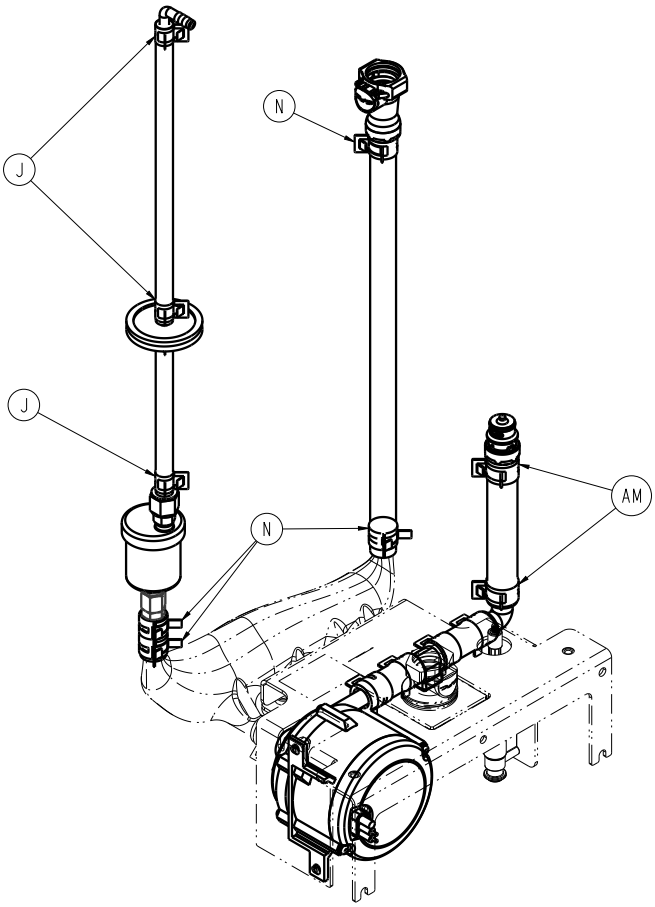


Figure 17:

Note: This will allow clearance to rotate the fluid assembly bracket.

Drain valve body replacement (Continued)

7. Pull up and rotate the fluid bracket to access drain valve screws (C) (Figure 18 on page 29).

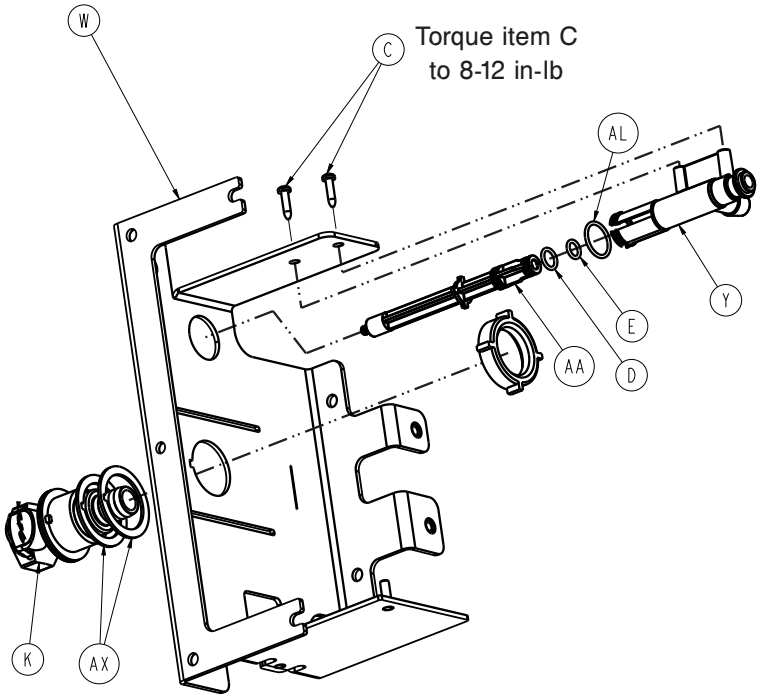


Figure 18: Drain valve screws

8. Using a T20 torx, remove and save the two screws that secure the drain valve to the fluid bracket.
9. Using needle nose pliers, squeeze the hose clamp that secures the tubing to the drain valve and discard.
10. Reverse the steps to reinstall.
11. Check for leaks.
12. Verify proper operation before returning the product to service.

Condenser air filter replacement

Tools required:

- None

Procedure:

1. Remove the patient back cover. See Back cover removal on page 19.
2. Remove and discard the condenser air filter.
3. Reverse steps to reinstall.
4. Verify proper operation before returning the product to service.

Fluid pump replacement

Tools required:

- 3/8” Combination wrench
- Needle nose pliers

Fluid pump replacement (Continued)

- T27 Torx

Procedure:

1. See Valved panel mount female coupling on page 25, for removal only.
2. Remove the patient back cover. See Back cover removal on page 19.
3. Remove both side covers. See Side cover removal (left or right) on page 20.
4. Disconnect both tubing lines directly above the front left caster leading to the fluid assembly, utilizing the quick disconnects.
5. Using needle nose pliers, remove the 2 hose clamps (N) that secure the tubing to the reservoir (Figure 19 on page 30).

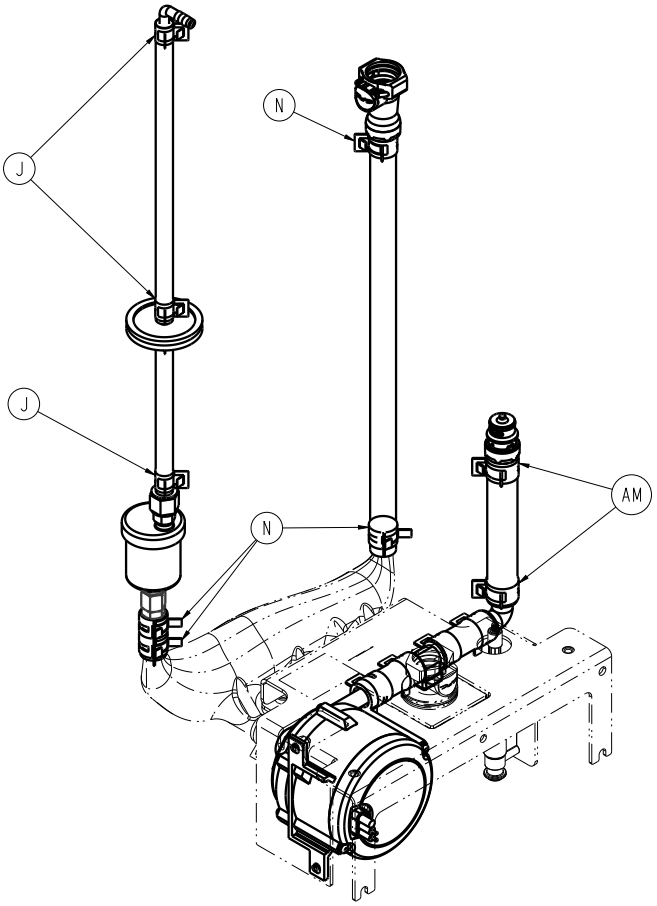


Figure 19: Secure tubing

Note: This will allow clearance to rotate the fluid assembly bracket.

6. Using a T27 torx, remove the 2 top screws and loosen the 2 bottom screws that secure the fluid bracket.
7. Pull up and rotate the fluid assembly bracket up to gain access to the fluid pump (T).
8. Disconnect the power plug to the fluid pump.

Fluid pump replacement (Continued)

9. Using a 3/8” combination wrench, remove and save the two nuts (B) that secure the fluid pump to the fluid bracket (Figure 20 on page 31).

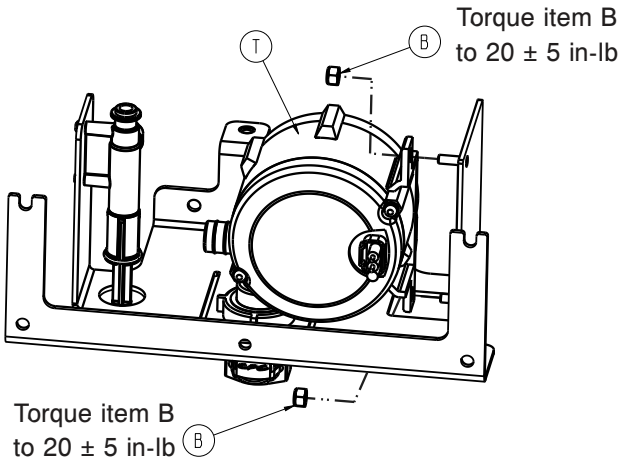


Figure 20: Screws that secure the fluid pump to the fluid bracket

Fluid pump replacement (Continued)

10. Using needle nose pliers, squeeze the two hose clamps (AM) that secure the tubing to the fluid pump (Figure 21 on page 32).

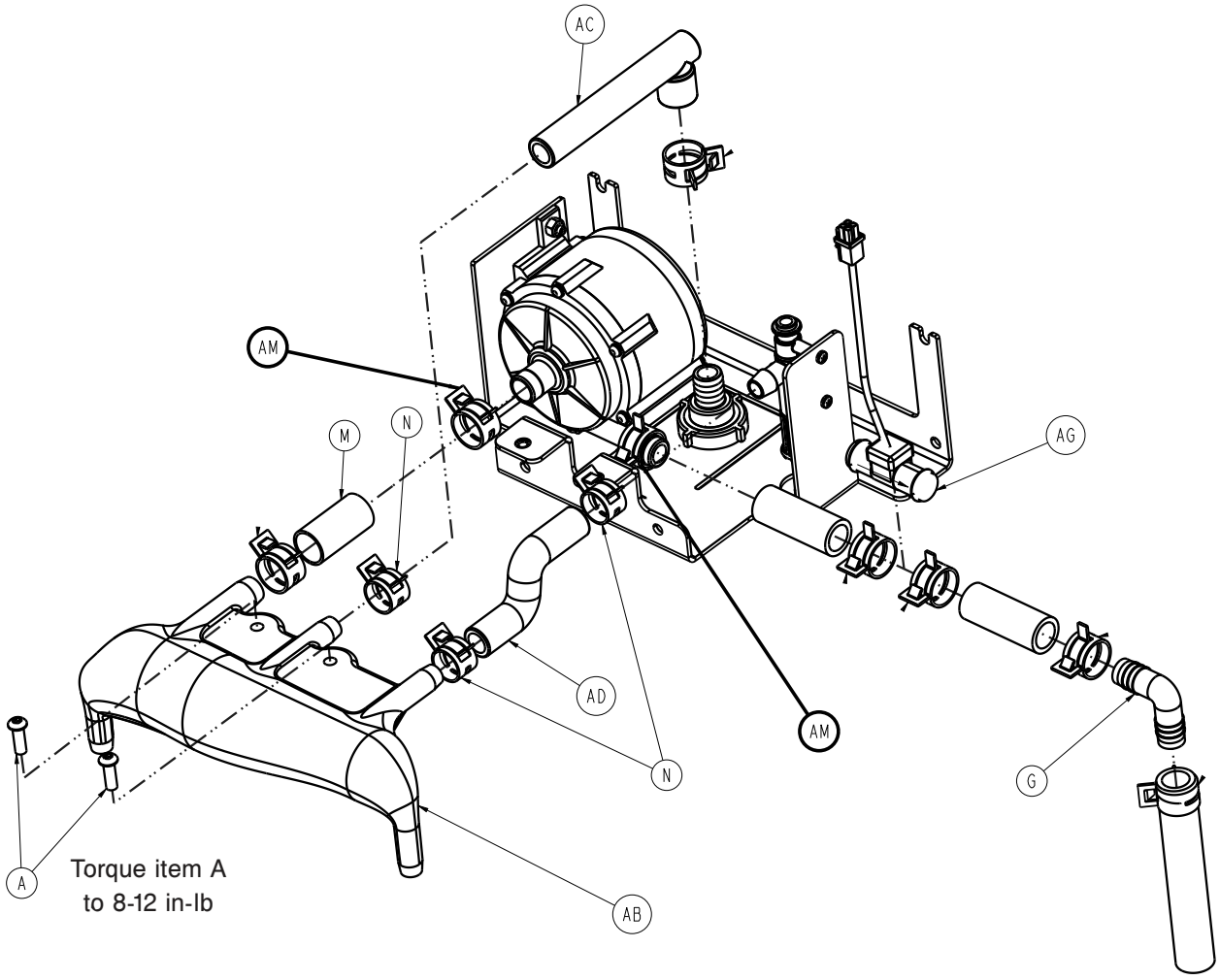


Figure 21: Two hose clamps

11. Remove the tubing from the fluid pump.
12. Remove the fluid pump from bracket and discard the fluid pump.
13. Reverse steps to reinstall.
14. Check for leaks.
15. Functional checks.
16. Verify proper operation before returning the product to service.

Heater replacement

Tools required:

- Utility knife
- T10 Torx
- T25 Torx

Heater replacement (Continued)

- T27 Torx
- 7/16” Socket
- Wire cutters

Procedure:

1. Drain the reservoir. See Draining water from the reservoir on page 65.
2. Move the product to an area that has a floor drain.
3. Remove the patient back cover. See Back cover removal on page 19.
4. Remove the patient front cover. See Front cover removal on page 20.
5. Remove both side covers. See Side cover removal (left or right) on page 20.
6. Using a T25 torx, remove and save the screw and cable clamp that secures the power cord to the control box cover.
7. Unplug power cord from the product.
8. Unscrew the two thumbscrews that secure the display cable to the control assembly.
9. Disconnect the two lines of tubing to the control assembly, utilize the quick disconnects on the patient left side of the product.
10. Using a 7/16” socket, loosen the two lock nuts on the back of the control assembly.
11. Using a T27 torx, remove and save the two screws that secure the control assembly to the side panels.
12. Lift up and pull out the control assembly, removing the control assembly from front side of the product.

    Note: Do not completely remove the control assembly, just enough to gain better access to the pump cable.
13. Unscrew the two thumbscrews that secure the pump cable to the control assembly.
14. Remove the Control assembly the rest of the way out of the product.

    Notes
    - Guide the control assembly tubing while removing from product.
    - Complete the following procedures with the control assembly removed from the product.

Heater replacement (Continued)

15. Using a T25 torx, remove and save the four screws (B) that secure the top bracket (AX) to thermal unit (Figure 22 on page 34).

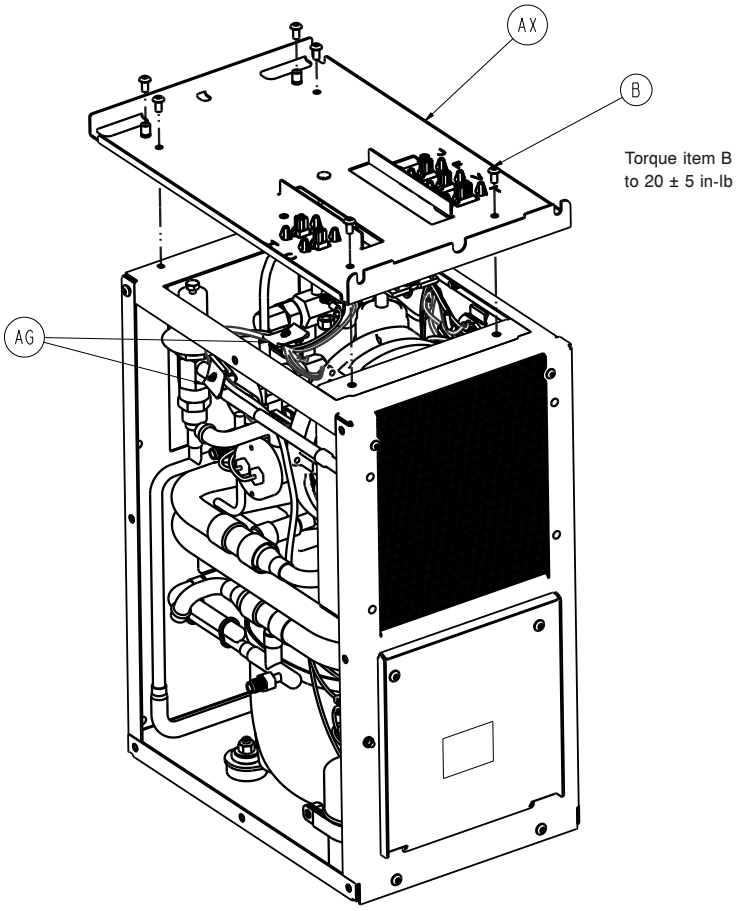


Figure 22: Top bracket

16. Remove heater cable from wire clamps.
17. Using a 7/16” socket, remove the locknut that secures the heater cable ground wire.

Heater replacement (Continued)

18. Using wire cutters remove the heater connector (BD) from the top bracket labeled H (Figure 23 on page 35).

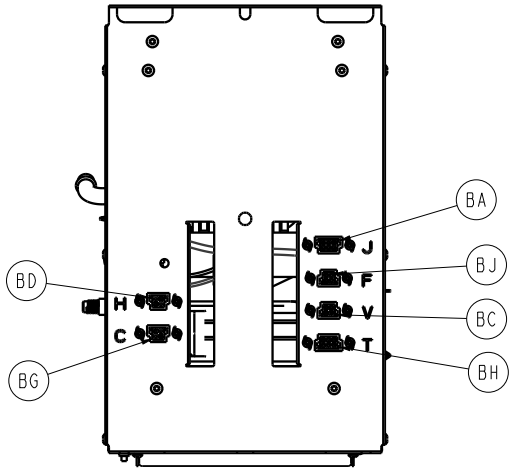


Figure 23: Heater connector

19. Using wire cutters remove the two zip ties that secure the heater cable to heater well assembly.
20. Using a T25 torx, remove and save the two screws that secure the heater well hanger to the main frame.
21. Using a T10 torx, remove and save the center screw that secure the heater well hanger to the heater, remove bracket.
22. Using a utility knife remove the insulation around the heater to gain access to the screws.

    Note: New insulation is provided with the heater assembly.

Heater replacement (Continued)

23. Using a T10 torx, remove and save the two screws (AB) that secure the heater (BD) to the heater well assembly (Figure 24 on page 36).

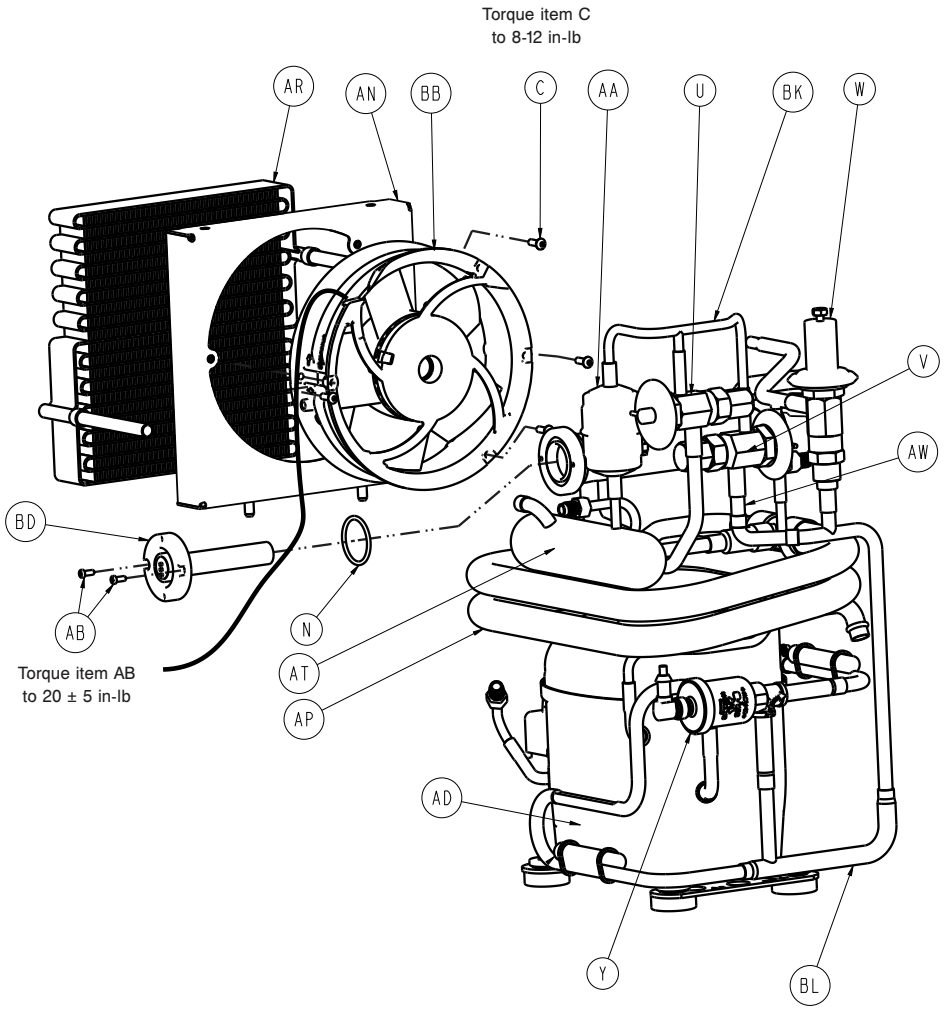


Figure 24: Heater well

24. Remove and discard the heater.
25. Reverse steps to reinstall.

    Note: During reinstall, push in the connector into the top bracket until it is fully seated.
26. Check for leaks.
27. Functional checks.
28. Verify proper operation before returning the product to service.

Refrigeration temperature probe replacement

Tools required:

- Utility knife
- T25 Torx
- Standard screwdriver

Refrigeration temperature probe replacement (Continued)

Procedure:

1. Remove the patient back cover. See Back cover removal on page 19.
2. Remove the patient front cover. See Front cover removal on page 20.
3. Remove the patient right side cover. See Side cover removal (left or right) on page 20.
4. Using a utility knife remove the insulation and tape around the refrigeration temperature probe (BF).

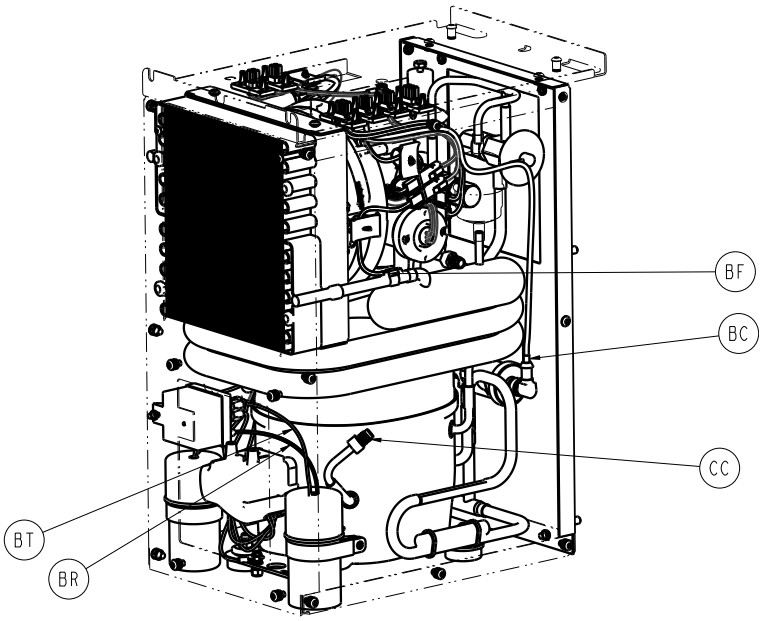


Figure 25:

Note: New insulation tape is supplied with the new refrigeration temperature probe.

5. Unplug and remove the refrigeration temperature probe from the cable clamps.
   a. Un-clip the refrigeration probe from refrigeration line and discard.
6. Reverse steps to reinstall.
7. Verify proper operation before returning the product to service.

Thermal unit replacement

Tools required:

- T27 Torx
- T25 Torx
- 7/16” Socket
- Wire cutters

Procedure:

1. See Draining water from the controller and hoses on page 64.
2. Remove the patient back cover. See Back cover removal on page 19.
3. Remove the patient front cover. See Front cover removal on page 20.
4. Remove both side covers. See Side cover removal (left or right) on page 20.
5. Using a T25 torx, remove and save the screw and cable clamp that secures the power cord to the control box cover.

Thermal unit replacement (Continued)

6. Unplug power cord from the product.
7. Unscrew the two thumbscrews that secure the display cable to the control assembly.
8. Disconnect the two lines of tubing to the control assembly, utilize the quick disconnects on the patient left side of the product.
9. Using a 7/16” socket, loosen the two lock nuts on the back of the control assembly.
10. Using a T27 torx, remove and save the two screws that secure the control assembly to the side panels.
11. Lift up and pull out control assembly, removing control assembly from front side of the product.

    Note: Do not completely remove the control assembly, just enough to gain better access to the pump cable.
12. Unscrew the two thumbscrews that secure the pump cable to the control assembly.
13. Remove the Control assembly the rest of the way out of the product.

    Notes
    - Guide control assembly tubing while removing from product.
    - Complete the following procedures with the control assembly removed from the product.
14. Using wire cutters, remove the one wire tie that secures the air eliminator tubing to the Thermal unit.

    a. Disconnect the line of tubing to the thermal unit, utilizing quick disconnects on the front side of the product.
15. Using a 7/16” socket, remove the two locknuts located on the bottom front of the unit that secures the Thermal unit to the main frame.
16. Remove and discard the Thermal unit from the patient back of the controller (Thermal product, 100-120V on page 151).

    Note: Follow the recycling passport for disposal.
17. Reverse steps to reinstall.

    Note: Make sure that you align the connectors when reinstalling the control assembly.
18. Check for leaks.
19. Functional checks.
20. Verify proper operation before returning the product to service.

Temperature probe replacement

Tools required:

- Utility knife
- T25 Torx
- Wire cutters
- 1/2” open end wrench

Procedure:

1. Remove the patient back cover. See Back cover removal on page 19.
2. Remove the patient front cover. See Front cover removal on page 20.
3. Remove both covers. See Side cover removal (left or right) on page 20.

Temperature probe replacement (Continued)

4. Using T25 torx, remove and save the two screws that secure the access panel (CE) (Figure 26 on page 39).

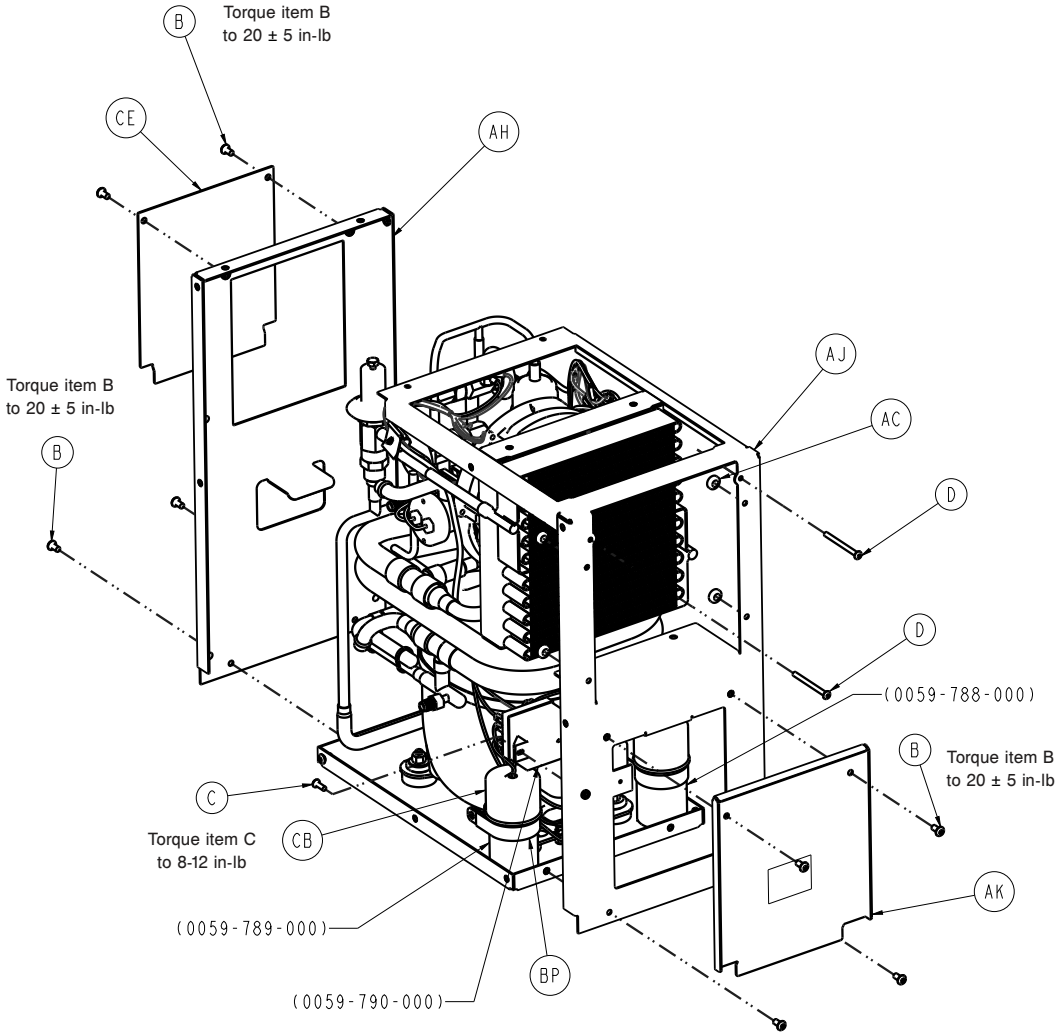


Figure 26: Access panel

Temperature probe replacement (Continued)

5. Using a utility knife remove the insulation around the heater well to gain access to either temperature probes (BE) (Figure 27 on page 40).

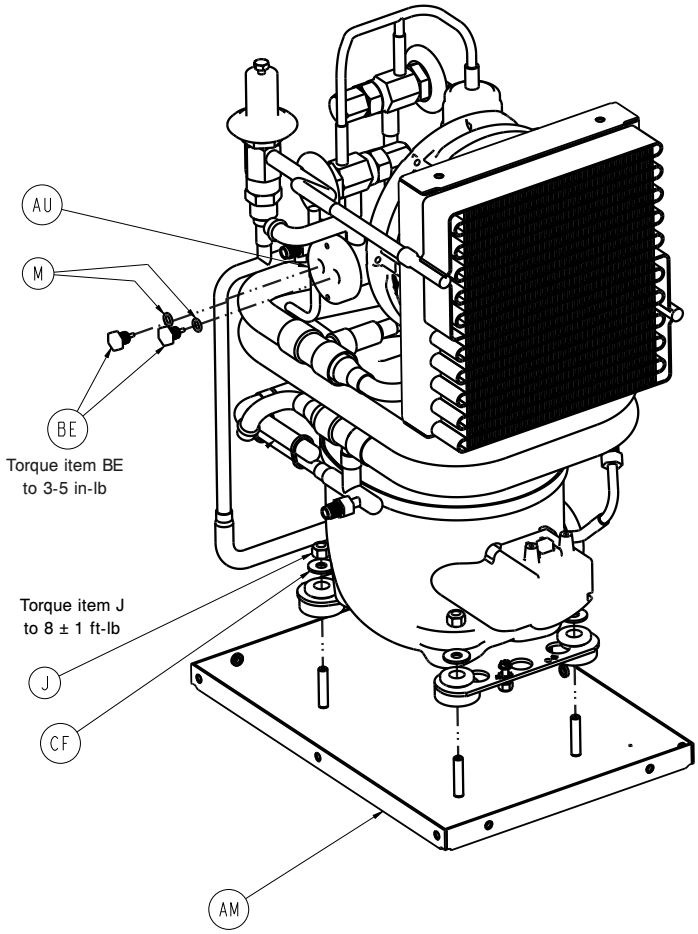


Figure 27: Temperature probe

6. Remove the temperature probe cables from the flexible wire duct.
7. Unplug probes from connectors.

   Note: New insulation and O-ring will be included with a new temperature probe assembly.
8. Using ½" open-end wrench, remove the non-functioning temperature probe(s) and discard.
9. Reverse steps to reinstall.
10. Check for leaks.
11. Functional checks.
12. Verify proper operation before returning the product to service.

Fan assembly, thermal unit replacement

Tools required:

- 3/32" Hex
- T25 Torx
- 7/16" Socket

Fan assembly, thermal unit replacement (Continued)

Procedure:

1. Remove the patient back cover. See Back cover removal on page 19.
2. Remove the patient front cover. See Front cover removal on page 20.
3. Remove the side covers. See Side cover removal (left or right) on page 20.
4. Using a T25 torx, remove and save the screw and cable clamp that secures the power cord to the control box cover.
5. Unplug power cord from the product.
6. Unscrew the two thumbscrews that secure the display cable to the control assembly.
7. Disconnect the two lines of tubing to the control assembly, utilize the quick disconnects on the patient left side of the product.
8. Using a 7/16” socket, loosen the two lock nuts on the back of the control assembly.
9. Using a T27 torx, remove and save the two screws that secure the control assembly to the side panels.
10. Lift up and pull out control assembly, removing control assembly from front side of the product.

    Note: Do not completely remove the control assembly, just enough to gain better access to the pump cable.
11. Unscrew the two thumbscrews that secure the pump cable to the control assembly.
12. Remove the Control assembly the rest of the way out of the product.

    Notes

    - Guide control assembly tubing while removing from product.
    - Complete the following procedures with the control assembly removed from the product.
13. Using a T25 torx, remove the four screws that secure the connector plate. Lift up and set plate to one side of the product.

Fan assembly, thermal unit replacement (Continued)

14. Using 3/32” Hex, remove the two screws (D) that secure the fan assembly to the product (Figure 28 on page 42).

    Note: Loosen screws a half turn then retighten, loosen screws a full turn then retighten. Repeat process until screws are fully removed.

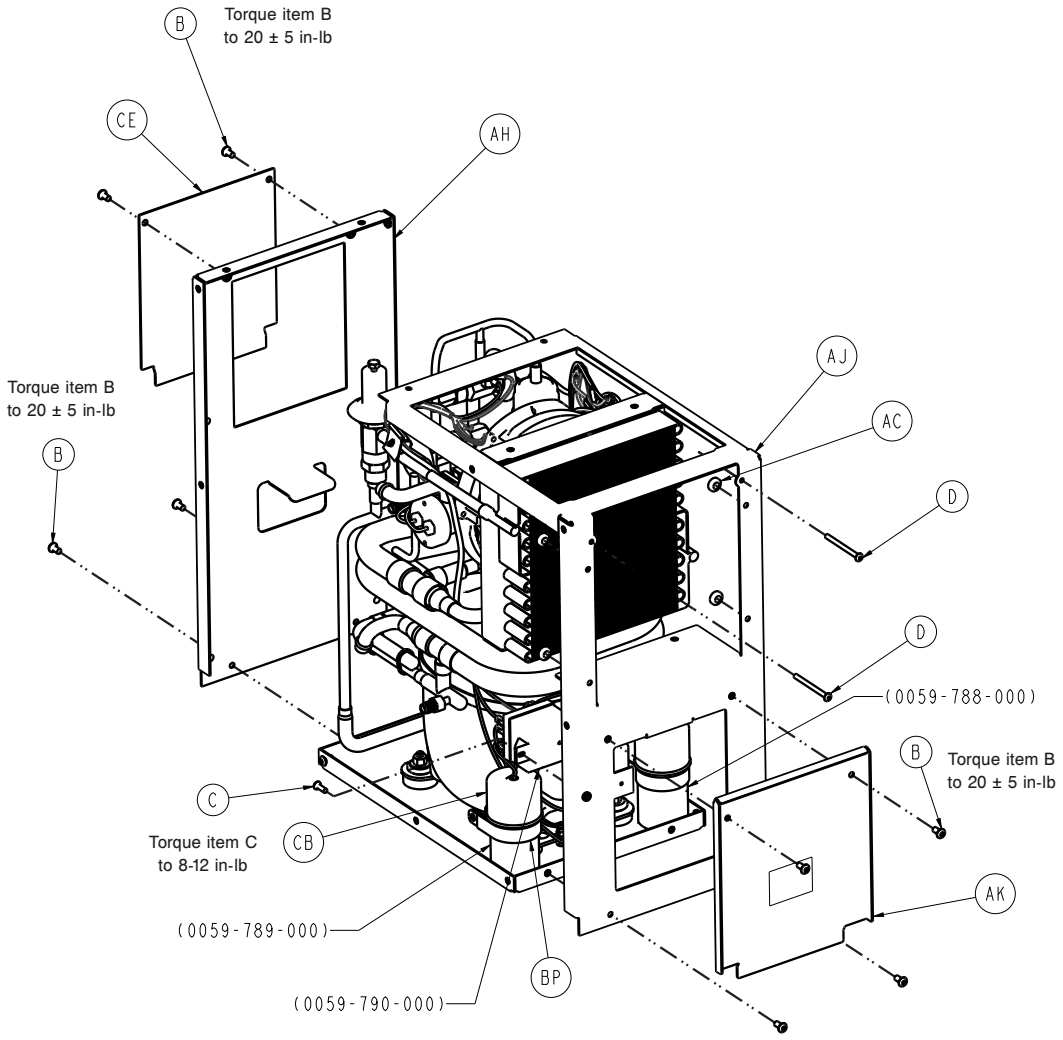


Figure 28: Fan assembly

15. Unplug the fan connector and lift up and out to remove the fan assembly.
16. Discard the fan assembly.
17. Reverse steps to reinstall.

    Note: Align the fan shroud pins correctly into the product (Thermal product, 100-120V on page 151).
18. Verify proper operation before returning the product to service.

Fluid management board (FMB) replacement

Tools required:

- T25 Torx
- ESD System

Fluid management board (FMB) replacement (Continued)

- T27 Torx
- 7/16” socket
- 3/8” socket
- Ratchet

Procedure:

1. Remove the patient back cover. See Back cover removal on page 19.
2. Remove the patient front cover. See Front cover removal on page 20.
3. Remove both side covers. See Side cover removal (left or right) on page 20.
4. Unplug power cord from the product.
5. Using a T27 torx, remove the 2 screws that secures control box cover to the side panels.
6. Using a T25 torx, remove the 6 screws (D) that secure the control box cover (Figure 29 on page 43).

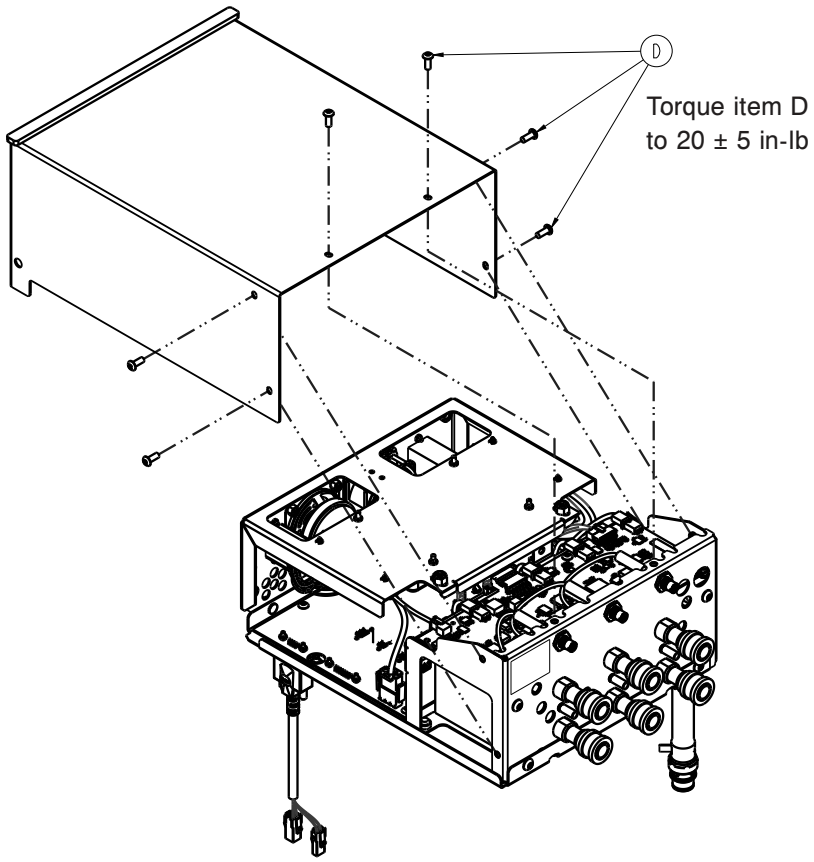


Figure 29: Control box cover

Fluid management board (FMB) replacement (Continued)

7. Using a T27 torx, remove and save the four screws (C) on the back of the control assembly. Pull the cover towards the back of the product, set aside (Figure 30 on page 44).

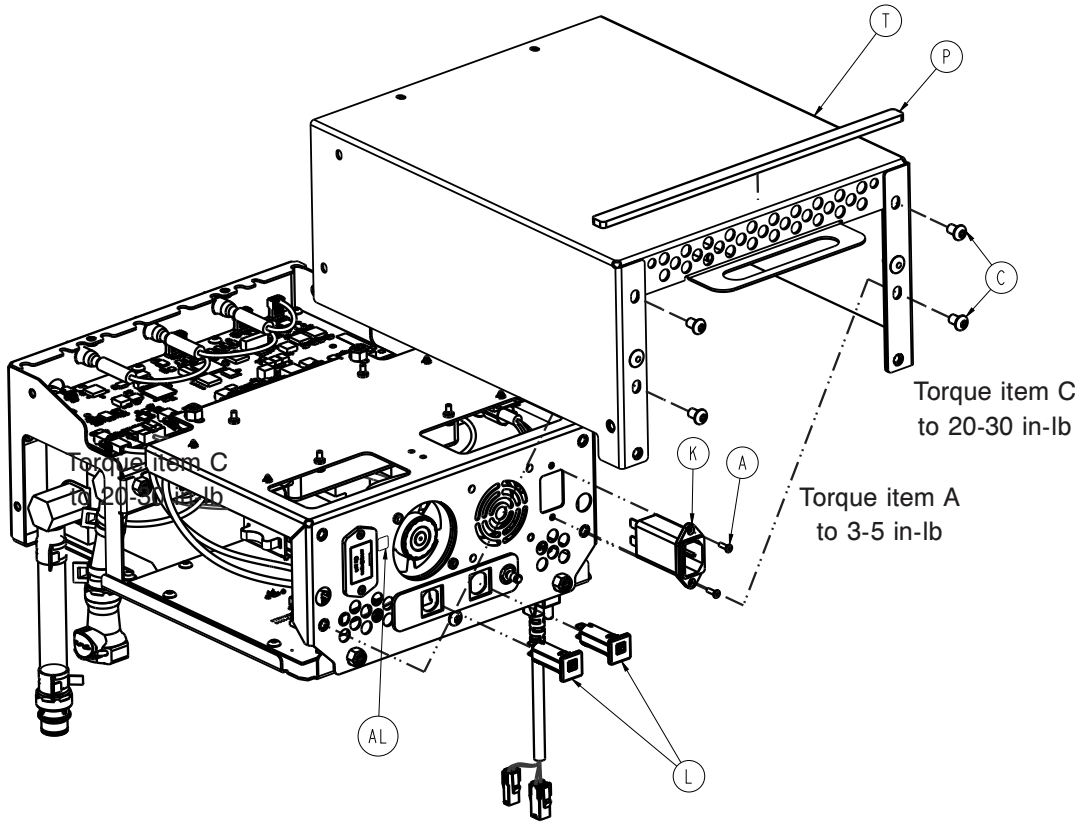


Figure 30: Back of the control assembly

8. Using thumb screws, remove the display cable from control assembly.
9. Using thumb screws, remove the pump cable from control assembly.

Fluid management board (FMB) replacement (Continued)

10. Using a 7/16” socket remove and save the four lock nuts (G) that secure the power supply mount to the control assembly (Figure 31 on page 45).

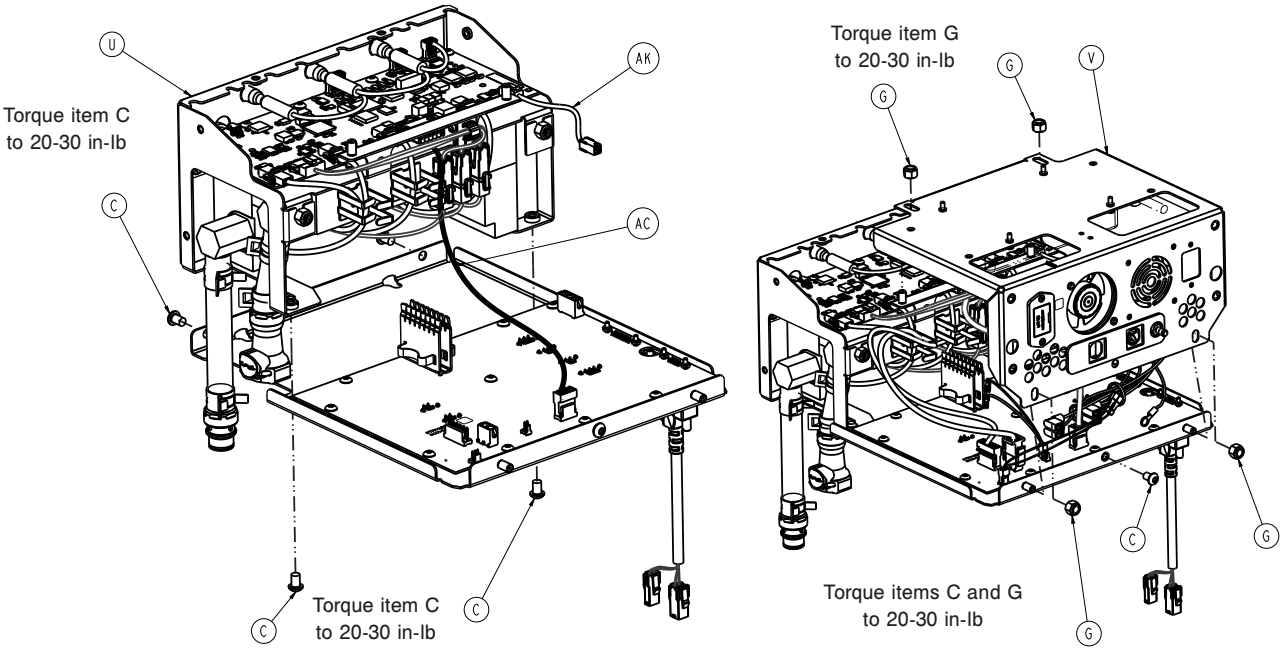


Figure 31: Power supply

11. Using a T27 torx, remove and save the screw (C) that secure the power supply mount to the control assembly (Figure 31 on page 45).
12. Lift up on the power supply mount to gain access to cable connections.
13. Disconnect all cable connections to the fluid management board.

    Note: ESD Requirement. See Protecting against Electrostatic Discharge (ESD) on page 16.
14. Provide support to the power supply assembly when disconnecting. Remove and save the power supply assembly.
15. Using a T25 torx, remove the nine screws (D) that secure the fluid management board (Figure 32 on page 46).

Fluid management board (FMB) replacement (Continued)

16. Using 3/8” socket, remove and save the nut (E) that secures the fluid grounding bracket (Figure 32 on page 46).

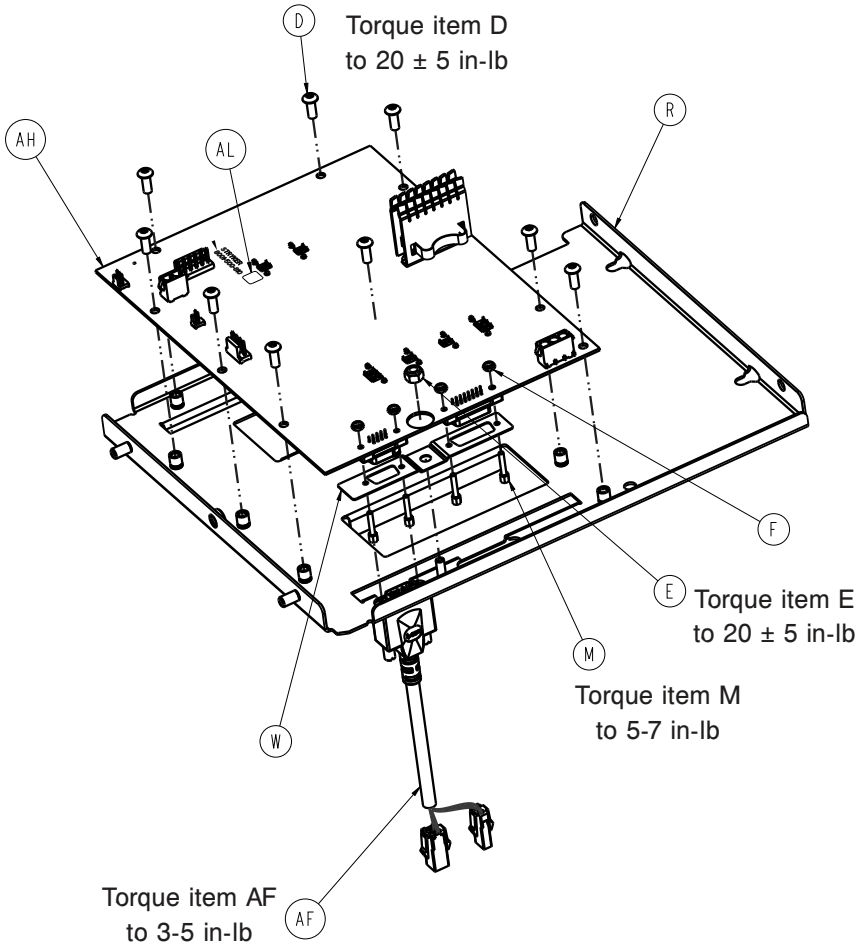


Figure 32: Fluid grounding bracket

17. Remove and discard the fluid management board (AH).

    Note: Do not dispose of as unsorted municipal waste. See your local distributor for return or collection systems available in your country.
18. Reverse steps to reinstall.
19. Functional checks.
20. Verify proper operation before returning the product to service.

Main control board (MCB) replacement

Tools required:

- T25 Torx
- T27 Torx
- ESD System
- 7/16” Socket
- Ratchet

Main control board (MCB) replacement (Continued)

Procedure:

1. Remove the patient back cover. See Back cover removal on page 19.
2. Remove the patient front cover. See Front cover removal on page 20.
3. Unplug power cord from product.
4. Using a T27 torx, remove and save the two screws that secure the control box cover to the side panels.
5. Using a T25 torx, remove the 6 screws (D) that secure the control box cover (Figure 33 on page 47).

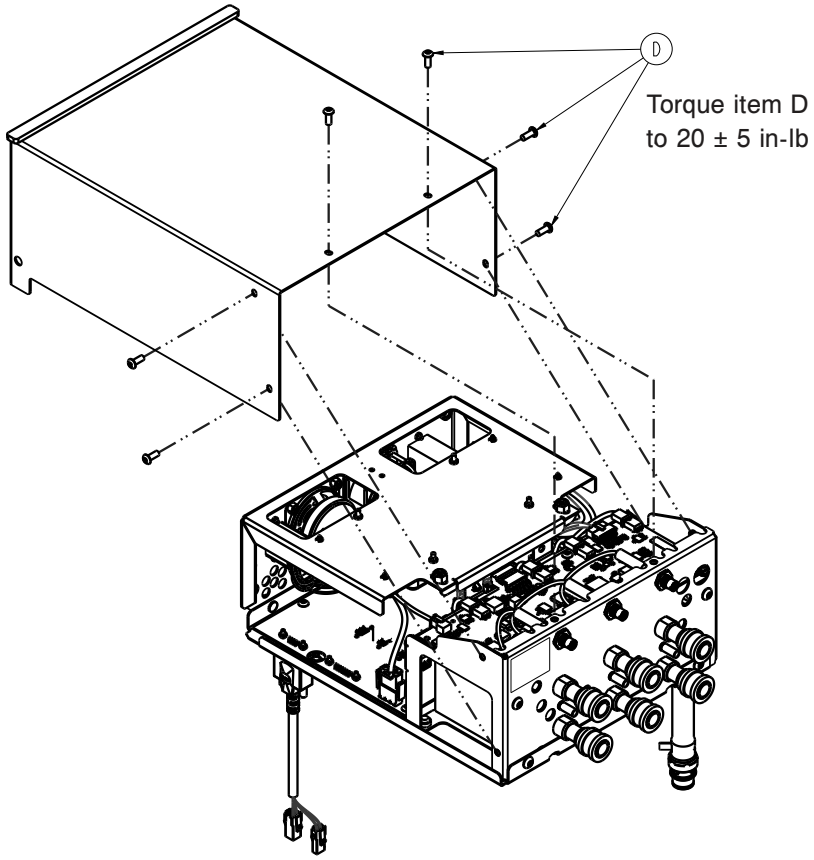


Figure 33: Control box cover

6. Using a T27 torx, remove the four screws on the back of the control assembly, remove cover by pulling towards back of product.

Main control board (MCB) replacement (Continued)

7. Disconnect the 10 cable connections to the MCB (AA). Labeled E, F, G, H, J, M , N, L, AG, and AH (Figure 34 on page 48).

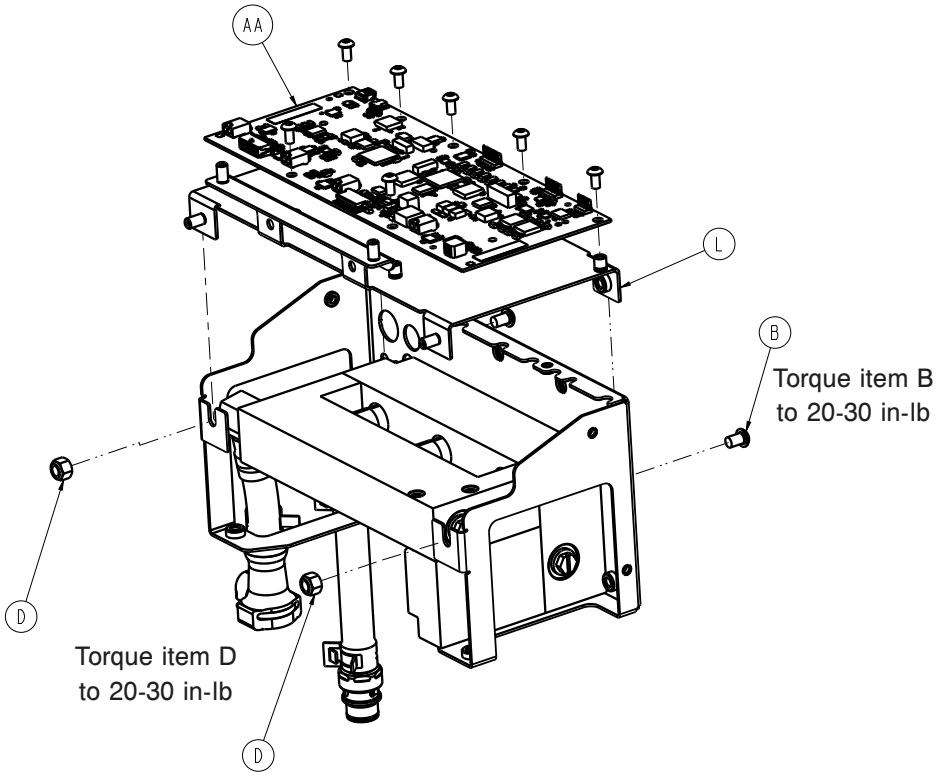


Figure 34: Main control board

Notes

- Make sure you take note were the cables were connected for reinstallation.
- ESD Requirement. See Protecting against Electrostatic Discharge (ESD)on page 16.

8. Using a T25 torx, remove and save the seven screws that secure the control board.
9. Discard the control board.

   Note: Do not dispose of as unsorted municipal waste. See your local distributor for return or collection systems available in your country.
10. Reverse steps to reinstall.
11. Functional checks.
12. Verify proper operation before returning the product to service.

Temperature or Monitor probe jack replacement

Tools required:

- Utility knife
- T27 Torx
- Wire cutters
- Adjustable wrench

Procedure:

Temperature or Monitor probe jack replacement (Continued)

1. Remove the patient back cover. See Back cover removal on page 19.
2. Remove the patient front cover. See Front cover removal on page 20.
3. Unplug power cord from the product.
4. Using a T27 torx, remove and save the two screws that secure the control box cover to the side panels.
5. Using a T25 torx, remove the 6 screws (D) that secure the control box cover (Figure 35 on page 49).

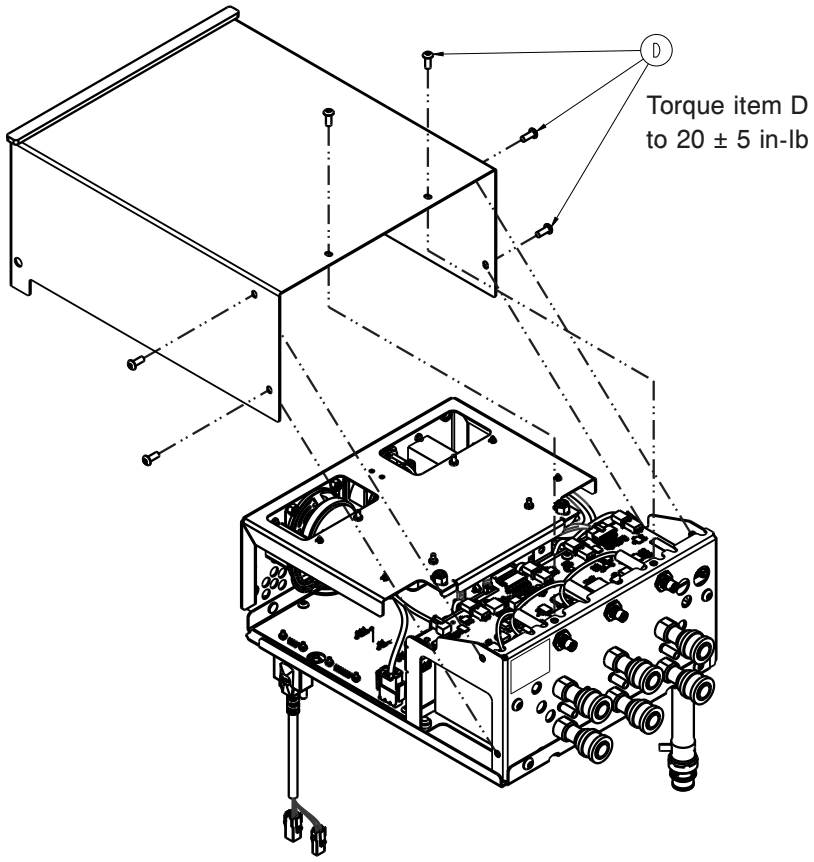


Figure 35: Control box cover

6. Using a T27 torx, remove and save the four screws on the back of the control assembly, remove cover by pulling towards back of product.
7. Unplug defective probe from main control board.
8. Using a an adjustable wrench, remove the nut that secures the Temperature or Monitor probe jack.
9. Remove and discard the Temperature or Monitor probe jack.

   Note: New nut is supplied with the probe jack.
10. Reverse steps to reinstall.
11. Functional checks.
12. Verify proper operation before returning the product to service.

Manifold assembly replacement

Tools required:

- T25 Torx

Manifold assembly replacement (Continued)

- 7/16” Socket

Procedure:

1. See Draining water from the controller and hoses on page 64.
2. Remove the patient back cover. See Back cover removal on page 19.
3. Remove the patient front cover. See Front cover removal on page 20.
4. Remove both side covers. See Side cover removal (left or right) on page 20.
5. Using a T25 torx, remove and save the screw and cable clamp that secures the power cord to the control box cover.
6. Unplug power cord from the product.
7. Unscrew the two thumbscrews that secure the display cable to the control assembly.
8. Disconnect the two lines of tubing to the control assembly, utilize the quick disconnects on the patient left side of the product.
9. Using a 7/16” socket, remove the two lock nuts on the back of the control assembly.
10. Using a T27 torx, remove and save the two screws that secure the control assembly to the side panels.
11. Lift up and pull out control assembly, removing control assembly from front side of the product.

    Note: Do not completely remove the control assembly, just enough to gain better access to the pump cable.
12. Unscrew the two thumbscrews that secure the pump cable to the control assembly.
13. Remove the Control assembly the rest of the way out of the product.

    Notes
    - Guide control assembly tubing while removing from product.
    - Complete the following procedures with the control assembly removed from the product.
14. Using a T27 torx, remove the four screws that secure the control box cover, set aside.

Manifold assembly replacement (Continued)

15. Using a T25 torx, remove the 6 screws (D) that secure the control box cover (Figure 36 on page 51).

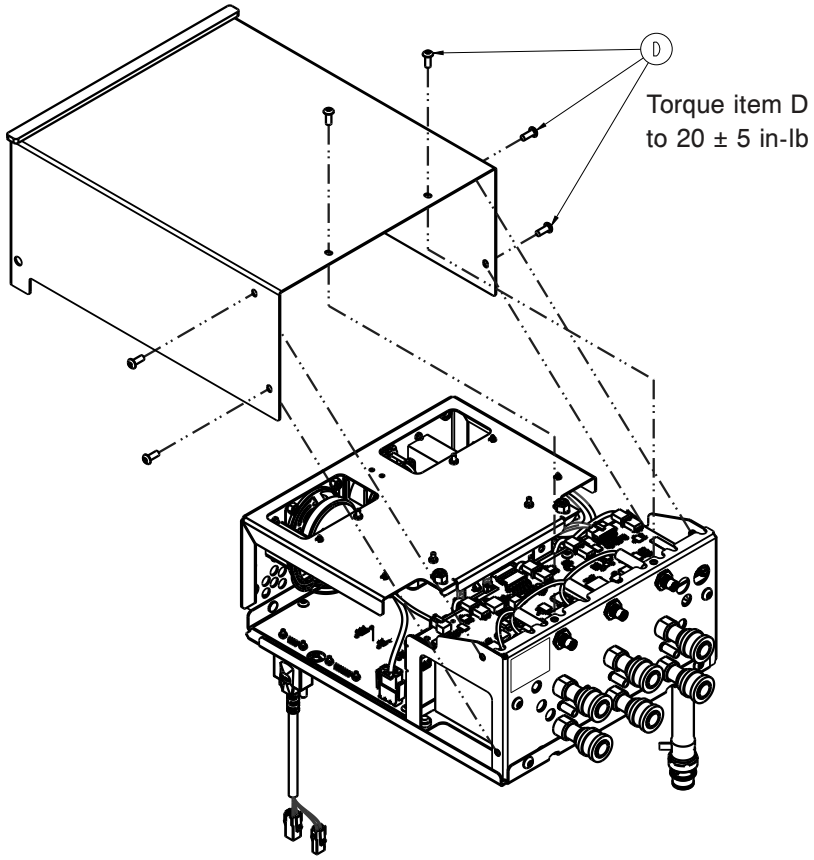


Figure 36: Control box cover

Manifold assembly replacement (Continued)

16. Using 7/16” socket, remove the 2 lock nuts (G) that secures the manifold assembly to the control assembly.(Figure 37 on page 52)

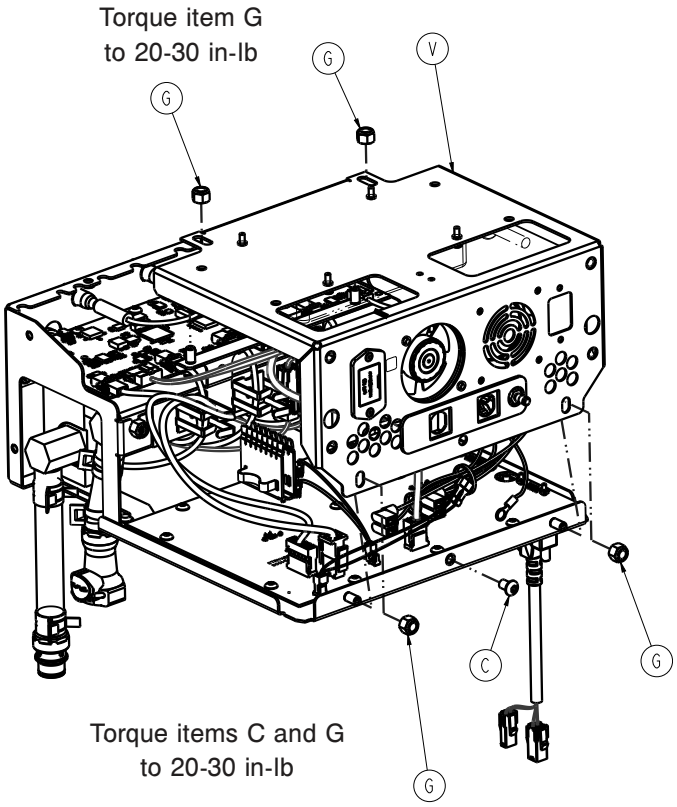


Figure 37: Lock nuts

Manifold assembly replacement (Continued)

17. Using a T27 torx, remove the four screws (C) that secure the manifold assembly (U) to control assembly (Figure 38 on page 53).

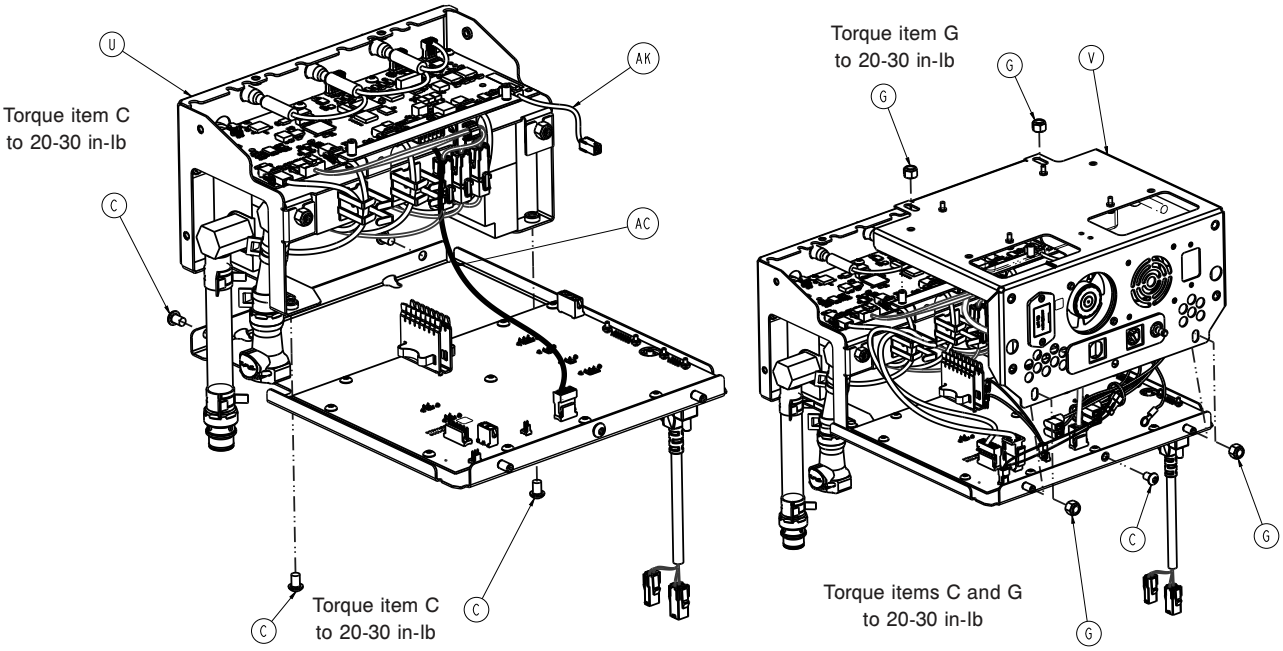


Figure 38: Manifold assembly

18. Disconnect connector AK and AC from the main control board.
    - Make sure to note the location of the connectors.
    - ESD Requirement. See Protecting against Electrostatic Discharge (ESD)on page 16.
19. Discard the manifold assembly.
20. Reverse steps to reinstall.
21. Functional checks.
22. Verify proper operation before returning the product to service.

Manifold flow sensor cable replacement

Tools required:

- T25 Torx
- 7/16” Socket
- 5/32” Hex

Procedure:

1. Remove the Manifold assembly from the product. See Manifold assembly replacement (Removal only).

Manifold flow sensor cable replacement (Continued)

2. Once the manifold assembly is removed, using a T25 torx remove the two screws (B) securing the outer manifold bracket to the MCB support bracket. (Figure 39 on page 54)

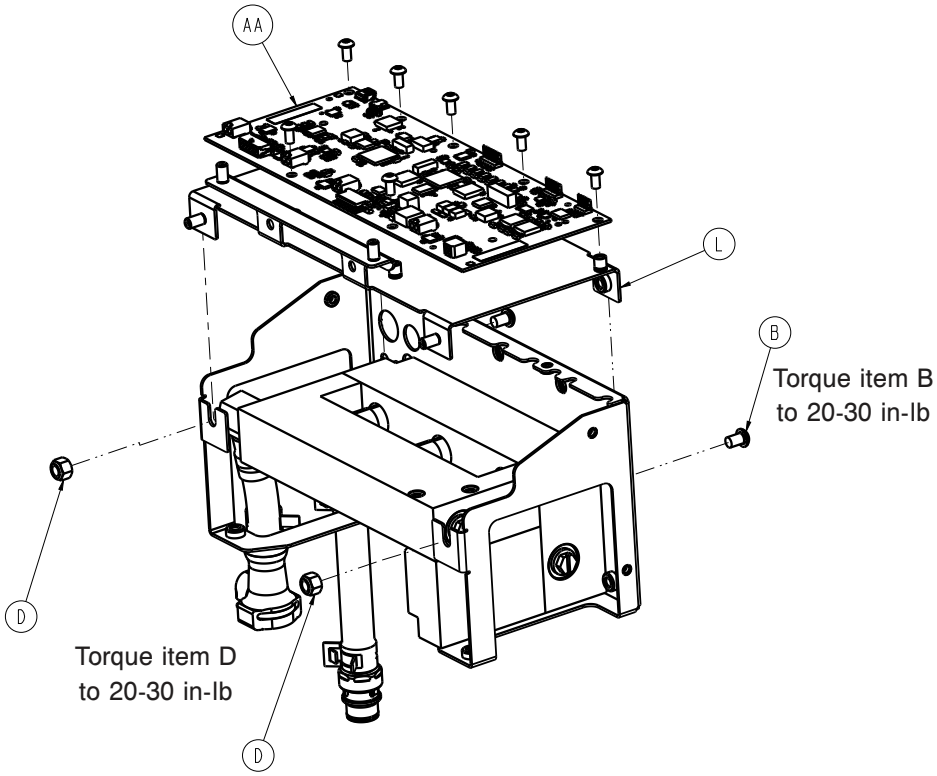


Figure 39: Outer manifold bracket to MCB support bracket

Notes

- Push up on the MCB support bracket. This will release it from the outer manifold bracket.
- ESD requirement. See Protecting against Electrostatic Discharge (ESD)on page 16

3. Remove the flow sensor cables from the cable clamp.

   Note: This will provide room to separate the return and supply manifolds.

Manifold flow sensor cable replacement (Continued)

4. Using a 5/32” hex, remove and save the 6 screws (C) that secure the return manifold (N) to the supply manifold (M). (Figure 40 on page 55)

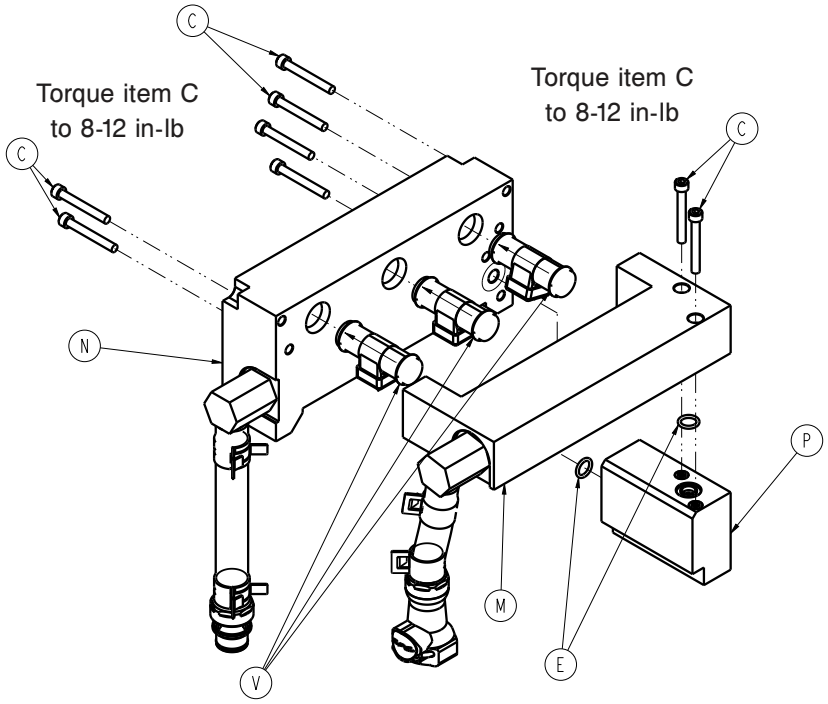


Figure 40: Return manifold to supply manifold

5. Separate the supply manifold from the return manifold.

   Note: Some water will come out of the manifolds.

6. Disconnect and remove the non-functioning flow sensors.

   Note: Orient the new flow sensor utilizing the arrow on the sensor points towards the hose connectors.

Manifold flow sensor cable replacement (Continued)

7. Reverse steps to install.

   Note: Verify O-ring (E) is seated properly between the return and supply manifolds. (Figure 41 on page 56)

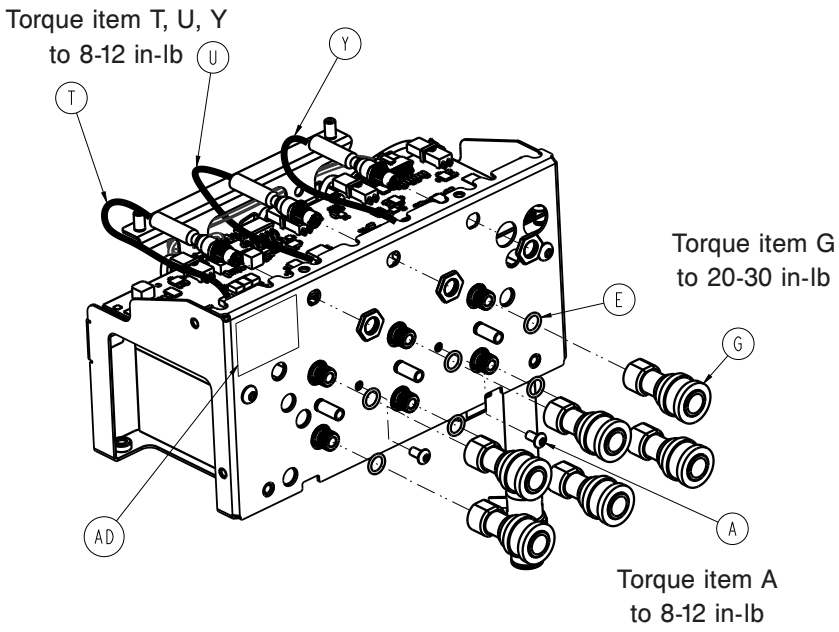


Figure 41: O-ring

8. Check for leaks.
9. Perform function check.
10. Verify proper operation before returning the product to service.

System flow sensor replacement

Tools required:

- Wire cutters
- Needle nose pliers
- T27 Torx

Procedure:

1. Drain the water from the unit. See Draining water from the controller and hoses on page 64.
2. Remove the patient back cover. See Back cover removal on page 19.
3. Remove the patient front cover. See Front cover removal on page 20.
4. Remove the left side cover. Side cover removal (left or right) on page 20.
5. Using a T27 torx, remove and save the two top screws that secure the fluid bracket to the frame.
6. Using a T27 torx, loosen the bottom two screws on the fluid bracket.
7. Disconnect both tubes on the left side that are directly above the front left caster, utilize the quick disconnect.
8. Using wire cutters, remove the cable tie on the Thermal Unit and push the Air Eliminator tubing back through the patient right side of the unit.
9. Lift up and rotate the fluid bracket to gain access to the sensor.

   Note: Help guide the tubing towards the front of the unit to allow better access underneath the fluid bracket.

System flow sensor replacement (Continued)

10. Disconnect the System Flow Sensor from the cable assembly.
11. Using needle nose pliers, pinch the hose clamps (AM) and remove the tubing off of the System Flow Sensor (Figure 42 on page 57).

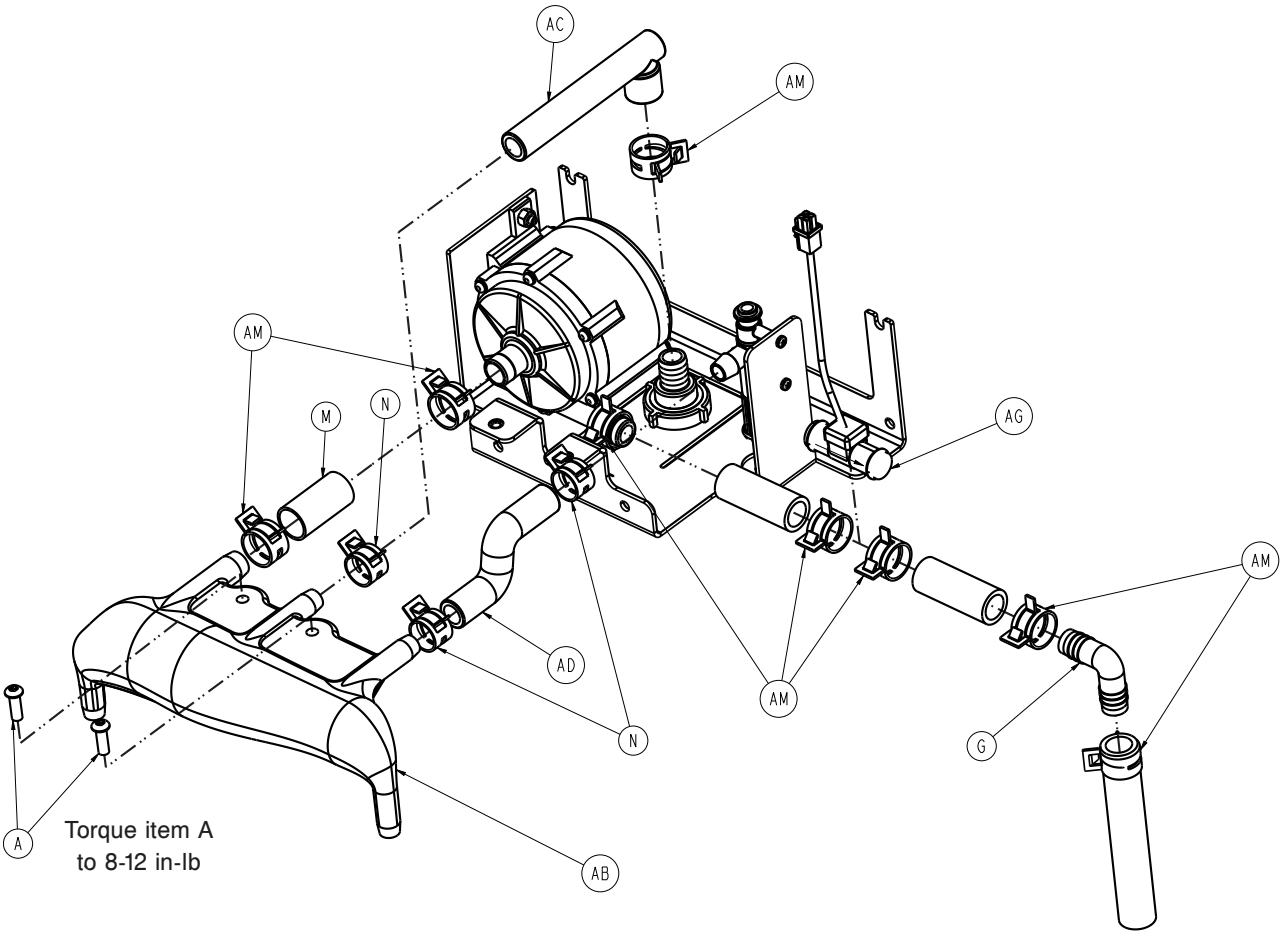


Figure 42: Hose clamps

12. Remove and discard sensor (AG).
13. Reverse the steps to reinstall
14. Check for leaks.
15. Verify proper operation before returning the product to service.

Supply manifold replacement

Tools required:

- 7/16” Socket
- T25 Torx
- 5/32 Allen

Procedure:

1. Drain the water from the unit. See Draining water from the controller and hoses on page 64.

Supply manifold replacement (Continued)

2. Remove the patient back cover. See Back cover removal on page 19.
3. Remove the patient front cover. See Front cover removal on page 20.
4. Remove both side covers. Side cover removal (left or right) on page 20.
5. Unplug the power cord from the product.
6. Unscrew the two thumbscrews that secure the display cable to the control assembly.
7. Unscrew the two thumbscrews that secure the pump cable to the control assembly.
8. Disconnect the two lines of tubing to the control assembly, utilize the quick disconnects on the patient left side of the product.
9. Using a 7/16” socket, remove and save the two lock nuts on the back of the control assembly.
10. Using a 727 torx, remove and save the two screws that secure the control assembly to the side panels.
11. Lift up and pull out the control assembly, removing the control assembly from the front of the product.

    Notes

    - Guide the control assembly tubing while you remove it from the unit.
    - Complete the following procedures with the control assembly removed from the product.
12. Using a T27 torx, remove and save the four screws that secure the control box cover.
13. Using a T27 torx, remove and save the screw that secures the power supply bracket to the control assembly bracket.
14. Disconnect the ten connectors from Main Control Board (MCB) labeled E, F, G, H, J, M, N, L, AG, and AH.
15. Using a T27 torx, remove and save the two screws (B) (Figure 43 on page 58) that secure the MCB bracket to control assembly bracket.

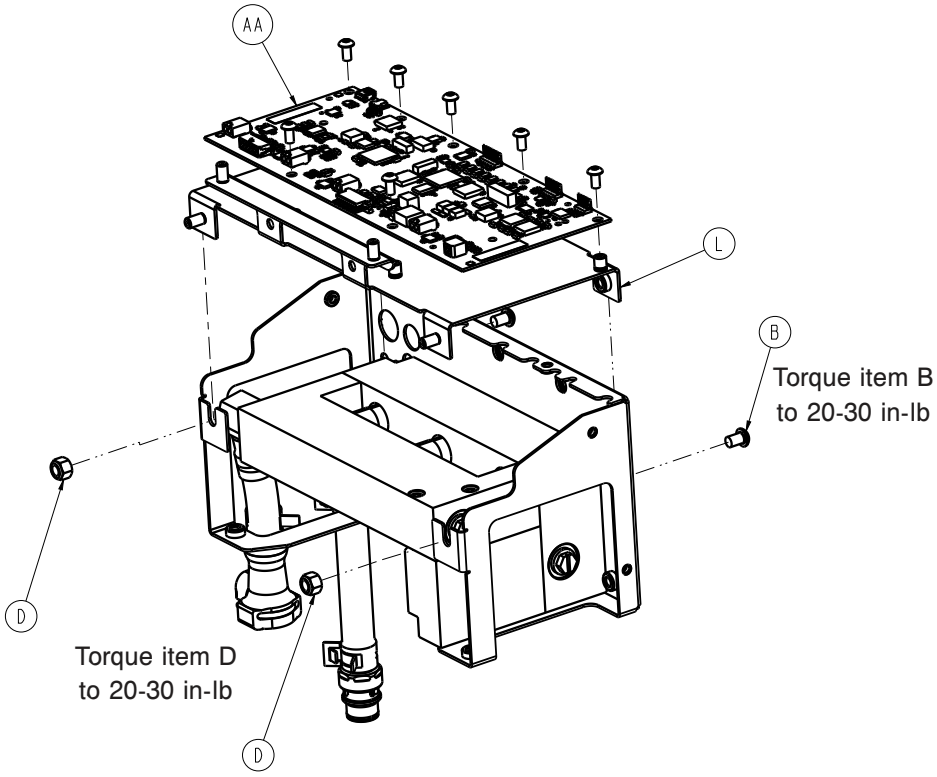


Figure 43: MCB bracket

16. Using 7/16” socket loosen the two nuts(D) that secure the MCB bracket to the control assembly bracket.
17. Using a 7/16” socket remove and save the two nuts that secure the MCB bracket to the power supply bracket. Move the power supply bracket out of your way.

Supply manifold replacement (Continued)

18. Lift up on the underside of MCB bracket. Move the MCB bracket towards the back end of the assembly out of your way.
19. Using a 5/32 Allen, remove and save the four screws (C) that secures the return manifold assembly (N) to the supply manifold assembly (M). (Figure 44 on page 59)

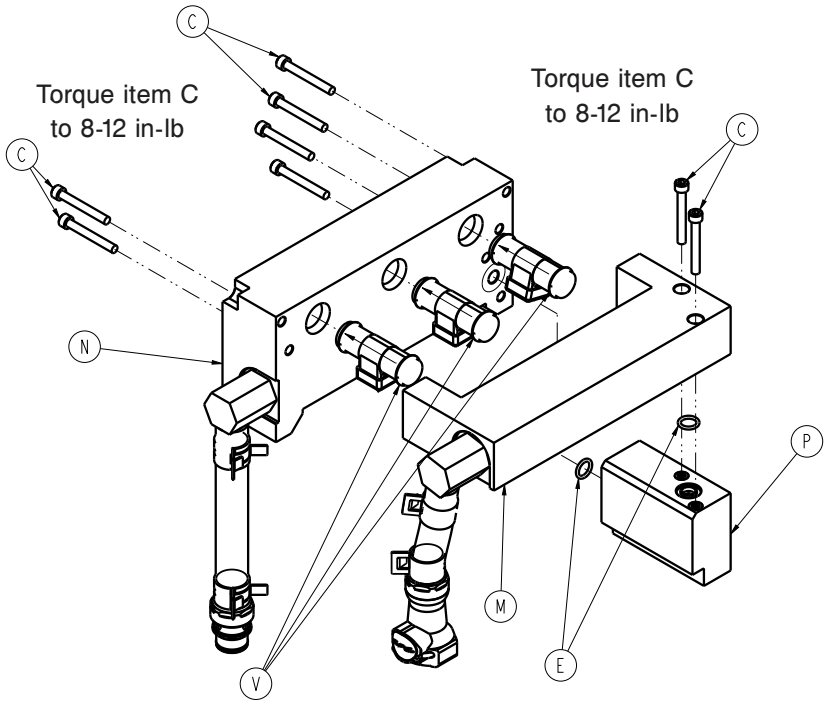


Figure 44: Manifolds

20. Separate the supply manifold assembly (M) from the return and bypass manifolds (P).

    Note: Verify all 3 Manifold Flow Sensors remain seated in the Return Manifold.
21. Discard supply manifold.
22. Reverse the steps to reinstall.

    Note: Verify O-ring (F) is seated properly between the Supply and Bypass manifolds during reinstall.
23. Verify proper operation before returning the product to service.

Return manifold replacement

Tools required:

- 7/16” Socket
- T25 Torx
- 5/32 Allen
- Crescent wrench

Procedure:

1. Drain the water from the unit. See Draining water from the controller and hoses on page 64.
2. Remove the patient back cover. See Back cover removal on page 19.
3. Remove the patient front cover. See Front cover removal on page 20.

Return manifold replacement (Continued)

4. Remove both side covers. Side cover removal (left or right) on page 20.
5. Unplug the power cord from the product.
6. Unscrew the two thumbscrews that secure the display cable to the control assembly.
7. Unscrew the two thumbscrews that secure the pump cable to the control assembly.
8. Disconnect the two lines of tubing to the control assembly, utilize the quick disconnects on the patient left side of the product.
9. Using a 7/16” socket, remove and save the two lock nuts on the back of the control assembly.
10. Using a 727 torx, remove and save the two screws that secure the control assembly to the side panels.
11. Lift up and pull out the control assembly, removing the control assembly from the front of the product.

    Notes

    - Guide the control assembly tubing while you remove it from the unit.
    - Complete the following procedures with the control assembly removed from the product.
12. Using a T27 torx, remove and save the four screws that secure the control box cover.
13. Using a T27 torx, remove and save the screw that secures the power supply bracket to the control assembly bracket.
14. Disconnect the ten connectors from Main Control Board (MCB) labeled E, F, G, H, J, M, N, L, AG, and AH.
15. Using a T27 torx, remove and save the two screws (B) (Figure 45 on page 60) that secure the MCB bracket to control assembly bracket.

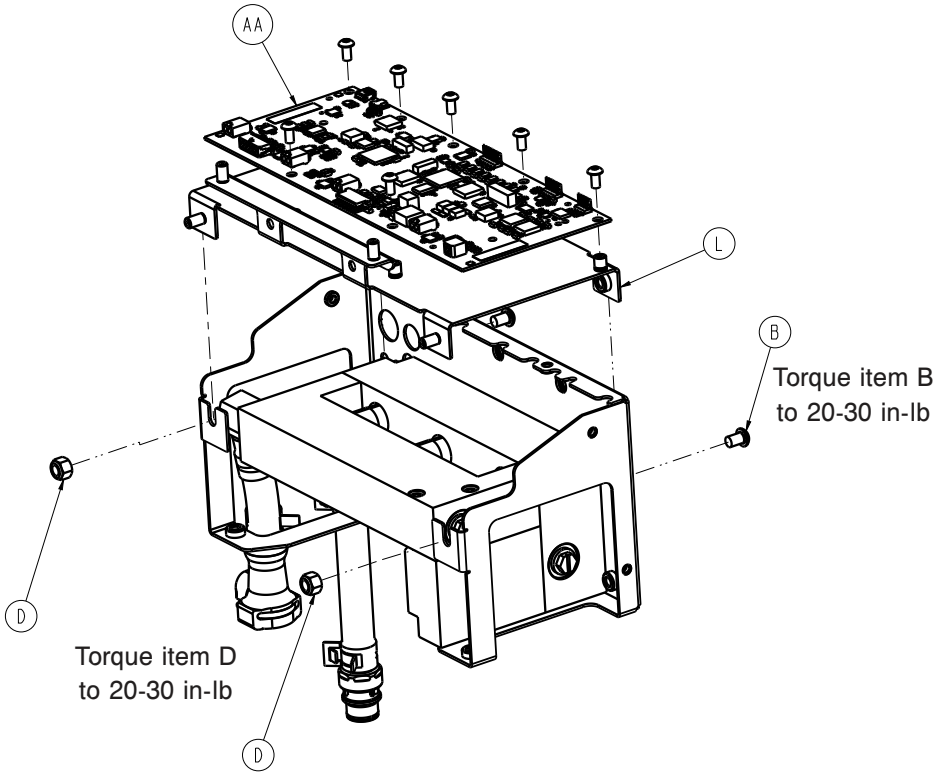


Figure 45: MCB bracket

16. Using 7/16” socket loosen the two nuts (D) that secure the MCB bracket to the control assembly bracket.
17. Using a 7/16” socket remove and save the two nuts that secure the MCB bracket to the power supply bracket. Move the power supply bracket out of your way.
18. Lift up on the underside of MCB bracket. Move the MCB bracket towards the back end of the assembly out of your way.

Return manifold replacement (Continued)

19. Using a crescent wrench, remove and save the six hose connectors (G) and O-rings (E). (Figure 46 on page 61)

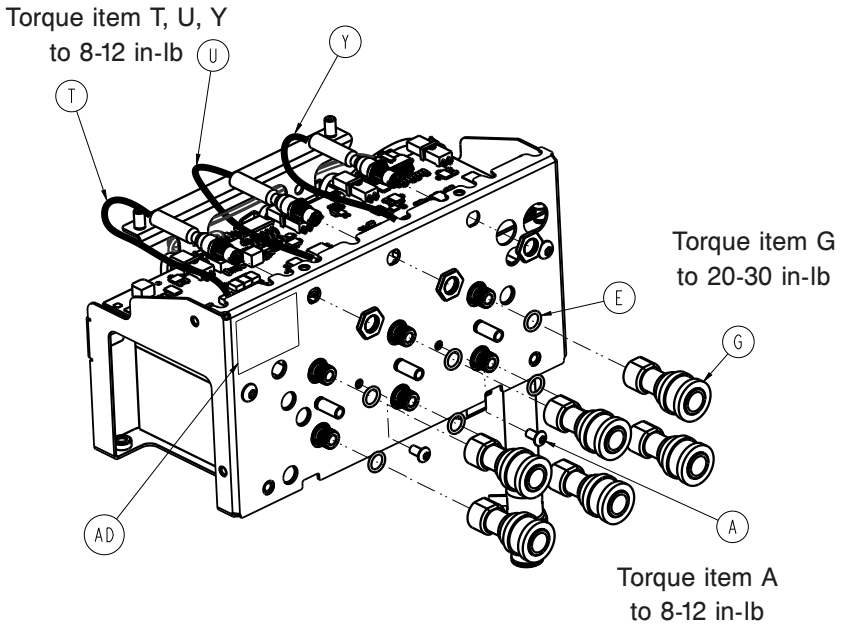


Figure 46: Hose connectors

20. Disconnect all three Manifold Flow Sensors labeled Port 1, 2, and 3.
21. Remove and discard the manifold block.

    Note: Although the system was drained of water residual water may be present use CAUTION when removing to make sure that water does not come in contact with electrical boards.

Return manifold replacement (Continued)

22. Using a 5/32” Allen remove and save the six screws (C) that secure the Return Manifold to the Bypass and Supply Manifolds. (Figure 47 on page 62)

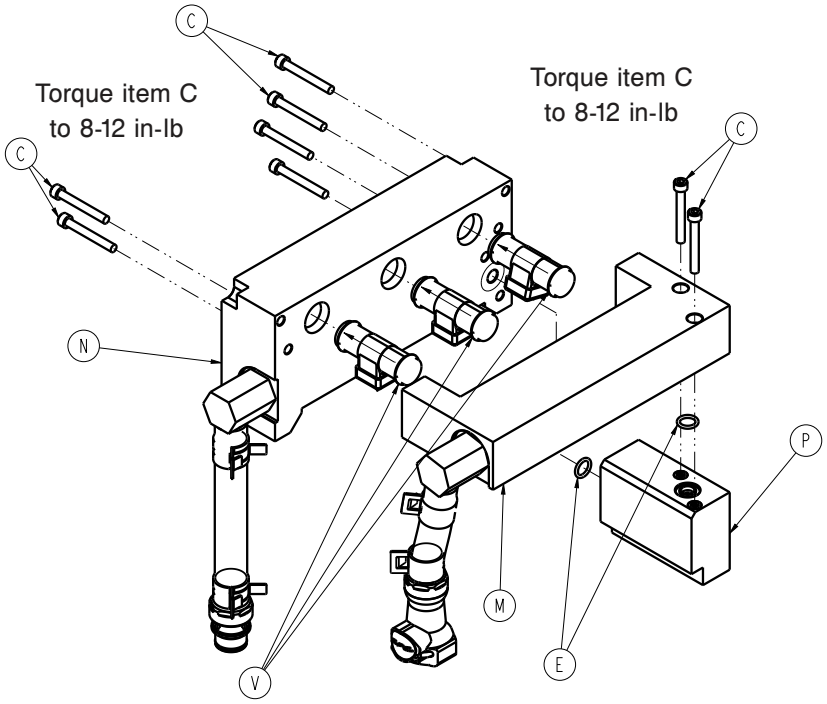


Figure 47: Manifolds

23. Separate the return manifold assembly (N) from the supply and bypass manifolds (M and P).
24. Reverse the steps to reinstall.

    Note: Verify O-ring (E) is seated properly between Return and Bypass manifolds during reinstall.
25. Verify proper operation before returning the product to service.

Storing the controller

Storage is equal to or greater than 7 days without use.

CAUTION

- Do not store the product with water in the device.
- Always store the product within the specified environmental condition values.

To store the controller:

1. See Disinfect the internal water circuit and hoses every 14 days on page 69.
2. See Draining the thermal transfer devices on page 64.
3. See Cleaning the external surfaces on page 66.
4. See Disinfecting external surfaces on page 68.

   Notes

   - Always bring the controller to room temperature after high or low temperature storage.
   - Always store the controller with the reservoir in place.

Storing the power cord and hoses

After you complete therapy or when you transport the product, store the power cord and hoses.

CAUTION

- Do not hang items on the controller handle to avoid the risk of tipping the product.
- Always store the power cord, cables, and hoses before you transport the product to reduce the risk of trip hazard.

To store the power cord and hoses:

1. Connect the ends of the connector hoses together, if applicable.
2. Coil and fasten the hose with the management straps (Figure 48 on page 63).
3. Unplug the power cord from the wall outlet and store with the management straps (Figure 48 on page 63).

Figure 48: Management straps

Draining water from the controller and hoses

Make sure that the controller and all components are dry before you store the product. Make sure to drain the hoses before you store them.

1. Place the controller over a floor drain.
2. Remove the reservoir and pull up on the controller drain plug (A) to open the drain (Figure 49 on page 64).

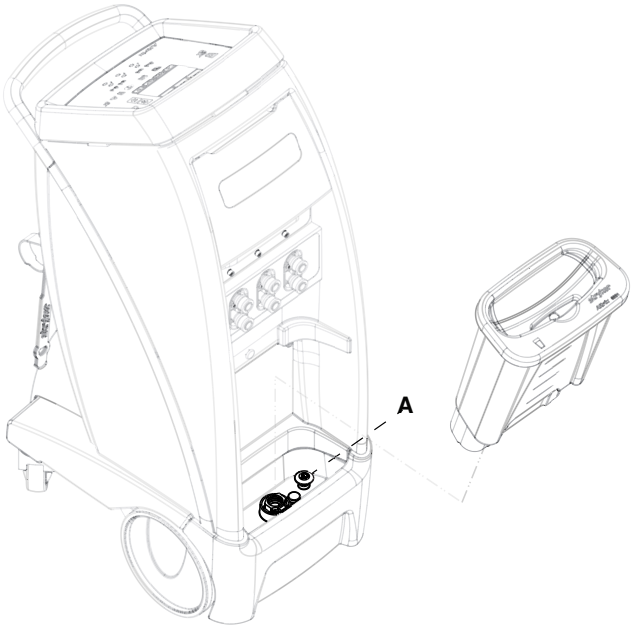


Figure 49: Drain plug

3. Connect a hose to each port.
   a. If you have Colder style connector hoses, attach the service tool adapter hose (8001-999-017).
   b. If you have **Clik-Tite** hoses, make sure that the connectors and clamps are open (Figure 50 on page 64).

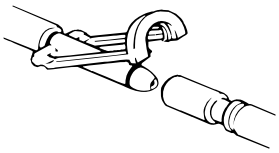


Figure 50: Clik-Tite open

4. Raise all the hoses completely above the connection ports on the controller.
5. Allow the product to drain for a minimum of two minutes.
6. Push down on the drain plug to close the drain.
7. Replace the reservoir.

Draining the thermal transfer devices

Read the manufacturer's operations manual for the individual thermal transfer devices (blankets and wraps) for warnings, cautions, and safe operating instructions before use. Make sure that you drain the hoses before you put them in storage.

1. Unplug the product.

Draining the thermal transfer devices (Continued)

2. Remove the thermal transfer device from the patient.
3. Open the clamps on the hoses and thermal transfer devices, if applicable. See Figure 11 on page 19.
4. Raise the thermal transfer devices attached to the hose above the ports on the controller. Gravity helps to drain the water into the controller.
5. Allow most of the water to drain back into the controller. (Approximately 10 minutes).
6. See Connecting and disconnecting thermal transfer devices on page 18.
7. See Disconnecting the insulated hoses on page 19.
8. See Storing the power cord and hoses on page 63.
9. Discard the disposable thermal transfer devices based on your local waste management protocol.

    a. Discard the disposable thermal transfer devices based on your local waste management protocol, if applicable.

Draining water from the reservoir

To drain the water from the reservoir:

1. See Removing and replacing the reservoir on page 17.
2. Dispose of the water per hospital protocol.
3. Replace the reservoir.

    Note: Make sure that the reservoir is dry before you store the product.

Cleaning the external surfaces

Clean the external surfaces of the controller and system components before each use. System components may be subject to contamination during use from contact with soiled hands of the user, airborne pathogens, and unexpected or accidental events. Make sure you remove all visible soils.

⚠ CAUTION

Do not power wash this product.

Tools Required:

- Mild soap
- Soft, lint free cloth (2 or more)

Validated mild soap:

- Enzol® Enzymatic Instrument Cleaner by Johnson & Johnson

To clean the external surfaces of the controller and system components:

See Product illustration on page 13 for clarification of product component names and locations.

1. Unplug the power cord from the wall outlet.
2. Apply wheel locks.
3. Undo power cord and hose straps.
4. Unravel and lay out hoses, cables, and power cord.
5. Disconnect the hoses. Push back on the retaining collar of the port on the controller. Pull the hose to disconnect.
6. Disconnect the patient temperature probe cable from the port.
7. Remove the reservoir. Pull forward at an angle, and lift out the reservoir.
8. If necessary, empty the water from the reservoir. Dispose of the water per your hospital protocol.
9. Prepare a mild soap and water solution as described by the manufacture.
10. Wipe the inside and outside of the reservoir and reservoir lid, with a soft, lint free cloth moistened with soap and water solution.
11. Wipe the hoses and patient temperature probe cables, with a soft, lint free cloth moistened with soap and water solution.
12. Wipe the controller surfaces while the reservoir is removed with a soft, lint free cloth moistened with soap and water solution. Also wipe the following system components:
    - Hose connectors
    - Power cord
    - Hose and power cord management straps
    - Storage compartment door
    - Inside storage compartment
    - Graphical user interface display
    - Handle
13. Wipe the controller, reservoir and reservoir lid surfaces, and system components with a clean, dry cloth to remove any excess liquid.
14. Replace the reservoir.
15. Allow the external surfaces of the controller and components to dry thoroughly.

Cleaning tools

Description	Part Number
BruClean TbC 13.1g tablet, 52 count	8001-999-224
Service tool adapter hose	8001-999-017

Disinfecting external surfaces

Disinfect the external surfaces of the controller and system components before each use. System components may be subject to contamination during use from contact with soiled hands of the user, airborne pathogens, and unexpected or accidental events. Follow your hospital protocols for disinfecting the product. Make sure to follow the manufacturer's instructions for the disinfectants.

⚠ CAUTION

Do not use quaternaries that contain glycol ethers as they may damage the reusable accessories.

Note: If the product is visibly soiled, clean the surface before disinfecting.

Tools Required:

- Personal protection equipment (PPE) as recommended by the disinfectant manufacturer's instructions
- Soft, lint free cloth (2 or more)
- Disinfectant
- 2 gallons (7.6 L) of sterile distilled water

Recommended disinfectants for the external surface of the controller and system components:

- Quaternary cleaners (active ingredient - ammonium chloride)
- Phenolic cleaners (active ingredient - o-phenylphenol)
- Chlorinated bleach solution ((1 part bleach solution (5.25% sodium hypochlorite) to 100 parts of water which equals 520 ppm available chlorine (40 ml of a 5.25% bleach solution per 4000 ml water))

Validated disinfectants for the external surface of the controller and system components:

- Sodium hypochlorite based - Clorox® Healthcare Bleach Germicidal Cleaner (EPA registration number 56392-7)

To disinfect the external surfaces of the controller and system components:

See Product illustration on page 13 for clarification of product component names and locations.

1. Use PPE as recommended by the disinfectant manufacturer's instructions.
2. Unplug the power cord from the wall outlet.
3. Apply the wheel locks.
4. Unfasten the power cord and hose straps.
5. Unravel and lay out hoses, cables, and power cord.
6. Disconnect the hoses. Push back on the retaining collar of the port on the controller. Pull the hose to disconnect.
7. Disconnect the patient temperature probe cable.
8. Remove the reservoir. Pull forward at an angle, and lift out the reservoir.
9. If necessary, empty the water from the reservoir. Dispose of the water per your hospital protocol.
10. Prepare disinfectant solution as described by the manufacture.
11. Apply disinfectant solution to the inside and outside of the reservoir and reservoir lid, with a soft, lint free cloth moistened with disinfectant. Reapply disinfectant to cloth as needed.
12. Apply disinfectant solution to the hoses and patient temperature probe cables, with a soft, lint free cloth moistened with disinfectant. Reapply disinfectant to cloth as needed.
13. Apply disinfectant solution to the controller surfaces while the reservoir is removed with a soft, lint free cloth moistened with disinfectant. Reapply disinfectant to the cloth as needed. Also wipe the following system components:
    - Hose connectors
    - Power cord
    - Hose and power cord management straps
    - Storage compartment door

Disinfecting external surfaces (Continued)

- Inside storage compartment
- Graphical user interface display
- Handle

14. Follow specified contact time in accordance with the disinfectants manufacturer's instructions for use.
15. To rinse, wipe the hoses and patient temperature probe cables, with a soft, lint free cloth moistened with sterile distilled water.
16. To rinse, wipe the controller, reservoir and reservoir lid surfaces, and system components with a lint free cloth moistened with sterile distilled water.
17. To dry, wipe the controller, reservoir, reservoir lid surfaces, and system components with a clean, dry cloth to remove any excess liquid.
18. Replace the reservoir.
19. Allow the external surfaces of the controller and components to dry thoroughly.
20. Store the power cord, cables, and hoses.

Disinfect the internal water circuit and hoses every 14 days

Use the **BruClean TbC** disinfectant tablets by **BruClean TbC** (EPA registration number 71847-2-106) before first use, at least every 14 days, and before storage. **BruClean TbC** has been validated for internal water circuit disinfection. Make sure that you follow the disinfectant manufacturer's guidelines to avoid the risk of injury. Failure to follow the disinfectant's instructions may void your warranty.

⚠ CAUTION

- Always use sterile distilled water or water that has been passed through a filter less than or equal to 0.22 microns with this product.
- Do not disinfect the internal water system with a thermal transfer device attached as this may cause a leak.
- Do not use bleach or any other cleaning or disinfectant agents for internal circuits. This could result in damage to the product. Only use approved disinfectant tablets.
- Always drain the product before disinfecting the internal water circuit. Failure to drain the product may reduce the effectiveness of the disinfection process.

Note: Disinfection of the **Altrix** internal water system was validated using *M. mucogenicum*.

Tools Required:

- 2 gallons (7.6 L) of sterile distilled water or water that has been passed through a filter less than or equal to 0.22 microns
- Personal protection equipment (PPE) as recommended by the disinfectant manufacturer's instructions
- Soft, lint free cloth (2 or more)
- 2 **BruClean TbC** 13.1 g tablets (Active ingredient NaDCC solution ppm = 1874 mg/L)
  Note: BruClean TbC is a blend of 48% sodium dichloroisocyanturate and Adipic Acid with a 5% sodium dodecyl benzene sulphonate surfactant.
- Service tool adapter hose (8001-999-017) for **Colder** style connector hoses
- Floor drain

See Product illustration on page 13 for clarification of product component names and locations.

Draining the internal water circuit and hoses for disinfection

1. Unplug the power cord from the wall outlet.

Draining the internal water circuit and hoses for disinfection (Continued)

2. Place the controller over a floor drain.

   Note: For best results, the floor drain should be within reach of a wall outlet to power on the controller.

3. To drain the controller, pull up on the controller drain plug (A) to open the drain (Figure 51 on page 70). Leave the drain open.

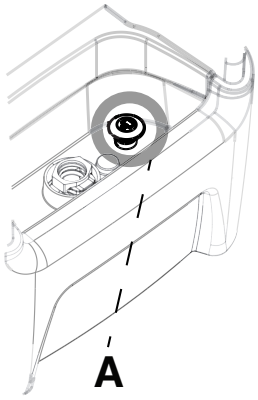


Figure 51: Drain plug

4. Connect a hose to each port (Figure 52 on page 70).

Figure 52: Hoses connected

5. Close the connector ends of all three hoses:

   a. If you have **Colder** style connector hoses, attach the service tool adapter hose (8001-999-017) (Figure 53 on page 70). Complete this for all three hoses.

Figure 53: Colder style connector hose connected to a tool adapter hose

   b. If you have **Clik-Tite** hoses, make sure that the connector ends are connected and closed (A), and clamps are open (B). Complete this for all three hoses. Figure 54 on page 71

Draining the internal water circuit and hoses for disinfection (Continued)

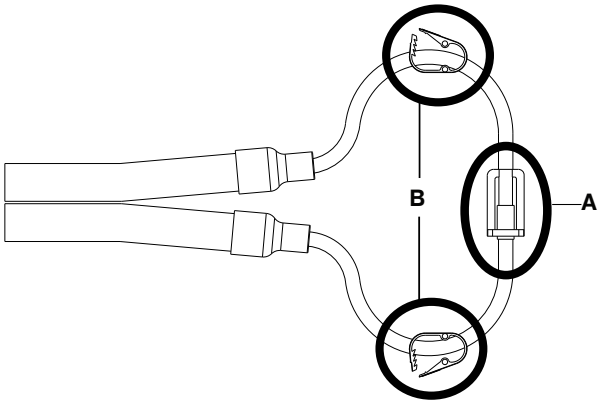


Figure 54: Clik-Tite hose ends are closed and clamps are open

6. To fully drain the hoses, raise all the hoses (Figure 55 on page 71) above the connection ports on the controller.

   Note: For best performance, hang the hoses to keep them raised. Do not lower the hoses until you have completed the disinfection and rinsing process.

Figure 55: Raise the hoses

7. Allow the controller and hoses to drain for a minimum of two minutes.
8. Push down on the drain plug to close the drain.

Disinfecting the internal water circuit and hoses

1. Use personal protection equipment as recommended by the **BruClean TbC** or equivalent disinfectant manufacturer's instructions for use.
2. Put 2 **BruClean TbC** tablets into the reservoir.
3. Using appropriate measuring equipment, fill the empty reservoir with 1 gallon (3.8 L) of sterile-distilled water.

   Note: Always allow the disinfectant tablets to completely dissolve before starting the 20 minute disinfection cycle.
4. Place the reservoir into the controller.

Disinfecting the internal water circuit and hoses (Continued)

5. Disconnect the bottom hose from the bottom right port (Figure 56 on page 72).

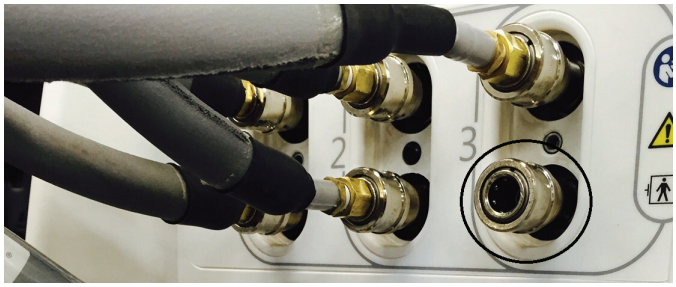


Figure 56: Disconnected hose

6. Connect the bottom hose end to the hydraulic connector in the lid of the reservoir (Figure 57 on page 72).

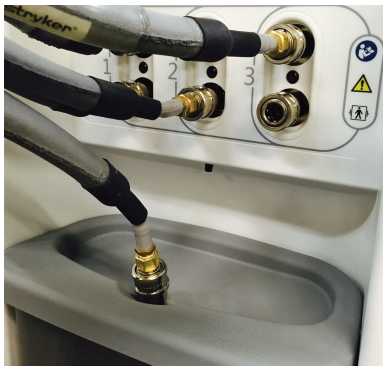


Figure 57: Bottom hose end in the lid of the reservoir

7. Plug the power cord into a wall outlet.
8. Press and hold the Stand-by button.
9. Tap the Manual mode icon.
10. Tap Confirm.
11. Set the water target temperature to 25.0˚ C (77.0˚ F).
12. Tap Confirm.
13. Run the controller for 20 minutes. 00:20:00
14. After 20 minutes, turn the controller off by pressing and holding the Stand-by button for two seconds.
15. Unplug the power cord from the wall outlet.
16. Place the controller over a floor drain.
17. Remove the reservoir. Pull forward at an angle, and lift out the reservoir.
18. Remove the bottom hose end from the hydraulic connector adapter in the reservoir lid by pushing down on the collar.
19. Empty water from the reservoir, dispose of the water per hospital protocol.

Disinfecting the internal water circuit and hoses (Continued)

Note: Do not rinse the reservoir.

20. Pull up on the controller drain plug (Figure 58 on page 73) to open the drain.

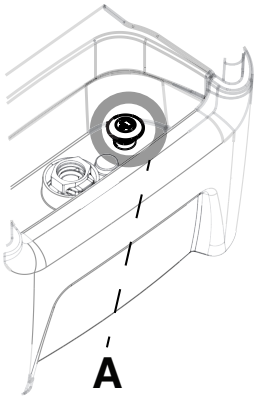


Figure 58: Drain plug

21. Make sure that all 3 hoses remain raised above the connection ports for draining.
22. Allow the controller and hoses to drain for a minimum of two minutes.
23. Push down on the controller drain plug to close the drain.
24. When the controller and hoses are drained, continue to Rinsing the internal water circuit and hoses on page 73.

Rinsing the internal water circuit and hoses

1. Using appropriate measuring equipment, fill the empty reservoir with 1 gallons (3.8 L) of sterile-distilled water.
2. Place the reservoir into the controller.
3. Connect the bottom hose end to the hydraulic connector in the lid of the reservoir.

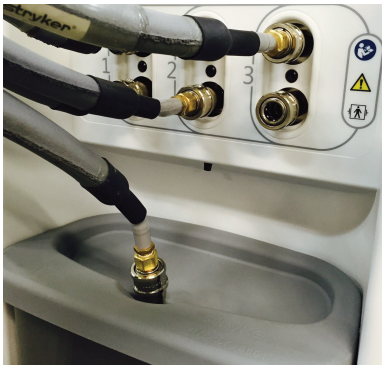


Figure 59: Bottom hose end in the lid of the reservoir

4. Plug the power cord into a wall outlet.
5. Press and hold the  Stand-by button.
6. Tap the Manual mode icon. 

Rinsing the internal water circuit and hoses (Continued)

7. Tap Confirm. 
8. Select the water target temperature of 25.0˚ C (77.0˚ F).
9. Tap Confirm. 
10. Allow the controller to run for 5 minutes. 

    Note: The timer will run on the main display, follow the current therapy duration timer.

11. After 5 minutes, turn the controller off by pressing and holding the Stand-by button for two seconds. 
12. Unplug the power cord from the wall outlet.
13. Place the controller over a floor drain.
14. Remove the reservoir. Pull forward at an angle, and lift out the reservoir.
15. Remove the bottom hose end from the hydraulic connector adapter in the reservoir lid by pushing down on the collar.
16. Empty water from the reservoir, dispose of the water per hospital protocol.
17. Pull up on the controller drain plug to open the drain.
18. Make sure that all 3 hoses remain raised above the connection ports for draining.
19. Allow the controller and hoses to drain for a minimum of two minutes.
20. Push down on the controller drain plug to close the drain.
21. Wipe the inside and outside of the reservoir and reservoir lid, with a dry, soft, lint free cloth.
22. Place the reservoir into the controller.
23. Disconnect and store the service tool adapter hoses from all three of the hoses. (If applicable, when used with colder style hoses.)
24. Store the power cord, cables, and hoses.

Test equipment

The following test equipment (or equivalent) is required to perform the preventive maintenance procedure:

- TPT10 Flowmeter (8001-999-001) / Temperature Tester (+/- 0.1L accuracy)
- Model 4000 Thermometer (of +/- 0.04˚ C accuracy)
- RS-201 - Resistance Substitution Box (+/- 0.1% + 0.025Ω accuracy)
- 3 Pack hose kit (8001-999-100)
- Resistance cable (8001-999-873)
- Safety Analyzer (Ground Resistance and Current leakage test)
- One gallon sterile distilled water

Preventive maintenance

At a minimum, make sure that all items listed during annual preventive maintenance for all Stryker Medical products. Preventive maintenance is to be completed by a qualified service technician.

Inspect all of the following items:

_____ Power cord and plug for fraying
_____ Condition of covers and push handle for damage
_____ Hose ports are operational
_____ Ground chain attached
_____ LCD is not cracked
_____ Wheels for smooth operation
_____ Rear caster wheels for free swivel action
_____ Both rear wheels lock securely when the brake is applied
_____ Front and rear wheels are not loose or wobbly
_____ Battery backup functional
_____ Alarm system - visual and audible
_____ LCD functional
_____ Touch screen functional
_____ Water temperature and flow verification
_____ Probe resistance
_____ Clear RFU codes
_____ Ground impedance not more than 100mΩ (millohms)
_____ Current leakage not more than 300 (microamps)
_____ Verify the integrity of all clamps and clamped joints located in the air elimination circuit.

Replace the following on an annual basis:

_____ Replace the 9 volt battery
_____ Replace the condenser inlet filter
_____ Replace the Air eliminator hose

Product Serial Number:
Completed by:
Date:

Functional test data sheet

Serial #:			
Functional checks			Check complete
LCD functionality, visual, and audible alarms			
High temp cutout check			
Probe resistance verification			Record value
Probe A resistance	1355 ohms	37.0˚ C +/- 0.3˚ C (98.6˚ F +/- 0.5˚ F)	
	1417 ohms	35.0˚ C +/- 0.3˚ C (95.0˚ F +/- 0.5˚ F)	
	1667 ohms	32.0˚ C +/- 0.3˚ C (89.6˚ F +/- 0.5˚ F)	
Probe B resistance	1355 ohms	37.0˚ C +/- 0.3˚ C (98.6˚ F +/- 0.5˚ F)	
	1417 ohms	35.0˚ C +/- 0.3˚ C (95.0˚ F +/- 0.5˚ F)	
	1667 ohms	32.0˚ C +/- 0.3˚ C (89.6˚ F +/- 0.5˚ F)	
Flow and water temperature verification			Record value
Port #1	Flow	Minimum .8 lpm (+/- 0.2 lpm)	
	Temperature	+/- 0.2˚ C (+/- 0.4˚ F)	
Port #2	Flow	Minimum .8 lpm (+/- 0.2 lpm)	
	Temperature	+/- 0.2˚ C (+/- 0.4˚ F)	
Port #3	Flow	Minimum .8 lpm (+/- 0.2 lpm)	
	Temperature	+/- 0.2˚ C (+/- 0.4˚ F)	
Ground impedance not more than 100 millohms			
Ground resistance not more than 300 microamps			

Installation checks completed by :		
Printed name	Signature	Date

LCD functionality, testing the visual and audible alarms

Before placing the product into service, make sure that the visual and audible alarms are functioning.

Stand-by

Back

Next or more

Note: Clik-Tite, colder style hoses with adaptor hose, or loop back hoses are required to run this procedure.

1. Make sure that the controller is in Stand-by.
2. At the same time, press and hold the **Stand-by** button and the **Back** button.
3. Once Stryker is displayed on the screen, continue holding the **Stand-by** button. Release the back button and press the **Next or more** button.
4. When you see **Preparation in progress…** , release the buttons.
5. Tap the **next or more** button displayed on the screen under **More**.
6. Tap the **Visual/Audible** icon.

7. Tap Confirm.
8. The controller will run through the LCD and alarm process.
   a. Verify the alarm sounds.
   b. Verify the green, yellow, and white indicators illuminate, mirroring the display. (See Figure 60 on page 78, Figure 61 on page 79, and Figure 62 on page 79).
   c. Verify the fluid controller light test illuminates, mirroring the display. (See Figure 63 on page 79).

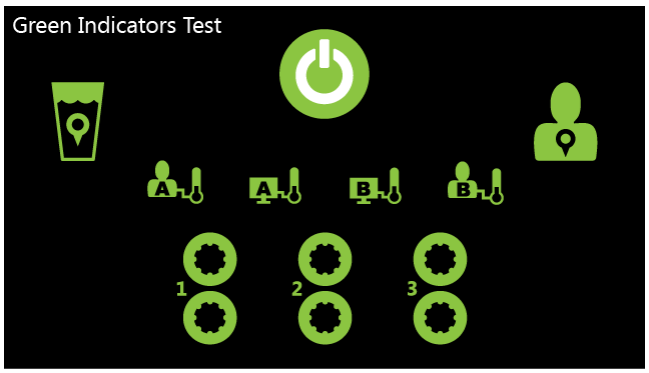


Figure 60: Green indicator test

LCD functionality, testing the visual and audible alarms (Continued)

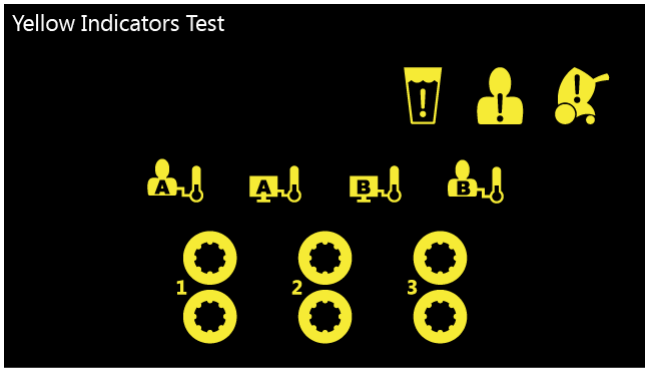


Figure 61: Yellow indicator test

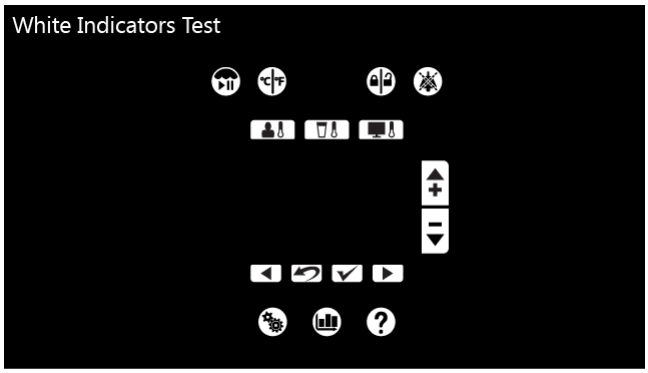


Figure 62: White indicator test

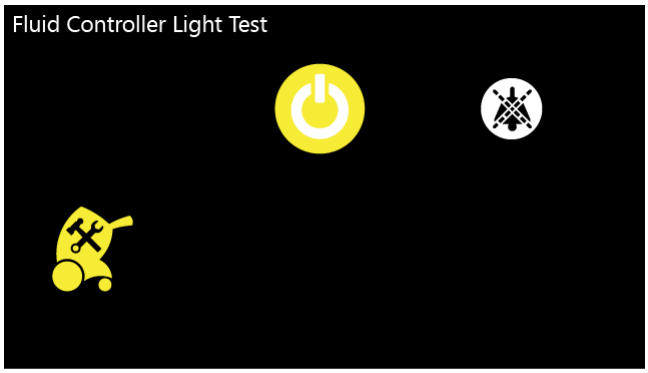


Figure 63: Fluid indicator test

9. Once verified, tap the **Back** button.
10. Complete the High thermal cutout test on page 79.

High thermal cutout test

Complete this test after the LCD indicator tests.

LCD functionality, testing the visual and audible alarms (Continued)

Note: Clik-Tite, colder style hoses with adaptor hose, or loop back hoses are required to run this procedure.

1. Tap the High Thermal Cutout icon.
2. Press confirm.
   a. The controller will then go through the high thermal cutout process.
3. The controller will cutout between 42.5˚ C and 45˚ C. (See Figure 64 on page 80 and Figure 65 on page 80).

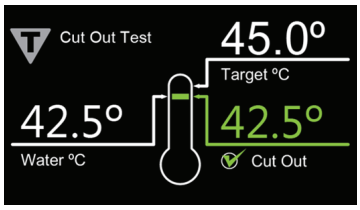


Figure 64: Cut out test pass

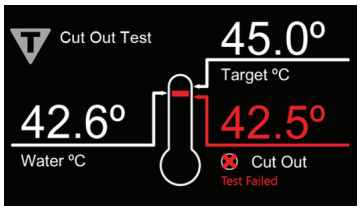


Figure 65: Cut out test fail

4. Cycle power the unit after the test is complete. The unit will indicate to unplug for a minimum of 10 seconds from power outlet.

Probe port resistance, flow and water temperature verification

1. Connect two 12 inch loop back hoses to ports 2 and 3 (Figure 66 on page 81).

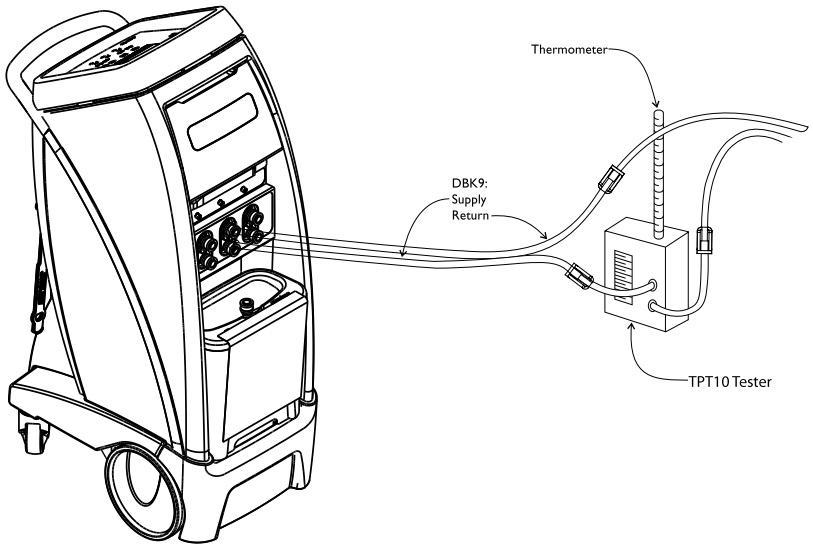


Figure 66: Connect to controller

2. Connect the **Clik-Tite** hose or the colder connector hose with the use of adaptor hose to port 1 and to the TPT10 flow meter (Figure 67 on page 81).

   Note: Verify proper hose connection on supply and return line on TPT10 and product.

Figure 67: TP10 flow meter

3. Fill the TPT10 thermometer well with sterile distilled water.

Probe port resistance, flow and water temperature verification (Continued)

4. Turn on the reference temperature thermometer and insert the temperature probe (Figure 68 on page 82).

Figure 68: Insert temperature probe

5. Verify the reservoir has at least a 2L of sterile distilled water.
6. Plug the product into a wall outlet.
7. Make sure that the controller is in **Stand-by**.
8. At the same time, press and hold the **Stand-by** button and the **Back** button.
9. Once Stryker is displayed on the screen, continue holding the **Stand-by** button. Release the back button and press the **Next or more** button.
10. When you see **Preparation in progress…** , release the buttons.
11. Tap system state, press confirm.
12. Using RS-201 resistance box (or equivalent) set resistance to 1355 ohms.
13. Connect RS-201 resistance box with resistance cable attached to port probe A.
14. Verify that Patient A reads 98.6˚ F ± 0.5˚ F (37.0˚ C ±0.3˚ C).
15. Change the resistance on the box to 1474 ohms.
16. Verify that Patient A reads 95.0˚ F ±0.5˚ F (35.0˚ C ± 0.3˚ C).
17. Change the resistance on the box to 1667 ohms.
18. Verify that patient A reads 89.6˚ F ±0.5˚ F (32.0˚ C ± 0.3˚ C).
19. Connect RS-201 resistance box to port probe B.
20. Repeat steps 12-18 on port probe B, patient B.
21. Remove RS-201 and resistance cable.
22. Make sure that the flow has stabilized for more than five minutes.
23. Using the reference flow meter verify the displayed flow on the product reads within +/- 0.2 l/m and a minimum flow of 0.8 l/m for Port 1.
24. Verify the manifold water temperature reads within +/- 0.2˚ C (+/- 0.4˚ F) on the thermometer for Port 1.
25. Move the flow and temperature tool to Port 2 and repeat steps 22-24.
26. Move the flow and temperature tool to Port 3 and repeat steps 22-24.
27. Unplug the product and remove the test equipment.

Preventive maintenance annual replacement

These instructions are for the replacement of the condenser inlet filter, air eliminator hose assembly, and 9 volt battery replacement as indicated on the preventive maintenance list.

Note: Order part number 8001-700-000 (PM kit) to receive the parts required for the annual replacements.

Tools required:

- T27 Torx
- T25 Torx
- 7/16” Socket
- 3/8” Drive ratchet
- Needle nose pliers
- Wire cutters

Procedure:

1. Apply the wheel locks.
2. Unplug the power cord.
3. Using a T27 Torx, remove and save the six screws that secures the back cover.
4. Remove and save the back cover by pulling outward and downward on the bottom of the back cover.

   Note: The power cord will remain attached to the controller. Allow the power cord to slide through the back cover.
5. Remove and save the water reservoir.
6. Using a T27 Torx, remove and save the two screws inside the water catch tray that secure the bumper.
7. Remove and save the bumper by lifting up on the left corner of the tray while you push in on the front cover.
8. Using a T27 Torx, remove and save the top two screws inside the storage compartment that secures the front cover.
9. Using a T25 Torx, remove the three screws between the connection ports.
10. Using a 7/16” socket, remove and save the two nuts that secure the front cover to the product.
11. Unscrew the drain knob turning it counterclockwise, remove and save.
12. Pull outward on the bottom of the front cover so it lowers down. Remove and save the front cover.
13. Using a T25 Torx, remove and save the nine screws that secure the right side cover to the main frame.

    Note: Removal of the front cover allows you to gain access to the screws securing the right side cover.
14. Remove the side cover, by rotating forward on the top and lifting upward. Now tip the side cover toward the back, remove and save the cover.
15. Complete the following Condenser inlet filter replacement on page 84, 9 volt battery replacement on page 84, Air eliminator hose assembly replacement on page 83.
16. Reverse the steps in this instruction to reinstall the covers.
17. Verify proper operation before returning the product to service.

Air eliminator hose assembly replacement

Procedure:

1. Using needle nose pliers squeeze the hose clamp securing the bottom tube of the air eliminator hose to the nylon fitting pull up on hose.
2. Using wire cutters remove the zip tie securing the hose to the frame.
3. Remove and discard the Air Eliminator Hose assembly.
4. Reverse steps to reinstall new Air Eliminator Hose assembly part number (8001-700-048).

Preventive maintenance annual replacement (Continued)

9 volt battery replacement

Procedure:

1. Push the battery cover towards the left and remove.
2. Remove and discard the battery following your local waste disposal policy.
3. Reverse step to replace with the new 9V Lithium battery part number (0058-372-000).

Condenser inlet filter replacement

Procedure:

1. Remove and discard the condenser inlet filter from the backside of the cover
2. Reverse step to instal the new condenser inlet filter part number (8001-000-361).

Quick Reference Replacement Parts

These parts are currently available for purchase. Call Stryker Customer Service at 1-800-327-0770 for availability and pricing.

Part name		Part number
Altrix TPT-10 service tool		8001-999-001
Filter, condenser inlet		8001-000-361
Swivel caster		0058-017-000
Fixed wheel assembly		8001-000-131
Pump		0048-260-000
Display assembly		8001-000-510
Fluid management board (FMB)		8001-500-810
Main control board (MCB)		8001-400-800
Flow sensor assembly		8001-065-887
Manifold assembly		8001-100-420
9V Battery		0058-372-000
Refrigeration fan		8001-065-375
Thermal product	100V 50/60 Hz	8001-100-310
	120V 60 Hz	8001-120-310
	220V 60 Hz	8001-220-310
	220–240V 50 Hz	8001-230-310
12 Amp circuit breaker		0059-271-000
Run capacitor		0059-789-000
Start capacitor		0059-788-000

Power cord			
Power cord type	**Length**	**Gauge**	**Part number**
E/F	180 in.(15 ft)	1.0mm²	0039-231-000
B Japan only	180 in.(15 ft)	2.0mm²	0039-242-000
B	180 in.(15 ft)	14AWG	0039-232-000
G	180 in.(15 ft)	1.0mm²	0039-234-000
I	180 in.(15 ft)	1.0mm²	0039-235-000
N	180 in.(15 ft)	1.0mm²	0039-236-000
E	180 in.(15 ft)	1.0mm²	0039-237-000
L	180 in.(15 ft)	1.0mm²	0039-238-000
J	180 in.(15 ft)	1.0mm²	0039-239-000
K	180 in.(15 ft)	1.0mm²	0039-240-000
D	180 in.(15 ft)	1.0mm²	0039-243-000

Quick Reference Replacement Parts

Power cord			
Power cord type	**Length**	**Gauge**	**Part number**
H	180 in.(15 ft)	1.0mm²	0039-244-000
M	180 in.(15 ft)	1.0mm²	0039-246-000

Problem / Failure	Action / Solution
No power to product.	1. Verify power cord connections at the wall outlet and at product. 2. Check 12amp circuit breakers located on back of product. If breakers are tripped, reset by pushing back in. 3. Verify 24VDC input LED is green lit on D89 of Fluid Management Board (FMB). a. If present, (See User Interface Screen Nonresponsive) b. If not present, go to step 4. 4. Check for 24VDC is present on connector T of Fluid management board (FMB) pins 1 and 2. a. If voltage is not present, replace power supply. b. If voltage is present, check FH7 fuse for continuity. If OK, replace FMB.

Problem / Failure	Action / Solution
Product will not warm.	1. Confirm product is in the warming mode. 2. Make sure that the product has proper flow out of each hose port. If no flow, *(See restricted or no water flow)* 3. Enter maintenance screen, confirm System State tab, and enter heat therapy. Observe manifold temperature. *(See Preventative Maintenance section for access)* a. Does manifold temperature increase? If so, cycle power on product and repeat steps 1 and 2. b. Does Manifold temperature, remain constant? Go to step 4. 4. Verify 120VAC on Connector P (pins 1 & 3) on Fluid Management Board (FMB) a. If voltage is present, go to step 5. b. If voltage is not present, (See No power to product) 5. Verify continuity of FH12 and FH13 fuses on the FMB. a. No continuity, replace as necessary. b. Continuity, go to step 6. 6. Confirm product is in the warming mode and check for 120VAC between TP123 and a Ground Test Point. a. If voltage is present replace heater assembly, reference *(Heater Assembly replacement procedure)*. b. If voltage is not present replace FMB, reference *(FMB replacement procedure).*

Problem / Failure	Action / Solution
Product will not cool.	1. Confirm product is in the cooling mode and has correct flow out to hoses. 2. Enter maintenance screen, confirm System State tab, and enter cool therapy. Observe the manifold Temperature. *(See Preventative Maintenance section for access)* a. Does the manifold temperature decrease? If so, repeat step 1. b. Does the manifold temperature remain constant? If so, go to step 3. 3. Verify 120VAC on Connector P (pins 1 & 3) a. If voltage is present go to step 4. b. If voltage is not present *(See no power to product)* 4. Verify refrigeration valve LED's are flashing on D145 and D146 of Fluid Management Board (FMB). a. Flashing indicates compressor motor running. Replace Thermal Unit, or inspect unit for refrigeration leaks. *(Certified Technician only)* b. If not flashing, check for 120VAC between TP124 and a Ground Test Point. Go to step 5. 5. Verify 120VAC at Thermal Unit Relay on hybrid cable assembly letter L (brown) and N (blue). a. If voltage is present, verify cabling on relay, replace relay. b. If voltage is not present, verify cabling and connection on control box, replace FMB.

Problem / Failure	Action / Solution
Restricted or No Water Flow	1. Preform internal disinfection, see (maintenance manual for disinfection procedure.) 2. Remove air filter from air elimination tubing path and observe flow a. If proper flow is present, replace filter with air elimination filter assembly (8001-700-002) b. If problem persists, procede to the next step and reinstall the air elimination filter 3. Enter maintenance screen, confirm System State tab. Observe flow readouts on P1, P2, P3 and system. *(verify a minimum of .8L/ports & 1.0L/system)* Determine issue with system or single port. a. For a single hose port issue, verify connection of specific flow sensor and check for 24VDC on pin 1 black and pin 2 red of the flow sensor to MCB cable assembly. i. If voltage is present, replace flow sensor. ii. If voltage is not present, replace cable assembly. b. If all the hose ports have flow issues, go to step 3 4. Verify 24VDC is present on Fluid Management Board (FMB) between TP34 and a Ground test point. a. If present, verify pump cable connection at connector Y on Control Box assembly. Go to step 4. b. If not present, replace FMB. 5. Verify 24VDC on yellow and gray wires of pump cable assembly. a. If present, replace pump assembly. b. If not, replace pump cable assembly.

Problem / Failure	Action / Solution
No output from Patient probe A and/or B	1. Verify product is in Auto Mode with proper connection and correct patient probe adaptor attached. If ok, go to step 2. 2. Enter maintenance screen, confirm System State tab. Observe outputs from patient temperature ports A and B utilizing adaptor cable and probe. *(See Preventative Maintenance section for access.)* a. Confirm an output from one patient temperature port cable or neither, go to step 3. 3. Verify Main control board (MCB) connection, Probe A at connector L and Probe B at connector M. 4. Verify 3.3VDC is present on TP63 and Isolated Ground Test Point ITP31. a. If present, determine which patient port has no output and replace as necessary. b. If not present, go to step 5. 5. Verify 24VDC Input from Fluid Management board (FMB) between TP19 and a Ground Test Point. a. If present, replace MCB. b. If not present, verify connection on MCB to FMB cable assembly from J7 on MCB to J4 on FMB. If Ok, go to step 6. 6. Verify continuity on FMB to MCB cable. a. No continuity, replace FMB to MCB cable. b. Continuity, replace FMB.

Problem / Failure	Action / Solution
User Interface Screen Nonresponsive	1. Does Power Icon pulse Green? a. If yes, hold Power Icon for at least 2 seconds. i. Check for proper connection or damage with the top ribbon cable on the back of the User interface assembly. If ok, see (User Interface Replacement in Maintenance Manual) b. If no, see *(no power to product)* or go to step 2. 2. Verify proper display cable connection at display assembly connector D and Control Box assembly connector W. 3. Verify 24VDC to User Interface Board (UIB) LED is green lit on FMB. a. If present, go to step 4. b. If not present, see *(No power to product)* 4. Verify 24VDC LED is present on Controller Communications Board. (CCB) a. If not present, replace Display cable assembly. b. If present, go to step 5. 5. Verify CPU Stat is flashing on CCB. 6. Verify 3.3VDC and 15VDC test points on User Interface Board. a. If present, replace User Interface Board. b. If not present, check connection between FMB and CCB, replace CCB.
Problem / Failure	**Action / Solution**
RFU code is present.	1. Enter Maintenance Screen *(Preventive Maintenance procedure for access)* and Clear RFU code. If code persists go to step 2. 2. ReferenceRemove from use codes on page 97 for troubleshooting steps.

Alarm conditions

The alarm rank establishes the order of presentation of the alarm on-screen message. The D in the table indicates the alarm is deactivated during that mode. Maintenance and RFU modes are always in the deactivated mode and are not listed in the table.

This product maintains the individual alarm status for all alarms as defined below.

- Alarm condition present

Alarm conditions (Continued)

- Visual indicator state
- Audible indicator state
- Current timer for audio pause activation
- Alarm rank per therapy mode

Alarm	Stand-by	Auto	Auto Paused	Manual	Manual Paused	Monitor
Remove from use	0	0	0	0	0	0
Power loss	D	1	1	1	1	1
Check patient probe	D	7	7	11	11	4
Patient probe malfunction	D	6	6	10	10	3
Probe disconnected	D	5	5	9	9	2
Patient temperature deviation	D	9	9	D	D	D
Water temperature deviation	D	D	D	7	D	D
Check water flow (all ports)	D	11	D	6	D	D
No water flow alarm (all ports)	D	4	D	4	D	D
No water	D	2	D	2	D	D
Therapy paused timed out	D	D	3	D	3	D
Normothermia deviation	D	D	D	D	D	5
Power backup level	1	19	19	14	14	6
Patient output deviation	D	22	22	17	17	7

Notes

- If more than one alarm is active at the same time, the product maintains the active state for the individual alarm including the audio pause timer. The screen alarms are displayed with the highest level alarm first with a page toggle to allow the operator to scroll to the subsequent alarms.
- The Paused in Auto Paused and Manual Paused refer to the Therapy Pause state.

Check patient probe alarm

This alarm notifies the operator that data provided by the probe is not normal or appears removed.

Notes

- The product only activates the Check Patient Probe Alarm when met during an Active Therapy. Otherwise, the alarm is disabled.

Alarm generation:

Primary patient temperature changes by more than 1.0˚ C within two minutes.

Note: The product will deactivate the heat exchange and keep the pump activated as requested by the Active Therapy.

Patient probe malfunction alarm

This alarm notifies the operator that the probe is not providing information to the product during an active therapy.

Alarm conditions (Continued)

Alarm generation:

When the primary patient probe is in a shorted, opened condition, or out of range for more than 30 seconds, the product will display the Patient Probe Malfunction Alarm.

Note: The product will deactivate the heat exchange and keep the pump activated as requested by the Active Therapy.

Patient probe disconnect alarm

This alarm notifies the operator that the probe is not providing information to the product during an active therapy.

Alarm generation:

When the adapter cable for the primary probe is removed and the reading of the Primary Patient probe is out of range for more than 30 seconds, the product displays the Patient Probe Disconnected alarm.

Patient temperature deviation medium alarm

This alarm notifies the operator that the patient is not responding as expected in the active therapy.

Alarm generation:

The product will display the Patient Temperature Deviation Medium Alarm, if after the initial achievement of the current patient temperature target, the actual primary patient temperature becomes 0.5˚ C or more above, or below the Current Target Temperature.

Patient temperature output deviation alarm

This alarm notifies the operator that the patient temperature output is out of range or their is a calibration error.

Alarm generation:

The product will display the Patient Temperature Output Deviation Alarm, if the calibration has failed, or the patient temperature output is out of range.

Normothermia deviation alarm

This alarm notifies the operator of that the Primary Patient Temperature is out of range.

Alarm generation:

If the actual Primary Patient Temperature is lower or equal to 35.9˚ C or higher or equal to 38.1˚ C, the controller will display the Patient Normothermia Deviation alarm.

Water temperature deviation alarm group

This alarm notifies the operator that the water is not responding as expected to the therapy. The product is at full power, with the current mode and the temperature selection. The water temperature cannot remain within a range of ±0.8º C of the selected Water Target Temperature.

Alarm generation:

Alarm conditions (Continued)

1. If the actual water temperature is 0.8˚ C or more above or below the Final Target Temperature, the product will display the Water Temperature Deviation Alarm.
2. When the product is entering the Manual mode or you change Target Temperature, the product will pause the audible component of the Water Temperature Deviation Alarm for four hours. The four hour pause automatically cancels after the Water Temperature becomes equal to the Final Target Temperature.

Check water flow alarm

This alarm notifies the operator of the quality of the flow in each individual water circuit.

Alarm generation:

- When in Manual or Automatic Mode and several ports are in use for the therapy.
- You have selected an outlet port and the flow is lower than 0.8 l /min for a period of 60 seconds or more. The product will display a Check Water Flow Alarm for the given port.

Notes

- The alarm displays if the flow is not at an optimal level on each port. This alarm will ask the operator to confirm which ports are currently in use.
- The addition of a port does not need the operator to confirm the addition.
- The removal of a port requires the operator to confirm.
- The Check Water Flow Alarm for the given outlet port stops, if the operator confirms removal.
- When none of 3 ports has a flow higher than or equal to 0.6l / min, the product deactivates the heater exchange and generates a no flow alarm. Otherwise the heater exchange will remain active as indicated by the current mode.

Power backup level alarm

This alarm notifies to the operator an indicator of the status of the Backup Power Level.

Notes

- The indicator will remain active until a qualified technician replaces the battery.
- There is no reduction in the usability of the product. The product remains functional and a visual alarm is displays.
- The product will disable the Backup Power Level Alarm in Sleep Mode. Otherwise, the alarm is enabled.

Alarm generation:

The product will display Backup Power Level Alarm when the battery level backup power is less than 100 minutes of alarms. Once activated, the Backup Power Level Alarm will remain active until you power off the product.

Therapy paused time out alarm

This alarm converts a therapy pause into an alarm if the duration of the pause is too long.

Alarm generation:

When paused for five minutes, the product will display the Therapy Paused Time Out Alarm. After you resume the current therapy, the Therapy Paused Time Out Alarm is deactivated.

Alarm conditions (Continued)

Remove from use mode

The Remove From Use (RFU) is a safety mode to limit operations. A fault condition prevents the product from normal functions and requires service. The controller will stop the Active Therapy and communicate to the operator that the controller is going into RFU mode.

⚠ CAUTION

Always remove the product from use before servicing any components. Contact qualified service personnel for service.

Depending on the remove from use (RFU) condition, text may or may not be displayed. For example, if there is a power loss.

- Water temperature probes are out of the allowed range
- Program and data checksum error
- High thermal cutout test failed
- Backup power product replacement required
- Low or over safety temperature
- Pump over current
- Compressor power fault
- Heater power fault
- Refrigerant control valve fault
- Main DC power lost
- CAN heart beat lost
- Dual safety temperature sensors do not match readings
- Dual safety temperature sensors are out of the allowed range
- Hardware watchdog heartbeat failure

Remove from use code entry

1. In the remove from use screen (Figure 69 on page 97), tap the help button to see the review RFU Code and Clear (Figure 70 on page 97).

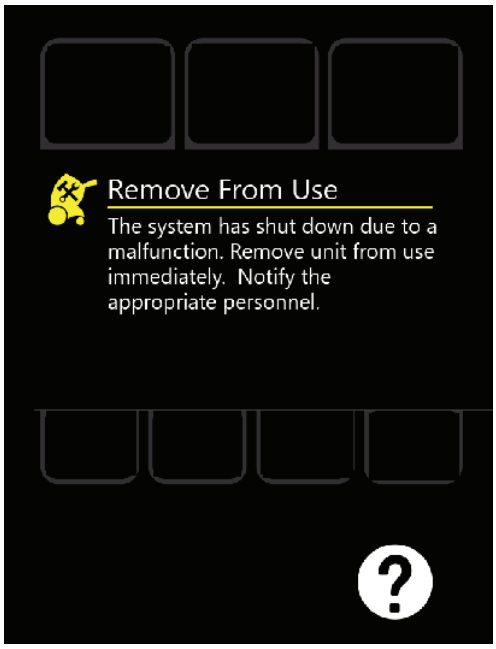


Figure 69: Remove from use

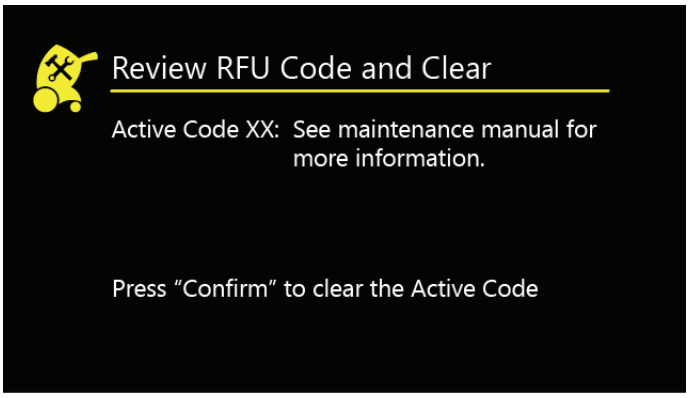


Figure 70: Review RFU Code and Clear

2. See the Remove from use codes on page 97.
3. Press confirm to clear the code.

Remove from use codes

RFU codes and descriptions.

Remove from use code entry (Continued)

Remove from use codes (Continued)

Acronyms	Description
ALU	Arithmetic logic unit
CAN	Controller–area network
CCB	Controller communications board
FMB	Fluid management board
FMC	Fluid management controller
HB	Heart beat
LCD	Liquid crystal display
LED	Light emitting diode
MC	Main controller
MCB	Main control board
RFU	Remove from use
UI	User interface
UIB	User interface board

Code number	Description	Troubleshooting
1	Invalid command received consecutively too many times	• Verify cable connection between the MCB and the FMB and the UIB • Replace CCB and/or MCB
2	Water temp is out of spec, possibly open/short	• Check for an internal water leak • Verify cable connection • Replace manifold water temperature sensor • Replace MCB
3	Main controller internal microprocessor checksum error	• Contact Technical Support • Replace MCB
5	To many MC CPU resets due to watchdog timeout	• Contact Technical Support • Replace the MCB
6	Maintenance mode hi cutout test failed	• Verify the Safety Temperature Sensors for accuracy • Verify the manifold Temperature Sensor for accuracy • Check for occluded flow • Verify the flow sensors for accuracy • Verify pump operation

Remove from use code entry (Continued)

Remove from use codes (Continued)

Code number	Description	Troubleshooting
7	The MC did not receive the CAN HB from the BUI	• Verify cable connection between the MCB and the FMB and the UIB • Replace CCB or MCB if RFU persists after clearing it
9	The pump cannot supply at least .6 l/min total in all ports	• Verify hose clamps are still intact • Verify for no kink in the hoses • Verify the flow sensors for accuracy, replace as necessary • Check for any blockage in water system, replace pump if no blockage/kink/hose clamp issue • Verify that the Air Eliminator hose assembly filter is not clogged.
10	MC controller detected FMC safety temp delta out of range	• Verify the Safety Temperature Sensors for accuracy • Verify the manifold Temperature Sensor for accuracy • Verify the flow sensors for accuracy • Verify pump operation • For the 4 items above, check cables connection and replace as necessary
11	MC patient calibration resistors out of range	• Check for an internal water leak • Replace MCB
12	FMC is counting the AC lost time, but unit is still running	• Verify AC power detection input • Replace FMB
13	MC reset unexpectedly too many time in succession	Replace MCB after too many occurrence of that RFU
14	MC had an error during initialization	Replace MCB
17	The MC did not receive the CAN HB from the FMC	• Verify cable connection between the MCB and the FMB and the UIB • Replace FMB or MCB if RFU persists after clearing it
18	PTC reset unexpectedly too many time in succession	Replace MCB
19	PTC communication had too many checksum errors in succession	• Contact Technical Support • Replace MCB

Remove from use code entry (Continued)

Remove from use codes (Continued)

Code number	Description	Troubleshooting
20	PTC communication error, for example,. time out or Com version error	• Contact Technical Support • Replace MCB
21	The MC failed the ALU check	Replace MCB
22	A critical variable in the MC in RAM is corrupt	Replace MCB if too many occurrences of this RFU
23	Manifold water temp calibration resistors out of range	• Check for an internal water leak • Replace MCB
27	Control Box tachometer failure	• Verify control box fan operation • Replace the Fan if it does not rotate • Verify tachometer feedback in maintenance mode, replace if zero RPM • After replacing the fan, if error persist, replace MCB
30	FMC controller internal microprocessor checksum error	• Contact Technical Support • Replace FMB
31	FMC controller microprocessor watchdog reset error	• Contact Technical Support • Replace the FMB
32	FMC controller CAN Heartbeat Lost error	Verify cable connection between the MCB and the FMB and the UIB
33	FMC controller detected a safety-temp over-temp condition	• Verify safety sensors accuracy - replace safety sensors • Contact Technical Support • Replace the FMB if error persist
34	FMC controller detected a safety-temp under-temp condition	• Verify safety sensors accuracy - replace safety sensors • Contact Technical Support • Replace the FMB if error persist
35	FMC controller detected a safety-temp over-delta-temp condition	• Verify safety sensors accuracy - replace safety sensors • Contact Technical Support • Replace the FMB if error persist
37	FMC controller detected a safety-temp open circuit condition	• Check safety sensors connections • Replace safety sensor • Replace FMB if error persists

Remove from use code entry (Continued)

Remove from use codes (Continued)

Code number	Description	Troubleshooting
38	FMC controller detected a safety-temp short circuit condition	• Check safety sensors connections • Replace safety sensor • Replace FMB if error persists
39	FMC controller detected a calibration resistors out of range condition	• Check for an internal water leak • Replace FMB
40	FMC controller detected the Hardware RFU circuit latched	• Verify safety sensors accuracy - replace safety sensors • Replace FMB if error persists
41	FMC controller detected a Fan Speed On error condition	• Verify control box fan operation • Replace the FAN if it does not rotate • Verify tachometer feedback in maintenance mode, replace if zero RPM • After replacing the fan, if error persist, replace FMB
42	FMC controller detected a Heater Relay Stuck On	Replace FMB
43	FMC controller detected a Heater Relay Stuck Off	Replace FMB
44	FMC controller detected a Heater TRIAC Stuck On	Replace FMB
45	FMC controller detected a Heater TRIAC Stuck Off	Replace FMB
46	FMC controller detected a Compressor Relay Stuck On	Replace FMB
47	FMC controller detected a Compressor Relay Stuck Off	Replace FMB
48	FMC controller detected a Compressor TRIAC Stuck On	Replace FMB
49	FMC controller detected a Compressor TRIAC Stuck Off	Replace FMB
50,	FMC controller detected a RCV stepper motor fault condition	• Replace the RCV if error persists • Replace FMB if RCV replacement did not fix the issue
51	FMC controller detected a AC power loss condition	• Check AC power connection on FMB • Replace FMB
52	FMC controller detected a DC power loss condition	Replace FMB
54	FMC controller has detected the Pump Safety latch has been engaged	• Verify pump operation • Replace the pump if error persists

Remove from use code entry (Continued)

Remove from use codes (Continued)

Code number	Description	Troubleshooting
		• Replace FMB if error persists
56	FMC controller has detected a backup battery low condition	• Check housing fully seated • Check connection on the FMB • Replace the battery
57	FMC controller detected a Refrigerant-temp out of range condition	• Verify refrigerant temperature sensor accuracy • Replace the refrigerant temperature sensor • Replace the FMB if error persists
59	FMC controller detected an Onboard-temp out of range condition	• Verify onboard temperature sensor accuracy • Replace the FMB if error persists
60	FMC controller detected an Onboard-temp high temperature level condition	• Verify onboard temperature sensor accuracy • Verify control box fan operation, replace as necessary • Replace the FMB if error persists
61	FMC reset unexpectedly too many time in succession	Replace FMB after too many occurrence of that RFU
62	FMC controller detected a Pump Over-Current condition	• Verify pump operation • Replace the pump • Replace the FMB if error persists
63	FMC failed the ALU check	Replace FMB
64	FMC controller detected the 12 volt supply out of range condition	Replace FMB
65	FMC controller detected the 12 volt boost out of range condition	Replace FMB
66	FMC controller detected a safety-temp out of range condition < 0C	• Verify safety temperature sensors accuracy • Replace the safety temperature sensors • Replace FMC if error persists
67	FMC controller detected a safety-temp out of range condition > 50C	• Verify safety temperature sensors accuracy. Replace the safety temperature sensors • Replace FMC if error persists
80	UI internal microprocessor checksum error	Contact Technical Support. Replace CCB
81	To many UI CPU resets due to watchdog timeout	• Contact Technical Support. Replace CCB

Remove from use code entry (Continued)

Remove from use codes (Continued)

Code number	Description	Troubleshooting
82	Mode change requests rejected twice within 12 hours	• Verify cable connection between the MCB and the FMB and the UIB • Replace CCB and/or MCB
83	UI Stored parameters do not match, NVM corrupted	Replace CCB
84	The BUI did not receive the CAN HB from the MC	• Verify cable connection between the MCB and the FMB and the UIB • Replace CCB and/or MCB
85	I2C interface malfunction on the UI	• Replace UIB • Replace CCB if error persists
86	CAN Bus Connection Failed	• Verify cable connection between the MCB and the FMB and the UIB • Replace CCB
87	BUI reset unexpectedly too many time in succession	Replace CCB after too many occurrence of that RFU
88	The BUI failed the ALU check	Replace CCB
89	The BUI detected internal errors and can't continue	• Contact Technical Support • Replace CCB
90	The BUI has run into errors with the SPI bus and can't continue	Replace CCB

Technical error code

Code number	Description	Troubleshooting
130	MC Stored parameters do not match, NVM corrupted	Replace MCB after too many occurrence of that TEC
131	MC More than 5 consecutive records in history corrupted	Replace MCB after too many occurrence of that TEC
133	MC had to restore a critical value in RAM from EEPROM	Replace MCB after too many occurrence of that TEC
134	BUI has requested an invalid mode while in preparation mode	For informational only
160	FMC controller stored parameters do not match, NVM corrupted	Replace FMB after too many occurrence of that TEC
161	FMC controller has detected a Fan Speed Off error condition	• Verify thermal unit fan operation

Remove from use code entry (Continued)

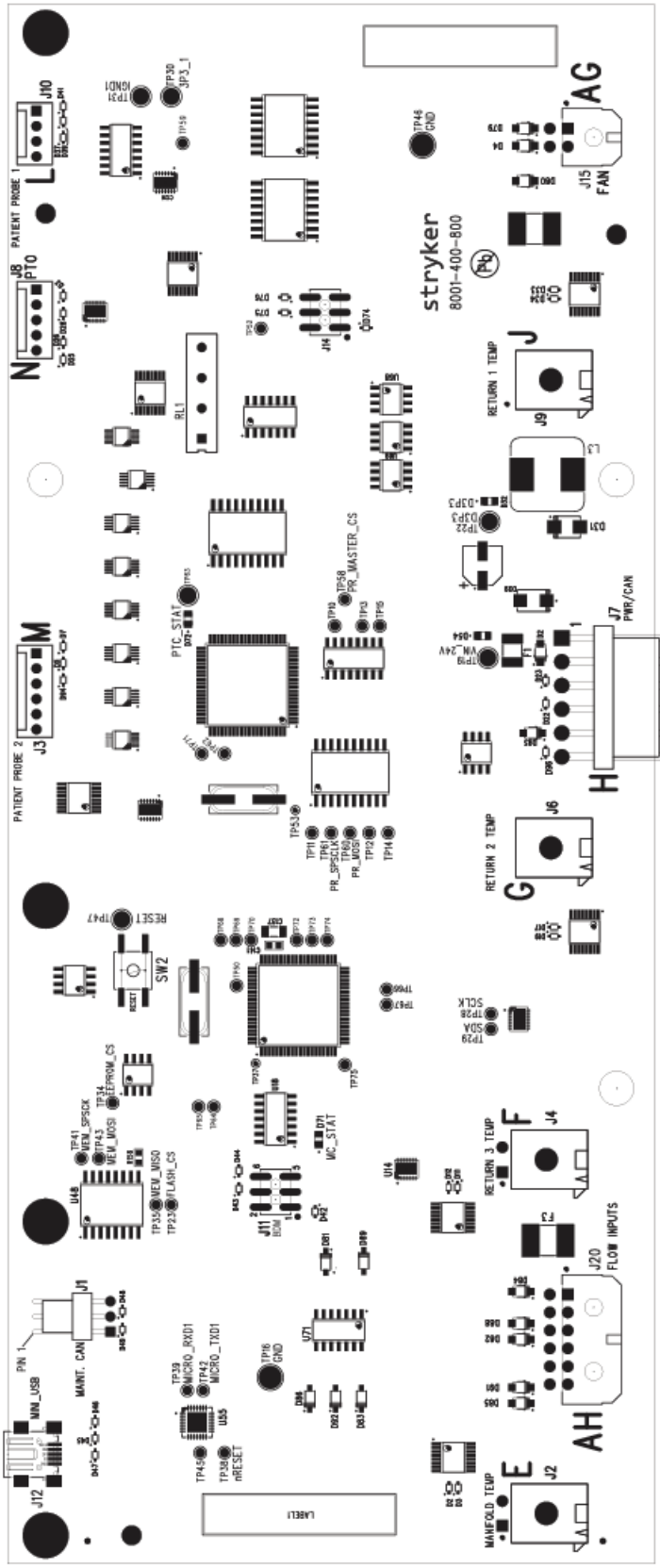
Remove from use codes (Continued)

Code number	Description	Troubleshooting
		• Replace thermal unit fan • Replace FMB if error persists
162	FMC controller stored RCV Positions do not match	Replace FMB after too many occurrence of that TEC
163	FMC controller detected the 12 volt boost out of range condition	Replace FMB
190	UI Stored parameters do not match, NVM corrupted	Replace CCB after too many occurrence of that TEC
191	UI has detected an internal error	Replace CCB after too many occurrence of that TEC
192	UI has detected an error in the CAN	For information only
193	UI has detected an error in the I2C	Replace CCB after too many occurrence of that TEC
194	UI has detected an error in the SPI	Replace CCB after too many occurrence of that TEC
195	UI has detected invalid communication from MC or command processor	For information only

8001-400-800 Rev M (Reference only)

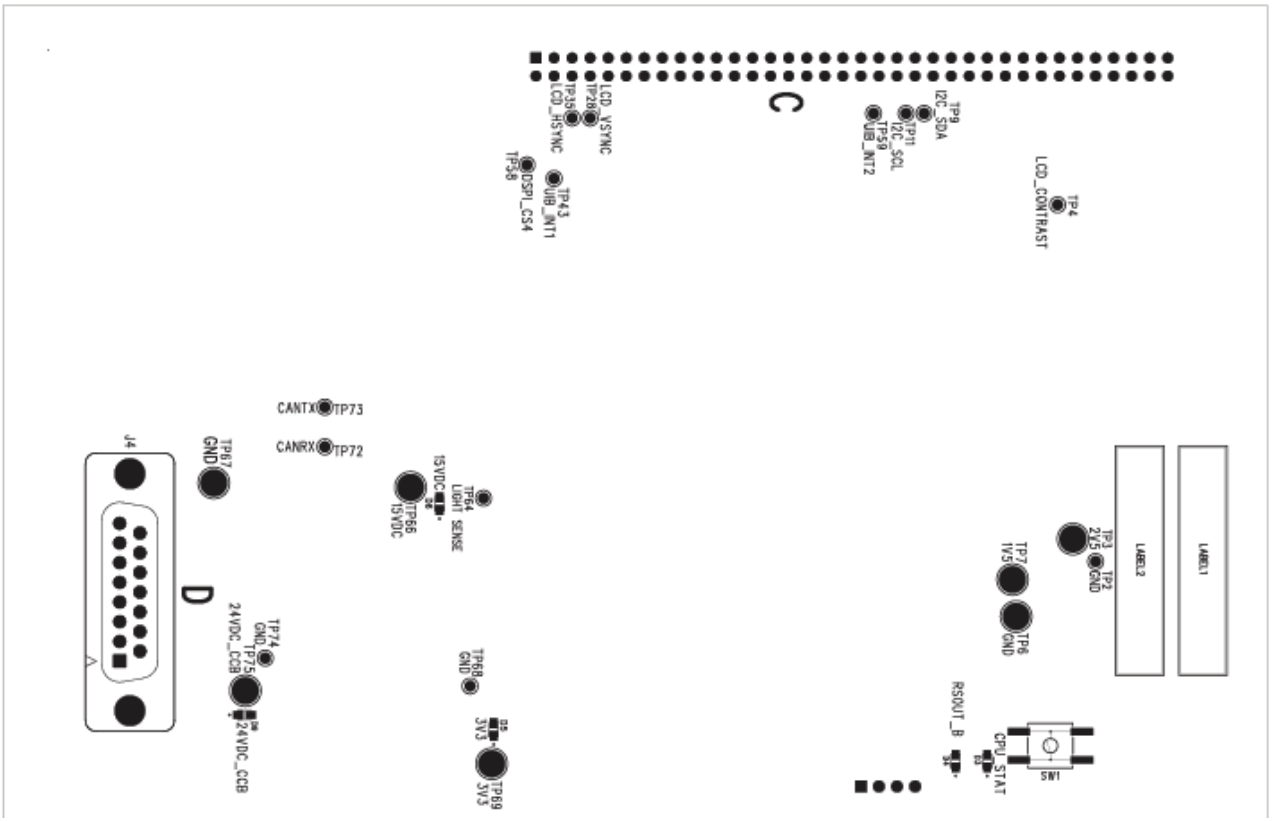
Cable location and test point	Voltage	Positive lead	Negative lead	Description
D54	+24VDC	TP19	TP18 GND	+24VOC input from FMB
D72	+3.3VDC	TP63	TP31 IGND	+3.3VOC isolated patient probes
D32	+3.3VDC	TP22	TP46 GND	+3.3VOC main LED

Main Control Board (MCB) assembly



8001-300-830 Rev N (Reference only)

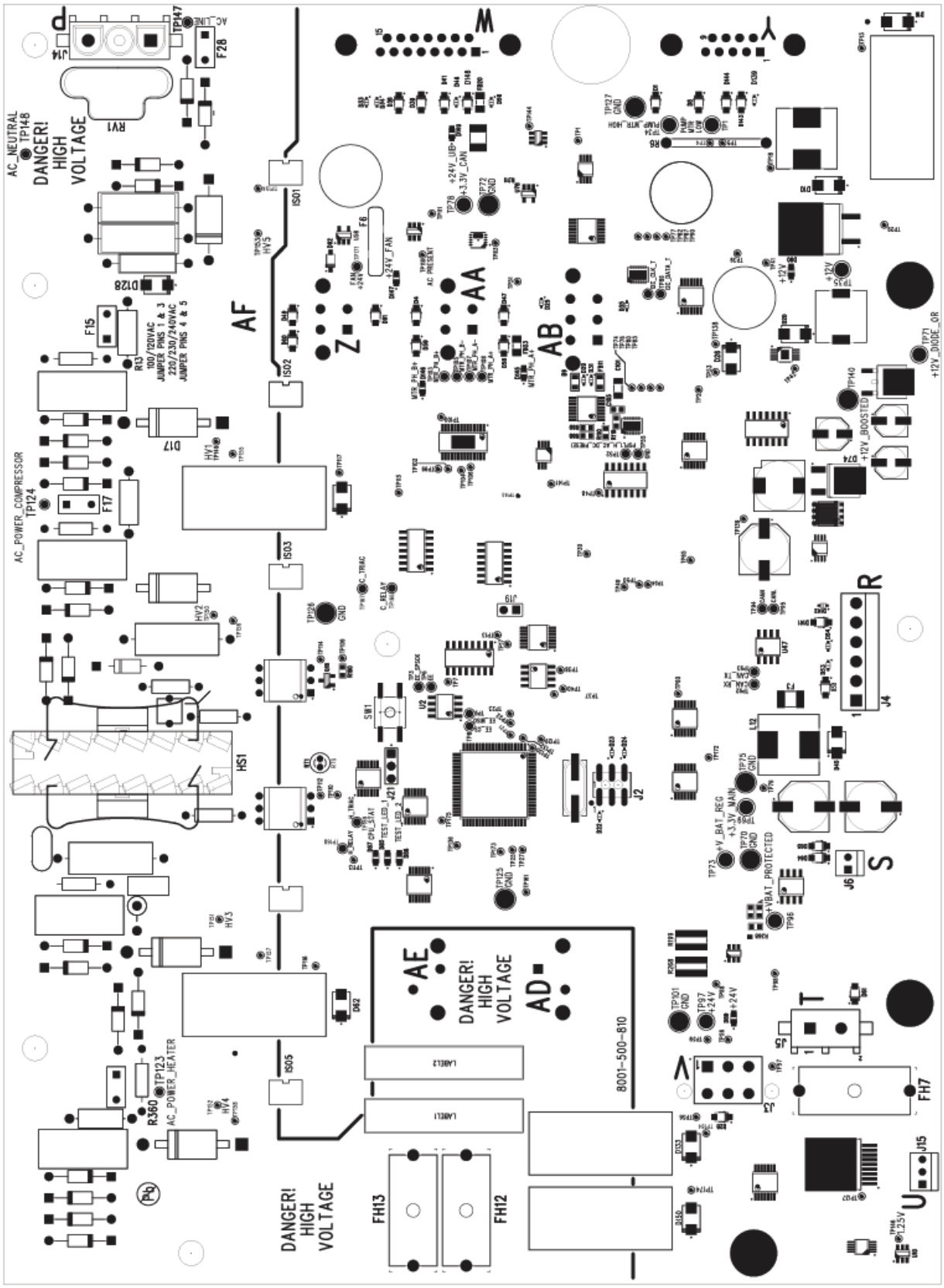
Cable location and test point	Voltage	Positive lead	Negative lead	Description
TP75	24VDC	TP75	TP74 GND	+24VDC Input from FMB
TP66	15VDC	TP66	TP6 GND	+15VDC LED power



8001-500-810 Rev G (Reference only)

Cable location and test point	Voltage	Positive lead	Negative lead	Description
P	120VAC	pin 1 brown	pin 3 blue	120VAC input
T	24VDC	pin 2	pin 1	+24VDC input from power supply
D89	24VDC	TP97	TP101 GND	+24VDC input LED from power supply
TP96	9VDC	TP96	TP101 GND	+9VDC battery test point
TP69	3.3VDC	TP69	TP101 GND	+3.3VDC main
TP140	12VDC	TP140	TP101 GND	+12VDC boosted battery backup
TP71	12VDC	TP71	TP101 GND	AC power and battery backup
D147	24VDC	TP171	TP127 GND	+24VDC thermal unit fan power
TP78	3.3VDC	TP78	TP127 GND	3.3VDC logic circuit
D60	12VDC	TP35	TP127 GND	+12VDC regulator output
TP34	24VDC	TP34	TP127 GND	+24VDC water pump
TP123	120VAC	TP123	TP125 GND	120VAC power heater
TP124	120VAC	TP124	TP125 GND	120VAC power compressor
D149	24VDC	n/a	n/a	+24VDC UIB LED

Fluid management board (FMB) assembly



Replaceable fuse ratings and type

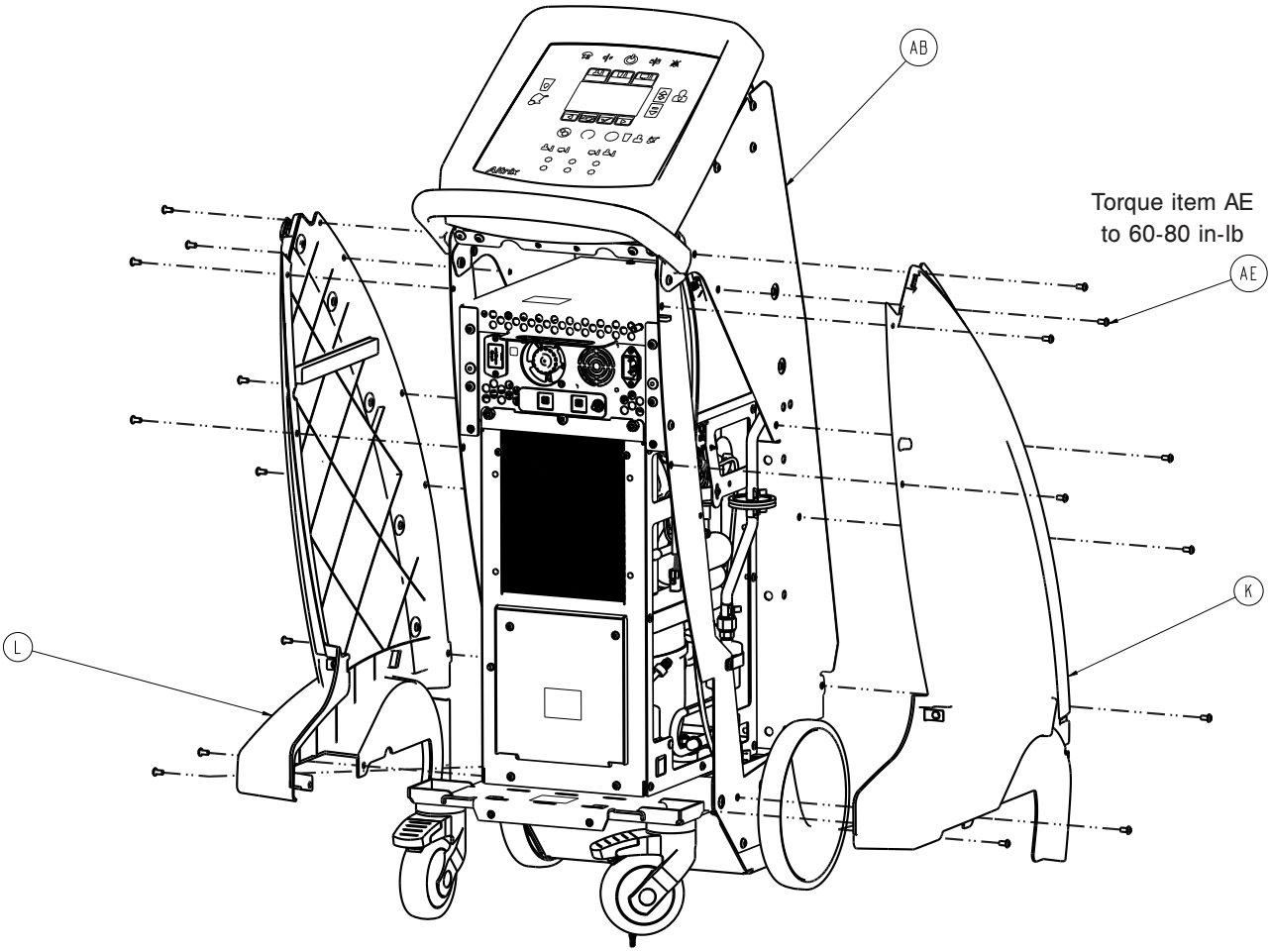
- F12: Littlefuse 021506.3HXP 5x20 slow blow 6.3A 250V (8001-007-302)
- F13: Littlefuse 021506.3HXP 5x20 slow blow 6.3A 250V (8001-007-302)
- F7: Schurter Inc. 0034.3127 5x20 T-lag 10A 250V (8001-007-301)

8001-103-010 Rev G 100V (Reference only)

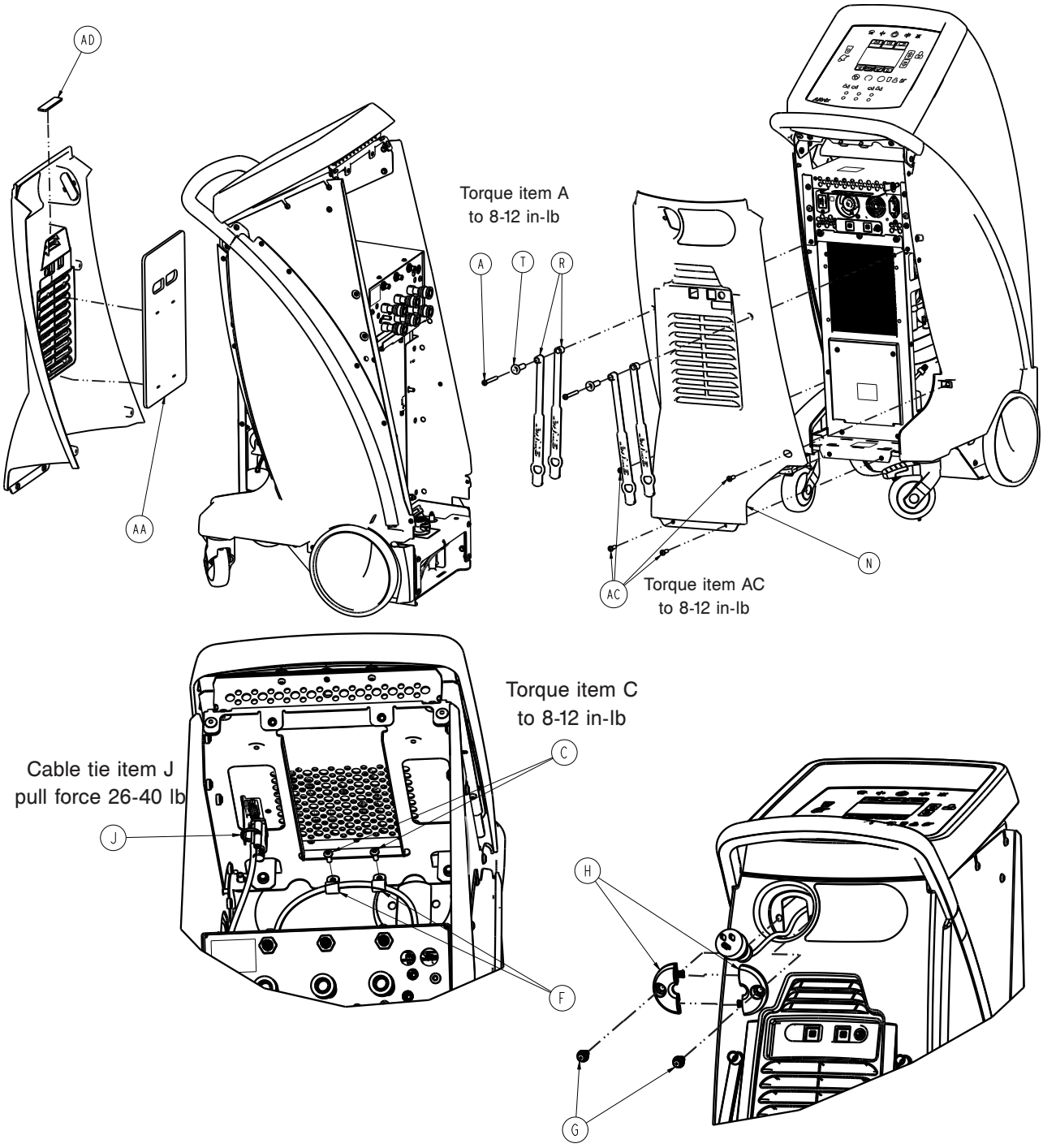
8001-123-010 Rev G 120V (Reference only)

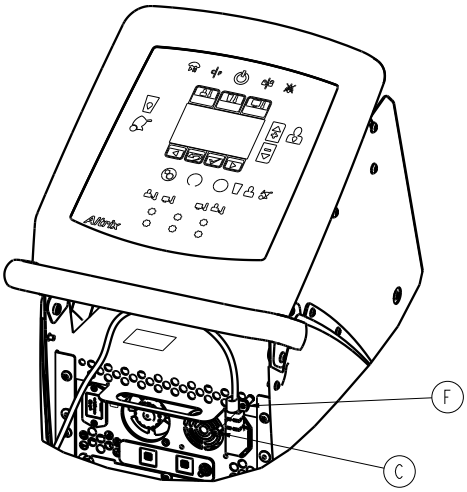
8001-223-010 Rev G 220V (Reference only)

8001-233-010 Rev G 230V (Reference only)

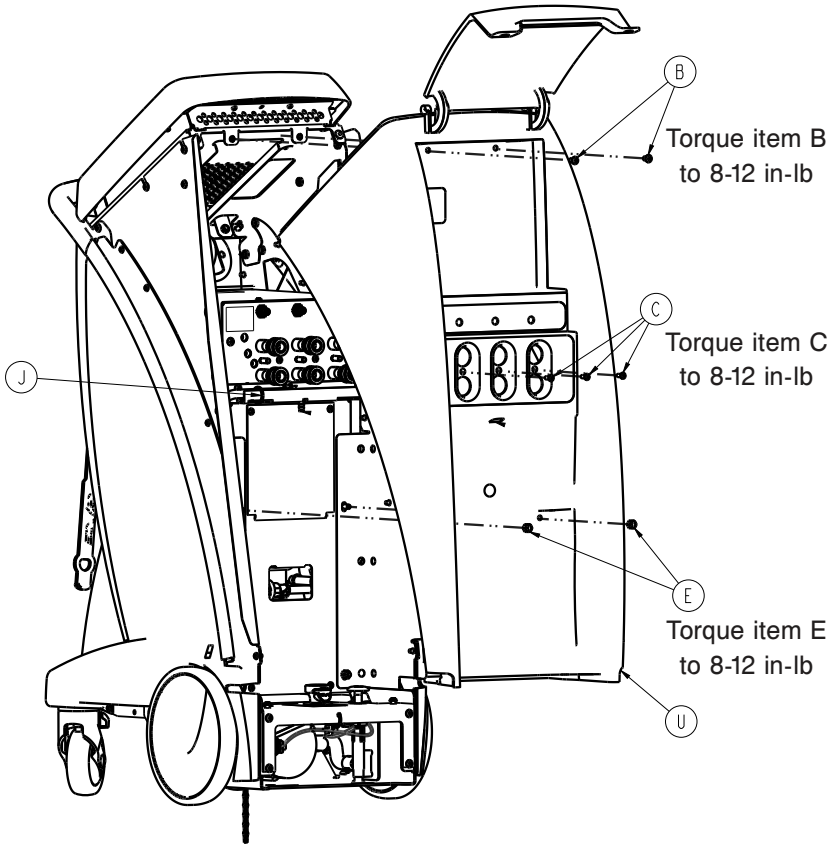


Final assembly





Torque item C
to 8-12 in-lb

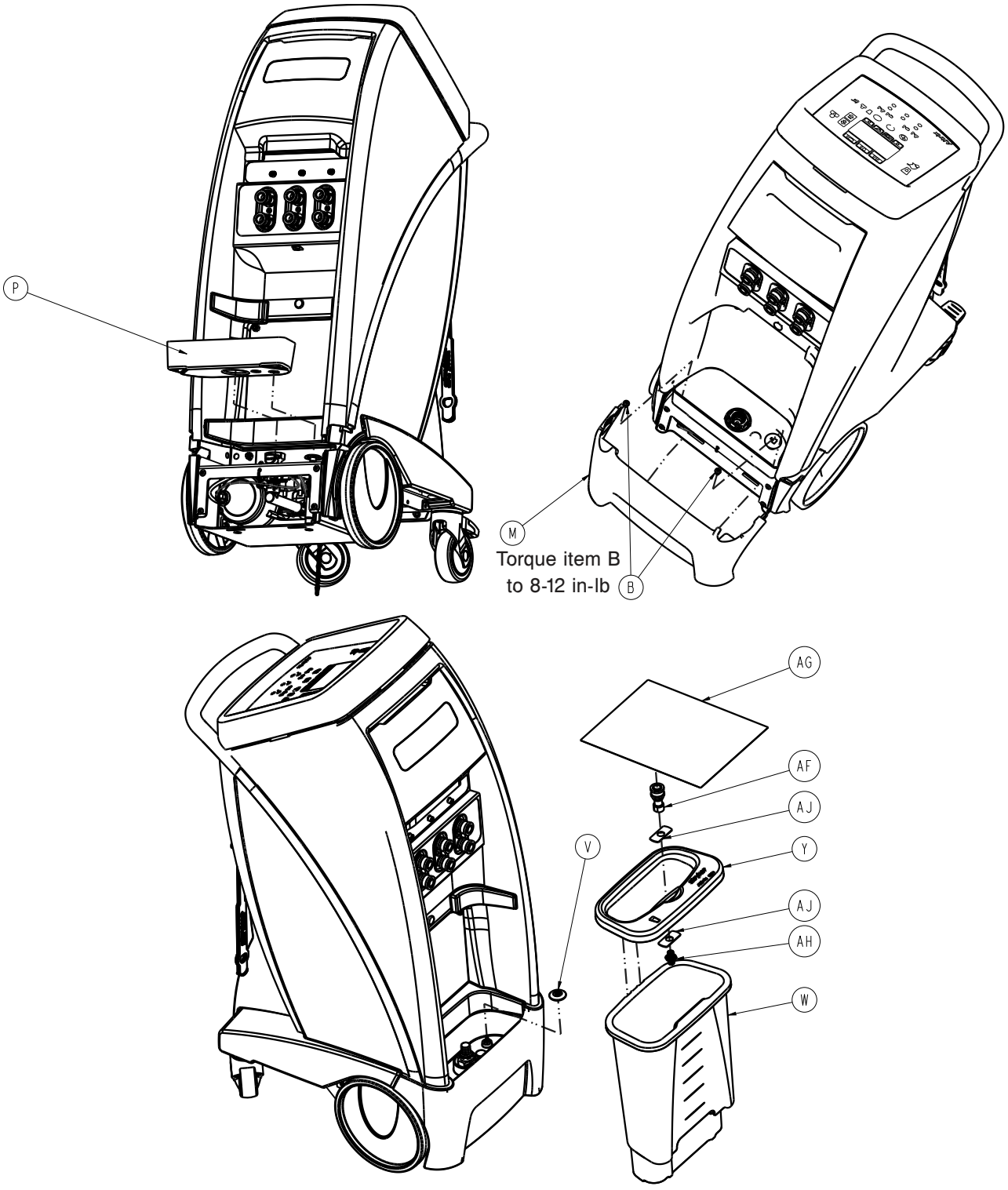


Torque item B
to 8-12 in-lb

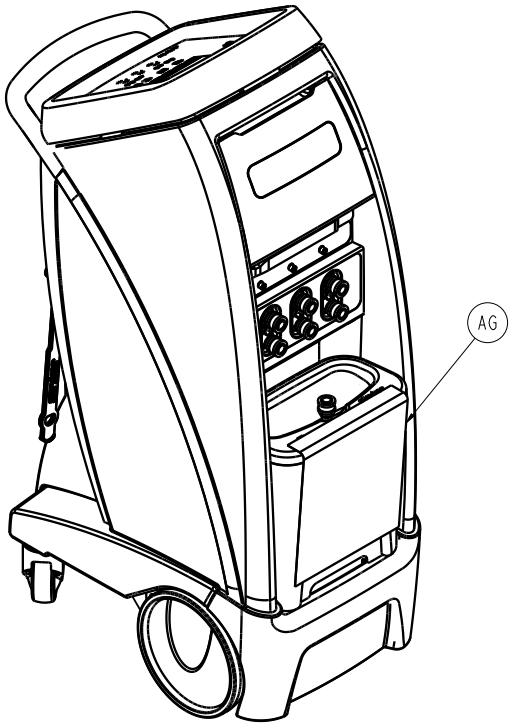
Torque item C
to 8-12 in-lb

Torque item E
to 8-12 in-lb

Final assembly



Final assembly



Item	Number	Name	Quantity
A	0004-388-000	Button head cap screw	2
B	0004-588-000	Button head cap screw	4
C	0004-634-000	Button head cap screw	6
E	0016-028-000	Fiberlock hex nut	2
F	0034-022-000	Cable clamp	3
G	1040-010-092	Scrulok assembly	2
H	1040-010-008	Cord ring, black	2
J	3000-300-113	8" cable ties	2
K	8001-000-140	Side cover assembly, right hand 8001-000-140 on page 122	1
L	8001-000-145	Side cover assembly, left hand 8001-000-145 on page 123	1
M	8001-000-153	Bumper	1
N	8001-000-161	Back cover assembly on page 169	1
P	8001-000-166	Hot tub	1
R	8001-000-171	Strap, cord/hose management	4
T	8001-000-172	Insert, cord/hose management	2
U	8001-000-190	Storage assembly 8001-000-190 on page 124	1
V	8001-000-228	Drain handle	1
W	8001-000-241	Reservoir base	1
Y	8001-000-242	Reservoir lid	1
AA	8001-000-361	Filter, condenser inlet	1
AB	8001-103-125	Frame assembly on page 117 100V	1
	8001-123-125	Frame assembly on page 117, 120V	
	8001-223-125	Frame assembly on page 117, 220V	
	8001-233-125	Frame assembly on page 117, 230V	

Item	Number	Name	Quantity
AC	0004-592-000	Button head cap screw	4
AD	8001-000-162	Velcro®, filter	1
AE	0004-587-000	Button head cap screw	18
AF	0048-283-000	Hydraulic connector	1
AG	8001-009-020	Altrix, caution	1
AH	8001-000-454	Fluid port fitting	1
AJ	0048-271-000	Washer, clipped	2

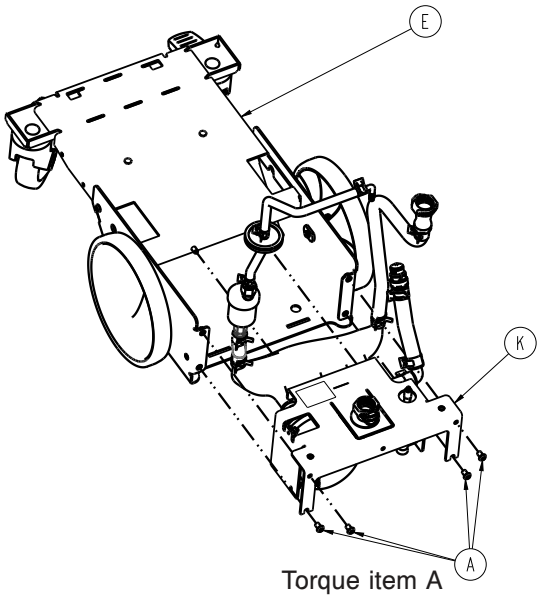
Frame assembly

8001-103-125 Rev H, 100V (Reference only)

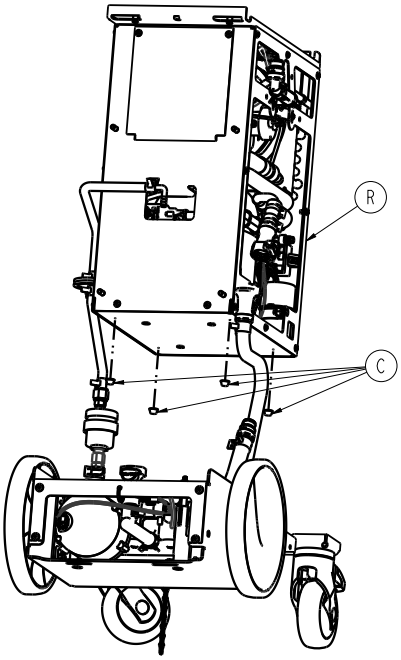
8001-123-125 Rev H, 120V (Reference only)

8001-223-125 Rev J, 220V (Reference only)

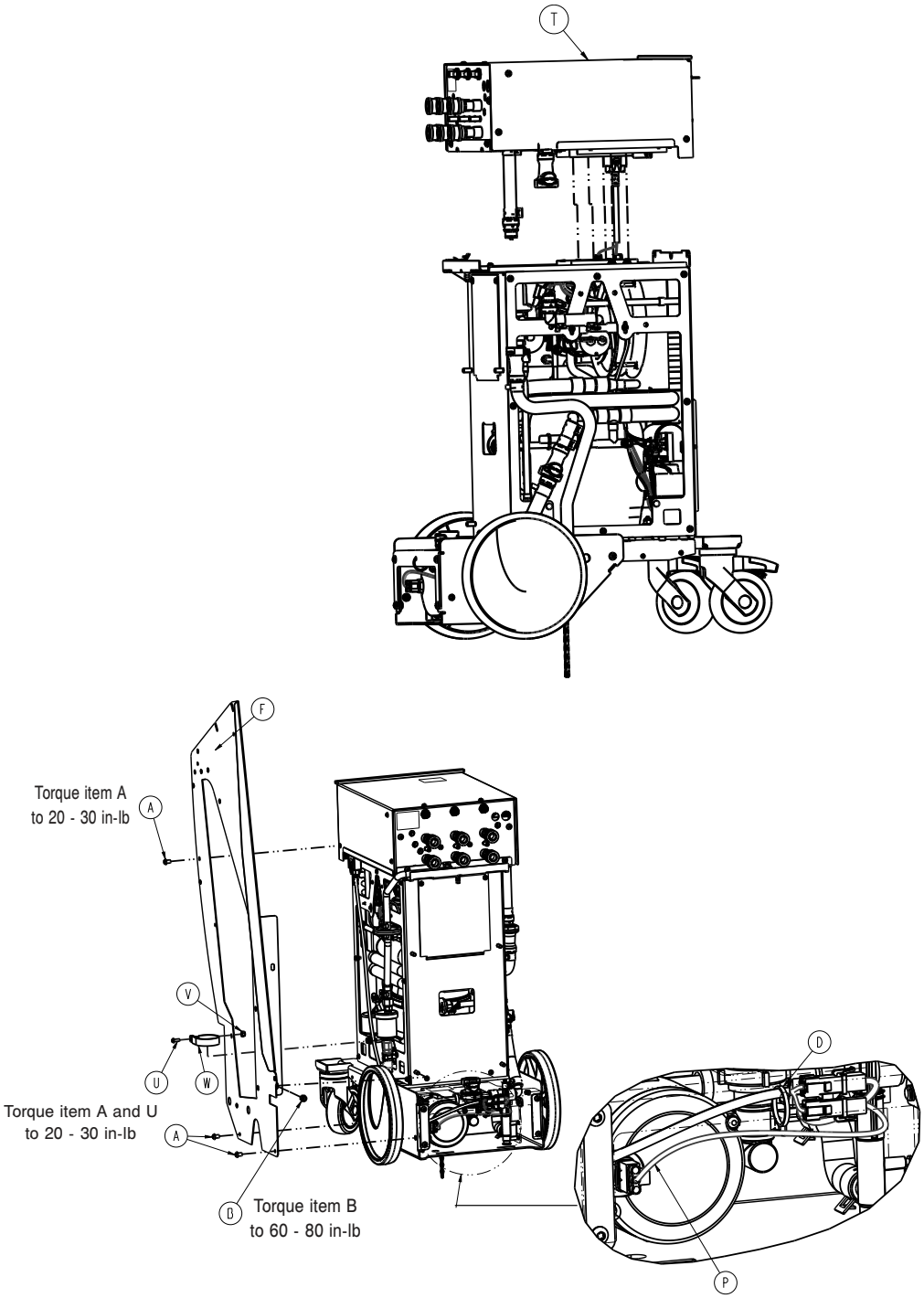
8001-233-125 Rev J, 230V (Reference only)



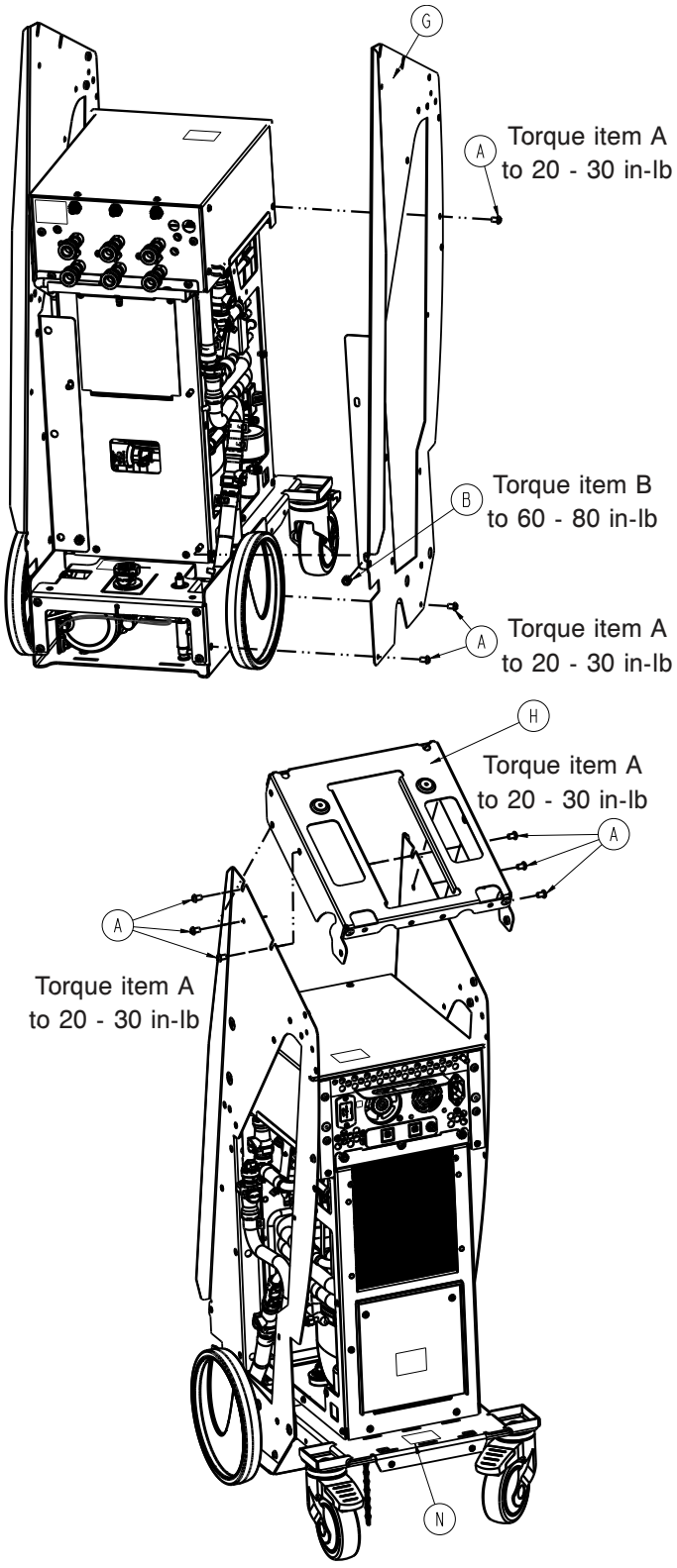
Torque item A
to 20 - 30 in-lb



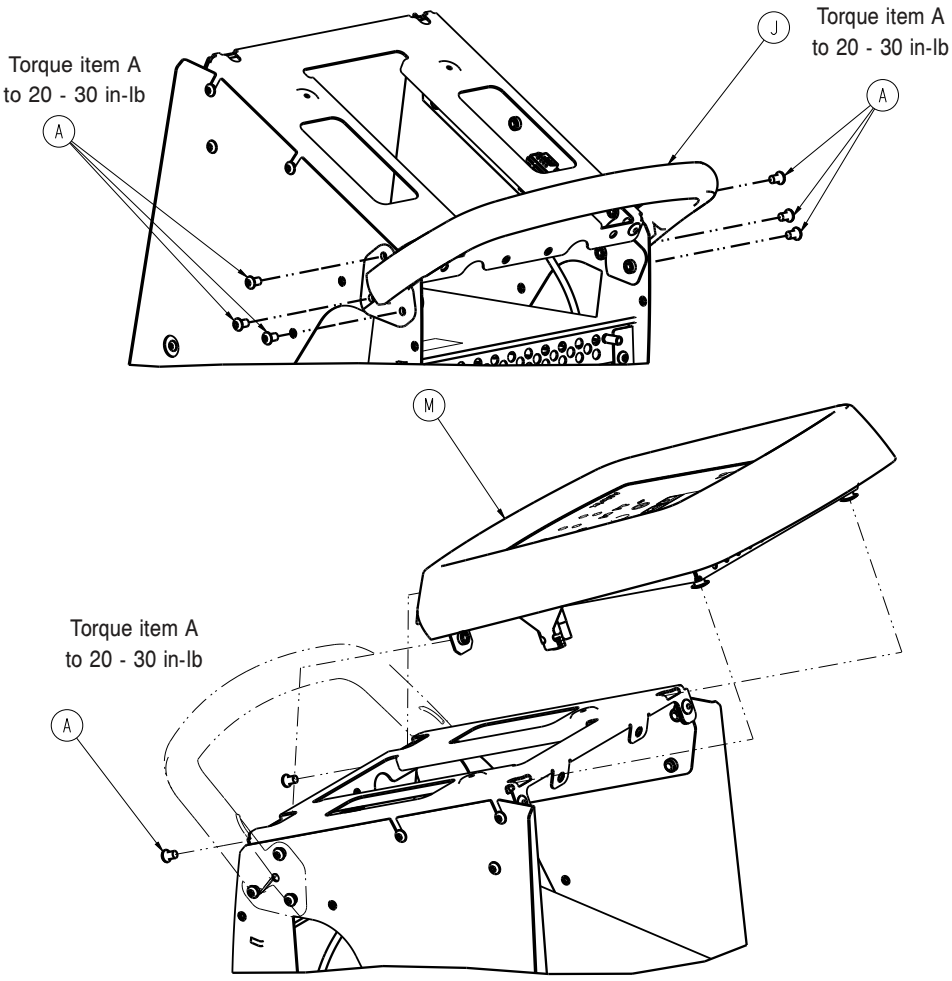
Frame assembly



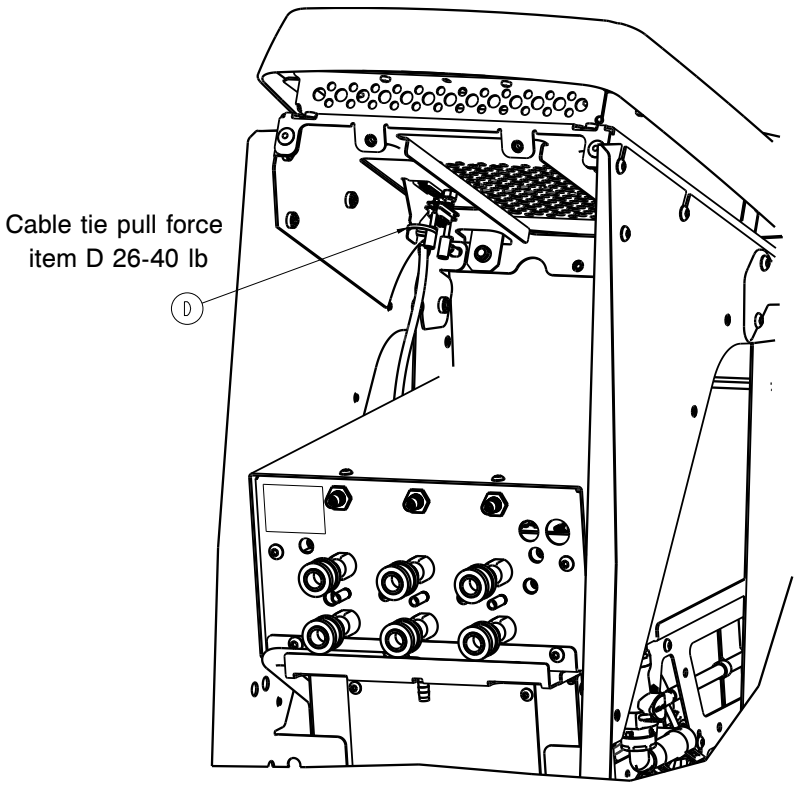
Frame assembly



Frame assembly



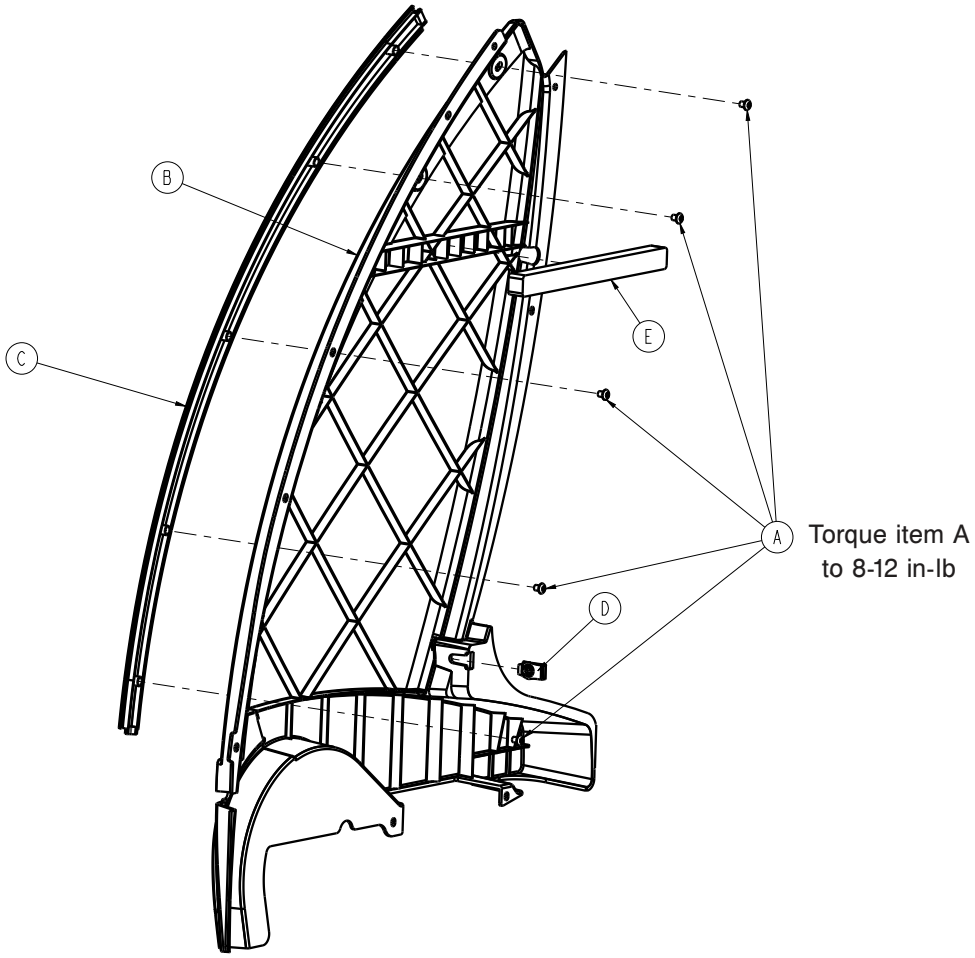
Frame assembly



Item	Number	Name	Quantity
A	0004-588-000	Button head cap screw	24
B	0016-028-000	Fiberlock hex nut	2
C	0056-017-000	Adhesive backed bumper	4
D	3000-300-113	8" cable tie	2
E	8001-000-120	Base assembly on page 130	1
F	8001-000-121	Side panel, right hand	1
G	8001-000-122	Side panel, left hand	1
H	8001-000-123	Top bracket	1
J	8001-000-152	Handle	1
K	8001-000-210	Fluid assembly on page 132	1
M	8001-000-510	Display assembly on page 137	1
N	8001-001-126	Label, serial number, Altrix, Base assembly	1
P	8001-065-871	Cable assembly, pump cable	1
R	8001-100-310	Thermal product, 100V / 50/60Hz	1
	8001-120-310	Thermal product, 120V / 60Hz	
	8001-220-310	Thermal product, 220V / 60Hz	
	8001-230-310	Thermal product, 220-240V / 50Hz	
T	8001-123-410	Control assembly, 100-120V	1
	8001-233-410	Control assembly, 220-240V	
U	0004-634-000	Button head cap screw	1
V	0016-003-000	Nylon hex nut	1
W	0048-274-000	P-clamp	1

Side cover assembly, right hand 8001-000-140

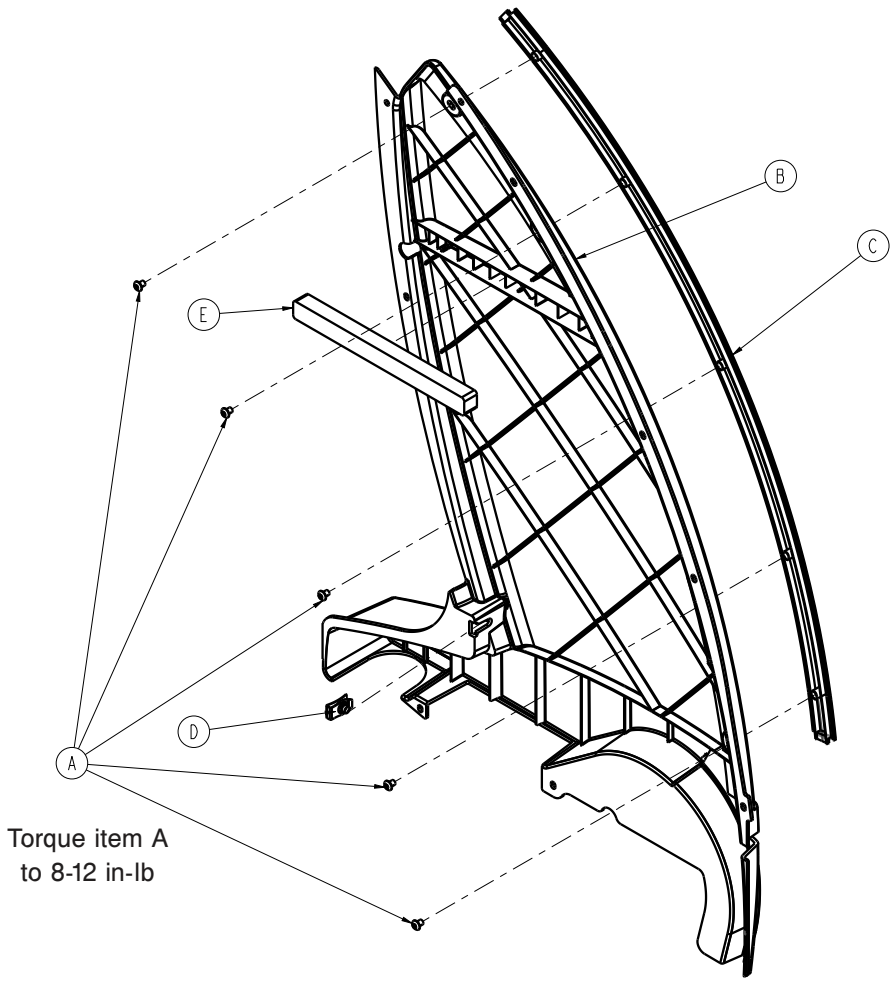
Rev B



Item	Number	Name	Quantity
A	0004-878-000	Button head cap screw	5
B	8001-000-141	Side cover, right hand	1
C	8001-000-142	Trim	1
D	0052-325-000	Au-Ve-Co Extruded u-nut	1
E	8001-000-148	Side cover foam	1

Side cover assembly, left hand 8001-000-145

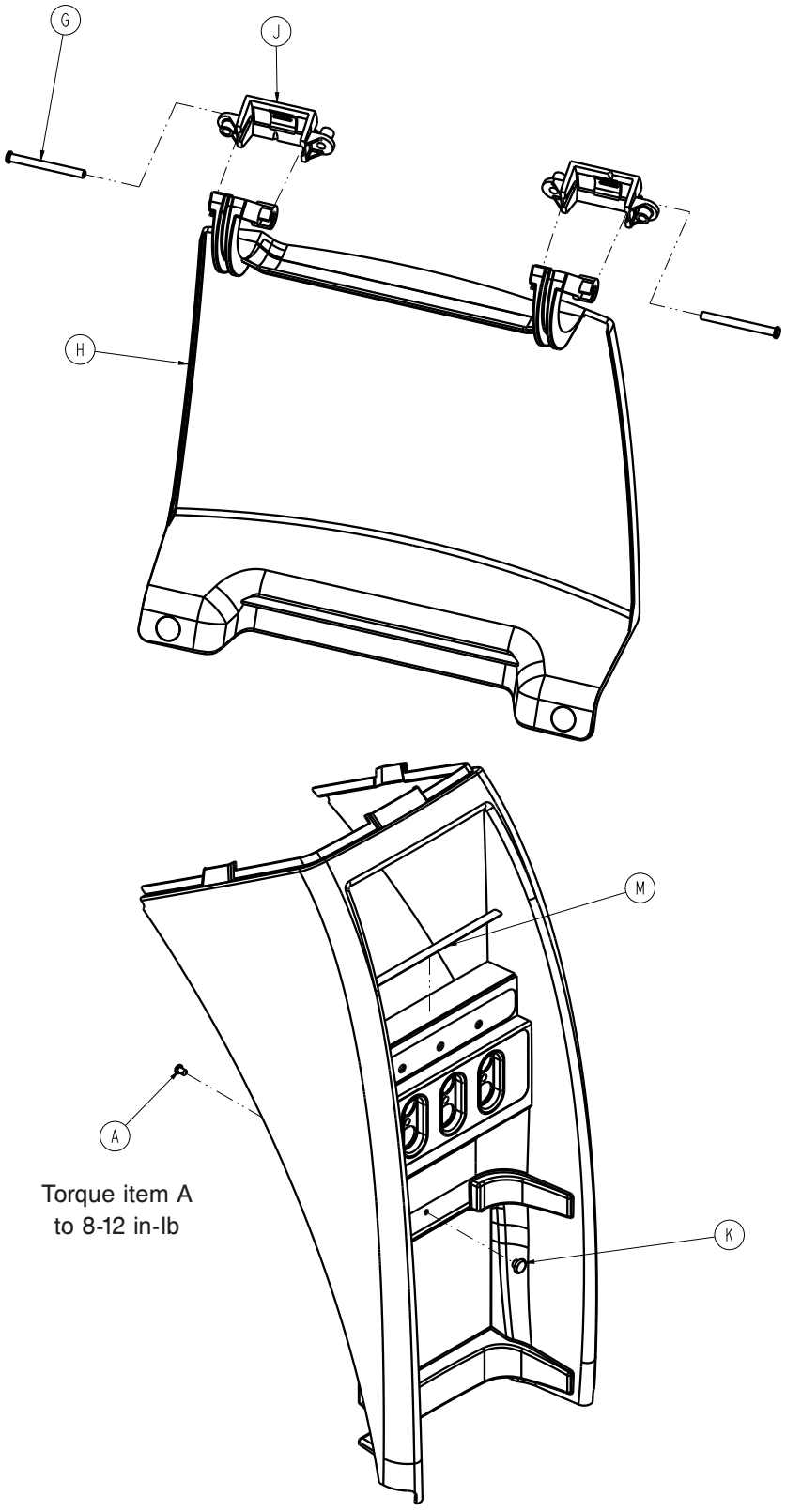
Rev B



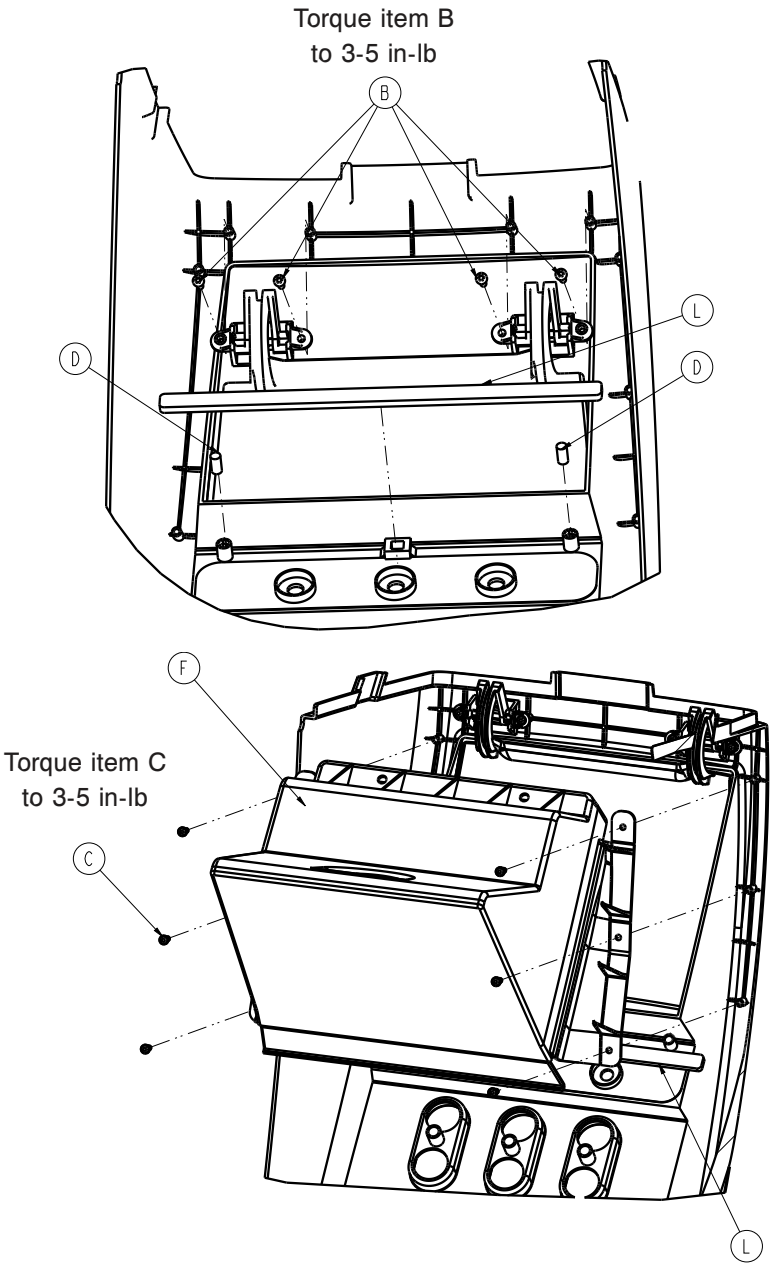
Item	Number	Name	Quantity
A	0004-878-000	Button head cap screw	5
B	8001-000-146	Side cover, left hand	1
C	8001-000-142	Trim	1
D	0052-325-000	Au-Ve-Co Extruded u-nut	1
E	8001-000-148	Side cover foam	1

Storage assembly 8001-000-190

Rev E



Storage assembly 8001-000-190

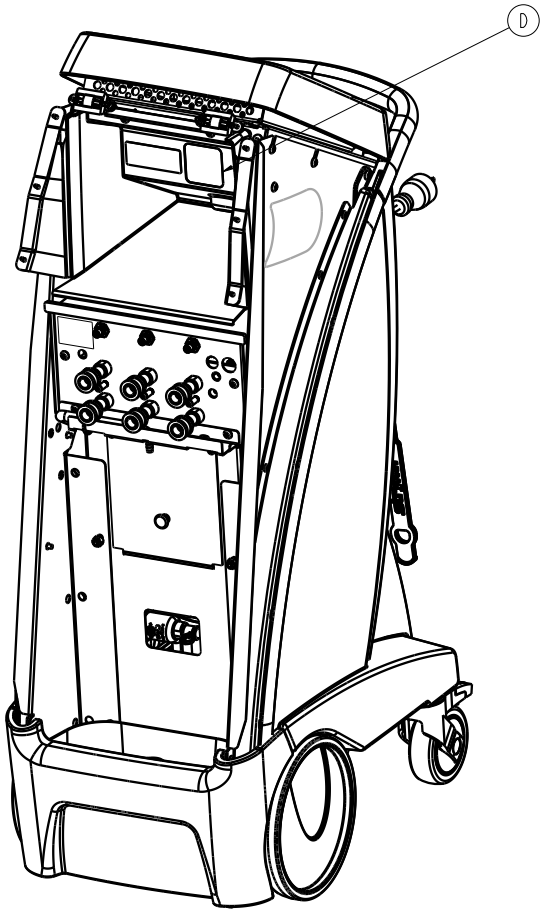


Item	Number	Name	Quantity
A	0004-588-000	Button head cap screw	1
B	0023-162-000	Delta PT screw	4
C	0023-167-000	Delta PT screw	6
D	0059-431-000	Actuator magnet	2
E	8001-000-165	Front cover	1
F	8001-000-191	Storage box	1
G	8001-000-192	Storage clevis pin	2
H	8001-000-196	Storage door	1
J	8001-000-197	Storage door mount	2
K	8001-000-247	Reservoir retaining pin	1
L	8001-000-402	Control box foam	1

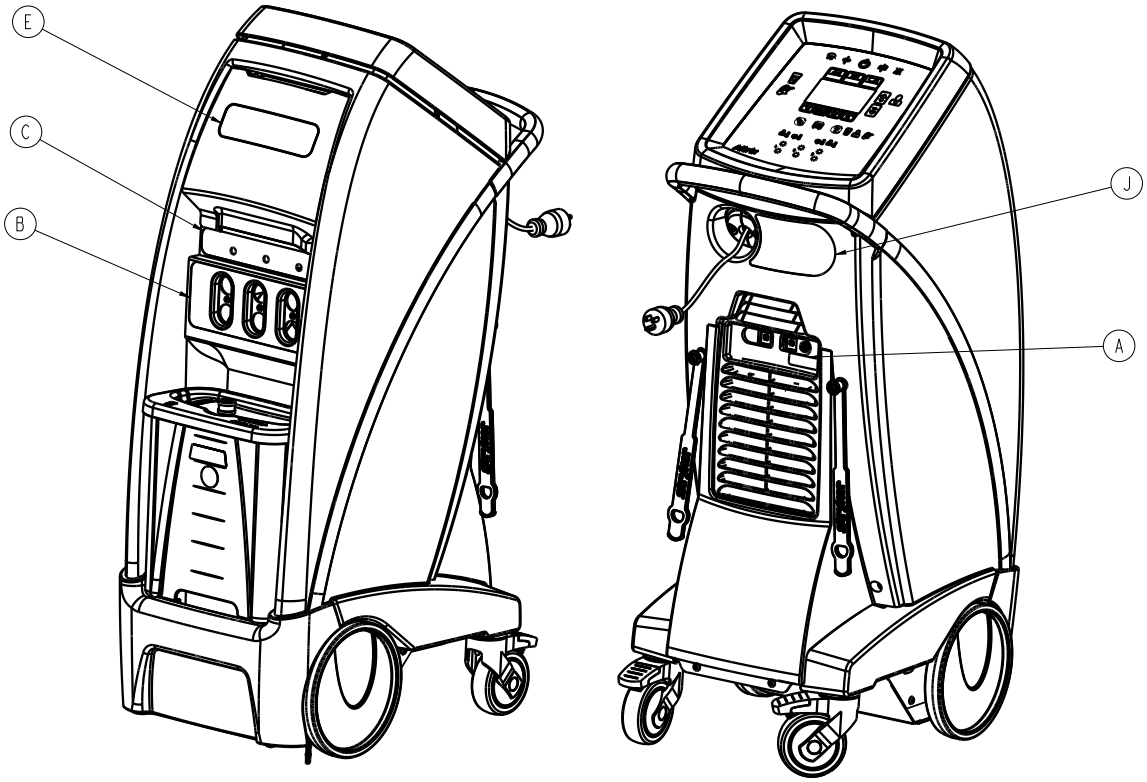
Storage assembly 8001-000-190

Item	Number	Name	Quantity
M	8001-000-194	Storage adhesive	1
N	3M 4298	3M Adhesion promoter	A/R

Label assembly



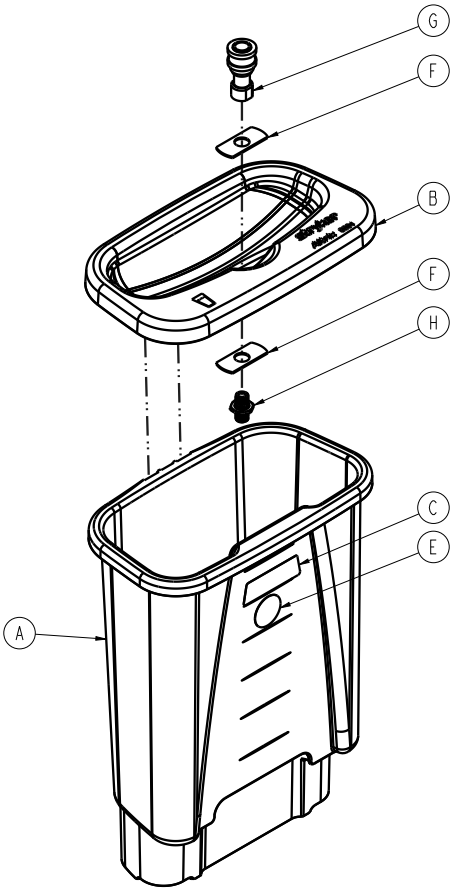
Label assembly



Item	Number	Name	Quantity
A	8001-001-016	Label, grounding	1
B	8001-001-017	Label, port	1
C	8001-001-021	Label, probe	1
D	8001-001-022	Label, storage safe working load	1
E	8001-001-023	Label, badge	1

Reservoir assembly kit 8001-007-241

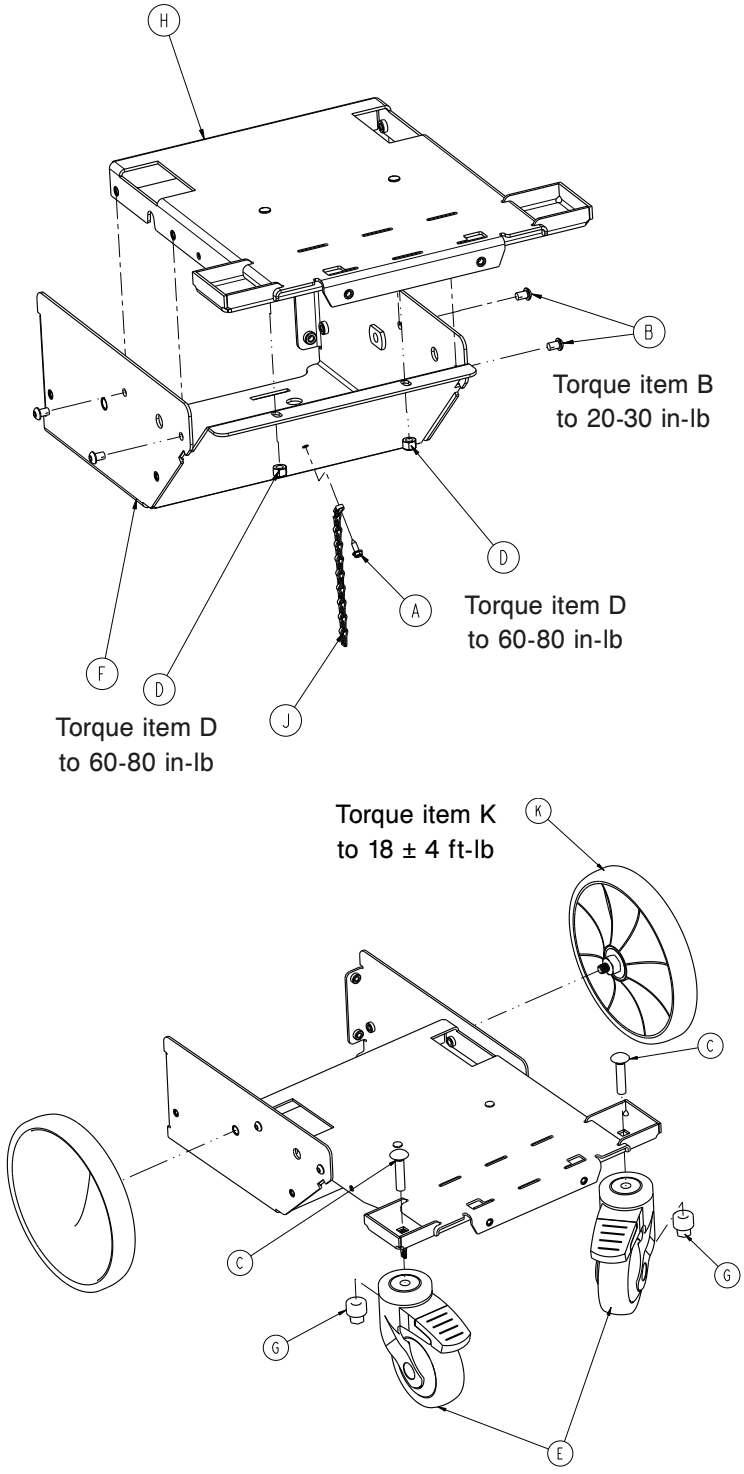
Rev B



Item	Number	Name	Quantity
A	8001-000-241	Reservoir base	1
B	8001-000-242	Reservoir lid	1
C	8001-001-024	Liquid level indicator label	1
E	8001-001-025	Label, warning , no tap water	1
F	0048-271-000	Clipped washer	2
G	0048-283-000	Hydraulic connector	1
H	8001-000-454	Fluid port fitting	1

Base assembly

8001-000-120 Rev C (Reference only)

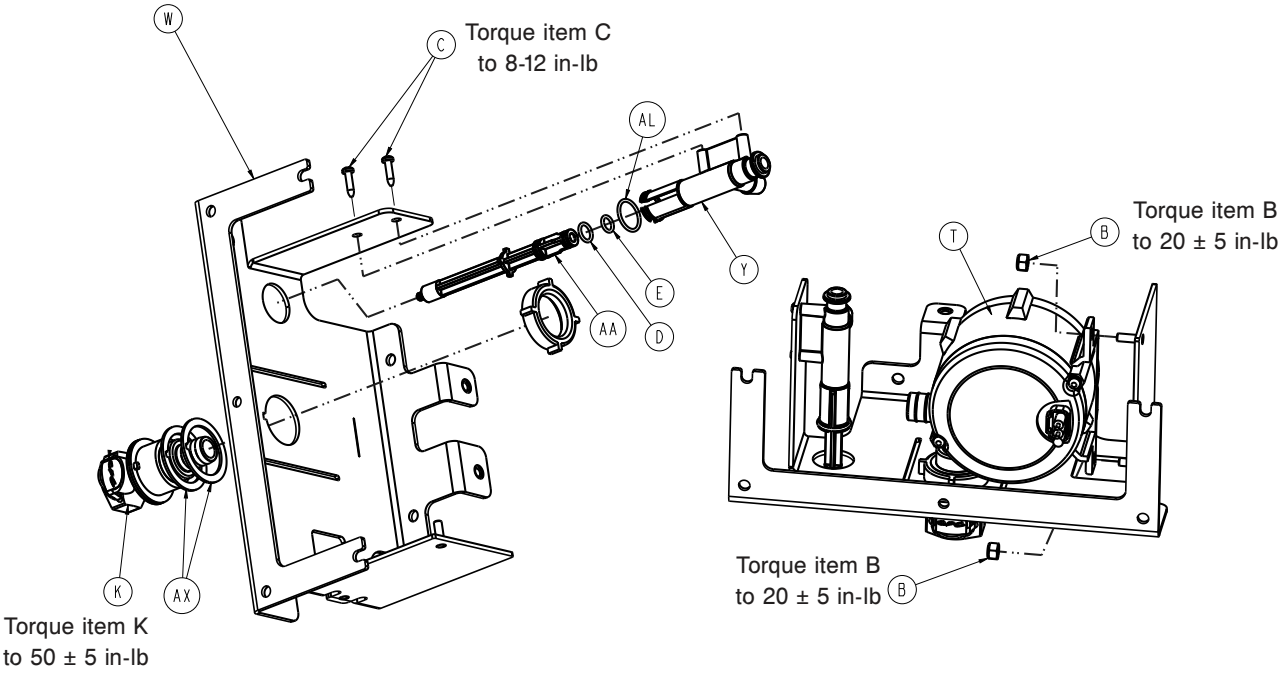


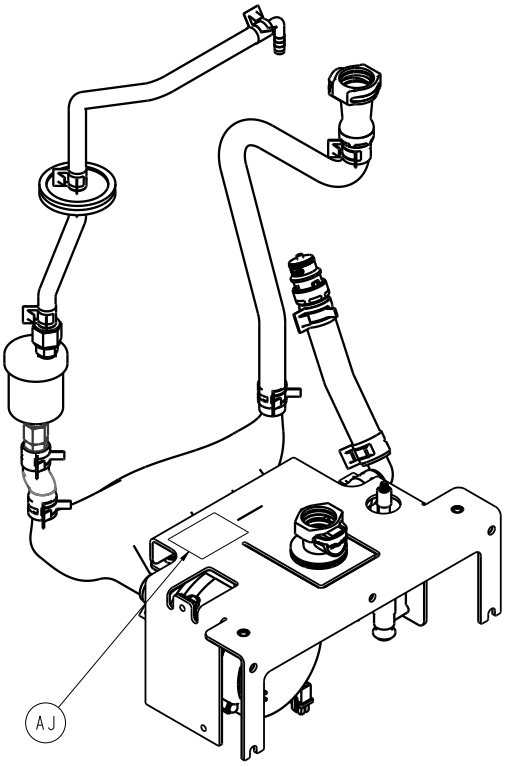
Item	Number	Name	Quantity
A	0003-364-000	Hex washer	1
B	0004-588-000	Button head cap screw	4
C	0005-041-000	Carriage bolt	2
D	0016-028-000	Fiberlock hex nut	2

Base assembly

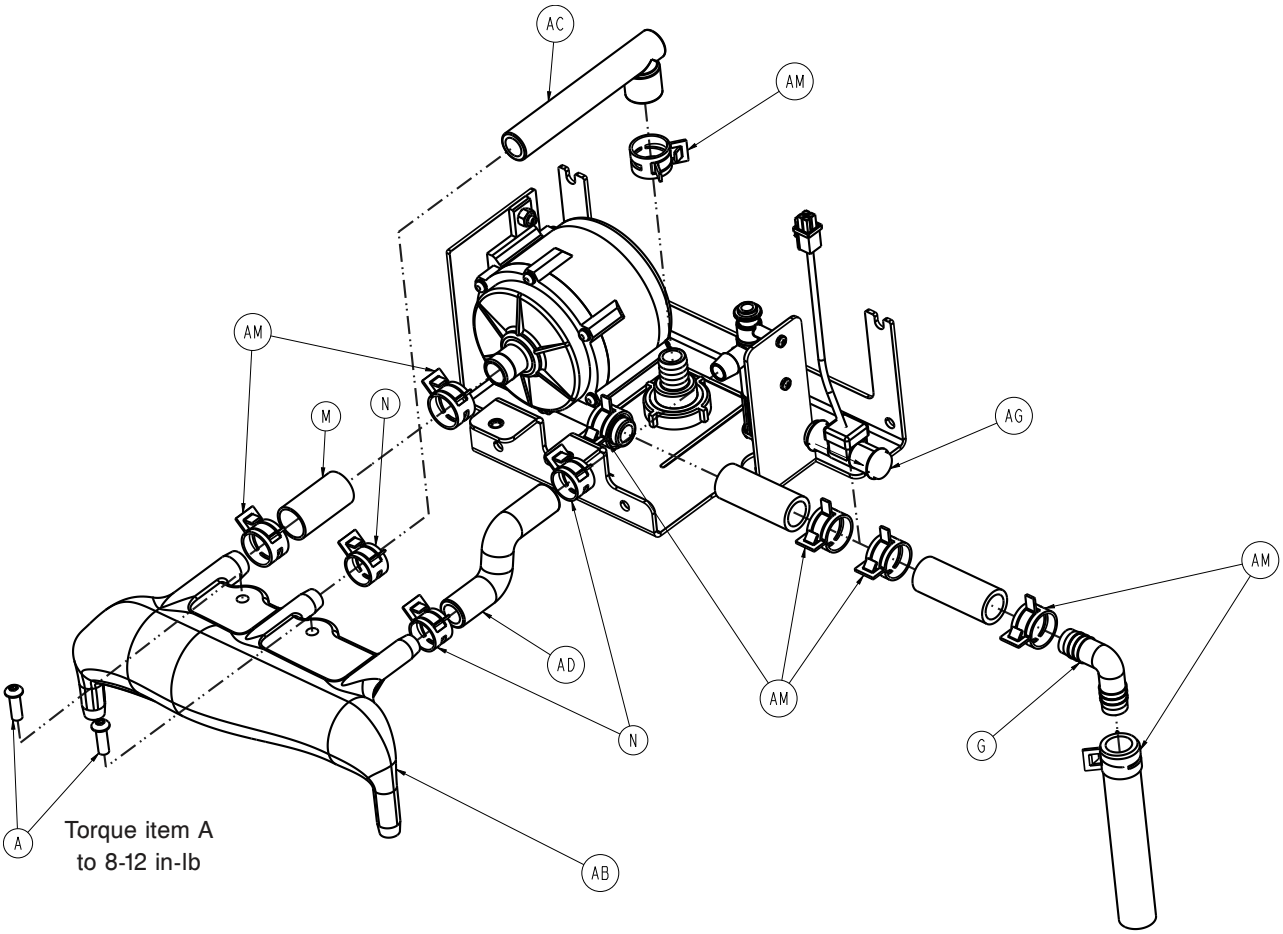
Item	Number	Name	Quantity
E	0058-017-000	Tente swivel caster with total lock	2
F	8001-000-112	Wheel bracket	1
G	8001-000-114	Hex nut	2
H	8001-000-115	Base weldment	1
J	8001-000-117	Ground chain	1
K	8001-000-131	Wheel assembly	2

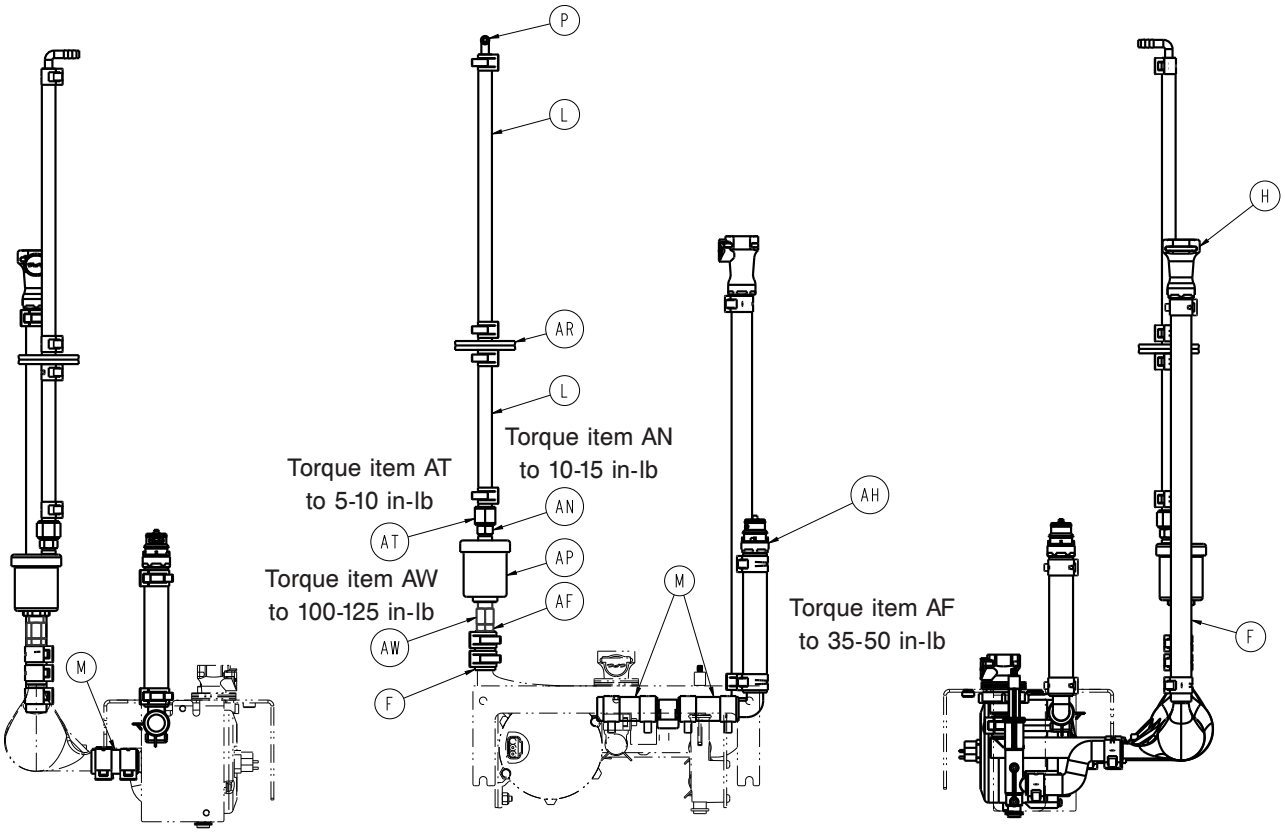
8001-000-210 Rev L (Reference only)



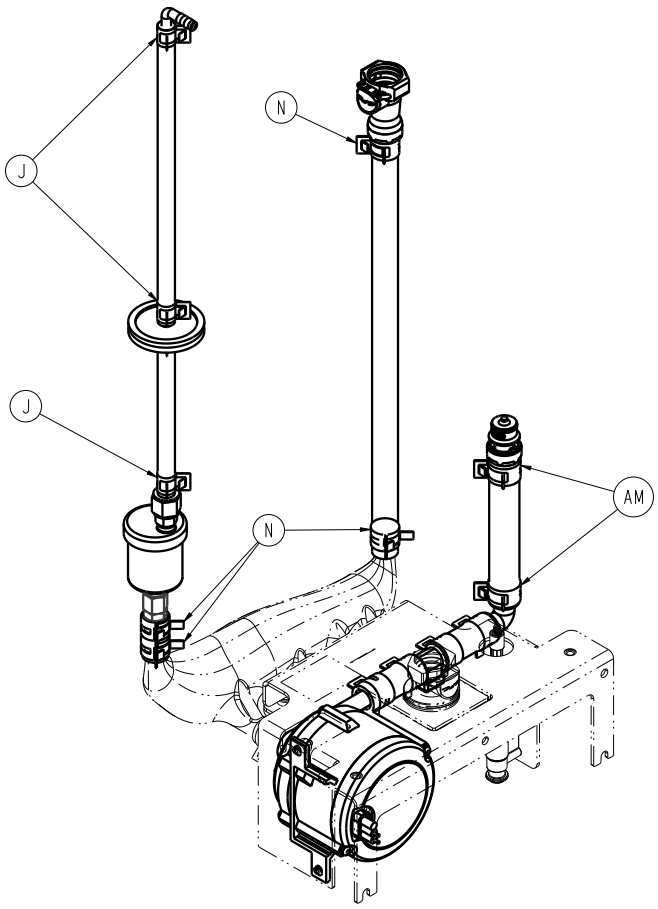


Fluid assembly




P
L
AR
L
Torque item AN
to 10-15 in-lb
Torque item AT
to 5-10 in-lb
AN
AT
AP
Torque item AW
to 100-125 in-lb
AF
AW
F
M
M
AH
Torque item AF
to 35-50 in-lb
H
F

Fluid assembly



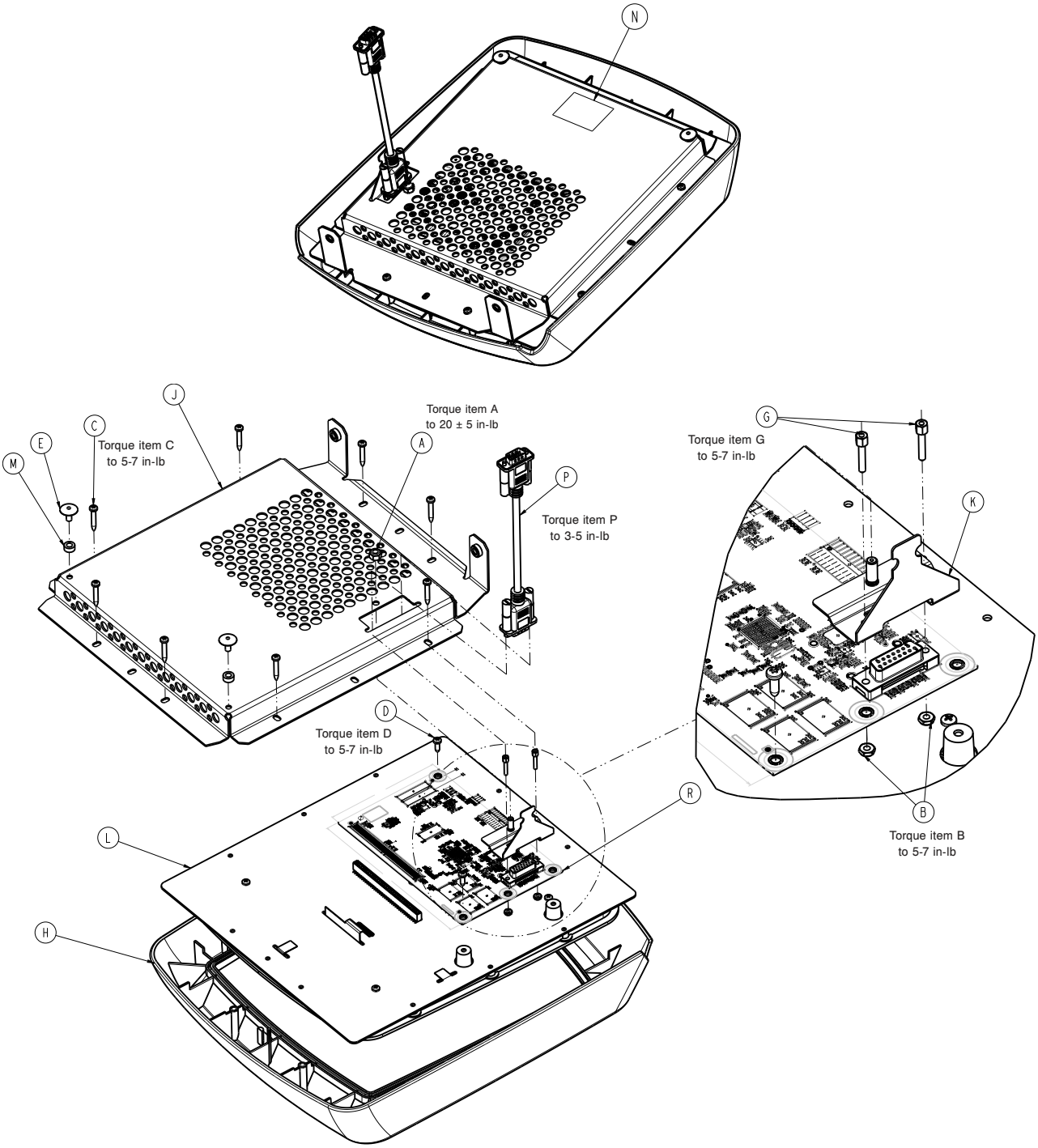
Item	Number	Name	Quantity
A	0004-592-000	Button head cap screw	2
B	0016-003-000	Nylock hex nut	2
C	0023-162-000	Delta PT® screw	2
D	0045-411-000	O-ring	1
E	0045-413-000	O-ring	1
F	0048-180-000	Tygon tubing	A/R
G	0048-248-000	Barb elbow	1
H	0048-182-000	Hose barb valved in-line coupling body	1
J	0048-264-000	Hose clamp	4
K	0048-245-000	Hose barb valved panel mount body	1
L	0048-249-000	Tygon tubing	A/R
M	0048-250-000	Tygon tubing	A/R
N	0048-265-000	Hose Clamp	7
P	0048-253-000	Elbow	1
T	0048-260-000	Pump	1
W	8001-000-211	Fluid bracket	1
Y	8001-000-226	Drain body	1
AA	8001-000-227	Drain plunger	1
AB	8001-000-231	Air eliminator	1
AC	8001-000-232	Tube, reservoir connecting	1

Fluid assembly

Item	Number	Name	Quantity
AD	8001-000-252	Tube, drain	1
AF	0048-259-000	Nylon adapter	1
AG	8001-065-887	Cable assembly, system flow sensor	1
AH	0048-404-000	Hose barb valved in-line insert	1
AJ	8001-001-226	Label, serial number, Altrix, fluid assembly	1
AK	0045-996-000	Super O-lube, Parker	A/R
AL	0045-113-000	O-ring	1
AM	0048-266-000	Hose clamp	9
AN	0048-267-000	Waste connector	1
AP	0048-268-000	Air vent, float style	1
AR	0048-269-000	Inline filtration vent	1
AT	0048-270-000	Nylon fitting barb	1
AW	0048-272-000	Brass adaptor	1
AX	0048-273-000	Spacer, colder connector	2

Display assembly

8001-000-510 Rev F (Reference only)



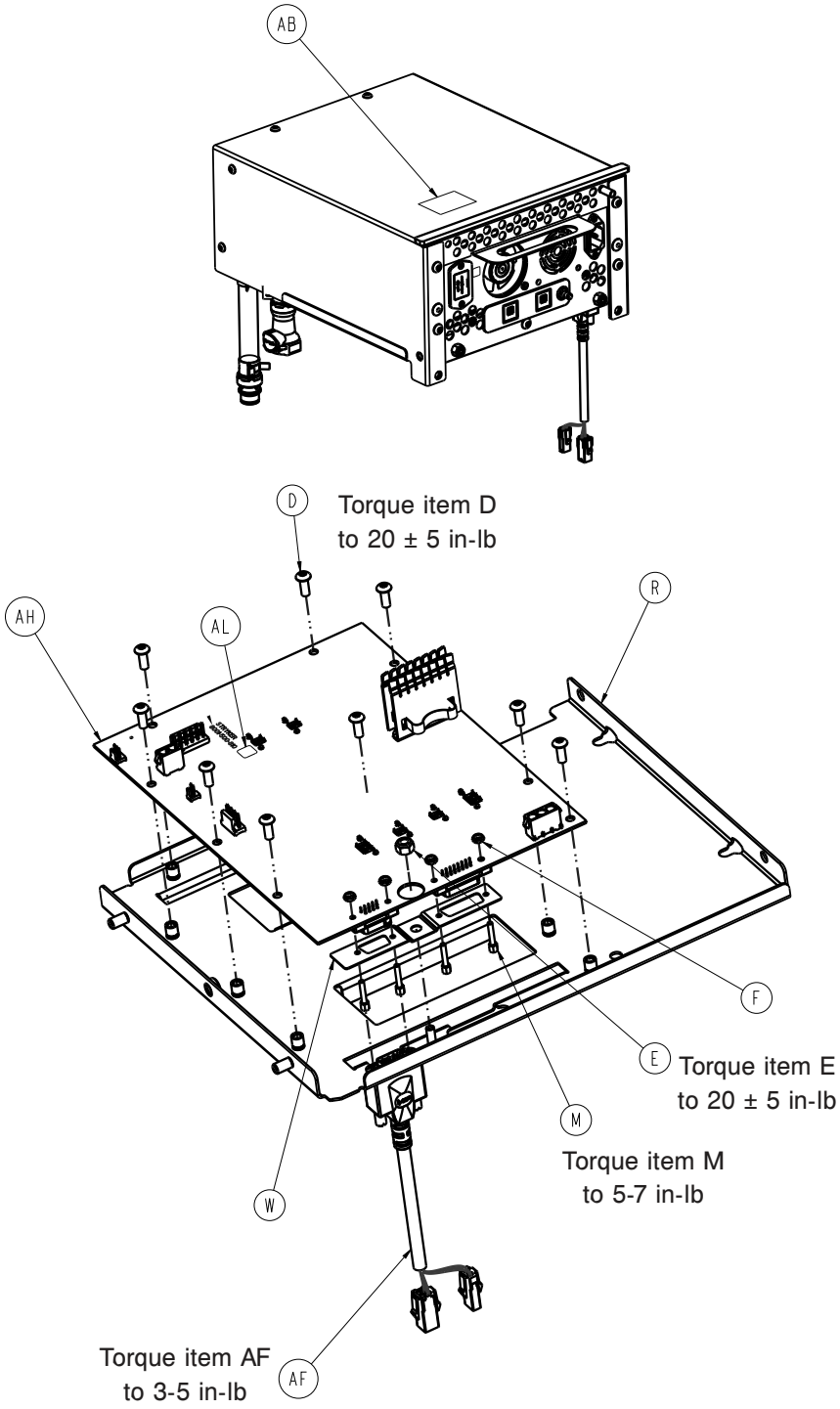
Item	Number	Name	Quantity
A	0016-003-000	Nylock hex nut	1
B	0016-007-000	Fiberlock hex nut	2
C	0023-166-000	Delta PT® screw	8
D	0023-167-000	Delta PT® screw	2
E	0025-132-000	Dome head rivet	2

Display assembly

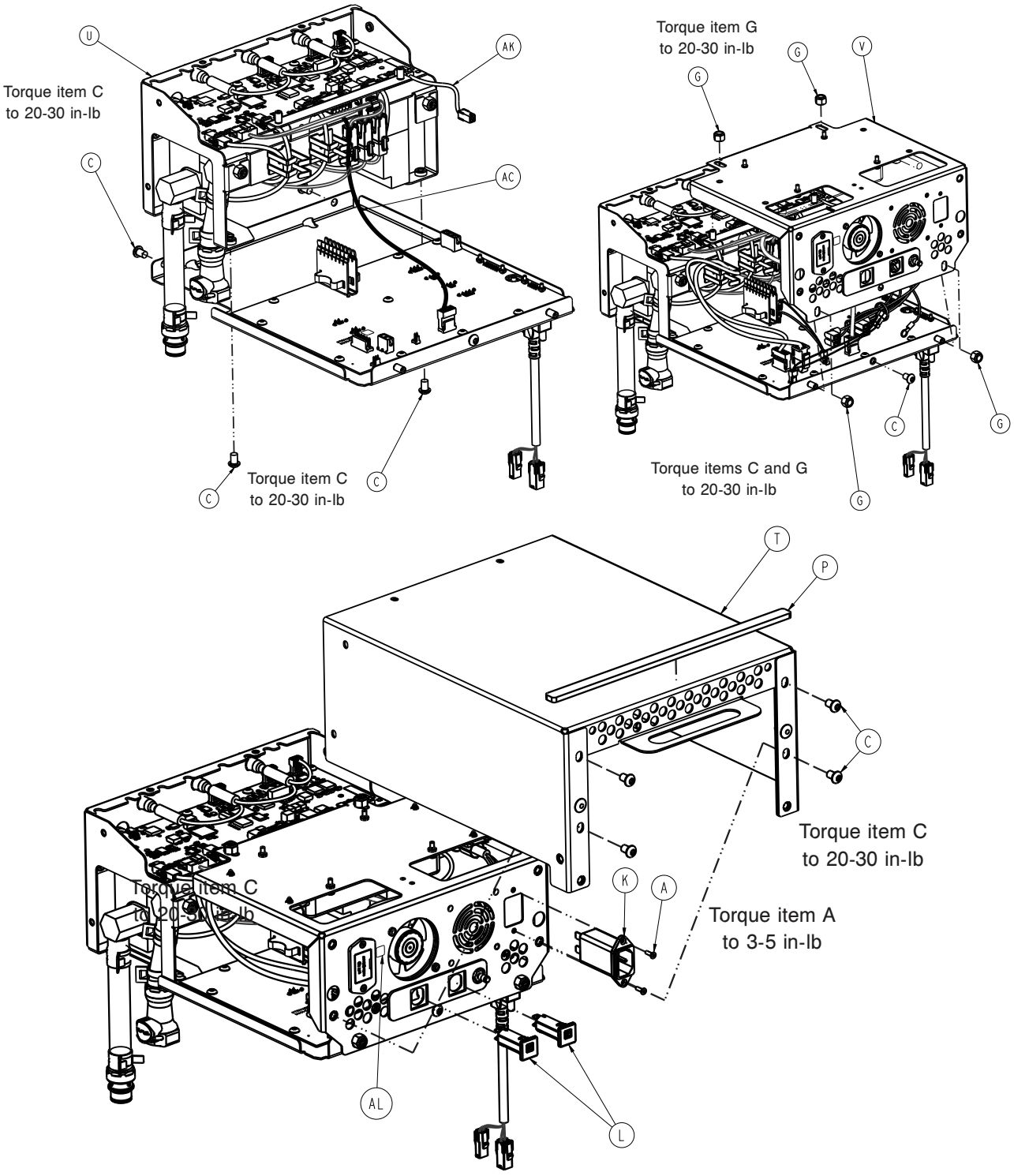
Item	Number	Name	Quantity
G	3001-300-007	Jack screw	2
H	8001-000-151	Bezel	1
J	8001-000-491	Display shield bracket	1
K	8001-000-493	Display ground bracket	1
L	8001-000-500	Stryker user interface	1
M	8001-000-519	Bushing, display key hole	2
N	8001-001-526	Label, serial number, display assembly	1
P	8001-065-865	Cable assembly, display	1
R	8001-300-830	Controller communications board (CCB) assembly	1

8001-123-410 Rev M 100-200V (Reference only)

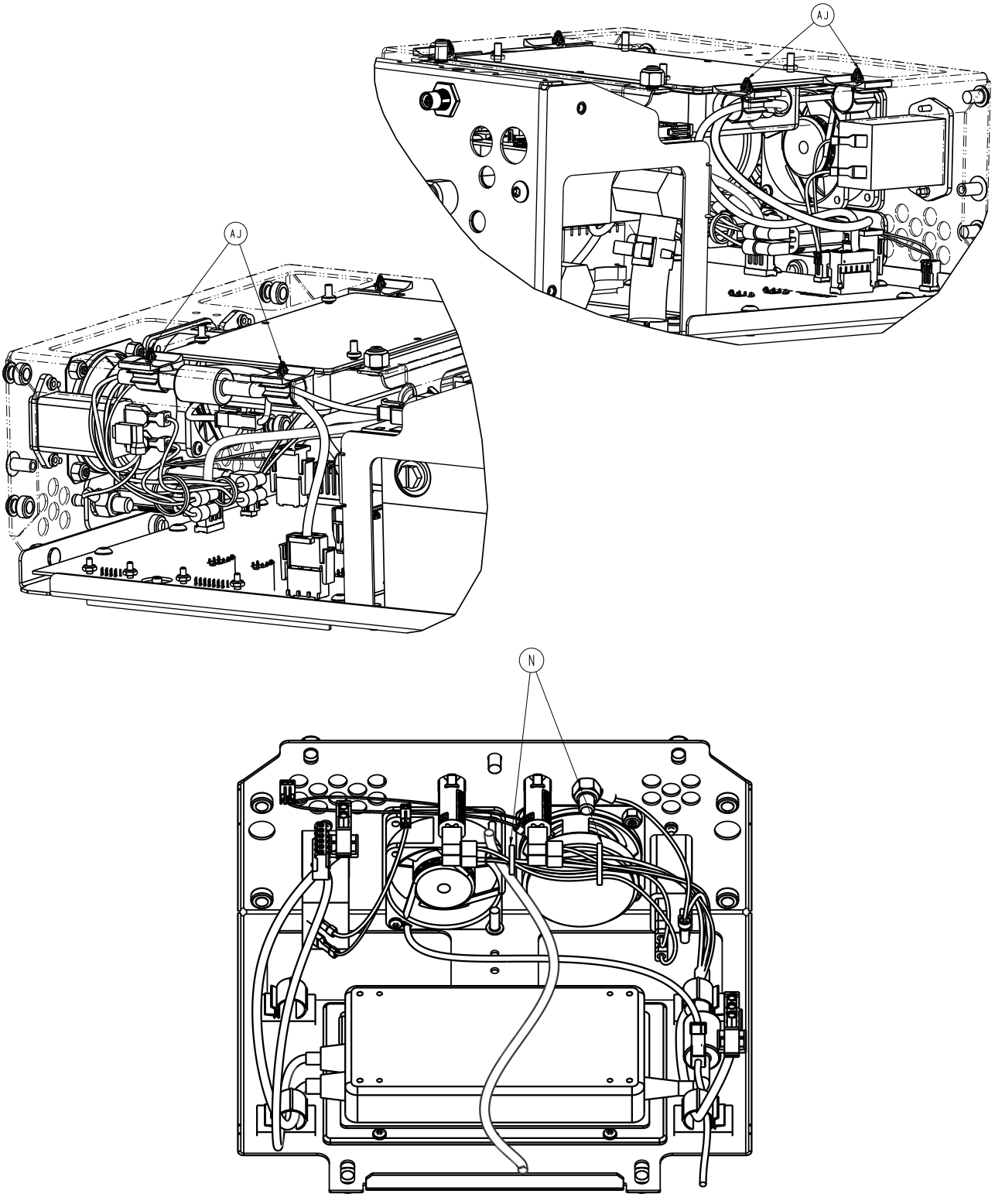
8001-233-410 Rev M 220-240V (Reference only)



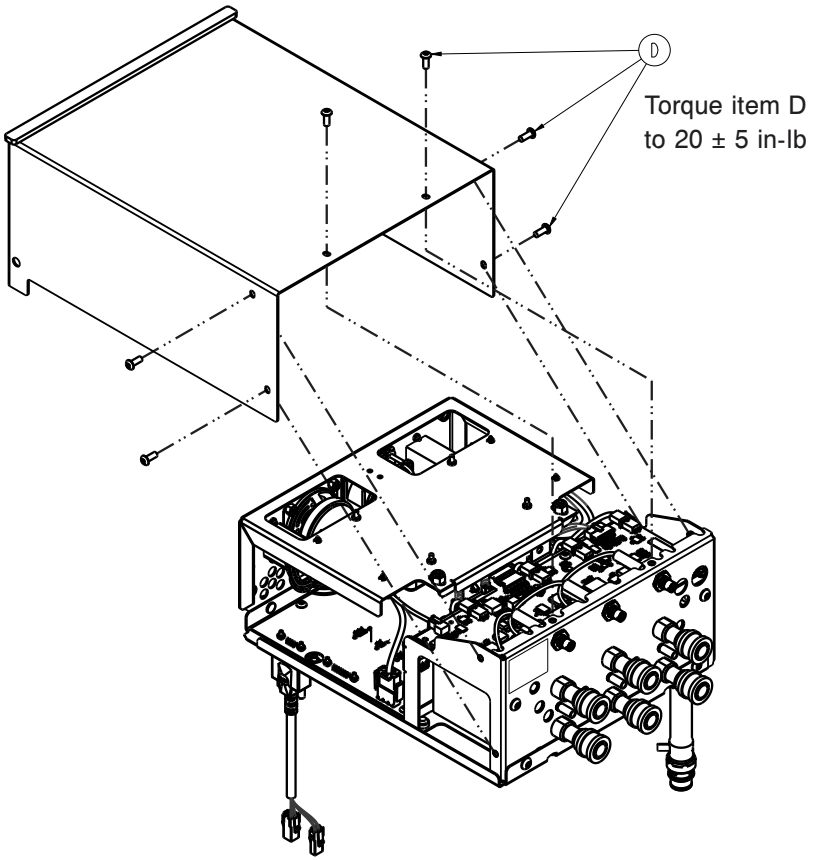
Control assembly



Control assembly



Control assembly

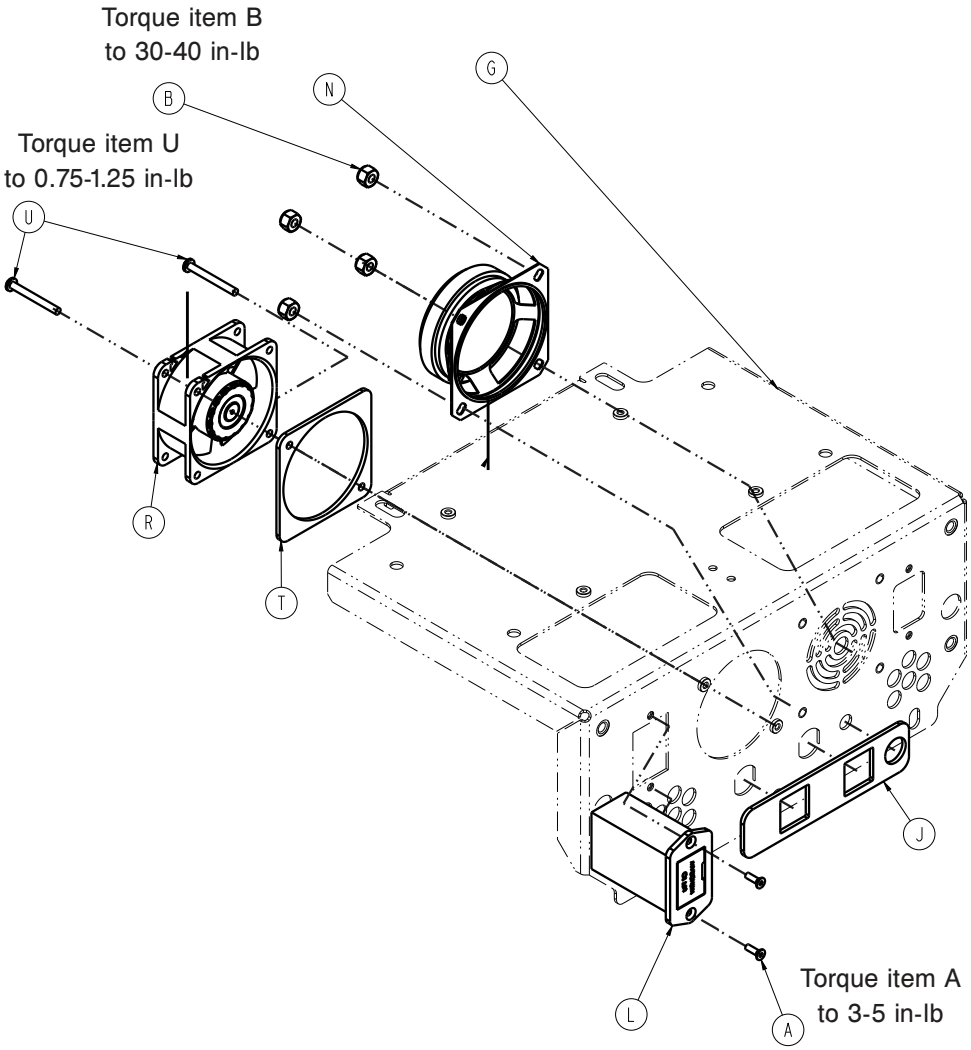


Item	Number	Name	Quantity
A	0001-107-000	Flat head cap screw	2
C	0004-588-000	Button head cap screw	9
D	0004-634-000	Button head cap screw with patch	15
E	0016-003-000	Nylock hex nut	1
F	0016-007-000	Fiberlock hex nut	4
G	0016-028-000	Fiberlock hex nut	4
K	0059-240-000	Power line filter	1
L	0059-271-000	Circuit breaker	2
M	3001-300-007	Jack screw	4
N	3000-300-113	8” Cable tie	2
P	8001-000-402	Control box foam	1
R	8001-000-411	Control assembly base	1
T	8001-000-412	Control box cover	1
U	8001-100-420	Manifold assembly	1
V	8001-000-460	Power supply assembly	1
W	8001-000-467	FMB grounding bracket	1
AB	8001-001-426	Label, serial number, Altrix, control assembly	1
AC	8001-065-864	Cable assembly, MCB to FMB	1
AF	8001-065-872	Cable assembly, DB9, pump	1
AH	8001-500-810	Fluid management board (FMB) assembly	1

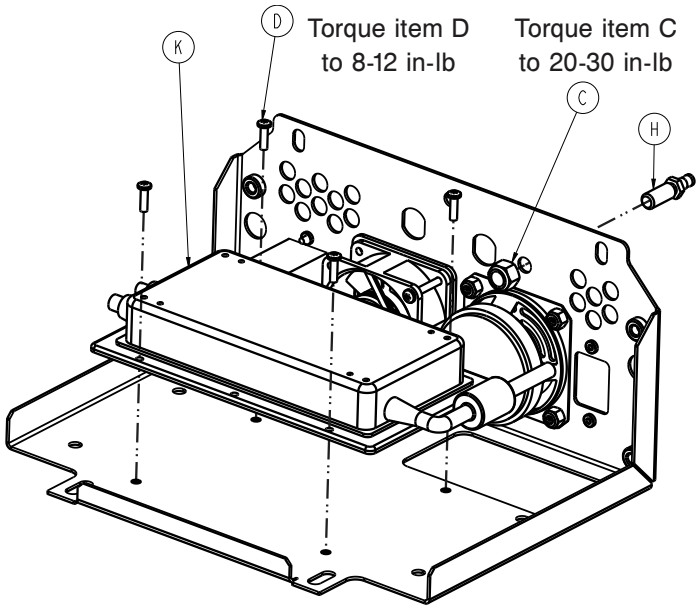
Control assembly

Item	Number	Name	Quantity
AJ	0059-434-000	3848 Heyco wire clip	4
AK	8001-065-895	Control box fan extension cable assembly	1
AL	8001-001-027	Battery/fuse label	2

8001-000-460 Rev F (Reference only)



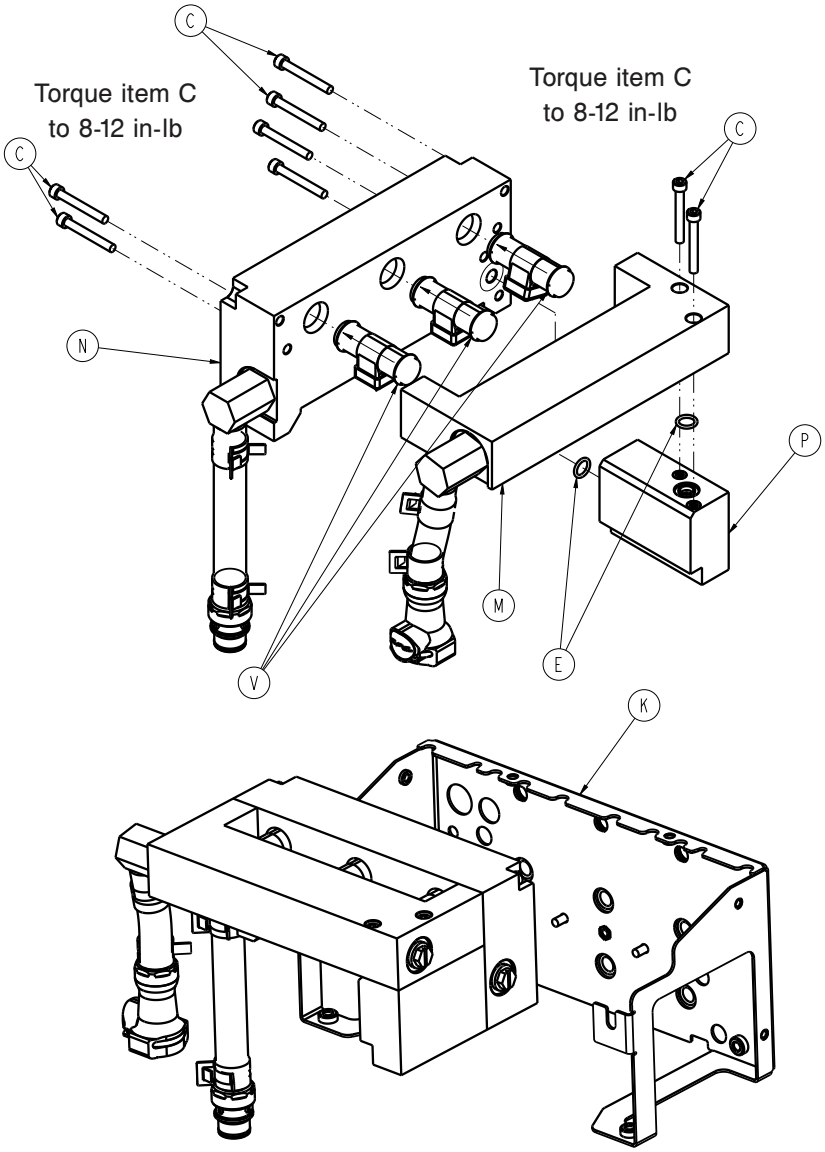
Power supply assembly



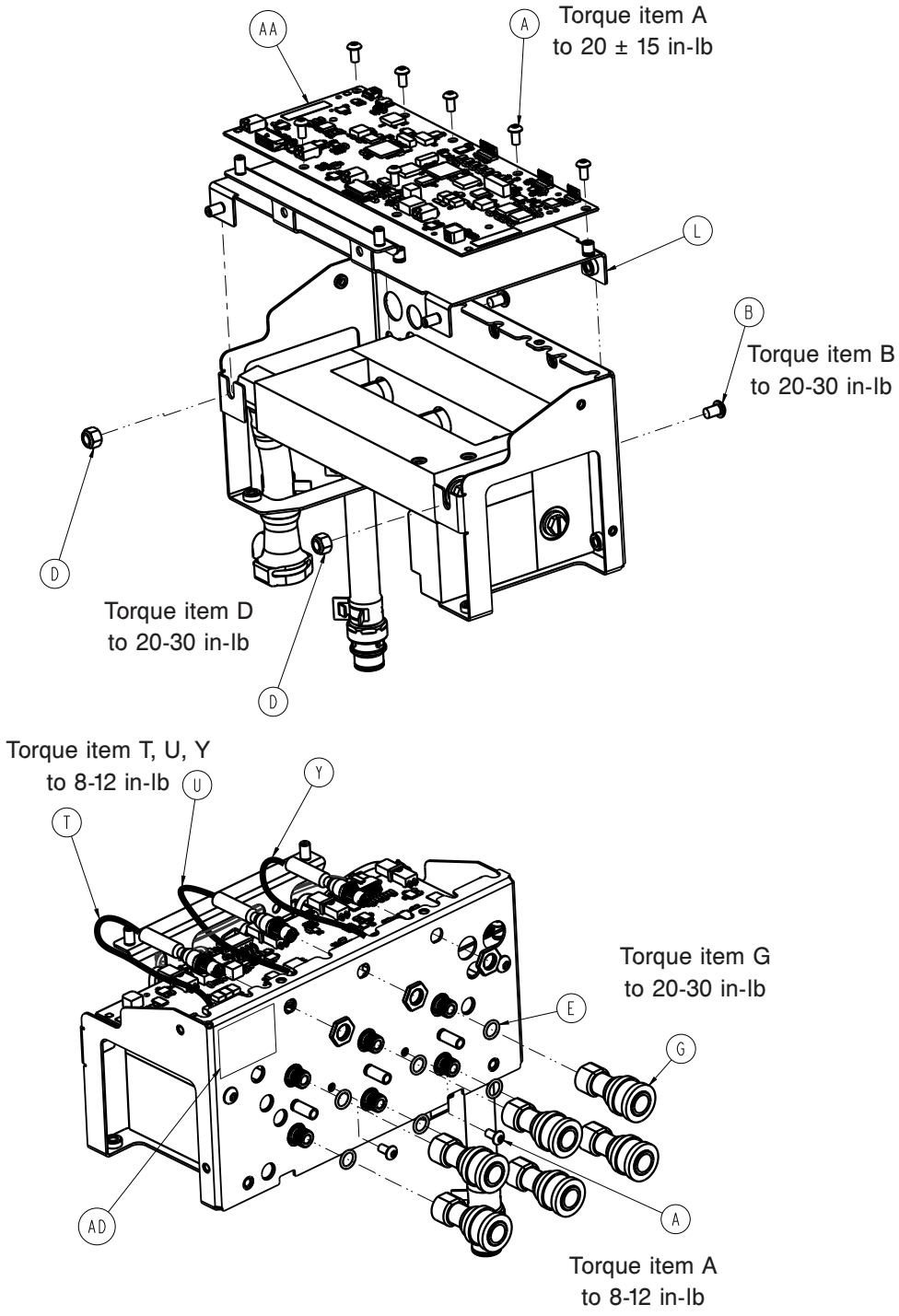
Item	Number	Name	Quantity
A	0001-107-000	Flat head cap screw	2
B	0016-014-000	Fiberlock hex nut	4
C	0016-036-000	Nylock hex nut	1
D	0050-032-000	Pan head machine screw	4
E	0058-372-000	9V battery (not shown)	1
G	8001-000-461	Power supply mount	1
H	8001-000-481	Grounding lug	1
J	8001-000-474	Speaker gasket	1
K	8001-065-460	Power supply cable assembly	1
L	8001-065-480	Battery holder cable assembly	1
N	8001-065-881	Speaker cable assembly	1
R	8001-065-886	Control box fan cable assembly	1
T	8001-000-476	Fan gasket	1
U	0050-083-000	Pan head machine screw with patch	2

Manifold assembly

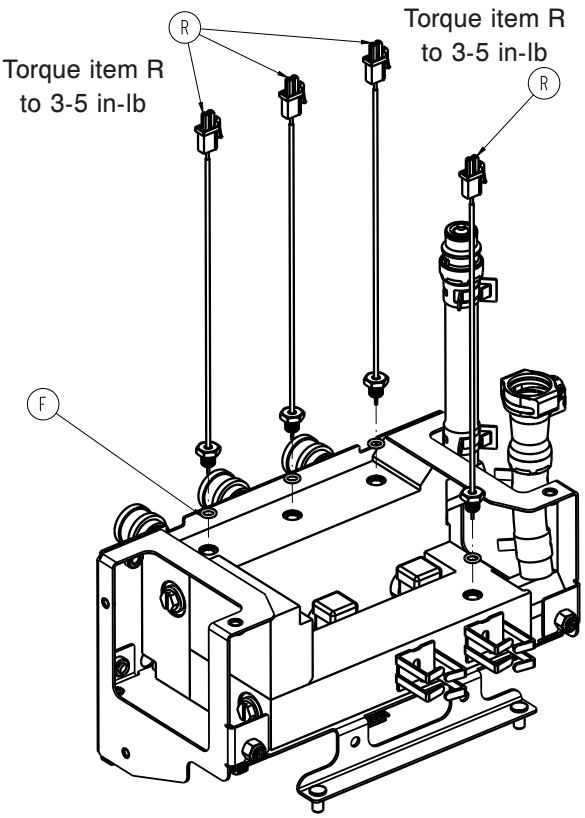
8001-100-420 Rev K (Reference only)



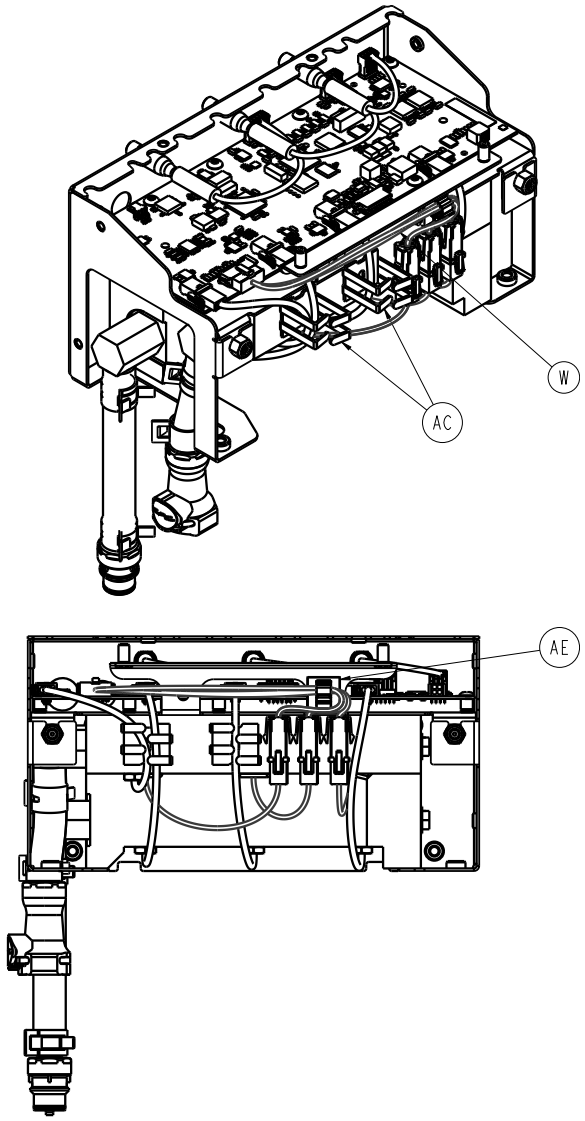
Manifold assembly



Manifold assembly



Manifold assembly



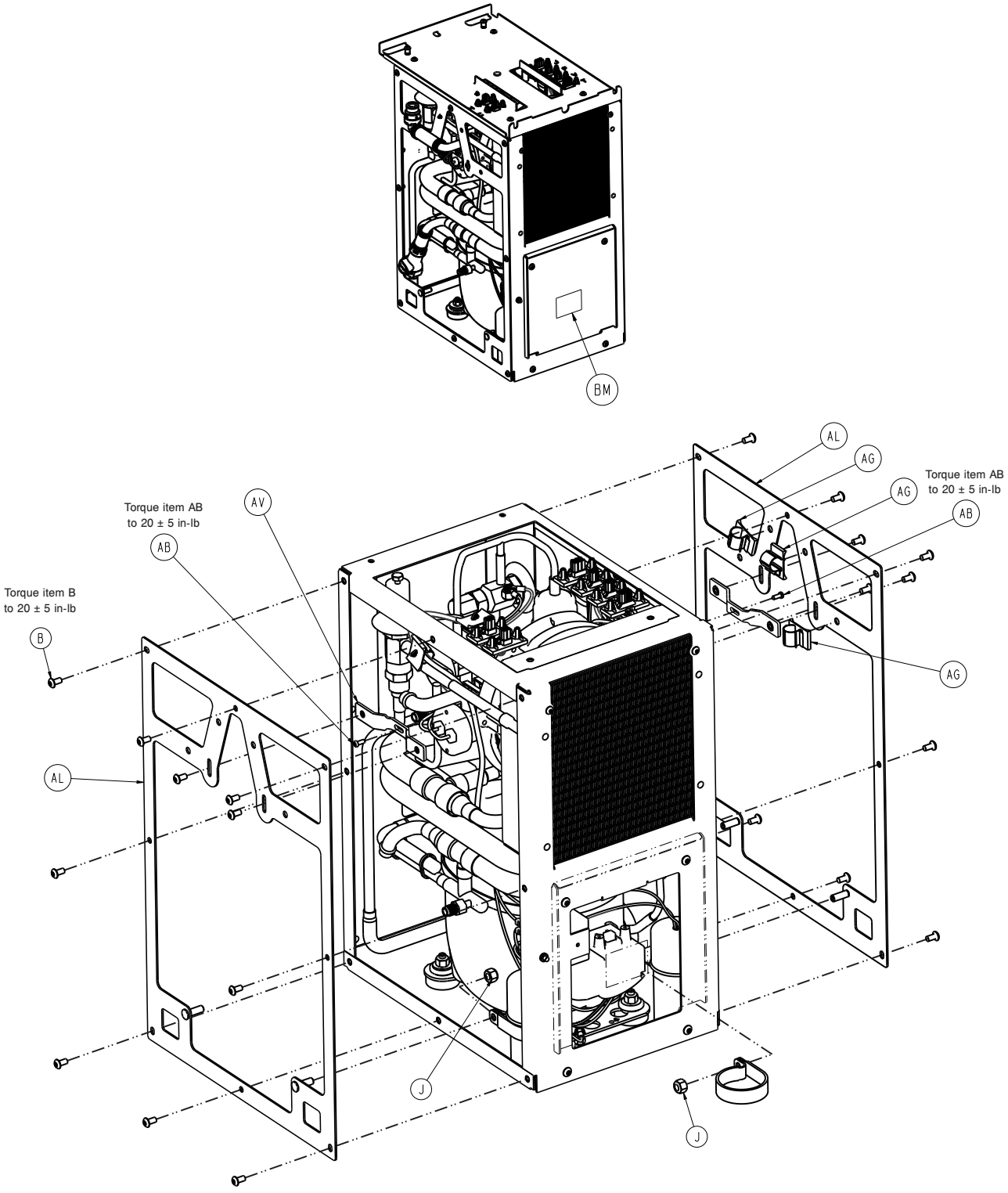
Item	Number	Name	Quantity
A	0004-587-000	Button head cap screw with patch	9
B	0004-588-000	Button head cap screw	2
C	0004-859-000	S head cap screw with patch	8
D	0016-028-000	Fiberlock hex nut	2
E	0004-411-000	O-Ring	8
F	0004-412-000	O-Ring	4
G	0048-283-000	Hydraulic connector	6
K	8001-000-451	Bracket outer, manifold assembly	1
L	8001-000-458	MCB support bracket	1
M	8001-000-630	Supply manifold assembly	1
N	8001-000-640	Return manifold assembly	1
P	8001-000-650	Bypass manifold assembly	1
R	8001-065-860	Temperature probe cable assembly	4
T	8001-065-869	Patient temperature port cable assembly (input)	1

Manifold assembly

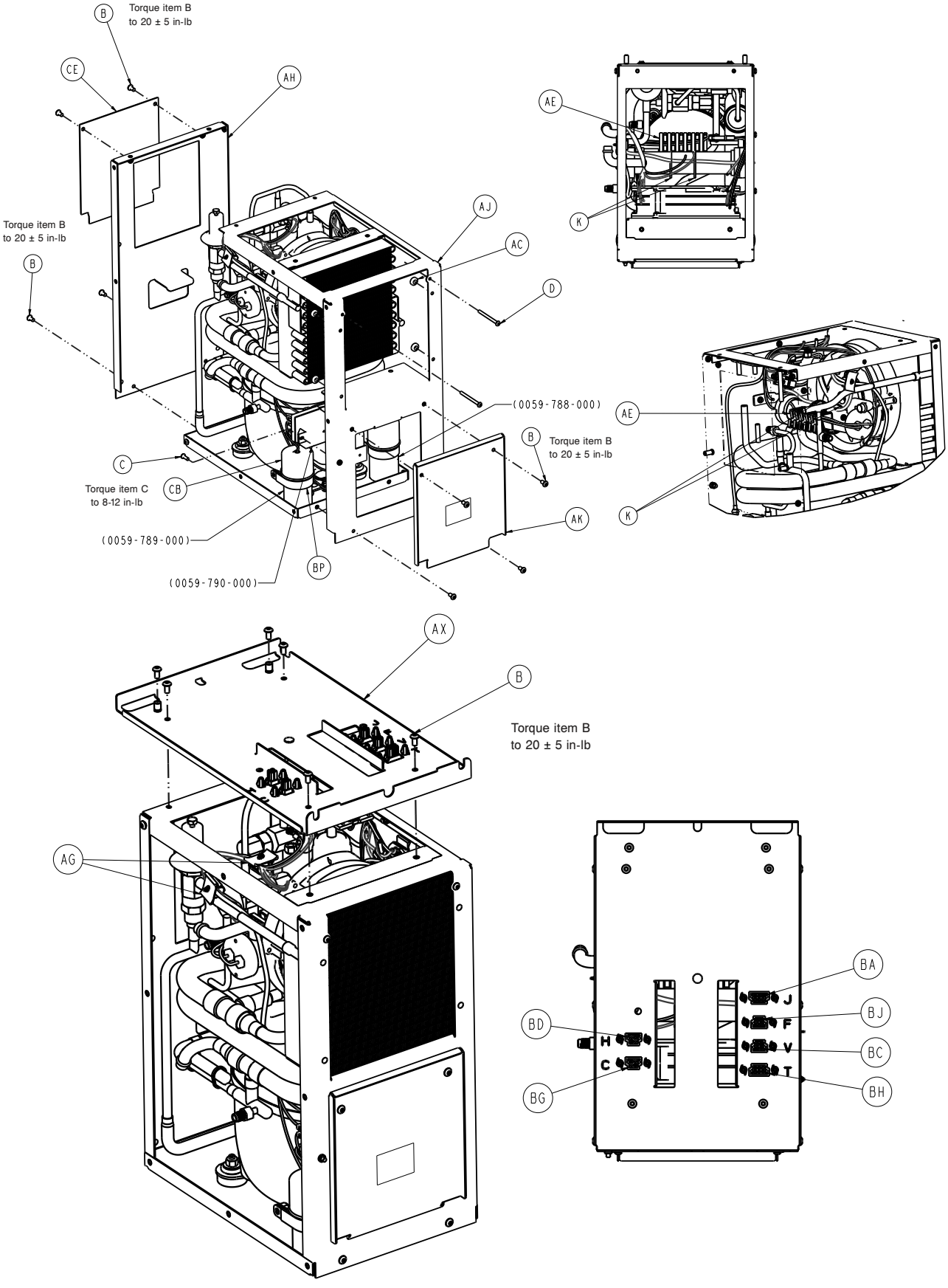
Item	Number	Name	Quantity
U	8001-065-870	Patient temperature replicator cable assembly	1
V	8001-065-887	System flow sensor cable assembly	3
W	8001-065-888	MCB to flow sensor cable assembly	1
Y	8001-065-891	Patient temperature port cable assembly (input)	1
AA	8001-400-800	Main control board (MCB) assembly	1
AB	0045-996-000	Super O-Lube, Parker	A/R
AC	0059-432-000	Flexible wire duct	A/R
AD	8001-001-426	Label, serial number, Altrix, Control assembly	1
AE	0059-433-000	3846 Heyco wire clip	1

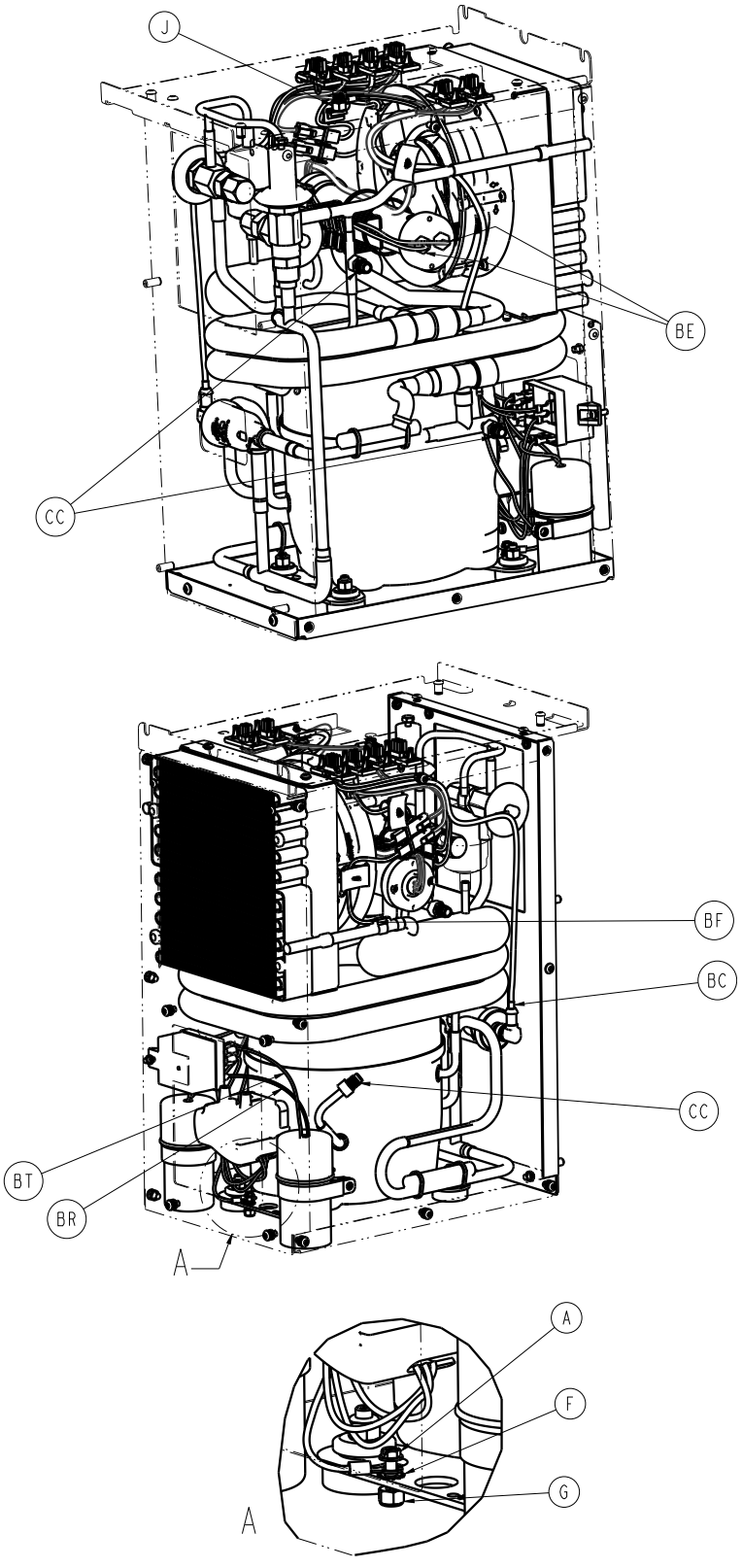
8001-100-310 100V 50/60 Hz Rev M (Reference only)

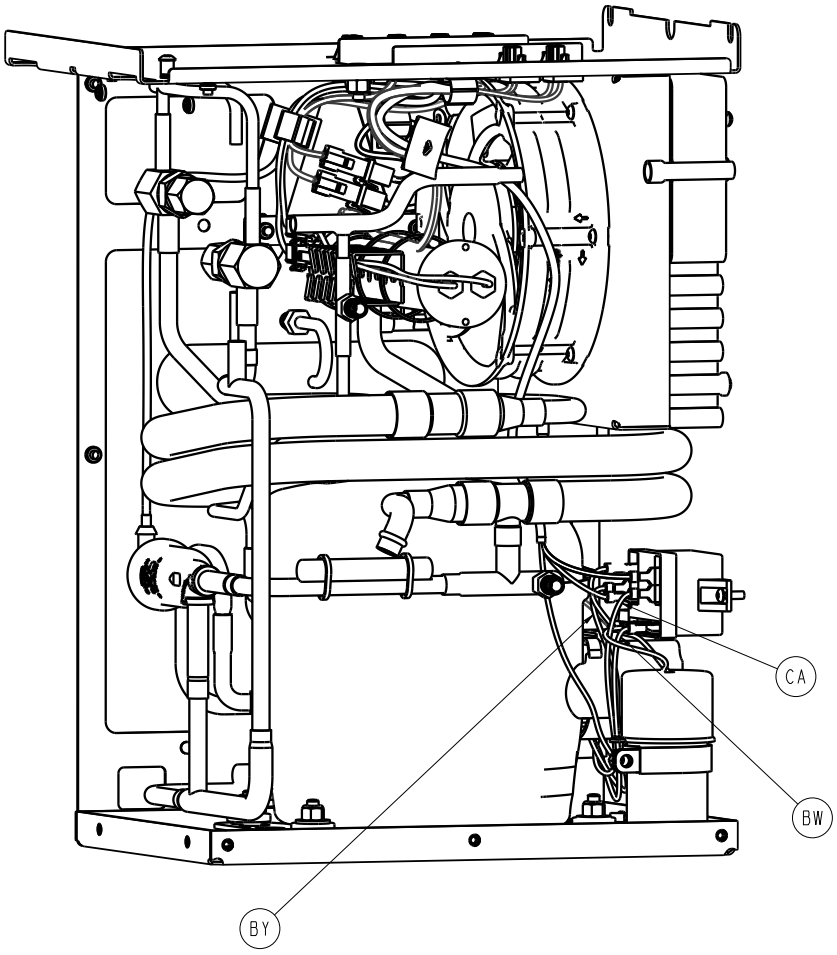
8001-120-310 120V 60 Hz Rev M (Reference only)



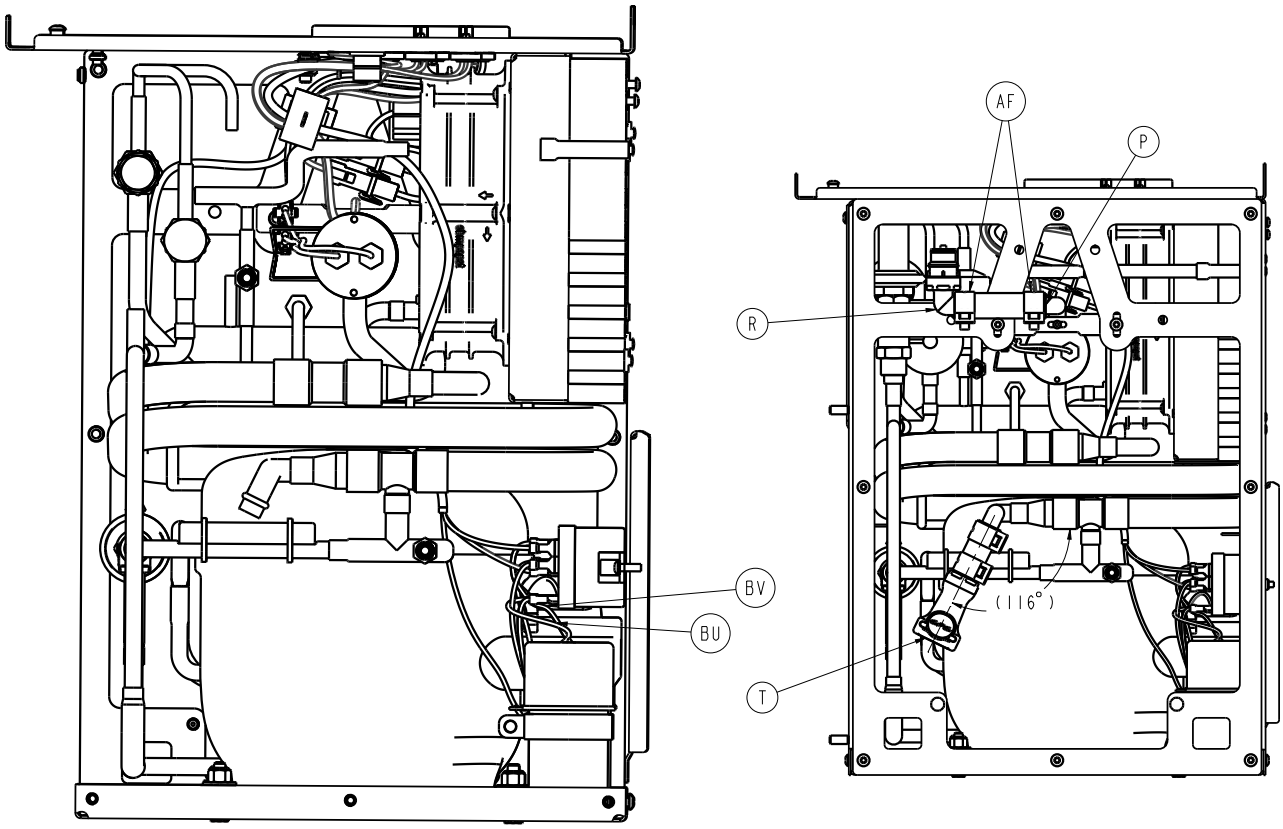
Thermal product, 100-120V

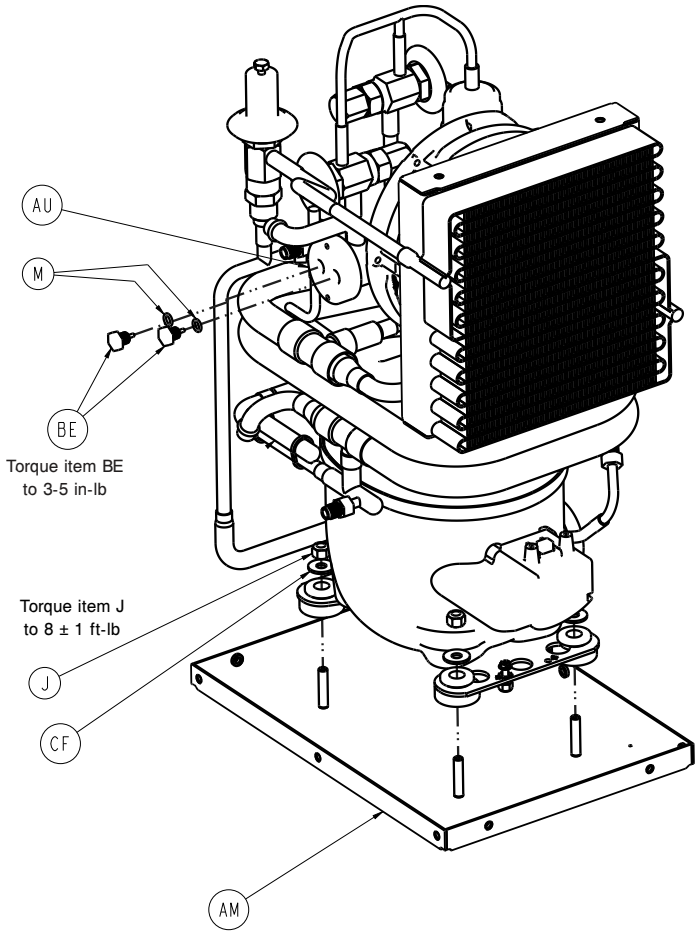


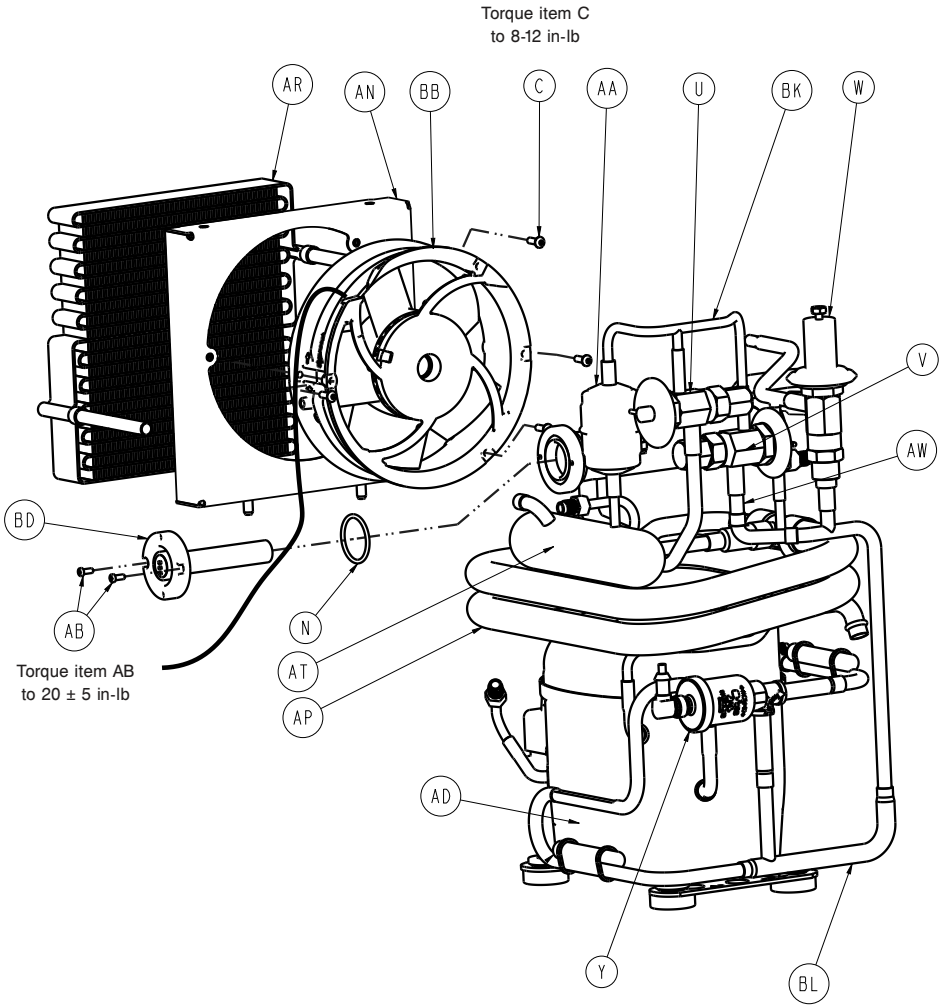

J
BE
CC
BF
BC
CC
BT
BR
A
A
F
G
A


CA
BW
BY

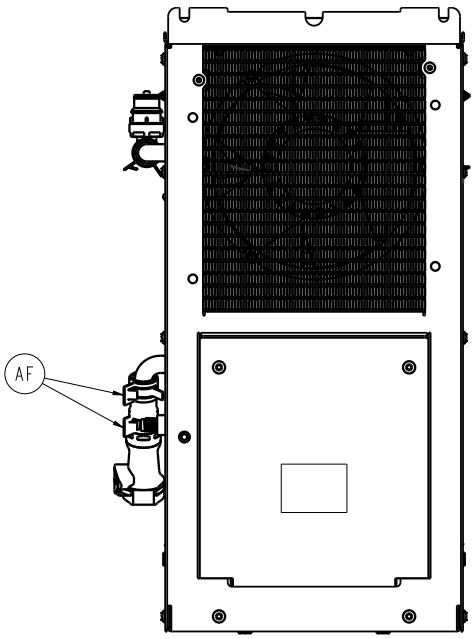
Thermal product, 100-120V




AU
M
BE
Torque item BE
to 3-5 in-lb
Torque item J
to 8 ± 1 ft-lb
J
CF
AM


Torque item C
to 8-12 in-lb
AR
AN
BB
C
AA
U
BK
W
V
AW
BD
AB
Torque item AB
to 20 ± 5 in-lb
N
AT
AP
AD
Y
BL

Thermal product, 100-120V



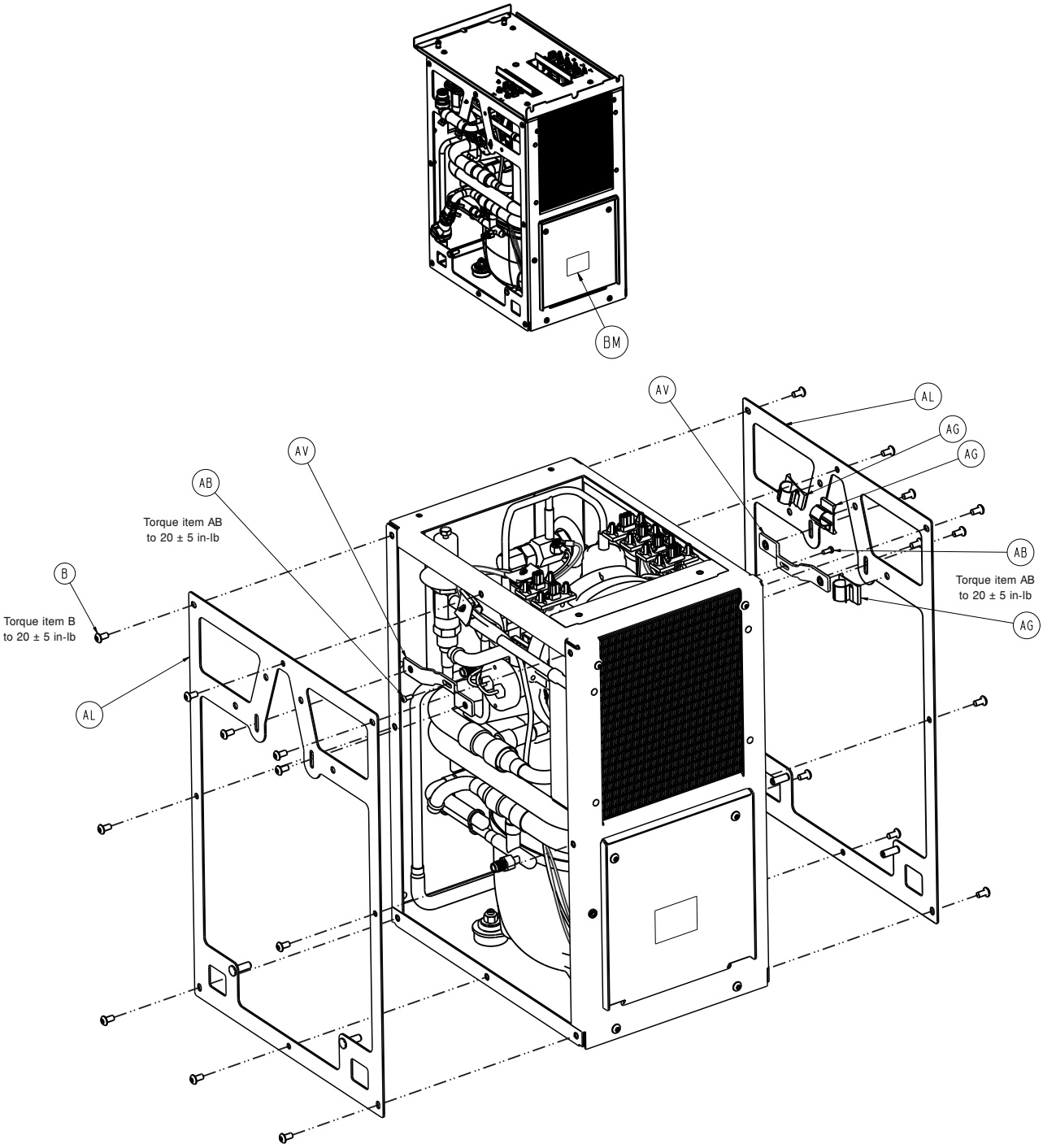
Item	Number	Name	Quantity
A	0003-364-000	#8–32 HWH SLT TCS	1
B	0004-587-000	Button head cap screw with patch	34
C	0004-876-000	Button head cap screw with patch	5
D	0004-877-000	Button head cap screw with patch	2
F	0013-018-000	External tooth lock washer	1
G	0016-014-000	Fiberlock hex nut	1
J	0016-028-000	Fiberlock hex nut	7
K	-	Plastic cable tie	2
M	0045-412-000	O-Ring	2
N	0045-414-000	O-Ring	1
P	0048-180-000	Tygon tubing	A/R
R	0048-409-000	Hose Barb valved elbow insert	1
T	0048-182-000	Barb valved in-line coupling body	1
U	0048-261-000	Main expansion valve	1
V	0048-262-000	Bypass expansion valve	1
W	0048-263-000	Bypass pressure valve	1
Y	0048-337-000	Electric expansion valve	1
AA	0048-403-000	Refrigerant filter / drier	1
AB	0004-882-000	Button head cap screw	4
AC	0056-029-000	Push-in bumper, tall	4
AD	0059-426-000	Compressor, 100-120V 50/60Hz	1
AE	0059-432-000	Flexible wire duct	A/R
AF	0048-265-000	Clamp, 3/4” OD hose	4
AG	0059-434-000	Heyco wire clip	5
AH	8001-000-332	Front support, TU	1
AJ	8001-000-333	Back support, TU	1
AK	8001-000-334	Compressor access bracket	1
AL	8001-000-335	Side panel, TU	2

Thermal product, 100-120V

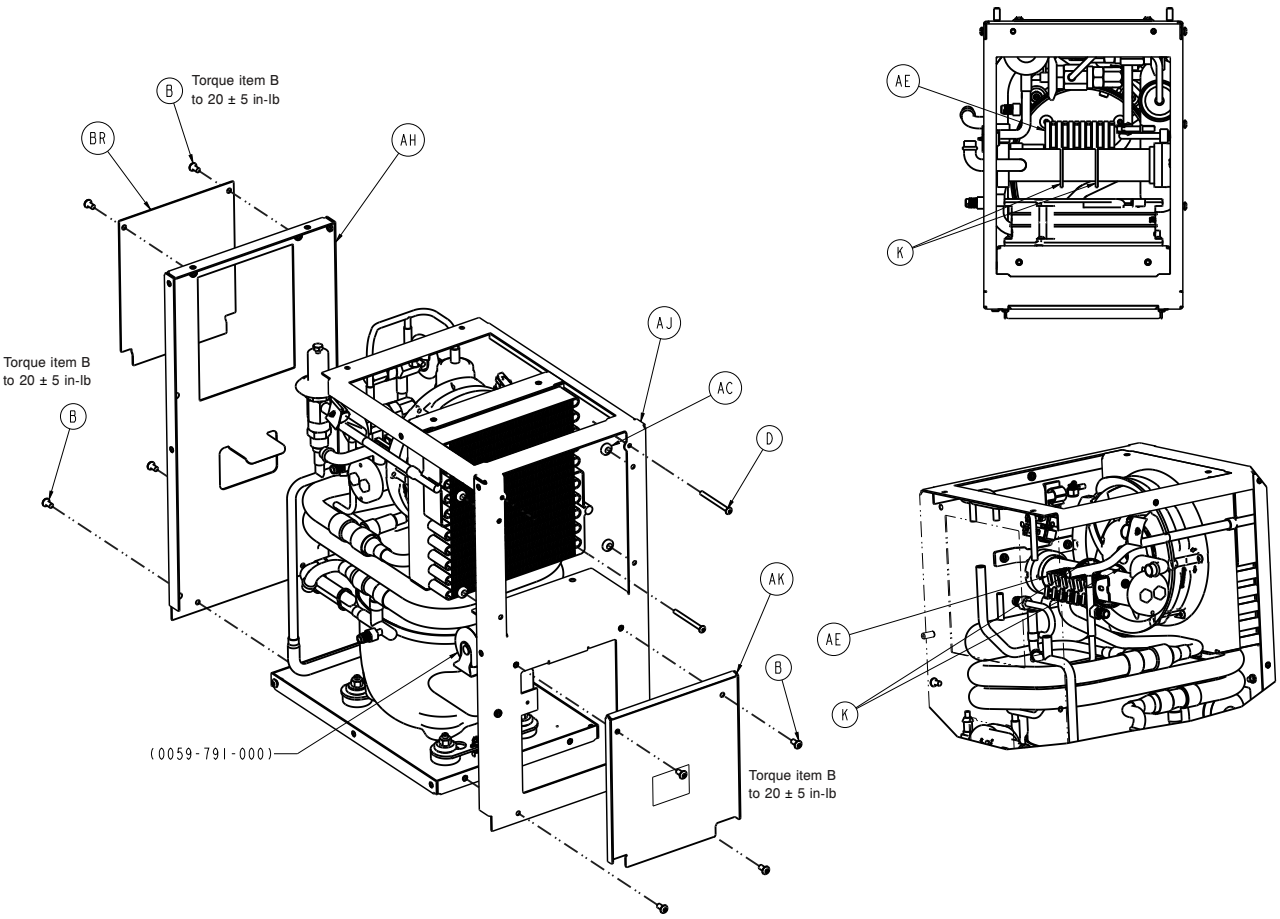
Item	Number	Name	Quantity
AM	8001-000-340	Compressor mount bracket	1
AN	8001-000-351	Fan shroud	1
AP	8001-000-355	Heat exchanger	1
AR	8001-000-356	Condenser	1
AT	8001-000-357	Refrigerant receiver	1
AU	8001-000-365	Heater well	1
AV	8001-000-376	Heater well hanger	2
AW	8001-000-377	Bypass orifice	1
AX	8001-000-471	Connector plate	1
BA	8001-065-100	Cable, jumper 100/120VAC	1
BB	8001-065-375	Cable assembly, refrigeration fan	1
BC	8001-065-376	Cable assembly, refrigerant valve	1
BD	8001-065-393	Cable assembly, 100V heater	1
	8001-065-391	Cable assembly, 120V heater	1
BE	8001-065-860	Cable assembly, temperature probe	2
BF	8001-065-861	Cable assembly, refrigeration temp probe	1
BG	8001-065-890	Cable assembly, hybrid compressor	1
BH	8001-065-867	Cable assembly, temp probe extension	1
BJ	8001-065-875	Cable assembly, fan extension	1
BK	7400-010-012	Copper tube	A/R
BL	7400-010-013	Copper tube	A/R
BM	8001-001-326	Label, serial number Altrix, thermal product	1
BP	0058-561-000	P-clamp	2
BR	8001-065-897	Cable assembly, compressor cable #1	1
BT	8001-065-898	Cable assembly, compressor cable #2	1
BU	8001-065-899	Cable assembly, compressor cable #3	1
BV	8001-065-900	Cable assembly, compressor cable #4	1
BW	8001-065-901	Cable assembly, compressor cable #5	1
BY	8001-065-902	Cable assembly, compressor cable #6	1
CA	8001-065-903	Cable assembly, compressor cable #7	1
CB	0059-794-000	Capacitor boot	2
CC	A31721	Schrader valve	3
CD	0045-996-000	Super O-lube	A/R
CE	8001-000-337	Cover, valve access	1
CF	0011-206-000	Plain washer	4

8001-220-310 Rev N 220V 60 Hz (Reference only)

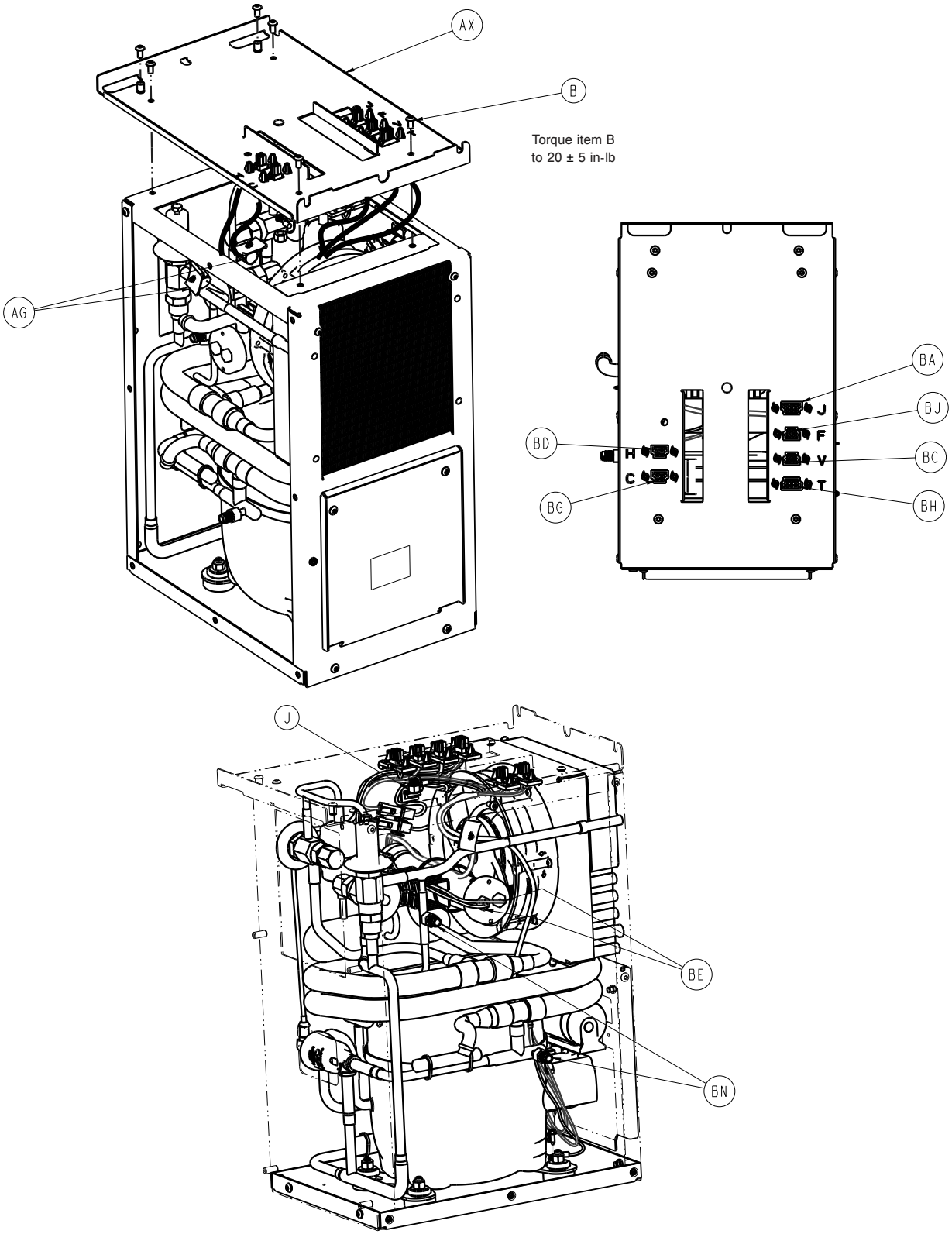
8001-230-310 Rev N 220-240V 50 Hz (Reference only)

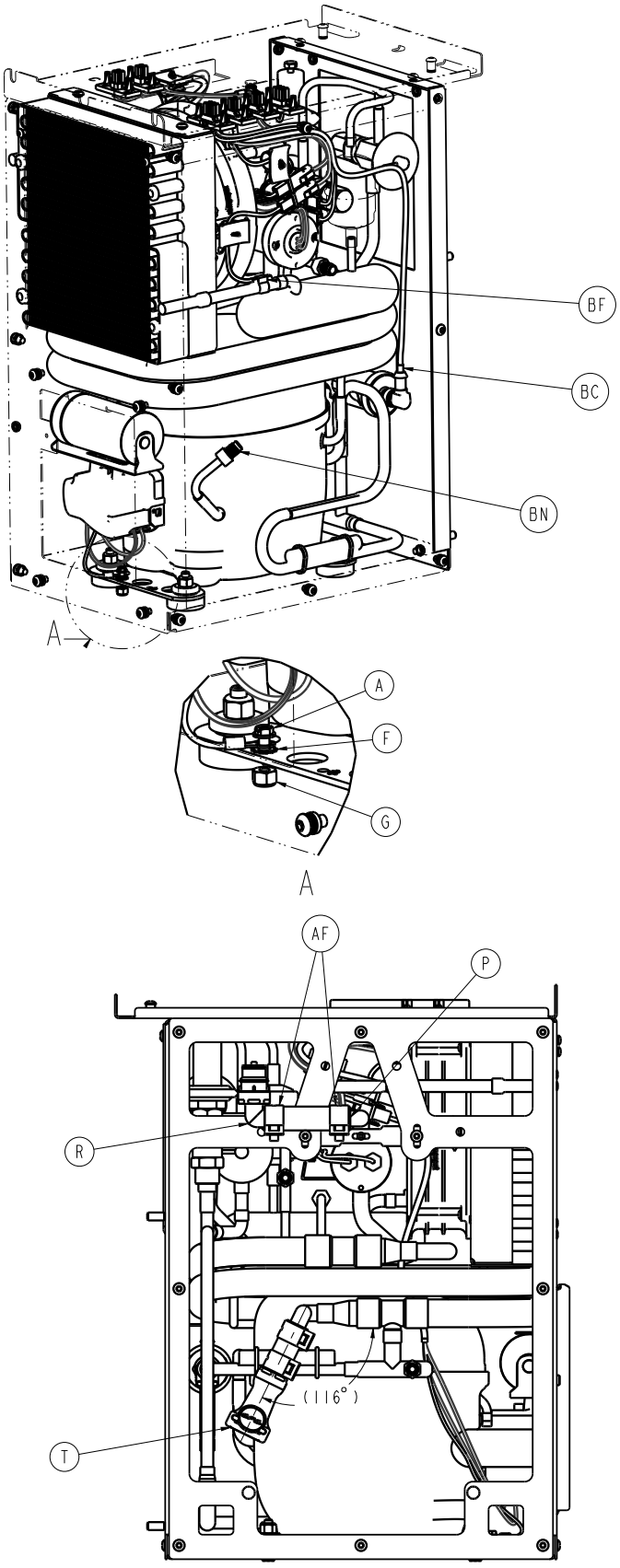


Thermal product, 220-240V



Thermal product, 220-240V




BF
BC
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A
A
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G
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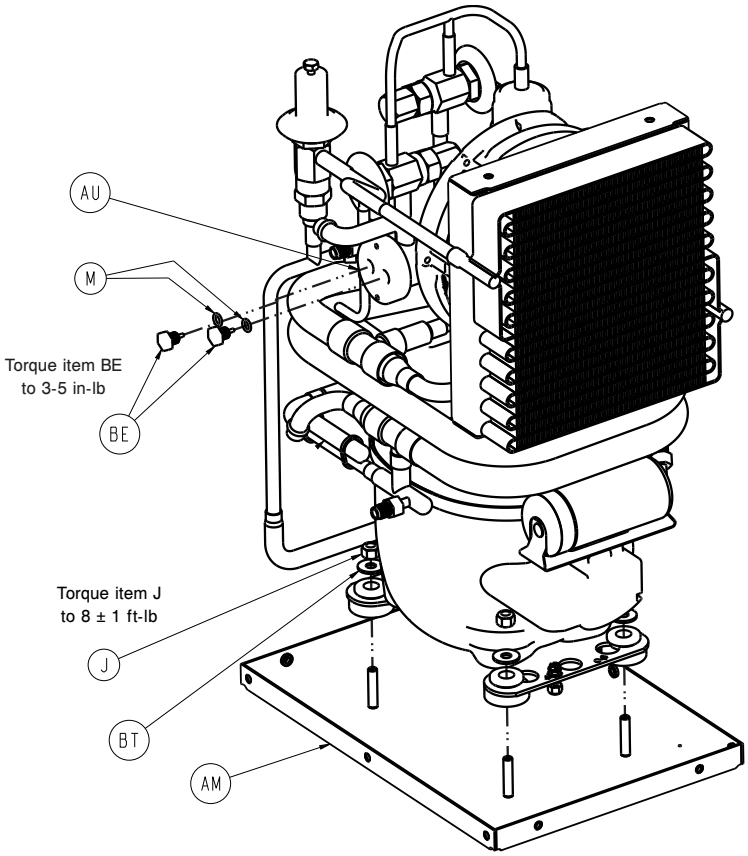
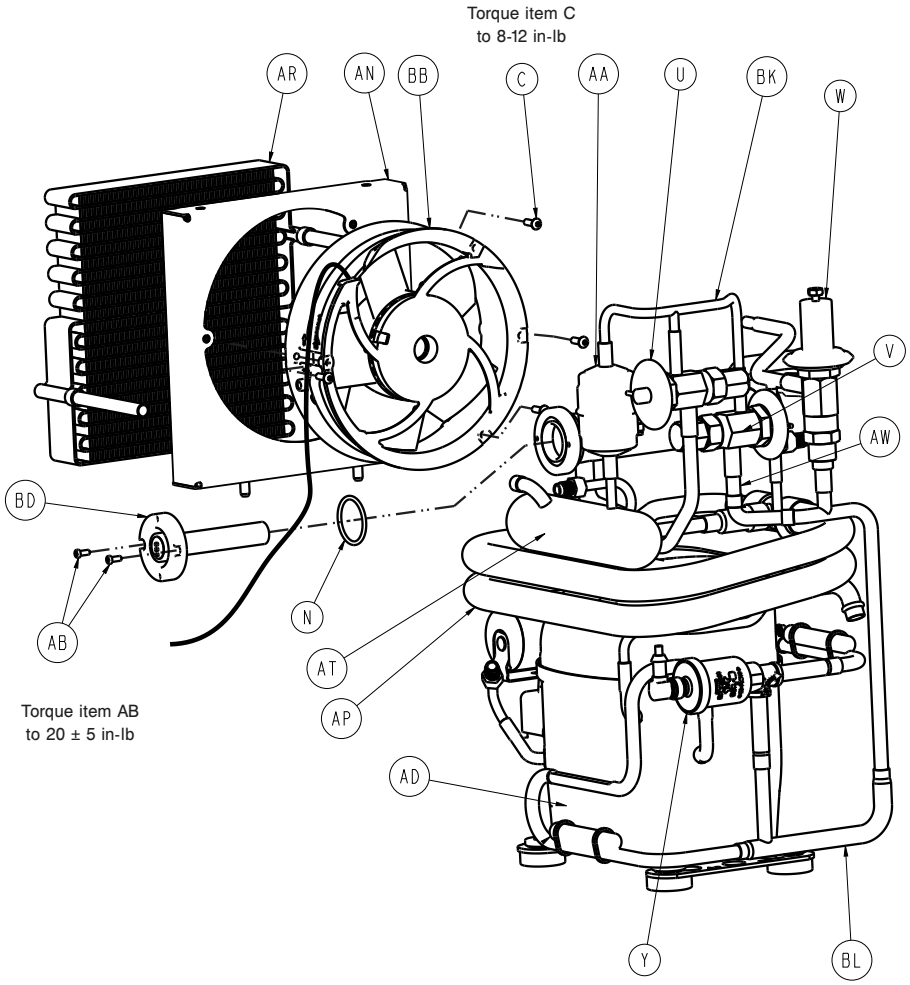
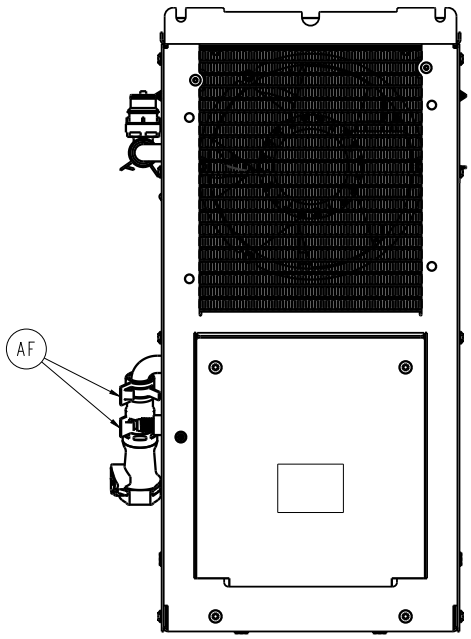
AF
P
R
(116°)
T


AU
M
Torque item BE
to 3-5 in-lb
BE
Torque item J
to 8 ± 1 ft-lb
J
BT
AM

Thermal product, 220-240V



Thermal product, 220-240V

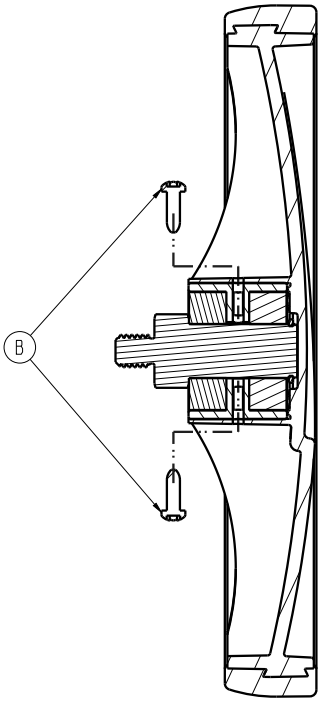


Item	Number	Name	Quantity
A	0003-364-000	#8−32 HWH SLT TCS	1
B	0004-587-000	Button head cap screw with patch	34
C	0004-876-000	Button head cap screw with patch	4
D	0004-877-000	Button head cap screw with patch	2
F	0013-018-000	External tooth lock washer	1
G	0016-014-000	Fiberlock hex nut	1
J	0016-028-000	Fiberlock hex nut	5
K	-	Plastic cable tie	2
M	0045-412-000	O-Ring	2
N	0045-414-000	O-Ring	1
P	0048-180-000	Tygon tubing	A/R
R	0048-409-000	Hose Barb valved elbow insert	1
T	0048-182-000	Barb valved in-line coupling body	1
U	0048-261-000	Main expansion valve	1
V	0048-262-000	Bypass expansion valve	1
W	0048-263-000	Bypass pressure valve	1
Y	0048-337-000	Electric expansion valve	1
AA	0048-403-000	Refrigerant filter / drier	1
AB	0004-882-000	Button head cap screw	4
AC	0056-029-000	Push-in bumper, tall	4
AD	0059-429-000	Compressor, 208-230V/60Hz	1
	0059-428-000	Compressor, 220-240V/50Hz	1
AE	0059-432-000	Flexible wire duct	A/R
AF	0048-265-000	Clamp	4
AG	0059-434-000	Heyco wire clip	5
AH	8001-000-332	Front support, TU	1
AJ	8001-000-333	Back support, TU	1
AK	8001-000-334	Compressor access bracket	1

Thermal product, 220-240V

Item	Number	Name	Quantity
AL	8001-000-335	Side panel, TU	2
AM	8001-000-340	Compressor mount bracket	1
AN	8001-000-351	Fan shroud	1
AP	8001-000-355	Heat exchanger	1
AR	8001-000-356	Condenser	1
AT	8001-000-357	Refrigerant receiver	1
AU	8001-000-365	Heater well	1
AV	8001-000-376	Heater well hanger	2
AW	8001-000-377	Bypass orifice	1
AX	8001-000-471	Connector plate	1
BA	8001-065-101	Cable, jumper 220/230/240VAC	1
BB	8001-065-375	Cable assembly, refrigeration fan	1
BC	8001-065-376	Cable assembly, refrigerant valve	1
BD	8001-065-392	Cable assembly, 230V heater	1
BE	8001-065-860	Cable assembly, temperature probe	2
BF	8001-065-861	Cable assembly, refrigeration temp probe	1
BG	8001-065-863	Cable assembly, hybrid compressor	1
BH	8001-065-867	Cable assembly, temp probe extension	1
BJ	8001-065-875	Cable assembly, fan extension	1
BK	7400-010-012	Copper tube	A/R
BL	7400-010-013	Copper tube	A/R
BM	8001-001-326	Label, serial number Altrix, thermal product	1
BN	A31724	Schrader valve	3
BP	0045-996-000	Super O-lube, Parker	A/R
BR	8001-000-337	Cover, valve access	1
BT	0011-206-000	Plain washer	4

8001-000-131 Rev E (Reference only)



Item	Number	Name	Quantity
B	0023-343-000	Pan head tap screw	2

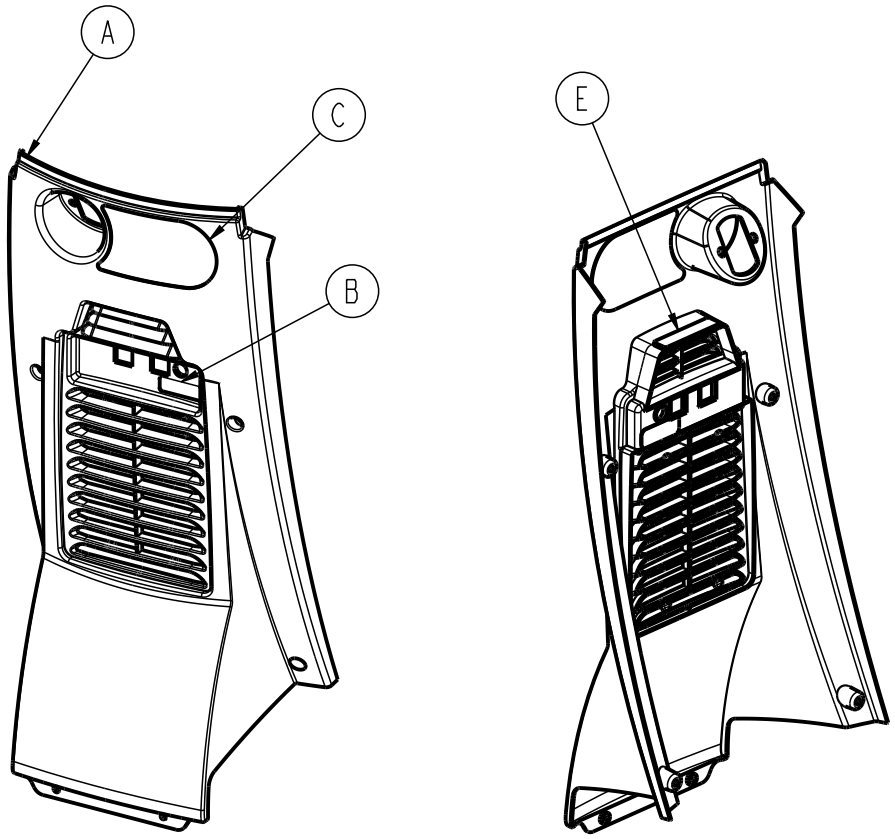
Back cover assembly

8001-007-100 Rev B (Reference only) 100V

8001-007-120 Rev B (Reference only) 120V

8001-007-220 Rev B (Reference only) 220V

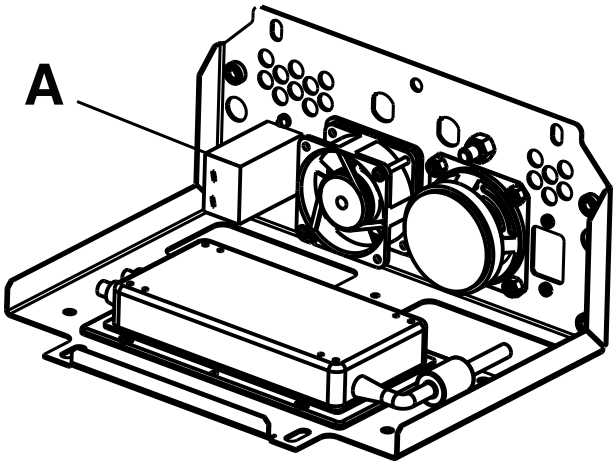
8001-007-230 Rev B (Reference only) 230V



Item	Number	Name	Quantity
A	8001-000-161	Back cover	1
B	8001-000-016	Grounding label	1
C	8001-000-042	Service specification label 100V	1
	8001-000-044	Service specification label 120V	1
	8001-000-046	Service specification label 220V	1
	8001-000-048	Service specification label 230V	1
E	8001-000-162	Filter Velcro®	1

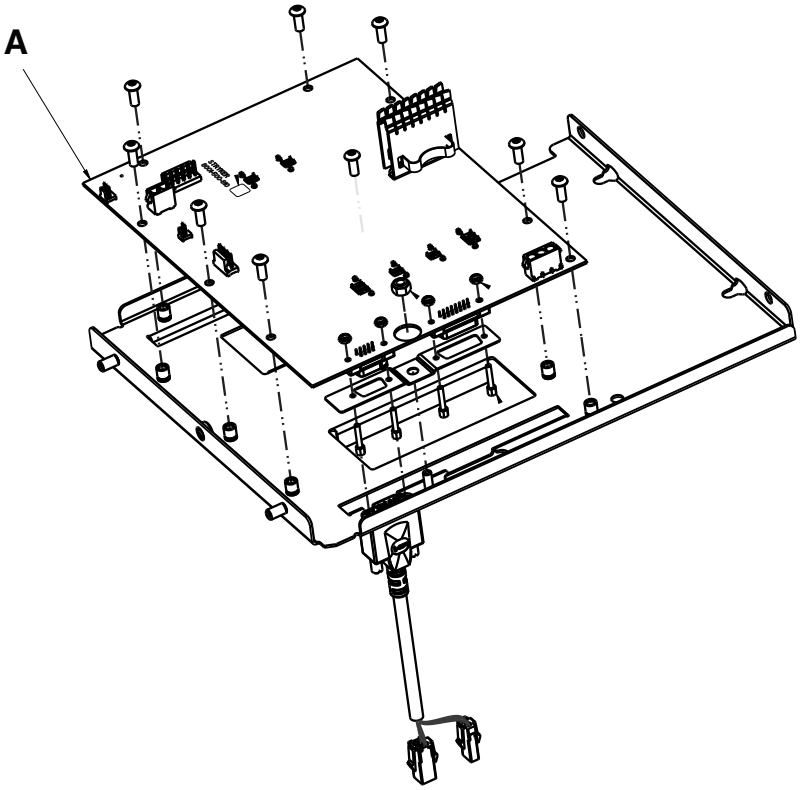
Recycling passport

8001-000-460 Assembly part number



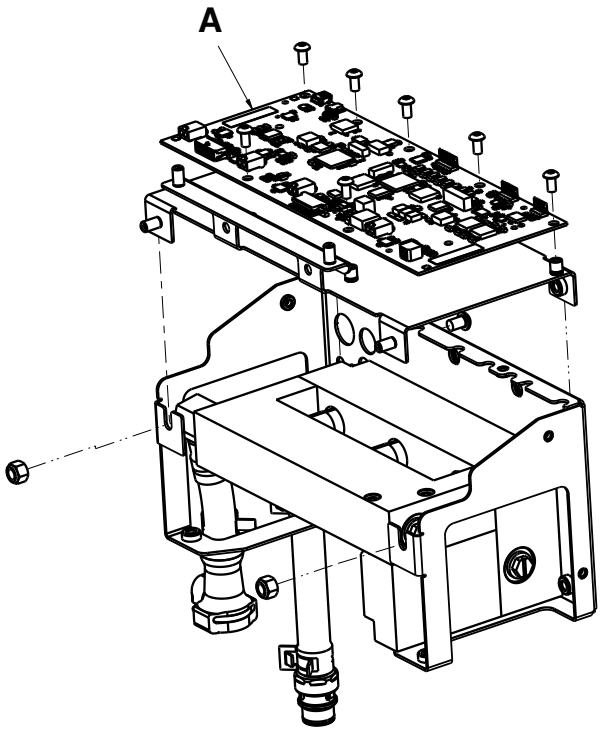
Item	Recyclable part number	Material code	Important information	Quantity
A	0058-372-000	Battery	9V Lithium	1

8001-123-410 or 8001-223-410 Assembly part number



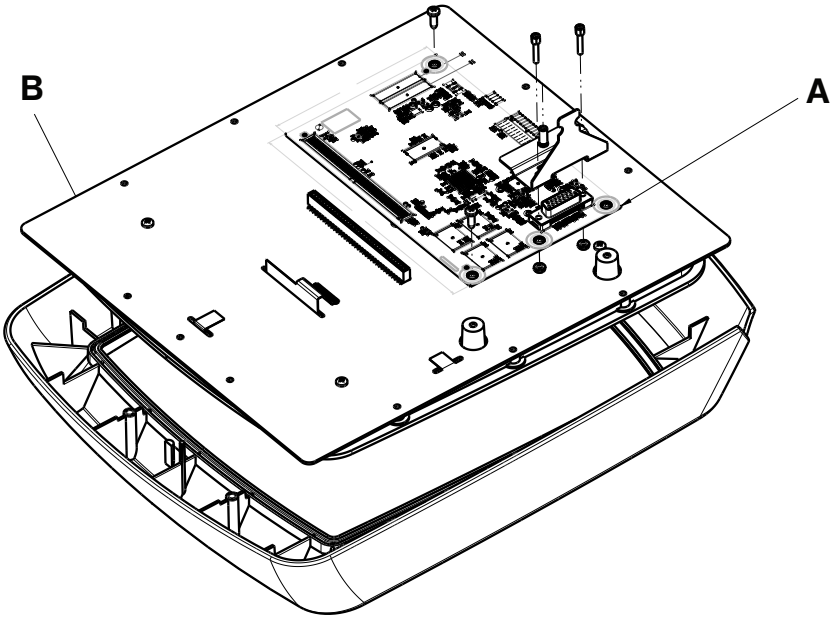
Item	Recyclable part number	Material code	Important information	Quantity
A	8001-500-810 (FMB)	Printed circuit board	n/a	1

8001-100-420 Assembly part number



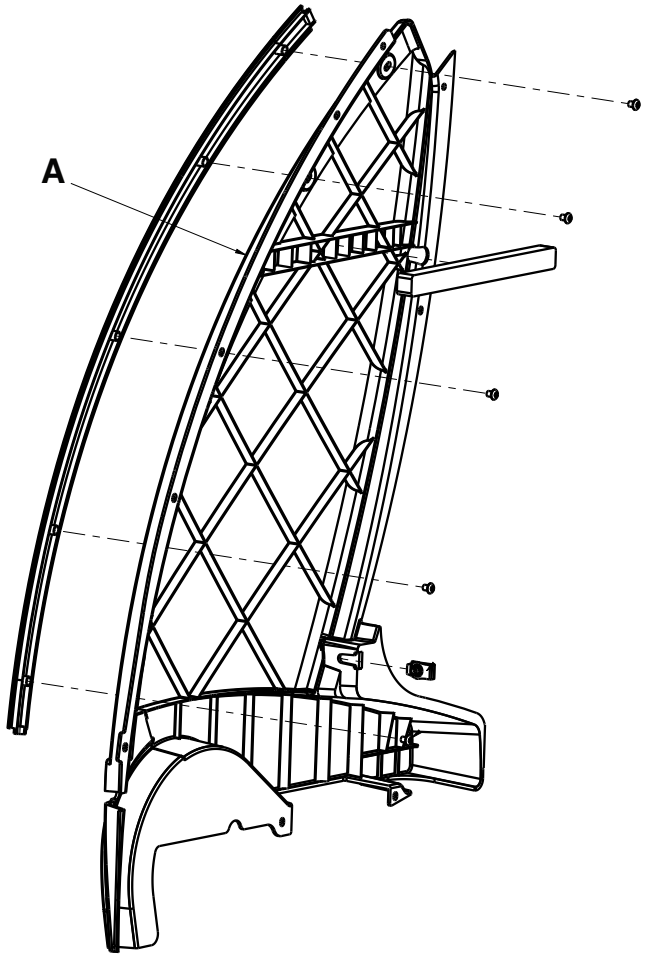
Item	Recyclable part number	Material code	Important information	Quantity
A	8001-400-800 (MCB)	Printed circuit board	n/a	1

8001-000-510 Assembly part number



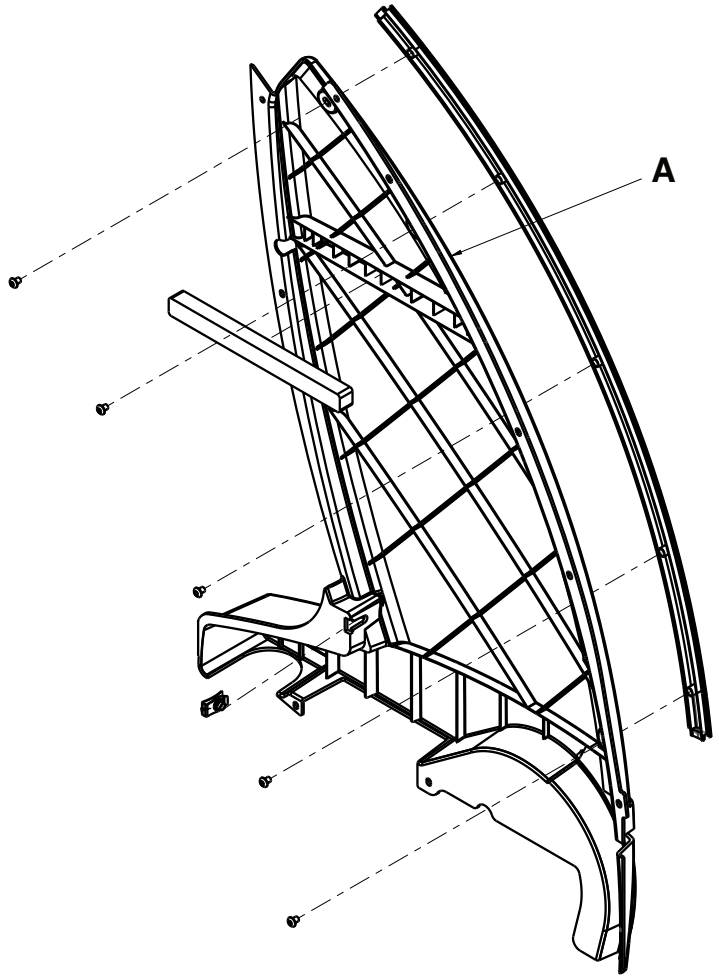
Item	Recyclable part number	Material code	Important information	Quantity
A	8001-300-830 (CCB)	Printed circuit board	n/a	1
B	8001-000-500 (UIB)	Printed circuit board/liquid crystal display	Assembly with (1) Circuit board joined to (1) LCD screen	1

8001-000-140 Assembly part number



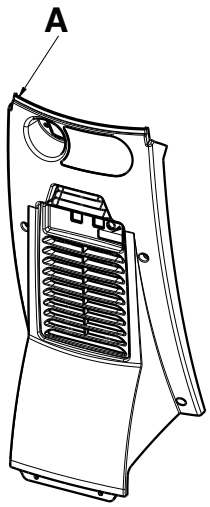
Item	Recyclable part number	Material code	Important information	Quantity
A	8001-000-141	Plastic Containing Brominated Fire Retardants	Side Cover RH	1

8001-000-145 Assembly part number



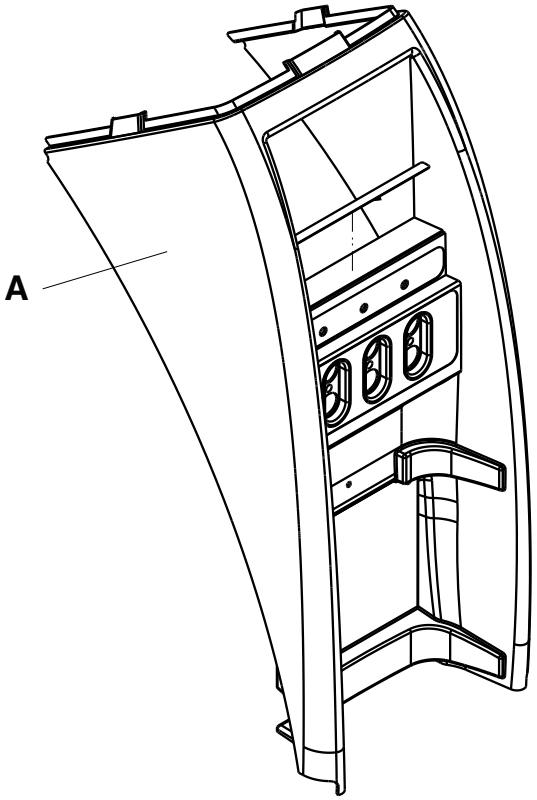
Item	Recyclable part number	Material code	Important information	Quantity
A	8001-000-146	Plastic Containing Brominated Fire Retardants	Side Cover LH	1

8001-007-100 / 8001-007-120 / 8001-007-220 Assembly part numbers



Item	Recyclable part number	Material code	Important information	Quantity
A	8001-000-161	Plastic Containing Brominated Fire Retardants	Back cover	1

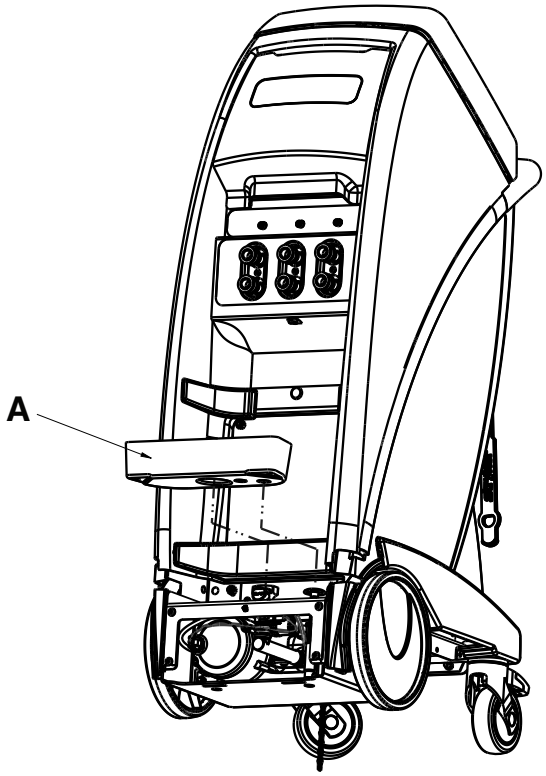
8001-000-190 Assembly part number



Item	Recyclable part number	Material code	Important information	Quantity
A	8001-000-165	Plastic Containing Brominated Fire Retardants	Front cover	1

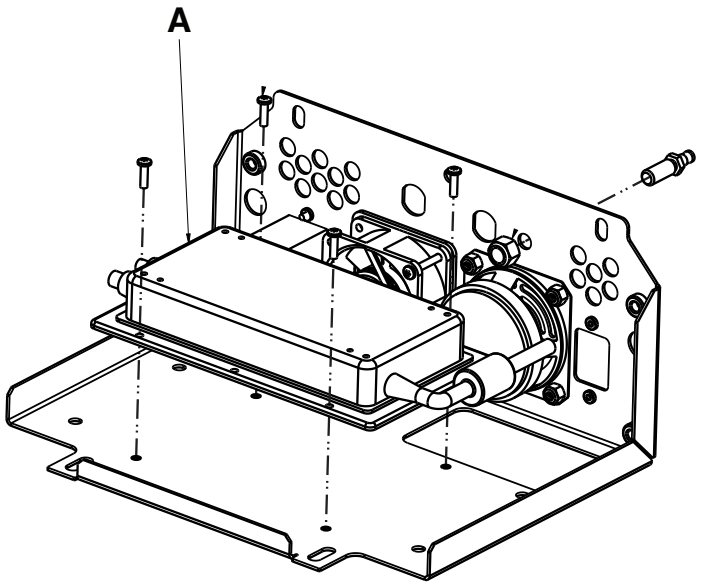
Recycling passport

8001-103-010 / 8001-123-010 / 8001-233-010 Assembly part number



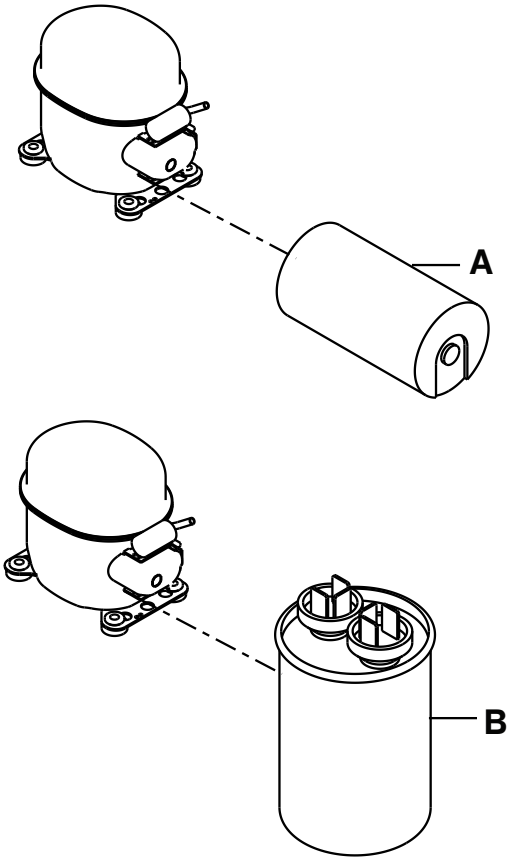
Item	Recyclable part number	Material code	Important information	Quantity
A	8001-000-166	Plastic Containing Brominated Fire Retardants	Hot tub	1

8001-000-460 Assembly part number



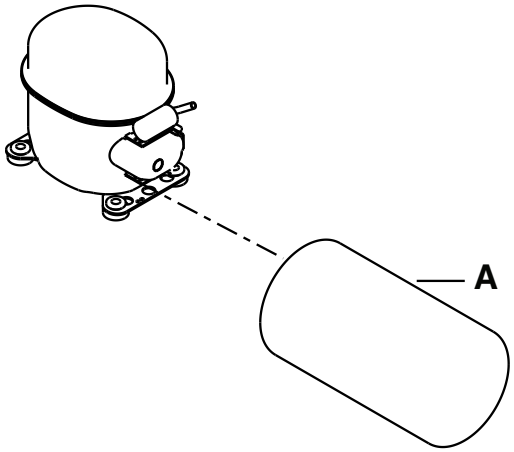
Item	Recyclable part number	Material code	Important information	Quantity
A	8001-065-460	Power supply	Cable assembly, power assembly	1

0059-426-000 Assembly part number



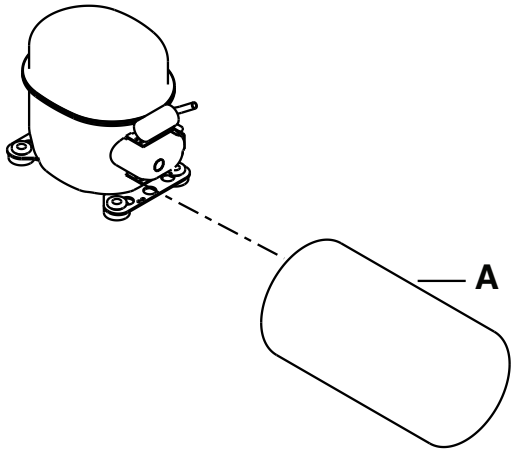
Item	Recyclable part number	Material code	Important information	Quantity
A	0059-789-000	Capacitor	20mF	1
B	0059-788-000	Capacitor	161-193mF	1

0059-428-000 Assembly part number



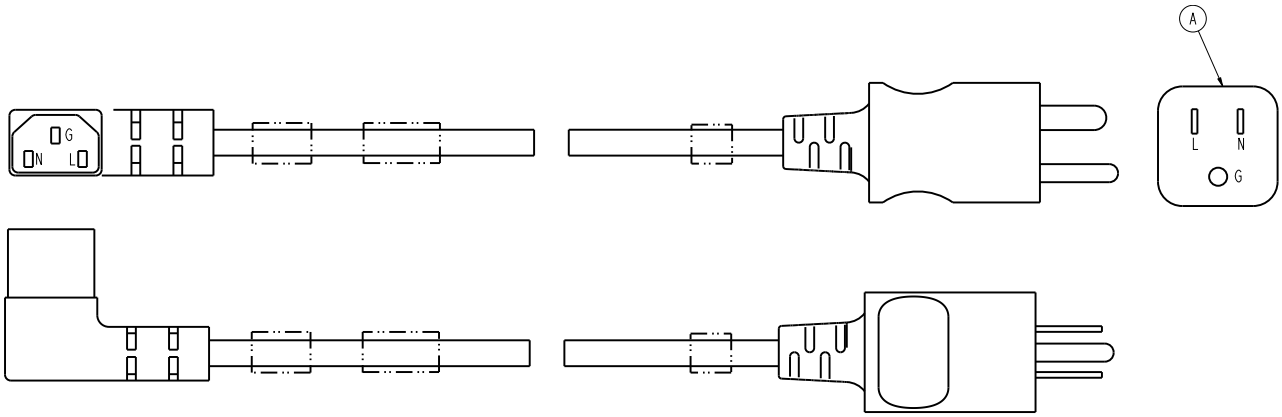
Item	Recyclable part number	Material code	Important information	Quantity
A	0059-792-000	Capacitor	88-108mF	1

0059-429-000 Assembly part number



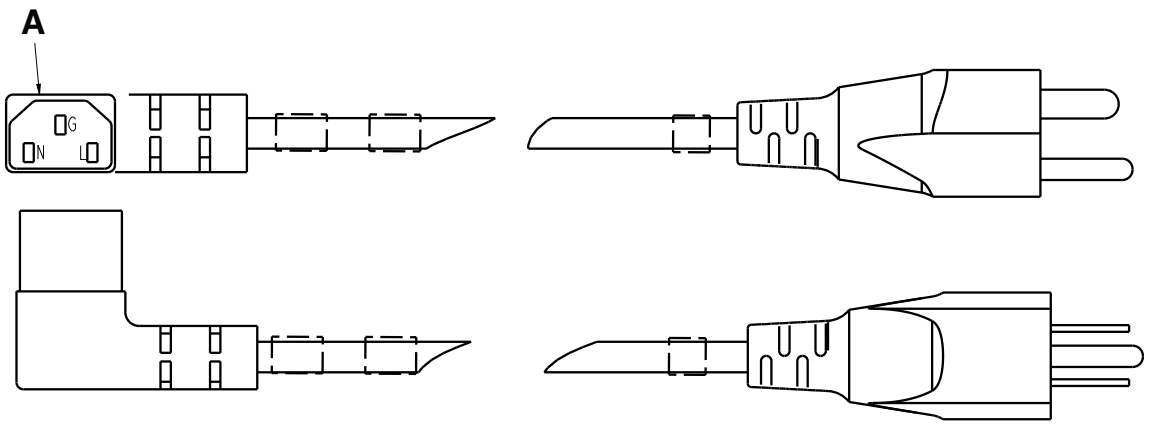
Item	Recyclable part number	Material code	Important information	Quantity
A	0059-791-000	Capacitor	71-88mF	1

0039-232-000



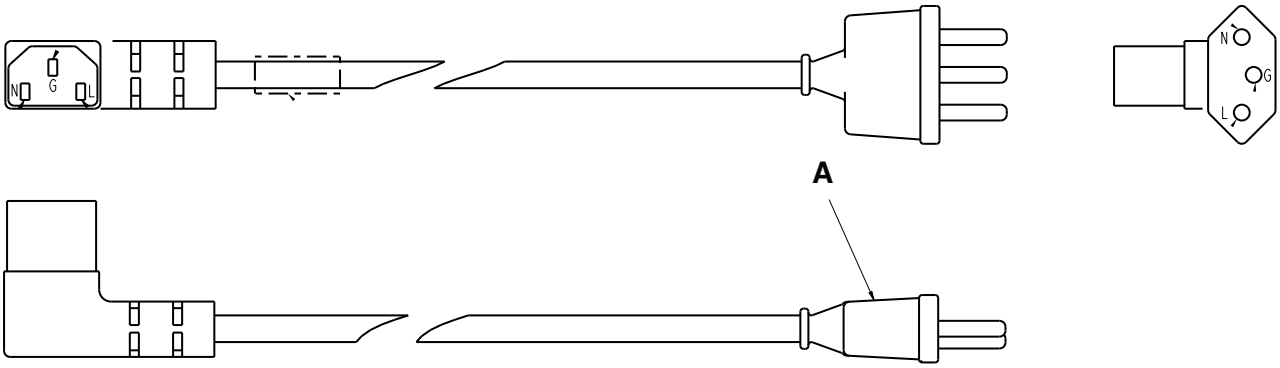
Item	Recyclable part number	Material code	Important information	Quantity
A	0039-232-000	External electronic cable	Power cord type B	1

0039-242-000



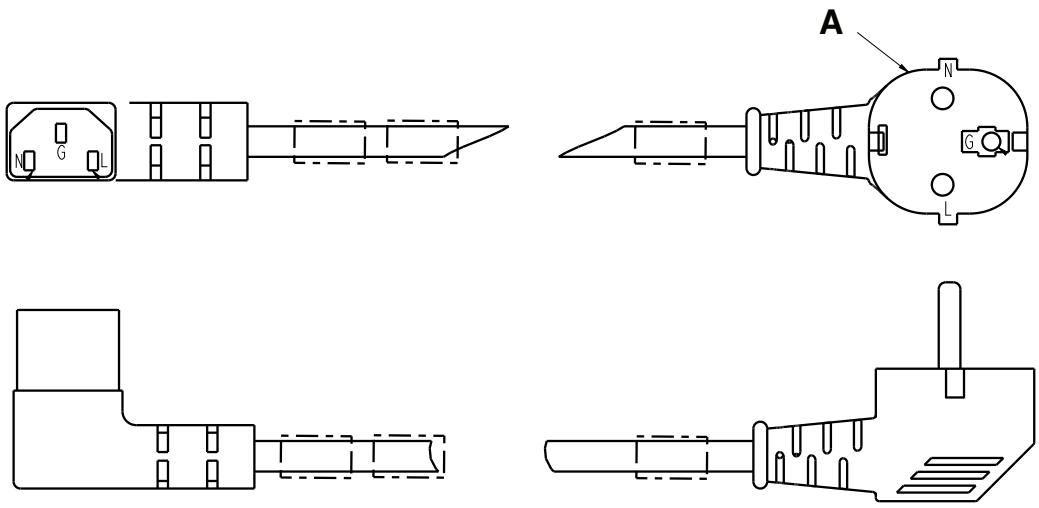
Item	Recyclable part number	Material code	Important information	Quantity
A	0039-242-000	External electronic cable	Power cord type B, Japan	1

0039-236-000



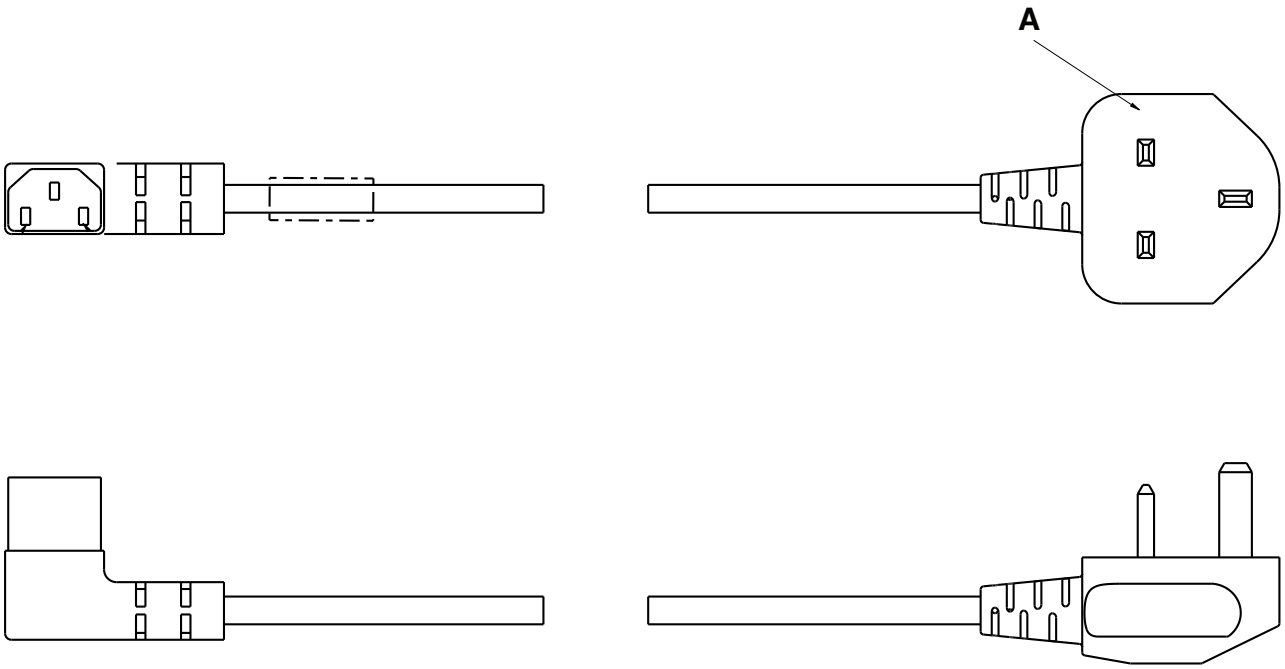
Item	Recyclable part number	Material code	Important information	Quantity
A	0039-236-000	External electronic cable	Power cord type N	1

0039-231-000



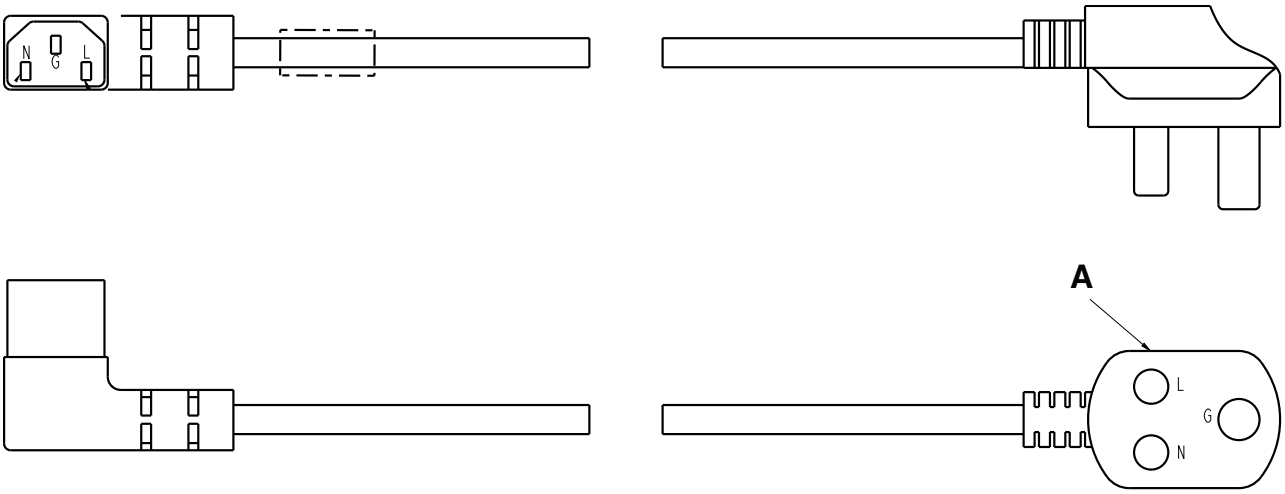
Item	Recyclable part number	Material code	Important information	Quantity
A	0039-231-000	External electronic cable	Power cord type E/F	1

0039-234-000



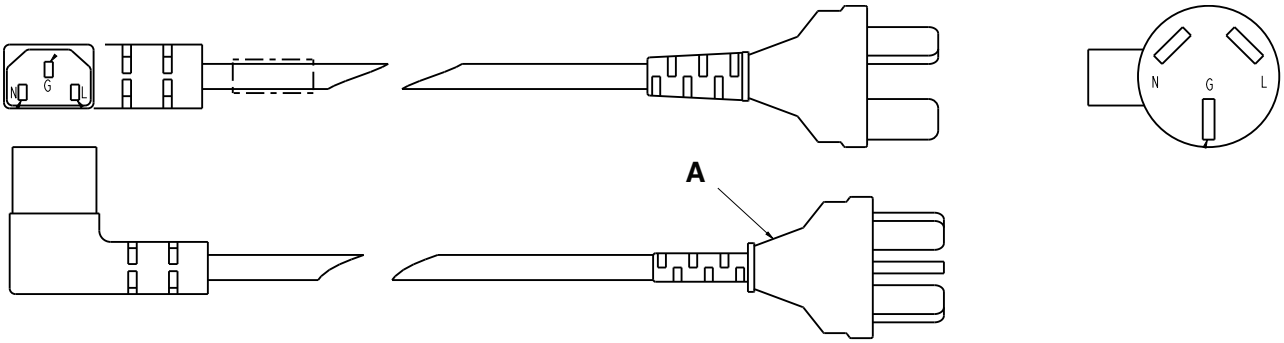
Item	Recyclable part number	Material code	Important information	Quantity
A	0039-234-000	External electronic cable	Power cord type G	1

0039-243-000



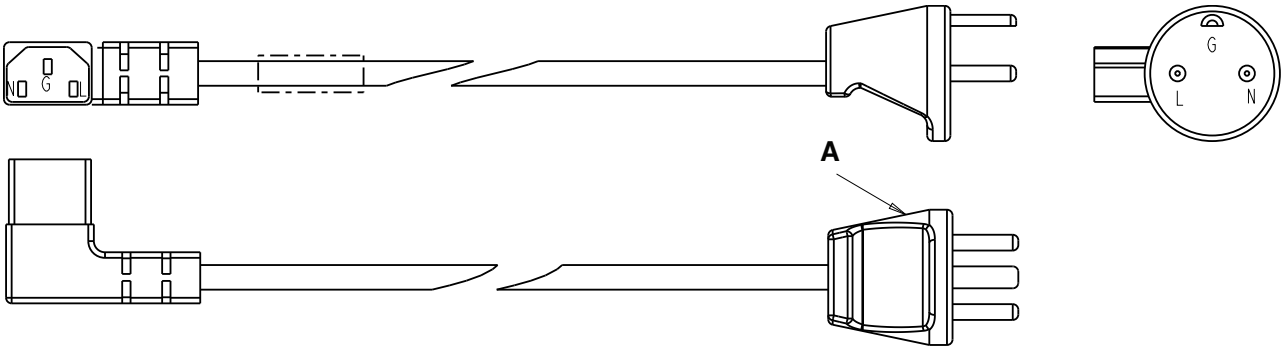
Item	Recyclable part number	Material code	Important information	Quantity
A	0039-243-000	External electronic cable	Power cord type D	1

0039-235-000



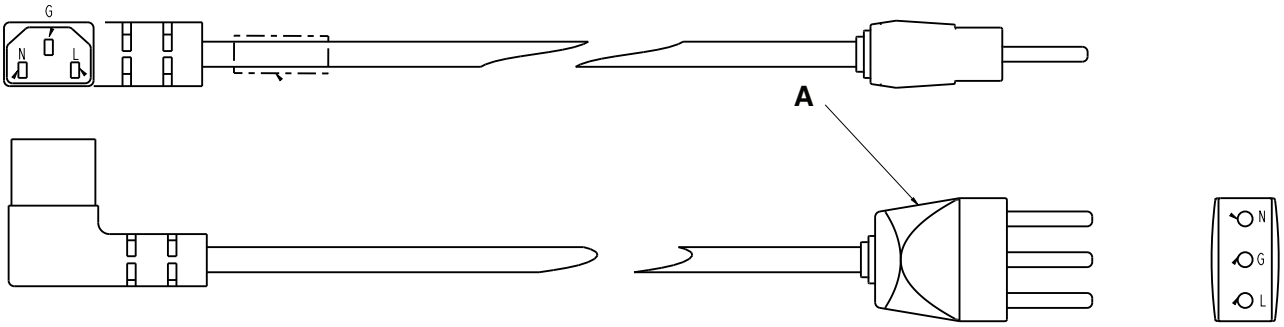
Item	Recyclable part number	Material code	Important information	Quantity
A	0039-235-000	External electronic cable	Power cord type I	1

0039-240-000



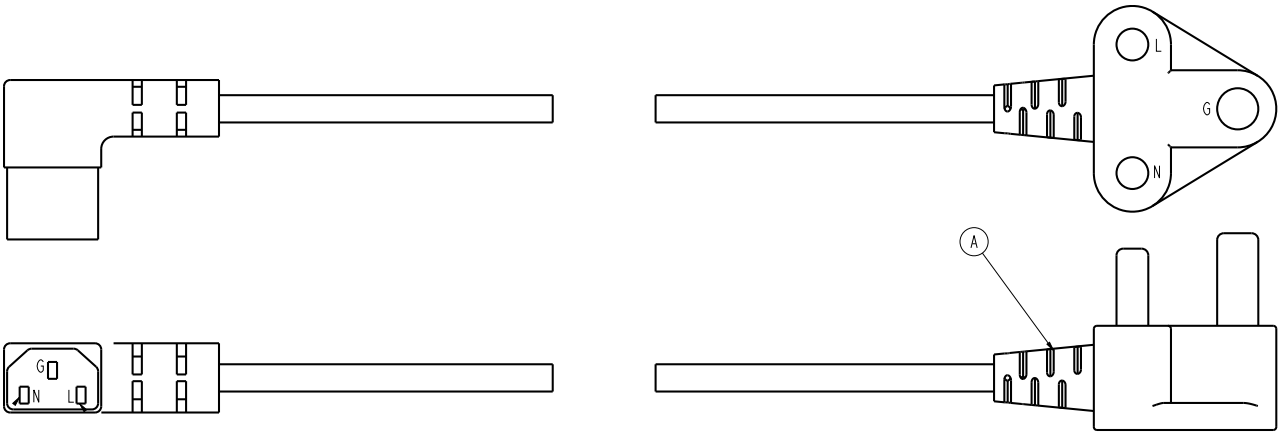
Item	Recyclable part number	Material code	Important information	Quantity
A	0039-240-000	External electronic cable	Power cord type K	1

0039-238-000



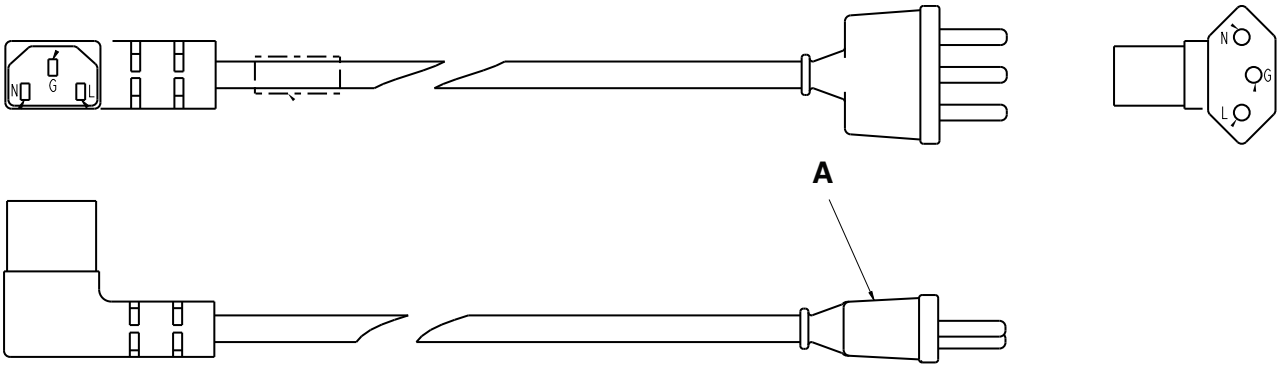
Item	Recyclable part number	Material code	Important information	Quantity
A	0039-238-000	External electronic cable	Power cord type L	1

0039-246-000



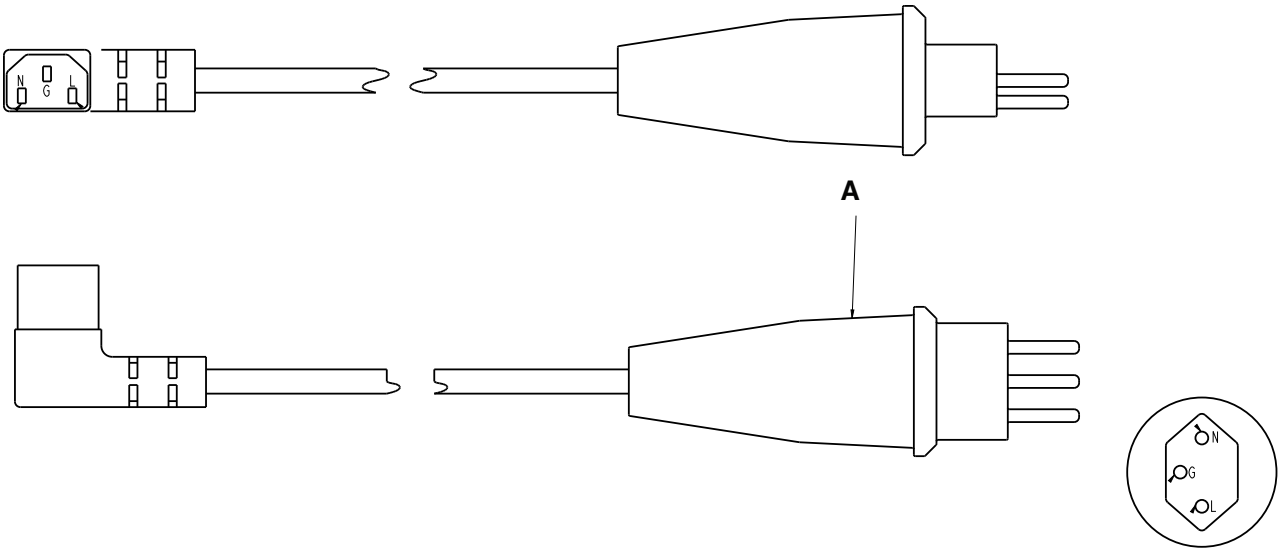
Item	Recyclable part number	Material code	Important information	Quantity
A	0039-246-000	External electronic cable	Power cord type M	1

0039-244-000



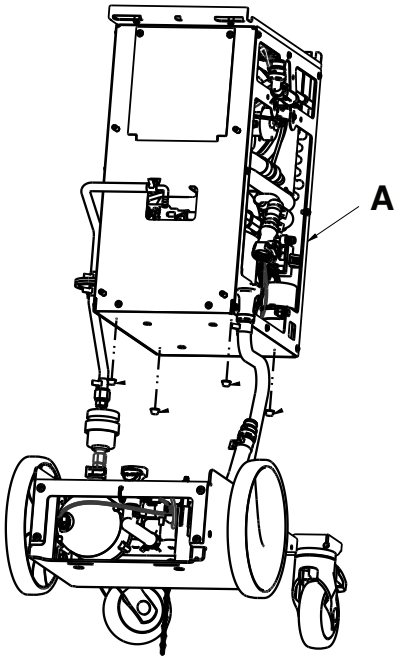
Item	Recyclable part number	Material code	Important information	Quantity
A	0039-244-000	External electronic cable	Power cord type H	1

0039-239-000



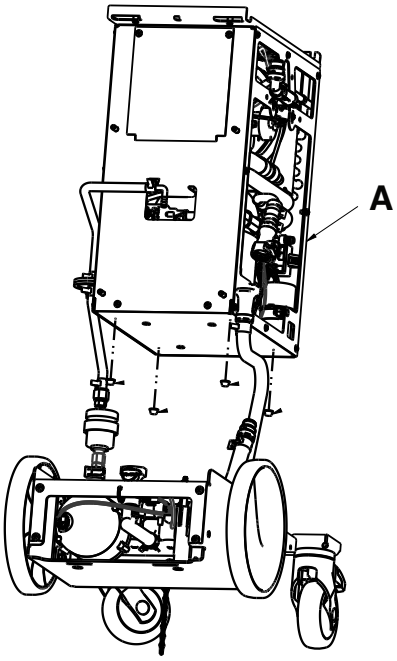
Item	Recyclable part number	Material code	Important information	Quantity
A	0039-239-000	External electronic cable	Power cord type J	1

8001-103-125 Assembly part number



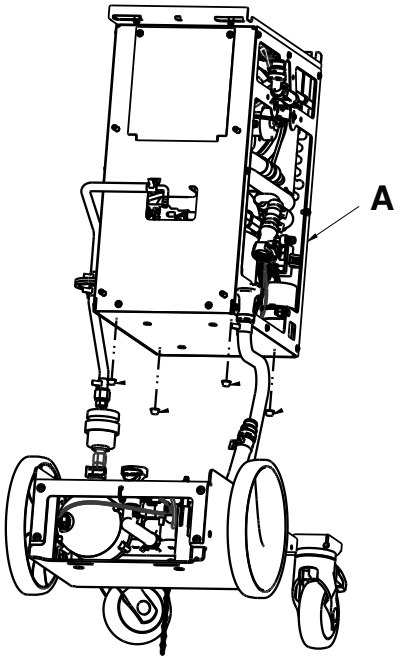
Item	Recyclable part number	Material code	Important information	Quantity
A	8001-100-310	Hydrofluorocarbons (HFC)	R-134a enclosed in assembly	1

8001-123-125 Assembly part number



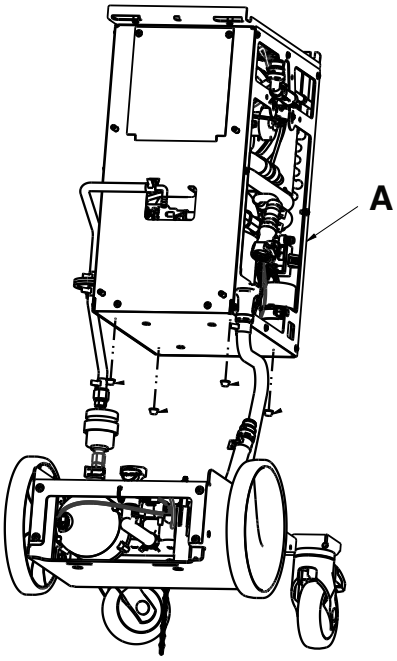
Item	Recyclable part number	Material code	Important information	Quantity
A	8001-120-310	Hydrofluorocarbons (HFC)	R-134a enclosed in assembly	1

8001-223-125 Assembly part number



Item	Recyclable part number	Material code	Important information	Quantity
A	8001-220-310	Hydrofluorocarbons (HFC)	R-134a enclosed in assembly	1

8001-233-125 Assembly part number



Item	Recyclable part number	Material code	Important information	Quantity
A	8001-230-310	Hydrofluorocarbons (HFC)	R-134a enclosed in assembly	1

Guidance and manufacturer's declaration - electromagnetic emissions		
The **Altrix** system is intended for use in the electromagnetic environment specified below. The customer or the user of **Altrix** should assure that it is used in such an environment.		
Emissions test	**Compliance**	**Electromagnetic environment**
RF Emissions CISPR 11	Group 1	The **Altrix** system uses RF energy only for its internal function. Therefore, its RF emissions are very low and are not likely to cause any interference in nearby electronic equipment.
RF Emissions CISPR 11	Class A	The **Altrix** system is suitable for use in all establishments other than domestic and those directly connected to the public low-voltage power supply network that supplies buildings used for domestic purposes.
Harmonic Emissions IEC 61000-3-2	Class A 220-240V/50Hz 220V/60Hz Does not apply to 100V 50/60Hz or 120V/60Hz	
Voltage Fluctuations Flicker Emissions IEC 61000-3-3	Complies 220-240V/50Hz only	

Recommended separations distances between portable and mobile RF communications equipment and the Altrix system			
The **Altrix** system is intended for use in an electromagnetic environment in which radiated RF disturbances are controlled. The customer or the user of **Altrix** can help prevent electromagnetic interferences by maintaining a minimum distance between portable and mobile RF communications equipment (transmitters) and the **Altrix** system as recommended below, according to the maximum output power of the communications equipment.			
Rated maximum output power of transmitter W	**Separation distance according to frequency of transmitter** m		
	150 kHz to 80 MHz **D=(1.2) (√*P*)**	**80 MHz to 800 MHz** **D=(0.35) (√*P*)**	**800 MHz to 2.5 GHz** **D=(0.70) (√*P*)**
0.01	0.12	0.035	0.07
0.1	0.38	0.11	0.22
1	1.2	0.35	0.7
10	3.8	1.1	2.2
100	12	3.5	7
For transmitters rated at a maximum output power not listed above, the recommended separation distance d in meters (m) can be estimated using the equation applicable to the frequency of the transmitter, where P is the maximum output power rating of the transmitter in watts (W) according to the transmitter manufacturer. Note 1: At 80 MHz and 800 MHz, the separation distance for the higher frequency range applies. Note 2: These guidelines may not apply in all situations. Electromagnetic propagation is affected by absorption and reflection from structures, objects and people.			

Guidance and manufacturer's declaration - electromagnetic immunity			
The **Altrix** system is suitable for use in the electromagnetic environment specified below. The customer or the user of **Altrix** should assure that it is used in such an environment.			
Immunity test	**IEC 60601 test level**	**Compliance level**	**Electromagnetic environment-guidance**
Electrostatic discharge (ESD) IEC 61000-4-2	±6 kV contact ±8 kV air	±6 kV contact ±8 kV air	Floors should be wood, concrete or ceramic tile. If floors are covered with synthetic material, the relative humidity should be at least 30%.
Electrostatic fast Transient/burst IEC 61000-4-4	±2 kV for power supply lines ±1 kV for input/output lines	±2 kV for power supply lines ±1 kV for input/output lines	Main power quality should be that of a typical commercial or hospital environment.
Surge IEC 61000-4-5	±1 kV line(s) to line(s) ±2 kV line(s) to earth	±1 kV line(s) to line(s) ±2 kV line(s) to earth	Main power quality should be that of a typical commercial or hospital environment.
Voltage dips, voltage variations and short interruptions on power supply input lines IEC 61000-4-11	<5% U_T (95% dip in U_T) for 0.5 cycle 40% U_T (60% dip in U_T) for 5 cycles 70% U_T (30% dip in U_T) for 25 cycles <5% U_T (>95% dip in U_T) for 5 sec.	<5% U_T (95% dip in U_T) for 0.5 cycle 40% U_T (60% dip in U_T) for 5 cycles 70% U_T (30% dip in U_T) for 25 cycles <5% U_T (>95% dip in U_T) for 5 sec.	Main power quality should be that of a typical commercial or hospital environment. If the user of the **Altrix** system requires continued operation during power main interruptions, it is recommended that the device be powered from an uninterrupted power supply or a battery.
Power frequency (50/60Hz) magnetic field IEC 61000-4-8	3 A/m	3 A/m	Power frequency magnetic fields should be at levels characteristic of a typical location in a typical commercial or hospital environment.
Note: U_T is the a.c. mains voltage before applications of the test level.			
Conducted RF IEC 61000-4-6 Radiated RF IEC 61000-4-3	3 Vrms 150 kHz to 80 MHz 10 V/m 80 MHz to 2.5 GHz	3 Vrms 10 V/m	Portable and mobile RF communications equipment should be used no closer to any part of the **Altrix** system, including cables, than the recommended separation distance calculated from the equation appropriate for the frequency of the transmitter. Recommended separation distance $D=(0.35)\ (\sqrt{P})$

(Continued)

Guidance and manufacturer's declaration - electromagnetic immunity			
			80 MHz to 800 MHz D=(0.70) ($\sqrt{P}$) 800 MHz to 2.5 GHz where *P* is the maximum output power rating of the transmitter in watts (W) according to the transmitter manufacturer and *d* is the recommended separation distance in meters (m). Field strengths from fixed RF transmitters, as determined by an electromagnetic site survey should be less than the compliance level in each frequency range.[b] Interference may occur in the vicinity of equipment marked with the following symbol: 

Note 1: At 80 MHz and 800 MHz, the higher frequency range applies.

Note 2: These guidelines may not apply in all situations. Electromagnetic propagation is affected by absorption and reflection from structures, objects and people.

[a] Field strengths from fixed transmitters, such as base stations for radio (cellular/cordless) telephones and land mobile radios, amateur radio, AM and FM radio broadcast, and TV broadcast cannot be predicted theoretically with accuracy. To assess the electromagnetic environment due to fixed RF transmitters, an electromagnetic site survey should be considered. If the measured field strength in the location in which the **Altrix** system is used exceeds the applicable RF compliance level above, the **Altrix** system should be observed to verify normal operation. If abnormal performance is observed, additional measures may be necessary, such as reorienting or relocating the **Altrix** system.

[b] Over the frequency range 150 kHz to 80 MHz, field strengths are less than 3 V/m.

Warranty

Stryker Medical, a division of Stryker Corporation, warrants to the original purchaser the Stryker Model 8001 **Altrix**, to be free from defects in material and workmanship for a period of one years after date of delivery. Stryker's obligation under this warranty is expressly limited to supplying replacement parts and labor for, or replacing at its option, any product which is, in the sole discretion of Stryker, found to be defective. If requested by Stryker, product or parts for which a warranty claim is made shall be returned prepaid to the factory. Any improper use or any alteration or repair by others in such a manner as in Stryker's judgment affects the product materially and adversely, shall void this warranty. Any repair of Stryker products using parts not provided or authorized by Stryker shall void this warranty. No employee or representative of Stryker is authorized to change this warranty in any way.

Stryker Medical temperature management products have a five year expected service life under normal use, conditions, and with appropriate periodic maintenance as described in the maintenance manual for each device.

The above noted warranty periods apply only to the original purchaser of the **Altrix** and begin on the date of delivery to such original purchaser.

Warranty exclusion and damage limitations

The express warranty set forth herein is the only warranty applicable to the product. **Any and all other warranties, whether express or implied, including any implied warranty of merchantability or fitness for a particular purpose are expressly excluded by Stryker.** In no event shall Stryker be liable for incidental or consequential damages.

To obtain parts and service

Stryker products are supported by a nationwide network of dedicated Stryker Field Service Representatives. These representatives are factory trained, available locally, and carry a substantial spare parts inventory to minimize repair time. Simply call your local representative or call Stryker Customer Service at 1-800-327-0770.

Return authorization

Product cannot be returned without prior approval from the Stryker Customer Service Department. An authorization number will be provided which must be printed on the returned product. Stryker reserves the right to charge shipping and restocking fees on returned product. Special, modified, or discontinued products are not subject to return.

Damaged product

ICC Regulations require that claims for damaged product must be made within fifteen (15) days of receipt of the product. Do not accept damaged shipments unless such damage is noted on the delivery receipt at the time of receipt. Upon prompt notification, Stryker will file a freight claim with the appropriate carrier for damages incurred. Claims will be limited in amount to the actual replacement cost. In the event that this information is not received by Stryker within the fifteen (15) day period following the delivery of the product, or the damage was not noted on the delivery receipt at the time of receipt, the customer will be responsible for payment of the original invoice in full within thirty (30) days of receipt. Claims for any incomplete shipments must be made within thirty (30) days of invoice.

International warranty clause

This warranty reflects U.S. domestic policy. Warranty outside the U.S. may vary by country. Contact your local Stryker Medical representative for additional information.

EC REP

Stryker European Operations B.V.
Herikerbergweg 110
Amsterdam
1101 CM
Netherlands

Stryker Medical
3800 E. Centre Avenue
Portage, MI 49002
USA

stryker®

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