Altrix Precision Temperature Management System

Maintenance Manual

REF 8001



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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

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

WARNING

- Always use 3T Medical accessories. Only IEC 60601-1 equipment shall be hooked to the patient temperature ports. Failure to comply with these instructions may invalidate any or all warranties and may negatively affect the product's EMC performance. This also protects the product from cardiac defibrillation.
- Avoid reduction in water flow. Do not connect two or more thermal transfer devices in a series on a single port.

CAUTION

- Always use electrostatic discharge (ESD) protective equipment before you open antistatic bags and service 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 powered off. 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.
- Do not use three or more adult Mul-T-Blanket products at the same time to avoid the risk of water overflow when you power off the controller.
- Always use sterile distilled water or distilled water that has been passed through a filter less than or equal to 0.22 microns with this product.
- Always prefill the thermal transfer devices with sterile, distilled water before you apply it to the patients. Prefilling reduces the risk of pressure ulcers.
- Always clamp the hoses when you disconnect the thermal transfer devices.
- Always wear gloves when you replace the battery in case of a battery leak.
- Do not put the product 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.
- 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 a trip hazard.
- This equipment is not intended for use in residential environments and may not provide adequate protection to radio reception in such environments.

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

Introduction for service

This manual assists you with the service of your 3T Medical product. Read this manual to service this product. This manual does not address the operation of this product. See the Operations Manual for operating and use instructions. To view your Operations Manual online, see https://3tmedical.com/technical-docs.

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. The 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.

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 use 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 use 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 use the pump to regulate the water flow to obtain maximum heat transfer through the thermal transfer device(s). The water controller will also use 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 three cooling rates and four 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 devices.

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

Physiological closed-loop control system (PCLCS) responses

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

Expected service life

The Altrix controller has a five year expected service life under normal use conditions and with appropriate periodic maintenance. See the maintenance manual for preventive maintenance and service information.

Refrigerant specifications

- Altrix contains a fluorinated greenhouse gas, and its functioning relies upon this gas (refrigerant).
- The industry designation for the fluorinated greenhouse gas used is R-513a.
- The unit is filled with 6.0 - 9.0 ozf (force) refrigerant R-513a into the system. This equates to approximately 0.45 lb (0.20 kg) of refrigerant.
- The global warming potential (GWP) of R-513a is 573.

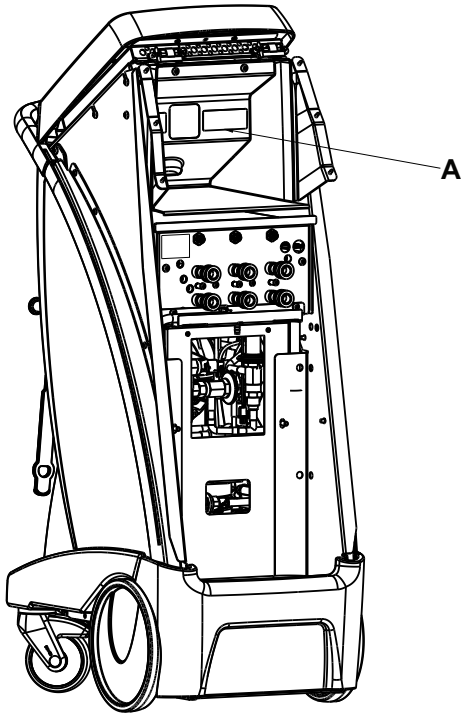


Figure 1 – Refrigerant label location

Note - For medical applications only.

Contact information

Contact 3T Medical Customer Service or Technical Support at: (734)-525-9580.

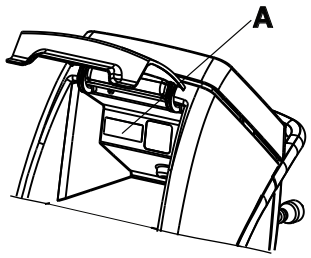
3T Medical Systems, Inc.
236 Fernwood Avenue
Edison, NJ 08837
USA

Note - The user and/or the patient should report any serious product-related incident to both the manufacturer and the Competent authority of the European Member State where the user and/or patient is established.

To view your operations or maintenance manual online, see https://3tmedical.com/technical-docs.

Have the serial number (A) of your 3T Medical product available when calling 3T Medical Customer Service or Technical Support. Include the serial number in all written communication.

Serial number location



Service

Service icons

Icon	Name
	Remove from use (RFU) code
	Service log
	System state
	Software version
	High thermal cutout
	High thermal cutout test

Powering off the product

To stop therapy or power off the product:

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

Maintenance mode, RFU code



1. To gain access to the maintenance mode see *LCD functionality, testing the visual and audible alarms* (page 58). Complete steps 1 through 4.
2. To review the RFU codes, select **RFU Code** (Figure 2).

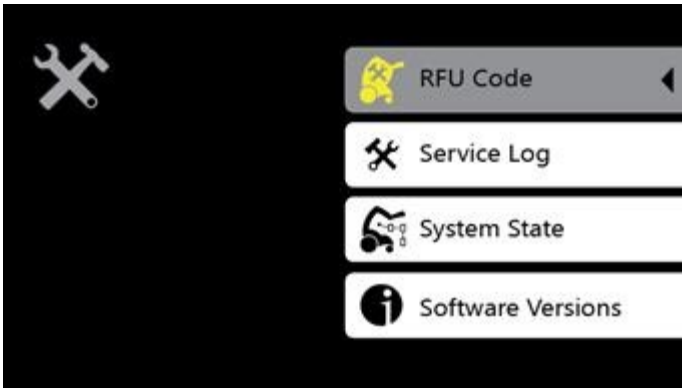


Figure 2 – Maintenance Mode

3. To clear the RFU Codes, select **Confirm** (Figure 3).

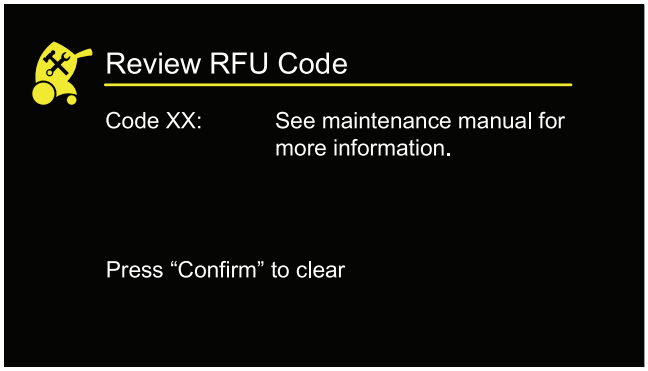


Figure 3 – RFU Code

Service log

1. To gain access, see *LCD functionality, testing the visual and audible alarms* (page 58). Complete steps 1 through 4.
2. Review the service log and clear (Figure 4).

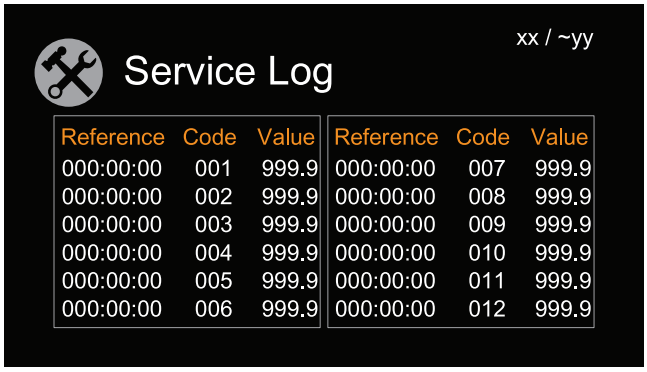


Figure 4 – Service log

Note - In the upper right hand corner of the service log screen (Figure 4), xx is the current page number. The yy displays the total number of service log pages.

System state

1. To gain access, see *LCD functionality, testing the visual and audible alarms* (page 58). Complete steps 1 through 4.
2. The system state (Figure 5).

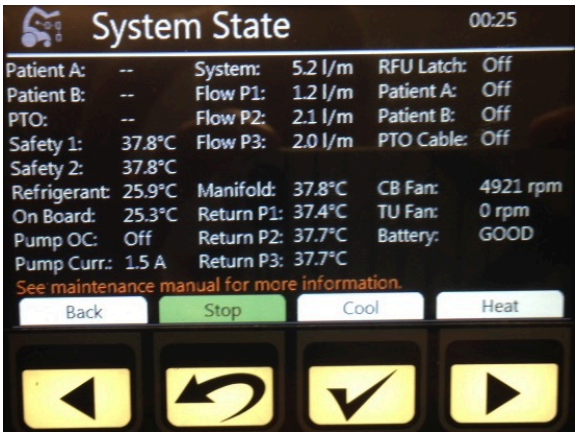


Figure 5 – System state, sample screen

Cool	Starts the cooling sub-function of the System State maintenance function
Heat	Starts the heating sub-function of the System State maintenance function
Stop	Stops the warming or cooling sub-function of the System State maintenance function

Software versions

1. To gain access, see *LCD functionality, testing the visual and audible alarms* (page 58). Complete steps 1 through 4.
2. Displays controller software versions (Figure 6).

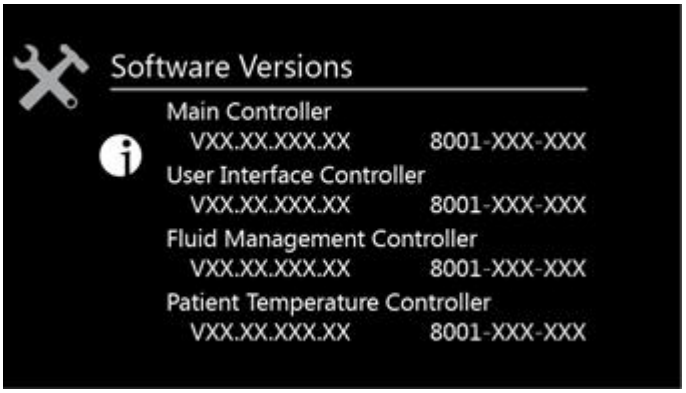


Figure 6 – Software versions, sample screen

Protecting against electrostatic discharge (ESD)

CAUTION

- Always use electrostatic discharge (ESD) protective equipment before you open antistatic bags and service electronic parts.
- Do not place unprotected circuit boards on the floor.

Note - Always ship the circuit boards back to 3T Medical. Use the antistatic bag that the new board was originally shipped in.

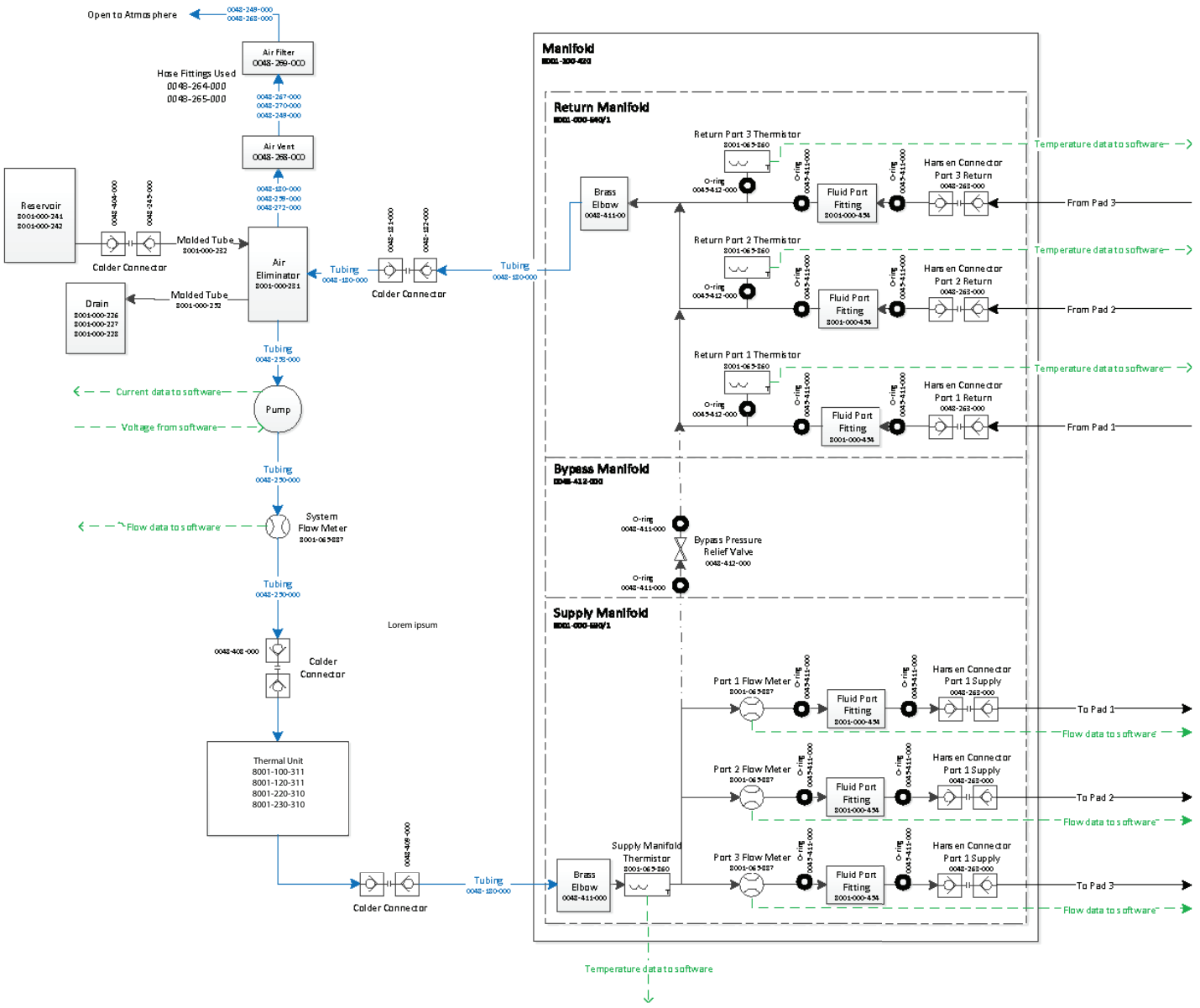
The electronic circuits in the product are completely protected from static electricity damage when factory assembled. Always use adequate static protection when you service the electronic systems of the product. All service personnel must use static protection whenever they touch wires.

Sample antistatic protection equipment includes:

- Antistatic wrist strap
- Grounding plug
- 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. Install the reservoir before you start 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.

To remove the reservoir, pull forward at an angle, and lift out the reservoir (Figure 7).

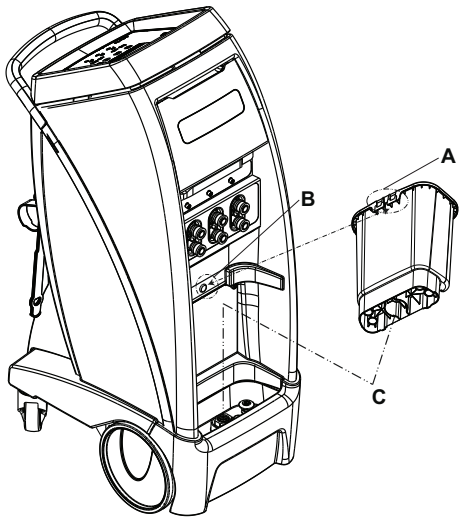


Figure 7 – Removable reservoir

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 7).
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.

WARNING

- Always use 3T Medical accessories. Only IEC 60601-1 equipment shall be hooked to the patient temperature ports. Failure to comply with these instructions may invalidate any or all warranties and may negatively affect the product's EMC performance. This also protects the product from cardiac defibrillation.
- Avoid reduction in water flow. Do not connect two or more thermal transfer devices in a series on a single port.

CAUTION

- Avoid the use of materials of good thermal conductivity, such as water, gel, or similar substances, with the Altrix system powered off. 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.
- Do not use three or more adult Mul-T-Blanket products at the same time to avoid the risk of water overflow when you power off the controller.
- Always use sterile distilled water or distilled water that has been passed through a filter less than or equal to 0.22 microns with this product.
- Always prefill the thermal transfer devices with sterile, distilled water before you apply it to the patients. Prefilling reduces the risk of pressure ulcers.
- Always clamp the hoses when you disconnect the thermal transfer devices.

To connect or disconnect the Clik-Tite connectors (Figure 8) to the insulated hoses.

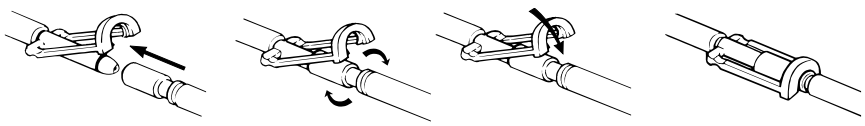


Figure 8 – Clik-Tite

To connect or disconnect the Colder® style (Figure 9) to the insulated hoses.

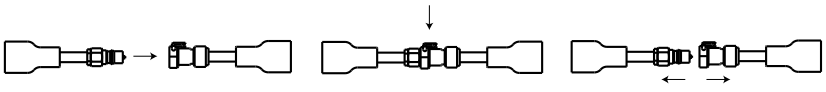


Figure 9 – Colder style connectors

To close or open hose clamps (Figure 10).

Always clamp the hoses before you disconnect. See *Draining the thermal transfer devices* (page 54).

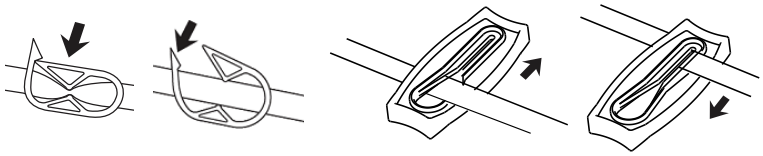


Figure 10 – Hose clamps

To connect the Altrix Temperature Management Wrap to the Altrix Temperature Management Hose, see Figure 11.

Press the button (A) on the hose to disconnect from the wrap.

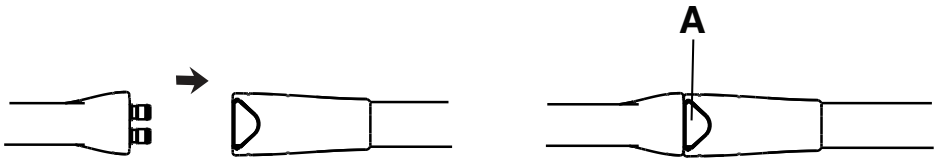


Figure 11 – Altrix Temperature Management Wrap connectors

The Altrix Temperature Management Wraps have an internal valve and do not need a clamp to stop the water flow.

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

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 driver

Procedure:

1. Apply the wheel locks.

2. Unplug the power cord from the wall outlet.
3. Using a T27 Torx driver, remove the six screws that secure the back cover to the frame. Save the screws.
4. Remove the back cover by pulling out and down on the bottom of the back cover. Save 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 driver
- T25 Torx driver
- 7/16” socket

Procedure:

1. Apply the wheel locks.
2. Unplug the power cord from the wall outlet.
3. Remove and save the water reservoir. See *Removing and replacing the reservoir* (page 13).
4. Using a T27 Torx driver, remove the top two screws inside the storage compartment that secure the front cover. Save the screws.
5. Using a T25 Torx driver, remove the three screws between the connection ports. Save the screws.
6. Using a T27 Torx driver, remove the two screws inside the water catch tray that secure the bumper. Save the screws.
7. Remove and save the bumper.
8. Using a 7/16” socket, remove the two nuts that secure the front cover to the product. Save the nuts.
9. Pull outward on the bottom of the front cover so the front cover lowers down.
10. Remove and save the front cover.

Side cover removal, left or right

Tools required:

- T25 Torx driver

Procedure:

1. Apply the wheel locks.
2. Remove the back cover. See *Back cover removal* (page 15).
3. Remove the front cover. See *Front cover removal* (page 16).
4. Using a T25 Torx driver, remove the five screws that secure the side cover to the main frame. Save the screws.
5. Remove the side cover, rotate the top, lift, and then tip the side cover to the back. Remove and save the side cover. Repeat steps 4 and 5 for the opposite side.

Back cover replacement

Tools required:

- #1 Phillips screwdriver

Procedure:

1. Remove the back cover. See *Back cover removal* (page 15).
2. Using a #1 Phillips screwdriver, loosen two screws on the Scrulock assembly.

3. Remove the power cord and Scrulock assembly from the front cover.
4. Discard the back cover.

   Note - Install the new air filters when you replace the back cover.

5. Reverse the steps to reinstall.
6. Verify proper operation before you return the product to service.

Battery removal and replacement

CAUTION - Always wear gloves when you replace the battery in case of a battery leak.

Tools required:

- ESD system

Procedure:

1. ESD protection. See *Protecting against electrostatic discharge (ESD)* (page 12).
2. Apply the wheel locks.
3. Remove the back cover. See *Back cover removal* (page 15).
4. Slide the battery cover to the left and remove. Save the battery cover.
5. Remove and discard the battery.

   Note - Do not dispose of as unsorted municipal waste. See your local distributor for return or collection systems available in your country.

6. Reverse steps to reinstall.

   Note - Replace with a 9V lithium battery.

7. Verify proper operation before you return the product to service.

Display assembly screen replacement

Tools required:

- T27 Torx driver
- Wire cutters
- ESD system

Procedure:

1. ESD protection. See *Protecting against electrostatic discharge (ESD)* (page 12).
2. Remove the back cover. See *Back cover removal* (page 15).
3. Using a T27 Torx driver, remove the two screws at the top of the display assembly screen that secure the display assembly screen to the product. Save the screws.
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. Save the thumbscrews.
7. 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.

8. Reverse steps to reinstall.

9. Perform the functional checks. Check complete on the *Functional test data sheet* (page 57).
10. Verify proper operation before you return the product to service.

User interface replacement

Tools required:

- T27 Torx driver
- T20 Torx driver
- 3/8” socket
- ESD system
- Wire cutters

Procedure:

1. ESD protection. See *Protecting against electrostatic discharge (ESD)* (page 12).
2. Remove the back cover. See *Back cover removal* (page 15).
3. Using a T27 Torx driver, remove the two screws at the top of the display assembly screen that secure the display assembly screen to the product. Save the screws.
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. Save the thumbscrews.
7. Unplug the communication cable and remove the display assembly.

   Note - Position the display assembly face down on an ESD controlled workbench.
8. Using a T20 Torx driver, remove the eight screws (C) (*Display assembly* (page 108)) that secure the display bracket. Save the screws.
9. Using a 3/8” socket, remove the hex nut (A) that secures the display bracket. Remove the bracket. Save all parts.
10. Using a T20 Torx driver, remove the two screws (D) that secure the controller communications board (CCB) (R) to the user interface. Save the screws.
11. Pull upward to unplug the CCB from the user interface. Save the CCB.
12. Remove the user interface from the bezel. Discard the user interface.

    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. Perform the *LCD functionality, testing the visual and audible alarms* (page 58). Check complete on the functional test data sheet.
15. Verify proper operation before you return the product to service.

Front wheel replacement, left or right

CAUTION - Do not put the product 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 front cover. See *Front cover removal* (page 16).
3. Remove the back cover. See *Back cover removal* (page 15).
4. Remove the side cover based on the wheel you are replacing. See *Side cover removal, left or right* (page 16).
5. Slightly tip the product and place a 2” x 4” board under the front corner of the frame on the side where you are replacing the front wheel (Figure 12).

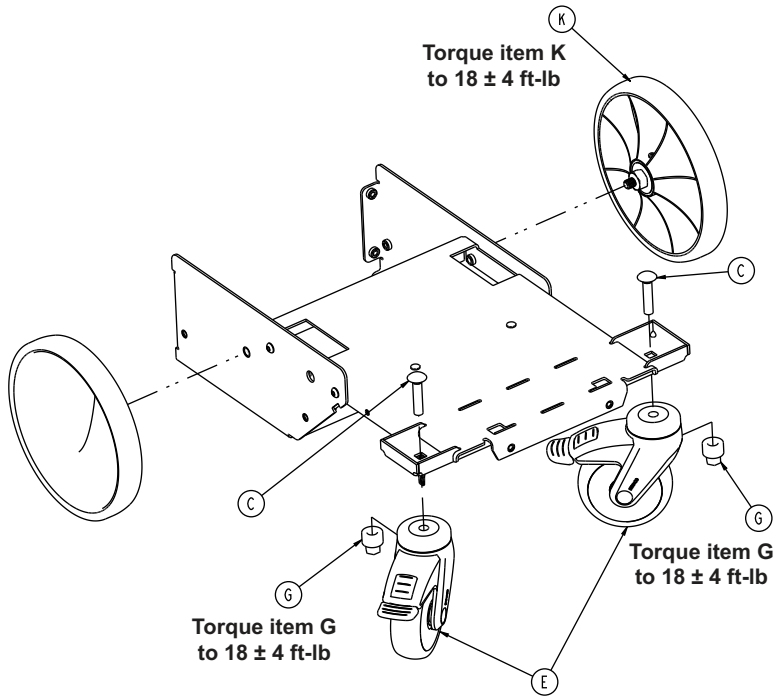


Figure 12 – Front wheels

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 three threads on the carriage bolt (C). Make sure that you start one to two threads up from the bottom of the carriage bolt.
7. Remove and discard the front wheel.
8. Reverse steps to reinstall.
9. Verify proper operation before you return the product to service.

Rear swivel lock caster replacement, left or right

CAUTION - Do not put the product 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* (page 15).
2. Slightly tip the product and place a 2” x 4” board under the front corner of the frame on the side where 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).

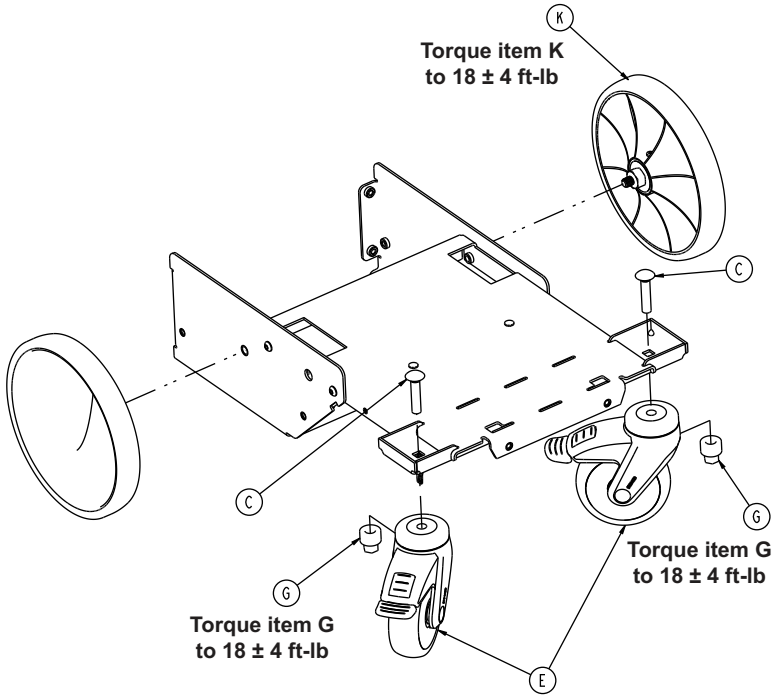


Figure 13 – Rear swivel lock casters

   a. To reinstall, apply **Loctite®** blue 242 to a minimum of three threads on the carriage bolt (C). Start one to two threads up from the bottom of the carriage bolt.
4. Reverse steps to reinstall.
5. Verify proper operation before you return the product to service.

Power cord replacement

Tools required:

- T25 Torx driver
- #1 Phillips screwdriver

Procedure:

1. Remove the back cover. See *Back cover removal* (page 15).
2. Remove the front cover. See *Front cover removal* (page 16).
3. Using a T25 Torx driver, remove the screw and cable clamp that secure the power cord to the control box cover. Save the screw and cable clamp.
4. Using a T25 Torx driver, remove the two screws (C) and cable clamps (F) that secure the power cord to the top bracket (Figure 14). Save the screws and cable clamps.

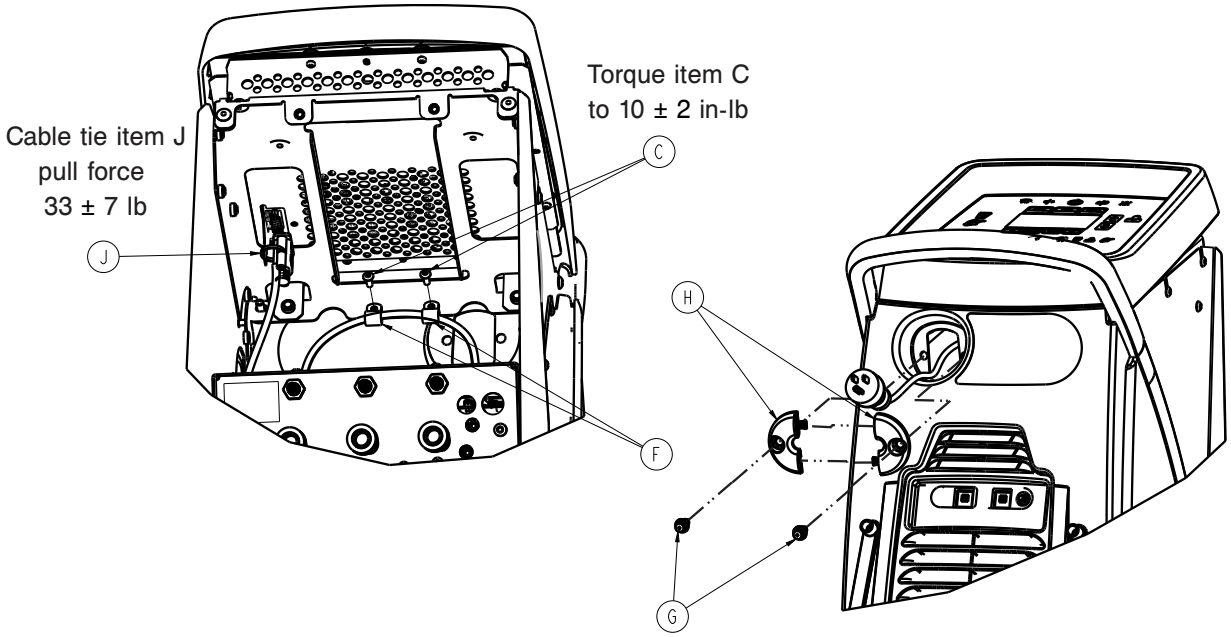


Figure 14 – Power cord to the top bracket

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

Valved panel mount female coupling replacement

Tools required:

- Needle nose pliers

Procedure:

1. Drain the water from the product. See *Draining water from the controller and hoses* (page 53).
2. Remove the front cover. See *Front cover removal* (page 16).
3. Using needle nose pliers, squeeze the hose clamp (AM) (Figure 15) that secures the tube to the coupling (K) (Figure 16).

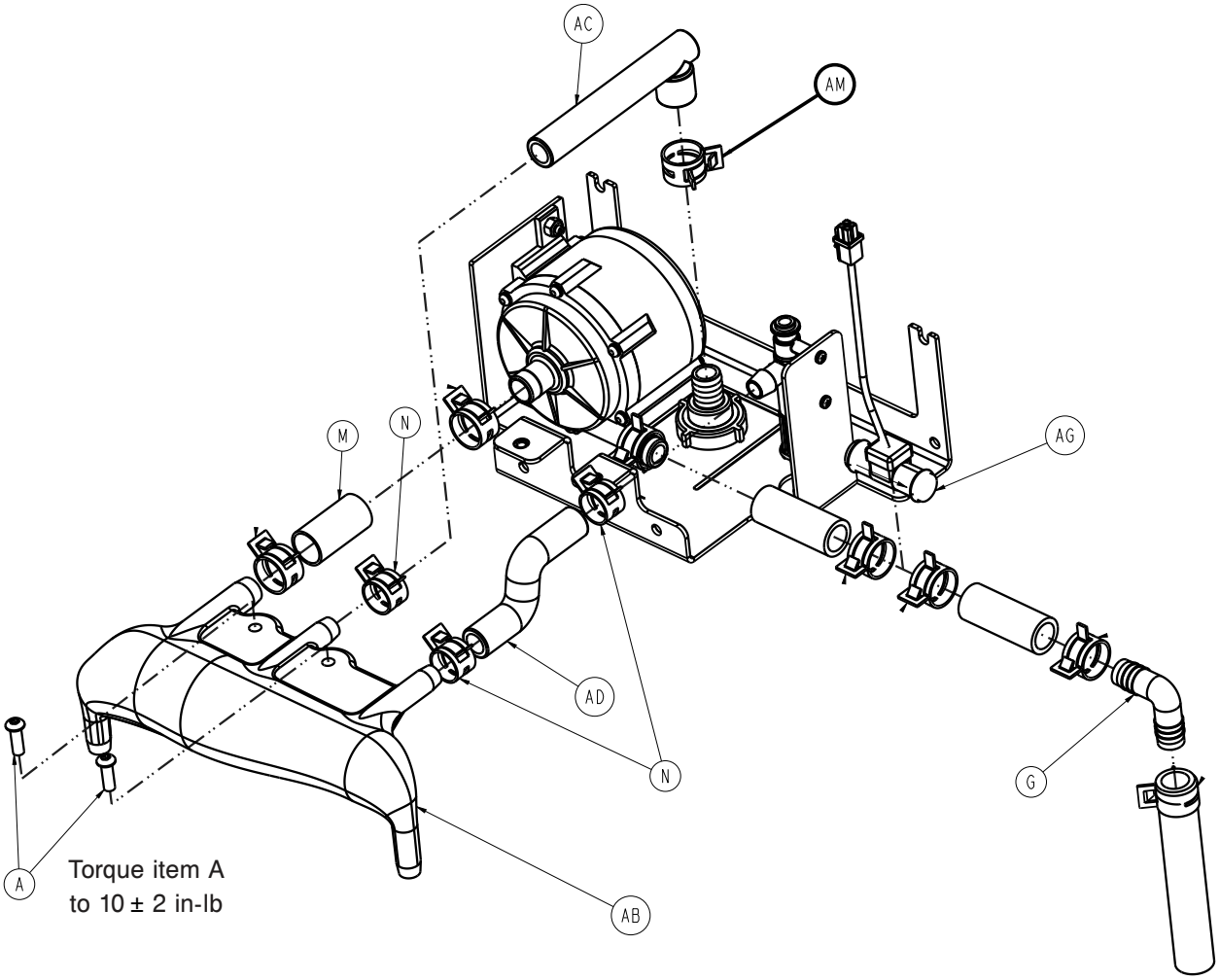


Figure 15 – Hose clamp

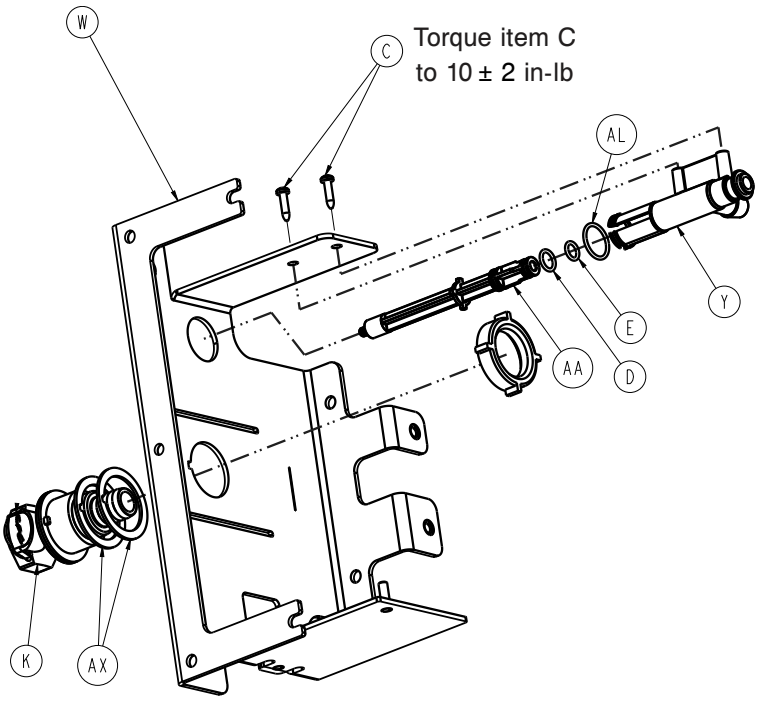


Figure 16 – Coupling

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

   Note - The new female coupling comes complete with one coupling seal and one coupling nut.

6. Reverse steps to reinstall.

   Note
   - If the replacement coupler has a locking pin, remove the locking pin before install.
   - Make sure that you position the coupler with the alignment tabs.

7. Check for leaks.
8. Verify proper operation before you return the product to service.

Drain valve body replacement

Tools required:

- T27 Torx driver
- T20 Torx driver
- Needle nose pliers

Procedure:

1. Remove the back cover. See *Back cover removal* (page 15).
2. Remove the front cover. See *Front cover removal* (page 16).
3. Remove the left side cover. See *Side cover removal, left or right* (page 16).
4. Using a T27 Torx driver, remove the two top screws and loosen the two bottom screws that secure the fluid bracket to the frame. Save the screws.
5. Disconnect both tube lines that are above the front left caster with the quick disconnects.

6. Using needle nose pliers, remove the two hose clamps (N) that secure the tubing to the reservoir (Figure 17). Save the clamps.

   Note - This will allow access to rotate the fluid assembly bracket.

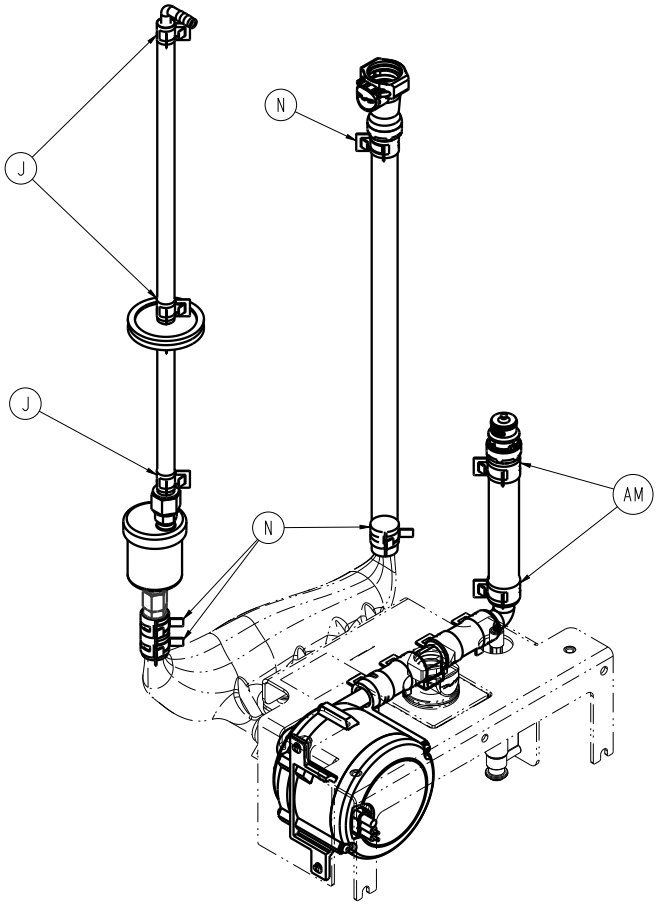


Figure 17 – Fluid assembly bracket

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

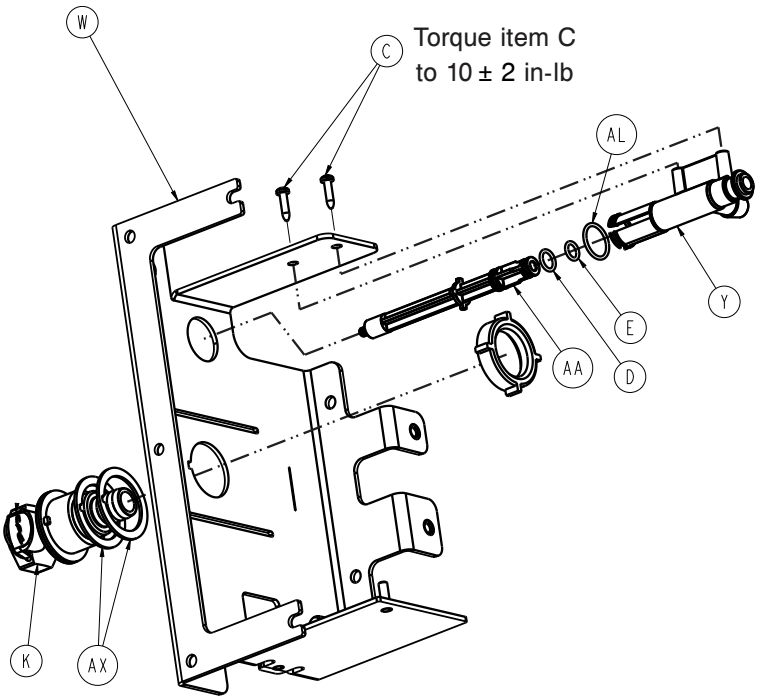


Figure 18 – Drain valve screws

8. Using a T20 Torx driver, remove the two screws that secure the drain valve to the fluid bracket. Save the screws.
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 you return the product to service.

Condenser air filter replacement

Tools required:

- None

Procedure:

1. Remove the back cover. See *Back cover removal* (page 15).
2. Remove and discard the condenser air filter.
3. Reverse steps to reinstall.
4. Verify proper operation before you return the product to service.

Fluid pump replacement

Tools required:

- 3/8” combination wrench
- Needle nose pliers
- T27 Torx driver

Procedure:

1. See *Valved panel mount female coupling replacement* (page 21), for removal only.

2. Remove the back cover. See *Back cover removal* (page 15).
3. Remove the side covers. See *Side cover removal, left or right* (page 16).
4. Disconnect both tube lines directly above the front left caster leading to the fluid assembly with the quick disconnects.
5. Using needle nose pliers, remove the two hose clamps (N) that secure the tubing to the reservoir (Figure 19). Save the clamps.

   Note - This will allow access to rotate the fluid assembly bracket.

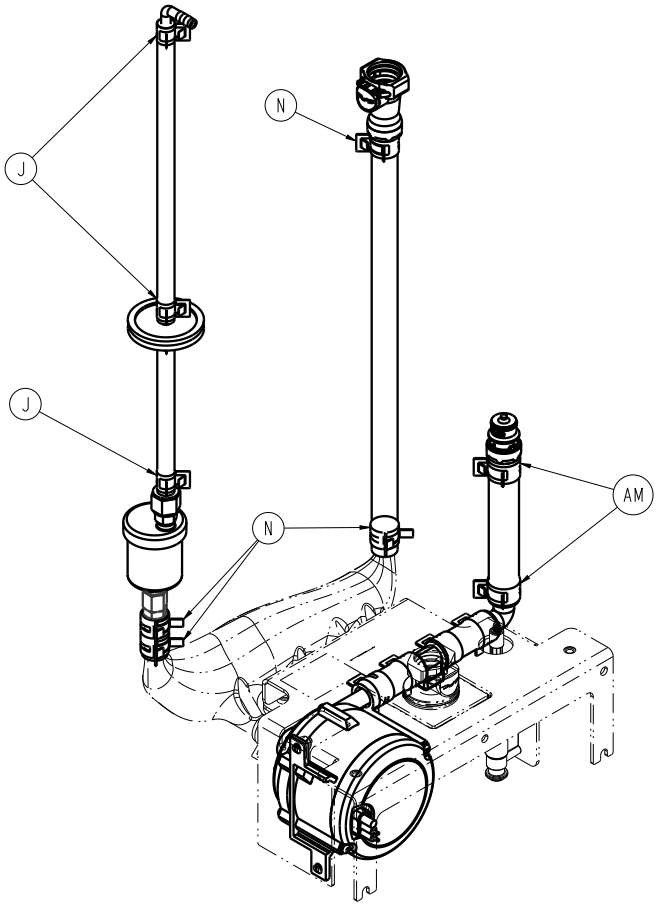


Figure 19 – Secure tubing

6. Using a T27 Torx driver, remove the two top screws and loosen the two bottom screws that secure the fluid bracket. Save the screws.
7. Pull up and rotate the fluid assembly bracket to gain access to the fluid pump (R) (Figure 20).
8. Disconnect the power plug from the fluid pump.
9. Using a 3/8” combination wrench, remove the two nuts (B) that secure the fluid pump to the fluid bracket (Figure 20). Save the nuts.

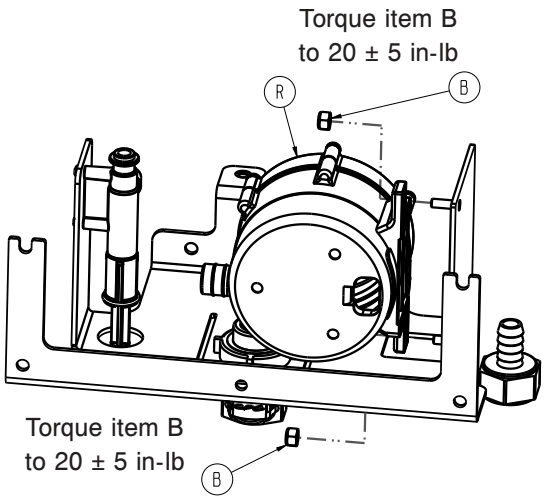


Figure 20 – Fluid pump to the fluid bracket

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

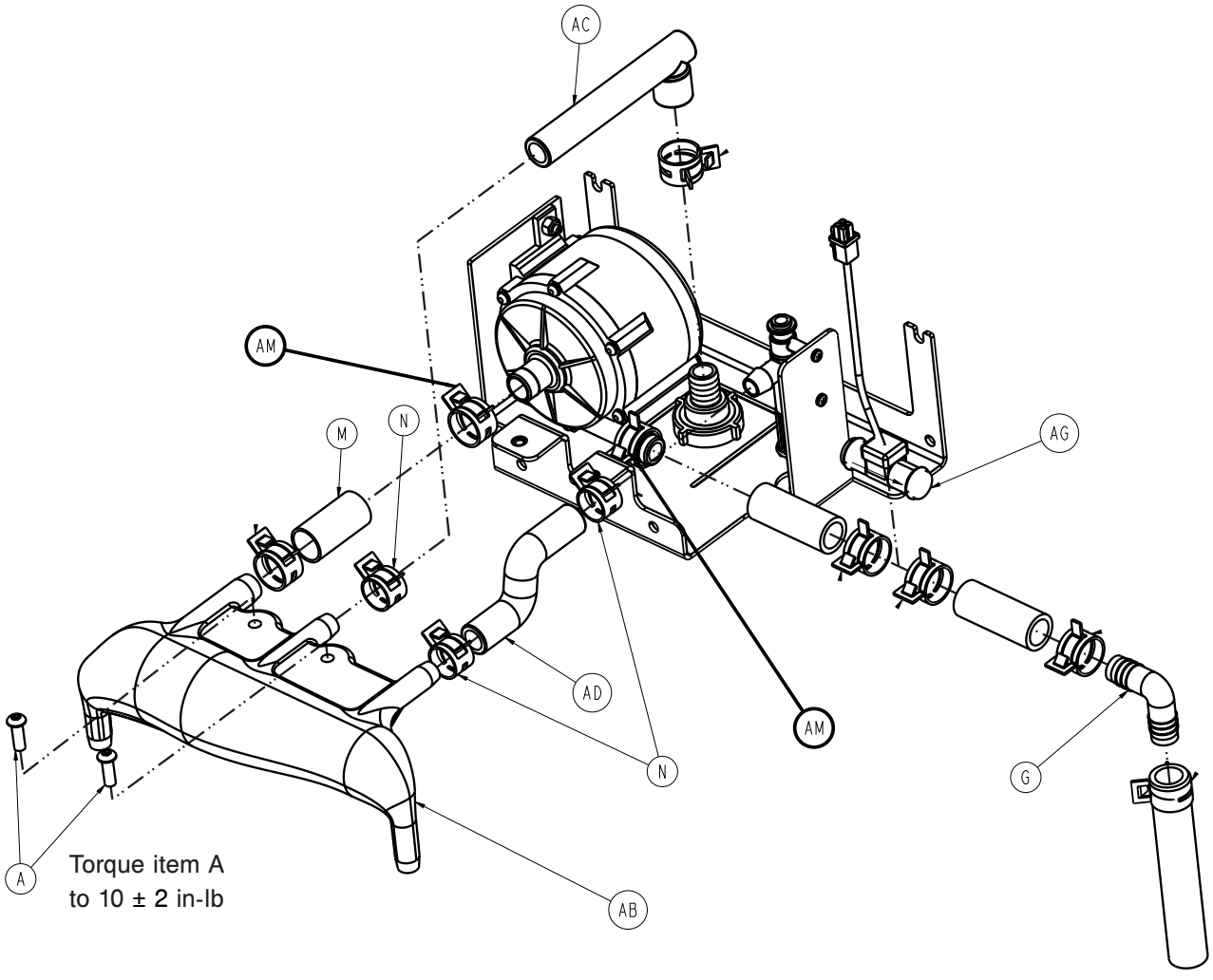


Figure 21 – Two hose clamps

11. Remove the tubing from the fluid pump.
12. Remove the fluid pump from the bracket and discard the fluid pump.

13. Reverse steps to reinstall.
14. Check for leaks.
15. Perform flow and valve verification. Record the value on the *Functional test data sheet* (page 57).
16. Verify proper operation before you return the product to service.

Heater replacement

Tools required:

- Utility knife
- T10 Torx driver
- T25 Torx driver
- T27 Torx driver
- 7/16” socket
- Wire cutters

Procedure:

1. Drain the reservoir. See *Draining water from the reservoir* (page 54).
2. Move the product to an area that has a floor drain.
3. Remove the back cover. See *Back cover removal* (page 15).
4. Remove the front cover. See *Front cover removal* (page 16).
5. Remove the side covers. See *Side cover removal, left or right* (page 16).
6. Using a T25 Torx driver, remove the screw and cable clamp that secure the power cord to the control box cover. Save the screw and cable clamp.
7. Unplug the power cord from the product.
8. Unscrew the two thumbscrews that secure the display cable to the control assembly. Save the thumbscrews.
9. Disconnect both tube lines from the control assembly with the quick disconnects on the left side.
10. Using a 7/16” socket, loosen the two locknuts on the back of the control assembly.
11. Using a T27 Torx driver, remove the two screws that secure the control assembly to the side panels. Save the screws.
12. Lift up and pull out on the control assembly to remove the control assembly from the front side of the product.

    Note - Do not completely remove the control assembly. Remove the control assembly as necessary to gain better access to the pump cable.

13. Unscrew the two thumbscrews that secure the pump cable to the control assembly. Save the thumbscrews.
14. Remove and save the control assembly.

    Note - Guide the control assembly tubing when you remove the control assembly.

15. Using a T25 Torx driver, remove the four screws (B) that secure the top bracket (AX) to the thermal unit (Figure 22). Save the screws.

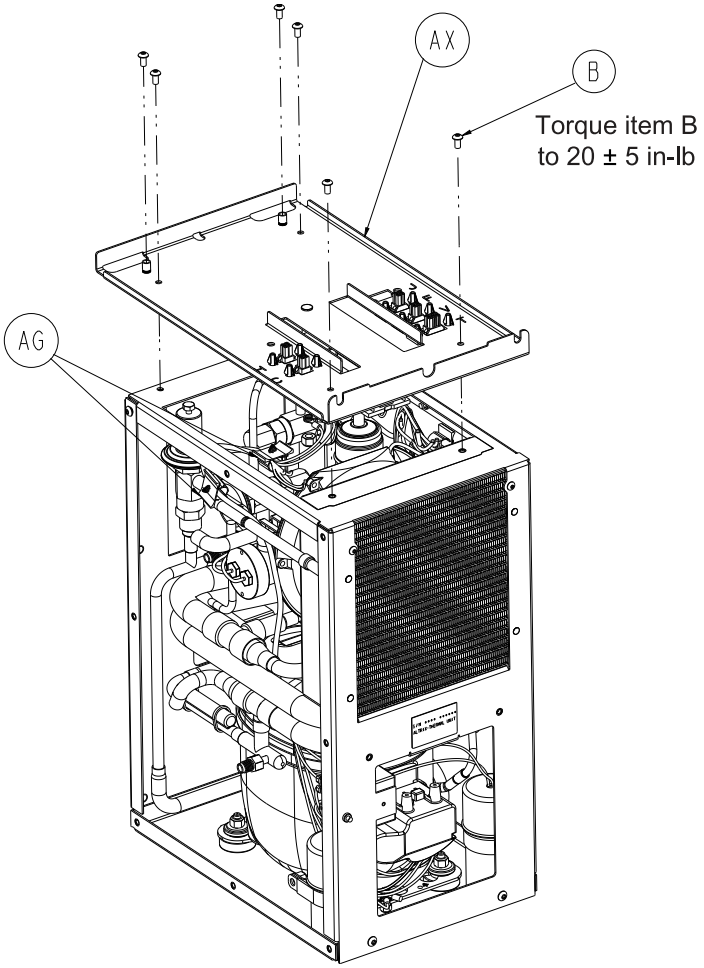


Figure 22 – Top bracket

16. Remove the heater cable from the wire clamps.
17. Using a 7/16” socket, remove the locknut that secures the heater cable ground wire. Save the locknut.
18. Using wire cutters, remove the heater connector (BD) from the top bracket (AX) (Figure 23).

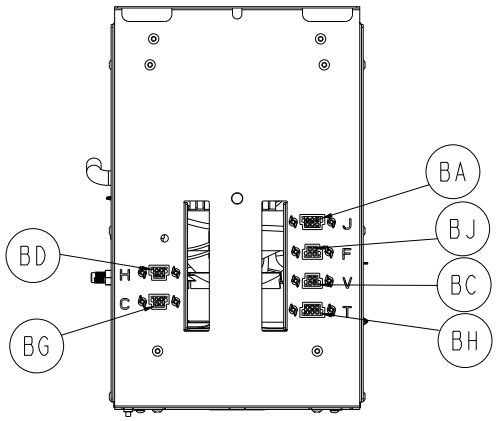


Figure 23 – Heater connector

19. Using wire cutters, remove and discard the two cable ties that secure the heater cable to the heater well assembly.
20. Using a utility knife, remove and discard the insulation around the heater to gain access to the screws.

Note - New insulation is provided with the heater assembly.

21. Using a T25 Torx driver, remove the two screws that secure the heater well hanger to the main frame. Save the screws.
22. Using a T10 Torx driver, remove the center screw that secures the heater well hanger to the heater to remove the bracket. Save the screw.
23. Using a T10 Torx driver, remove the two screws (AB) that secure the heater (BD) to the heater well assembly (Figure 24). Save the screws.

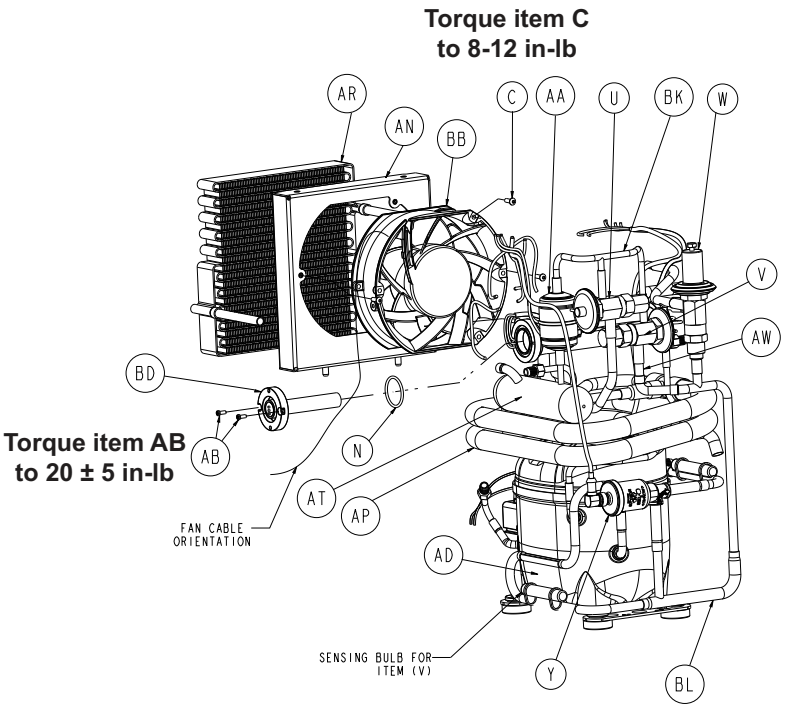


Figure 24 – Heater well

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

    Note - When you reinstall, push the connector into the top bracket until the connector is fully seated.

26. Check for leaks.
27. Perform the high temp cutout check. Check complete on the *Functional test data sheet* (page 57).
28. Verify proper operation before you return the product to service.

Refrigeration temperature probe replacement

Tools required:

- Utility knife

Procedure:

1. Remove the back cover. See *Back cover removal* (page 15).
2. Remove the front cover. See *Front cover removal* (page 16).
3. Remove the right side cover. See *Side cover removal, left or right* (page 16).
4. Using a utility knife, remove and discard the insulation and tape around the refrigeration temperature probe (BF) (Figure 25).

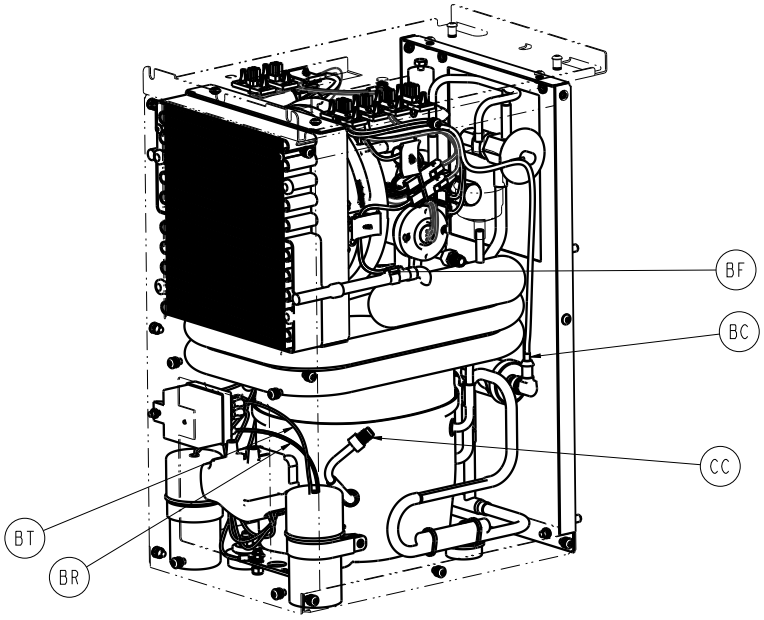


Figure 25 – Refrigeration temperature probe

Note - The new refrigeration temperature probe comes complete with new insulation and tape.

5. Unplug and remove the refrigeration temperature probe from the cable clamps.
   a. Unclip the refrigeration probe from the refrigeration line and discard.
6. Reverse steps to reinstall.
7. Verify proper operation before you return the product to service.

Thermal unit replacement

Tools required:

- T27 Torx driver
- T25 Torx driver
- 7/16” socket
- Wire cutters
- Ratchet

Procedure:

1. See *Draining water from the controller and hoses* (page 53).
2. Remove the back cover. See *Back cover removal* (page 15).
3. Remove the front cover. See *Front cover removal* (page 16).
4. Remove the side covers. See *Side cover removal, left or right* (page 16).
5. Using a T25 Torx driver, remove the screw and cable clamp that secure the power cord to the control box cover. Save the screw and cable clamp.
6. Unplug the power cord from the product.
7. Unscrew the two thumbscrews that secure the display cable to the control assembly. Save the thumbscrews.
8. Disconnect both tube lines from the control assembly with the quick disconnects on the left side.
9. Using a 7/16” socket and ratchet, loosen the two locknuts on the back of the control assembly.
10. Using a T27 Torx driver, remove the two screws that secure the control assembly to the side panels. Save the screws.

11. Lift and pull out the control assembly from the front to access the pump cable.

    Note - Do not completely remove the control assembly. Remove the control assembly as necessary to gain better access to the pump cable.

12. Unscrew the two thumbscrews that secure the pump cable to the control assembly. Save the thumbscrews.
13. Remove and save the control assembly.

    Note - Guide the control assembly tubing while you remove the tubing from the product.

14. Using wire cutters, remove and discard the cable tie that secures the air eliminator tubing to the thermal unit.
15. Disconnect the tube line from the thermal unit with the quick disconnects on the front side.
16. Using a 7/16” socket and ratchet, remove and save the two locknuts from the bottom front that secure the thermal unit to the mainframe.
17. Remove and discard the thermal unit from the back of the controller (*Thermal unit, 100V* (page 122)).

    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.

    Note - Make sure that you align the connectors when you reinstall the control assembly.

19. Check for leaks.
20. Perform test procedures. Complete the *Functional test data sheet* (page 57).
21. Verify proper operation before you return the product to service.

Temperature probe replacement

Tools required:

- Utility knife
- 1/2” open end wrench

Procedure:

1. Remove the back cover. See *Back cover removal* (page 15).
2. Remove the front cover. See *Front cover removal* (page 16).
3. Remove the side covers. See *Side cover removal, left or right* (page 16).
4. Using a utility knife, remove and discard the insulation around the heater well to gain access to either temperature probe (BE) (Figure 26).

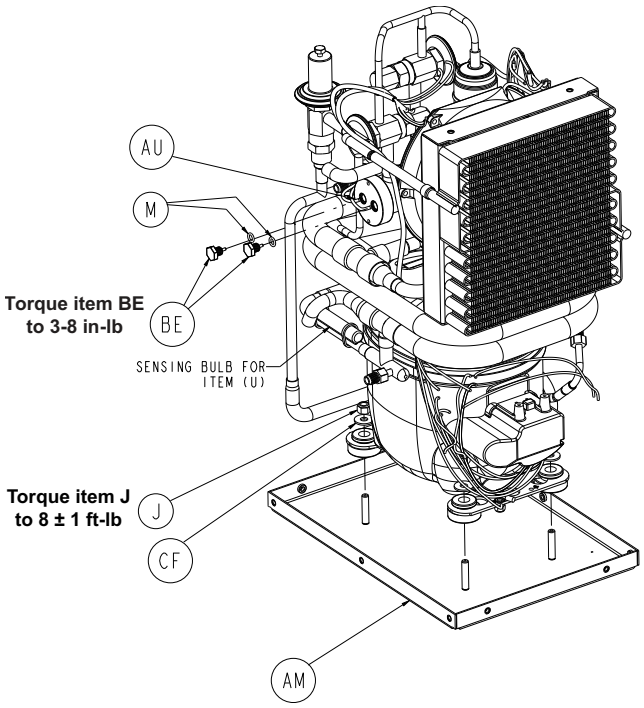


Figure 26 – Temperature probe

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

   Note - New insulation and an O-ring are included with the temperature probe assembly.

7. Using a 1/2” open end wrench, remove the temperature probe you want to replace. Discard the temperature probe.
8. Reverse steps to reinstall.
9. Check for leaks.
10. Perform a high temp cutout check. Check complete on the *Functional test data sheet* (page 57).
11. Verify proper operation before you return the product to service.

Fan assembly, thermal unit replacement

Tools required:

- T25 Torx driver
- T27 Torx driver
- 3/32” hex wrench
- 7/16” socket
- Ratchet

Procedure:

1. Remove the back cover. See *Back cover removal* (page 15).
2. Remove the front cover. See *Front cover removal* (page 16).
3. Remove the side covers. See *Side cover removal, left or right* (page 16).
4. Using a T25 Torx driver, remove the screw and cable clamp that secure the power cord to the control box cover. Save the screw and cable clamp.
5. Unplug the power cord from the product.

6. Unscrew the two thumbscrews that secure the display cable to the control assembly. Save the thumbscrews.
7. Disconnect both tube lines from the control assembly with the quick disconnects on the left side.
8. Using a 7/16” socket and ratchet, loosen the two locknuts on the back of the control assembly.
9. Using a T27 Torx driver, remove the two screws that secure the control assembly to the side panels. Save the screws.
10. Lift and pull out the control assembly from the front to gain access to the pump cable.

    Note - Do not completely remove the control assembly. Remove the control assembly as necessary to gain better access to the pump cable.

11. Unscrew the two thumbscrews that secure the pump cable to the control assembly. Save the thumbscrews.
12. Remove and save the control assembly.

    Note - Guide the control assembly tubing when you remove the control assembly.

13. Using a T25 Torx driver, remove the four screws that secure the connector plate to the fan assembly. Lift and move the connector plate to the side. Save the screws.
14. Using a 3/32” hex wrench, remove the two screws (D) that secure the fan assembly to the frame (Figure 27). Save the screws.

    Note - Loosen the screws a half turn then retighten, loosen the screws a full turn then retighten. Repeat the process until you remove the screws. Save the screws.

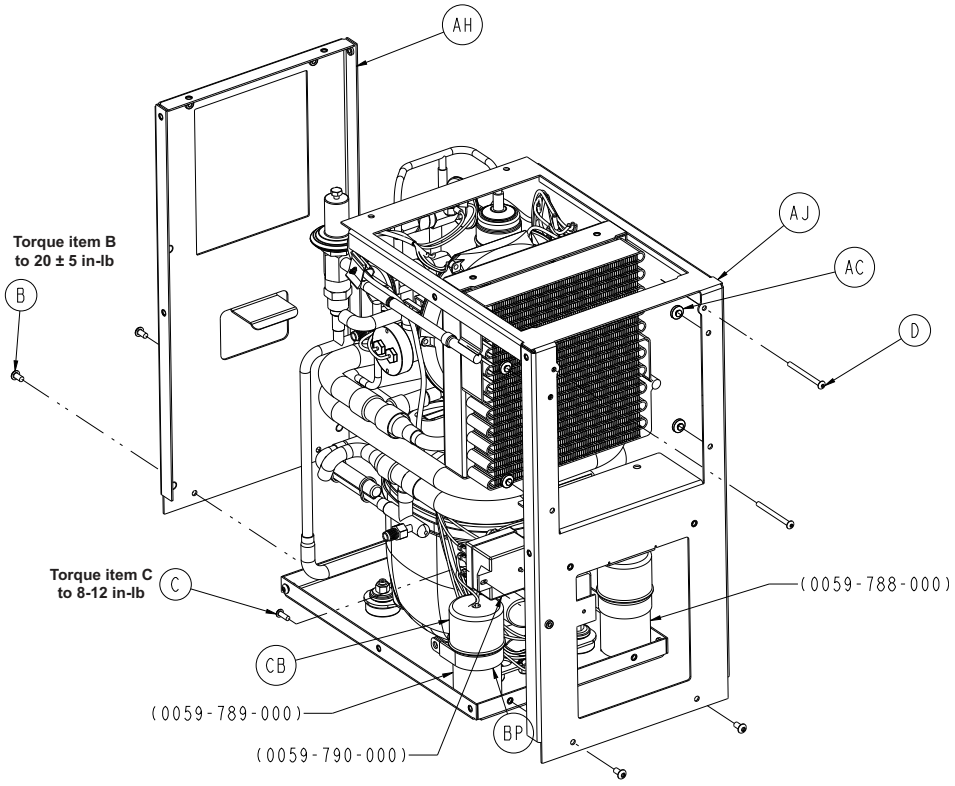


Figure 27 – Fan assembly

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

    Note - Align the fan shroud pins (*Thermal unit, 100V* (page 122)).

18. Verify proper operation before you return the product to service.

Fluid management board (FMB) replacement

Tools required:

- T25 Torx driver
- T27 Torx driver
- 3/8” socket
- 7/16” socket
- ESD system

Procedure:

1. Remove the back cover. See *Back cover removal* (page 15).
2. Remove the front cover. See *Front cover removal* (page 16).
3. Remove the side covers. See *Side cover removal, left or right* (page 16).
4. Unplug the power cord from the product.
5. Using a T27 Torx driver, remove the two screws from the control box cover. Save the screws.
6. Using a T25 Torx driver, remove the six screws (D) from the control box cover (Figure 28). Save the screws.

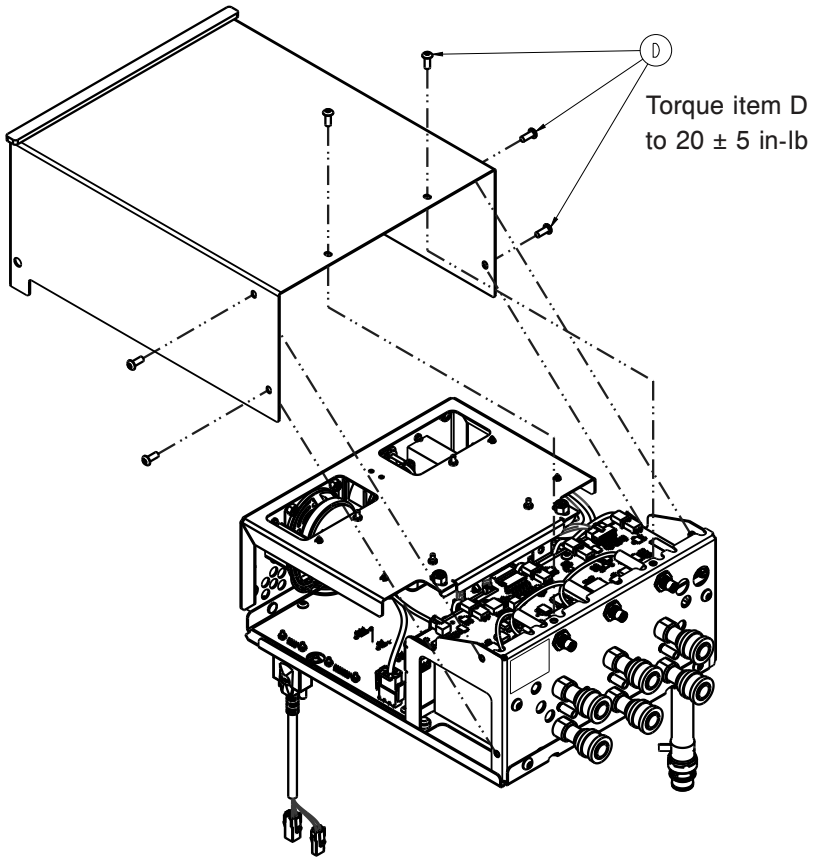


Figure 28 – Control box cover

7. Using a T27 Torx driver, remove the four screws (C) from the back cover of the control assembly. Pull the cover to the back of the product. Set the cover aside (Figure 29). Save the screws.

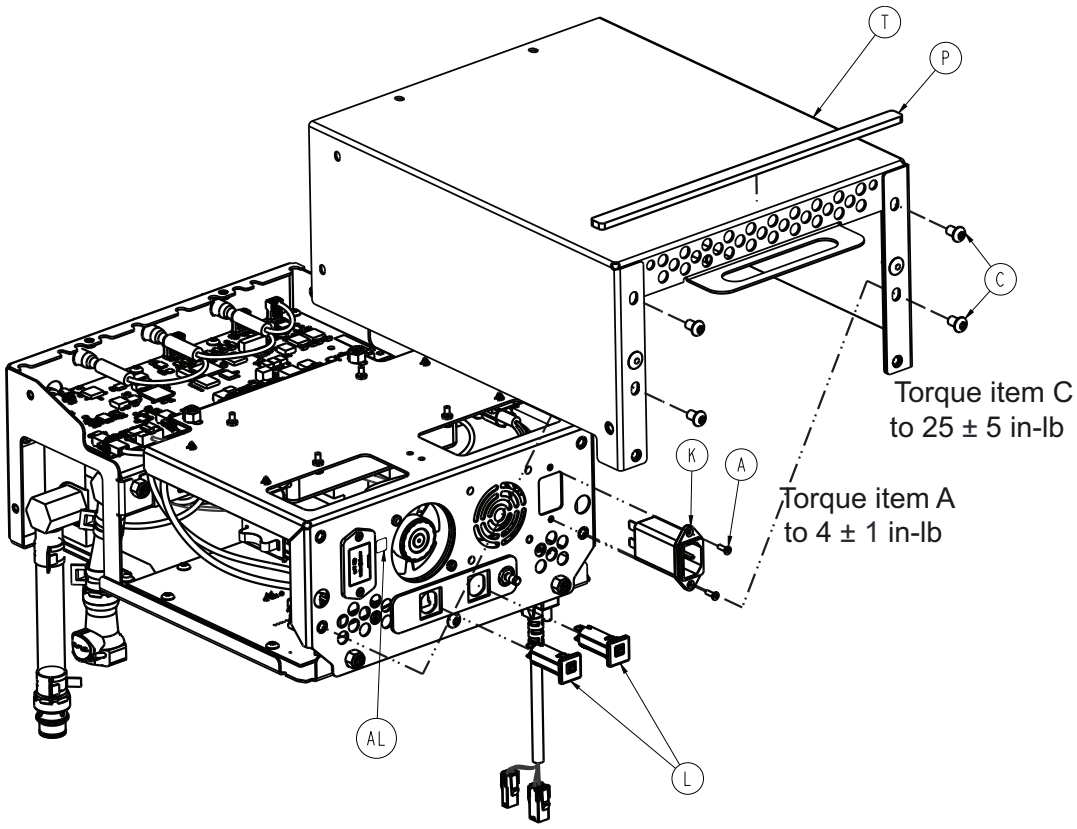


Figure 29 – Back of the control assembly

8. Unscrew the two thumbscrews that secure the display cable to the control assembly. Save the thumbscrews.
9. Unscrew the two thumbscrews that secure the pump cable to the control assembly. Save the thumbscrews.
10. Using a 7/16” socket, remove the four locknuts (G) that secure the power supply mount to the control assembly (Figure 30). Save the locknuts.

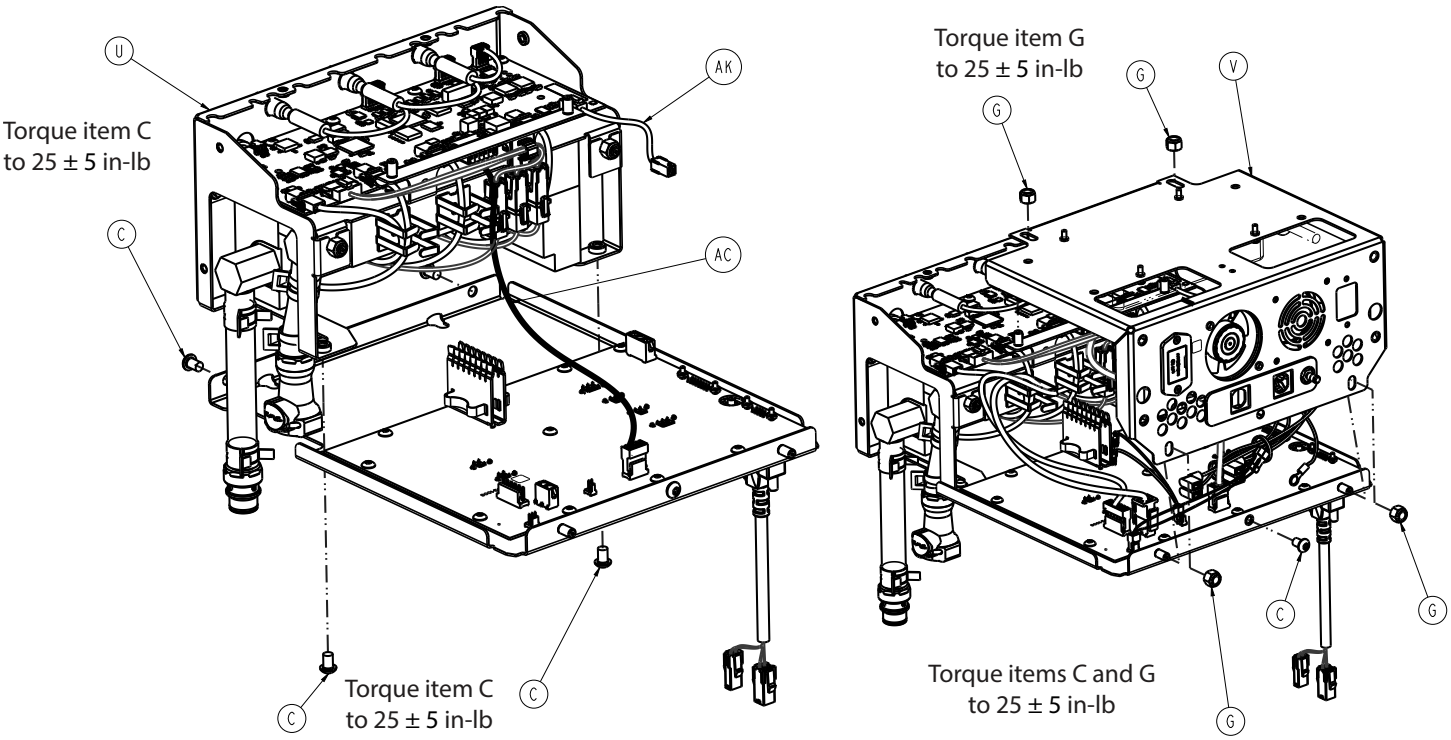


Figure 30 – Power supply

11. Using a T27 Torx driver, remove the screw (C) that secures the power supply mount to the control assembly (Figure 30). Save the screw.
12. Lift the power supply mount to gain access to the cable connections.
13. Disconnect all cable connections from the FMB.
14. ESD protection. See *Protecting against electrostatic discharge (ESD)* (page 12).
15. Provide support to the power supply assembly when you disconnect from the bracket. Remove and save the power supply assembly.
16. Using a T25 Torx driver, remove the nine screws (D) that secure the FMB to the control assembly base (R) (Figure 31). Save the screws.
17. Using a 3/8” socket, remove the nut (E) that secures the fluid grounding bracket to the control assembly base (Figure 31). Save the nut.

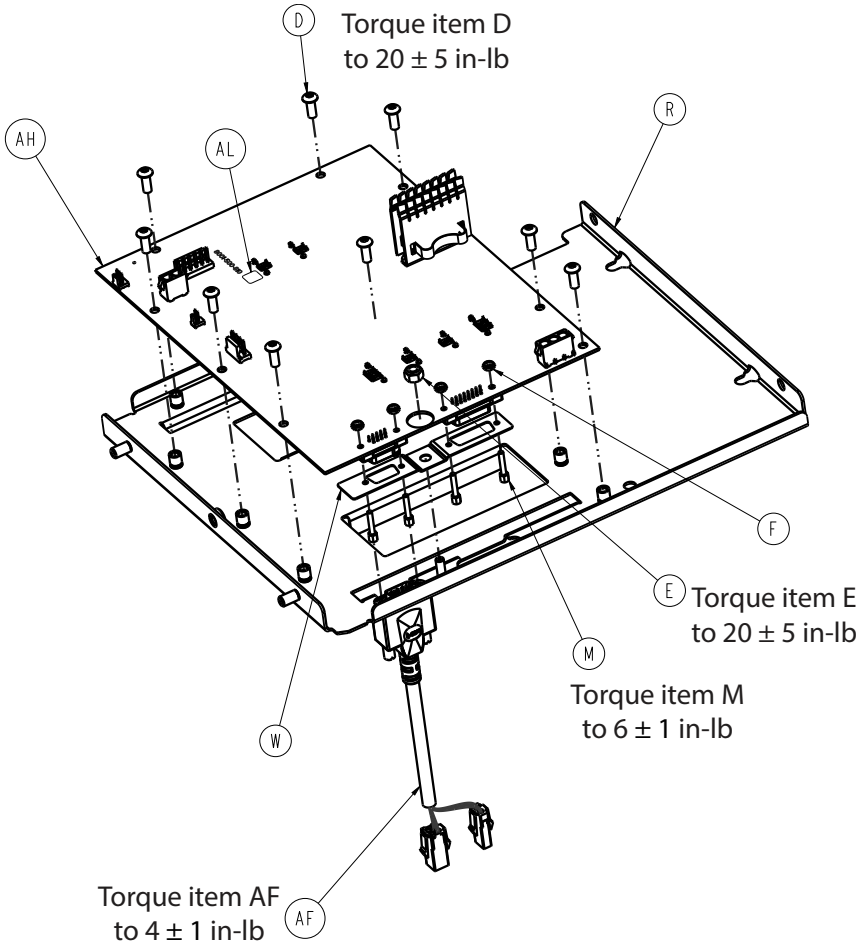


Figure 31 – Fluid grounding bracket

18. Remove and discard the FMB (AH).

    Note - Do not dispose of as unsorted municipal waste. See your local distributor for return or collection systems available in your country.

19. Reverse steps to reinstall.
20. Perform all test procedures. Complete the *Functional test data sheet* (page 57).
21. Verify proper operation before you return the product to service.

Main control board (MCB) replacement

Tools required:

- T25 Torx driver
- T27 Torx driver
- ESD system

Procedure:

1. Remove the back cover. See *Back cover removal* (page 15).
2. Remove the front cover. See *Front cover removal* (page 16).
3. Unplug the power cord from the product.
4. Using a T27 Torx driver, remove the two screws that secure the control box cover to the side panels. Save the screws.

5. Using a T25 Torx driver, remove the six screws (D) that secure the control box cover to the MCB frame (Figure 32). Save the screws.

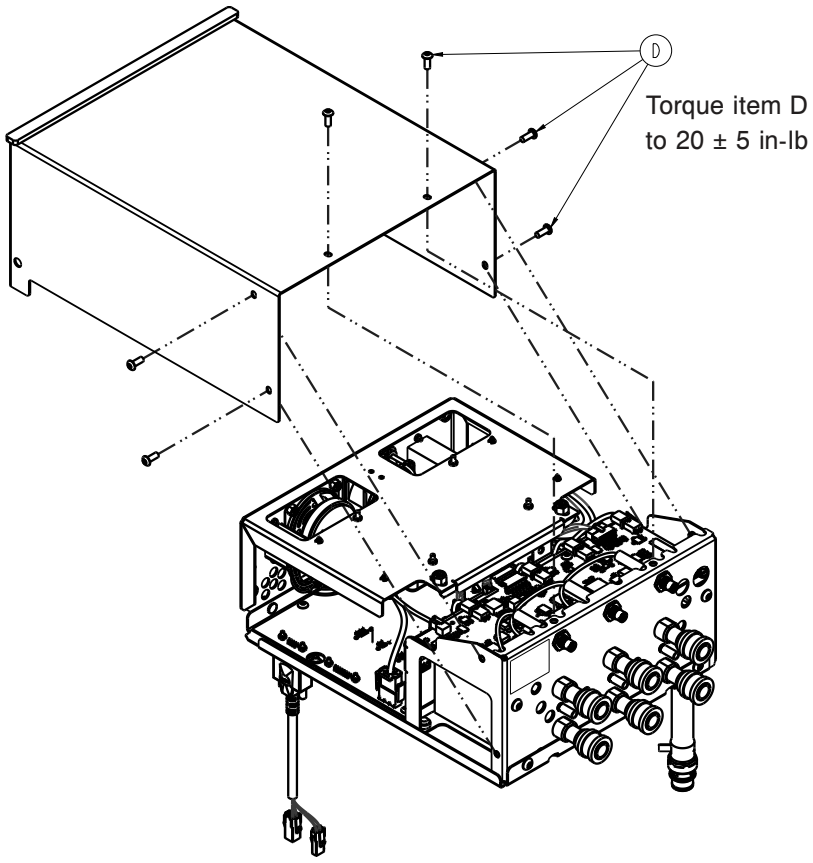


Figure 32 – Control box cover

6. Using a T27 Torx driver, remove the four screws from the back of the control assembly. Save the screws.
7. Pull the cover to the back of the product. Save the cover.
8. Disconnect the cable connections from the MCB (AA). The ten cable connections are labeled E, F, G, H, J, M, N, L, AG, and AH (Figure 33).

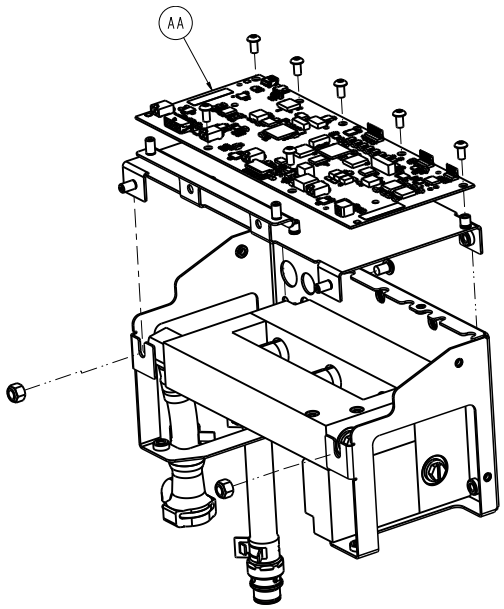


Figure 33 – Main control board

Note - Make sure that you take note of where the cables were connected for reinstallation.

9. ESD protection. See *Protecting against electrostatic discharge (ESD)* (page 12).
10. Using a T25 Torx driver, remove the seven screws from the MCB. Save the screws.
11. Discard the MCB.

    Note - Do not dispose of as unsorted municipal waste. See your local distributor for return or collection systems available in your country.

12. Reverse steps to reinstall.
13. Perform all test procedures. Complete the *Functional test data sheet* (page 57).
14. Verify proper operation before you return the product to service.

Temperature or monitor probe jack replacement

Tools required:

- T25 Torx driver
- T27 Torx driver
- Adjustable wrench

Procedure:

1. Remove the back cover. See *Back cover removal* (page 15).
2. Remove the front cover. See *Front cover removal* (page 16).
3. Unplug the power cord from the product.
4. Using a T27 Torx driver, remove the two screws that secure the control box cover to the side panels. Save the screws.
5. Using a T25 Torx driver, remove the six screws (D) that from the control box cover (Figure 34). Save the screws.

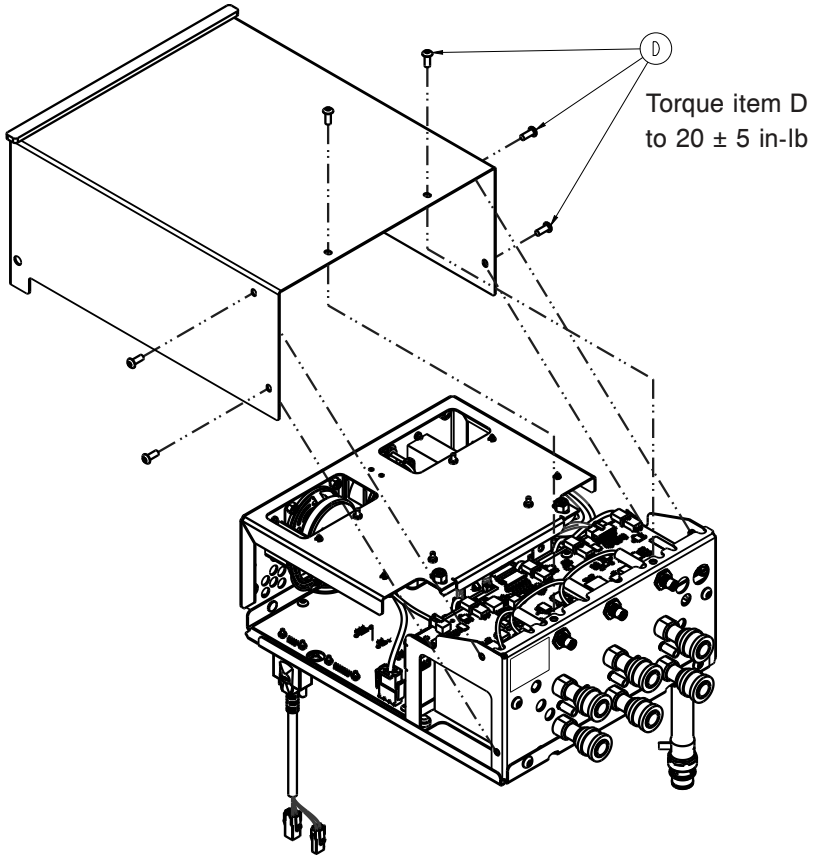


Figure 34 – Control box cover

6. Using a T27 Torx driver, remove the four screws from the back of the control assembly. Save the screws.
7. Pull the cover to the back of the product and remove. Save the cover.
8. Unplug the defective probe from the main control board.
9. Using an adjustable wrench, remove the nut that secures the temperature or monitor probe jack. Discard the nut.

   Note - A new nut is supplied with the probe jack.
10. Remove and discard the temperature or monitor probe jack.
11. Reverse steps to reinstall.
12. Perform the temperature probe tests. Record the values on the *Functional test data sheet* (page 57).
13. Verify proper operation before you return the product to service.

Manifold assembly replacement

Tools required:

- T25 Torx driver
- T27 Torx driver
- 7/16” socket
- Ratchet
- ESD system

Procedure:

1. Drain the water from the product. See *Draining water from the controller and hoses* (page 53).

2. Remove the back cover. See *Back cover removal* (page 15).
3. Remove the front cover. See *Front cover removal* (page 16).
4. Remove the side covers. See *Side cover removal, left or right* (page 16).
5. Using a T25 Torx driver, remove the screw and cable clamp that secure the power cord to the control box cover. Save the screw and cable clamp.
6. Unplug the power cord from the product.
7. Unscrew the two thumbscrews that secure the display cable to the control assembly. Save the thumbscrews.
8. Disconnect both tube lines from the control assembly with the quick disconnects on the left side.
9. Using a 7/16” socket and ratchet, remove the two locknuts from the back of the control assembly. Save the locknuts.
10. Using a T27 Torx driver, remove the two screws that secure the control assembly to the side panels. Save the screws.
11. Lift and pull out the control assembly from the front to gain access to the pump cable.

    Note - Do not completely remove the control assembly. Remove the control assembly as necessary to gain better access to the pump cable.

12. Unscrew the two thumbscrews that secure the pump cable to the control assembly. Save the thumbscrews.
13. Remove and save the control assembly from the product.

    Note - Guide the control assembly tubing when you remove the control assembly.

14. Using a T27 Torx driver, remove the four screws from the control box cover. Save the screws.
15. Using a T25 Torx driver, remove the six screws (D) from the control box cover (Figure 35). Save the screws.

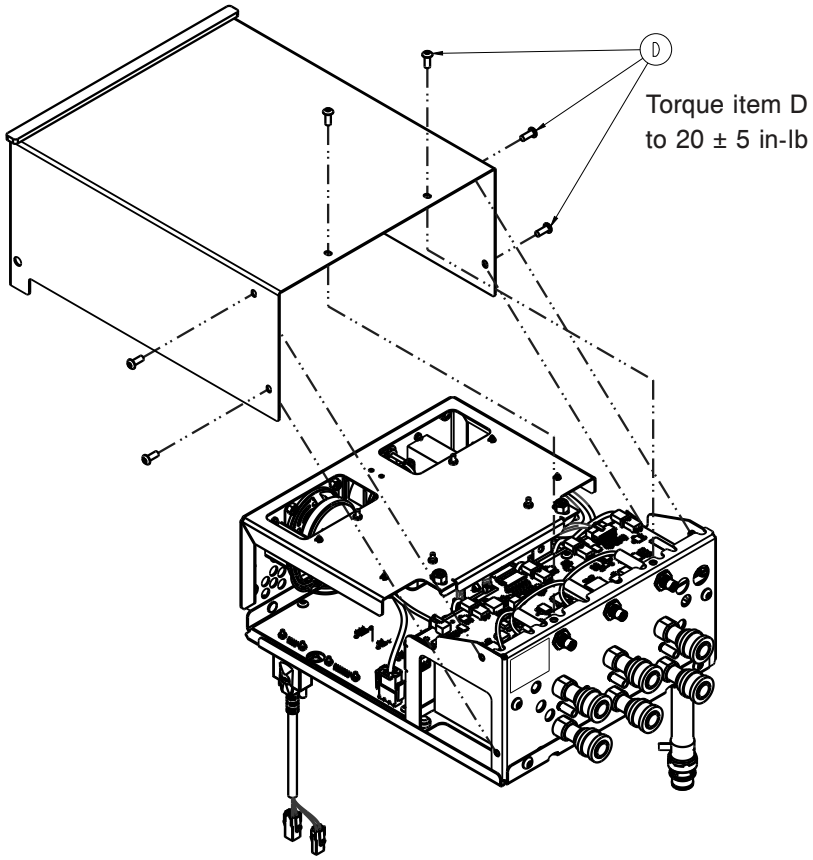


Figure 35 – Control box cover

16. Using a 7/16” socket and ratchet, remove the two locknuts (G) that secure the manifold assembly to the control assembly (Figure 36). Save the locknuts.

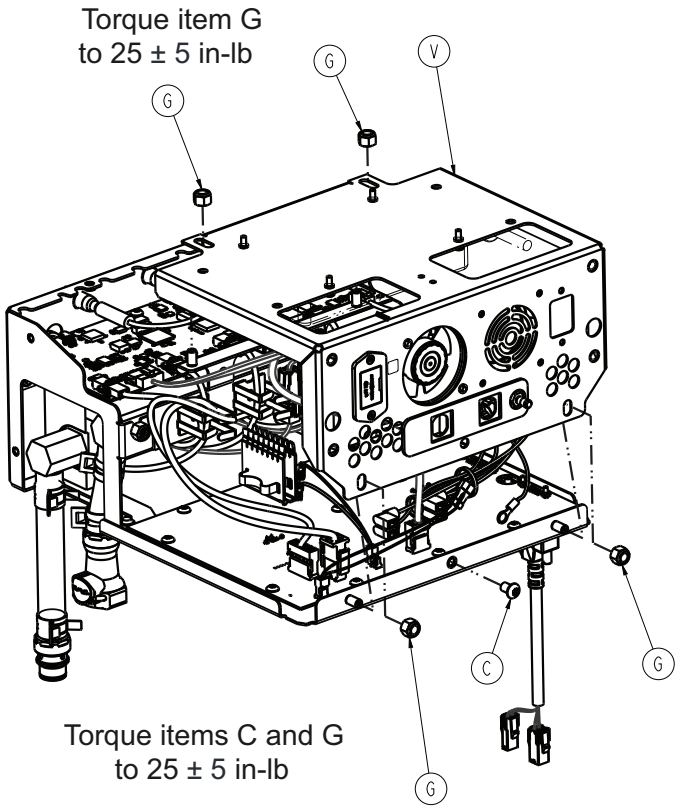


Figure 36 – Locknuts

17. Using a T27 Torx driver, remove the four screws (C) that secure the manifold assembly (U) to the control assembly (Figure 37). Save the screws.

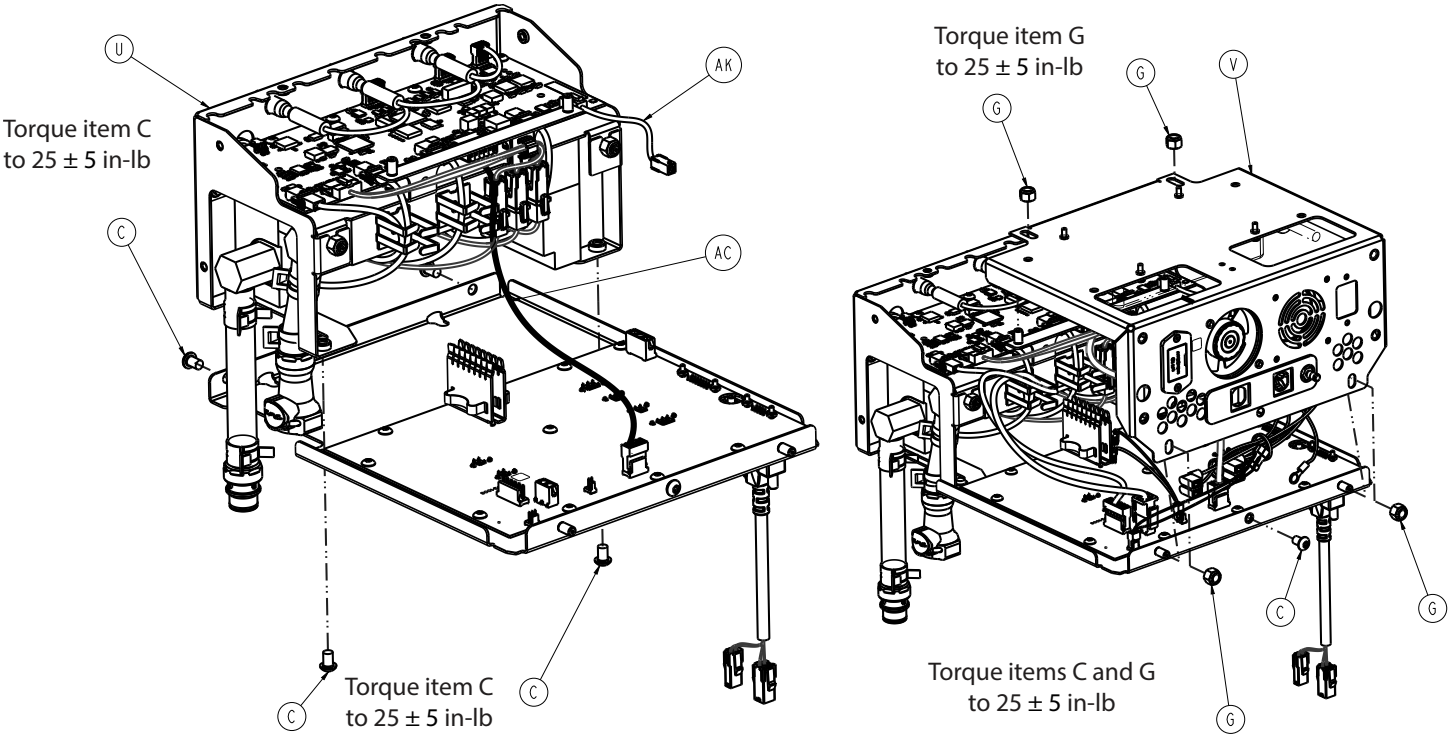


Figure 37 – Manifold assembly

18. Disconnect the cable connections from the MCB. The two cable connections are labeled AK and AC.

Note - Make sure that you take note of where the cables were connected for reinstallation.

19. ESD protection. See *Protecting against electrostatic discharge (ESD)* (page 12).
20. Discard the manifold assembly.
21. Reverse steps to reinstall.
22. Perform all test procedures. Complete the *Functional test data sheet* (page 57).
23. Verify proper operation before you return the product to service.

Manifold flow sensor cable replacement

Tools required:

- T25 Torx driver
- 5/32” hex wrench
- ESD system

Procedure:

1. Remove the manifold assembly. See *Manifold assembly replacement* (page 41) (removal only).
2. Using a T25 Torx driver, remove the two screws (B) that secure the outer manifold bracket to the MCB support bracket (Figure 38). Save the screws.

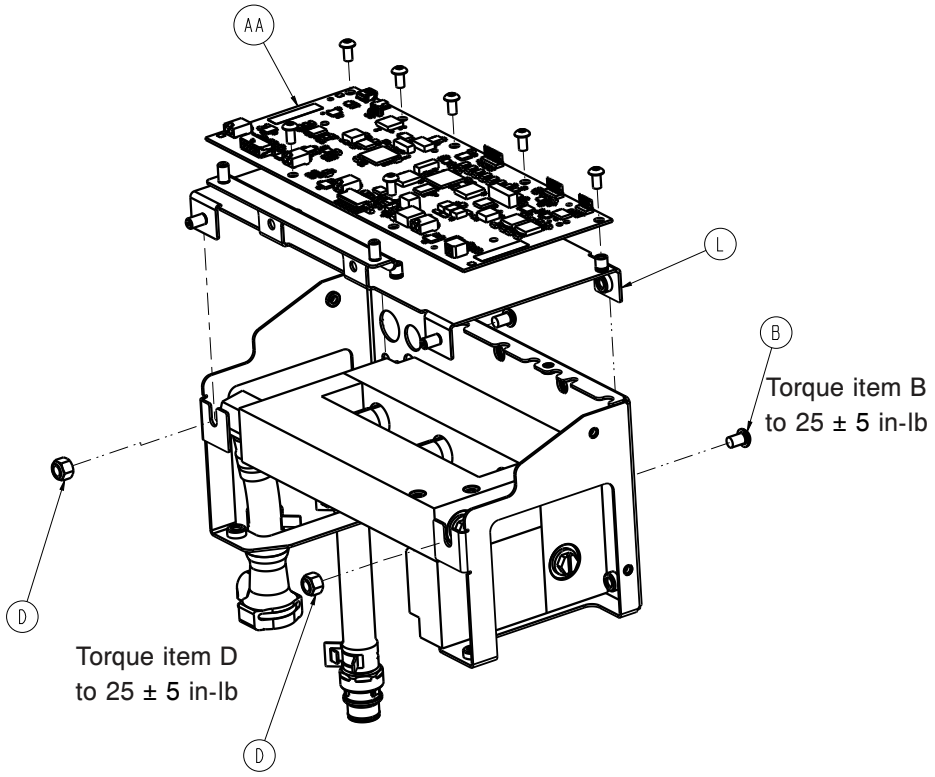


Figure 38 – Outer manifold bracket to MCB support bracket

Note - Push up on the MCB support bracket to release the bracket from the outer manifold bracket.

3. ESD protection. See *Protecting against electrostatic discharge (ESD)* (page 12).
4. Remove the flow sensor cables from the cable clamp to create room to separate the return and supply manifolds.
5. Using a 5/32” hex wrench, remove the six screws (C) that secure the return manifold (N) to the supply manifold (M) (Figure 39). Save the screws.

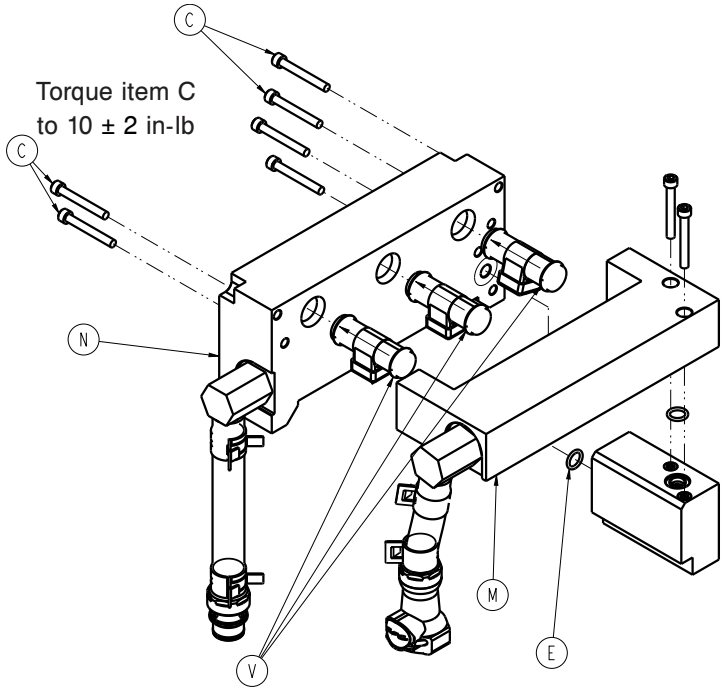


Figure 39 – Return manifold to supply manifold

6. Separate the supply manifold from the return manifold.

   Note - Some water will come out of the manifolds.

7. Disconnect and remove the flow sensors you want to replace.

   Note - Make sure that the arrow on the flow sensor points toward the hose connector when you install the flow sensor.

8. Reverse steps to install.

   Note - Verify that the O-ring (E) is seated between the return and supply manifolds (Figure 39).

9. Check for leaks.
10. Perform flow and water temperature verification. Record the values on the *Functional test data sheet* (page 57).
11. Verify proper operation before you return the product to service.

System flow sensor replacement

Tools required:

- T27 Torx driver
- Needle nose pliers
- Wire cutters

Procedure:

1. Drain the water from the product. See *Draining water from the controller and hoses* (page 53).
2. Remove the back cover. See *Back cover removal* (page 15).
3. Remove the front cover. See *Front cover removal* (page 16).
4. Remove the left side cover. See *Side cover removal, left or right* (page 16).
5. Using a T27 Torx driver, remove the two top screws that secure the fluid bracket to the frame. Save the screws.
6. Using a T27 Torx driver, loosen the bottom two screws on the fluid bracket.

7. Disconnect both tube lines that are above the front left caster with the quick disconnects.
8. Using wire cutters, remove and discard the cable tie on the thermal unit. Push the air eliminator tubing back through the right side of the product.
9. Lift and rotate the fluid bracket to gain access to the sensor.

   Note - Help guide the tubing to the front of the product to allow better access underneath the fluid bracket.

10. Disconnect the system flow sensor from the cable assembly.
11. Using needle nose pliers, pinch the hose clamps (AM) and remove the tubing from the system flow sensor (Figure 40).

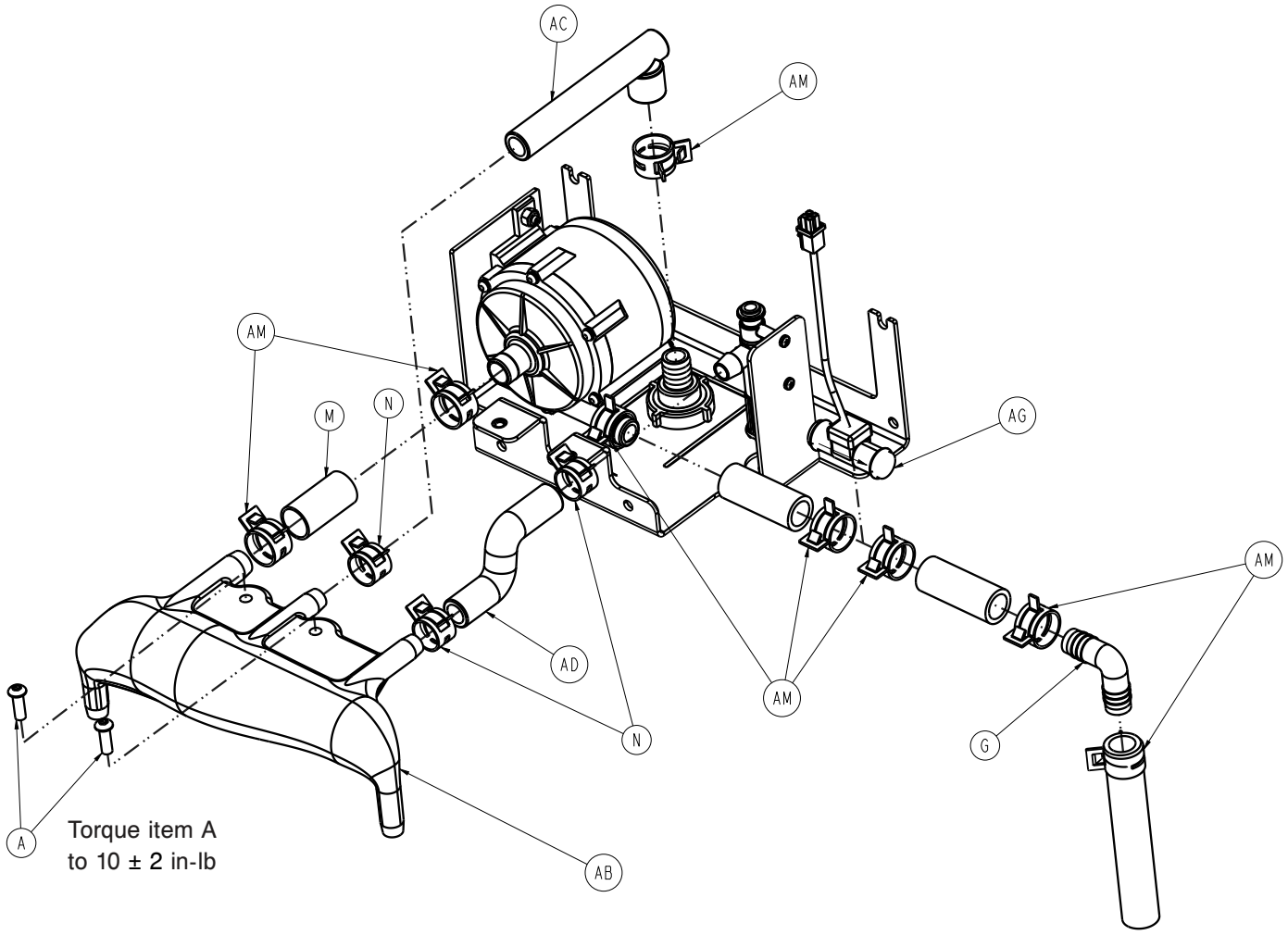


Figure 40 – Hose clamps

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

Supply manifold replacement

Tools required:

- T27 Torx driver
- 5/32” hex wrench

- 7/16” socket
- Ratchet

Procedure:

1. Drain the water from the product. See *Draining water from the controller and hoses* (page 53).
2. Remove the back cover. See *Back cover removal* (page 15).
3. Remove the front cover. See *Front cover removal* (page 16).
4. Remove the side covers. See *Side cover removal, left or right* (page 16).
5. Unplug the power cord from the product.
6. Unscrew the two thumbscrews that secure the display cable to the control assembly. Save the thumbscrews.
7. Unscrew the two thumbscrews that secure the pump cable to the control assembly. Save the thumbscrews.
8. Disconnect both tube lines that are above the front left caster with the quick disconnects.
9. Using a 7/16” socket and ratchet, remove the two locknuts on the back of the control assembly. Save the locknuts.
10. Using a T27 Torx driver, remove the two screws that secure the control assembly to the side panels. Save the screws.
11. Lift and pull out the control assembly. Remove and save the control assembly.

    Note - Guide the control assembly tubing when you remove the control assembly.

12. Using a T27 Torx driver, remove the four screws from the control box cover. Save the screws.
13. Using a T27 Torx driver, remove the screw that secures the power supply bracket to the control assembly bracket. Save the screw.
14. Disconnect the cable connections from the MCB. The ten cable connections are labeled E, F, G, H, J, M, N, L, AG, and AH.
15. Using a T27 Torx driver, remove the two screws (B) (Figure 41) that secure the MCB bracket to the control assembly bracket. Save the screws.

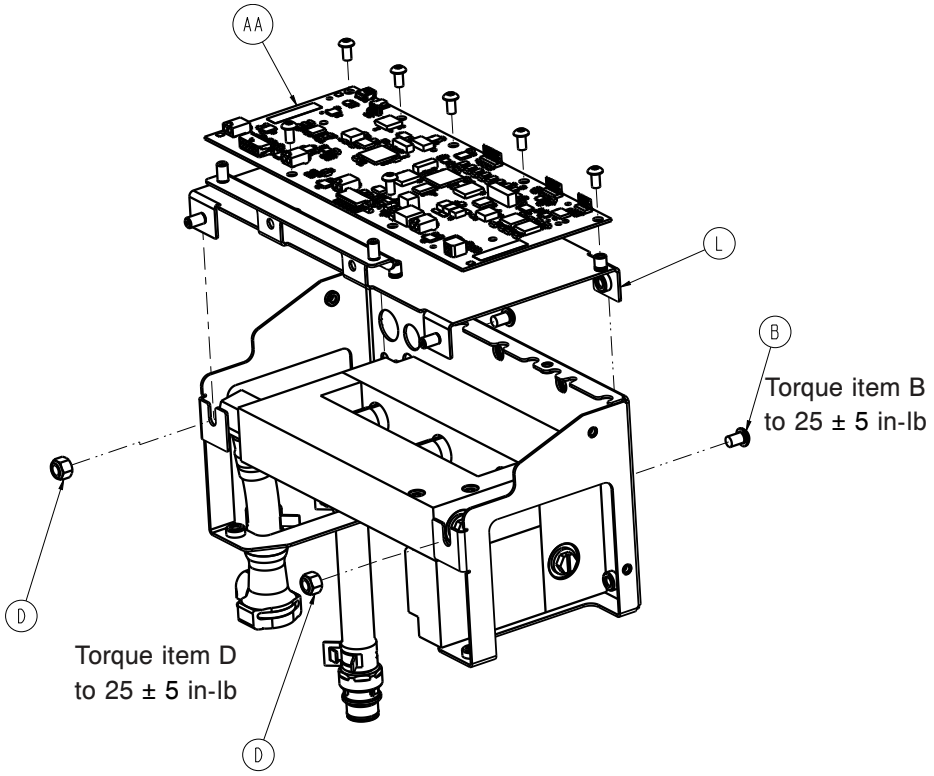


Figure 41 – MCB bracket

16. Using a 7/16” socket and ratchet, loosen the two nuts (D) that secure the MCB bracket to the control assembly bracket.
17. Using a 7/16” socket and ratchet, remove the two nuts that secure the MCB bracket to the power supply bracket. Move the power supply bracket out of your way. Save the nuts.
18. Lift under the MC bracket to move the bracket to the back of the assembly and out of your way.
19. Using a 5/32” hex wrench, remove the four screws (C) that secure the return manifold assembly (N) to the supply manifold assembly (M) (Figure 42). Save the screws.

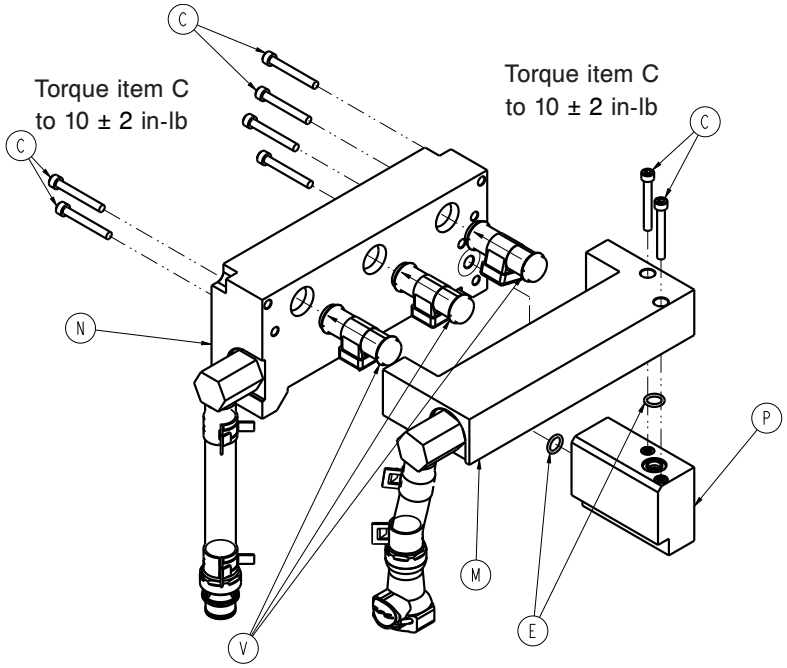


Figure 42 – Manifolds

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

    Note - Verify that all manifold flow sensors remain seated in the return manifold.

21. Discard the supply manifold.
22. Reverse the steps to reinstall.

    Note - Verify that the O-ring (E) is seated between the supply and bypass manifolds when you reinstall.

23. Check for leaks.
24. Perform all test procedures. Complete the *Functional test data sheet* (page 57).
25. Verify proper operation before you return the product to service.

Return manifold replacement

Tools required:

- T27 Torx driver
- 5/32” hex wrench
- 7/16” socket
- Ratchet
- Crescent wrench

Procedure:

1. Drain the water from the product. See *Draining water from the controller and hoses* (page 53).
2. Remove the back cover. See *Back cover removal* (page 15).
3. Remove the front cover. See *Front cover removal* (page 16).
4. Remove the side covers. See *Side cover removal, left or right* (page 16).
5. Unplug the power cord from the product.
6. Unscrew the two thumbscrews that secure the display cable to the control assembly. Save the thumbscrews.

7. Unscrew the two thumbscrews that secure the pump cable to the control assembly. Save the thumbscrews.
8. Disconnect both tube lines from the control assembly with the quick disconnects on the left side.
9. Using a 7/16” socket and ratchet, remove the two locknuts on the back of the control assembly. Save the locknuts.
10. Using a T27 Torx driver, remove the two screws that secure the control assembly to the side panels. Save the screws.
11. Lift and pull out the control assembly. Remove the control assembly from the front of the product.

Note

- Guide the control assembly tubing when you remove the control assembly from the product.

12. Using a T27 Torx driver, remove the four screws from the control box cover. Save the screws.
13. Using a T27 Torx driver, remove the screw that secures the power supply bracket to the control assembly bracket. Save the screw.
14. Disconnect the cable connections from the MCB. The ten cable connections are labeled E, F, G, H, J, M, N, L, AG, and AH.
15. Using a T27 Torx driver, remove the two screws (B) (Figure 43) that secure the MCB bracket to the control assembly bracket. Save the screws.

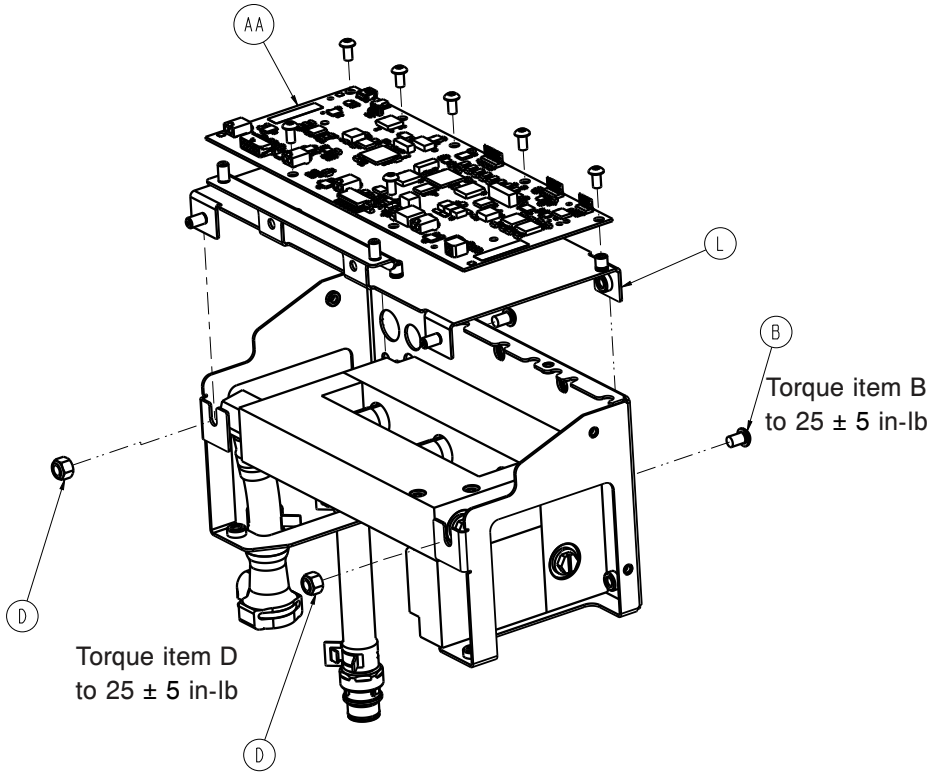


Figure 43 – MCB bracket

16. Using a 7/16” socket and ratchet, loosen the two nuts (D) that secure the MCB bracket to the control assembly bracket.
17. Using a 7/16” socket and ratchet, remove the two nuts that secure the MCB bracket to the power supply bracket. Move the power supply bracket out of the way. Save the nuts.
18. Lift under the MCB bracket to move the bracket to the back of the assembly and out of your way.
19. Using a crescent wrench, remove the six hose connectors (G) and O-rings (E) (Figure 44). Save the hose connectors.

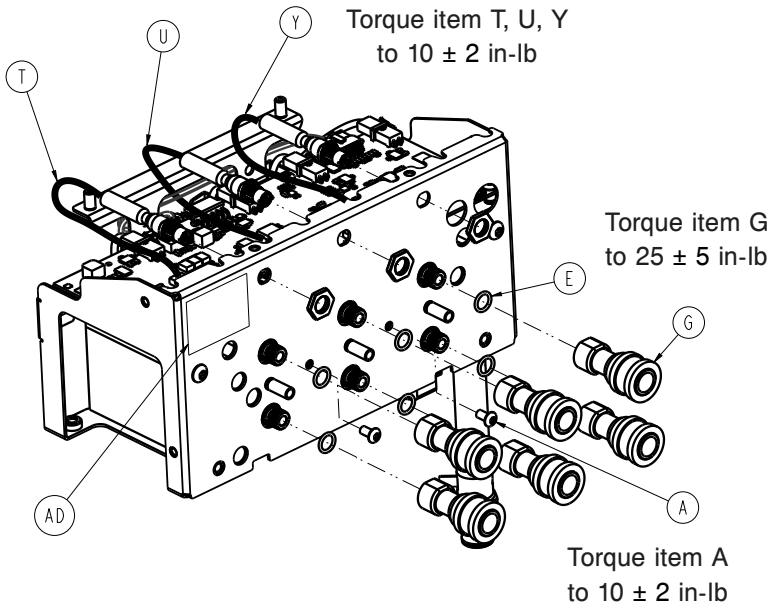


Figure 44 – Hose connectors

20. Disconnect all three manifold flow sensors labeled Port 1, 2, and 3.
21. Remove and discard the manifold block.

    Note - Although you drained the system of water, residual water may be present in the manifold block. When you remove the manifold block, do not allow water to come in contact with the electrical boards.

22. Using a 5/32” hex wrench, remove the six screws (C) that secure the return manifold to the bypass and supply manifolds (Figure 45). Save the screws.

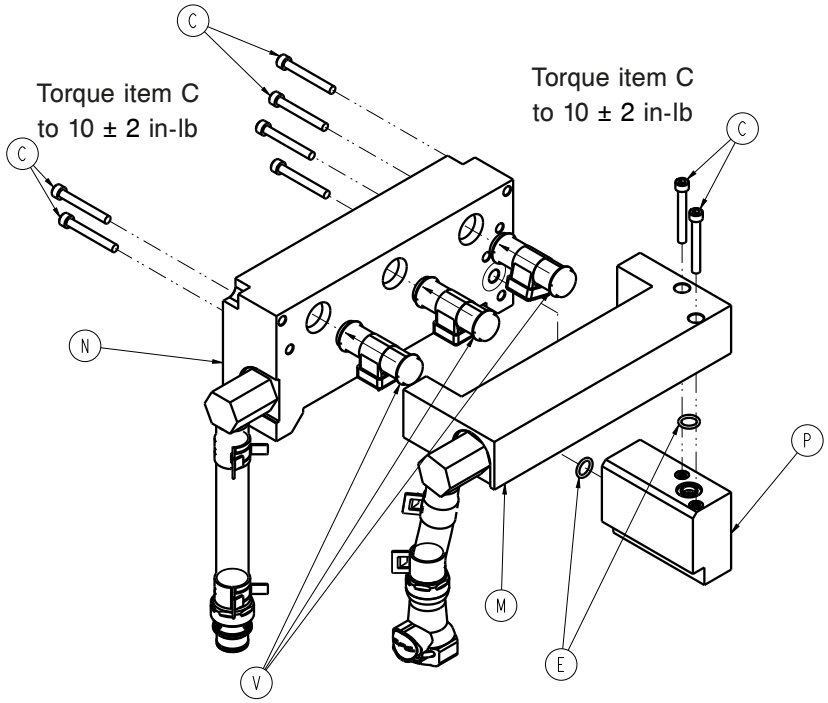


Figure 45 – Manifolds

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

Note - Verify that the O-ring (E) is seated between the return and bypass manifolds when you reinstall.

25. Check for leaks.
26. Perform all test procedures. Complete the *Functional test data sheet* (page 57).
27. Verify proper operation before you return the product to service.

Storing the controller

Store this product when equal to or greater than seven days without continuous use. Dry the controller and all components before you store the product. Drain the hoses before you store them.

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, see the Altrix Operations Manual.

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 a 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 46).
3. Unplug the power cord from the wall outlet.
4. Store the power cord with the management straps (Figure 46).



Figure 46 – 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 or drain pan.
2. Remove the reservoir and pull up on the controller drain plug (A) to open the drain (Figure 47).

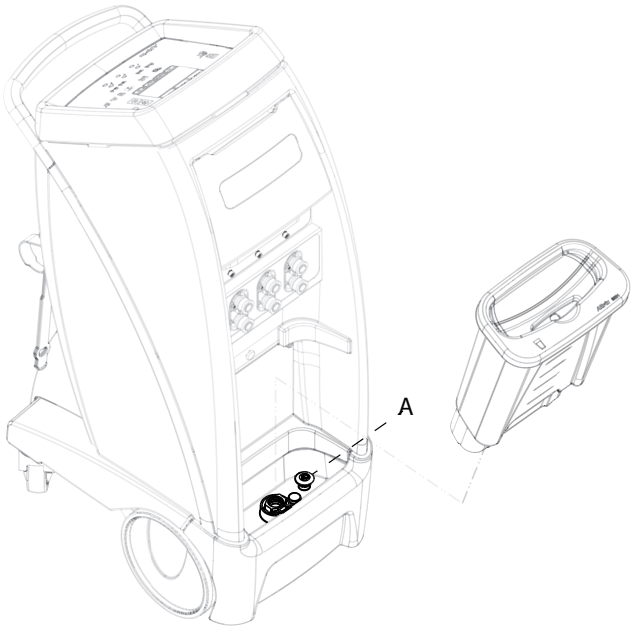


Figure 47 – Drain plug

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 48).

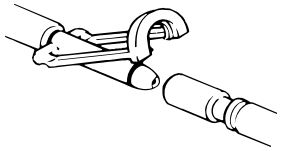


Figure 48 – Clik-Tite open

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. Empty the water from the drain pan, if applicable.
8. 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 power cord from the wall outlet.
2. Remove the thermal transfer device from the patient.
3. Open the clamps on the hoses and thermal transfer devices, if applicable. See Figure 10.
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* (page 14).
7. See *Disconnecting the insulated hoses* (page 15).
8. See *Storing the power cord and hoses* (page 52).
9. Discard the disposable thermal transfer devices based on your local waste management protocol.

Draining water from the reservoir

To drain the water from the reservoir:

1. See *Removing and replacing the reservoir* (page 13).
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.

Test equipment

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

- TPT10 Flowmeter - Temperature Tester (+/- 0.1L accuracy) (8001-999-001)
- Model 4000 Thermometer (+/- 0.05° 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

Remove the product from service before you perform the preventive maintenance inspection. Check all items listed during annual preventive maintenance for all 3T Medical products. You may need to perform preventive maintenance checks more often based on your level of product usage. Service only by qualified service technician.

Note - Complete functional checks as indicated in the maintenance manual.

Inspect all of the following items:

_____ All fasteners secure

_____ 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

_____ LCD operational

_____ Touch screen operational

_____ Wheels for smooth operation

_____ Rear caster wheels for free swivel action

_____ Both rear wheels lock secure when applied

_____ Front and rear wheels are not loose or wobbly

_____ Battery backup, functional check

_____ Alarm system - visual and audible, functional check

_____ High temp cutout checks

_____ Water temperature and flow verification, functional check

_____ Probe resistance, functional check

_____ Clear RFU codes

_____ Ground impedance not more than 100mΩ (milliohms)

_____ Current leakage not more than 300 (microamps)

_____ Integrity of all clamps and clamped joints located in the air elimination circuit

Replace the following on an annual basis:

_____ 9 V battery

_____ Condenser inlet filter

_____ Air eliminator hose

_____ Collars

_____ Inlet filter

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)	
	1471 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)	
	1471 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 milliohms			
300uA in normal condition			

Installation checks completed by:		
Printed name	Signature	Date

LCD functionality, testing the visual and audible alarms

Test the visual and audible alarms before you place the product into service.



Stand-by



Back



Next or more

Note - You need Clik-Tite, Colder style hoses with adaptor hose, or loop back hoses 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 3T Medical is displayed on the screen, continue to hold the **Stand-by** button. Release the **Back** button and press the **Next or more** button.
4. When you see **Preparation in progress**... on the screen, 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 displays in Figure 49, Figure 50, and Figure 51.
   c. Verify the fluid controller light test illuminates, mirroring the display in Figure 52.

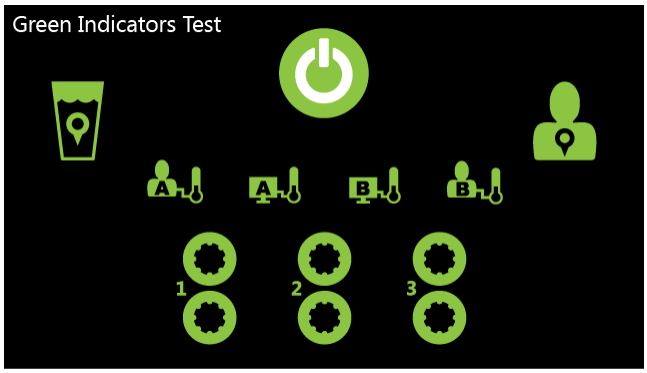


Figure 49 – Green indicator test

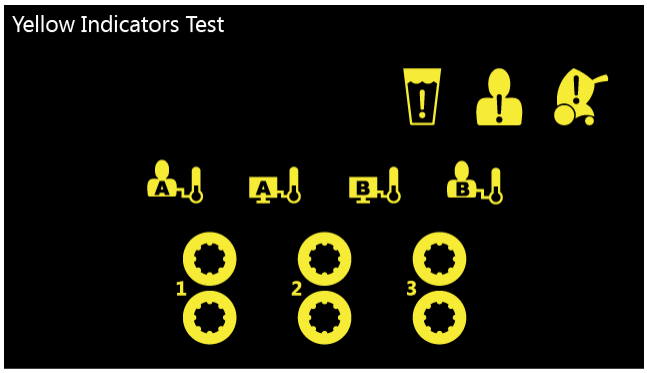


Figure 50 – Yellow indicator test

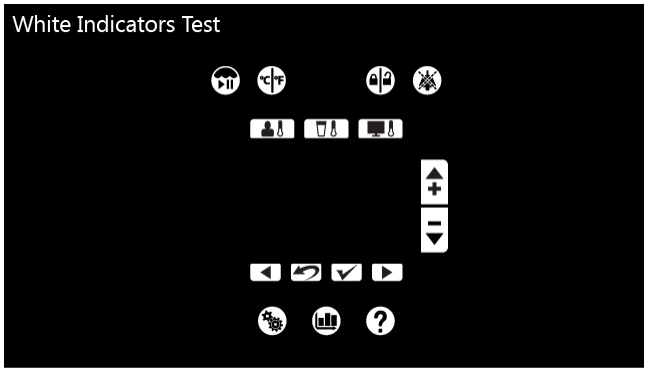


Figure 51 – White indicator test

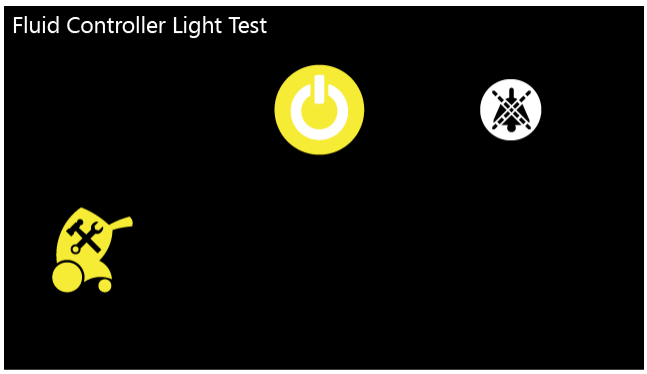


Figure 52 – Fluid indicator test

9. Once verified, tap the **Back** button.
10. Complete the *High thermal cutout test* (page 60).

High thermal cutout test

Complete this test after the LCD indicator tests.

Note - You need Clik-Tite, Colder style hoses with adaptor hose, or loop back hoses to run this procedure.

1. Tap the High Thermal Cutout icon.
2. Tap **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 (Figure 53).

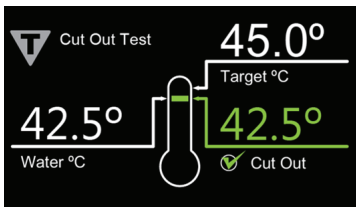


Figure 53 – Cut out test pass

4. Power cycle the product after the test is complete. The product will indicate to unplug the power cord from the wall outlet for a minimum of ten seconds.
5. Plug the power cord into a wall outlet after ten seconds.

Probe port resistance, flow, and water temperature verification

Procedure:

1. Connect two 12” loop back hoses (A) to ports 2 and 3 (Figure 54).

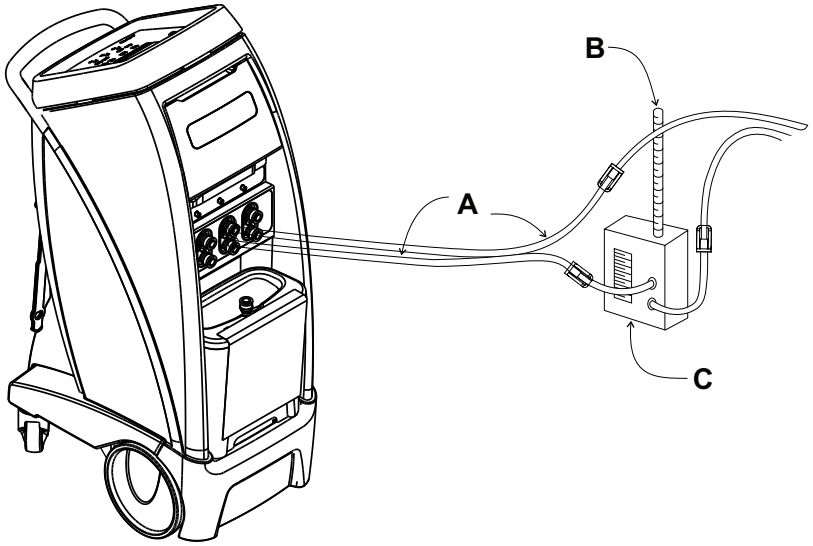


Figure 54 – Connect to controller

2. Connect the Clik-Tite hose or the Colder style connector hose to the adaptor hose on port 1 and to the TPT10 flow meter (C) (Figure 54).

   Note - Verify proper hose connection on the supply and return line of the TPT10 flow meter and the controller.

3. Fill the TPT10 thermometer well (D) with sterile distilled water (Figure 55).

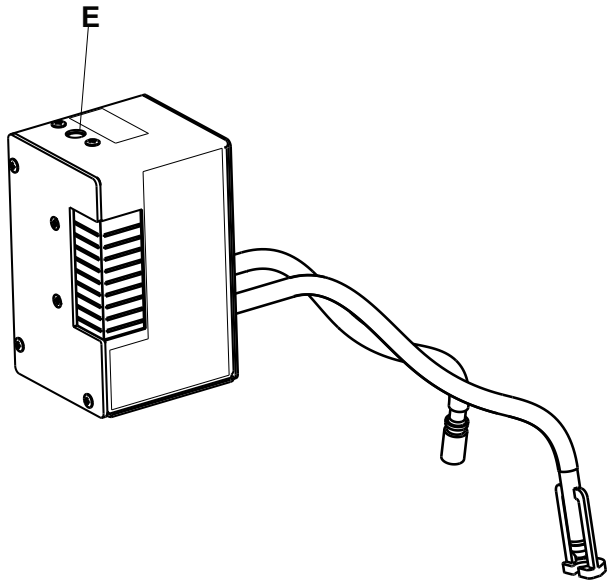


Figure 55 – TP10 flow meter

4. Turn on the reference temperature thermometer and insert the temperature probe (B) into the hole (E) (Figure 56). See temperature probe (B) installed (Figure 54).

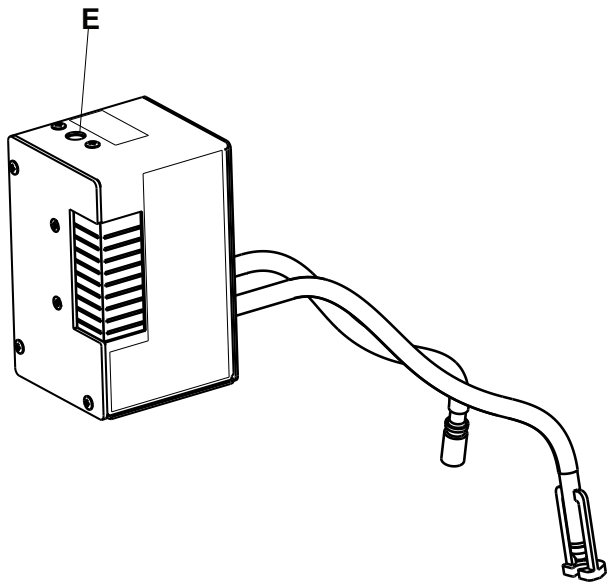


Figure 56 – Insert temperature probe

5. Verify the reservoir has at least two liters of sterile distilled water.
6. Plug the power cord 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 3T Medical 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** and then tap **Confirm**.
12. Using a RS-201 resistance box, or equivalent, set the resistance to 1355 ohms.
13. Connect the RS-201 resistance box with the 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 RS-201 resistance box to 1471 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 RS-201 resistance box to 1667 ohms.
18. Verify that Patient A reads 89.6° F ±0.5° F (32.0° C ± 0.3° C).
19. Connect the RS-201 resistance box to port probe B.
20. Repeat steps 12-18 on port probe B, Patient B.
21. Remove the RS-201 resistance box and the 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 power cord from the wall outlet and remove the test equipment from the product.
28. Verify proper operation before you return the product to service.

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 driver
- T25 Torx driver
- 7/16” socket
- Needle nose pliers
- Wire cutters

Procedure:

1. Apply the wheel locks.
2. Unplug the power cord from the wall outlet.
3. Using a T27 Torx driver, remove the six screws that secure the back cover to the frame. Save the screws.
4. Pull out and down 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 back cover.
6. Remove and save the water reservoir.
7. Using a T27 Torx driver, remove the two screws that secure the bumper inside the water cabin tray. Save the screws.
8. Lift the left corner of the tray while you push on the front cover to remove the bumper. Save the bumper.
9. Using a T27 Torx driver, remove the top two screws that secure the front cover inside the storage compartment. Save the screws.
10. Using a T25 Torx driver, remove the three screws between the connection ports. Save the screws.
11. Using a 7/16” socket, remove the two nuts that secure the front cover to the product. Save the nuts.
12. Unscrew the drain knob by turning the drain knob counterclockwise.
13. Remove and save the drain knob.
14. Pull out on the bottom of the front cover so it lowers down. Remove and save the front cover.

    Note - Removal of the front cover allows you to gain access to the screws that secure the right side cover to the main frame.
15. Using a T25 Torx driver, remove the five screws that secure the right side cover to the main frame. Save the screws.
16. Remove the side cover, rotate the top, lift, and then tip the side cover to the back. Remove and save the side cover.
17. Complete the following.
    a. *Condenser inlet filter replacement* (page 64).
    b. *9 volt battery replacement* (page 64).
    c. *Air eliminator hose assembly replacement* (page 64).
18. Reverse the steps to reinstall.
19. Verify proper operation before you return the product to service.

Air eliminator hose assembly replacement

Procedure:

1. Using needle nose pliers, squeeze the hose clamp that secures the bottom tube of the air eliminator hose to the nylon fitting and pull up on the hose.
2. Using wire cutters, remove and discard the cable tie that secures the hose to the frame.
3. Remove and discard the air eliminator hose assembly.
4. Reverse steps to reinstall new air eliminator hose assembly (8001-700-048).

9 volt battery replacement

Procedure:

1. Push the battery cover to the left and remove.
2. Remove and discard the battery following your local waste disposal policy.
3. Reverse steps to install 9V lithium battery (0058-372-000).

Condenser inlet filter replacement

Procedure:

1. Remove and discard the condenser inlet filter from the back of the cover.
2. Reverse steps to install the new condenser inlet filters (8001-000-361 and 8001-000-362).

Quick reference replacement parts

These accessories may be available for use with your product. Confirm availability for your configuration or region. Call 3T Medical Customer Service: (734)-525-9580.

Name		Number
9 V battery		0058-372-000
12 amp circuit breaker		0059-271-000
Altrix TPT-10 service tool		8001-999-001
Display assembly		8001-000-510
Filter, condenser inlet		8001-000-361
Filter, condenser inlet, small		8001-000-362
Fixed wheel assembly		8001-000-131
Flow sensor assembly		8001-065-887
Fluid management board (FMB)		8001-500-810
Foam, condenser inlet		8001-000-403
Kit, air eliminator hose		8001-700-048
Kit, PM service		8001-700-000
Main control board (MCB)		8001-400-800
Manifold assembly		8001-100-420
Pump		0048-260-000
Refrigeration fan		8001-065-377
Run capacitor		0059-789-000
Start capacitor		0059-788-000
Swivel caster		700003342177
Thermal product	100V 50/60 Hz	8001-100-311
	120V 60 Hz	8001-120-311
	220V 60 Hz	8001-220-310
	220–240V 50 Hz	8001-230-310

Power cord			
Power cord type	**Length**	**Gauge**	**Part number**
B Japan only	180 in.(15 ft)	2.0 mm²	0039-242-000
B	180 in.(15 ft)	14 AWG	0039-232-000
D	180 in.(15 ft)	1.0 mm²	0039-243-000
E	180 in.(15 ft)	1.0 mm²	0039-237-000
E/F	180 in.(15 ft)	1.0 mm²	0039-231-000
G	180 in.(15 ft)	1.0 mm²	0039-234-000

Power cord			
Power cord type	**Length**	**Gauge**	**Part number**
H	180 in.(15 ft)	1.0 mm²	0039-244-000
I	180 in.(15 ft)	1.0 mm²	0039-235-000
J	180 in.(15 ft)	1.0 mm²	0039-239-000
K	180 in.(15 ft)	1.0 mm²	0039-240-000
L	180 in.(15 ft)	1.0 mm²	0039-238-000
M	180 in.(15 ft)	1.0 mm²	0039-246-000
N	180 in.(15 ft)	1.0 mm²	0039-236-000

Troubleshooting

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, push back in to reset. 3. Verify 24VDC input LED is green on D89 of FMB. 3.1. If present, see User Interface Screen Nonresponsive. 3.2. If not present, go to step 4. 4. Check for 24VDC is present on connector T of FMB pin 1 and pin 2. 4.1. If voltage is not present, replace the power supply. 4.2. If voltage is present, check FH7 fuse for continuity. If OK, replace the 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 *Preventive Maintenance section for access.* 3.1. Does manifold temperature increase? If yes, cycle power on product and repeat steps 1 and 2. 3.2. Does manifold temperature remain constant? If yes, go to step 4. 4. Verify 120VAC on Connector P (pin 1 and pin 3) on FMB. 4.1. If voltage is present, go to step 5. 4.2. If voltage is not present, see *No power to product*. 5. Verify continuity of FH12 and FH13 fuses on the FMB. 5.1. If no continuity, replace as necessary. 5.2. If continuity, go to step 6. 6. Confirm product is in the warming mode and check for 120VAC between TP123 and a ground test point. 6.1. If voltage is present, replace the heater assembly. See *Heater Assembly replacement procedure.* 6.2. If voltage is not present, replace the FMB, see *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 *Preventive Maintenance section for access.* 2.1. Does the manifold temperature decrease? If yes, repeat step 1. 2.2. Does the manifold temperature remain constant? If yes, go to step 3. 3. Verify 120VAC on Connector P (pin 1 and pin 3). 3.1. If voltage is present, go to step 4. 3.2. If voltage is not present, see *No power to product.* 4. Verify refrigeration valve LEDs are flashing on D145 and D146 of FMB. 4.1. If LEDs are flashing, the compressor motor is running. Replace the thermal unit or inspect product for refrigeration leaks. A thermal unit needs to be replaced by certified technician only. 4.2. If LEDs are 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 labeled L (brown) and N (blue). 5.1. If voltage is present, verify cabling on relay. Replace the relay. 5.2. If voltage is not present, verify cabling and connection on control box, replace the FMB.

Problem/failure	Action/solution
Restricted or no water flow	1. Perform internal disinfection see *Operations Manual for disinfection procedure*. 2. Remove the air filter assembly from the air elimination tubing path and observe flow. 2.1. If proper flow is present, replace the filter assembly with the air elimination filter assembly (8001-700-048). 2.2. If problem persists, proceed to the next step. Reinstall the air elimination filter assembly. 3. Enter maintenance screen, confirm system state tab. Observe flow readouts on P1, P2, P3, and system. Verify a minimum of .8L/ports and 1.0L/system. Determine issue with system or single port. 3.1. 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. 3.1.1. If voltage is present, replace the flow sensor. 3.1.2. If voltage is not present, replace the cable assembly. 3.2. If all the hose ports have flow issues, go to step 4. 4. Verify 24VDC is present on the FMB between TP34 and a ground test point. 4.1. If present, verify the pump cable connection at Connector Y on control box assembly. Go to step 5. 4.2. If not present, replace the FMB. 5. Verify 24VDC on the yellow and gray wires of the pump cable assembly. 5.1. If present, replace the pump assembly. 5.2. If not present, replace the pump cable assembly.

Problem/failure	Action/solution
No output from patient probe A or probe B	1. Verify product is in auto mode with proper connection and correct patient probe adaptor attached. If yes, go to step 2. 2. Enter maintenance screen, confirm System State tab. Observe outputs from patient temperature port A or port B with adaptor cable and probe. See *Preventive Maintenance section for access.* 2.1. Confirm an output from one patient temperature port cable or neither, and go to step 3. 3. Verify 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. 4.1. If present, determine which patient port has no output and replace as necessary. 4.2. If not present, go to step 5. 5. Verify 24VDC input from FMB between TP19 and a ground test point. 5.1. If present, replace the MCB. 5.2. If not present, verify the connection on MCB to FMB cable assembly from J7 on MCB to J4 on FMB. If connected, go to step 6. 6. Verify the continuity on FMB to MCB cable. 6.1. If no continuity, replace the FMB to MCB cable. 6.2. If continuity, replace the FMB.

Problem/failure	Action/solution
User interface screen nonresponsive	1. Does the power icon pulse green? 1.1. If yes, hold the power icon for at least two seconds. 1.1.1. Check for connection or top ribbon cable damage on the back of the user interface assembly. If connected, see *User Interface Replacement*. 1.2. If no, see *no power to product* or go to step 2. 2. Verify the display cable connection at the display assembly connector D and the control box assembly connector W. 3. Verify 24VDC to UIB LED is green on the FMB. 3.1. If present, go to step 4. 3.2. If not present, see *No power to product*. 4. Verify 24VDC LED is present on the CCB. 4.1. If not present, replace the display cable assembly. 4.2. If present, go to step 5. 5. Verify CPU Stat is flashing on the CCB. 6. Verify 3.3VDC and 15VDC test points on the UIB. 6.1. If present, replace the UIB. 6.2. If not present, check the FMB and CCB connection. Replace the CCB.
Problem/failure	**Action/solution**
RFU code is present	1. Enter the Maintenance Screen. See *Preventive Maintenance procedure for access* and clear the RFU code. If the error code persists, go to step 2. 2. See *Remove from use codes* (page 72) for troubleshooting steps.

Remove from use code entry

1. In the Remove from Use screen (Figure 57), tap the **?** button to see the Review RFU Code and Clear screen (Figure 58).

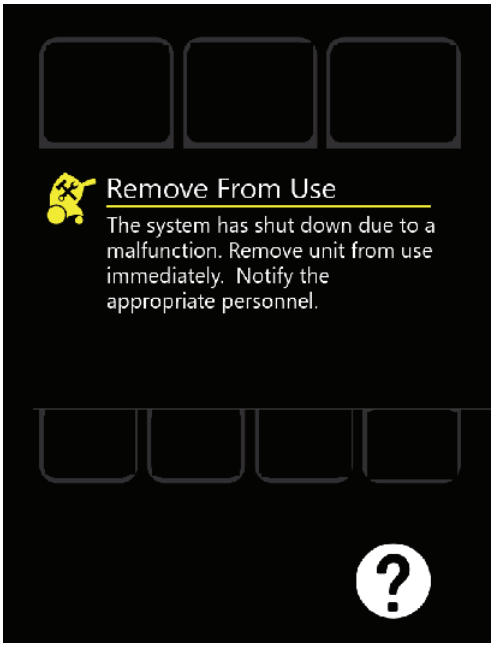


Figure 57 – Remove from use

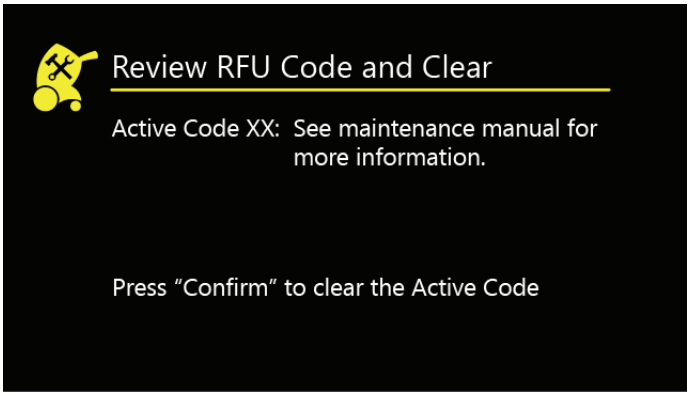


Figure 58 – Review RFU Code and Clear

2. See the *Remove from use codes* (page 72).
3. Press **Confirm** to clear the Active Code.

Remove from use codes

Acronyms	Description
ALU	Arithmetic logic unit
CAN	Controller-area network
CCB	Controller communications board
FMB	Fluid management board
FMC	Fluid management controller
HB	Heartbeat
LCD	Liquid crystal display

Acronyms	Description
LED	Light emitting diode
MC	Main controller
MCB	Main control board
RFU	Remove from use
UI	User interface
UIB	User interface board

Code	Description	Troubleshooting
1	Invalid command received consecutively too many times	1. Verify the cable connection between the MCB, the FMB, and the UIB. 2. Replace the CCB or the MCB.
2	Water temp is out of spec, possibly open/short	1. Check for an internal water leak. 2. Verify the cable connection. 3. Replace the manifold water temperature sensor. 4. Replace the MCB.
3	Main controller internal microprocessor checksum error	1. Contact technical support. 2. Replace the MCB.
5	Too many MC CPU resets due to watchdog timeout	1. Contact technical support. 2. Replace the MCB.
6	Maintenance mode high cutout test failed	1. Verify the safety temperature sensors for accuracy. Replace if necessary. If the safety temperature sensors work and are accurate, go to the next step. 2. Verify the manifold temperature sensors for accuracy. Replace if necessary. If the manifold temperature sensors work and are accurate, go to the next step. 3. Check for an occluded flow. 4. Verify the flow sensors for accuracy. Replace if necessary. If the flow sensors work and are accurate, go to the next step. 5. Verify pump operation. 6. If the condition persists, contact technical support.
7	The MC did not receive the CAN HB from the BUI	1. Verify the cable connection between the MCB, the FMB, and the UIB. 2. If the condition persists after clearing, replace the CCB or MCB.

Code	Description	Troubleshooting
10	MC controller detected FMC safety temp delta out of range	1. Verify the safety temperature sensors for accuracy. Replace if necessary. If the safety temperature sensors work and are accurate, go to the next step. 2. Verify the manifold temperature sensors for accuracy and check the cable connections. Replace if necessary. If the manifold temperature sensors work and are accurate, go to the next step. 3. Verify the flow sensors for accuracy and check the cable connections. Replace if necessary. If the flow sensors work and are accurate, go to the next step. 4. Verify pump operation and check the cable connections. Replace if necessary.
11	MC patient calibration resistors out of range	1. Check for an internal water leak. 2. Replace the MCB.
12	FMC is counting the AC lost time, but product is still running	1. Verify the AC power detection input. 2. Replace the FMB.
13	MC reset unexpectedly too many times in succession	If the condition persists, replace the MCB.
14	MC had an error during initialization	Replace the MCB.
17	The MC did not receive the CAN HB from the FMC	1. Verify the cable connection between the MCB, the FMB, and the UIB. 2. If the condition persists after clearing, replace the MCB.
18	PTC reset unexpectedly too many times in succession	If the condition persists, replace the MCB.
19	PTC communication had too many checksum errors in succession	1. Contact technical support. 2. Replace the MCB.
20	PTC communication error, for example, timeout or com version error	1. Contact technical support. 2. Replace the MCB.
21	The MC failed the ALU check	Replace the MCB.
22	A critical variable in the MC in RAM is corrupt	If the condition persists, replace the MCB.
23	Manifold water temp calibration resistors out of range	1. Check for an internal water leak. 2. Replace the MCB.

Code	Description	Troubleshooting
27	Control box tachometer failure	1. Verify the control box fan operation. 2. If the control box fan does not rotate, replace the fan. 3. Verify the tachometer feedback in the maintenance mode. 4. If the RPM is zero, replace the control box fan. 5. If the condition persists after you replaced the control box fan, replace the MCB.
30	FMC controller internal microprocessor checksum error	1. Contact technical support. 2. Replace the FMB.
31	FMC controller microprocessor watchdog reset error	1. Contact technical support. 2. Replace the FMB.
32	FMC controller CAN HB lost error	Verify the cable connection between the MCB, the FMB, and the UIB.
33	FMC controller detected a safety-temp over-temp condition	1. Verify the safety sensors for accuracy. Replace if necessary. 2. Contact technical support. 3. If the condition persists, replace the FMB.
34	FMC controller detected a safety-temp under-temp condition	1. Verify the safety sensors for accuracy. Replace if necessary. If the safety sensors work and are accurate, go to the next step. 2. Contact technical support. 3. If the condition persists, replace the FMB.
35	FMC controller detected a safety-temp over-delta-temp condition	1. Verify the safety sensors for accuracy. Replace if necessary. If the safety sensors work and are accurate, go to the next step. 2. Contact technical support. 3. If the condition persists, replace the FMB.
37	FMC controller detected a safety-temp open circuit condition	1. Check the safety sensor connections. 2. Replace the safety sensors. 3. If the condition persists, replace the FMB.
38	FMC controller detected a safety-temp short circuit condition	1. Check the safety sensor connections. 2. Replace the safety sensors. 3. If the condition persists, replace the FMB.
39	FMC controller detected a calibration resistors out of range condition	1. Check for an internal water leak. 2. Replace the FMB.

Code	Description	Troubleshooting
40	FMC controller detected the hardware RFU circuit latched	1. Verify the safety sensors for accuracy. Replace if necessary. If the safety sensors work and are accurate, go to the next step. 2. If the condition persists, replace the FMB.
41	FMC controller detected a fan speed on error condition	1. Verify the condenser fan operation. 2. If the condenser fan does not rotate, replace the condenser fan. 3. Verify the tachometer feedback in the maintenance mode. 4. If the RPM is zero, replace the condenser fan. 5. If the condition persists after you replaced the condenser fan, replace the FMB.
42	FMC controller detected a heater relay stuck on	Replace the FMB.
43	FMC controller detected a heater relay stuck off	Replace the FMB.
44	FMC controller detected a heater TRIAC stuck on	Replace the FMB.
45	FMC controller detected a heater TRIAC stuck off	Replace the FMB.
46	FMC controller detected a compressor relay stuck on	Replace the FMB.
47	FMC controller detected a compressor relay stuck off	Replace the FMB.
48	FMC controller detected a Compressor TRIAC Stuck On	Replace the FMB.
49	FMC controller detected a Compressor TRIAC Stuck Off	Replace the FMB.
50	FMC controller detected an RCV stepper motor fault condition	1. If the condition persists, replace the RCV. 2. If the condition persists after you replaced the RCV, replace the FMB.
51	FMC controller detected an AC power loss condition	1. Check the AC power connection on the FMB. 2. Replace the FMB.
52	FMC controller detected a DC power loss condition	Replace the FMB.
54	FMC controller has detected the pump safety latch has been activated	1. Verify the pump operation. 2. If the condition persists, replace the pump. 3. If the condition persists after you replaced the pump, replace the FMB.
56	FMC controller has detected a backup battery low condition	1. Check the housing is fully seated. 2. Check the connection on the FMB. 3. Replace the battery.

Code	Description	Troubleshooting
57	FMC controller detected a refrigerant-temp out of range condition	1. Verify the refrigerant temperature sensors for accuracy. Replace if necessary. If the refrigerant temperature sensors work and are accurate, go to the next step. 2. If the condition persists, replace the FMB.
59	FMC controller detected an onboard-temp out of range condition	1. Verify the onboard temperature sensors for accuracy. Replace if necessary. If the onboard temperature sensors work and are accurate, go to the next step. 2. If the condition persists, replace the FMB.
60	FMC controller detected an onboard-temp high temperature level condition	1. Verify the onboard temperature sensors for accuracy. Replace if necessary. If the onboard temperature sensors work and are accurate, go to the next step. 2. Verify the control box fan operation. Replace if necessary. If the control box fan works, go to the next step. 3. If the condition persists, replace the FMB.
61	FMC reset unexpectedly too many times in succession	If the condition persists, replace the FMB.
62	FMC controller detected a pump over-current condition	1. Verify the pump operation. Replace if necessary. If the pump works, go to the next step. 2. If the condition persists, replace the FMB.
63	FMC failed the ALU check	Replace the FMB.
64	FMC controller detected the 12-volt supply out of range condition	Replace the FMB.
65	FMC controller detected the 12-volt boost out of range condition	Replace the FMB.
66	FMC controller detected a safety-temp out of range condition < 0° C	1. Verify the safety temperature sensors for accuracy. Replace if necessary. If the safety temperature sensors work and are accurate, go to the next step. 2. If the condition persists, replace the FMC.
67	FMC controller detected a safety-temp out of range condition > 50° C	1. Verify the safety temperature sensors for accuracy. Replace if necessary. If the safety temperature sensors work and are accurate, go to the next step 2. If the condition persists, replace the FMC.
80	UI internal microprocessor checksum error	1. Contact technical support. 2. Replace the CCB.

Code	Description	Troubleshooting
81	Too many UI CPU resets due to watchdog timeout	1. Contact technical support. 2. Replace the CCB.
82	Mode change requests rejected twice within 12 hours	1. Verify the cable connection between the MCB, the FMB, and the UIB. 2. Replace the CCB or the MCB.
83	UI stored parameters do not match, NVM corrupted	Replace the CCB.
84	The BUI did not receive the CAN HB from the MC	1. Verify the cable connection between the MCB, the FMB, and the UIB 2. Replace the CCB or the MCB.
85	I2C interface malfunction on the UIB	1. Replace the UIB. 2. If the condition persists, replace the CCB.
86	CAN bus connection failed	1. Verify the cable connection between the MCB, the FMB, and the UIB. 2. Replace the CCB.
87	BUI reset unexpectedly too many times in succession	1. Contact technical support. 2. If the condition persists, replace the CCB.
88	The BUI failed the ALU check	Replace the CCB.
89	The BUI detected internal errors and cannot continue	1. Contact technical support. 2. Replace the CCB.
90	The BUI has run into errors with the SPI bus and cannot continue	Replace the CCB.

Technical error code

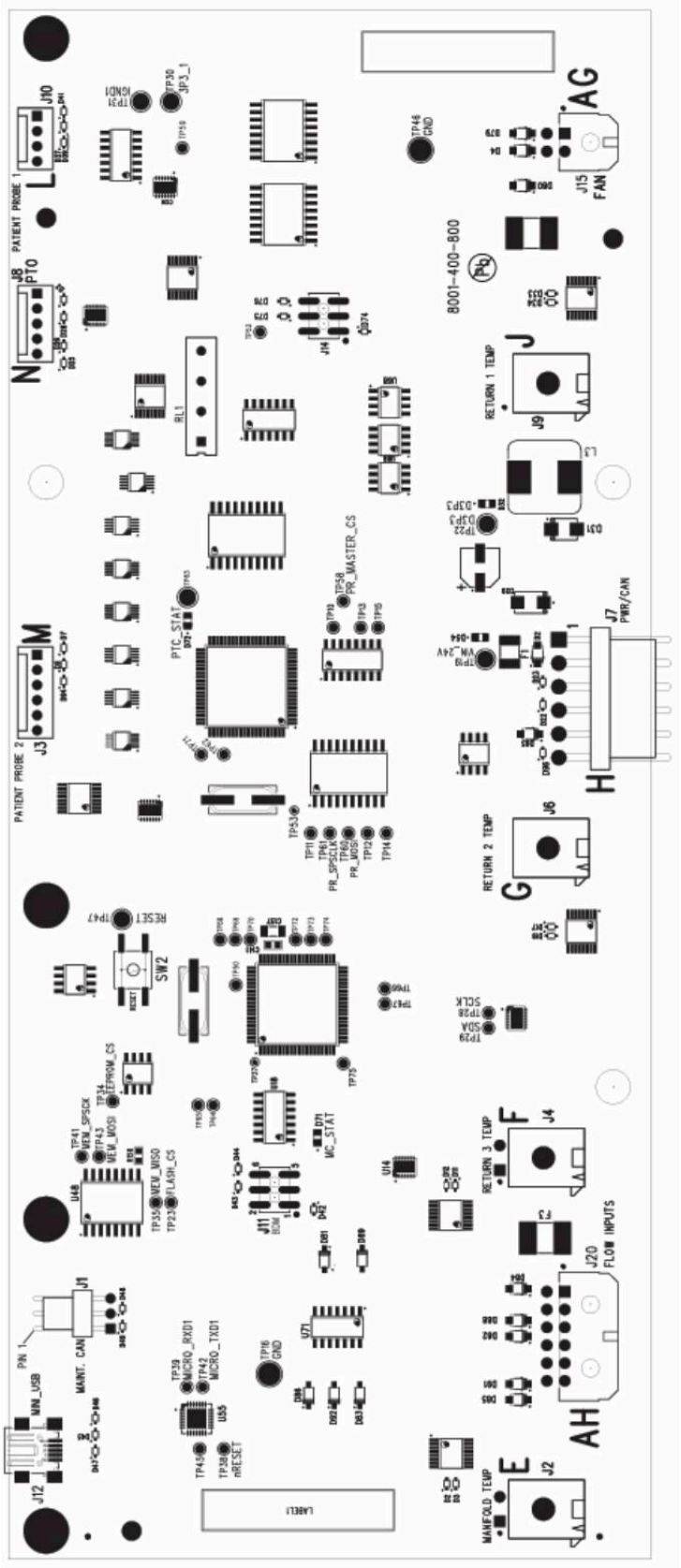
Code	Description	Troubleshooting
130	MC Stored parameters do not match, NVM corrupted	Replace the MCB after too many occurrences of TEC.
131	MC more than 5 consecutive records in history corrupted	Replace the MCB after too many occurrences of TEC.
133	MC had to restore a critical value in RAM from EEPROM	Replace the MCB after too many occurrences of TEC.
134	BUI has requested an invalid mode while in preparation mode	For information only.
135	MC has encountered an internal error	For information only.
160	FMC controller stored parameters do not match, NVM corrupted	Replace the FMB after too many occurrences of TEC.

Code	Description	Troubleshooting
161	FMC controller has detected a fan speed off error condition	1. Verify the thermal unit fan operation. Replace if necessary. If the thermal unit fan works, go to the next step. 2. If the condition persists, replace the FMB.
162	FMC controller stored RCV positions do not match	Replace the FMB after too many occurrences of TEC.
163	FMC controller detected the 12-volt boost out of range condition	Replace the FMB.
190	UI Stored parameters do not match, NVM corrupted	Replace the CCB after too many occurrences of TEC.
191	UI has detected an internal error	Replace the CCB after too many occurrences of TEC.
192	UI has detected an error in the CAN	For information only.
193	UI has detected an error in the I2C	Replace the CCB after too many occurrences of TEC.
194	UI has detected an error in the SPI	Replace the CCB after too many occurrences of TEC.
195	UI has detected invalid communication from MC or command processor	For information only.

Main control board (MCB) assembly

8001-400-800 (Contact customer service for revision)

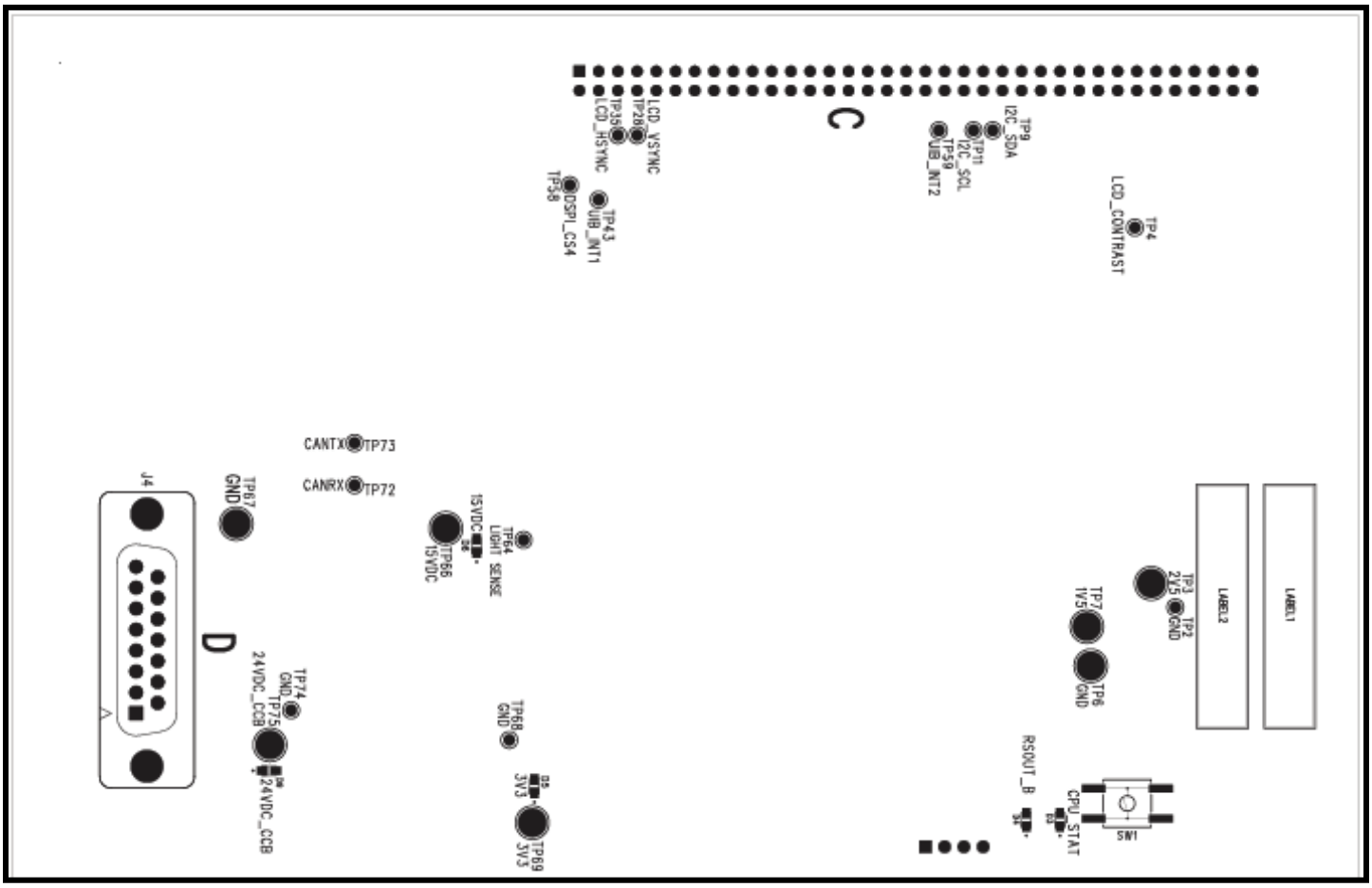
Cable location and test point	Voltage	Positive lead	Negative lead	Description
D54	+24VDC	TP19	TP18 GND	+24VOC input from FMB
D72	+3.3VDC	TP63	TP31 GND	+3.3VOC isolated patient probes
D32	+3.3VDC	TP22	TP46 GND	+3.3VOC main LED


J10
PATENT PROBE 1
J8
PT0
J3
PATIENT PROBE 2
J1
MANT. CAN
J12
MINI_USB
J15
FAN
J9
RETURN 1 TEMP
J6
RETURN 2 TEMP
J4
RETURN 3 TEMP
J2
MANIFOLD TEMP
J20
FLOW INPUTS
J7
PWR/CAN
8001-400-800
SW2
RESET
PTC_STAT
PR_MASTER_CS
PR_SPSCLK
PR_MOSI
EEPROM_CS
MEM_MOSI
FLASH_CS
MICRO_RXD1
MICRO_TXD1
nRESET
SCLK
SDA
MC_STAT
VIN_24V
GND
LABEL1

Controller communications board (CCB) assembly

8001-300-830 (Contact customer service for revision)

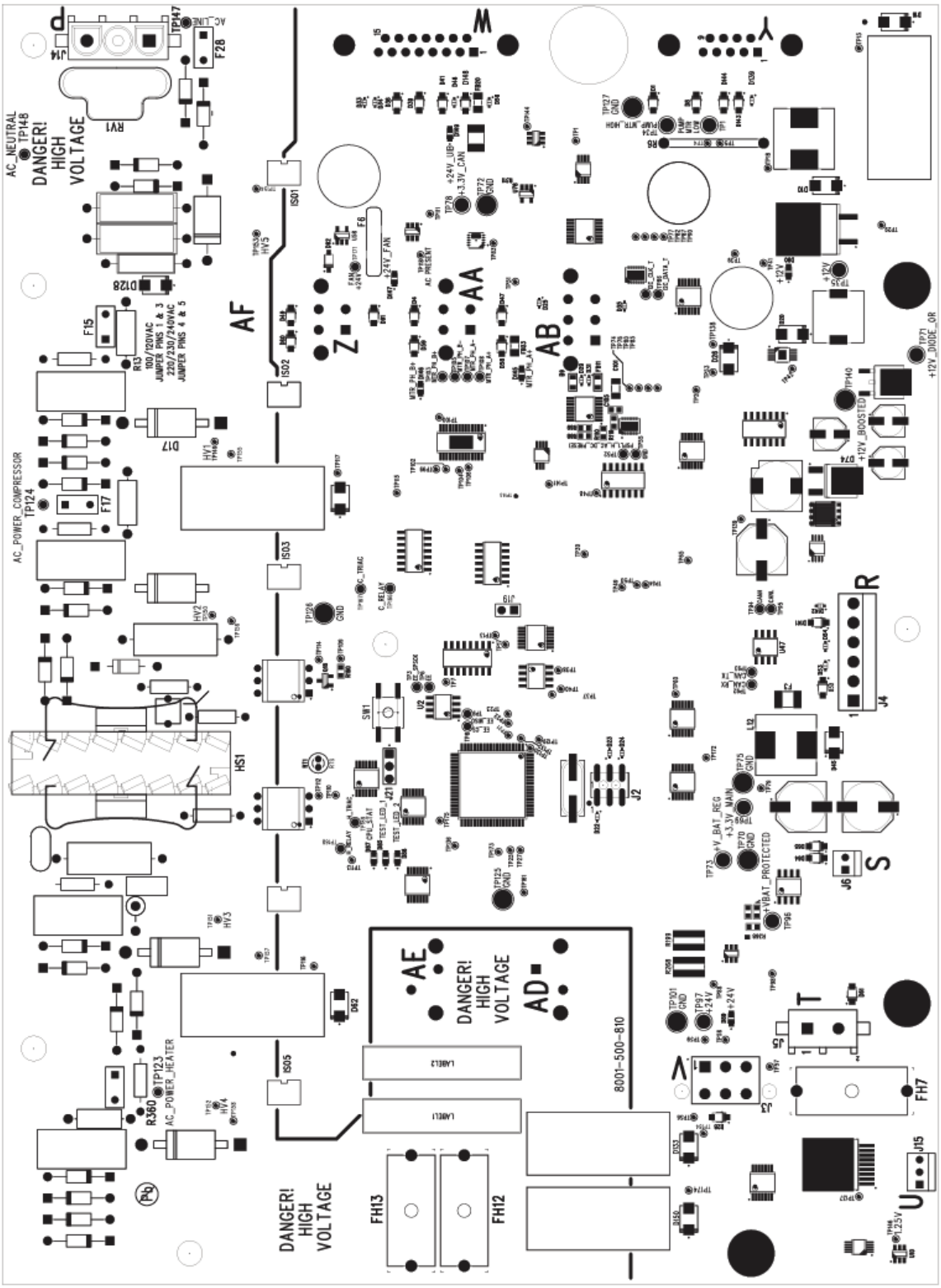
Cable location and test point	Voltage	Positive lead	Negative lead	Description
TP75	24VDC	TP75	TP74 GND	+24VDC input from FMB
TP66	15VDC	TP66	TP6 GND	+15VDC LED power



Fluid management board (FMB) assembly

8001-500-810 (Contact customer service for revision)

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



Replaceable fuse ratings and type

- F12, F13: Littlefuse 021506.3HXP fuse slow 250VAC 6.3A 5x20
- F7: Schurter Inc. 0034.3127 fuse 10A 250VAC 5x20 t-lag glass

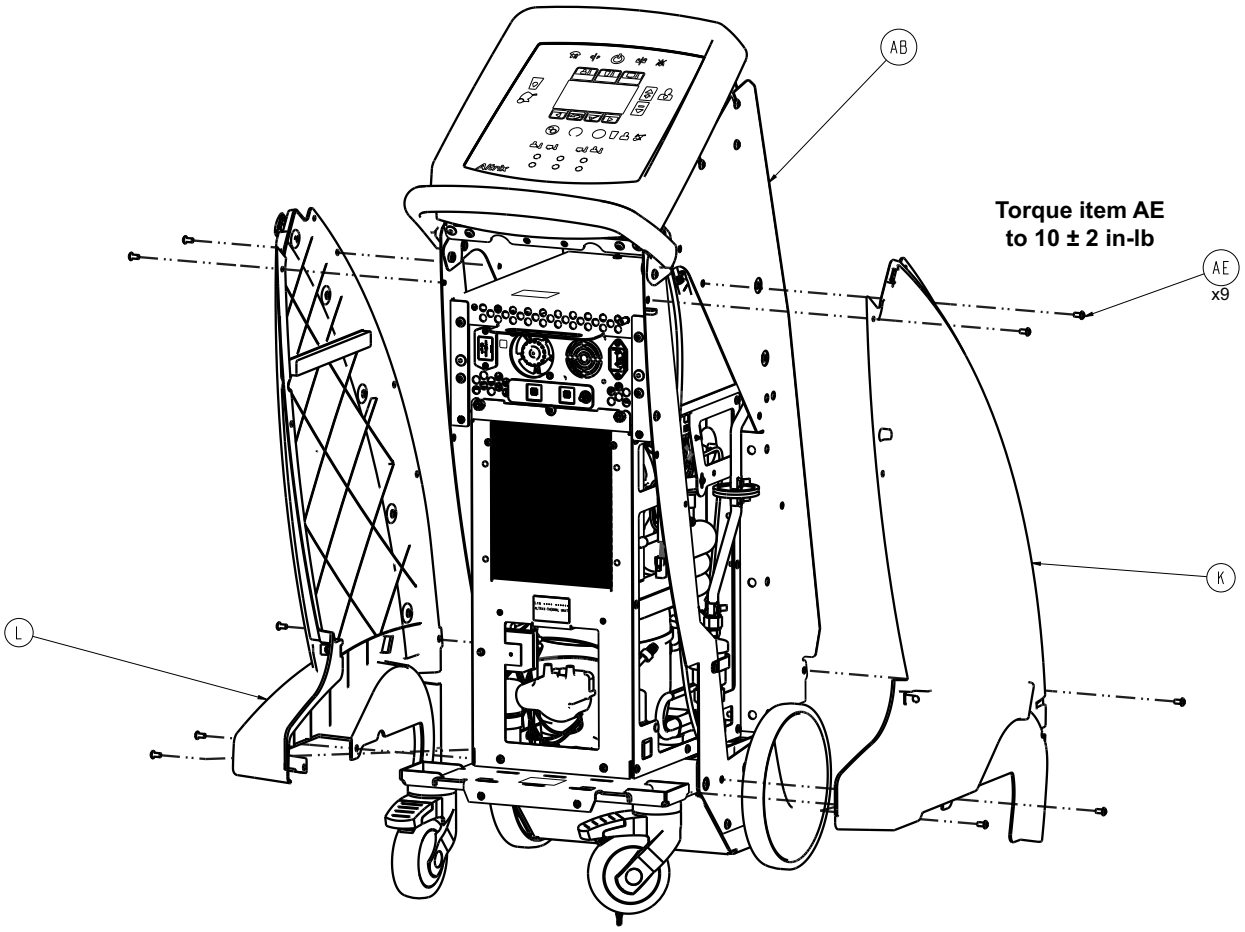
Final assembly

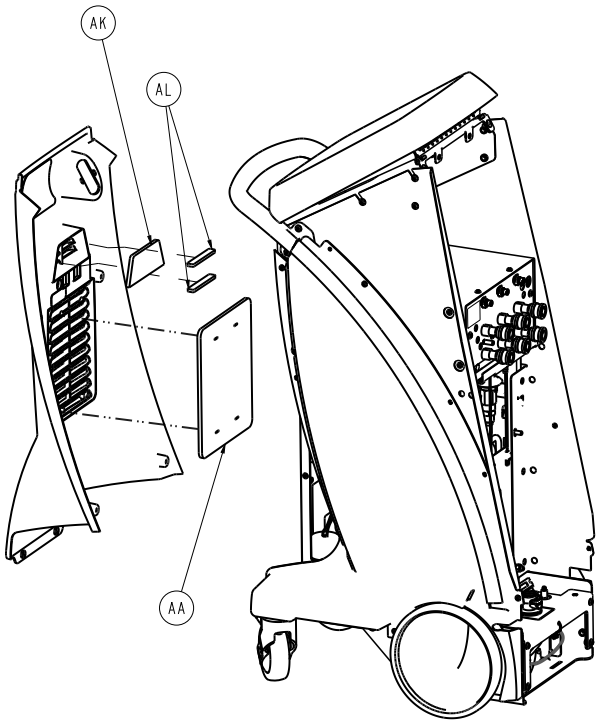
8001-103-010 100V (Contact customer service for revision)

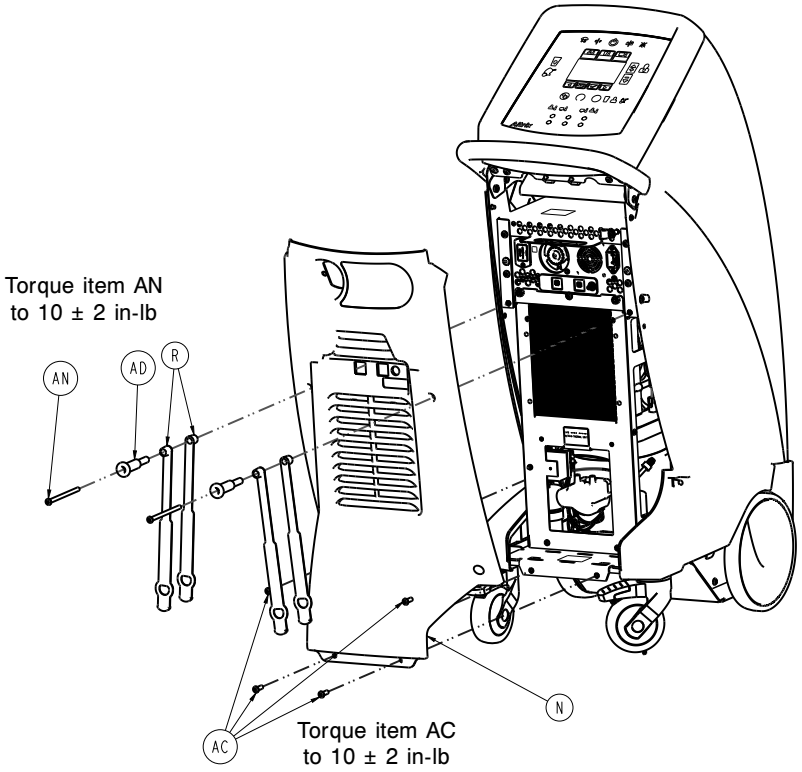
8001-123-010 120V (Contact customer service for revision)

8001-223-010 220V (Contact customer service for revision)

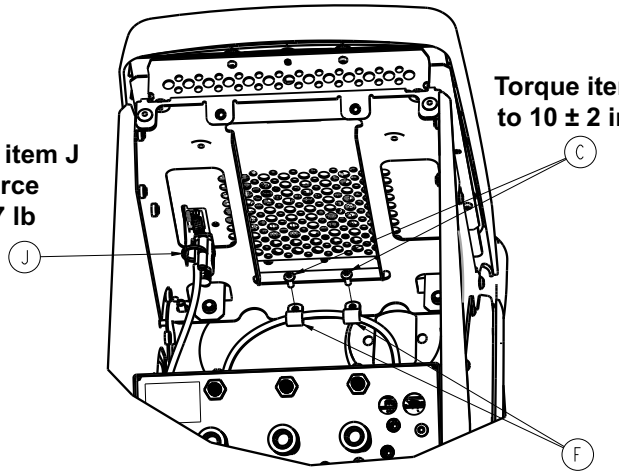
8001-233-010 230V (Contact customer service for revision)



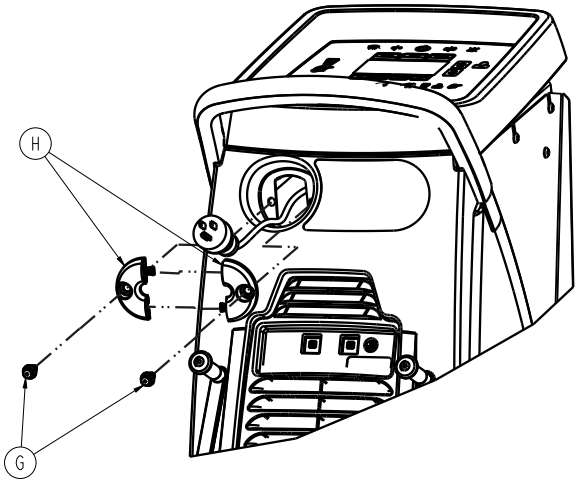


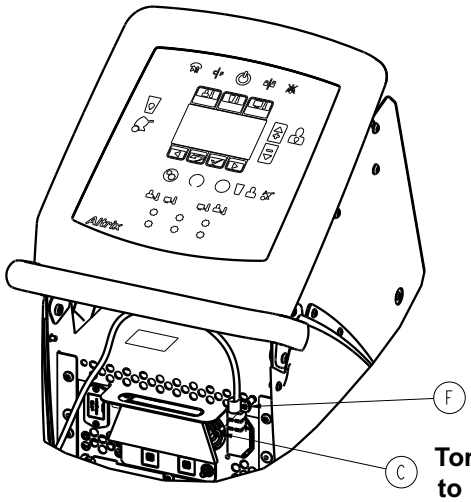


Cable tie item J
pull force
33 ± 7 lb

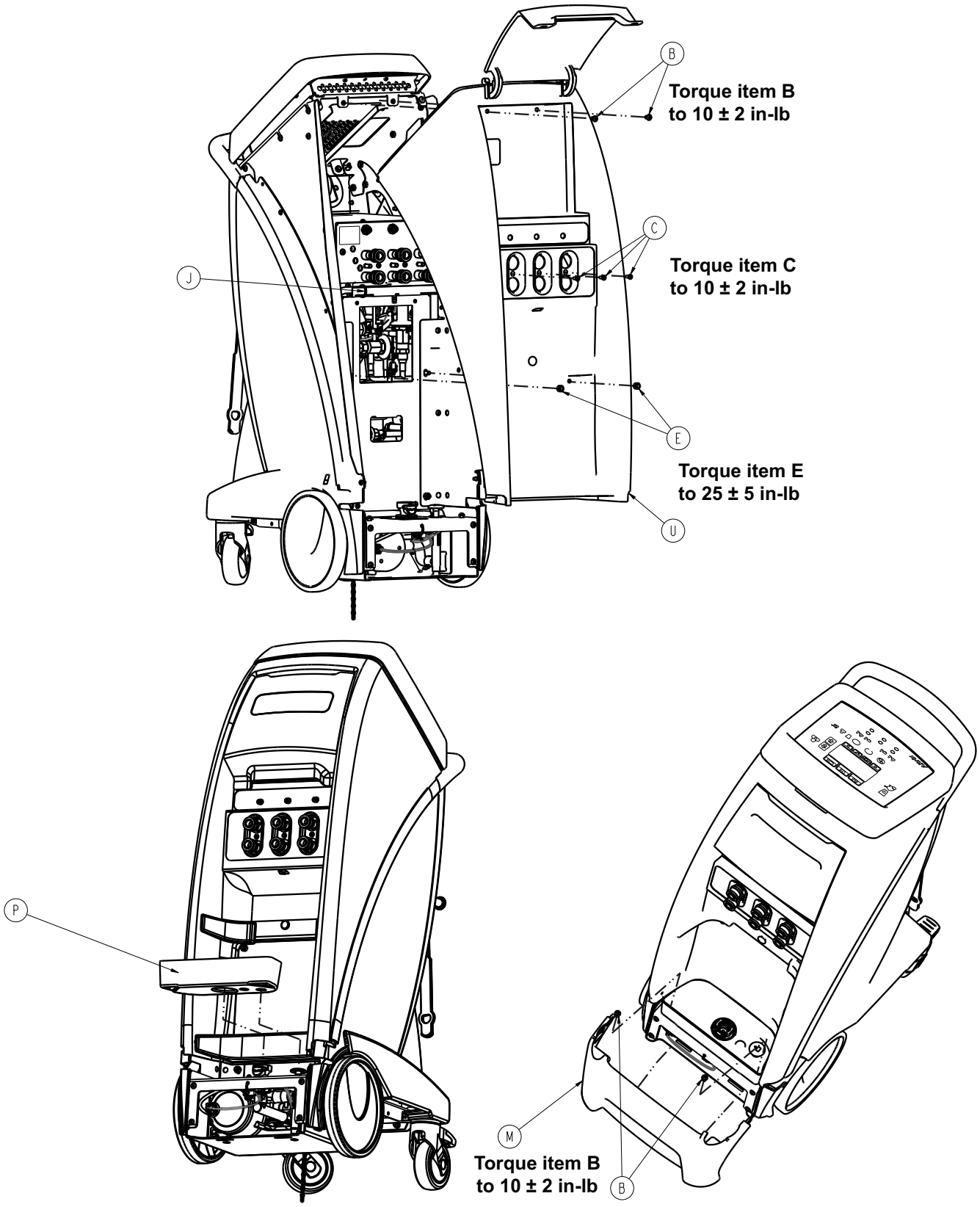


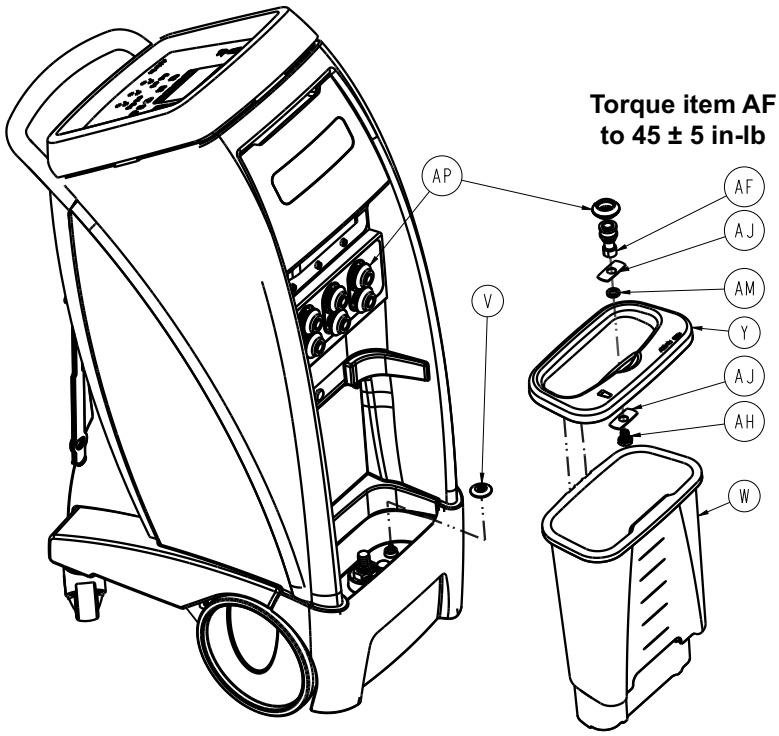
Torque item C
to 10 ± 2 in-lb





Torque item C
to 10 ± 2 in-lb


B
Torque item B
to 10 ± 2 in-lb
C
Torque item C
to 10 ± 2 in-lb
J
E
Torque item E
to 25 ± 5 in-lb
U
P
M
Torque item B
to 10 ± 2 in-lb
B



Item	Number	Name	Quantity
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	Scrulock assembly	2
H	1040-010-008	Cord ring, black	2
J	3000-300-113	8" cable tie	2
K	8001-000-140	*Side cover assembly, right hand - 8001-000-140* (page 95)	1
L	8001-000-145	*Side cover assembly, left hand - 8001-000-145* (page 96)	1
M	8001-000-153	Bumper	1
N	8001-000-161	*Back cover assembly* (page 142)	1
P	8001-000-166	Hot tub	1
R	8001-000-171	Strap, cord/hose management	4
U	8001-000-190	*Storage assembly - 8001-000-190* (page 97)	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* (page 90) 100V	1
	8001-123-125	*Frame assembly* (page 90), 120V	
	8001-223-125	*Frame assembly* (page 90), 220V	
	8001-233-125	*Frame assembly* (page 90), 230V	
AC	0004-592-000	Button head cap screw	4
AD	800102600000	Cord/hose management insert	2
AE	0004-587-000	Button head cap screw	10

Item	Number	Name	Quantity
AF	0048-283-000	Hydraulic connector	1
AH	700000013703	Fluid port fitting	1
AJ	0048-271-000	Washer, clipped	2
AK	8001-000-362	Filter, small condenser inlet	1
AL	8001-000-403	Foam, condenser inlet	2
AM	700000008448	Spacer	1
AN	700001164421	Button head cap screw with patch	2
AP	8003-001-165	Collar, hydraulic connector	7

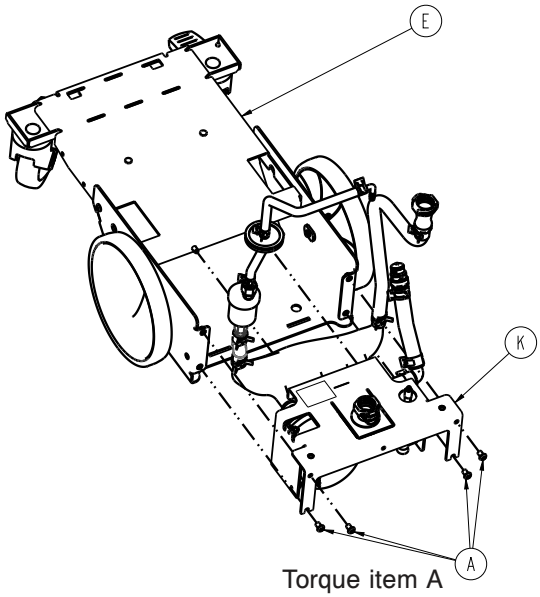
Frame assembly

8001-103-125 100 V (Contact customer service for revision)

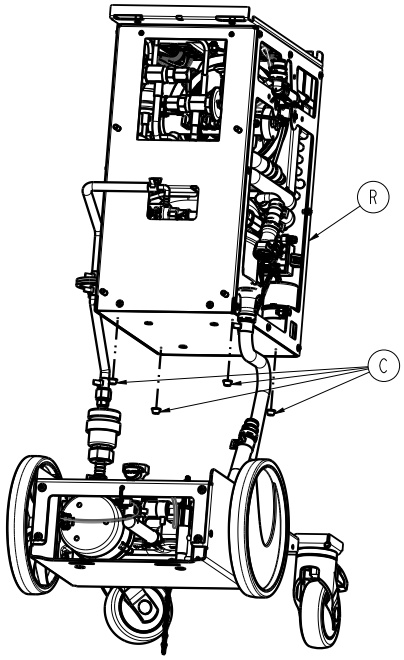
8001-123-125 120 V (Contact customer service for revision)

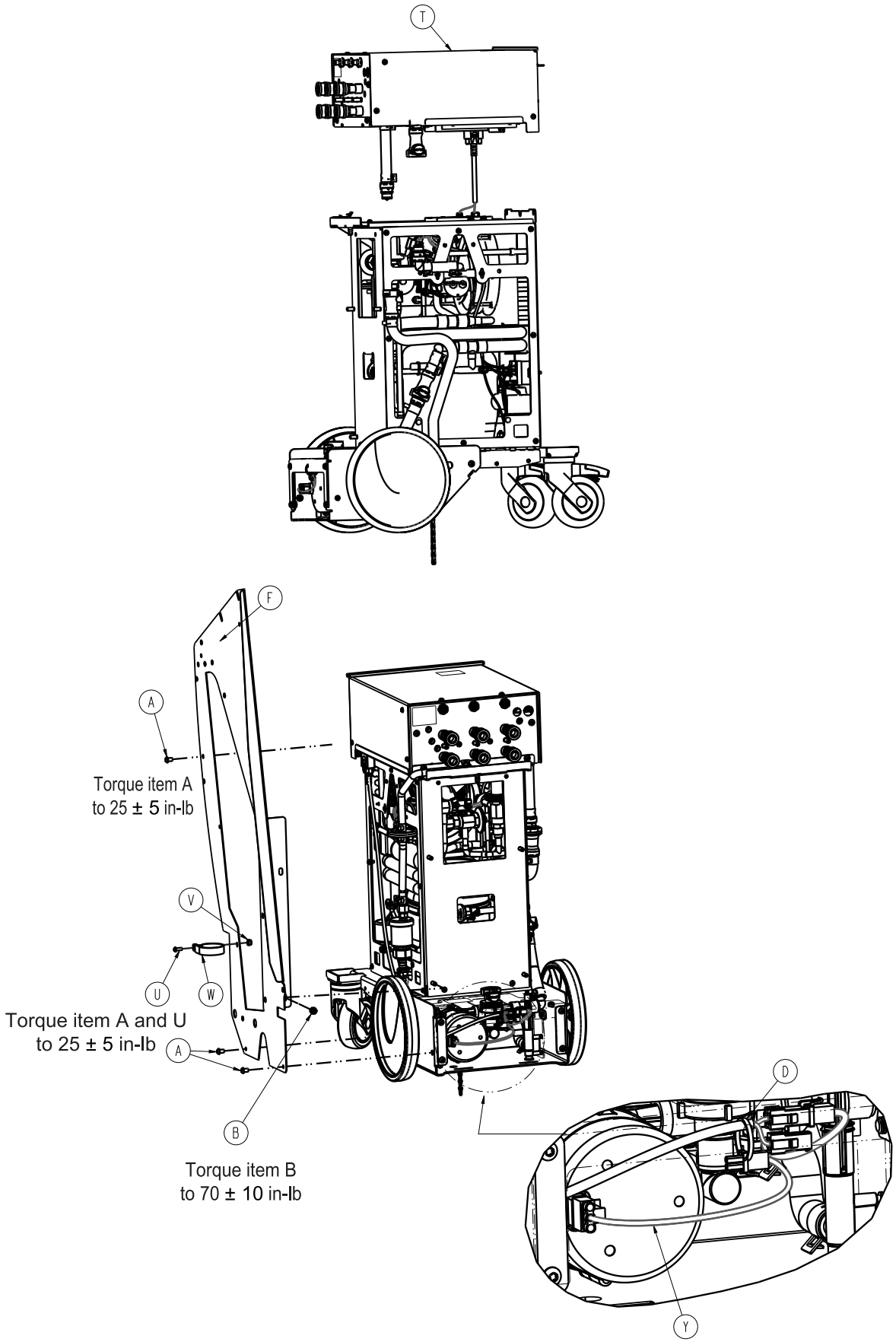
8001-223-125 220 V (Contact customer service for revision)

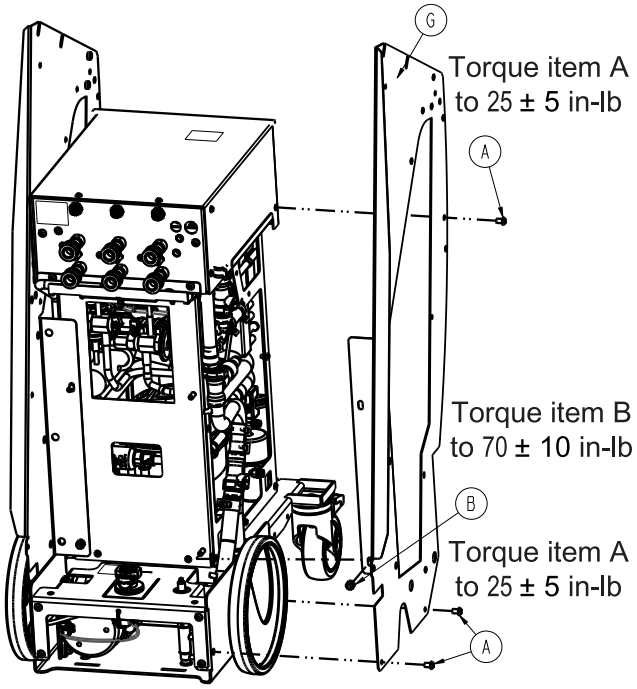
8001-233-125 230 V (Contact customer service for revision)

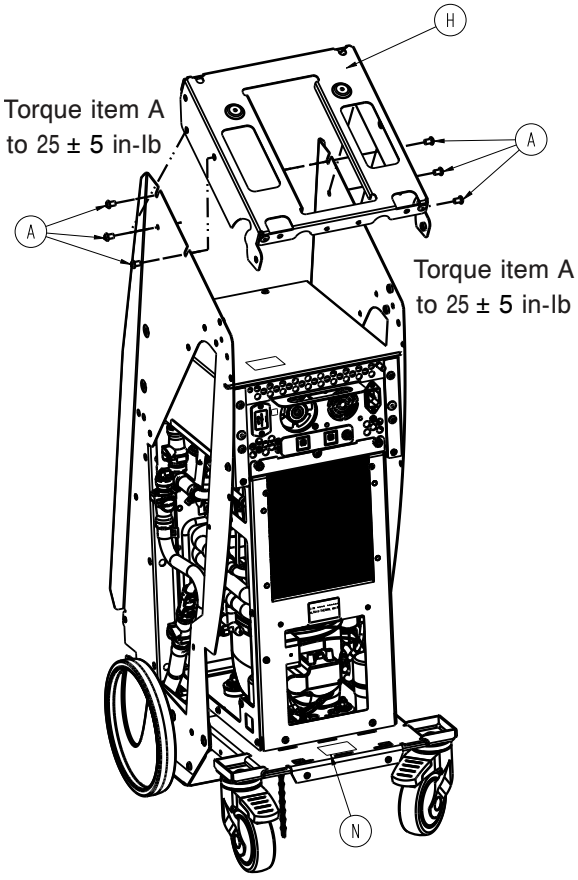


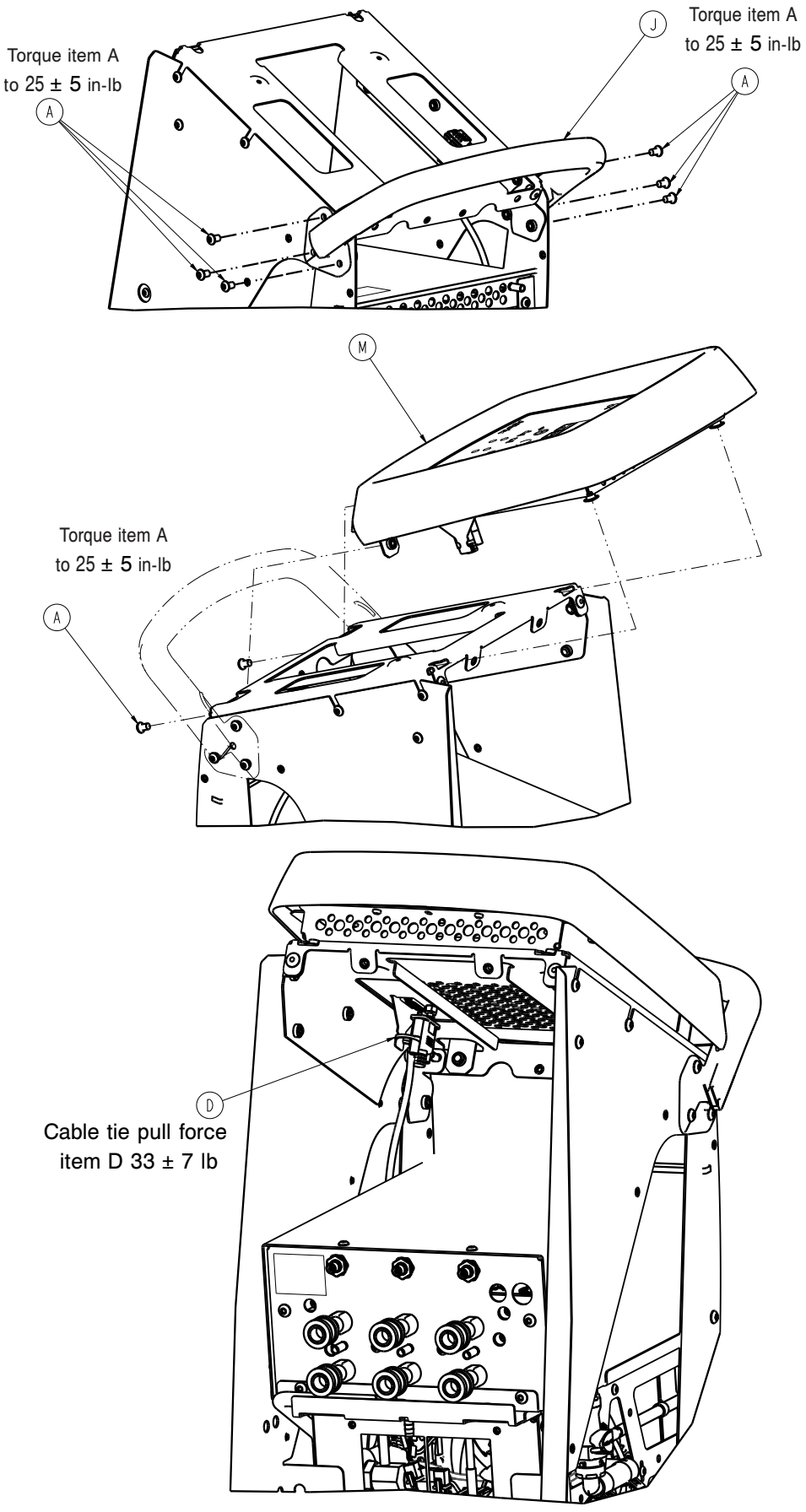
Torque item A
to 25 ± 5 in-lb




T
F
A
Torque item A
to 25 ± 5 in-lb
V
U
W
Torque item A and U
to 25 ± 5 in-lb
A
B
Torque item B
to 70 ± 10 in-lb
D
Y

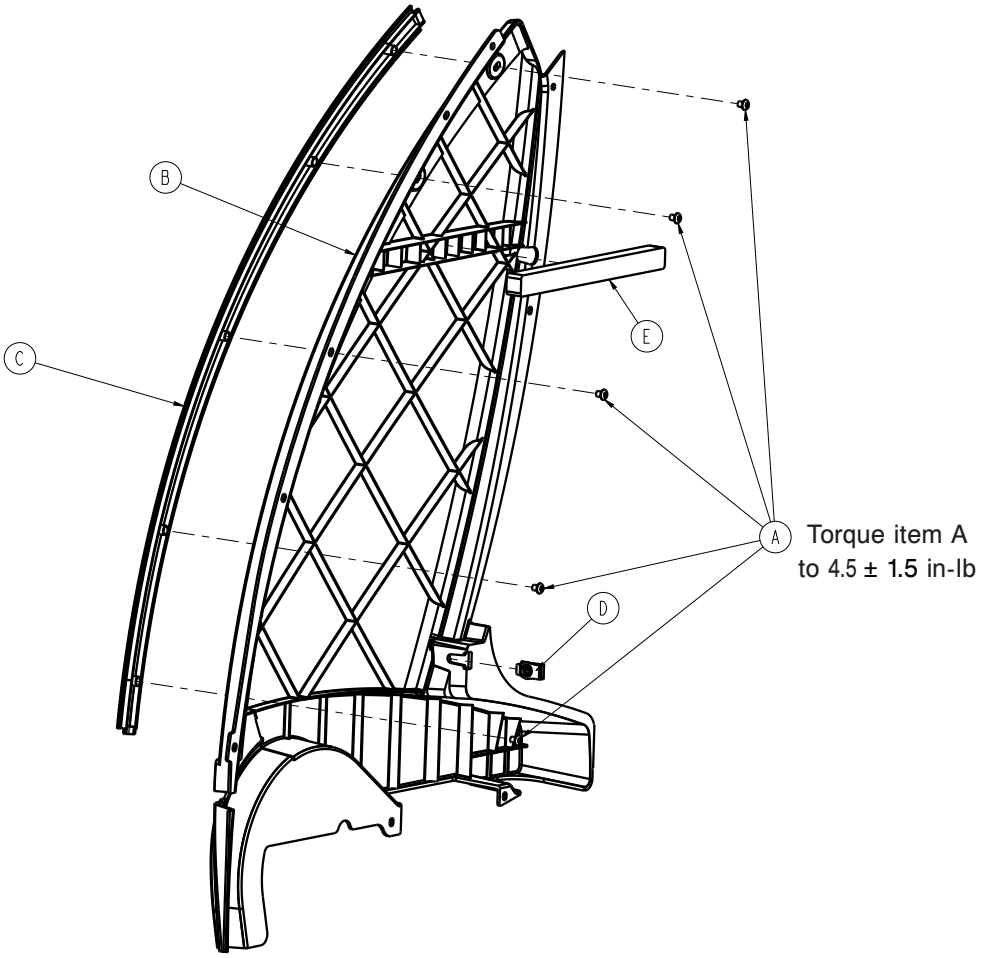

G
Torque item A
to 25 ± 5 in-lb
A
Torque item B
to 70 ± 10 in-lb
B
Torque item A
to 25 ± 5 in-lb
A


H
Torque item A
to 25 ± 5 in-lb
A
A
Torque item A
to 25 ± 5 in-lb
N


Torque item A
to 25 ± 5 in-lb
A
J
Torque item A
to 25 ± 5 in-lb
A
M
Torque item A
to 25 ± 5 in-lb
A
D
Cable tie pull force
item D 33 ± 7 lb

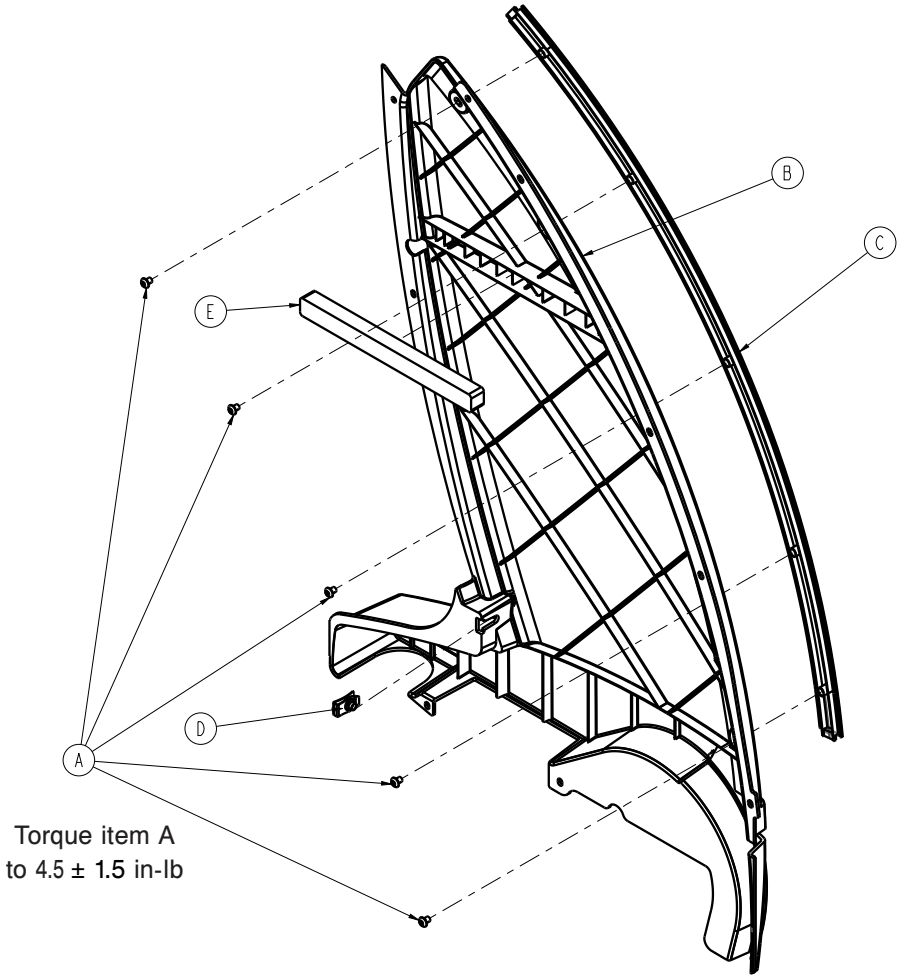
Item	Number	Name	Quantity
A	0004-588-000	Button head cap screw	24
B	0016-028-000	Fiberlock hex nut	2
C	0056-017-000	Adhesive backed bumper	4
D	3000-300-113	8" cable tie	2
E	8001-000-120	*Base assembly* (page 102)	1
F	8001-000-121	Side panel, right hand	1
G	8001-000-122	Side panel, left hand	1
H	8001-000-123	Top bracket	1
J	8001-000-152	Handle	1
K	8001-000-210	*Fluid assembly* (page 103)	1
M	8001-000-510	*Display assembly* (page 108)	1
N	8001-001-126	Label, serial number, Altrix, base assembly	1
R	8001-100-311	*Thermal unit, 100V* (page 122)	1
	8001-120-311	*Thermal unit, 120V 60Hz - 8001-120-311* (page 128)	
	8001-220-310	*Thermal unit, 220-240 V* (page 134)	
	8001–230–310		
T	8001-123-410	Control assembly, 100-120 V	1
	8001-233-410	Control assembly, 220-240 V	
U	0004-634-000	Button head cap screw	1
V	0016-003-000	Nylon hex nut	1
W	0048-274-000	P-clamp	1
Y	800100650877	Pump cable assembly	1

Side cover assembly, right hand - 8001-000-140



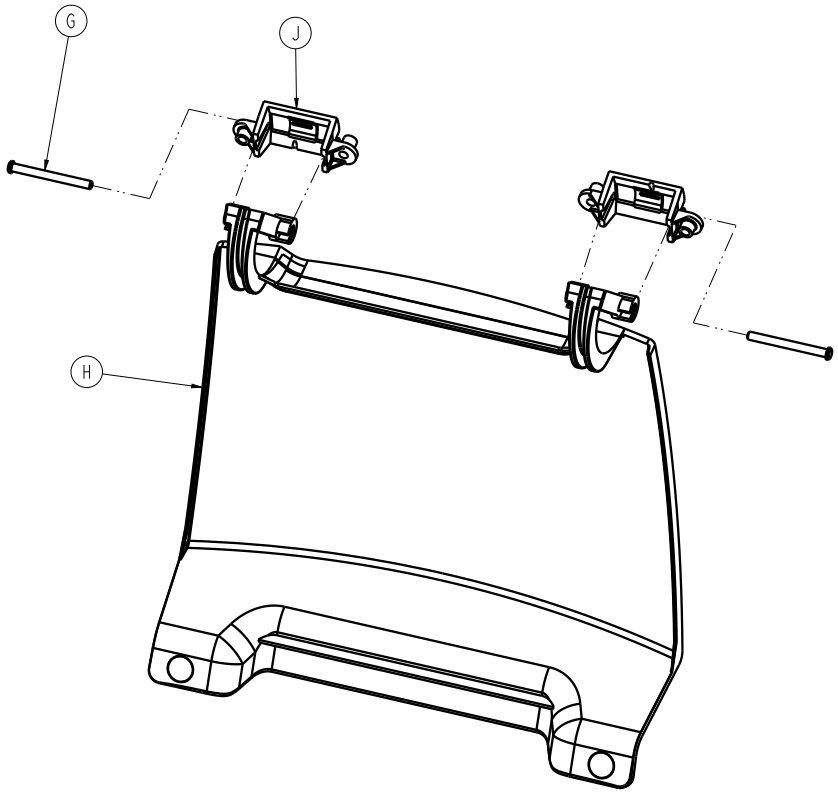
Item	Number	Name	Quantity
A	0004-587-000	Button head cap screw	5
B	8001-000-141	Side cover, right hand	1
C	8001-000-142	Trim	1
D	0052-325-000	Au-Ve-Co Extruded u-nut	1
E	8001-000-148	Side cover foam	1

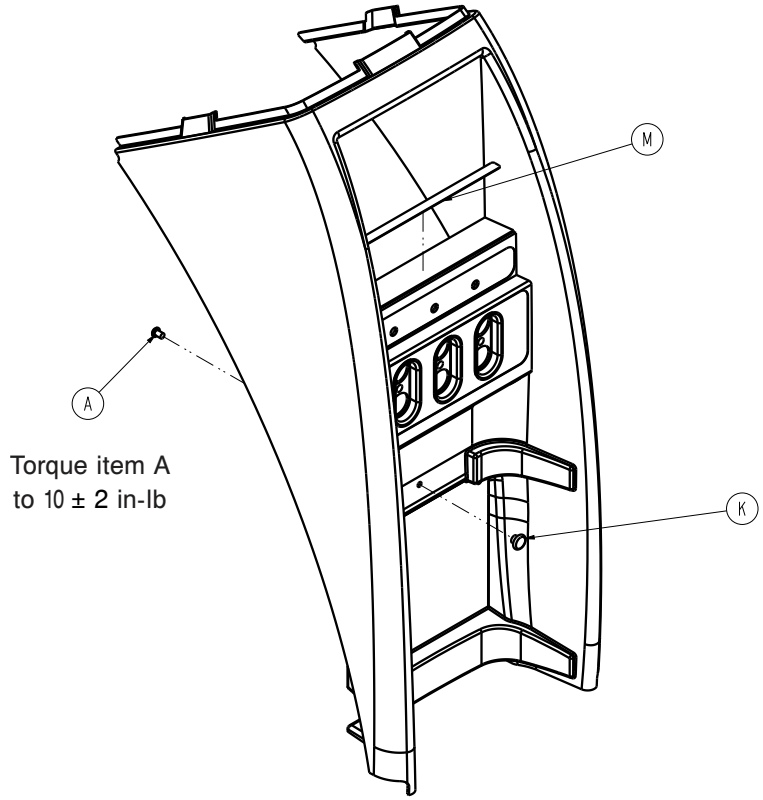
Side cover assembly, left hand - 8001-000-145



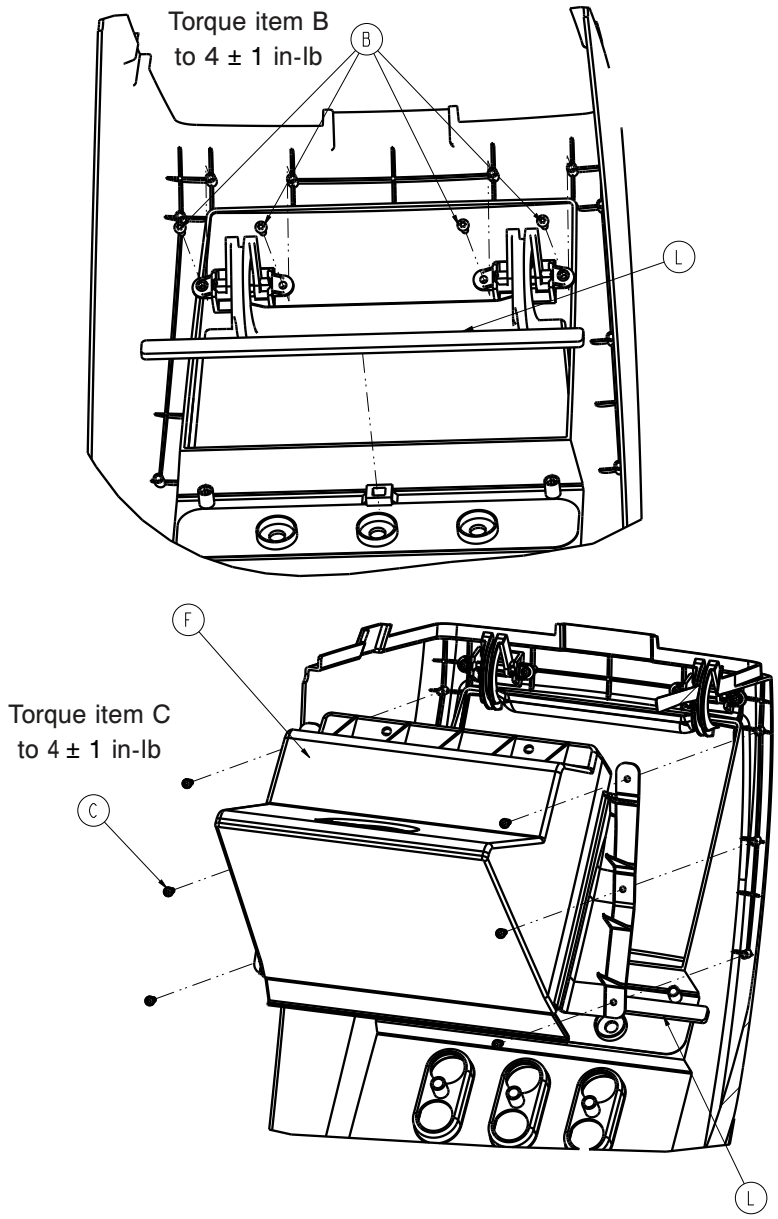
Item	Number	Name	Quantity
A	0004-587-000	Button head cap screw	5
B	8001-000-146	Side cover, left hand	1
C	8001-000-142	Trim	1
D	0052-325-000	Au-Ve-Co Extruded u-nut	1
E	8001-000-148	Side cover foam	1

Storage assembly - 8001-000-190





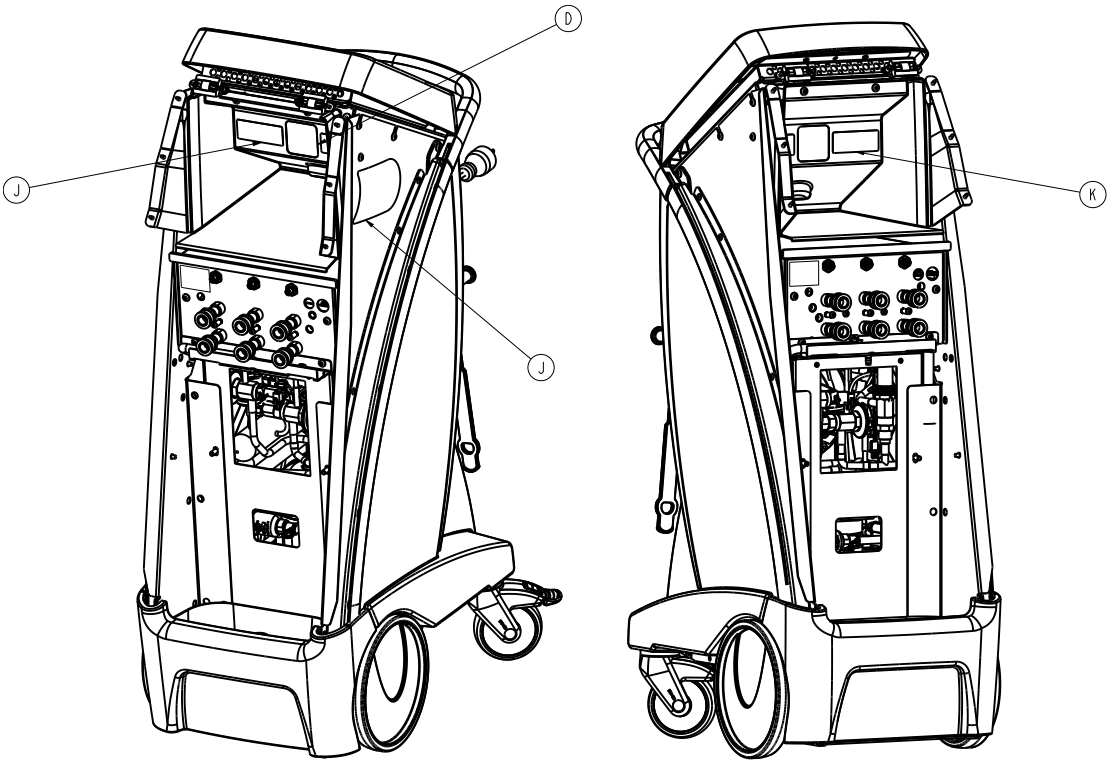
Torque item A
to 10 ± 2 in-lb

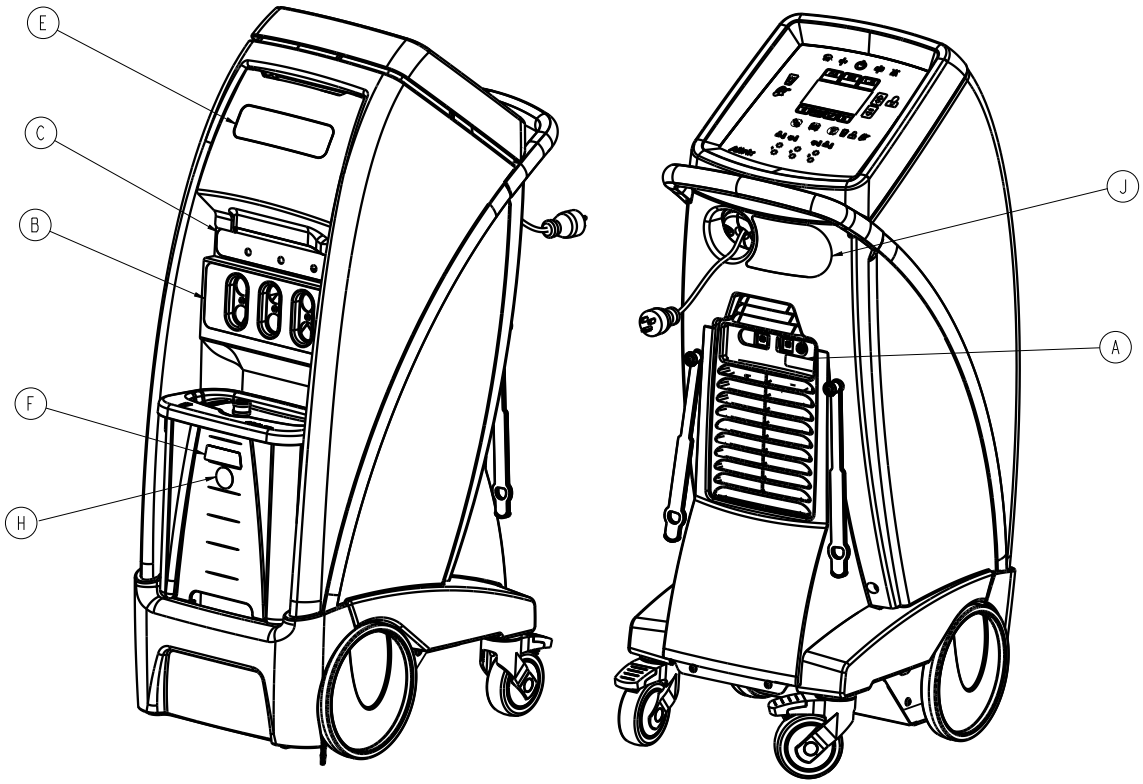


Item	Number	Name	Quantity
A	0004-588-000	Button head cap screw	1
B	0023-162-000	Delta PT screw	4
C	0023-167-000	Delta PT screw	6
E	8001-000-165	Front cover	1
F	8001-000-191	Storage box	1
G	8001-000-192	Storage clevis pin	2
H	8001-000-196	Storage door	1
J	8001-000-197	Storage door mount	2
K	8001-000-247	Reservoir retaining pin	1
L	8001-000-402	Control box foam	1
M	8001-000-194	Storage adhesive	1
N	3M 4298	**3M**™ adhesion promoter	A/R

Label assembly

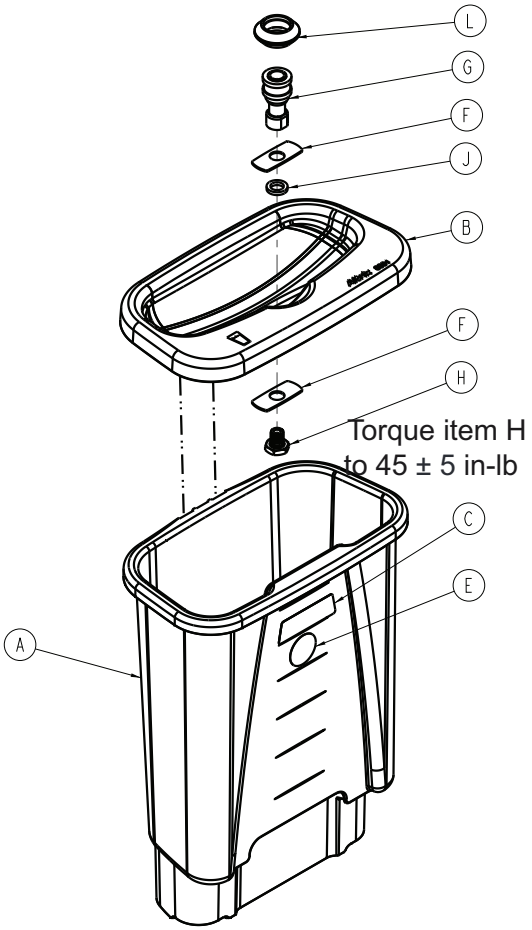
8001-001-121	8001-001-233
8001-001-103	8001-001-234
8001-001-122	8001-001-235
8001-001-123	8001-001-236
8001-001-221	8001-001-237
8001-001-222	8001-001-238
8001-001-223	8001-001-239
8001-001-231	80010001090
8001-001-232	(Contact customer service for revision)





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
F	8001-001-024	Label, liquid level indicator	1
H	8001-001-025	Label, warning, no tap water	1
J	8001-001-901	Label, specification - 8001-000-001	1
	8001-001-902	Label, specification - 8001-000-002	
	8001-001-903	Label, specification - 8001-000-003	
	8001-001-904	Label, specification - 8001-000-006	
	8001-001-905	Label, specification - 8001-000-008	
	8001-001-906	Label, specification - 8001-000-009	
	8001-001-907	Label, specification - 8001-000-011	
	8001-001-908	Label, specification - 8001-000-013	
	8001-001-909	Label, specification - 8001-000-015	
	8001-001-910	Label, specification - 8001-000-016	
	8001-001-911	Label, specification - 8001-000-017	
	8001-001-912	Label, specification - 8001-000-018	
	8001-001-913	Label, specification - 8001-000-019	
	8001-001-914	Label, specification - 8001-000-021	
	8001-001-915	Label, specification - 8001-000-022	
	8001-001-916	Label, specification - 8001-000-023	
K	800100010902	Label, refrigerant	1

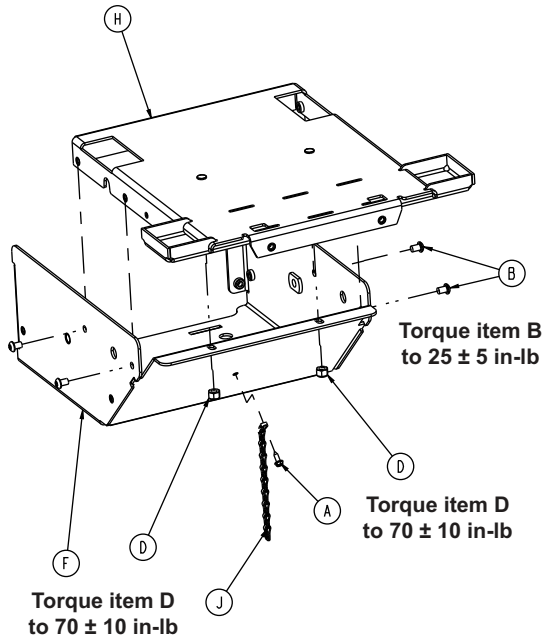
Reservoir assembly kit - 8001-007-241

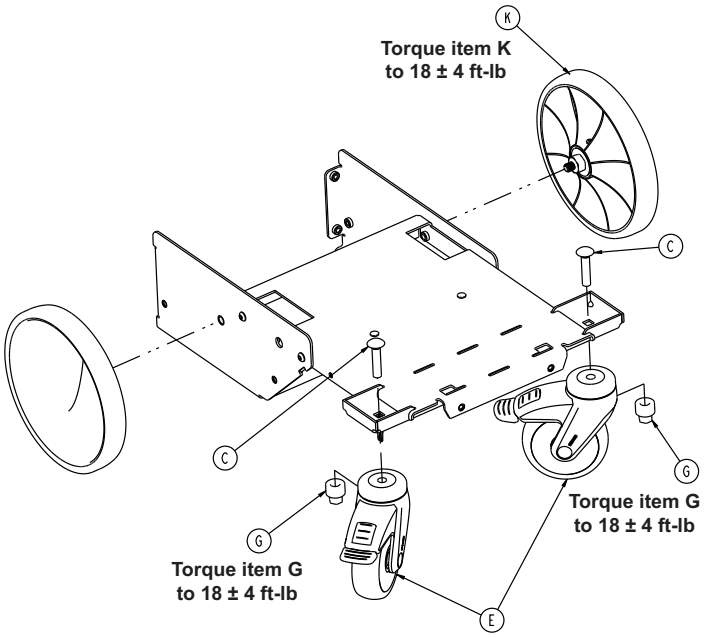


Item	Number	Name	Quantity
A	8001-000-241	Reservoir base	1
B	8001-000-242	Reservoir lid	1
C	8001-001-024	Label, liquid level indicator	1
E	8001-001-025	Label, warning, no tap water	1
F	0048-271-000	Clipped washer	2
G	0048-283-000	Hydraulic connector	1
H	700000013703	Fluid port fitting	1
J	700000008448	Spacer	1
L	8003-001-165	Hydraulic connector collar	1

Base assembly

8001-000-120 (Contact customer service for revision)

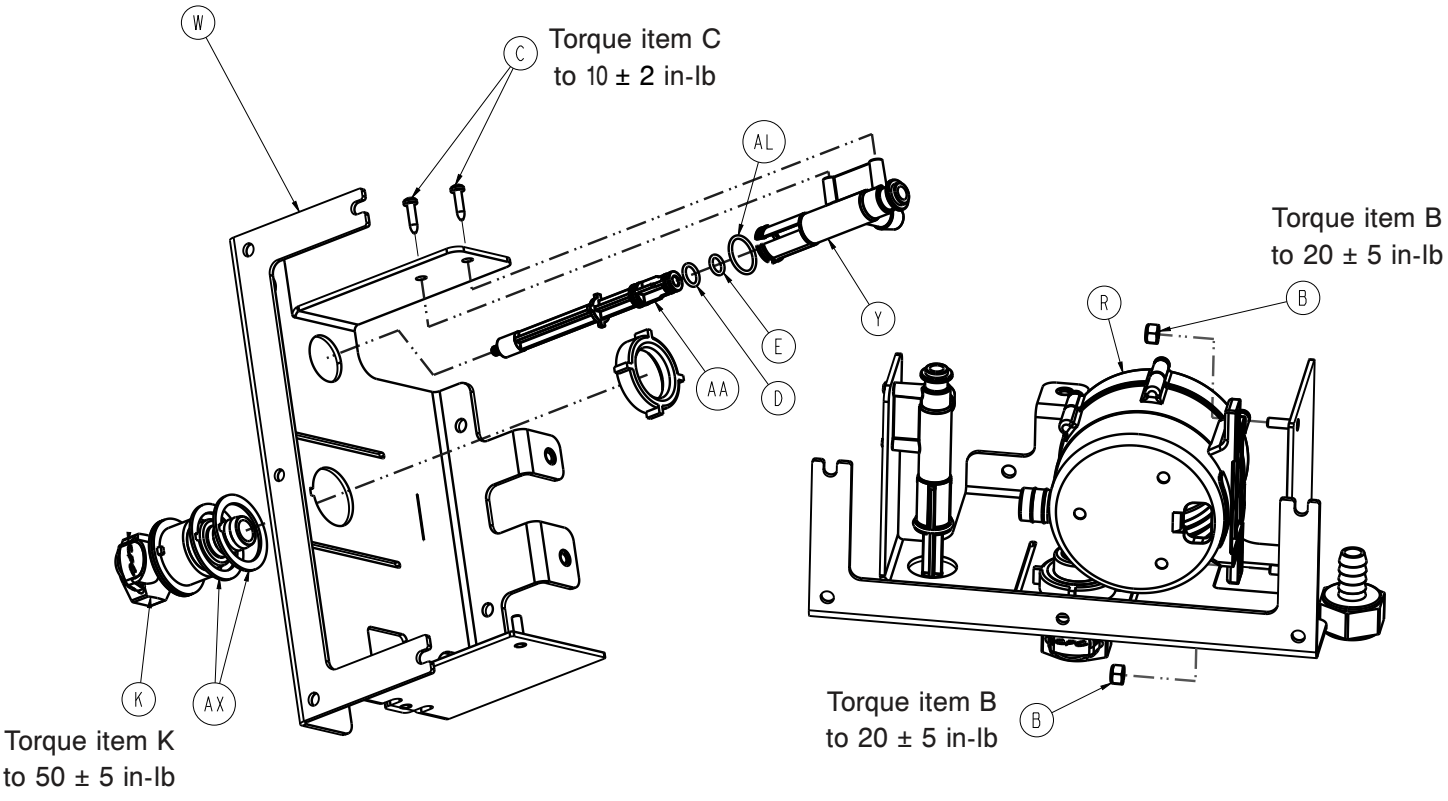


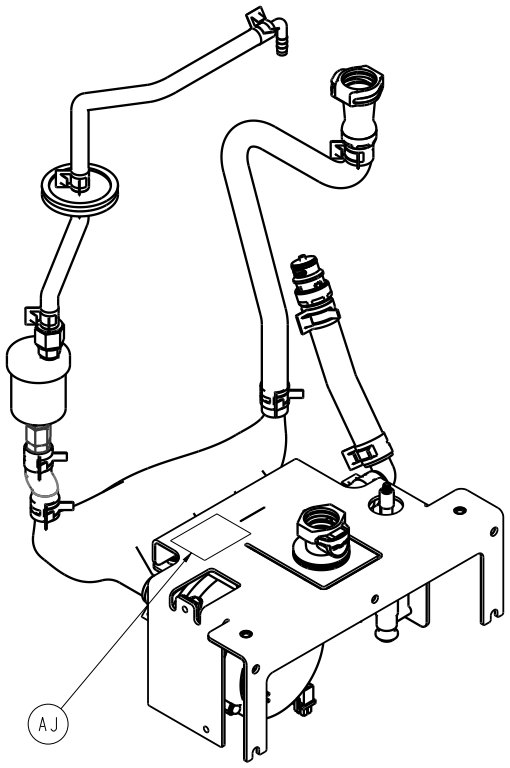


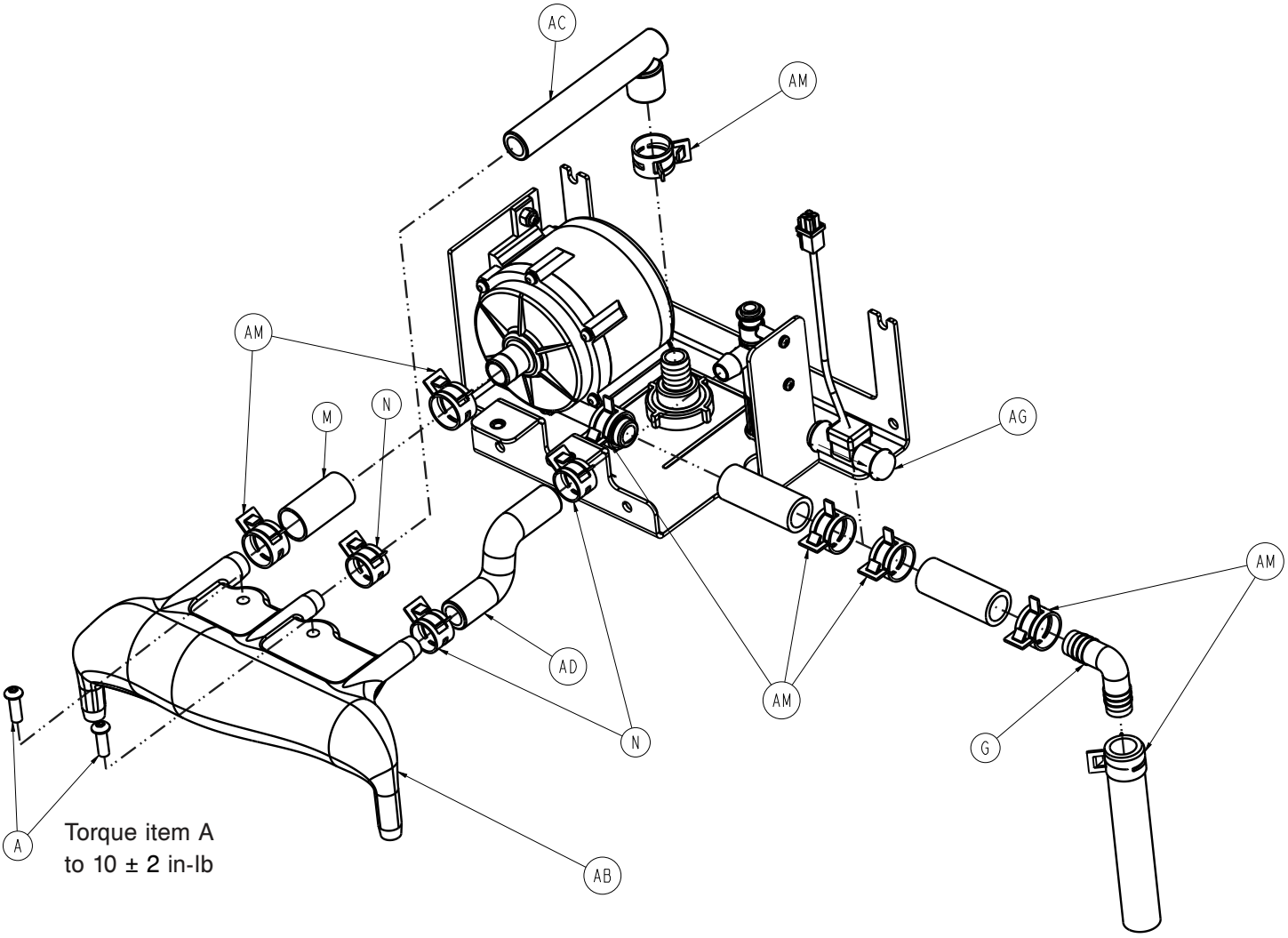
Item	Number	Name	Quantity
A	0003-364-000	Hex washer	1
B	0004-588-000	Button head cap screw	4
C	0005-041-000	Carriage bolt	2
D	0016-028-000	Fiberlock hex nut	2
E	700003342177	Swivel caster with total lock	2
F	8001-000-112	Wheel bracket	1
G	8001-000-114	Hex nut	2
H	8001-000-115	Base weldment	1
J	8001-000-117	Ground chain	1
K	8001-000-131	Wheel assembly	2

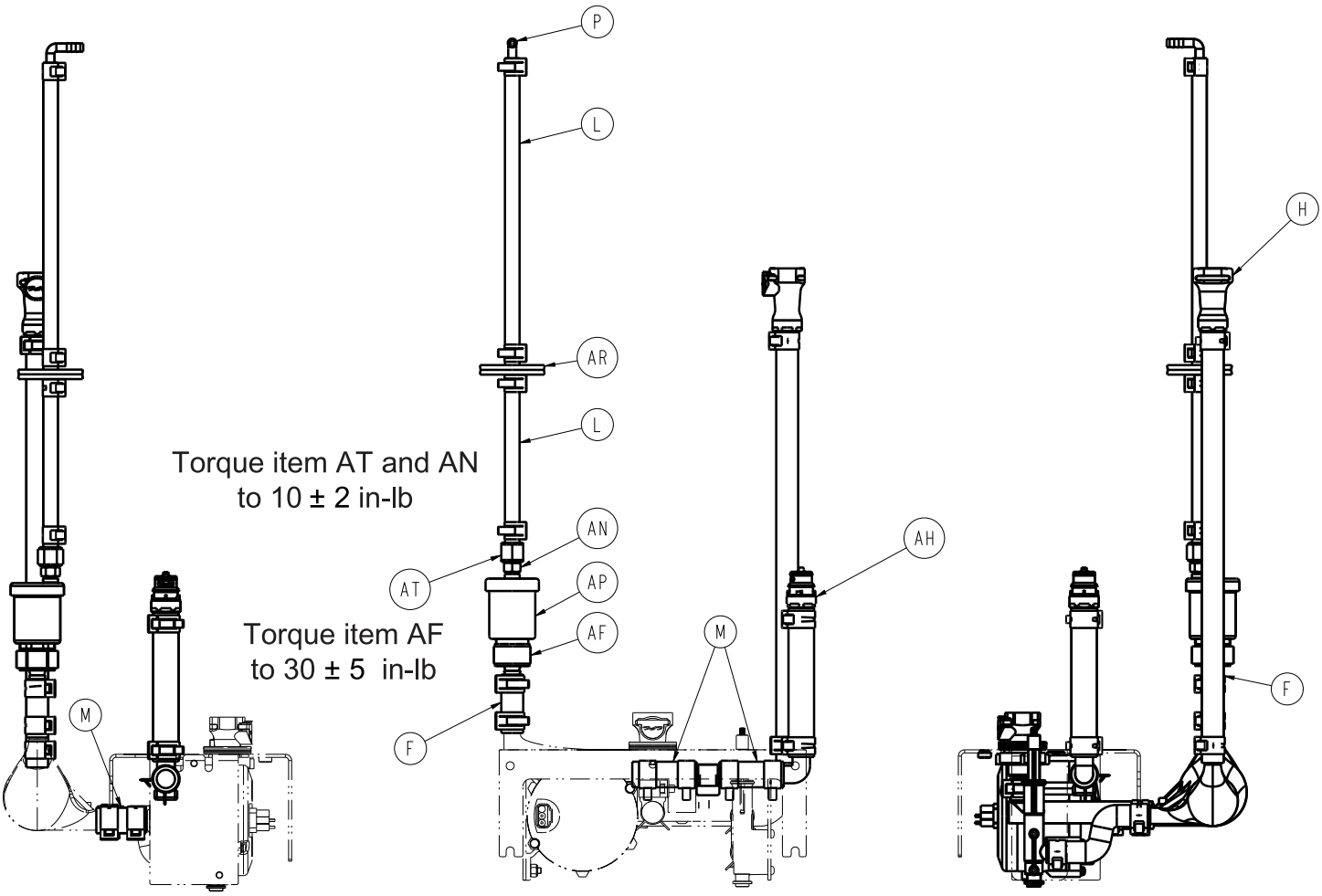
Fluid assembly

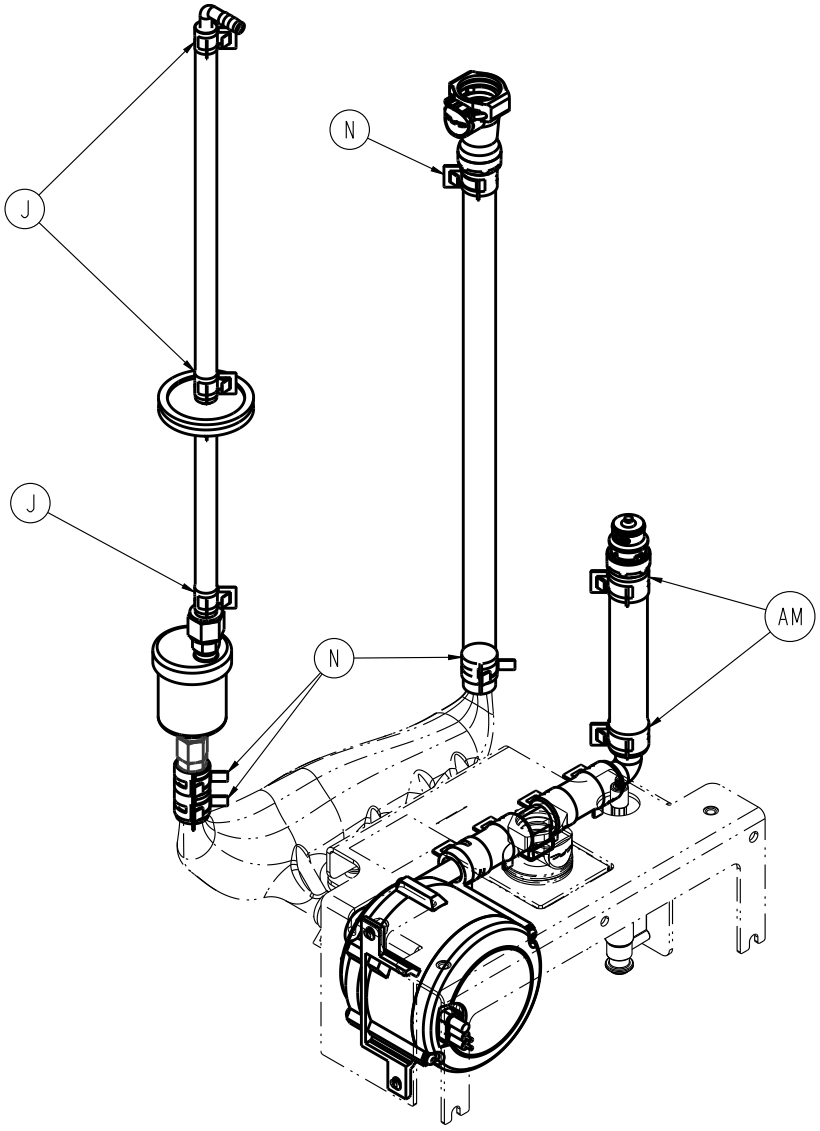
8001-000-210 (Contact customer service for revision)






AC
AM
AM
M
N
AG
AM
AD
N
AM
G
A
Torque item A
to 10 ± 2 in-lb
AB


P
L
AR
L
AN
AT
AP
AF
F
M
AH
H
Torque item AT and AN
to 10 ± 2 in-lb
Torque item AF
to 30 ± 5 in-lb

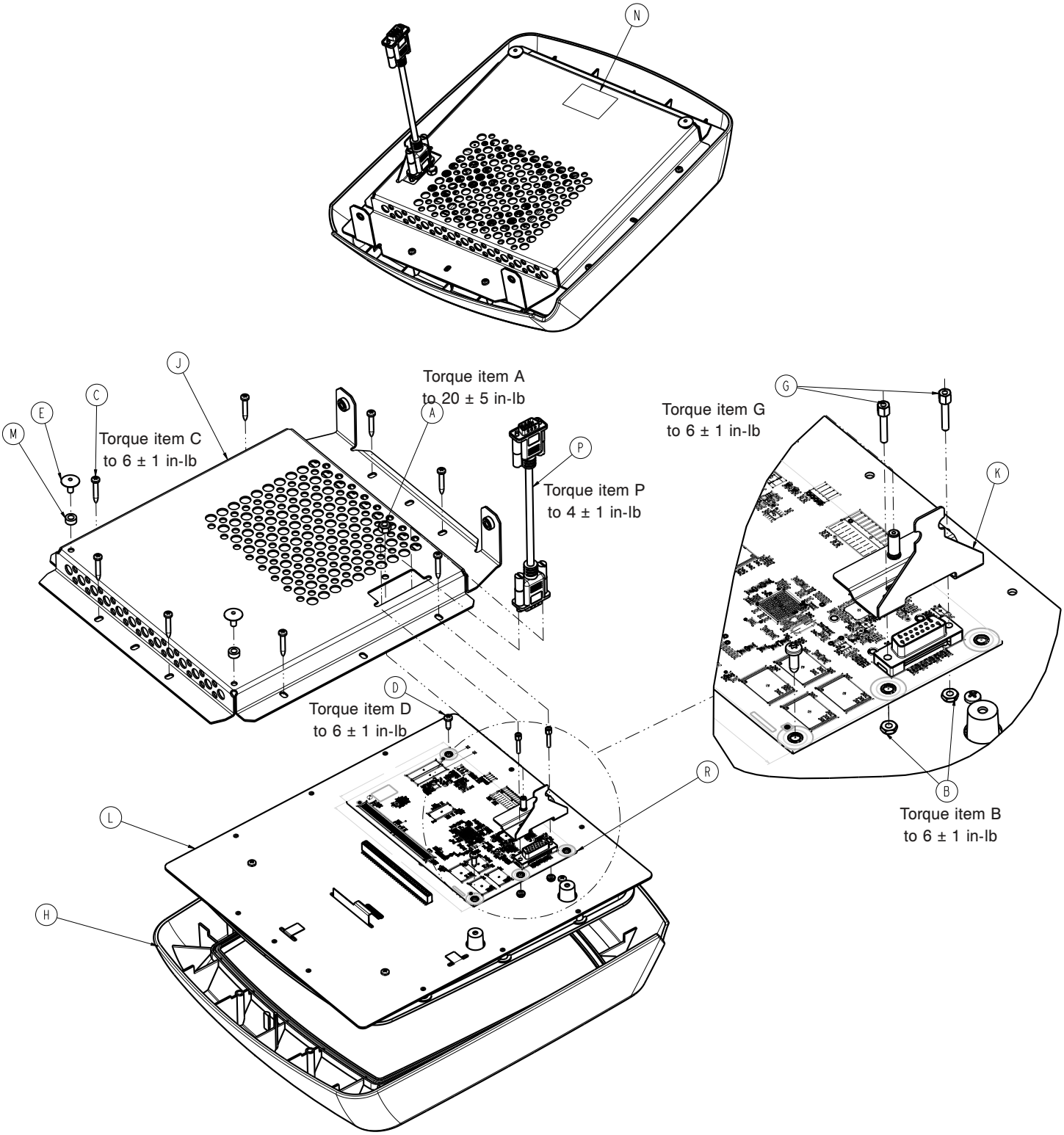


Item	Number	Name	Quantity
A	0004-592-000	Button head cap screw	2
B	0016-003-000	Nylock hex nut	2
C	0023-162-000	Screw	2
D	0045-411-000	O-ring	1
E	0045-413-000	O-ring	1
F	0048-180-000	Tubing	A/R
G	0048-248-000	Barb elbow	1
J	0048-264-000	Hose clamp	4
K	0048-245-000	Hose barb valved panel mount body	1
L	0048-249-000	Tubing	A/R
M	0048-250-000	Tubing	A/R
N	0048-265-000	Hose Clamp	7
P	0048-253-000	Elbow	1
R	800100650876	Pump	1
W	8001-000-211	Fluid bracket	1
Y	8001-000-226	Drain body	1
AA	8001-000-227	Drain plunger	1

Item	Number	Name	Quantity
AB	8001-000-231	Air eliminator	1
AC	8001-000-232	Tube, reservoir connecting	1
AD	8001-000-252	Tube, drain	1
AF	800102590000	Nylon adapter	1
AG	8001-065-887	Cable assembly, system flow sensor	1
AJ	8001-001-226	Label, serial number, Altrix, fluid assembly	1
AK	0045-996-000	Super O-lube	A/R
AL	0045-113-000	O-ring	1
AM	0048-266-000	Hose clamp	9
AN	0048-267-000	Waste connector	1
AP	800102680000	Air vent, float style	1
AR	0048-269-000	Inline filtration vent	1
AT	0048-270-000	Nylon fitting barb	1
AX	0048-273-000	Spacer, Colder connector	2

Display assembly

8001-000-510 (Contact customer service for revision)



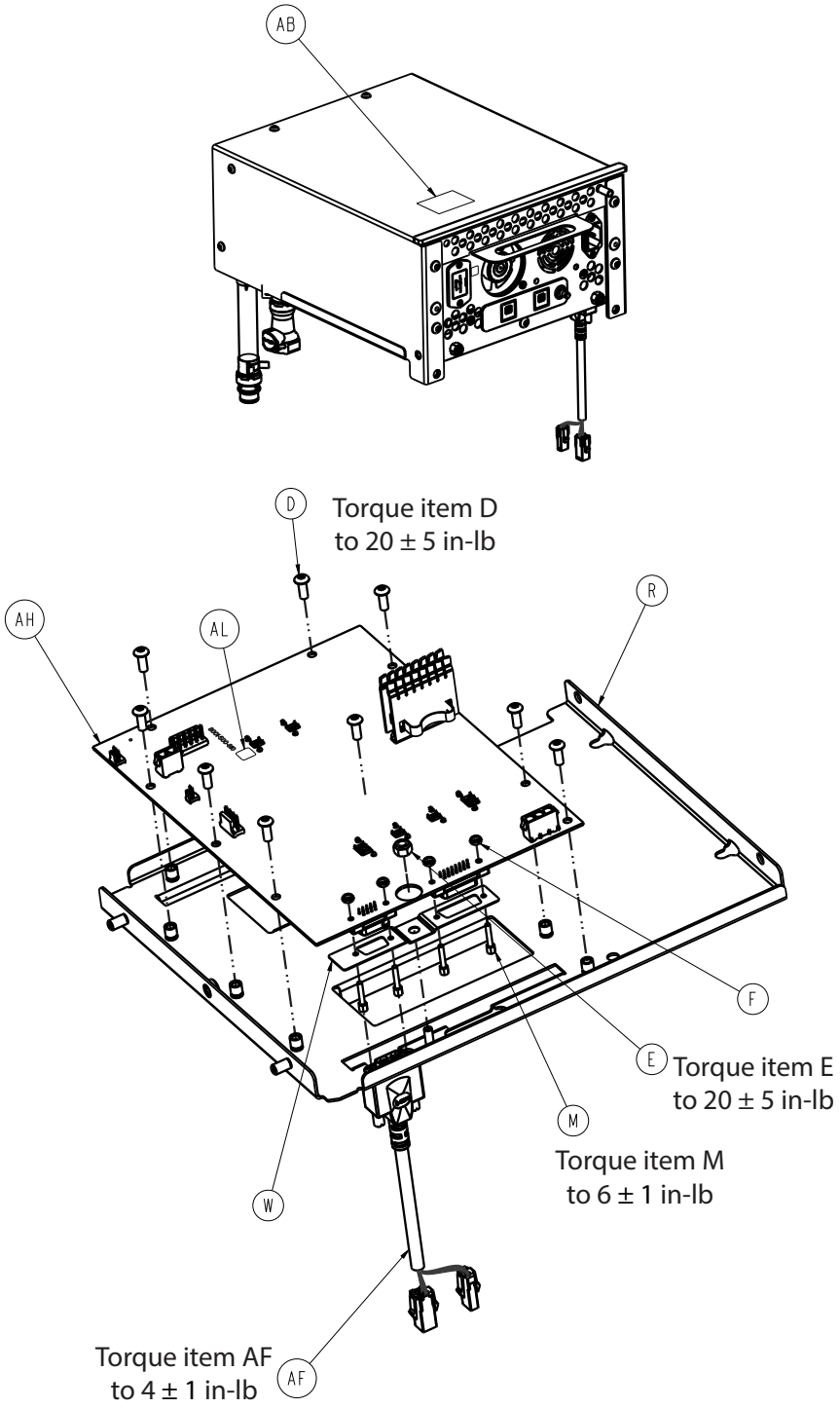
Item	Number	Name	Quantity
A	0016-003-000	Nylock hex nut	1
B	0016-007-000	Fiberlock hex nut	2
C	0023-166-000	Screw	8

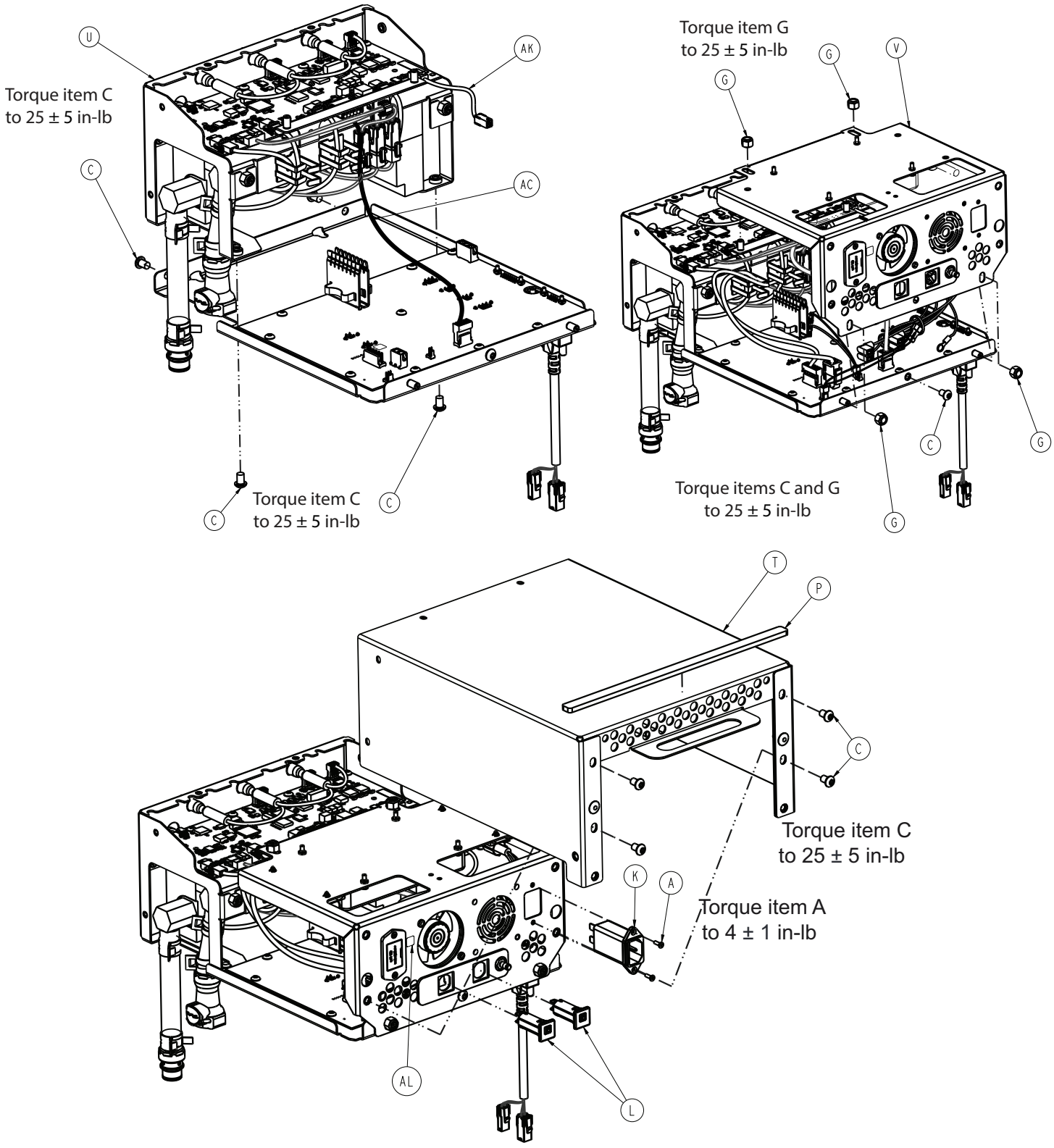
Item	Number	Name	Quantity
D	0023-167-000	Screw	2
E	0025-132-000	Dome head rivet	2
G	3001-300-007	Jack screw	2
H	8001-000-151	Bezel	1
J	8001-000-491	Display shield bracket	1
K	8001-000-493	Display ground bracket	1
L	8001-000-500	User interface	1
M	8001-000-519	Bushing, display key hole	2
N	8001-001-526	Label, serial number, display assembly	1
P	8001-065-865	Cable assembly, display	1
R	8001-300-830	*Control assembly* (page 110)	1

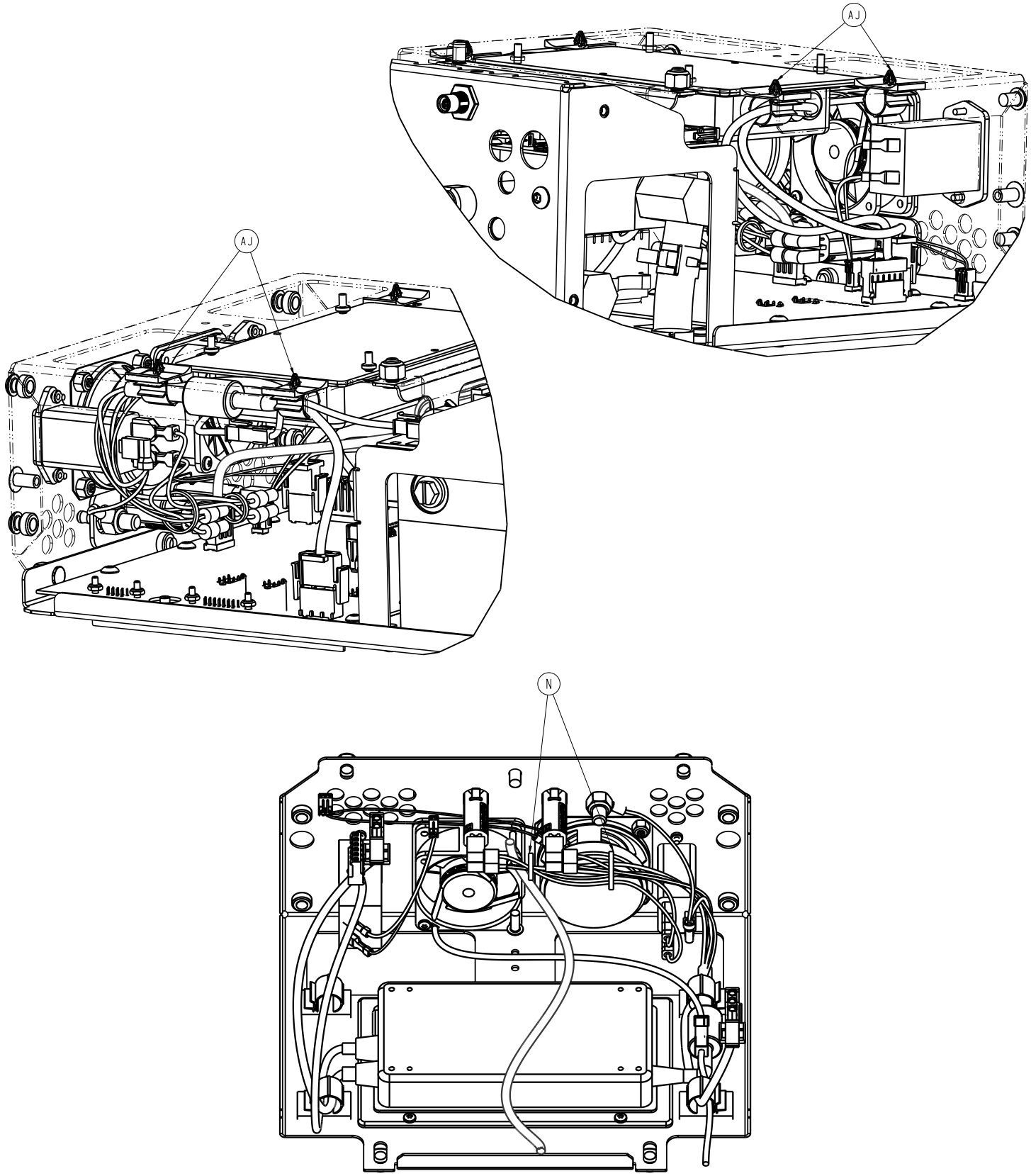
Control assembly

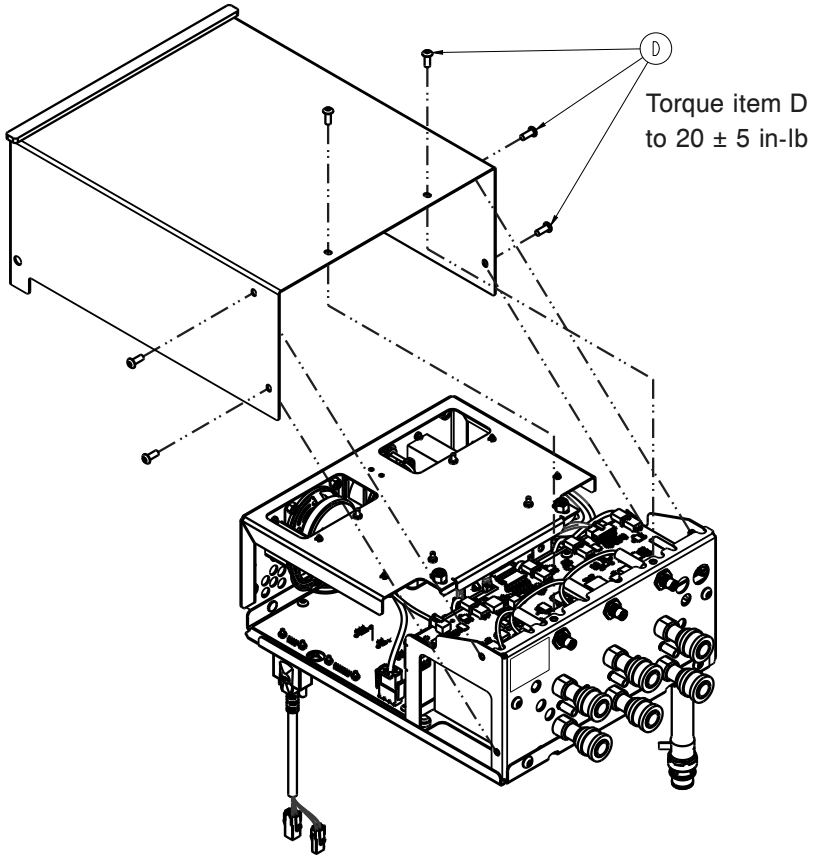
8001-123-410 100-200V (Contact customer service for revision)

8001-233-410 220-240V (Contact customer service for revision)




U
AK
Torque item C
to 25 ± 5 in-lb
C
AC
C
Torque item C
to 25 ± 5 in-lb
C
Torque item G
to 25 ± 5 in-lb
G
G
V
C
G
Torque items C and G
to 25 ± 5 in-lb
G
T
P
C
Torque item C
to 25 ± 5 in-lb
K
A
Torque item A
to 4 ± 1 in-lb
AL
L


AJ
AJ
N

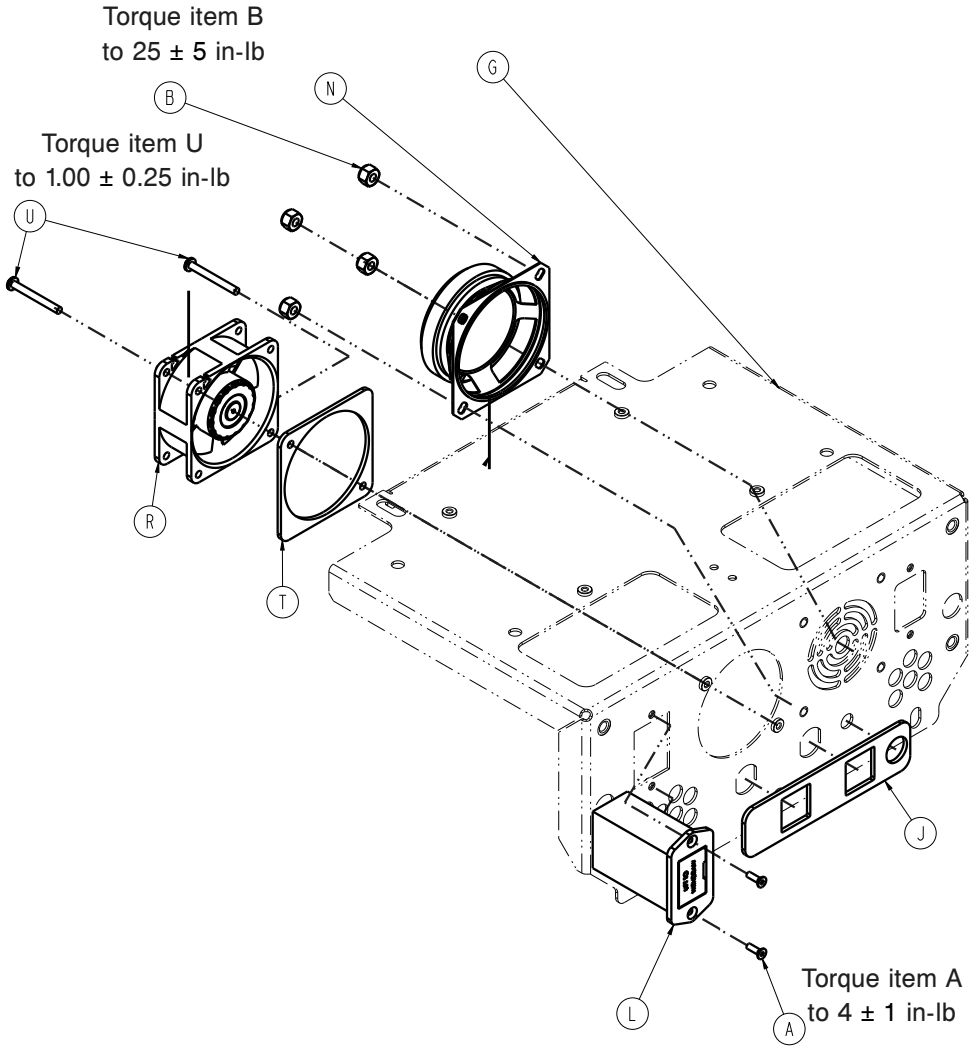


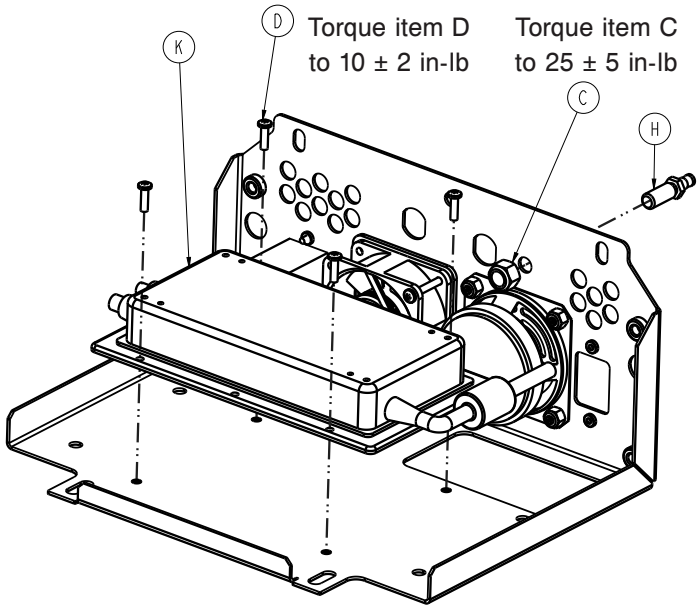
Item	Number	Name	Quantity
A	0001-107-000	Flat head cap screw	2
C	0004-588-000	Button head cap screw	9
D	0004-634-000	Button head cap screw with patch	15
E	0016-003-000	Nylock hex nut	1
F	0016-007-000	Fiberlock hex nut	4
G	0016-028-000	Fiberlock hex nut	4
K	0059-240-000	Power line filter	1
L	0059-271-000	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
AJ	0059-434-000	3848 wire clip	4

Item	Number	Name	Quantity
AK	8001-065-895	Control box fan extension cable assembly	1
AL	8001-001-027	Battery/fuse label	2

Power supply assembly

8001-000-460 (Contact customer service for revision)

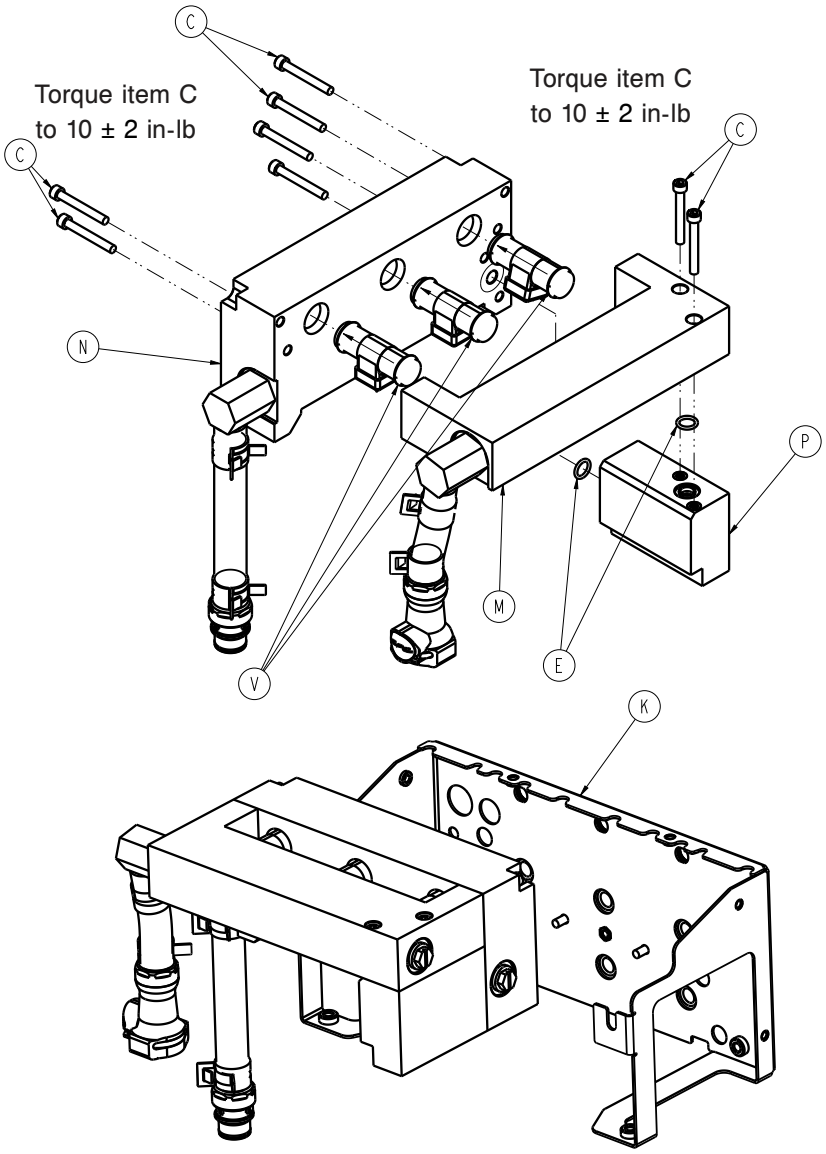


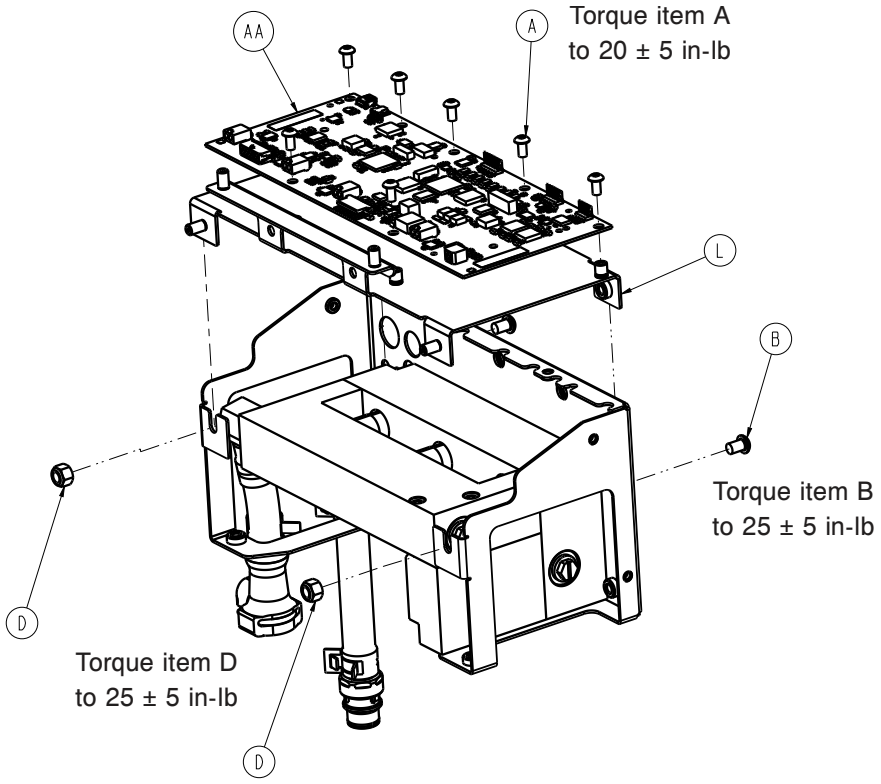


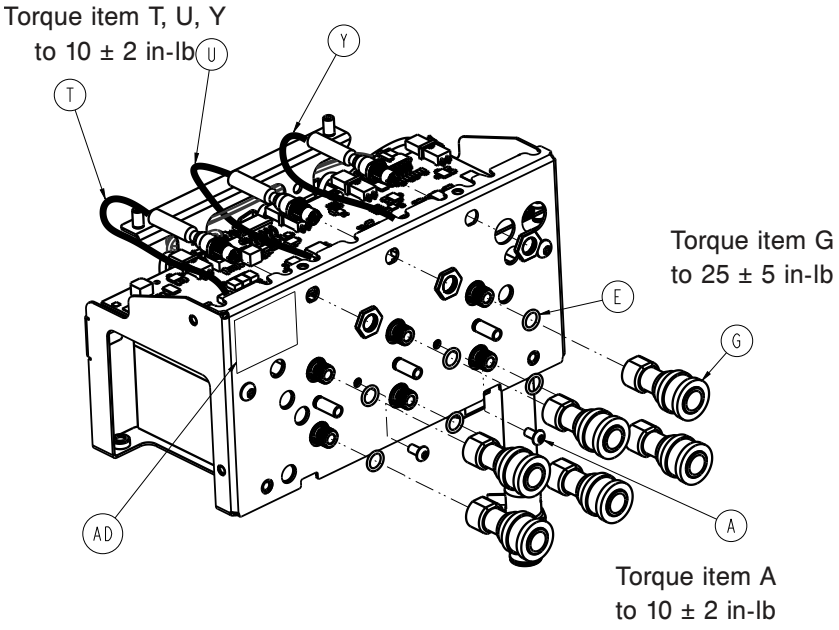
Item	Number	Name	Quantity
A	0001-107-000	Flat head cap screw	2
B	0016-014-000	Fiberlock hex nut	4
C	0016-036-000	Nylock hex nut	1
D	0050-032-000	Pan head machine screw	4
E	0058-372-000	9V battery (not shown)	1
G	8001-000-461	Power supply mount	1
H	8001-000-481	Grounding lug	1
J	8001-000-474	Speaker gasket	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

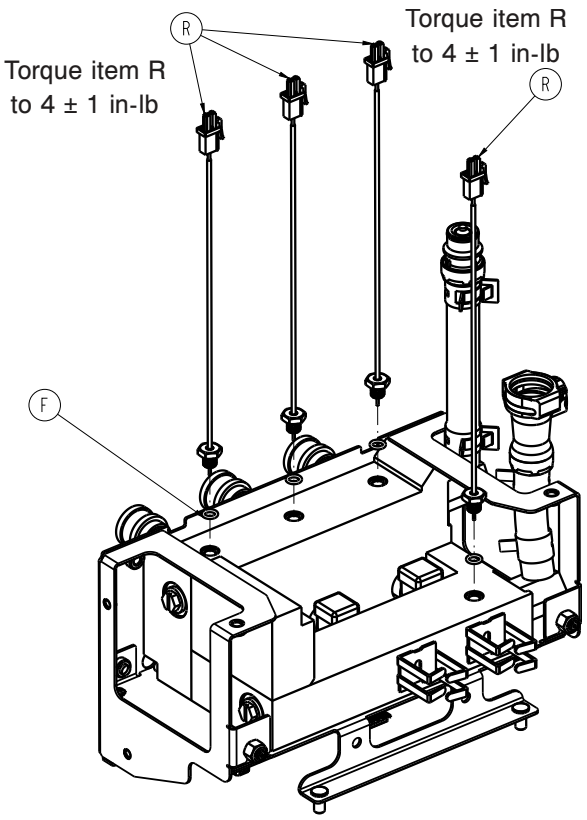
Manifold assembly

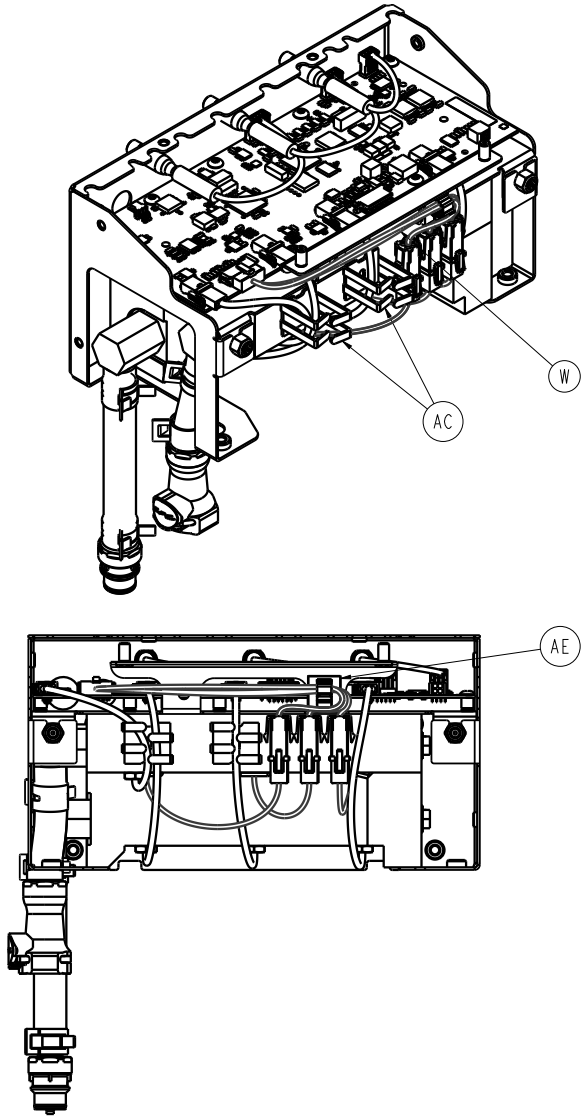
8001-100-420 (Contact customer service for revision)




AA
A
Torque item A
to 20 ± 5 in-lb
L
B
Torque item B
to 25 ± 5 in-lb
D
Torque item D
to 25 ± 5 in-lb
D


Torque item T, U, Y
to 10 ± 2 in-lb
U
Y
T
Torque item G
to 25 ± 5 in-lb
E
G
AD
A
Torque item A
to 10 ± 2 in-lb


R
Torque item R
to 4 ± 1 in-lb
Torque item R
to 4 ± 1 in-lb
R
F

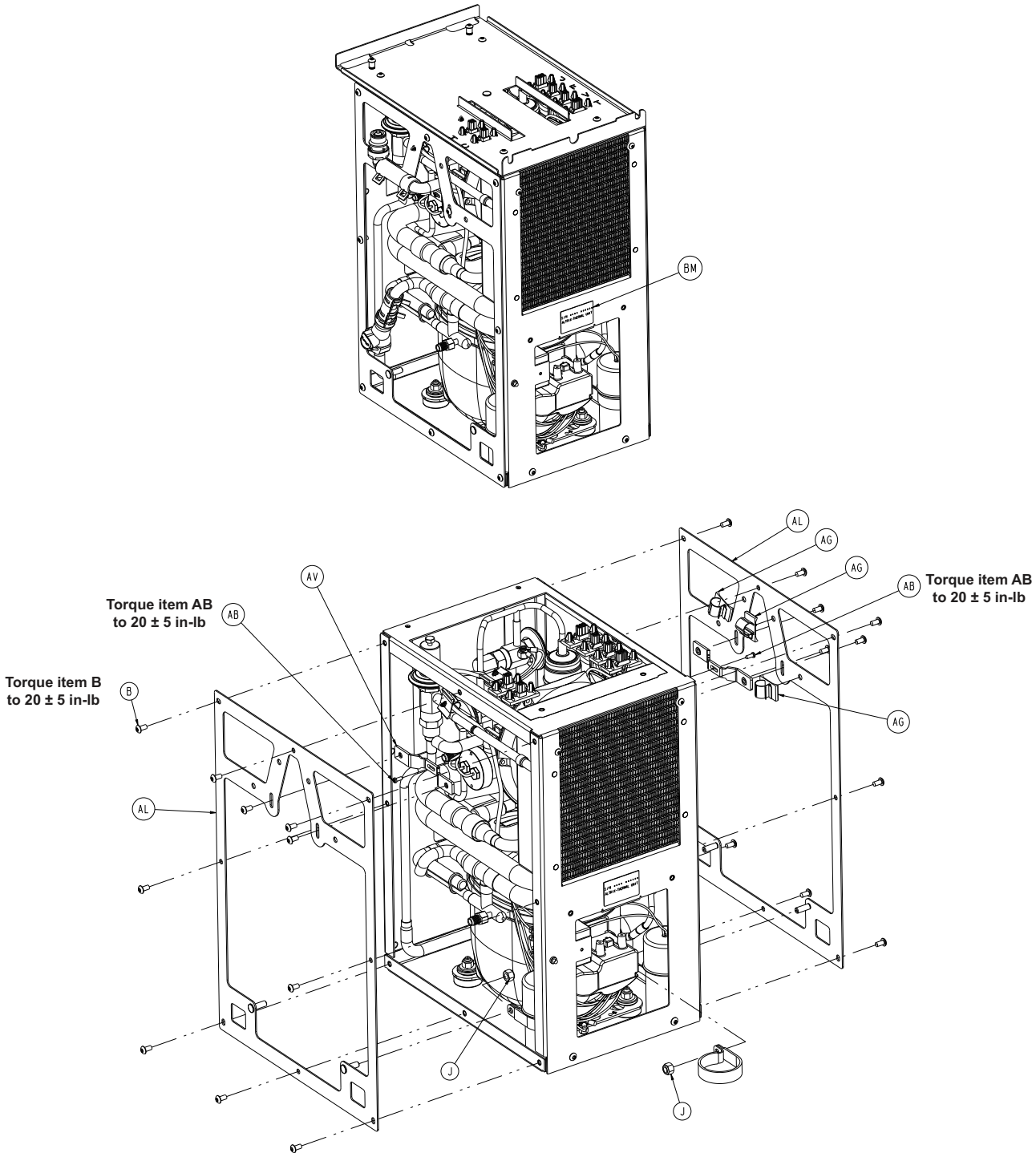


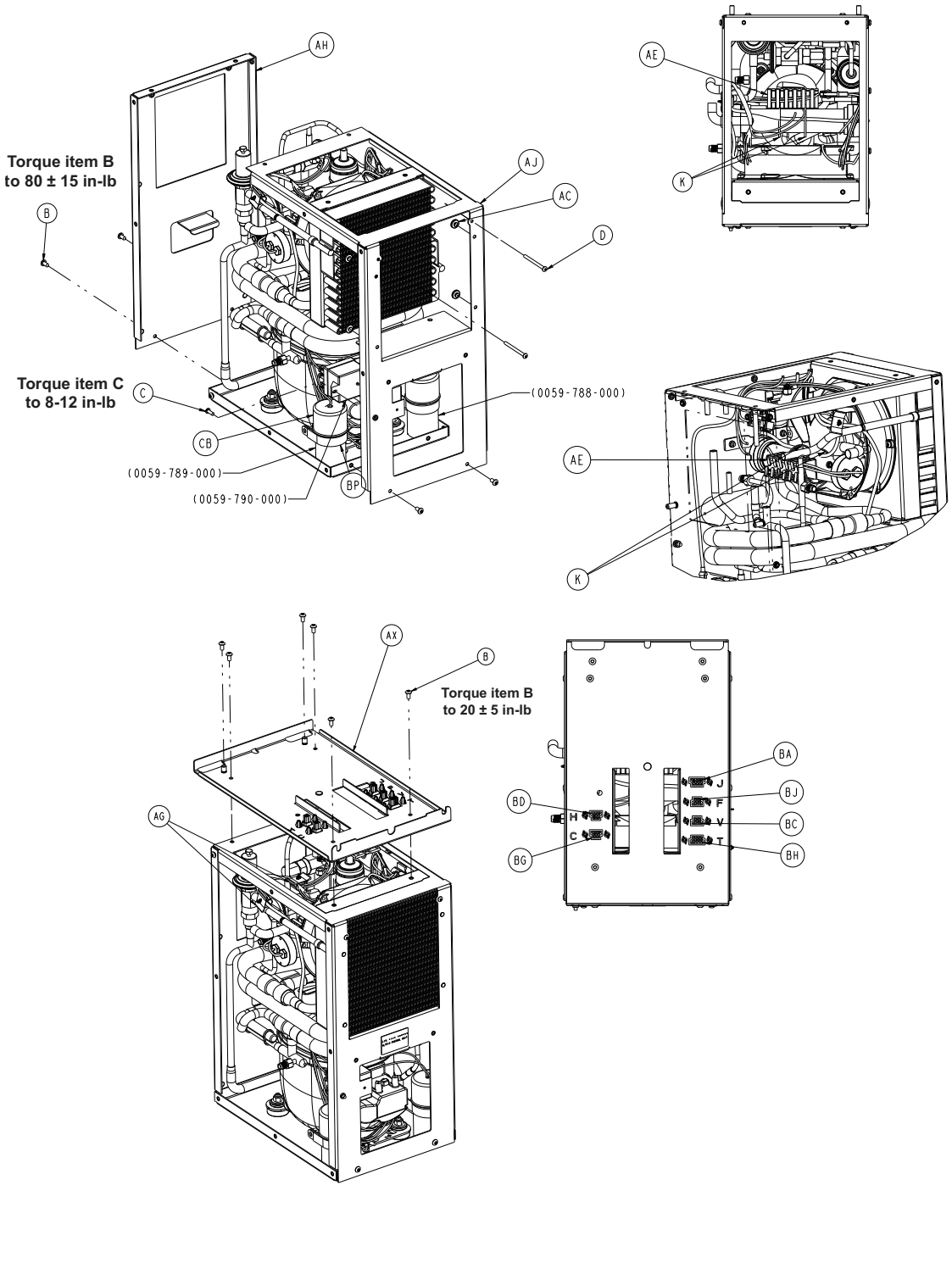
Item	Number	Name	Quantity
A	0004-587-000	Button head cap screw with patch	9
B	0004-588-000	Button head cap screw	2
C	0004-859-000	Socket head cap screw with patch	8
D	0016-028-000	Fiberlock hex nut	2
E	0045-411-000	O-ring	8
F	0045-412-000	O-ring	4
G	0048-283-000	Hydraulic connector	6
K	8001-000-451	Bracket 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
U	8001-065-870	Patient temperature replicator cable assembly	1
V	8001-065-887	System flow sensor cable assembly	3

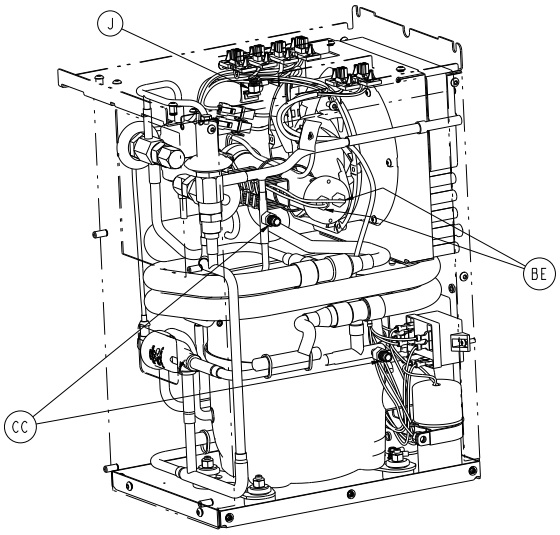
Item	Number	Name	Quantity
W	8001-065-888	MCB to flow sensor cable assembly	1
Y	8001-065-891	Patient temperature port cable assembly (input)	1
AA	8001-400-800	*Main control board (MCB) assembly* (page 80)	1
AB	0045-996-000	Super O-Lube	A/R
AC	0059-432-000	Flexible wire duct	A/R
AD	8001-001-426	Label, serial number, Altrix, control assembly	1
AE	0059-433-000	3846 wire clip	1

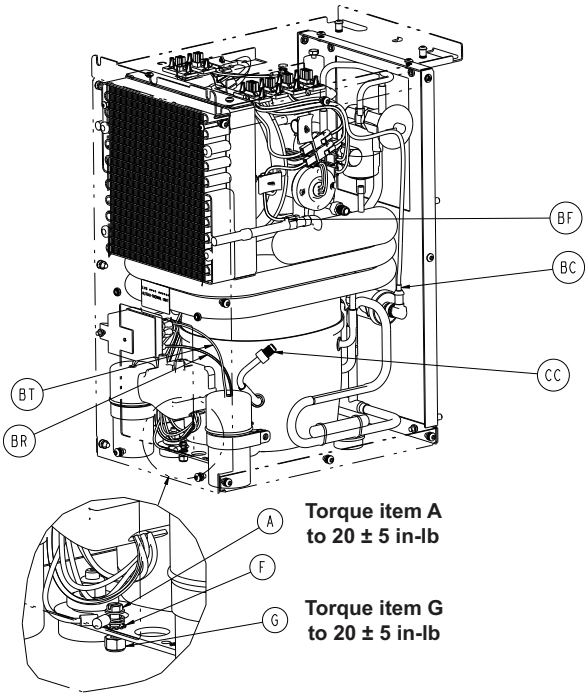
Thermal unit, 100V

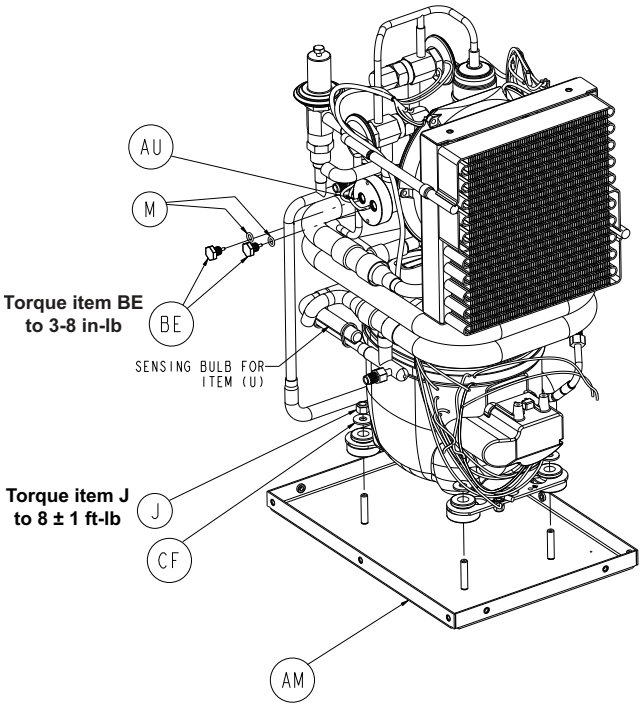
8001-100-311 100V 50/60 Hz (Contact customer service for revision)

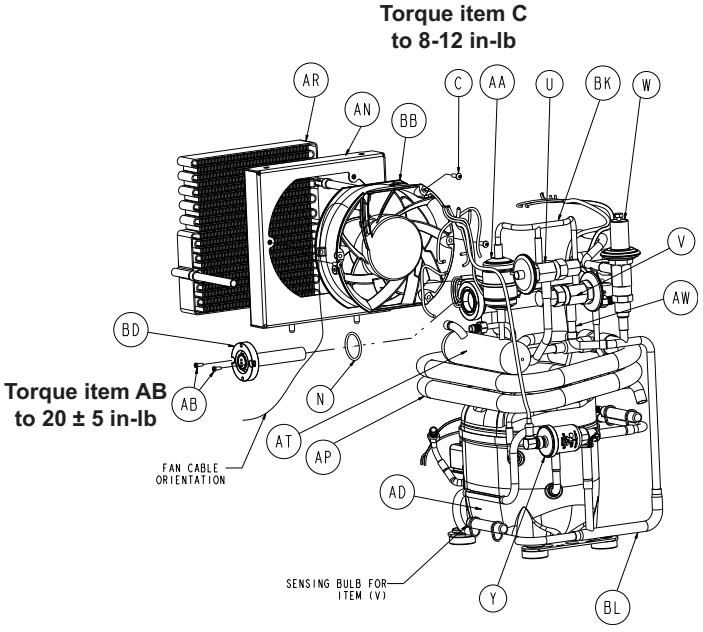


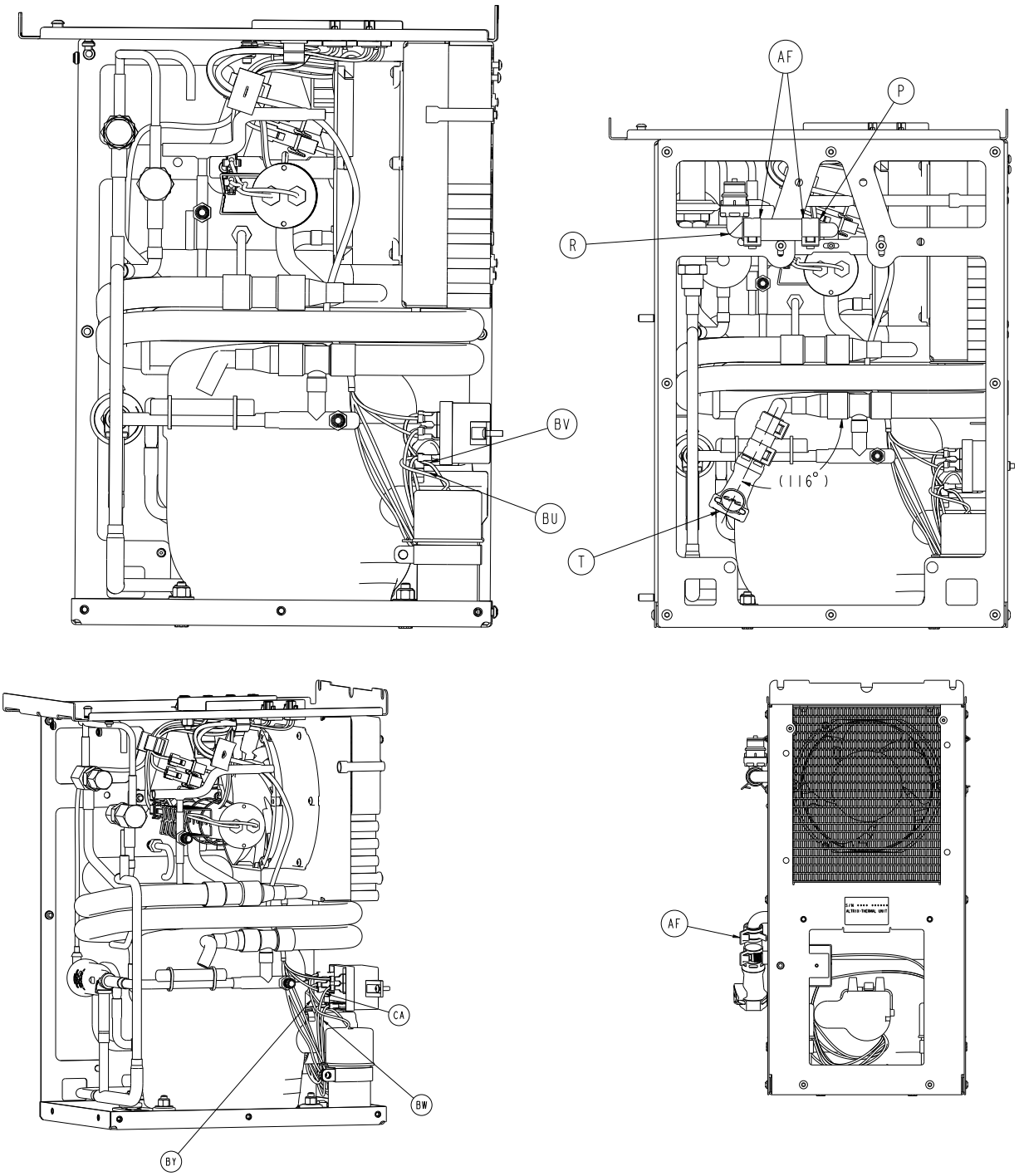

AH
AE
Torque item B
to 80 ± 15 in-lb
AJ
AC
B
D
K
Torque item C
to 8-12 in-lb
C
(0059-788-000)
CB
AE
(0059-789-000)
BP
(0059-790-000)
K
AX
B
Torque item B
to 20 ± 5 in-lb
BA
BD
BJ
H
J
F
BC
V
C
T
BG
BH
AG


J
BE
CC


BF
BC
CC
BT
BR
A
F
G
Torque item A
to 20 ± 5 in-lb
Torque item G
to 20 ± 5 in-lb


AU
M
Torque item BE
to 3-8 in-lb
BE
SENSING BULB FOR
ITEM (U)
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
Torque item AB
to 20 ± 5 in-lb
AB
N
AT
AP
FAN CABLE
ORIENTATION
AD
SENSING BULB FOR
ITEM (V)
Y
BL



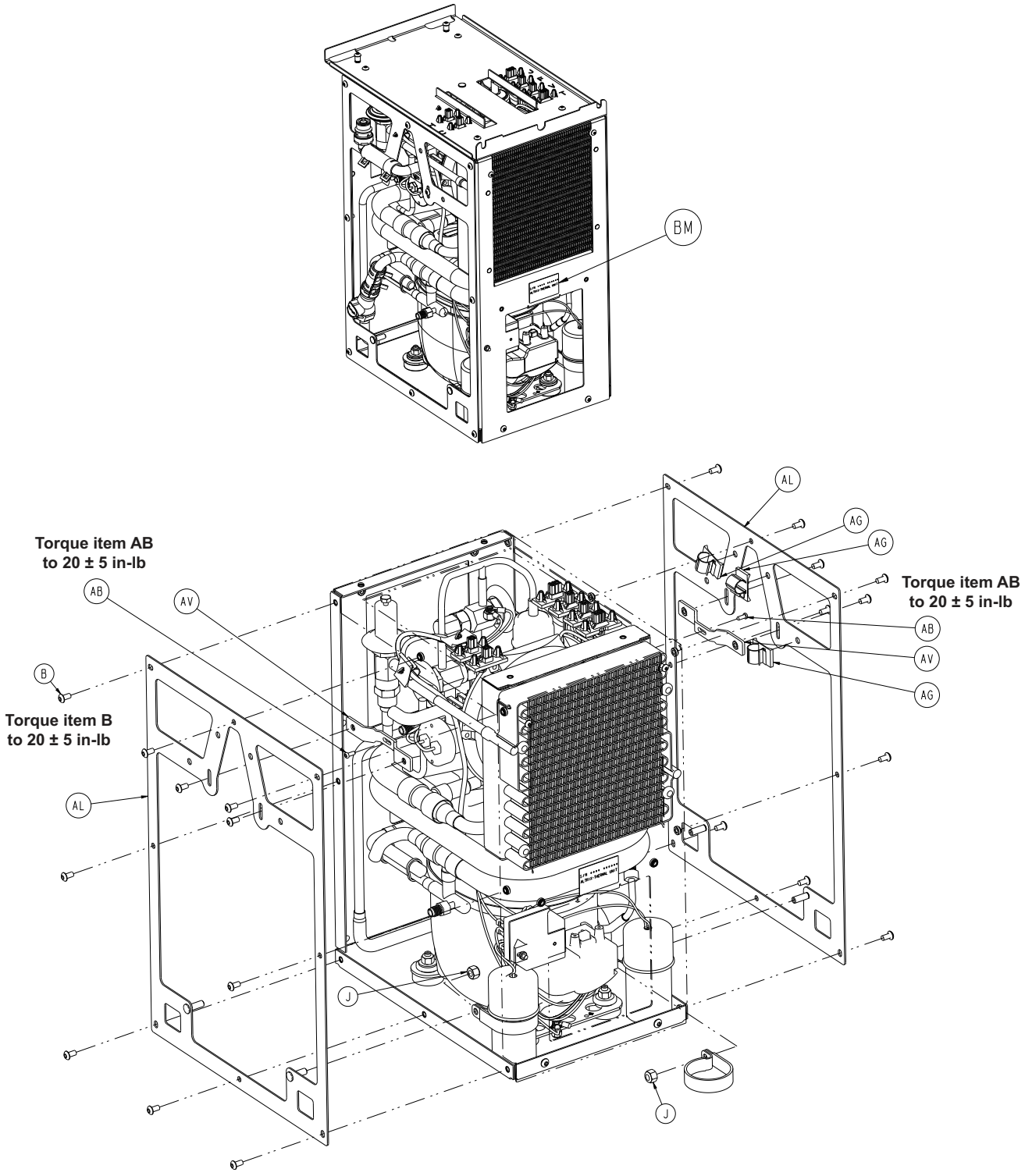
Item	Number	Name	Quantity
A	0003-364-000	#8-32 Hex washer head, slotted, thread cutting screw	1
B	0004-587-000	Button head cap screw with patch	30
C	0004-876-000	Button head cap screw with patch	5
D	0004-877-000	Button head cap screw with patch	2
F	0013-018-000	External tooth lock washer	1
G	0016-014-000	Fiberlock hex nut	1
J	0016-028-000	Fiberlock hex nut	7
K	-	Plastic cable tie	2
M	0045-412-000	O-ring	2

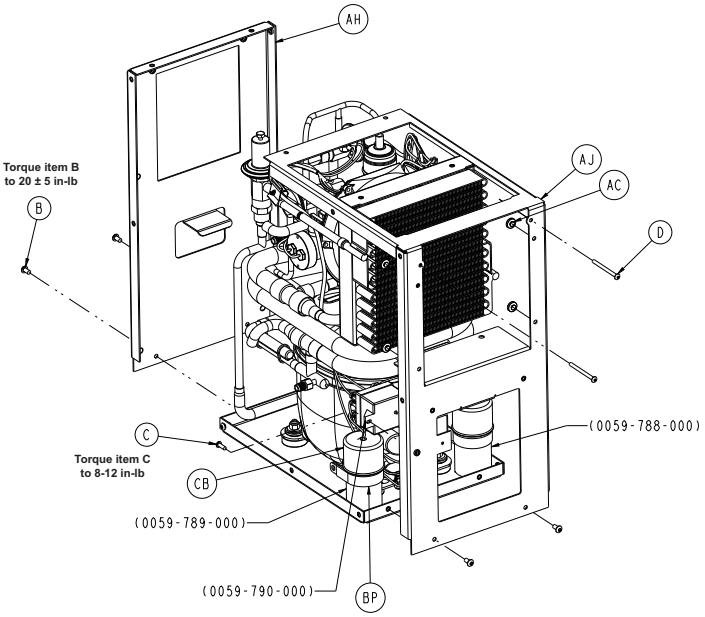
Item	Number	Name	Quantity
N	0045-414-000	O-ring	1
P	0048-180-000	Tubing	A/R
R	0048-409-000	Hose barb valved elbow insert	1
T	0048-182-000	Barb valved in-line coupling body	1
U	0048-261-000	Main expansion valve	1
V	0048-262-000	Bypass expansion valve	1
W	0048-263-000	Bypass pressure valve	1
Y	0048-337-000	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	Wire clip	5
AH	8001-000-332	Front support, thermal unit	1
AJ	8001-000-333	Back support, thermal unit	1
AL	8001-000-335	Side panel, thermal unit	2
AM	8001-000-340	Compressor mount bracket	1
AN	8001-100-351	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	8001-065-377	Cable assembly, refrigeration fan	1
BC	8001-065-376	Cable assembly, refrigeration valve	1
BD	8001-065-393	Cable assembly, 100V heater	1
BE	8001-065-860	Cable assembly, temperature probe	2
BF	8001-065-861	Cable assembly, refrigeration temperature probe	1
BG	8001-065-890	Cable assembly, hybrid compressor	1
BH	8001-065-867	Cable assembly, temperature probe extension	1
BJ	8001-065-875	Cable assembly, fan extension	1
BK	7400-010-012	Copper tube, 1/4”	A/R
BL	7400-010-013	Copper tube, 3/8”	A/R
BM	8001-001-326	Label, serial number Altrix, thermal unit	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

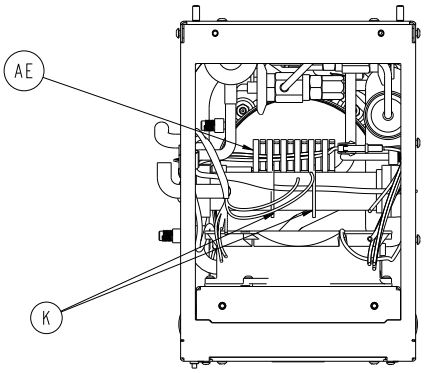
Item	Number	Name	Quantity
BY	8001-065-902	Cable assembly, compressor cable #6	1
CA	8001-065-903	Cable assembly, compressor cable #7	1
CB	0059-794-000	Capacitor boot	2
CC	A31724	Schrader valve	3
CD	0045-996-000	Super O-lube	A/R
CF	0011-206-000	Plain washer	4

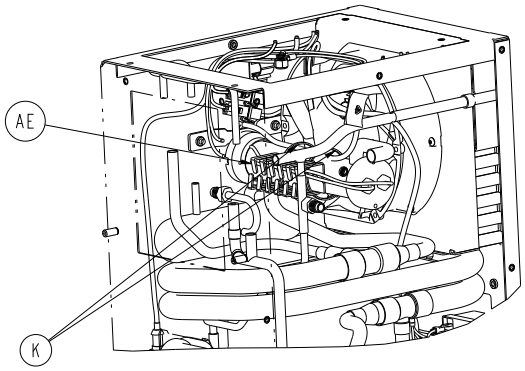
Thermal unit, 120V 60Hz - 8001-120-311

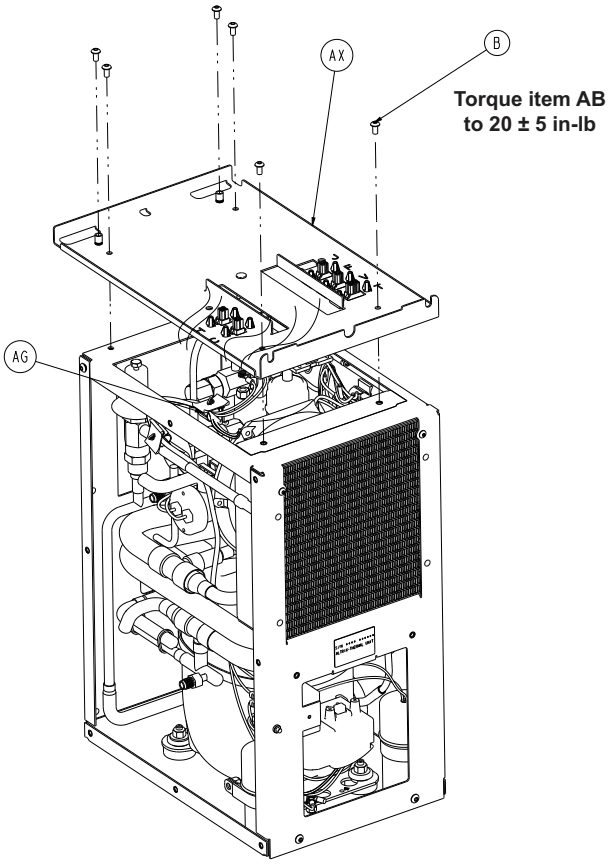
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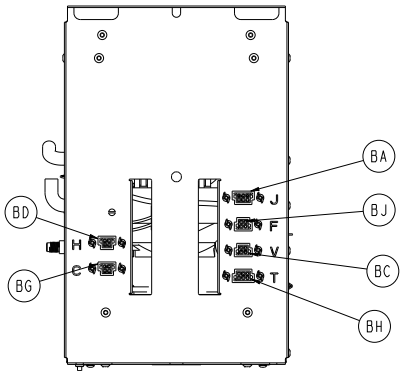


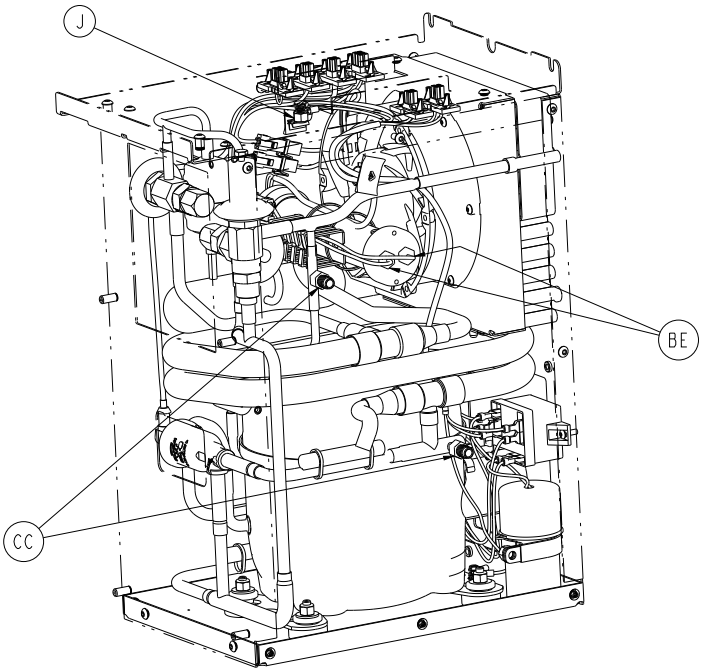

AH
Torque item B
to 20 ± 5 in-lb
B
AJ
AC
D
C
Torque item C
to 8-12 in-lb
CB
(0059-788-000)
(0059-789-000)
(0059-790-000)
BP

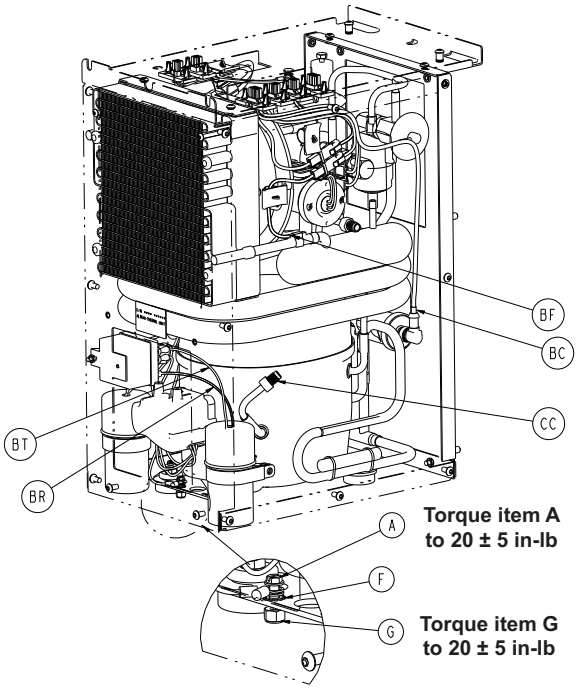

AE
K

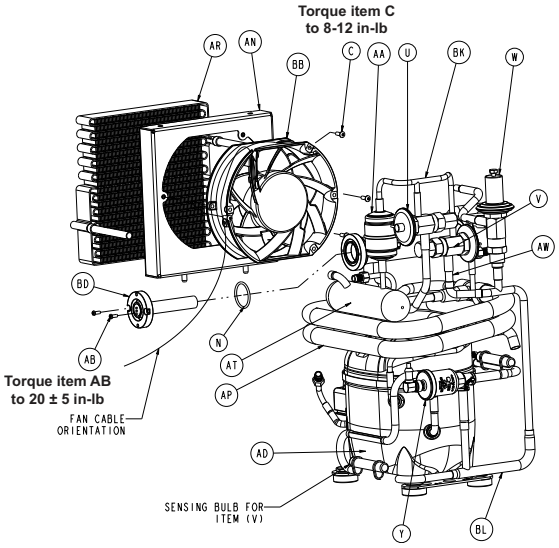

AE
K

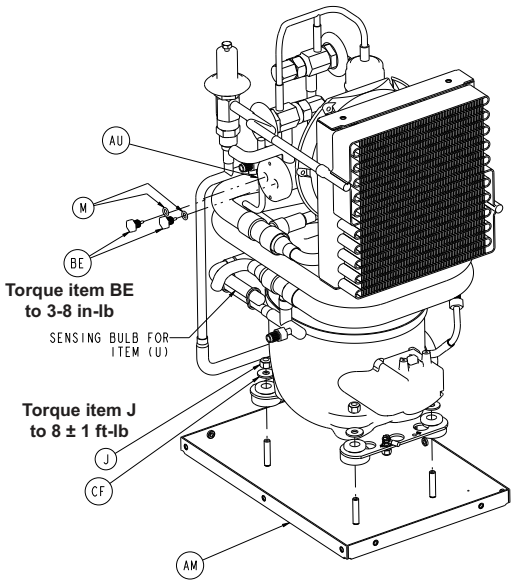

AX
B
Torque item AB
to 20 ± 5 in-lb
AG

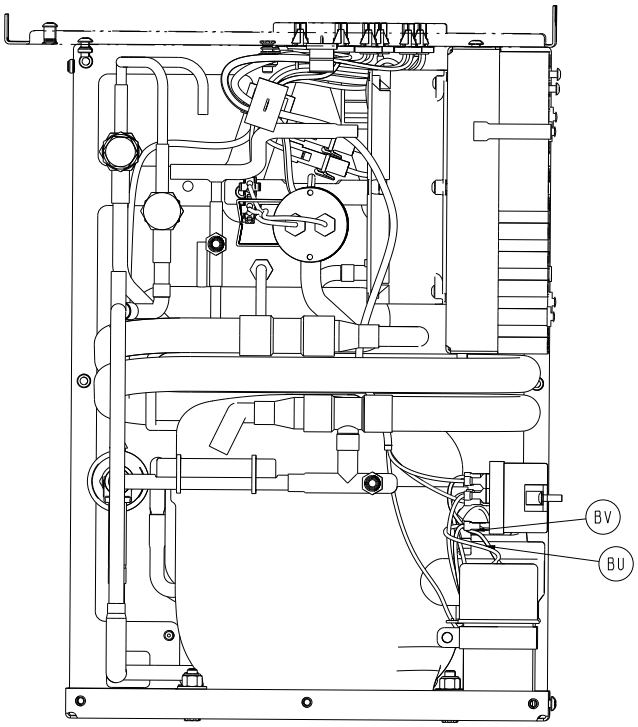

BA
BD
J
BJ
H
F
V
BC
BG
T
BH

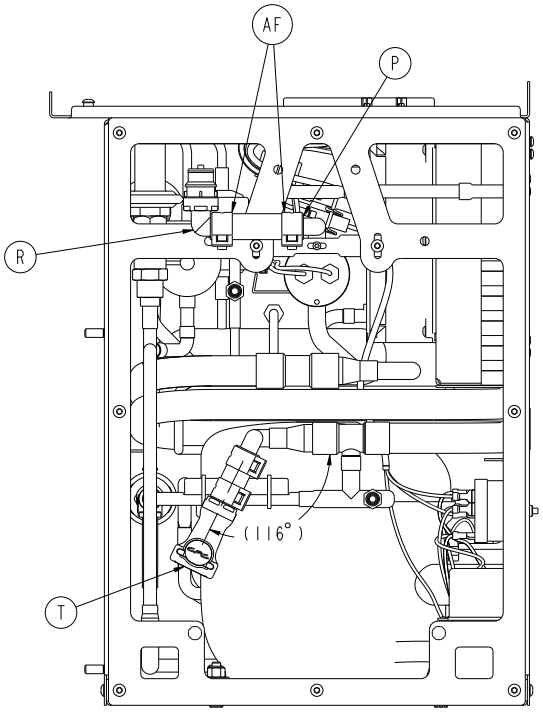

J
BE
CC

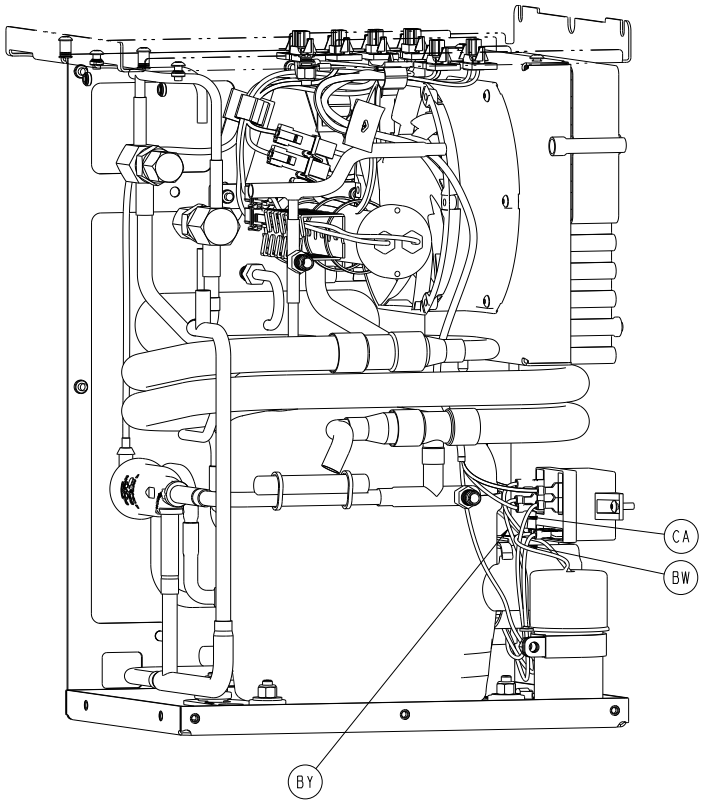

BF
BC
CC
BT
BR
A
F
G
Torque item A
to 20 ± 5 in-lb
Torque item G
to 20 ± 5 in-lb

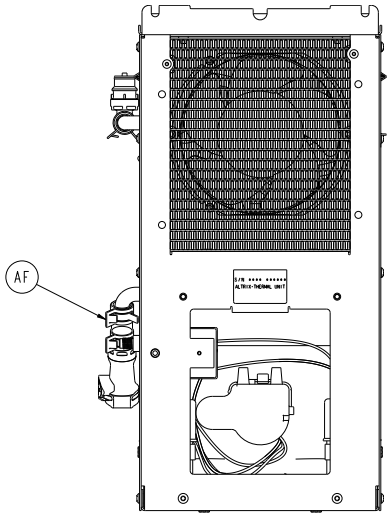

Torque item C
to 8-12 in-lb
AR
AN
BB
C
AA
U
BK
W
V
AW
BD
AB
N
AT
AP
AD
Torque item AB
to 20 ± 5 in-lb
FAN CABLE
ORIENTATION
SENSING BULB FOR
ITEM (V)
Y
BL


AU
M
BE
Torque item BE
to 3-8 in-lb
SENSING BULB FOR
ITEM (U)
Torque item J
to 8 ± 1 ft-lb
J
CF
AM









Item	Number	Name	Quantity
A	0003-364-000	#8-32 Hex washer head, slotted, thread cutting screw	1
B	0004-587-000	Button head cap screw with patch	30
C	0004-876-000	Button head cap screw with patch	5

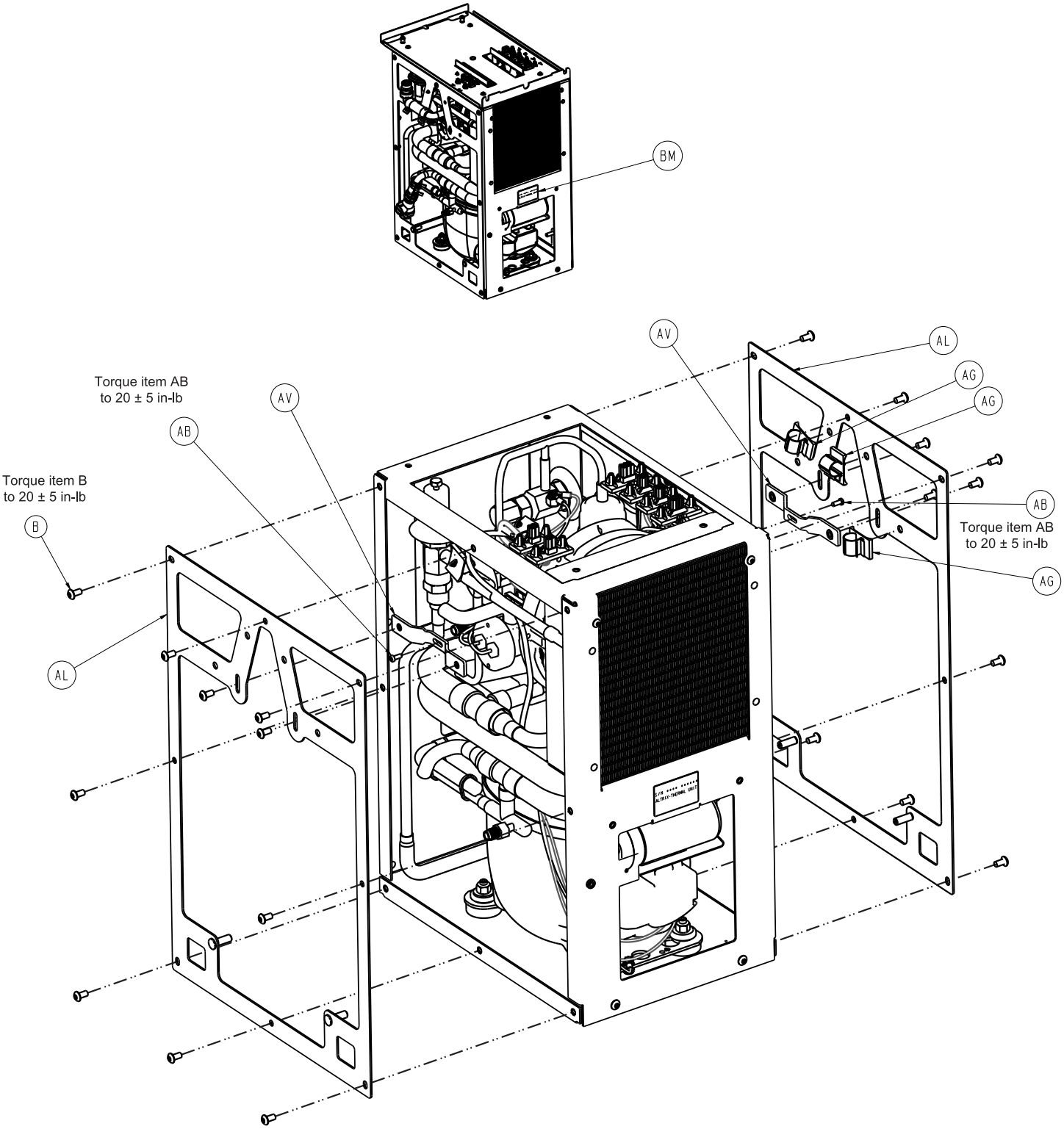
Item	Number	Name	Quantity
D	0004-877-000	Button head cap screw with patch	2
F	0013-018-000	External tooth lock washer	1
G	0016-014-000	Fiberlock hex nut	1
J	0016-028-000	Fiberlock hex nut	7
K	-	Plastic cable tie	2
M	0045-412-000	O-ring	2
N	0045-414-000	O-ring	1
P	0048-180-000	Tubing	A/R
R	0048-409-000	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	Wire clip	5
AH	8001-000-332	Front support, thermal unit	1
AJ	8001-000-333	Back support, thermal unit	1
AL	8001-000-335	Side panel, thermal unit	2
AM	8001-000-340	Compressor mount bracket	1
AN	8001-100-351	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	8001-065-377	Cable assembly, refrigeration fan	1
BC	8001-065-376	Cable assembly, refrigeration valve	1
BD	8001-065-391	Cable assembly, 120V heater	1
BE	8001-065-860	Cable assembly, temperature probe	2
BF	8001-065-861	Cable assembly, refrigeration temperature probe	1
BG	8001-065-890	Cable assembly, hybrid compressor	1
BH	8001-065-867	Cable assembly, temperature probe extension	1
BJ	8001-065-875	Cable assembly, fan extension	1
BK	7400-010-012	Copper tube, 1/4”	A/R
BL	7400-010-013	Copper tube, 3/8”	A/R
BM	8001-001-326	Label, serial number Altrix, thermal unit	1

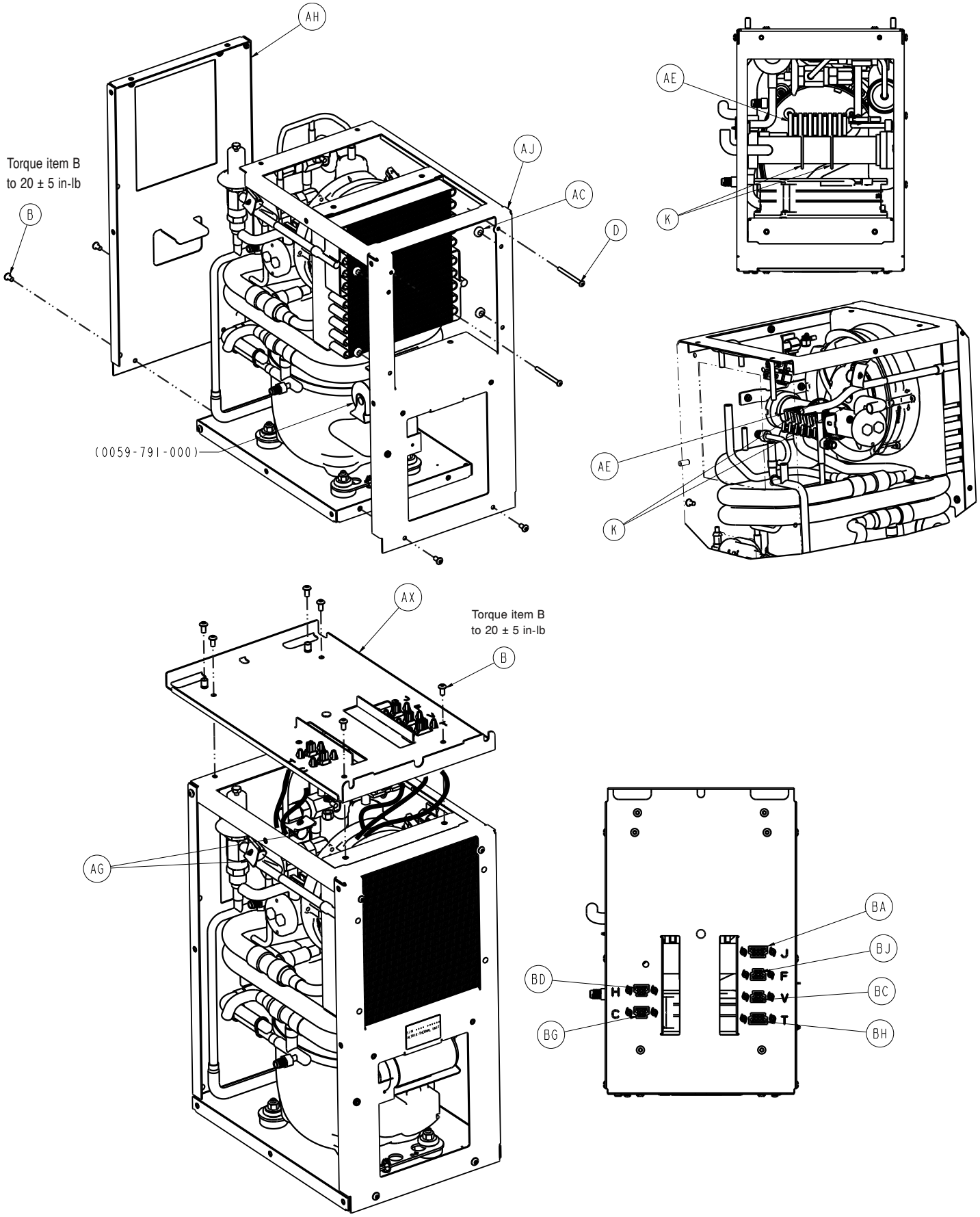
Item	Number	Name	Quantity
BP	0058-561-000	P-clamp	2
BR	8001-065-897	Cable assembly, compressor cable #1	1
BT	8001-065-898	Cable assembly, compressor cable #2	1
BU	8001-065-899	Cable assembly, compressor cable #3	1
BV	8001-065-900	Cable assembly, compressor cable #4	1
BW	8001-065-901	Cable assembly, compressor 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	A31724	Schrader valve	3
CD	0045-996-000	Super O-lube	A/R
CF	0011-206-000	Plain washer	4

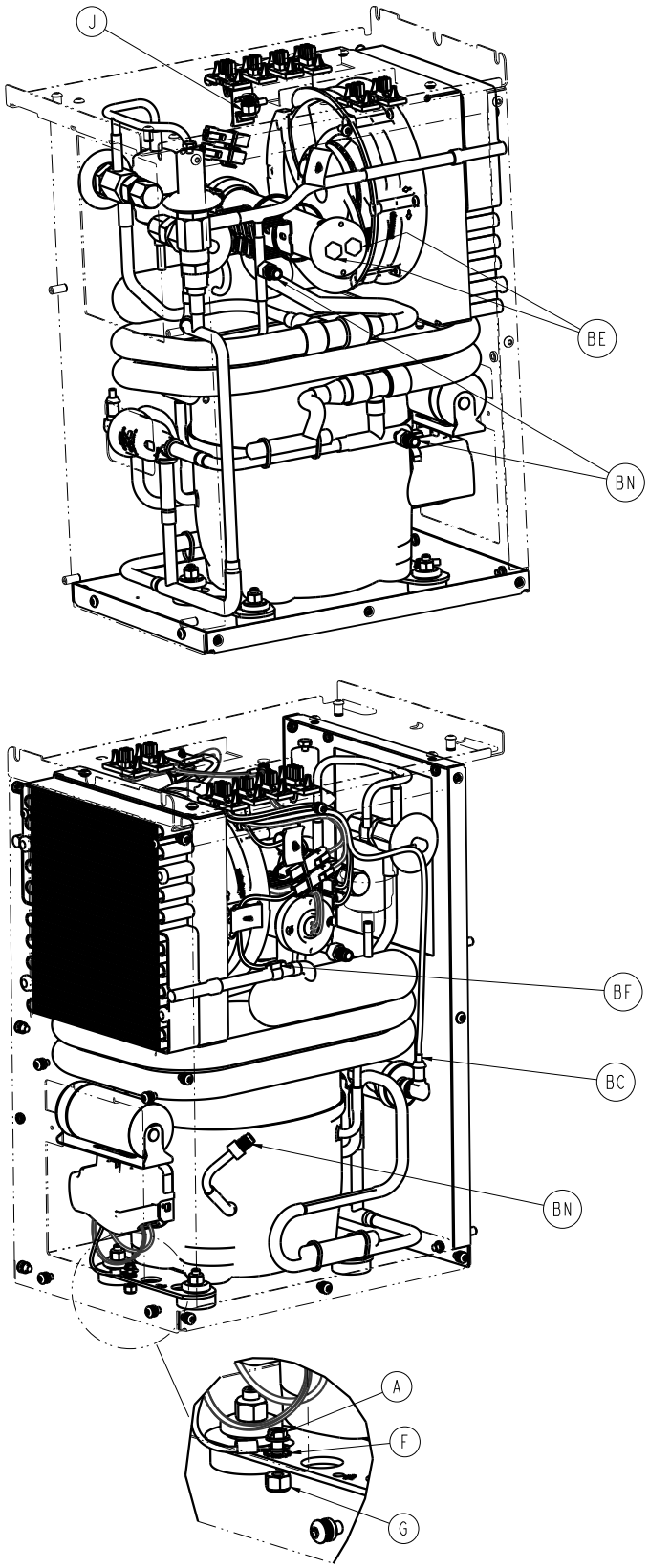
Thermal unit, 220-240 V

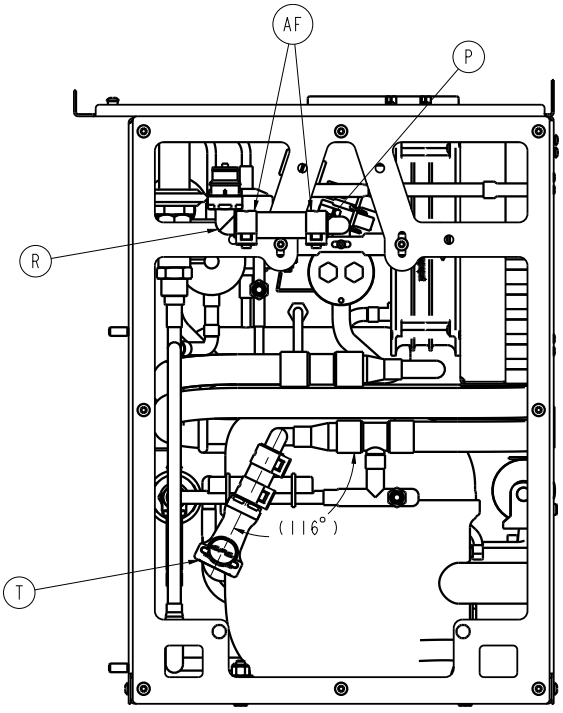
8001-220-310 220 V 60 Hz (Contact customer service for revision)

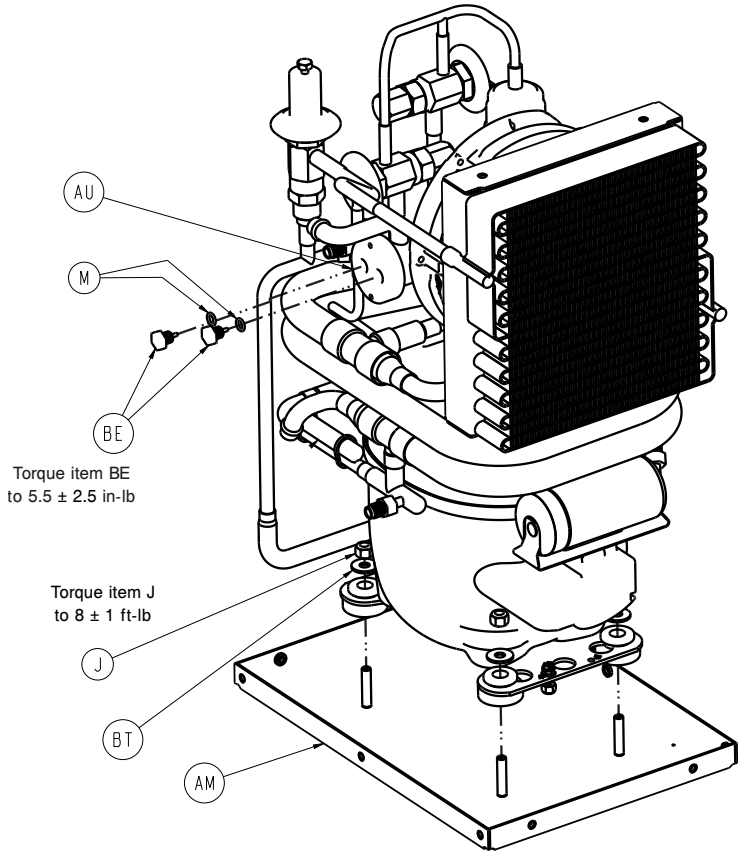
8001-230-310 220-240 V 50 Hz (Contact customer service for revision)

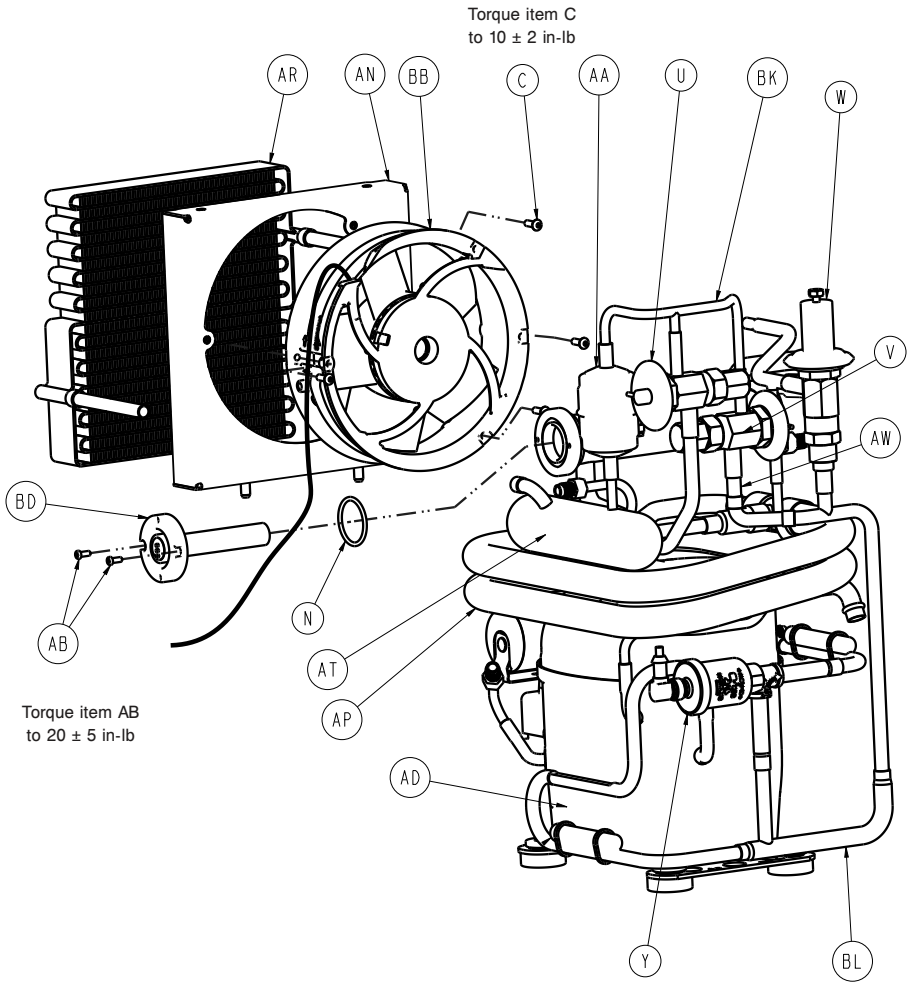


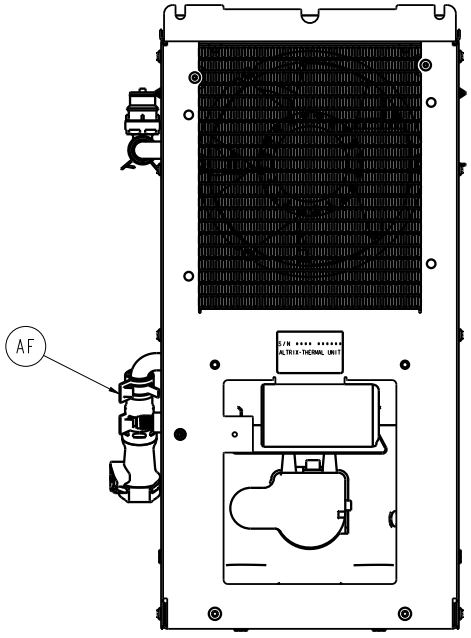

AH
Torque item B
to 20 ± 5 in-lb
B
AJ
AC
D
(0059-791-000)
AE
K
AE
K
AX
Torque item B
to 20 ± 5 in-lb
B
AG
BA
BJ
BD
BC
BG
BH
J
F
H
V
C
T


J
BE
BN
BF
BC
BN
A
F
G


AF
P
R
(116°)
T


AU
M
BE
Torque item BE
to 5.5 ± 2.5 in-lb
Torque item J
to 8 ± 1 ft-lb
J
BT
AM





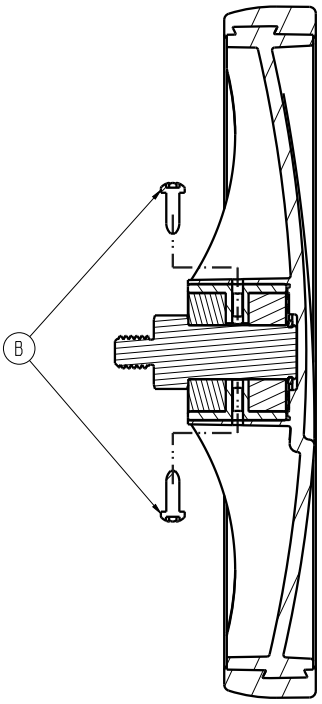
Item	Number	Name	Quantity
A	0003-364-000	#8-32 HWH SLT TCS	1
B	0004-587-000	Button head cap screw with patch	30
C	0004-876-000	Button head cap screw with patch	4
D	0004-877-000	Button head cap screw with patch	2

Item	Number	Name	Quantity
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	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, 208-230 V 60Hz	1
	0059-428-000	Compressor, 220-240 V 50Hz	1
AE	0059-432-000	Flexible wire duct	A/R
AF	0048-265-000	Clamp	4
AG	0059-434-000	Wire clip	5
AH	8001-000-332	Front support, TU	1
AJ	8001-000-333	Back support, TU	1
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 220/230/240 VAC	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, 230 V 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

Item	Number	Name	Quantity
BM	8001-001-326	Label, serial number Altrix, thermal product	1
BN	A31724	Schrader valve	3
BP	0045-996-000	Super O-lube	A/R
BT	0011-206-000	Plain washer	4

Wheel assembly

8001-000-131 (Contact customer service for revision)



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

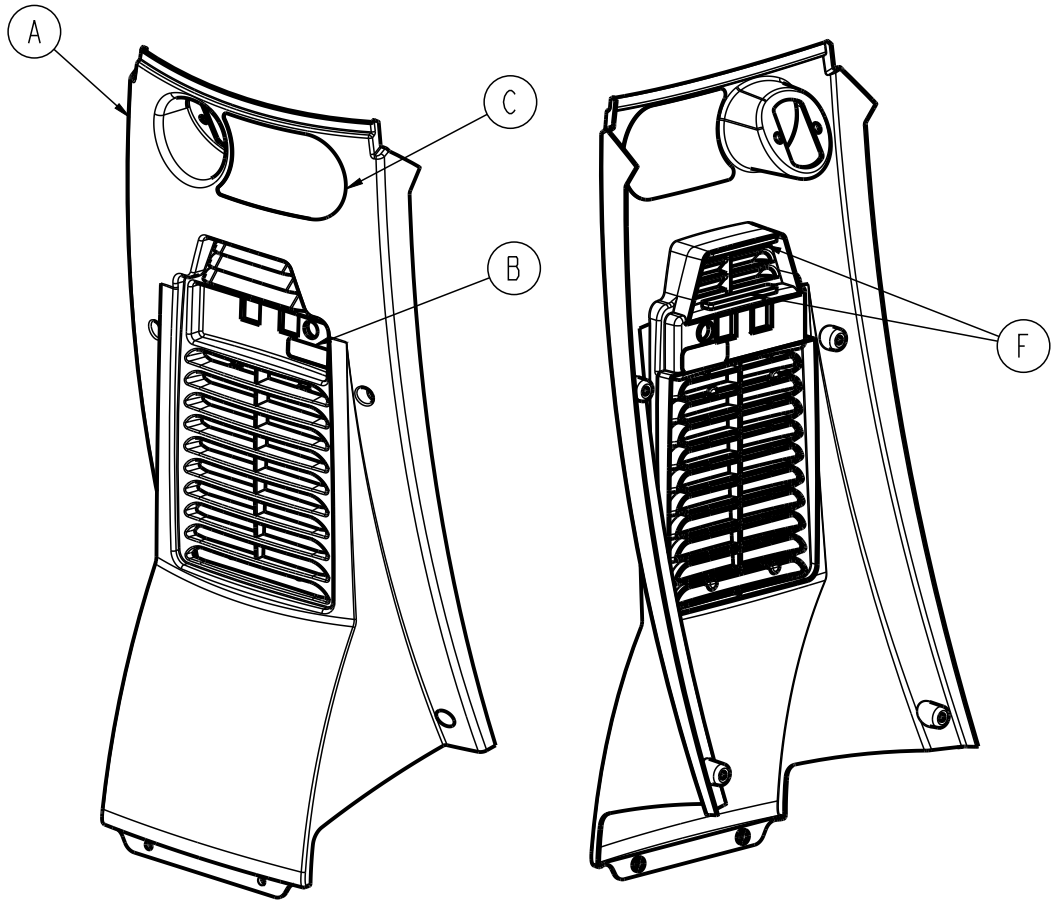
Back cover assembly

8001-007-100 100V (Contact customer service for revision)

8001-007-120 120V (Contact customer service for revision)

8001-007-220 220V (Contact customer service for revision)

8001-007-230 230V (Contact customer service for revision)



Item	Number	Name	Quantity
A	8001-000-161	Back cover	1
B	8001-000-016	Grounding label	1
C	8001-000-042	Label, service specification 100V	1
	8001-000-044	Label, service specification 120V	1
	8001-000-046	Label, service specification 220V	1
	8001-000-048	Label , service specification 230V	1
F	8001-000-403	Foam, condenser inlet	2

EMC Information

CAUTION - This equipment is not intended for use in residential environments and may not provide adequate protection to radio reception in such environments.

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	

Note - The emissions characteristics of this equipment make it suitable for use in industrial areas and hospitals (CISPR 11 class A). If it is used in a residential environment, for which CISPR 11 class B is normally required, this equipment might not offer adequate protection to radio frequency communication services. The user might need to take mitigation measures, such as relocating or reorienting the equipment.

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 2.7 GHz** **D=(0.70) (√*P*)**
0.01	0.12	0.035	0.07
0.1	0.38	0.11	0.22

Recommended separations distances between portable and mobile RF communications equipment and the Altrix system			
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	±8 kV contact ±15 kV air	±8 kV contact ±15 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	0% U_T for 0.5 cycle at 0°, 45°, 90°, 135°, 180°, 225°, 270°, and 315° 0% U_T for 1 cycle 70% U_T (30% dip in U_T) for 25 cycles 0% U_T for 250 cycles	0% U_T for 0.5 cycle at 0°, 45°, 90°, 135°, 180°, 225°, 270°, and 315° 0% U_T for 1 cycle 70% U_T> (30% dip in U_T) for 25 cycles 0% U_T for 250 cycles	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	30 A/m	30 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.			

Guidance and manufacturer's declaration - electromagnetic immunity			
Conducted RF IEC 61000-4-6 Radiated RF IEC 61000-4-3	3 Vrms 6 Vrms in ISM bands 150 kHz to 80 MHz 10 V/m 80 MHz to 2.7 GHz	3 V 6 V in ISM bands 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) (√*P*) 80 MHz to 800 MHz D=(0.70) (√*P*) 800 MHz to 2.7 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, [a] 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.

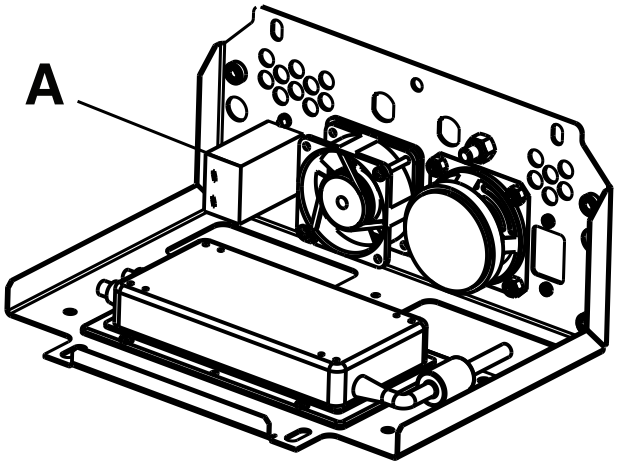
Note - 3- The ISM (industrial, scientific, and medical) bands between 0,15 MHz and 80 MHz are 6,765 MHz to 6,795 MHz; 13,553 MHz to 13,567 MHz; 26,957 MHz to 27,283 MHz; and 40,66 MHz to 40,70 MHz.

[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.

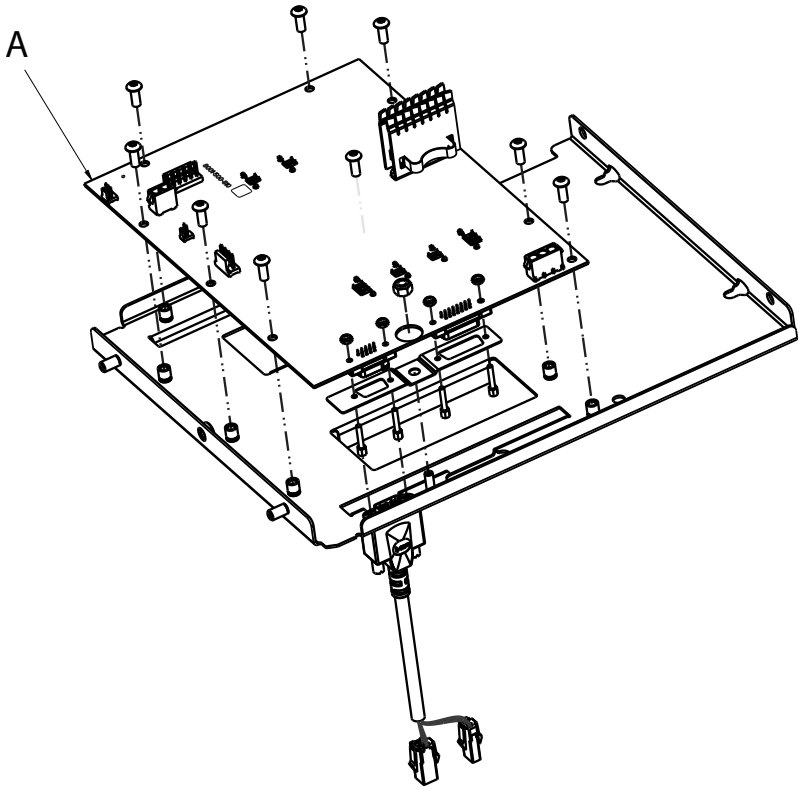
[b] Over the frequency range 150 kHz to 80 MHz, field strengths are less than 3 V/m.

Recycling passport

8001-000-460

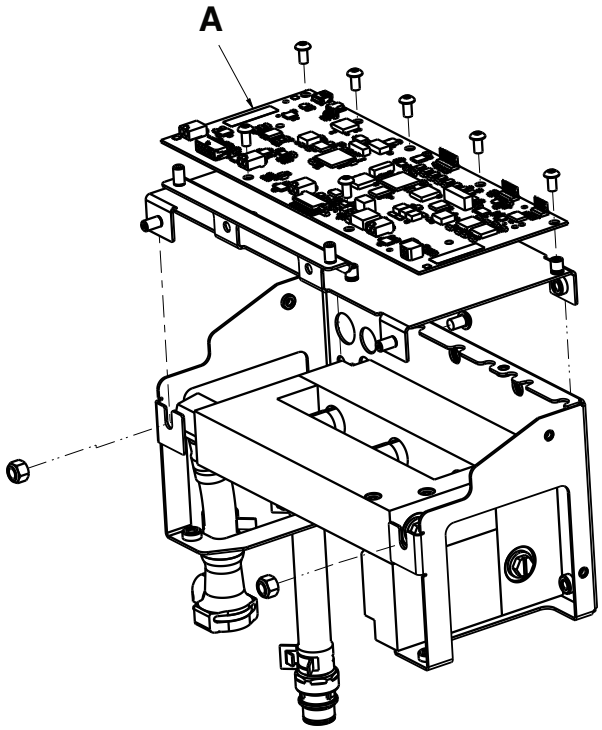


Item	Recyclable part number	Material code	Important information	Quantity
A	0058-372-000	Battery	9V lithium	1



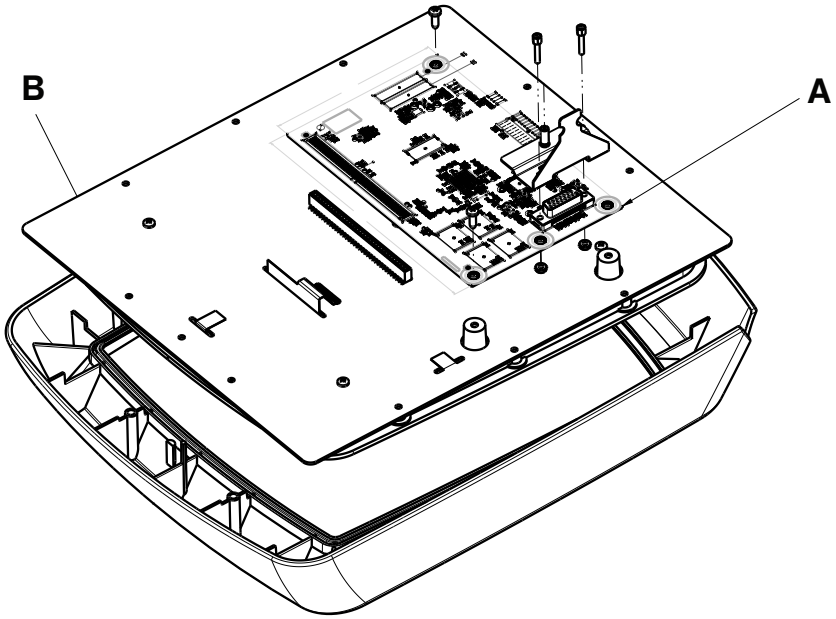
Item	Recyclable part number	Material code	Important information	Quantity
A	8001-500-810 (FMB)	Printed circuit board	N/A	1

8001-100-420



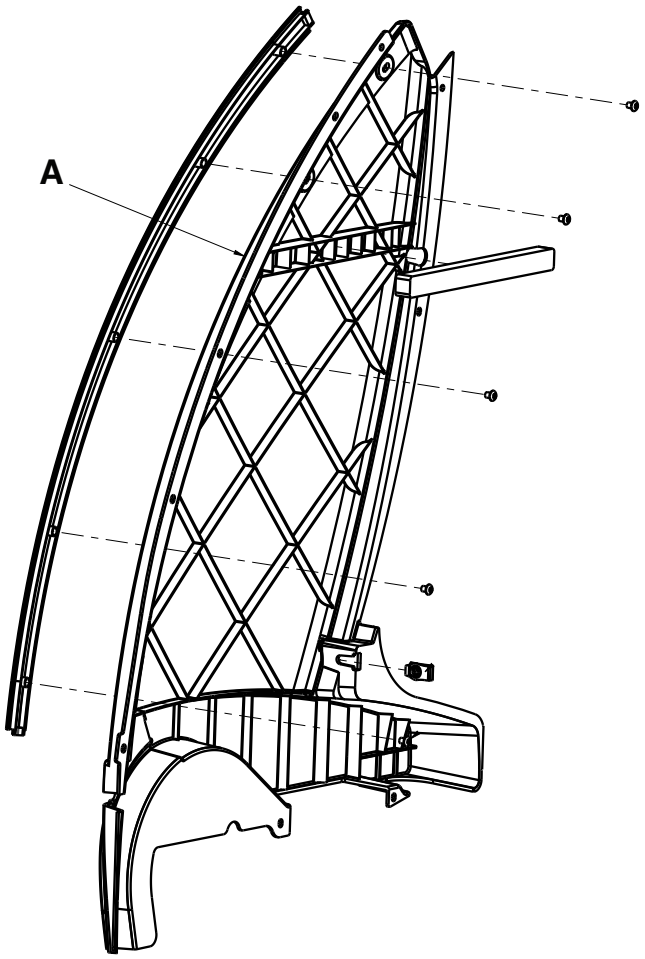
Item	Recyclable part number	Material code	Important information	Quantity
A	8001-400-800 (MCB)	Printed circuit board	N/A	1

8001-000-510



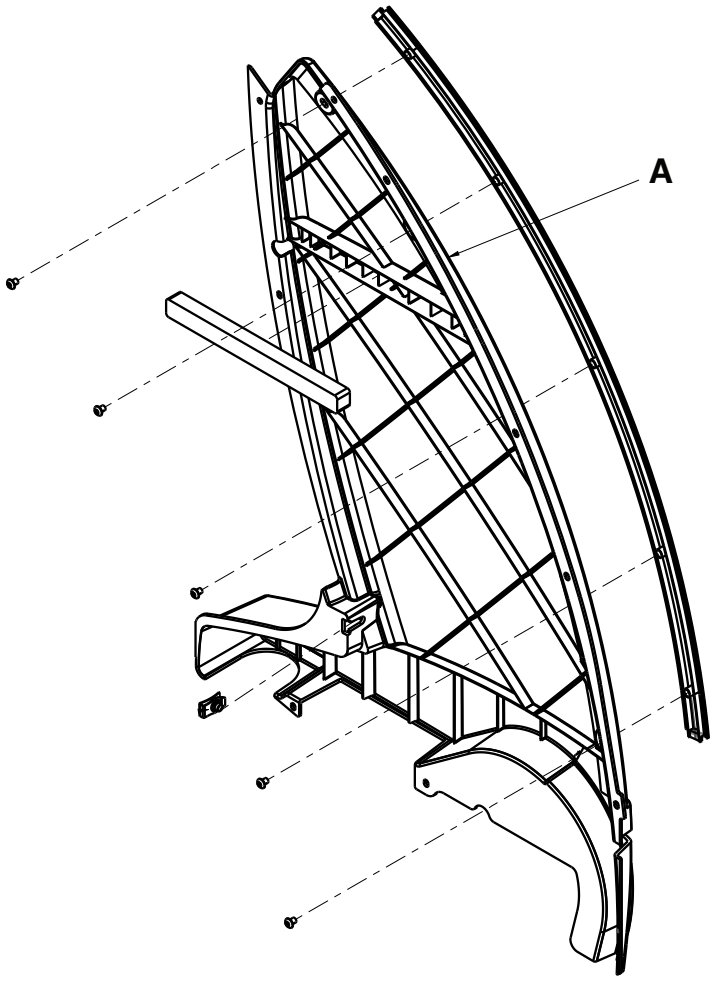
Item	Recyclable part number	Material code	Important information	Quantity
A	8001-300-830 (CCB)	Printed circuit board	N/A	1
B	8001-000-500 (UIB)	Printed circuit board/liquid crystal display	Assembly with (1) circuit board joined to (1) LCD screen	1

8001-000-140

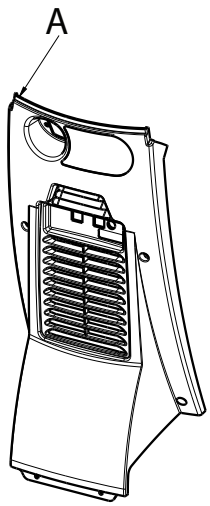


Item	Recyclable part number	Material code	Important information	Quantity
A	8001-000-141	Plastic containing brominated fire retardants	Side cover RH	1

8001-000-145

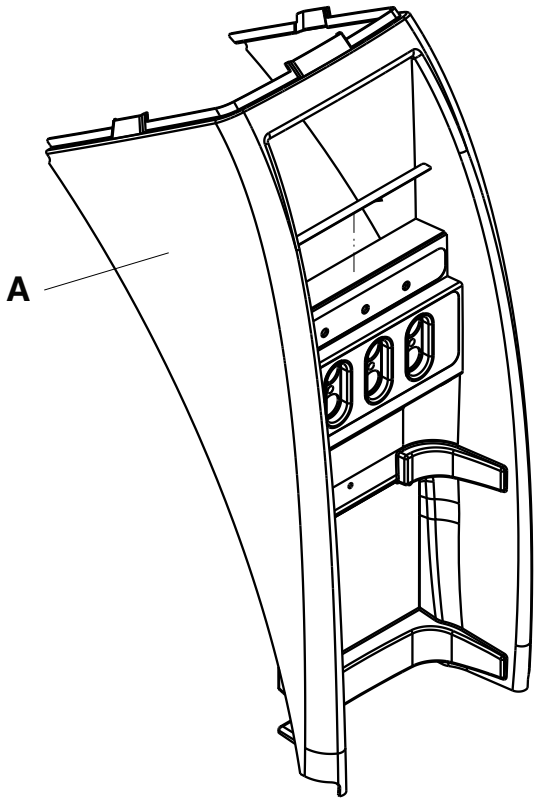


Item	Recyclable part number	Material code	Important information	Quantity
A	8001-000-146	Plastic containing brominated fire retardants	Side cover LH	1



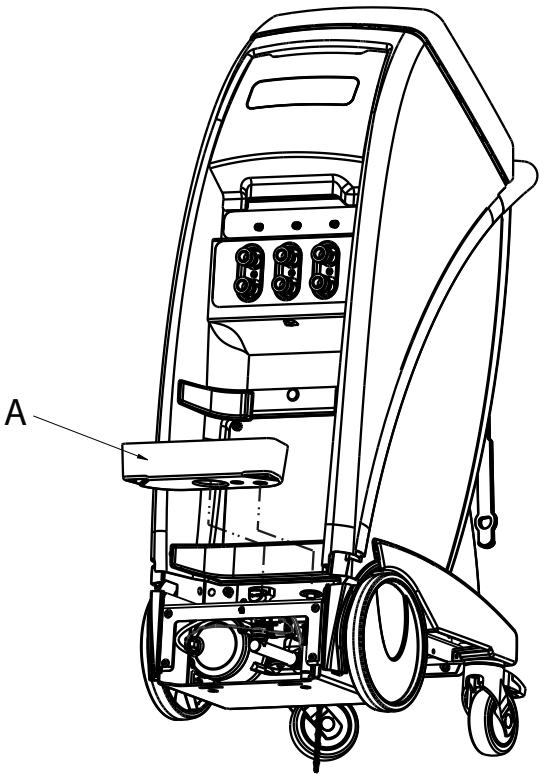
Item	Recyclable part number	Material code	Important information	Quantity
A	8001-000-161	Plastic containing brominated fire retardants	Back cover	1

8001-000-190



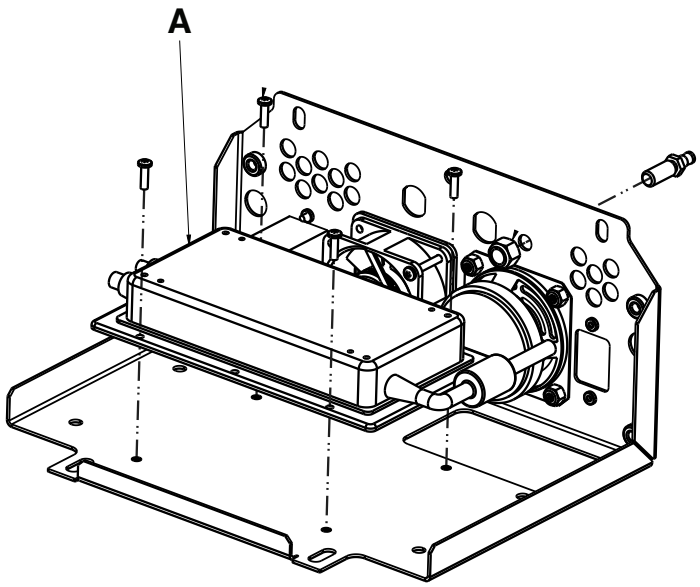
Item	Recyclable part number	Material code	Important information	Quantity
A	8001-000-165	Plastic containing brominated fire retardants	Front cover	1

8001-103-010/8001-123-010/8001-223-010/8001-233-010



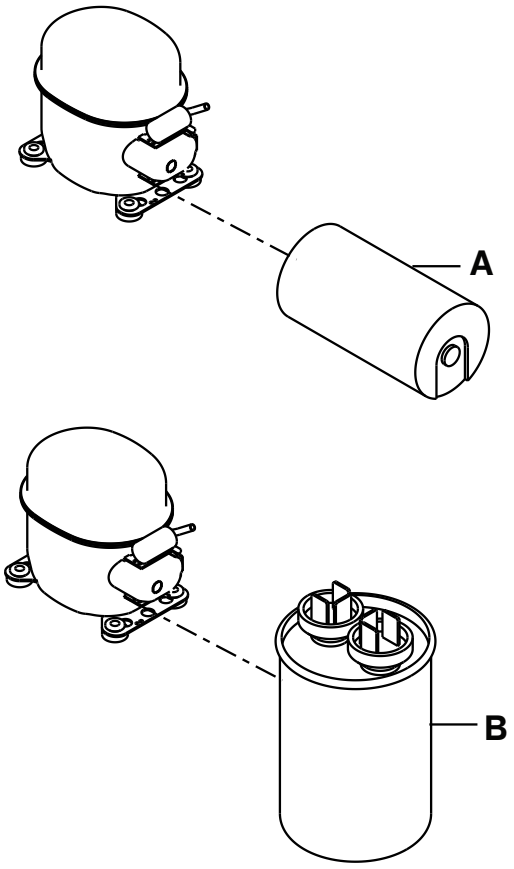
Item	Recyclable part number	Material code	Important information	Quantity
A	8001-000-166	Plastic containing brominated fire retardants	Hot tub	1

8001-000-460



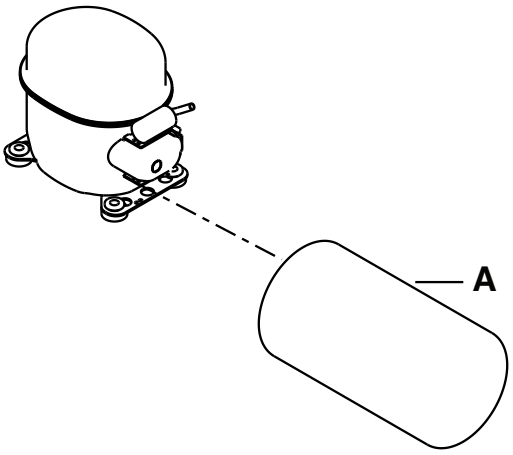
Item	Recyclable part number	Material code	Important information	Quantity
A	8001-065-460	Power supply	Cable assembly, power assembly	1

0059-426-000



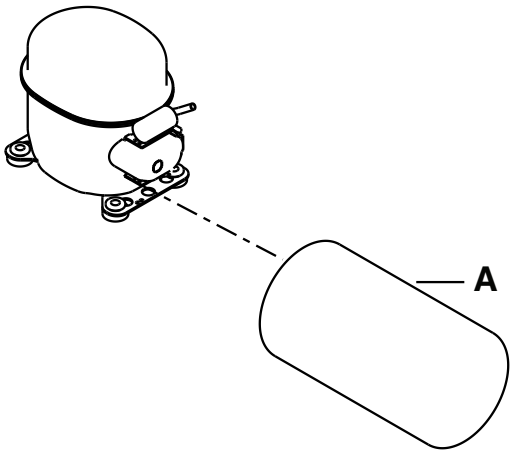
Item	Recyclable part number	Material code	Important information	Quantity
A	0059-789-000	Capacitor	20mF	1
B	0059-788-000	Capacitor	161-193mF	1

0059-428-000



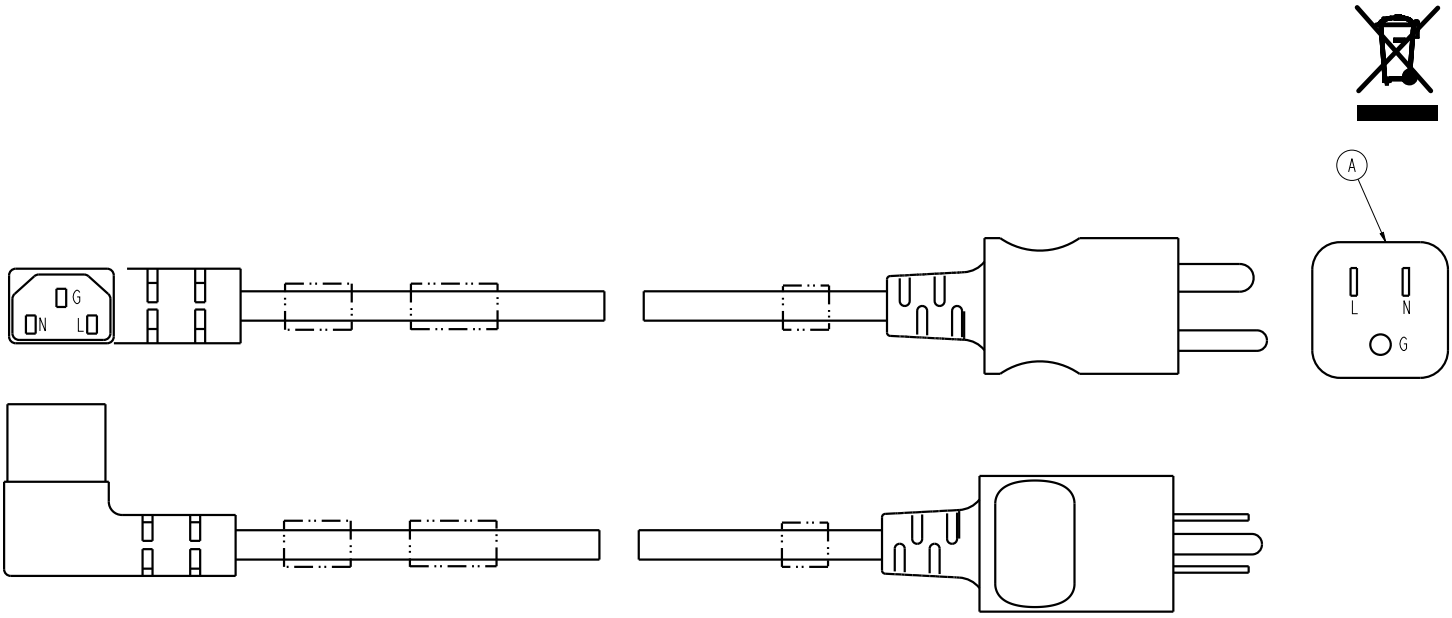
Item	Recyclable part number	Material code	Important information	Quantity
A	0059-792-000	Capacitor	80-108mF	1

0059-429-000



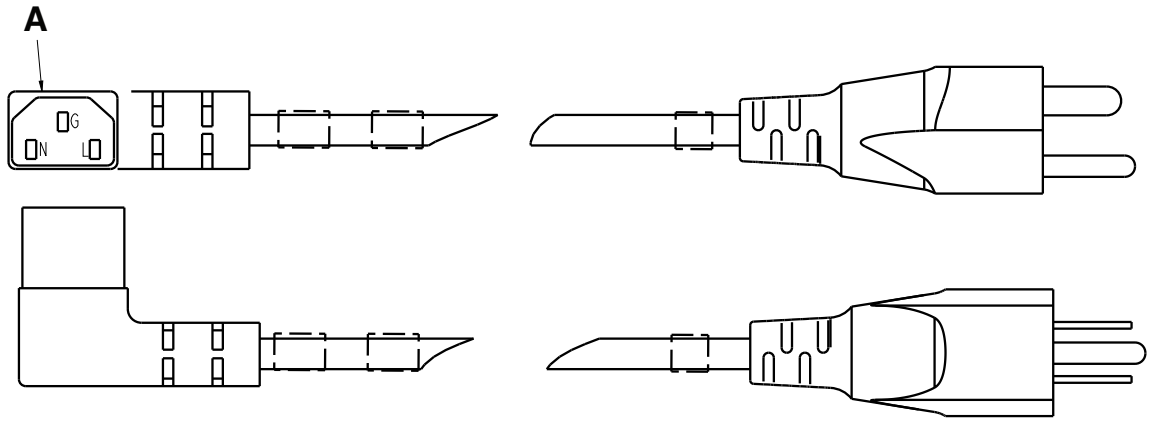
Item	Recyclable part number	Material code	Important information	Quantity
A	0059-791-000	Capacitor	71-88mF	1

0039-232-000



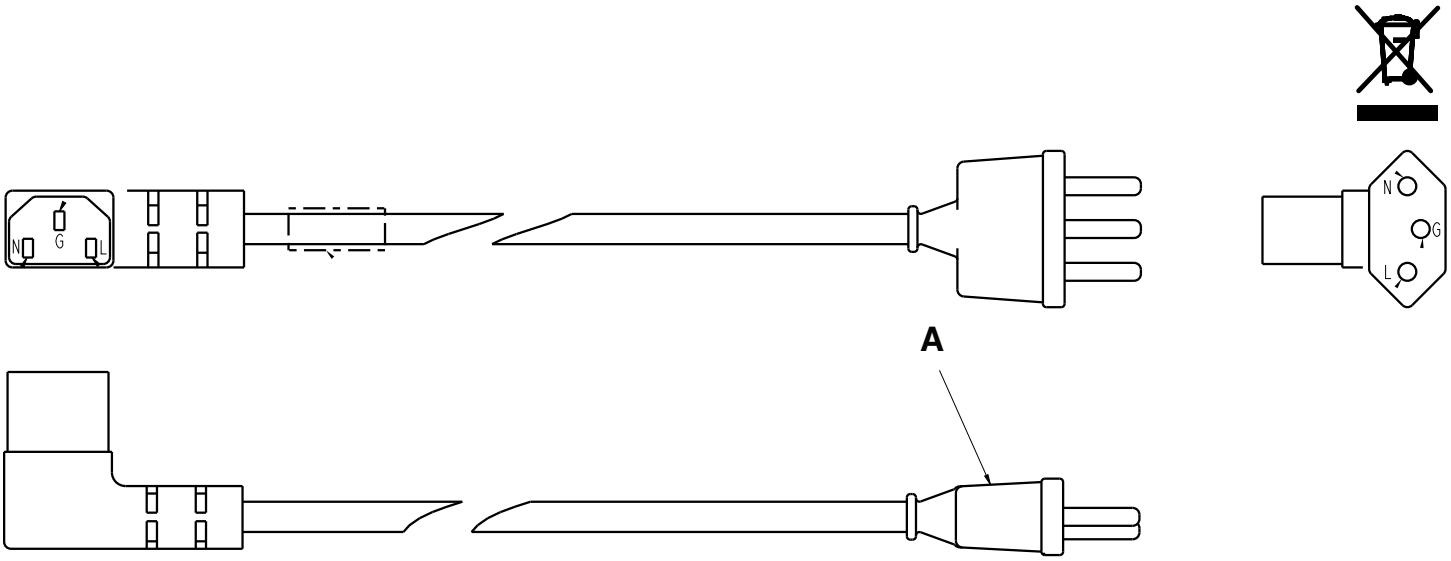
Item	Recyclable part number	Material code	Important information	Quantity
A	0039-232-000	External electronic cable	Power cord type B	1

0039-242-000



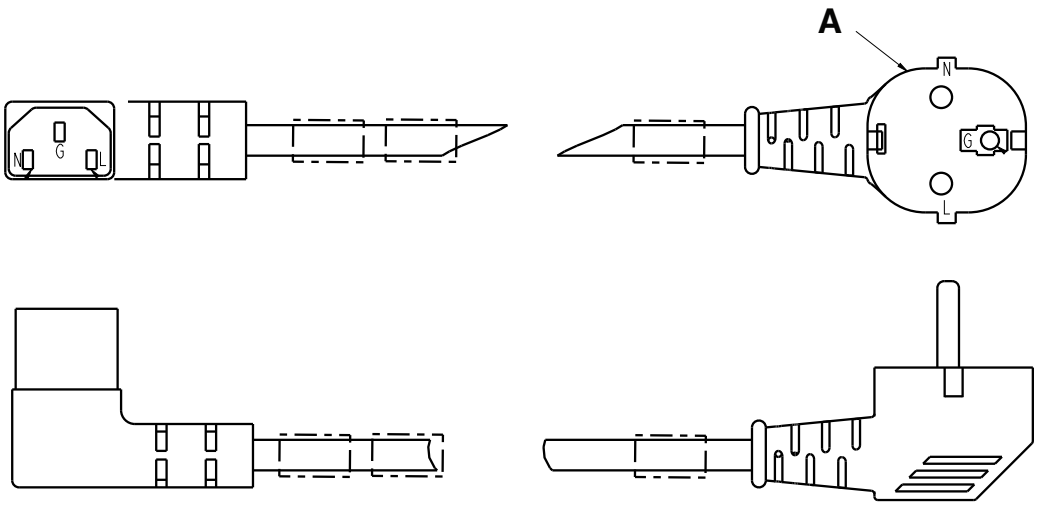
Item	Recyclable part number	Material code	Important information	Quantity
A	0039-242-000	External electronic cable	Power cord type B, Japan	1

0039-236-000



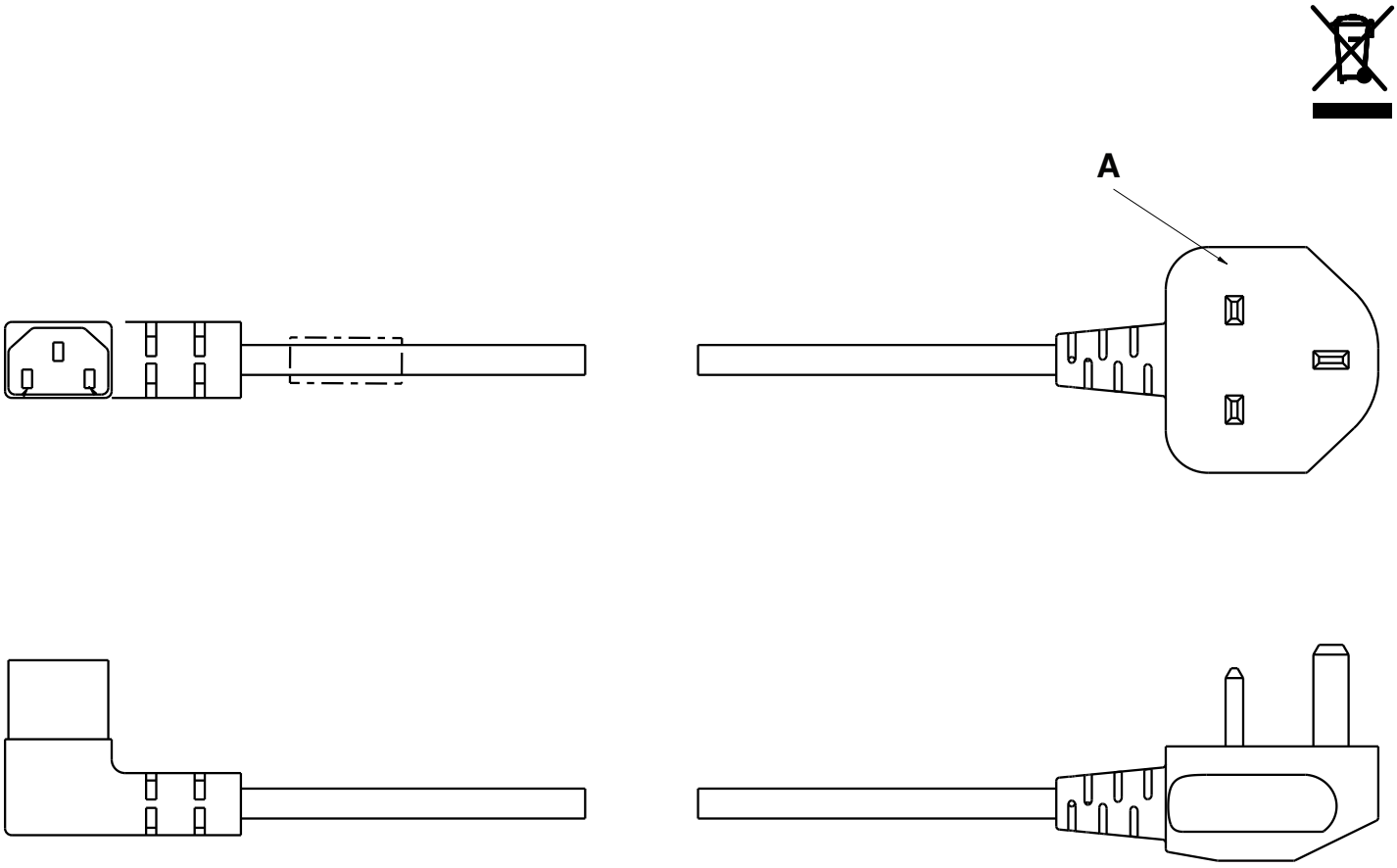
Item	Recyclable part number	Material code	Important information	Quantity
A	0039-236-000	External electronic cable	Power cord type N	1

0039-231-000



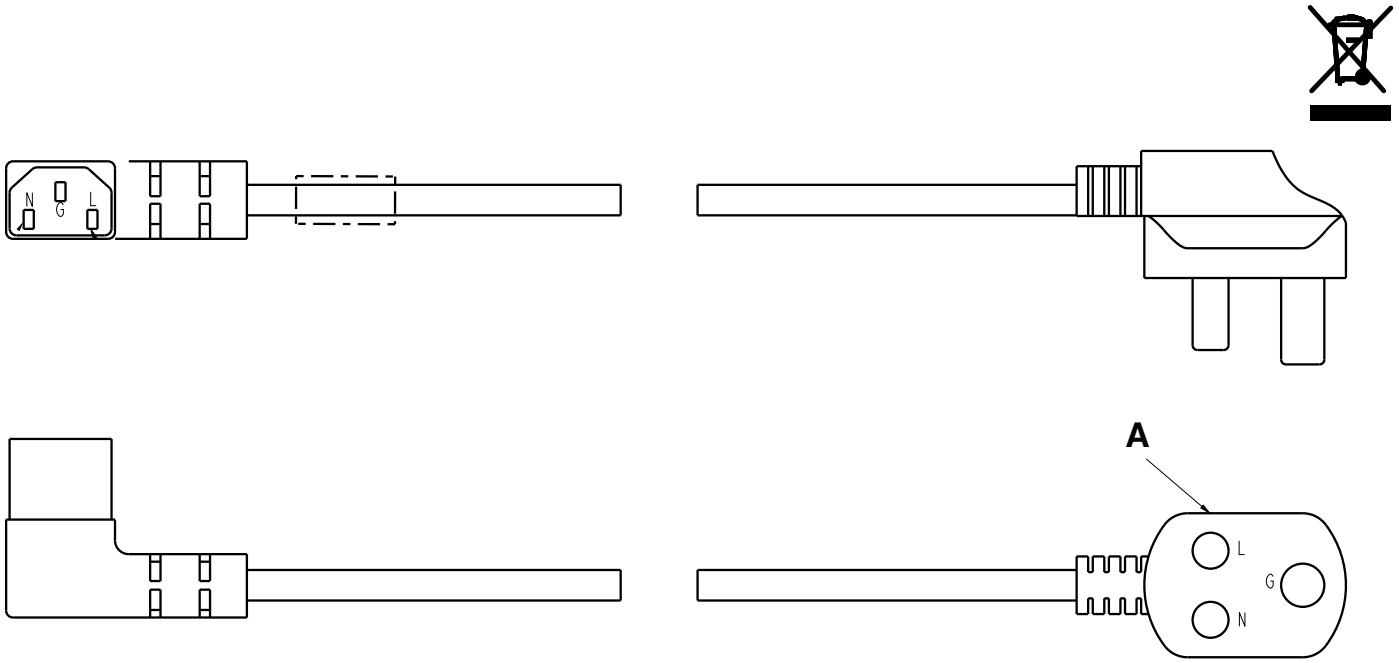
Item	Recyclable part number	Material code	Important information	Quantity
A	0039-231-000	External electronic cable	Power cord type E/F	1

0039-234-000



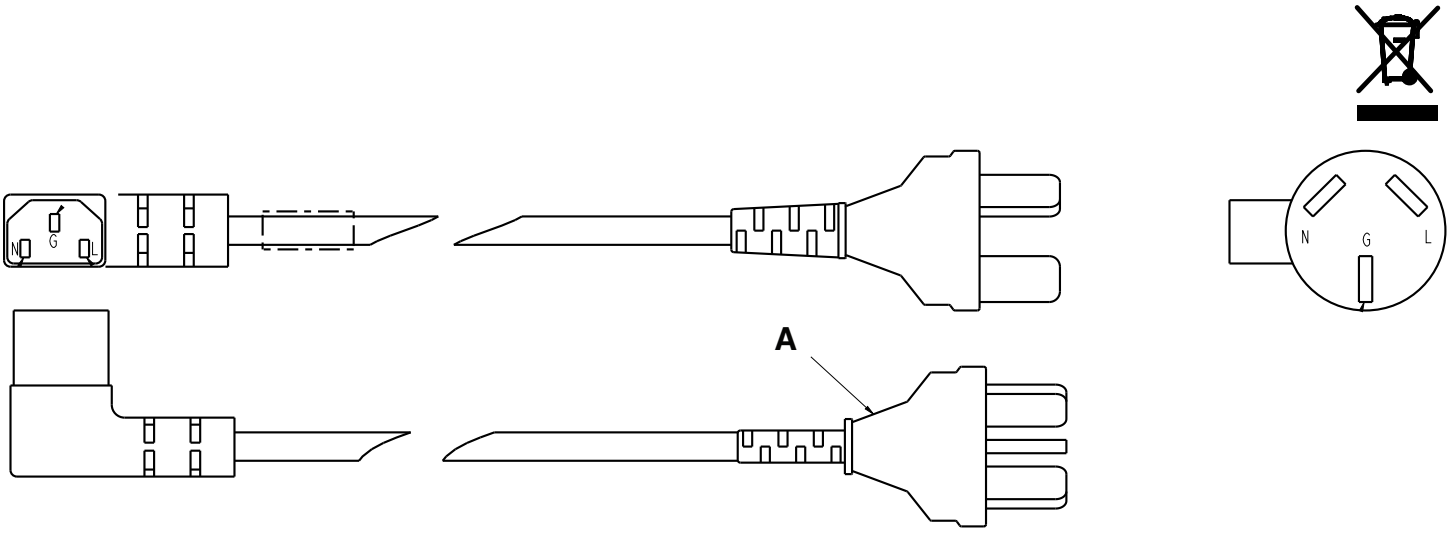
Item	Recyclable part number	Material code	Important information	Quantity
A	0039-234-000	External electronic cable	Power cord type G	1

0039-243-000



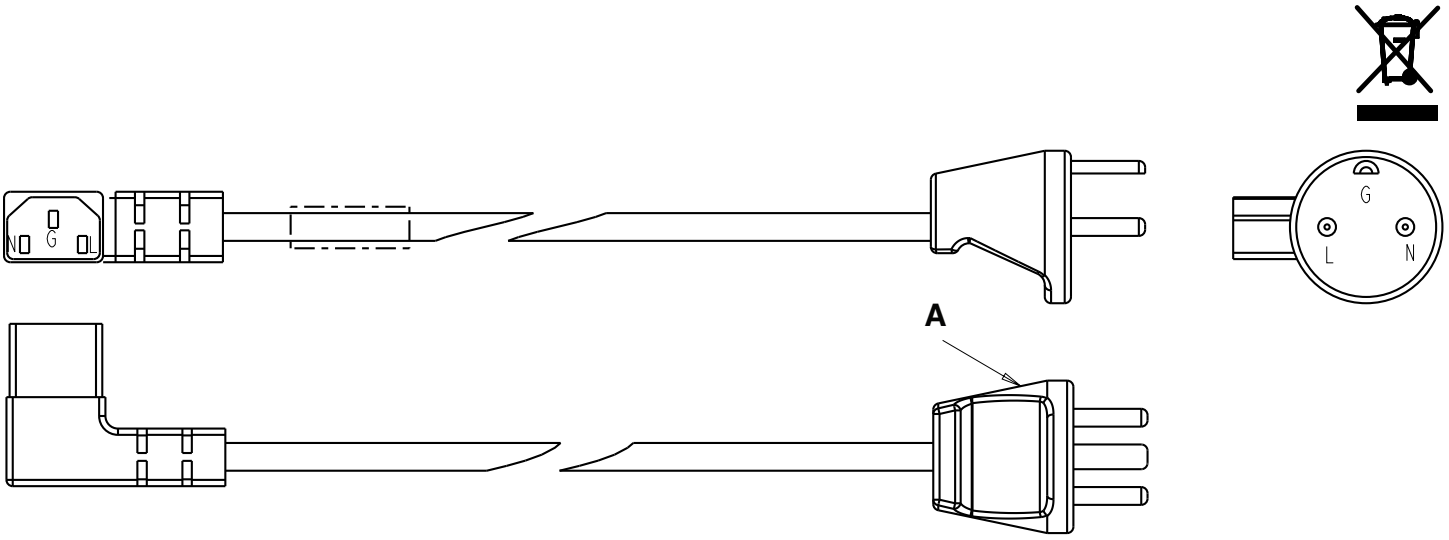
Item	Recyclable part number	Material code	Important information	Quantity
A	0039-243-000	External electronic cable	Power cord type D	1

0039-235-000



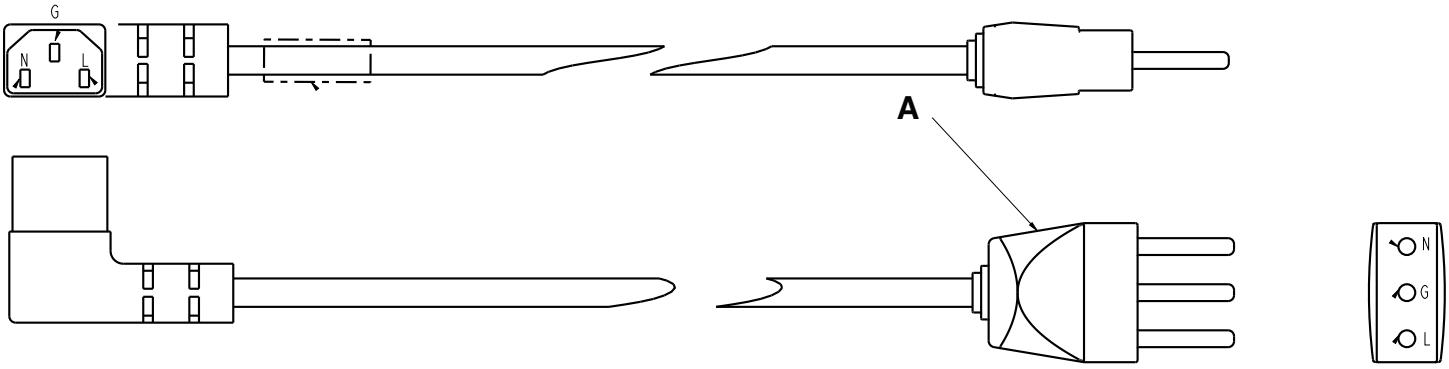
Item	Recyclable part number	Material code	Important information	Quantity
A	0039-235-000	External electronic cable	Power cord type I	1

0039-240-000



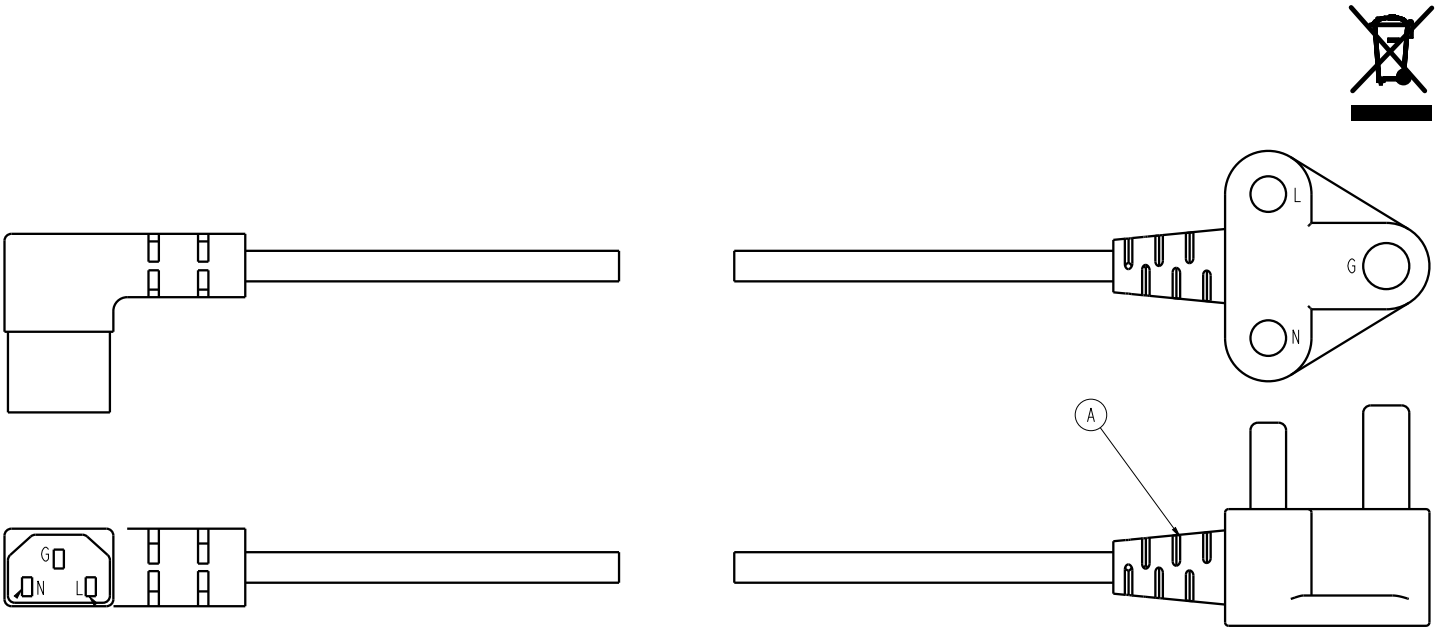
Item	Recyclable part number	Material code	Important information	Quantity
A	0039-240-000	External electronic cable	Power cord type K	1

0039-238-000



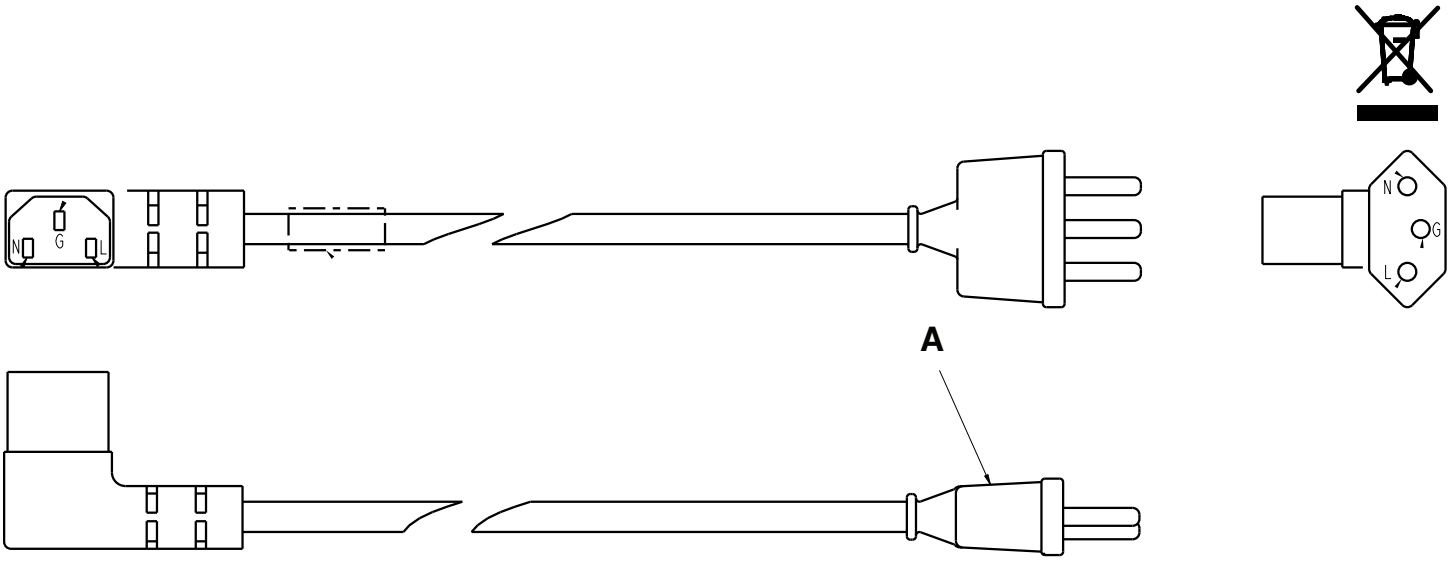
Item	Recyclable part number	Material code	Important information	Quantity
A	0039-238-000	External electronic cable	Power cord type L	1

0039-246-000



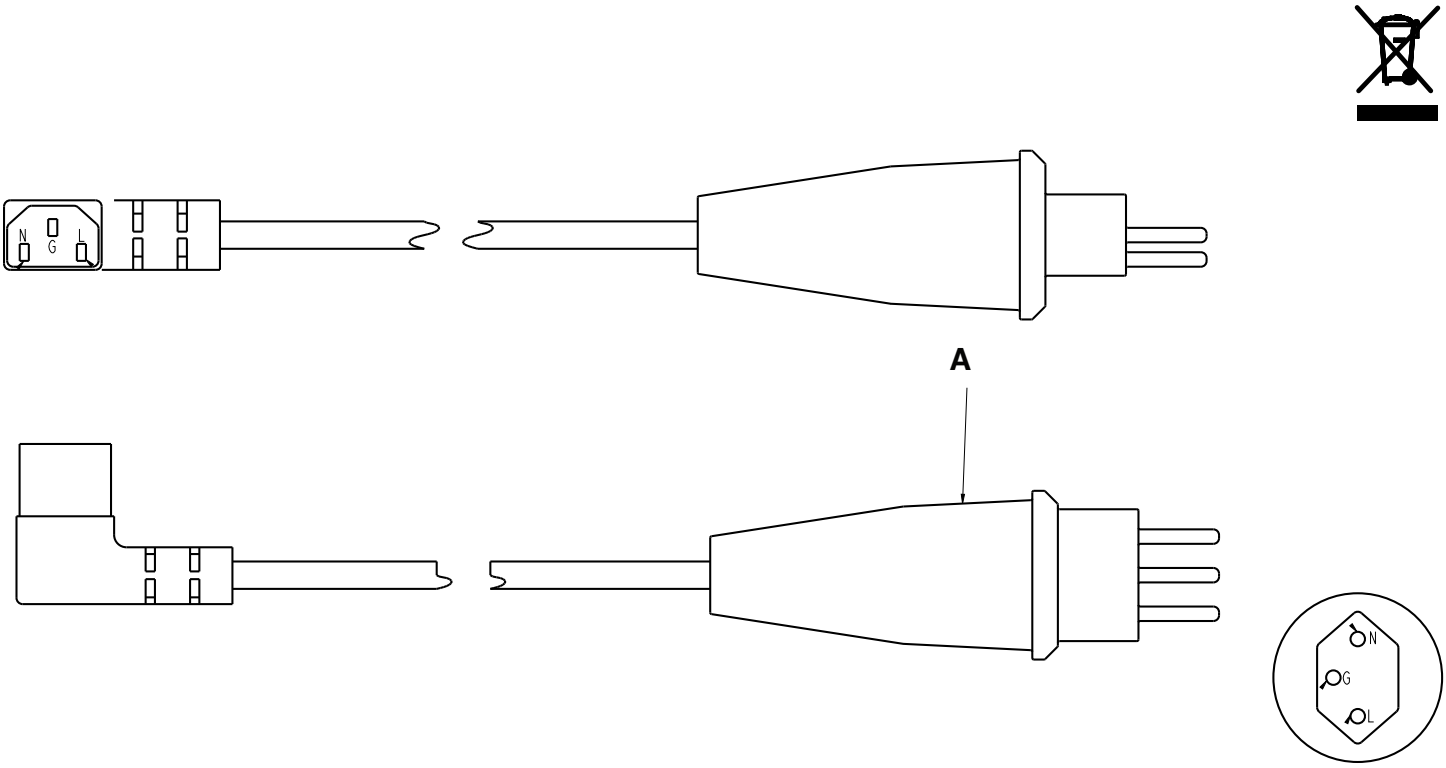
Item	Recyclable part number	Material code	Important information	Quantity
A	0039-246-000	External electronic cable	Power cord type M	1

0039-244-000



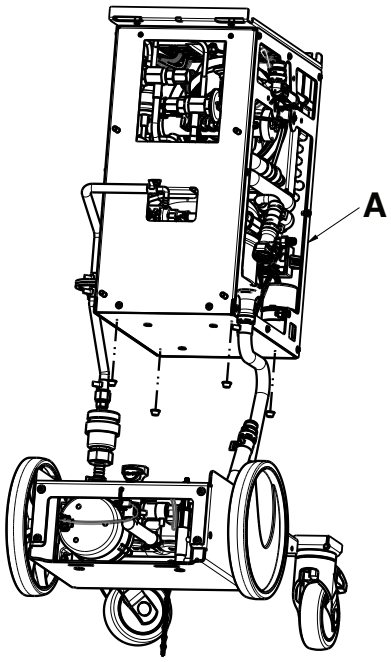
Item	Recyclable part number	Material code	Important information	Quantity
A	0039-244-000	External electronic cable	Power cord type H	1

0039-239-000



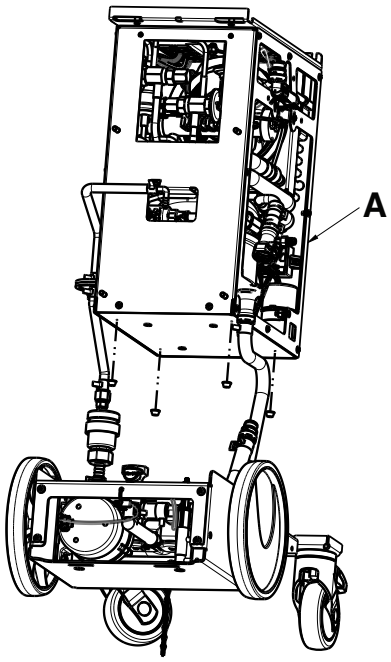
Item	Recyclable part number	Material code	Important information	Quantity
A	0039-239-000	External electronic cable	Power cord type J	1

8001-103-125



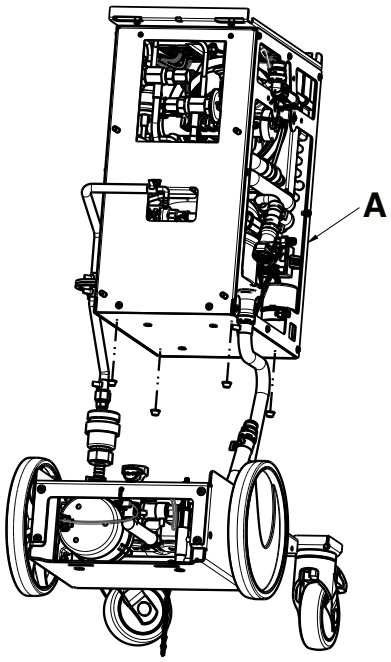
Item	Recyclable part number	Material code	Important information	Quantity
A	8001-100-311	Hydrofluorocarbons (HFC)	R-134a enclosed in assembly	1

8001-123-125



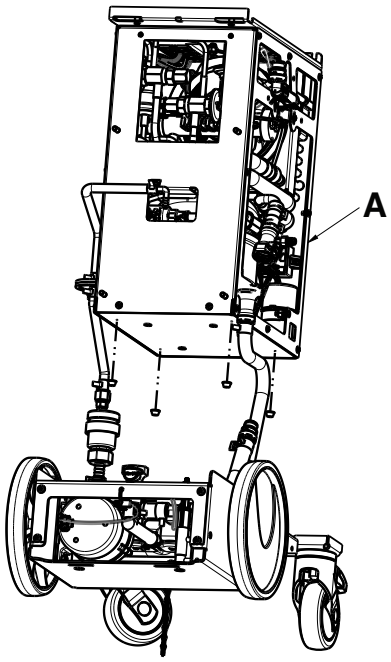
Item	Recyclable part number	Material code	Important information	Quantity
A	8001-120-311	Hydrofluorocarbons (HFC)	R-513a enclosed in the assembly	1

8001-223-125



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

8001-233-125



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

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