Touchscreen Console Service Manual

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Contents

Warnings, safety, and warranty information

See the appropriate User's Guide for detailed safety information. We have based the provided safety information on our experience with these products. However, you should work with Safety Management personnel to integrate this equipment into your safety practices. Please take some time to perform your own job safety analysis in order to identify and control potential hazards.

WARNING: Hazardous voltage inside.
The Touchscreen Console has electrical components that pose a risk of electrical shock, injury, and death. Disconnect power before opening electrical components. Use standard lockout/tagout procedures when working on electrical components.

WARNING: Follow lockout/tagout procedures.
To prevent injury, when servicing equipment, use lockout/tagout procedures to isolate electrical, mechanical, pneumatic, hydraulic, chemical, thermal, gravitational, or any other potential energy and protect workers from the release of hazardous energy.

WARNING: Use caution with hazardous chemicals or materials.
Personnel servicing equipment need to know the hazards of any chemicals or materials that may be present on or in the equipment. Use general hazard communication techniques such as Safety Data Sheets, labels, and pictograms to communicate any hazards.

Warranty information

Any warranties, if applicable, covering this equipment exclude (a) normal wear and tear; (b) accident, disaster or event of force majeure; (c) your misuse, fault or negligence; (d) use of the equipment in a manner for which it was not designed; (e) causes external to the equipment such as, but not limited to, external puncturing, power failure or electrical power surges; (f) improper storage and handling of the equipment; (g) use of the equipment in combination with equipment or software that we did not supply; (h) equipment sold to you as 'used' products; (i) contact with improperly used or unapproved chemicals or samples; (j) installation, removal, use, maintenance, storage, or handling in an improper, inadequate, or

unapproved manner, such as, but not limited to, failure to follow the documentation or instructions in the deliverables or related to the equipment, operation outside of stated environmental or other operational specifications, or operation with unapproved software, materials or other products; (k) manufacture in accordance with requirements you gave us; (l) installation of software or interfacing or use of the equipment in combination with software or products we have not approved; (m) use of the deliverables or any documentation to support regulatory approvals; (n) the performance, efficacy or compatibility of specified components; and (o) the performance of custom equipment or products or specified components or achievement of any results from the equipment, specified components or services within ranges desired by you even if those ranges are communicated to us and are described in specifications, a quote, or a statement of work.

ADDITIONALLY, ANY INSTALLATION, MAINTENANCE, REPAIR, SERVICE, RELOCATION OR ALTERATION TO OR OF, OR OTHER TAMPERING WITH, THE EQUIPMENT PERFORMED BY ANY PERSON OR ENTITY OTHER THAN US WITHOUT OUR PRIOR WRITTEN APPROVAL, OR ANY USE OF REPLACEMENT PARTS WE HAVE NOT SUPPLIED, WILL IMMEDIATELY VOID AND CANCEL ALL WARRANTIES WITH RESPECT TO THE AFFECTED EQUIPMENT. WE MAY ALSO VOID YOUR WARRANTY IF YOU SHIP THE EQUIPMENT OUTSIDE OF THE UNITED STATES.

Use restrictions

You must use this equipment in accordance with our documentation and if applicable, with our other associated instructions, including without limitation, a "research use only" product label or "limited use" label license. This equipment is intended for research use or further manufacturing in bioprocessing applications and not for diagnostic use or direct administration into humans or animals, we do not submit the equipment for regulatory review by any governmental body or other organization, and we do not validate the equipment for clinical or diagnostic use, for safety and effectiveness, or for any other specific use or application.

How to use this guide

Scope of this publication

The purpose of this guide is to provide detailed information about how to service and maintain the Touchscreen Console for S.U.M. systems. It is intended for use by Thermo Fisher Scientific certified service personnel who may or may not have experience with the Touchscreen Console.

Document change information

Revision	Date	Section	Change made	Author
A	12/2018	--	Initial release	E. Hale

Questions about this publication

If you have any questions or concerns about the content of this publication, please contact:

technicaldocumentation@thermofisher.com

Related publications

The related publication(s) listed below provide safety, operating, and specifications information.

Publication	Doc number
Thermo Scientific HyPerforma S.U.M. with Touchscreen Console User's Guide	DOC0042
Thermo Scientific HyPerforma S.U.M. with Touchscreen Console Unpacking Guide	DOC0061
Thermo Scientific HyPerforma S.U.M. with Touchscreen Console Integrator's Guide	DOC0069

1

Touchscreen Console overview

Figures 1.1–1.3 illustrate the front and back panels and the inside view of the Touchscreen Console.

Figure 1.1. Front view of the Touchscreen Console

Touchscreen

Stainless steel body

Emergency stop (E-Stop) button

Reset button

Figure 1.2. Back view of the Touchscreen Console

Outlet filter ventilation

Motor connection

USB port

Buzzer speaker

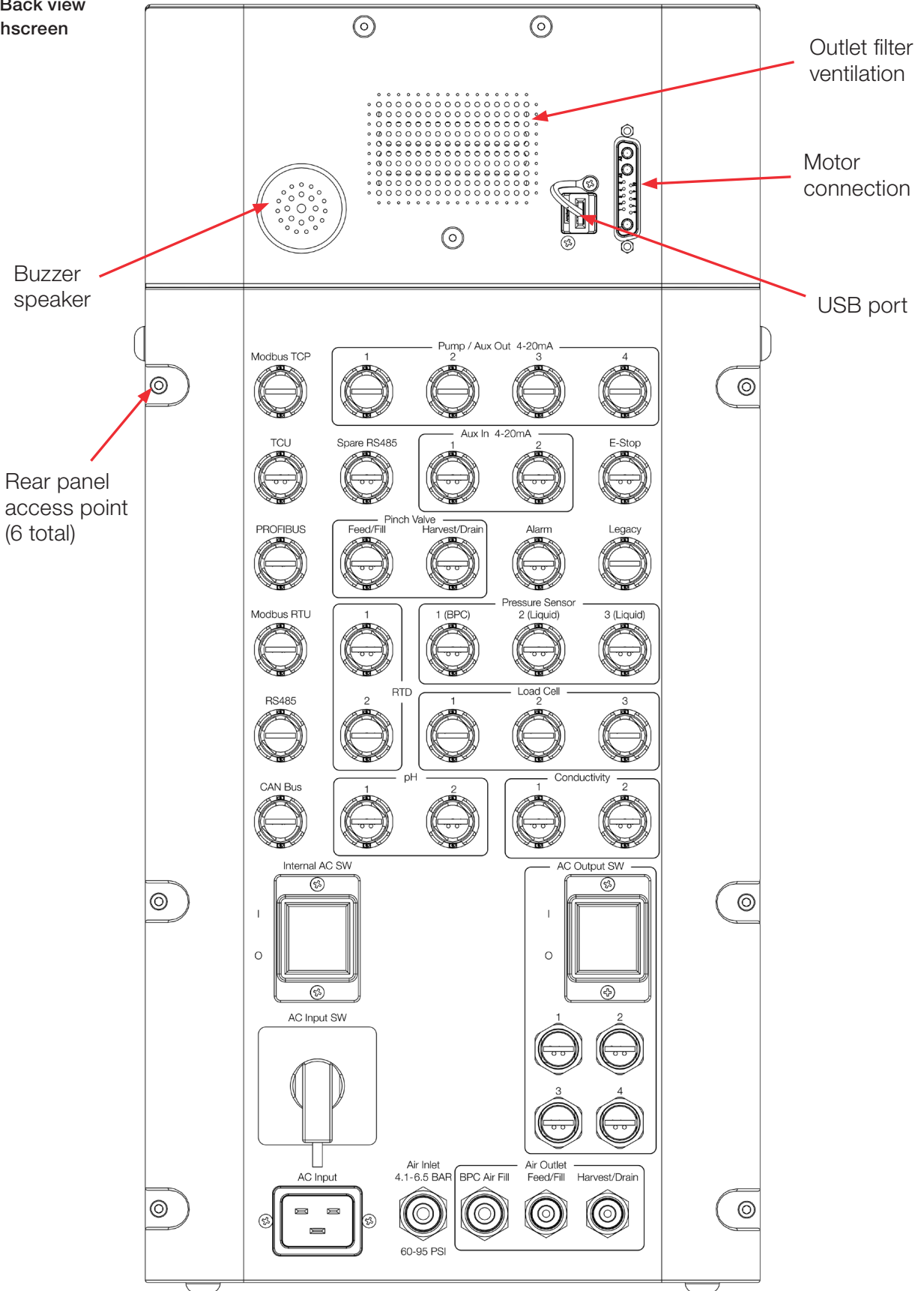Rear panel access point (6 total)

Figure 1.3. Inside view of the Touchscreen Console

Power assemblies (48VDC located behind 24VDC)

Reset button assembly

Pneumatic assembly

Inlet dust filter

Rear panel access point (3 on each side of door)

Circuit breakers

Main disconnect assembly

Air inlet lines (4)

2

Touchscreen Console specifications

Table 2.1. Specifications for the Touchscreen Console.

		Specification
General	Dimensions (W x H x D)	25 x 52 x 23.4 cm (9.84 x 20.42 x 9.21 in.)
	Total weight	18.5 kg (40.8 lb)
	HMI	21.34 cm (8.4 in.) LCD panel with capacitative touchscreen
	Construction material	AISI 304 stainless steel
	Electrical requirements	120/240 VAC, 50/60 Hz, single, 15/10.4 A
	Air pressure range	4.14–6.55 bar (60–95 psi)
	Operating temperature range	18–30°C
	Noise level	< 70 dB at 1.5 m
	Relative humidity	15–80%
	IP rating	IP54
	RoHS 2011/65/EU	CE compliant
External components and data	Pumps	Supports various pumps with 4-20 mA signal control
	Load cells	Mettler Toledo MTB
	Supported pH sensors	Thermo, Mettler Toledo, Broadley James
	Supported conductivity sensors	Jumo, Mettler Toledo
	Pinch clamps	Bimba ACRO 935 pinch valve 19 mm (3/4 in.) OD x 3.17 mm (1/8 in.) wall tubing
	Alarms	Factory set and user-defined
	Communication ports	USB, Ethernet, Profibus, Modbus RTU
	E-Stop	Integrated safety circuit for entire system (external E-Stop also available)
	File formats	CSV
	Data recording	User-defined data record transfer via Ethernet, Profibus, or Modbus RTU; 72 hour data storage exportable via USB
	Data exporting	Local via USB flash drive; remote via PC/Network with Ethernet, Profibus, or Modbus RTU

3

Servicing and preventive maintenance

3.1 Installation checklists

Ensure that the following installation prerequisites are fulfilled before installing and providing a Touchscreen Console unit to a customer.

☑ Transportation allowing for the total weight of the Touchscreen Console [18.5 kg (40.8 lb)]
☑ Installation site (from customer) includes a flat surface capable of supporting the total dimensions and weight of the S.U.M. unit with Touchscreen Console, and relative air humidity of 15–80%
☑ Utilities (from customer) include proper electrical requirements (120/240 VAC, 50/60 Hz, single, 15/10.4 A) and compressed air requirements [4.14–6.55 bar (60–95 psi)]
☑ Proper tools are available (see section 3.2)
☑ The proper country-specific power cable is available (see Table 3.1 on the following page).

Table 3.1. Country-specific power cables and part numbers.

Power cable	Cat. no.
USA 20A power cable	SV51142.720
EURO 16A power cable	SV51142.700
GBR 13A power cable	SV51142.702
China 16A power cable	SV51142.706
AUS/NZL 15A power cable	SV51142.701
S. Africa 16A power cable	SV51142.703
Brazil 16A power cable	SV51142.704
Italy 16A power cable	SV51142.705
Switzerland 16A power cable	SV51142.707
Argentina 16A power cable	SV51142.708
Israel 16A power cable	SV51142.709
India 16A power cable	SV51142.710
Japan 20A power cable	SV51142.721

Follow the installation/test instructions below.

1. Move the unit to its final location (delivery and installation site required). Check access to the technical area, ensure there are no damaged parts (if any, report on delivery note), and check the distance to the main plug.

2. Connect compressed air to the Touchscreen Console.

3. Connect main power to the Touchscreen Console (electrical plug required). Check inside the electrical cabinet for any loose parts, and check all cables.

4. Turn on the main power (main power required).

5. Check the emergency switch, and for any abnormal noises.

6. Close all panels.

3.2 Required tools and parts inventory

See Table 3.2 for the required tool and spare part inventory for maintaining and servicing the Touchscreen Console.

Table 3.2. Required tools and parts inventory.

Quantity	Description	Size	Cat. no.	Supplier
1	Phillips head screwdriver	#3	N/A	N/A
1	Allen wrench	5.5 mm	N/A	N/A
1	Flathead screwdriver	1/8 in.	N/A	N/A
1	Preventive maintenance kit • Thread sealant • Adhesive • Inlet dust filter	N/A	SV51231.01	Thermo Fisher
1	Needle nose pliers	N/A	N/A	N/A
1	Scissors/wire cutters	N/A	N/A	N/A
1	M12 plug installation tool (for connecting cables to communication ports)	N/A	SV50177D.18	Thermo Fisher
2	Plugs for rear panel access points (set of 3)	N/A	SV51149.17	Thermo Fisher
1	Main door sealing gasket	N/A	SV51149.07	Thermo Fisher
1	Door gap sealing gasket	N/A	SV51149.08	Thermo Fisher
1	Inlet dust filter	N/A	SV51149.04	Thermo Fisher
1	Rubber USB plug	N/A	SV51149.23	Amphenol
2	Circuit breaker	N/A	SV51149.10	Thermo Fisher
2	Circuit breaker switch cover	N/A	SV51149.22	SCHURTER
1	E-Stop mushroom head	N/A	SV51149.21	IDEC
1	E-Stop button assembly	N/A	SV51149.12	Thermo Fisher
1	Reset button	N/A	SV51149.20	Omron
1	Main disconnect	N/A	SV51149.09	Thermo Fisher
1	Pneumatic assembly	N/A	SV51149.06	Thermo Fisher
1	24VDC power supply	N/A	SV51149.02	Thermo Fisher
1	48VDC power supply	N/A	SV51149.01	Thermo Fisher

3.3 Preventive maintenance parts replacement schedule

In accordance with preventive maintenance of the Touchscreen Console, the 24VDC and 48VDC power supplies, as well as the inlet dust filter, should each be replaced once per year. Other parts should be replaced as needed.

3.4 Pre-maintenance checklist

Table 3.3 provides a checklist of items to be verified prior to any maintenance activity on the Touchscreen Console.

Table 3.3. Pre-maintenance checklist for Touchscreen Console components.

Component	Maintenance checklist items
Main disconnect	• Ensure that the main disconnect switch can easily be turned both on and off. • Inspect the main disconnect components for any damage.
Circuit breakers and switch covers	• Ensure that the circuit breakers can easily be flipped both on and off. • Inspect the circuit breaker switch covers for any damage.
E-Stop button assembly	• Ensure that the E-Stop button can easily be both engaged and disengaged. • Ensure that the buzzer sounds when the E-Stop button is engaged.
Reset button	Ensure that the reset button can easily be pressed.

3.5 Routine cleaning and maintenance

The following routine maintenance guidelines are based on standard operating conditions, as defined in the S.U.M. with Touchscreen Console User's Guide (DOC0042).

Take time between mixing batches to clean the exterior of the S.U.M. This will improve the appearance and overall longevity of the hardware system. Between runs, the outer support container, drive shaft, mixer drive, and Touchscreen Console can be wiped down with sanitary wipes. Steel surfaces on the outer support container can also be cleaned with a stainless steel cleaner. **Note:** Only use a clean, dry cloth to wipe down the touchscreen on the Touchscreen Console.

All of the S.U.M. hardware is constructed in accordance with IP-54 ingress protection ratings, and can be cleaned to the extent of standard laboratory cleaning procedures. Ensure that all electrical connections are firmly in place or removed and capped before washdown. The unit should not be intentionally washed down while powered on. The main power cord should be removed from the TC during a washdown cleaning. The unit must be allowed to fully dry prior to being brought back into operation.

3.6 Calibrating procedures

3.6.1 Calibrating pumps

7. If you have not set up an active pump calibration, a screen will appear with a prompt to create a new calibration. Touch the "Calibrate now" button.

8. Fill in the fields for tubing type, tubing inner diameter, fluid type, units, and fluid density. You may also name the pump calibration and add notes, if desired. Touch "Next."

9. Users can choose to use either mass or volume to calibrate pumps. For mass calibration, a beaker and scale are required. A graduated cylinder is required for volume calibration. The Volume option requires users to enter the units (mL or L), while the Mass option only uses grams. Both options require users to enter rpm limits (top and bottom speeds), and fluid density.

10. You can select either "Prime Set Up" or "Skip Prime" after you have filled in the necessary fields. If you select "Prime Set Up," a screen will appear instructing you to set up either the beaker or graduated cylinder on a scale.
    a. After touching "Next," a second screen will appear instructing you to load tubing into the pump, and then to place the tubing into the beaker or graduated cylinder.
    b. Touch "Next" again. Press and hold the "Prime" button until the prime set point is shown on the screen.
    c. Select "Next." You will be taken to the "Calibration Total Time Input" screen with a prompt to enter the total time of the pump calibration (in seconds).

Note: If you choose "Skip Prime," you will be taken directly to the "Calibration Total Time Input" screen. Enter the total time of the pump calibration in seconds.

5. There are four calibration points for both mass and volume options, and four steps for each calibration point. Repeat the steps below for each of the four calibration points:
    a. Choose to either empty the beaker/graduated cylinder and zero the scale after each calibration point, or fill the beaker/graduated cylinder and do not zero the scale after each calibration point.
    b. Set up an empty beaker/graduated cylinder and a scale. Tare the scale to ensure that only the weight of the fluid is being measured, and not the weight of the fluid and the beaker. Touch "Next."
    c. Touch the "Deliver bolus" button to deliver a bolus into the beaker/graduated cylinder. For each calibration point, the pump will run at a different percentage of the available rpm output range (from low to high limits) for a different length of time.
    d. After the bolus is delivered, the screen will say "Delivery Complete." Touch "Next." Enter the total amount of fluid pumped during the calibration point (1, 2, 3, or 4), and touch "Calibrate." The screen for the next calibration point will appear.

6. After all four calibration points have been completed, touch "Done" in the lower right corner of the screen to return to the Pump Settings screen.

3.6.2 Calibrating pH

1. If you have not set up an active pH calibration, a screen will appear with a prompt to create a new calibration. Touch the "Create New Calibration" button. If you have already created an active pH calibration, touch the pH module on the Touchscreen Console home screen to open the "pH Settings" screen. Touch the "Calibration" button.

2. First, select the pH sensor you would like to calibrate. Then, choose the type of calibration you would like to use (enter slope and offset, offset calibration, 2-point, or 3-point).

3. Follow the steps below for slope and offset calibration:
    a. After touching the "Enter slope and offset" button, a screen will appear prompting users to enter the slope (pH/mV) and offset (mV).
    b. Touch "Done" in the lower right corner of the screen to return to the pH Settings screen.

4. Follow the steps below for offset calibration:
    a. After touching the "Offset calibration" button, a screen will appear displaying the stabilizing pH sensor value for Calibration Point 1. Once the value has stabilized, the "Buffer Solution Value" field will automatically populate to match the exact buffer value. You may also change the value, if desired. Touch "Calibrate."
    b. Touch "Done" in the lower right corner of the screen to return to the pH Settings screen.

5. Follow the steps below for 2-point calibration. **Note:** Three-point calibration uses the same steps, but will repeat steps "d" and "e" for the third calibration point.
    a. After touching the "2-Point calibration" button, a screen will appear prompting users to select a temperature compensation to use for the calibration. The expected buffer temperature will be used if there is no RTD present. You can also use the RTD, if present, by setting the slider to enable it. Touch "Next."
    b. The screen that appears will prompt the user to put the pH sensor (and RTD, if selected) into the first buffer solution for Calibration Point 1. Touch "Next."
    c. The following screen displays the stabilizing pH sensor value for Calibration Point 1. Once the value has stabilized, the "pH value" field will automatically populate to match the exact buffer value. You may also change the value, if desired. Touch "Calibrate."
    d. The screen that appears will prompt the user to put the pH sensor (and RTD, if selected) into the second buffer solution for Calibration Point 2. Touch "Next."
    e. The following screen displays the stabilizing pH sensor value for Calibration Point 2. Once the value has stabilized, the "pH value" field will automatically populate to match the exact buffer value. You may also change the value, if desired. Touch "Calibrate."
    f. The following screen states that the pH calibration is done, and prompts the user to update the desired temperature compensation in the next screen. Touch "Next."
    g. Set the temperature compensation to use when the sensor is set as active. The expected buffer temperature will be used if there is no RTD present. You can also use the RTD, if present, by setting the slider to enable it. Touch "Done."
    h. The "pH calibration complete" screen should appear. Touch "Done" in the lower right corner of the screen to return to the pH Settings screen.

3.6.3 Calibrating conductivity

1. If you have not set up an active conductivity calibration, a screen will appear with a prompt to create a new calibration. Touch the "Create New Calibration" button. If you have already created an active conductivity calibration, touch the Conductivity module on the Touchscreen Console home screen to open the "Conductivity Settings" screen. Touch the "Calibration" button.

2. A screen will appear prompting the user to select a conductivity sensor to calibrate (Conductivity1 or Conductivity2). After selecting a conductivity sensor, the user will be prompted to select the calibration method you would like to use (1-point, 2-point, or 3-point calibration).

3. Follow the steps below for 1-point calibration:
   a. On the screen that appears, enter the conductivity sensor cell constant. Then touch "Next."
   b. The screen that appears will prompt the user to put the conductivity sensor into a buffer solution. Touch "Next."
   c. The following screen displays the stabilizing conductivity sensor value for calibration point 1 of 1 (in µS/cm). Once the value has stabilized, the "Conductivity value" field will automatically populate to match the exact buffer value. You may also change the value, if desired. Touch "Calibrate."
   d. After the "Conductivity calibration complete" screen appears, the calibration is complete. Touch "Done" in the lower right corner of the screen to return to the Conductivity Settings screen.

4. Follow the steps below for 2-point calibration. **Note:** 3-point calibration uses the same steps, but will repeat steps "d" and "e" for the third calibration point.
   a. On the screen that appears, enter the conductivity sensor cell constant. Then touch "Next."
   b. The screen that appears will prompt the user to put the conductivity sensor into the first buffer solution. Touch "Next."
   c. The following screen displays the stabilizing conductivity sensor value for calibration point 1 (in µS/cm). Once the value has stabilized, the "Conductivity value" field will automatically populate to match the exact buffer value. You may also change the value, if desired. Touch "Calibrate."
   d. The screen that appears will prompt the user to put the conductivity sensor into the next buffer solution. Touch "Next."

e. The following screen displays the stabilizing conductivity
    sensor value for the calibration point (in µS/cm). Once
    the value has stabilized, the "Conductivity value" field will
    automatically populate to match the exact buffer value. You
    may also change the value, if desired. Touch "Calibrate."

f. After the "Conductivity calibration complete" screen appears,
    the calibration is complete. Touch "Done" in the lower right
    corner of the screen to return to the Conductivity Settings
    screen.

3.6.4 Calibrating agitation speed

1. Touch the Agitation module on the Touchscreen Console home
    screen to open the "Agitation Settings" screen. Touch the
    "Calibration" button.

2. A screen will appear prompting the user to measure the actual
    motor speed (in rpm) using a tachometer, and enter the speed in
    the field provided. After entering the actual motor speed, touch
    "Done."

3. A "1-point offset adjustment complete" screen should appear
    when calibration is complete. Touch "Done" in the lower right
    corner of the screen to return to the "Agitation Settings" screen.

3.6.5 Calibrating mass

1. Touch the Mass module on the Touchscreen Console home
    screen to open the "Mass Settings" screen. Touch the
    "Calibration" button.

2. Select the type of calibration you would like to use (1-point,
    2-point, or 3-point). **Note:** The steps below detail the process for
    2-point calibration. 1-point and 3-point calibration use the same
    steps, with slight differences: 1-point calibration does not include
    step "b," and 3-point calibration will repeat step "b" for the third
    calibration point.

3. Follow the steps below for 2-point calibration:
    a. After touching the "2-point calibration" button, a screen will
        appear for "Calibration Point 1 of 2," prompting the user to
        enter the first mass sensor value in kg. Place a weight in
        the vessel, enter the sensor value on the screen, and touch
        "Calibrate."

b. A screen will appear for "Calibration Point 2 of 2." Place a second weight, heavier than the weight from the previous step, into the vessel. Enter the total mass sensor value in kg, then touch "Calibrate."

c. After the "Mass Calibration Complete" screen appears, the calibration is complete. Touch "Done" in the lower right corner of the screen to return to the "Mass Settings" screen.

3.6.6 Calibrating BPC air pressure

1. If you have not set up an active BPC pressure calibration, a screen will appear with a prompt to create a new calibration. Touch the "Create New Calibration" button. If you have already created an active BPC Pressure calibration, touch the BPC Pressure module on the Touchscreen Console home screen to open the "BPC Pressure Settings" screen. Touch the "Calibration" button.

2. A screen will appear prompting the user to select a calibration method: zero/tare, enter a 1-point offset value, or clear offset. Select "Enter a 1-point offset value."

3. The following screen will prompt the user to enter the BPC sensor value in psi. After entering the BPC pressure in psi, touch "Calibrate."

4. After the "BPC Pressure Calibration Complete" screen appears, the calibration is complete. Touch "Done" in the lower right corner of the screen to return to the "BPC Pressure Settings" screen.

3.6.7 Calibrating liquid pressure

1. If you have not set up an active liquid pressure calibration, a screen will appear with a prompt to create a new calibration. Touch the "Create New Calibration" button. If you have already created on active liquid pressure calibration, touch the Liquid Pressure module on the Touchscreen Console home screen to open the "Liquid Pressure Settings" screen. Touch the "Calibration" button.

2. A screen will appear prompting the user to select a calibration method: zero/tare Liquid Pressure1, zero/tare Liquid Pressure2, enter a 1-point offset value, or clear offset. Select "Enter a 1-point offset value."

3. On the following screen, select a liquid pressure sensor to use for calibration.

4. The following screen will prompt the user to enter the liquid pressure sensor value in psi. After entering the liquid pressure in psi, touch "Calibrate."

5. After the "Liquid Pressure Calibration Complete" screen appears, the calibration is complete. Touch "Done" in the lower right corner of the screen to return to the "Liquid Pressure Settings" screen.

3.6.8 Calibrating temperature

1. If you have not set up an active temperature calibration, a screen will appear with a prompt to create a new calibration. Touch the "Create New Calibration" button. If you have already created an active temperature calibration, touch the Temperature module on the Touchscreen Console home screen to open the "Temperature Settings" screen. Touch the "Calibration" button.

2. A screen will appear prompting the user to select a temperature sensor to calibrate.

3. The following screen will prompt the user to select a calibration method. Select "1-Point Calibration." **Note:** The calibration instructions provided here illustrate one-point calibration. Repeat the steps below for 2-point and 3-point calibration.

4. The following screen will prompt the user to enter the temperature sensor value (in °C). After entering the temperature sensor value, touch "Calibrate."

5. After the "Temperature calibration complete" screen appears, the calibration is complete. Touch "Done" in the lower right corner of the screen to return to the "Temperature Settings" screen.

6. The following screen will prompt the user to enter the temperature sensor value. After entering the temperature sensor value, touch "Calibrate."

7. After the "Temperature Calibration Complete" screen appears, the calibration is complete. Touch the "X" in the upper right corner of the screen to return to the "Temperature Settings" screen.

4

Troubleshooting

4.1 Troubleshooting issues and potential causes

See the following tables for general troubleshooting issues and their potential causes.

Table 4.1. Touchscreen Console troubleshooting issues and potential causes.

Issue	Potential cause(s)
Touchscreen Console will not turn on	• Power plug or outlet is faulty • Fuse (circuit breaker) is shut off
Touchscreen Console is stuck on the boot-up screen	• If intermittent, may be due to a read failure, which requires rebooting • Firmware corrupted or hardware failure
The motor will not turn on	• Motor communication cable issue • Safety cap is open
Motor RPM is outside of tolerance	Should not be an issue for DC motors; optical sensor feedback keeps RPM within tolerance
Mass reading is not displaying	• Load cell/load cell cable issue • Load cell summing box issue
Mass readings are inaccurate	• Vessel size is incorrect • Load cell calibration is inaccurate
pH readings are not displaying or the pH transmitter is unable to recognize the sensor	• pH connection issue • pH board issue in the Touchscreen Console • pH cable issue
pH readings are inaccurate	• pH readings will always be displayed, even without a sensor or cable connected • pH calibration issue
Conductivity readings are not displaying	• Conductivity sensor issue • Conductivity connection issue • Conductivity cable issue
Conductivity readings are inaccurate	• Conductivity calibration issue • Conductivity sensor issue
BPC pressure is not reading	• Pressure sensor in BPC is not working • Connection issue between pressure sensor and the Touchscreen Console • BPC pressure cable issue

Table 4.1. Touchscreen Console troubleshooting issues and potential causes (continued).

Issue	Potential cause(s)
BPC pressure readings are inaccurate	• Pressure sensor calibration issue • Connection issue between pressure sensor and the Touchscreen Console
BPC pressure module is not pumping air into the BPC when "Start" is pressed	• Issue with air supply into the Touchscreen Console • Issue with pneumatic solenoid valves
Touchscreen Console will not control the TCU	• Issue with TCU parameters • Issue with TCU cordsets
Touchscreen Console has multiple breaker trips within a 4 hour window	• Inadequate power supply; ensure no other device is sharing the power outlet • Too much power consumed by devices (defective or otherwise) connected on auxiliary power outlets; remove device(s) to identify defective component
Touchscreen Console HMI screen is unresponsive	• Issue with software • Issue with electrical hardware
Touchscreen Console does not recognize USB drive	• USB drive is not in FAT format • Electronics hardware issue
Touchscreen Console will not control pinch clamp	• Incorrect pinch clamp feedback and control connection • Pressurized air inlet issue
Touchscreen Console will not control external device (4-20 mA output)	• Issue with parameters on external component • Issue with cordset
Touchscreen Console fails to recognize auxiliary input (4-20 mA input)	• Issue with external 4-20 mA supply • Issue with cordset
Auxiliary breaker has multiple breaker trips within a 4 hour window	• Overload of auxiliary plugs • Issue with breaker
Temperature readings are not displaying or fail to recognize a sensor	• Issue with RTD • Issue with cordset
Temperature readings are inaccurate	• Issue with RTD • Temperature calibration is inaccurate
Digital communication protocol is not working	• Issue with software • Issue with cordset
External E-Stop is not recognized	• Issue with cordset • Issue with E-Stop circuit
E-Stop buzzer will not turn off	• Issue with E-Stop reset circuit • Issue with buzzer
E-Stop buzzer will not turn on when the E-Stop button is pressed	• Issue with buzzer • Issue with E-Stop circuit
Auxiliary power outlets are not working	• Auxiliary breaker may have tripped • Issue with power cord
Overtemperature warning	• Issue with exhaust fan • Issue with inlet filter
HMI is slow to respond or is lagging	Issue with firmware
DC motor overtemperature	• Issue with cooling fan • Issue with wiring

4.2 Critical failures

The following Touchscreen Console components are considered critical failures. If any of these components fail, customers will be required to replace the Touchscreen Console.

- Rear panel
- Front enclosure
- Touchscreen (if broken or cracked)
- Outlet fan
- Outlet filter
- Buzzer

5

Replacing parts

Before proceeding to perform any work on the Touchscreen Console, it is mandatory that service technicians complete the following:

- Turn off and lock out all utilities to the Touchscreen Console
- Isolate all electrical circuits from the electrical AC main supply and prevent accidental reconnection of electrical power
- Disconnect the AC power supply cable from the wall socket
- Disconnect the compressed air hose
- Follow lockout/tagout procedures and local site electrical rules and laws

Needle nose pliers and a **#3 Phillips head screwdriver** are required to open the rear panel of the unit prior to replacing any parts. Use the pliers to grasp the detents on the rear panel access point plugs and remove each plug (see section 5.1 below). Then, use the Phillips screwdriver to remove the screws from the rear panel access points.

5.1 Replacing the plugs for the rear panel access points

Use the following instructions to replace the plugs on the rear panel access points of the Touchscreen Console.

5.1.1 Required tools

The following tools and accessories are required for replacing the rear panel access point plugs.

- Spare plugs for rear panel access points, set of 3 (cat. no. SV51149.17)
- Needle nose pliers

5.1.2 Preparations

Prior to replacing the plugs for the rear panel access points, lock out and tag out all utilities to ensure the Touchscreen Console is safe to service.

5.1.3 Removal and installation procedures

Proceed as follows to remove and replace the rear panel access point plugs.

1. Use needle nose pliers to grasp the detents in each of the plugs that require replacement and pull them from the access points on the rear panel (Figures 5.1 and 5.2).

Figure 5.1. (Left) Grasping detents on plug

Figure 5.2. (Right) Pulling plug from an access point

2. Insert new plugs into the access points.

5.2 Replacing the main door sealing gasket and door gap sealing gasket

Use the following instructions to replace the main door sealing gasket and door gap sealing gasket on the Touchscreen Console.

5.2.1 Required tools

The following tools and accessories are required for replacing the main door sealing gasket and door gap sealing gasket.

- Spare main door sealing gasket (cat. no. SV51149.07) and door gap sealing gasket (SV51149.08)
- Adhesive [provided in preventive maintenance kit: (SV51231.01)]

5.2.2 Preparations

Prior to replacing the sealing gaskets, lock out and tag out all utilities to ensure the Touchscreen Console is safe to service.

5.2.3 Removal and installation procedures

Proceed as follows to remove and replace the sealing gaskets.

1. Open the rear panel of the Touchscreen Console. The main door sealing gasket is located along the left edge of the unit (Figure 5.3), and the door gap sealing gasket is along the top edge of the unit (Figure 5.4).

Figure 5.3. Main door sealing gasket
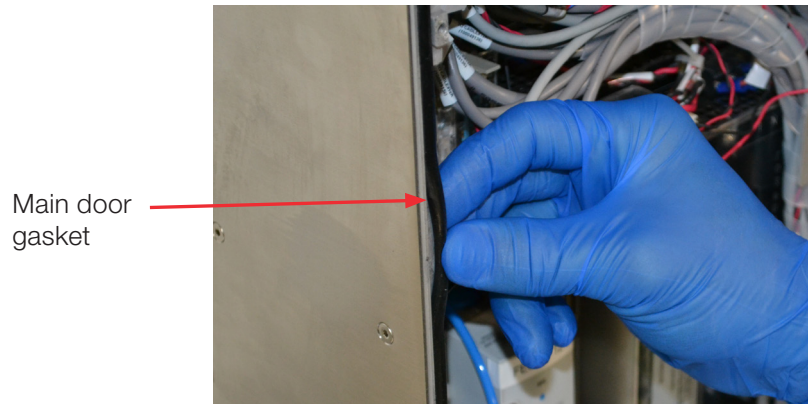
Main door gasket

Figure 5.4. Door gap sealing gasket

Door gap gasket
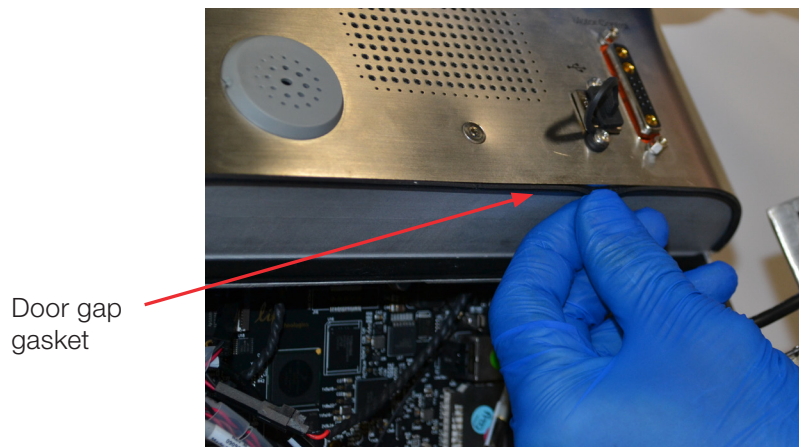
2. Use a small amount of adhesive from the preventive maintenance kit to secure the gasket to the edge of the unit.

3. Before closing the door of the rear panel, ensure that the adhesive has dried and that no cables are caught in the door opening. There should be no resistance while closing the door.

4. Close the rear panel door and use the screws and Phillips screwdriver to secure. Then insert the access point plugs.

5.3 Replacing the inlet dust filter

Use the following instructions to replace the inlet dust filter in the Touchscreen Console.

5.3.1 Required tools

The following tools and accessories are required for replacing the inlet dust filter. Both are included in the preventive maintenance kit (SV51231.01).

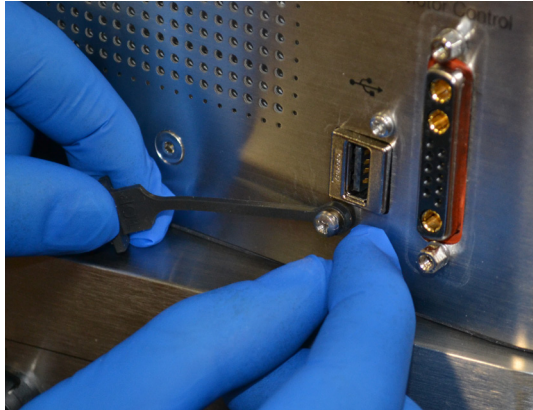*   Spare inlet dust filter
*   Adhesive

5.3.2 Preparations

Prior to replacing the inlet dust filter, lock out and tag out all utilities to ensure the Touchscreen Console is safe to service.

5.3.3 Removal and installation procedures

Proceed as follows to replace the inlet dust filter.

1. Open the rear panel of the Touchscreen Console. Locate the gray foam inlet dust filter at the bottom right of the unit.

2. Lift the used inlet dust filter from the unit (Figure 5.5).

Figure 5.5. Lifting up the used inlet dust filter
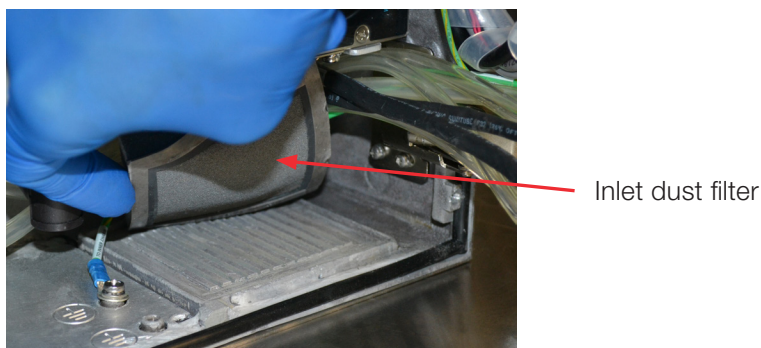
Inlet dust filter

3. Place a small amount of adhesive from the preventive maintenance kit on the bottom of the new filter. Use a firm amount of pressure to push the inlet dust filter in place (Figure 5.6).

Figure 5.6. Pressing down the new inlet dust filter
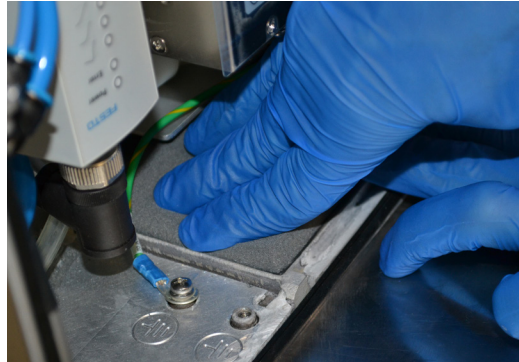
4. Before closing the door of the rear panel, ensure that the adhesive has dried and that no cables are caught. There should be no resistance while closing the door.

5. Close the rear panel door and use the screws and Phillips screwdriver to secure. Then insert the access point plugs.

5.4 Replacing the rubber USB plug

Use the following instructions to replace the rubber USB plug on the Touchscreen Console.

5.4.1 Required tools

The following tools and accessories are required for replacing the rubber USB plug.

*   Spare rubber USB plug (cat. no. SV51149.23)
*   Phillips head screwdriver

5.4.2 Preparations

Prior to replacing the rubber USB plug, lock out and tag out all utilities to ensure the Touchscreen Console is safe to service.

5.4.3 Removal and installation procedures

Proceed as follows to remove and replace the rubber USB plug.

1. Use a Phillips screwdriver to remove the single screw below the USB port and remove the old rubber ring from the plug.

2. Place the ring from the new rubber USB plug against the unit so the hole is centered inside the ring. Then insert and tighten the screw (Figure 5.7). Use a Phillips screwdriver to fully tighten.

Figure 5.7. Inserting the screw after replacing the rubber USB plug

5.5 Replacing the circuit breakers and switch covers

Use the following instructions to replace the circuit breakers and switch covers on the Touchscreen Console.

5.5.1 Required tools

The following tools and accessories are required for replacing the circuit breakers and switch covers.

- Spare circuit breaker (cat. no. SV51149.10) and switch cover (SV51149.22)
- Phillips head screwdriver
- Flathead screwdriver

5.5.2 Preparations

Prior to replacing the circuit breakers and switch covers, lock out and tag out all utilities to ensure the Touchscreen Console is safe to service.

5.5.3 Removal and installation procedures

Proceed as follows to remove and replace the circuit breakers and switch covers.

1. Use a Phillips screwdriver to remove the two screws securing the switch cover on the circuit breaker (Figure 5.8). Then pull the switch cover away from the circuit breaker (Figure 5.9).

Figure 5.8. (Left) Removing screws from the switch cover

Figure 5.9. (Right) Pulling off the switch cover

2. Open the rear panel of the Touchscreen Console and locate the circuit breaker on the right side of the door. Disconnect the brown and blue wires from the circuit breaker (Figure 5.10) **Note:** Take note of the location of each of the wire connections for reference during reinstallation.

Figure 5.10. Circuit breaker and disconnected wires

Circuit breaker

Brown and blue wires (disconnected)
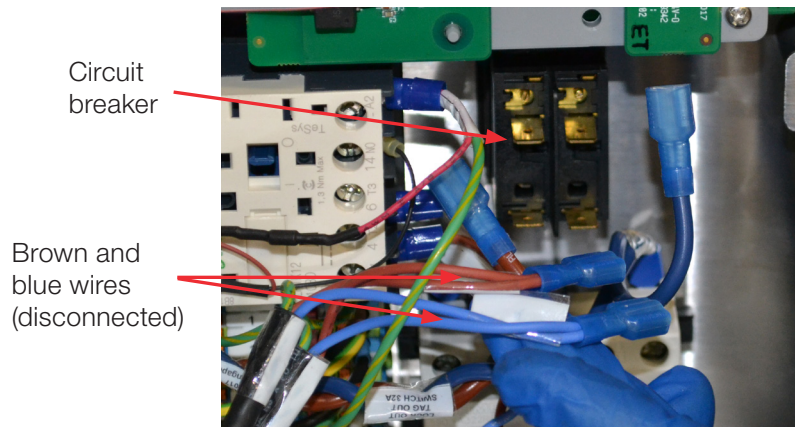
3. Use a flathead screwdriver to depress the tabs on the edges of the circuit breaker. A close-up view of the tabs is shown in Figure 5.11. **Note:** The circuit breaker is shown removed from the rear panel to provide a close-up view, but will still be inserted in the panel at this step.

Figure 5.11. Close-up view of screwdriver depressing the tabs on the circuit breaker

Circuit breaker switch

Tab on the edge of the circuit breaker
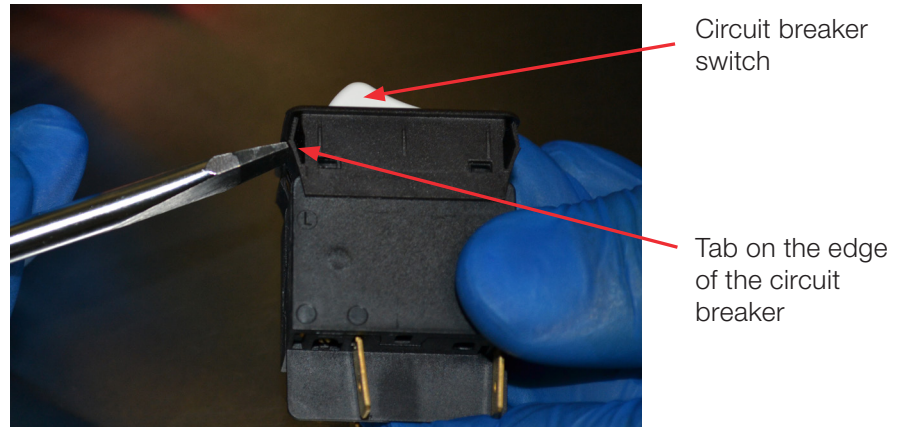
4. Pull the circuit breaker switch assembly through the outside of the rear panel (Figure 5.12).

Figure 5.12. Pulling the circuit breaker switch assembly through the outside of the rear panel

5. Reverse the above steps to reinstall the circuit breaker and switch cover. **Note:** When replacing the circuit breaker, ensure that the switch assembly is oriented correctly, with the "I" located at the top of the switch and the "O" at the bottom.

6. Ensure that no cables are caught in the door opening and close the rear panel door. There should be no resistance. Use the screws and Phillips screwdriver to secure, then insert the access point plugs.

5.6 Replacing the E-Stop button assembly and mushroom head

Use the following instructions to replace the E-Stop button assembly and E-Stop mushroom head in the Touchscreen Console.

5.6.1 Required tools

The following tools and accessories are required for replacing the E-Stop button assembly and E-Stop mushroom head.

- Spare E-Stop button assembly (cat. no. SV51149.12) and E-Stop mushroom head (SV51149.21)

5.6.2 Preparations

Prior to replacing the E-Stop button and mushroom head, lock out and tag out all utilities to ensure the Touchscreen Console is safe to service.

5.6.3 Removal and installation procedures

Proceed as follows to remove the E-Stop button and mushroom head.

1. Open the rear panel of the Touchscreen Console. From the front enclosure assembly, unscrew and remove the red mushroom head and silver ring from the E-Stop button (Figures 5.13 and 5.14). Then remove the yellow "Emergency Stop" plate.

Figure 5.13. (Left) Removing the red mushroom head from the E-Stop button

Figure 5.14. (Right) Removing the silver ring from the E-Stop button

2. Pull the E-Stop button assembly through the back side of the front enclosure (Figure 5.15).

Figure 5.15. E-Stop assembly
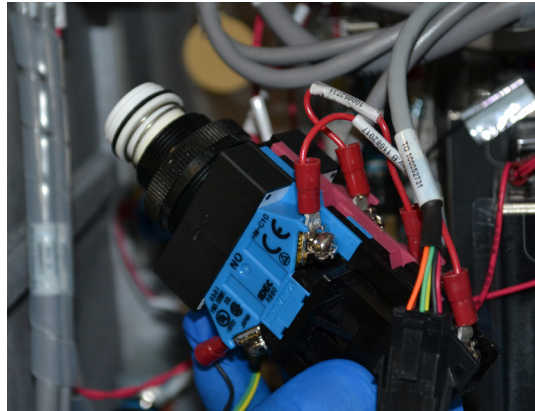
3. Refer to the following schematic (Figure 5.16) to remove wires and reconnect wires to the new E-Stop button assembly.

Figure 5.16. E-Stop button wiring schematic
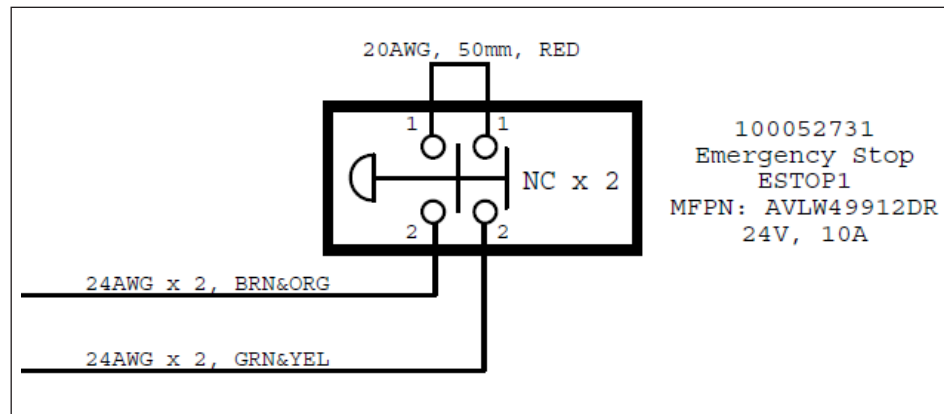
4. When replacing the button assembly, unscrew the black ring shown in Figure 5.17 counterclockwise until it is offset approximately 3/16 in. to allow proper positioning of the assembly.

Figure 5.17. Unscrewing black ring on the button assembly

Black ring being turned counterclockwise
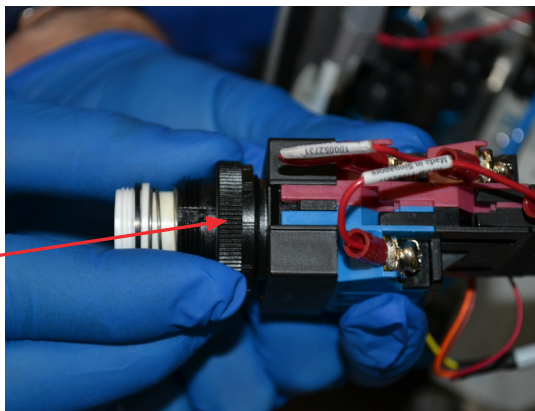
5. Replace the yellow plate over the button assembly on the front enclosure, then screw the silver ring and red mushroom cap back onto the button assembly.

6. Ensure that no cables are caught in the door opening before closing the rear panel door. There should be no resistance. Use the screws and Phillips screwdriver to secure, then insert the access point plugs.

5.7 Replacing the reset button

Use the following instructions to replace the reset button on the Touchscreen Console.

5.7.1 Required tools

The following tools and accessories are required for replacing the reset button.

- Spare reset button (cat. no. SV51149.20)
- #3 Phillips head screwdriver
- Needle nose pliers

5.7.2 Preparations

Prior to replacing the reset button, lock out and tag out all utilities to ensure the Touchscreen Console is safe to service.

5.7.3 Removal and installation procedures

Proceed as follows to remove and replace the reset button.

1. Open the Touchscreen Console. Reference section 5.6.3 to remove the E-Stop button to allow for easier access.

2. Use a Phillips screwdriver to depress the yellow lever located on the left (Figure 5.18) and turn it counter-clockwise. This will "unlock" the reset button component, allowing it to be removed. Use needle nose pliers to pull out the terminal block.

Figure 5.18. View of reset button assembly from inside the Touchscreen Console unit

Terminal block

Yellow lever (depress to unlock)
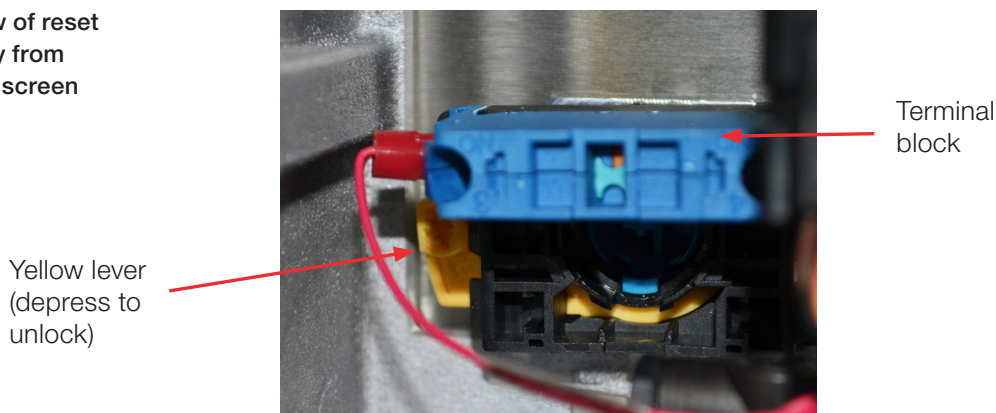
3. Remove the plastic nut securing the square washer, and pull the reset button out through the front enclosure (Figure 5.19).

Figure 5.19. Removing the reset button through the front enclosure

4. Replace the reset button by reversing the above steps.
   Note: Ensure that the grooves on the inner portion of the reset button are properly aligned while reassembling.

5. Ensure that no cables are caught in the door opening before closing the rear panel door. There should be no resistance. Use the screws and Phillips screwdriver to secure, then insert the access point plugs.

5.8 Replacing the main disconnect

Use the following instructions to replace the main disconnect in the Touchscreen Console.

5.8.1 Required tools

The following tools and accessories are required for replacing the main disconnect.

- Spare main disconnect (cat. no. SV51149.09)
- #3 Phillips head screwdriver
- 1/8 in. Flathead screwdriver

5.8.2 Preparations

Prior to replacing the main disconnect, lock out and tag out all utilities to ensure the Touchscreen Console is safe to service.

5.8.3 Removal and installation procedures

Proceed as follows to remove the main disconnect.

1. Open the Touchscreen Console. Use a Phillips screwdriver to remove the switch handle.

2. Use a flathead screwdriver to carefully pry off the yellow plate on the front of the switch (Figure 5.20).

Figure 5.20. Removing the yellow plate on the main disconnect switch

3. Use a Phillips screwdriver to remove the two screws that secure the black plastic cover (Figure 5.21). Then remove the cover.

Figure 5.21. Unscrewing the black plastic switch cover

4. Refer to the following schematic (Figure 5.22) to remove wires and reconnect wires to the new component.

Figure 5.22. Main disconnect wiring schematic
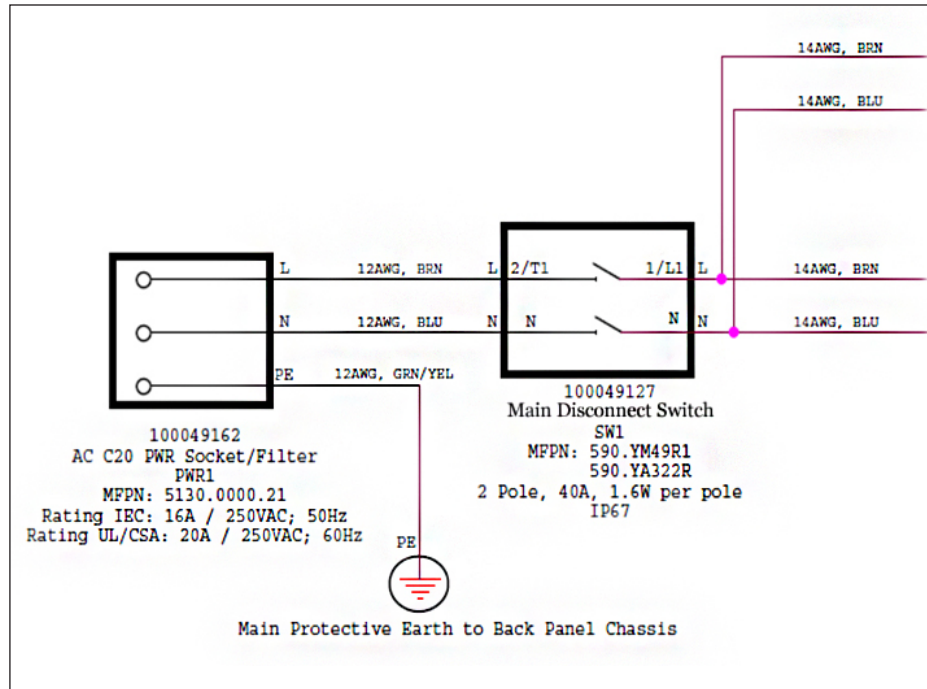
5. Pull out the contact block (Figure 5.23).

Figure 5.23. Removing the contact block
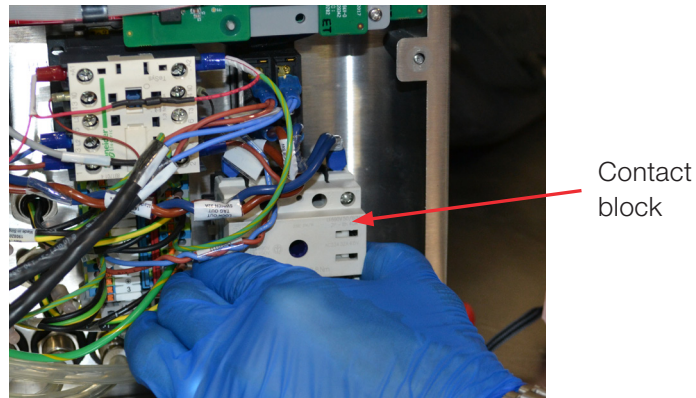
Contact block

6. Disconnect the brown wire on the bottom of the contact block first, followed by the blue wire on the bottom of the block. Then disconnect the wires on the top. See Figure 5.24 for the location of the wires.

Figure 5.24. Location of wires on top and bottom of the contact block

Location of blue wire on bottom of block
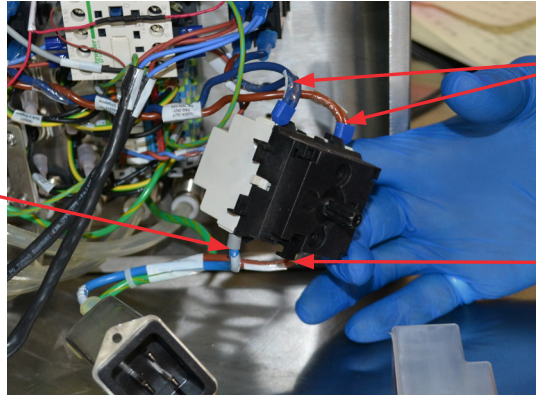
Location of top brown and blue wires

Location of brown wire on bottom of block

7. Reconnect the wires by reversing the above instructions. Then replace the new, fully wired main disconnect (Figure 5.25).

Figure 5.25. Replacing main disconnect component
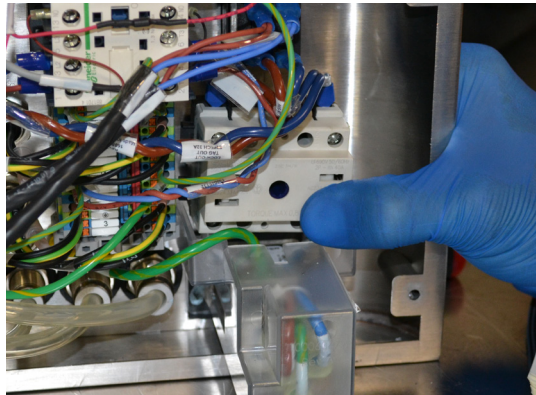
Note: Ensure that the red gasket is correctly in place before reassembling the switch (Figure 5.26).

Figure 5.26. Red gasket in place

Red gasket
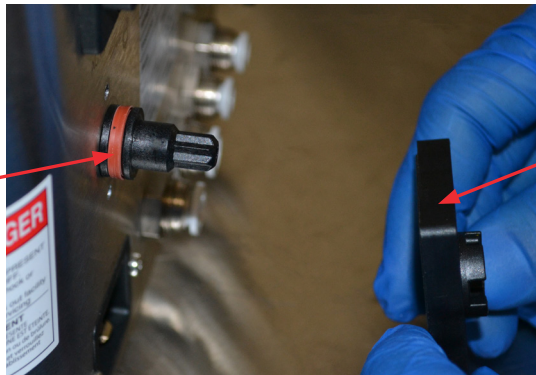
Black plate on main switch

8. Reassemble the switch by screwing on the black plastic cover, snapping on the yellow plate, and screwing on the switch handle. **Note:** Ensure that the black plastic cover is properly oriented before replacing the yellow plate.

9. Ensure that no cables are caught in the door opening before closing the rear panel door. There should be no resistance. Use the screws and Phillips screwdriver to secure, then insert the access point plugs.

5.9 Replacing the pneumatic assembly

Use the following instructions to replace the pneumatic assembly in the Touchscreen Console.

5.9.1 Required tools

The following tools and accessories are required for replacing the pneumatic assembly.

- Spare pneumatic assembly (cat. no. SV51149.06)
- Needle nose pliers
- 5.5 mm Allen wrench

5.9.2 Preparations

Prior to replacing the pneumatic assembly, lock out and tag out all utilities to ensure the Touchscreen Console is safe to service.

5.9.3 Removal and installation procedures

Proceed as follows to remove the pneumatic assembly.

1. Open the Touchscreen Console and locate the pneumatic assembly. Unscrew the main power connection at the bottom of the pneumatic assembly.

2. Use a 5.5 mm Allen wrench to disconnect the pneumatic assembly from the unit (Figure 5.27). Remove the assembly once it is disconnected (Figure 5.28).

Figure 5.27. Using
an Allen wrench to
disconnect from the unit

Assembly
connected to
the unit

Pneumatic
assembly

Figure 5.28. Removing
pneumatic assembly
from the unit
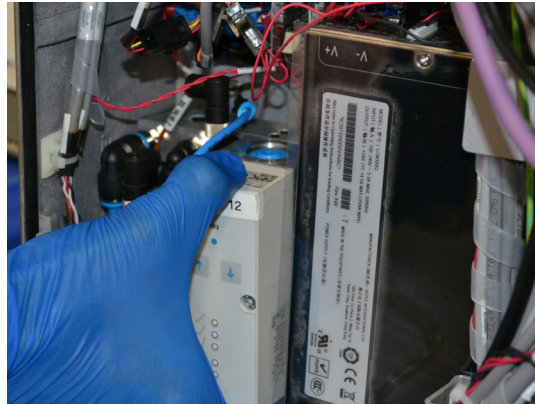
3. Use needle nose pliers to suppress the gray collar on the air inlet
    tubing connections, and use firm pressure to detach the air inlet
    tubing (Figure 5.29).

Figure 5.29. Detaching
air inlet tubing

4. Reverse the above steps to reconnect the pneumatic assembly.
    When reattaching the pneumatic assembly, ensure that all air lines
    are correctly connected.

5. Ensure that no cables are caught in the door opening before closing the rear panel door. There should be no resistance. Use the screws and Phillips screwdriver to secure, then insert the access point plugs.

5.10 Replacing the 24VDC and 48VDC power assemblies

Use the following instructions to replace the 24VDC and 48VDC power assemblies in the Touchscreen Console.

5.10.1 Required tools

The following tools and accessories are required for replacing the power assemblies.

- Spare 24VDC power assembly (cat. no. SV51149.02) and 48VDC power assembly (SV51149.01)
- #3 Phillips head screwdriver
- Scissors or wire cutters

5.10.2 Preparations

Prior to replacing the power assemblies, lock out and tag out all utilities to ensure the Touchscreen Console is safe to service.

5.10.3 Removal and installation procedures

Proceed as follows to remove the power assemblies.

1. Open the Touchscreen Console and locate the power assemblies. For greater accessibility, use scissors or wire cutters to clip the zip tie from the cables at the top of the power assemblies (Figure 5.30).

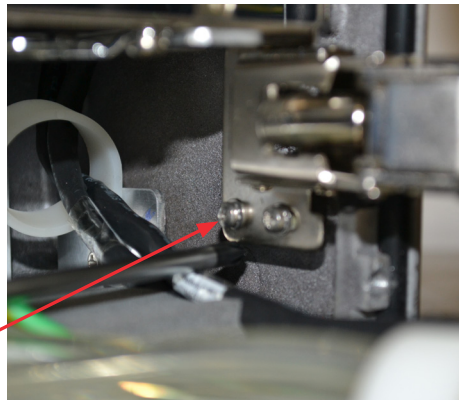**Figure 5.30. Clipping the zip tie from cables**
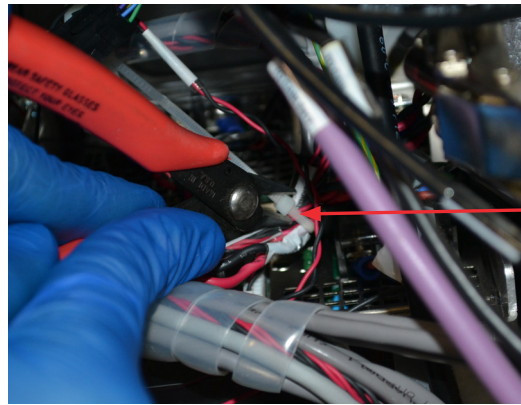
Zip tie holding cables

2. Use a Phillips screwdriver to remove the four (4) screws that secure the lower hinge on the rear panel door (Figures 5.31–5.32) and remove the hinge for easier access.

**Figure 5.31. (Left) Lower hinge on rear panel door**

Figure 5.32. (Right) Removing screws from the hinge


Screws on door hinge

3. Remove one (1) screw from the pneumatic tie, two (2) screws from the 24VDC power supply, and four (4) screws from the 48VDC power supply. **Note:** Separate and organize the screws from each of the above components to ensure the correct screws are used for each component when they are reinserted.

4. Disconnect the wiring from the power supply using the appropriate tools. Take note of the location of each of the wires as reference when reconnecting. Refer to the wiring schematic (Figure 5.33) to confirm wiring.

**Figure 5.33. Power assemblies wiring schematic**
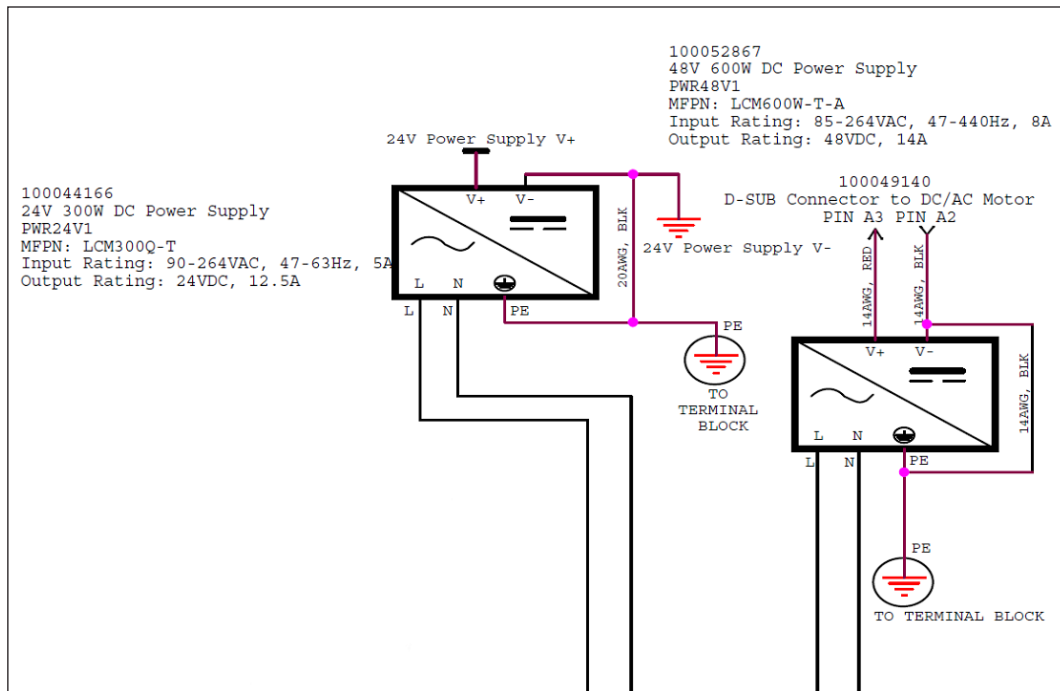
5. Disconnect the 20 pin connector at the top of the power supply (Figure 5.34). Then remove the power supply from the unit.

Figure 5.34. Disconnecting 20 pin connector

20 pin connector
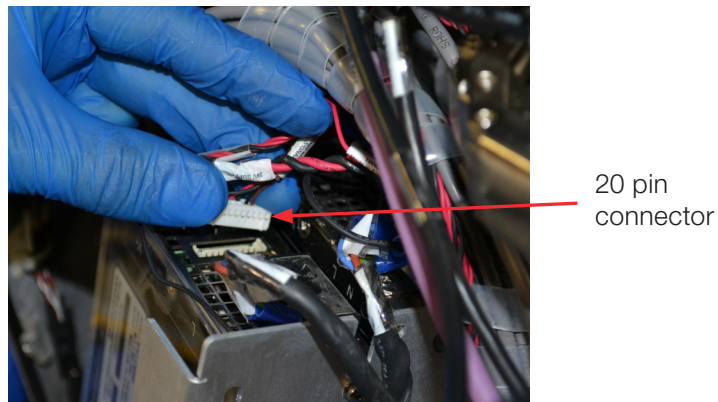
6. When replacing with a new 24VDC or 48VDC power supply, set the frame holding both power assemblies (Figure 5.35) on the peg located at the back inside of the console.
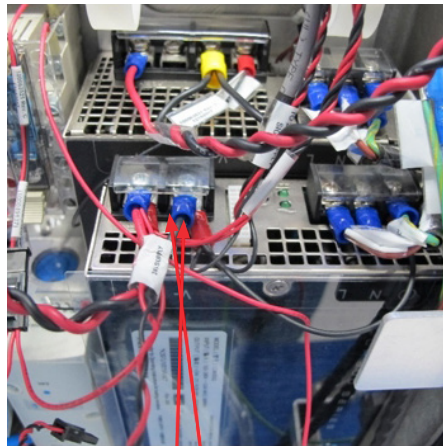
Figure 5.35. Frame holding power assemblies
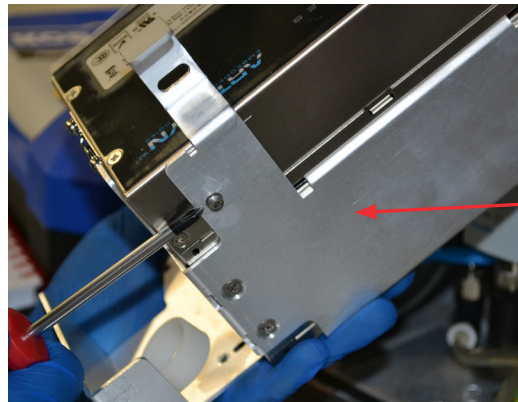
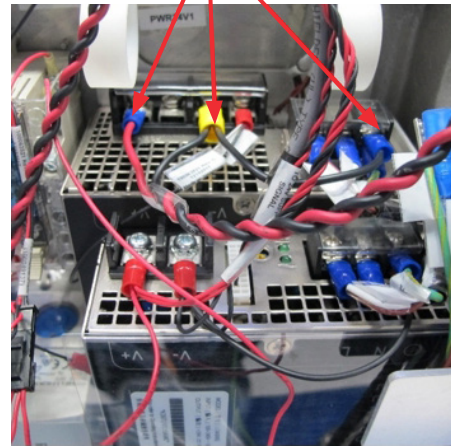Frame for power supply assemblies

7. Connect the 24V or 48V cable to the respective power supply and cover the back terminal (Figures 5.36 and 5.37).

Figure 5.36. (Left) Connecting 24V cable to 24VDC power supply

Figure 5.37. (Right) Connecting 48V cable to 48VDC power supply

Connect 48V cable

Connect 24V cable

8. When replacing the screws for the pneumatic tie, 24VDC power supply, 48VDC power supply, and hinge, use a dab of thread sealant (provided in the preventive maintenance kit) on the top of each screw to allow the screwdriver to easily insert them into their respective locations.

9. Ensure that no cables are caught in the door opening before closing the rear panel door. There should be no resistance. Use the screws and Phillips screwdriver to secure, then replace the access point plugs.

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