ChargeSecure™
INSTALLATION, STARTUP, AND OPERATING MANUAL

ChargeSecure™

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This volume is an Installation and Startup manual.

Hillphoenix Systems Division

IMPORTANT

At Hillphoenix®, the safety of our customers and employees, as well as the ongoing performance of our products, are top priorities. To that end, we include important warning messages in all Hillphoenix installation and operations handbooks, accompanied by an alert symbol paired with the word "DANGER", "WARNING", or "CAUTION".

All warning messages will inform you of the potential hazard; how to reduce the risk of case damage, personal injury or death; and what may happen if the instructions are not properly followed.

⚠ DANGER

Indicates an immediate threat of death or serious injury if all instructions are not followed carefully.

⚠ WARNING

Indicates a potential threat of death or serious injury if all instructions are not followed carefully.

⚠ CAUTION

Indicates that failure to properly follow instructions may result in case damage.

Revision History

Rev.	Date	Change Description	Author
Rev 1.0	07/24	New Manual Creation - Updating to New Format	T.A.G.
Rev 2.0	02/25	Parts Update	T.A.G.
Rev 3.0	06/25	FAQ and Rack Updates	T.A.G.
Rev. 4.0	10/26	Appendix, Formatting, and ToC Updates	T.A.G.

GENERAL INFORMATION

The ChargeSecure is an integrated charge-preservation system designed for Hillphoenix engineered and manufactured CO_2 booster racks. The ChargeSecure requires no additional or synthetic refrigerants. Instead, the ChargeSecure utilizes the system's existing refrigerant charge, piping, and gas cooler for operation and to maintain system pressures below the CO_2 flash tank relief valve setpoints. Activated automatically in the event of a power loss to the rack, the ChargeSecure ensures minimal to no loss of refrigerant during extended periods of power or phase loss. This guide is intended to provide details and instructions for the field installation or retrofit of the ChargeSecure on a Hillphoenix-manufactured CO_2 booster rack.

Note: The following procedure will require depressurization of isolated sections of the system to make the necessary connections to the flash tank and oil management system. These activities may only be conducted by qualified, trained, and licensed professionals familiar with CO_2 booster refrigeration systems.

ChargeSecure MOUNTING DETAILS

1. ChargeSecure can be either floor fixed or wall mounted next to the unit no more than 15 ft away from the Receiver.

Note: When doing floor mount of ChargeSecure, use factory-supplied bracket to ensure there is a minimum 2" gap below the ChargeSecure unit for air intake.

PREPARE THE RACK FOR INSTALLATION OF THE ChargeSecure

1. Based on the distance between the ChargeSecure and the rack, prepare all piping lines as indicated in **Figure B (Page 8)**.

1) ChargeSecure suction line
2) ChargeSecure discharge line
3) ChargeSecure oil supply

2. Install the necessary fittings and valves in each line that HPX supplies as indicated in **Figure B (Page 8)**.
Note: 8mm hydraulic steel tubes should be used for all ChargeSecure field-installed piping.

Note: Suction Line and High-Pressure Valve Bypass Line sections can be done without shutting down the rack. For Oil Supply Line through Discharge Line sections, prepare the piping from ChargeSecure up to the rack and then shutdown the system to minimize the downtime.

ChargeSecure SUCTION LINE INSTALLATION DETAILS

1. This section covers ChargeSecure Suction line installation, which is Item 1 in PID **Figure B (Page 8)**.

2. Close receiver manifold service and access valves (V-624) on the Rack.

3. Connect the field-installed ChargeSecure suction pipe to manifold access valve (V-624) on the rack using supplied fittings as indicated in **Figure C (page 9)**.

HIGH-PRESSURE VALVE BYPASS LINE INSTALLATION DETAILS

1. This section covers High-Pressure Valve Bypass Solenoid installation, which is Item 4 in PID **Figure B (Page 8)**.

2. Close drain line access valves (V-639A and V-639B). If you are not able to find V-639A on unit, then use access valve V-621.

3. Connect the field-installed high-pressure bypass line to drain access valves (V-639A and 639B) on Rack using supplied fittings as indicated in **Figure D (Page 10)**. If you are not able to find V-639A on unit, then use access valve V-621.

4. Insulate the bypass line with 3/4" thickness insulation.

5. Bypass Solenoid (V-687) to be wired to ChargeSecure control panel per wiring diagram indicated in **Figure D2 (Page 11)**.

OIL SUPPLY LINE INSTALLATION DETAILS

1. Shut down the rack; for the complete shutdown procedure, go to Page 5.

2. Close oil reservoir feed line access valve (V-665), ChargeSecure oil supply service valve (V-663A) and all compressor oil supply lines (V-314,324,114 and 124).

3. Connect the field-installed oil supply pipe to the oil manifold end (remove the end cap of manifold) on Rack using supplied fittings as indicated in **Figure E (Page 12)**.
Note: For more details on how to install the Hy-Lok fittings, please refer to Appendix D.

DOS FEED LINE BYPASS AND OIL RESERVOIR VENT LINE NOZZLE INSTALLATION DETAILS

1. This section covers Oil Pressurization Solenoid and Reservoir Pressure Holdback installation, which are Items 5 & 6 in PID **Figure B (Page 8)**.

2. Close DOS feed line access valve (V-662).

3. Connect the field installed DOS bypass line to main oil feed line on Rack using supplied fittings as indicated in **Figure F**.

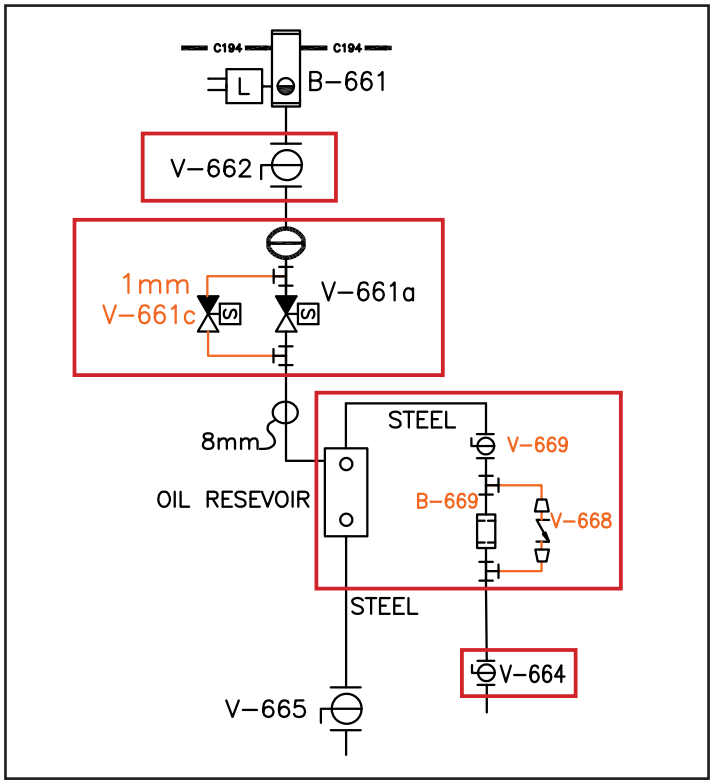


Figure F: DOS Feed Line Bypass installation details

4. Oil Pressurization Solenoid (V-661c) is to be wired to ChargeSecure control panel per wiring diagram in **Figure F2 (Page 13)**.

5. Close Oil reservoir vent line access valve (V-664).

6. Install Ball Valve (V-669) and Nozzle (B-669) on Oil Reservoir Vent Line as indicated in **Figure F**.

7. Install the bypass check valve (V-668) assembly to Oil Reservoir vent line on Rack using supplied fittings as indicated in **Figure F**.

ChargeSecure DISCHARGE LINE INSTALLATION DETAILS

1. Assemble the discharge line pipe and associated valves as described in Section 2.

2. Close all MT compressors discharge service valves (V-112 and V-122); the number of compressors will be based on Rack model and close MT discharge line service V-615A. Vent the refrigerant between Compressor outlet and V-615A using access valve V-611.

3. Connect the assembled discharge line pipe to MT discharge line after DOS on Rack using supplied fittings as indicated in **Figure G (Page 14)**.

4. Once all piping is complete, follow the Hillphoenix/Advansor startup guide to properly vacuum the system. This guide can be reached by scanning the QR code on the side of the ChargeSecure Unit.

5. Restart the rack. For the complete startup procedure, go to Page 5.

Important Note:
For Flex models ONLY:

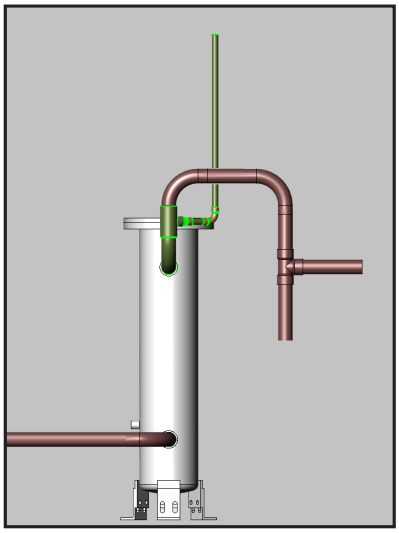


Figure H1: Inverted U-trap and ChargeSecure Discharge Line

Make sure to rework the DOS outlet line shown in Figure H1. Create an inverted U-trap and connect the ChargeSecure discharge to the side as shown in the picture above. This allows the oil to drain back into the DOS. Ensure that C194 tees and fittings are used.

For all other models: Ensure the DOS outlet line is a vertical riser. ChargeSecure discharge must be connected above the DOS as shown in Figure H2.

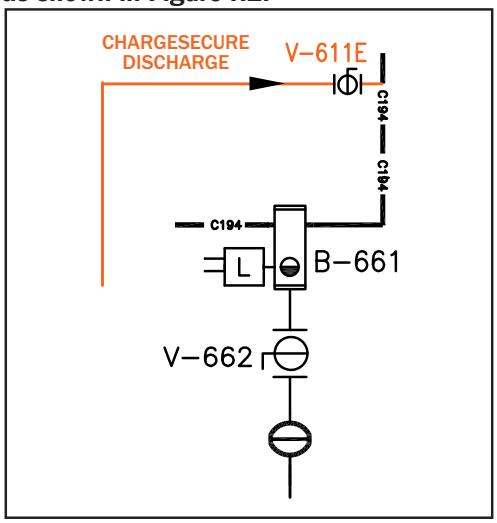


Figure H2: Ensure the DOS outlet line is a vertical riser

ELECTRICAL CONNECTIONS, OPERATIONAL TEST & SHUTDOWN AND STARTUP

CONNECT THE ELECTRICAL SUPPLY TO THE ChargeSecure ACCORDING TO Figure K.

1. **Note:** ChargeSecure operates at 208VAC single-phase power. If using a backup generator or outside source UPS, ensure that the output is compatible with the requirements of the ChargeSecure. If powering the UPS from the rack, please refer to Figures K1 and K2 for details.

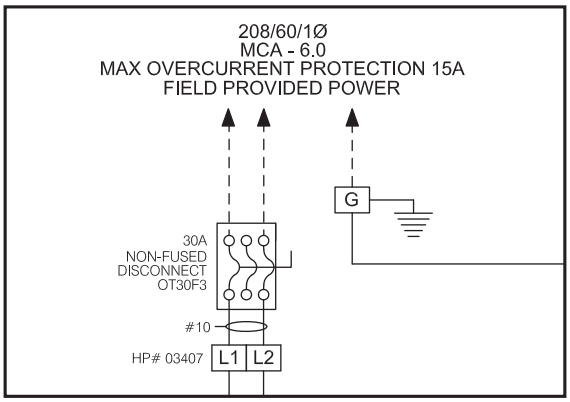


Figure K – ChargeSecure standard wiring information

2. If installing with a Hillphoenix-supplied battery pack/module, follow the wiring diagram in **Figure L**.

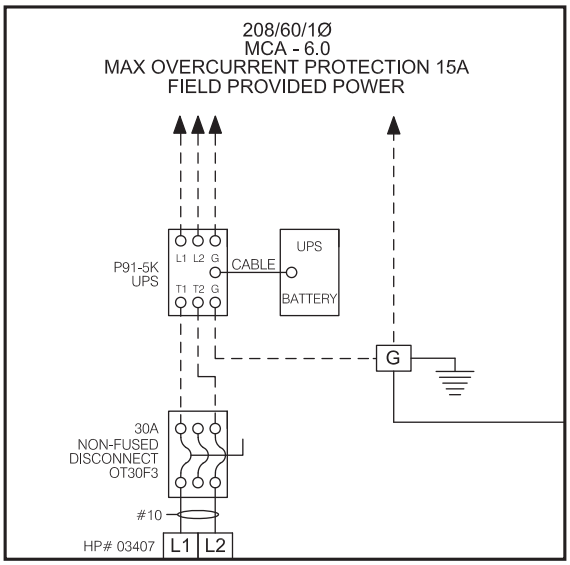


Figure L – ChargeSecure wiring diagram excerpt

Note: For more details on installing the UPS, please refer to the UPS manual:

www.hillphoenix.com/products/chargesecure-co2-charge-preservation

Verify all isolation valves associated with the CSU are in the open position.

ChargeSecure UNIT OPERATIONAL TEST

- Verify power comes from generator or backup UPS
  - Refer to UPS manual to ensure proper installation and UPS/battery startup
- Turn “Run Enable Override” Switch to “Manual”
- Turn the “Compressor Maintenance Run Timer” to 5 minutes. This will force the unit compressor to start
- Verify the unit oil solenoid valves both open for 30 seconds after compressor start (critical to first-run oil operation)
- Monitor the unit suction and discharge pressure for proper operation
  - Discharge should rise
  - Suction should lower
- Once proper operation is verified, turn off the "Start Enable Override" and allow the timer to continue to zero
- Verify that all solenoid valves on the rack used for the HPV bypass and the DOS feedline bypass are 208V/240V rated

Note: If the rack is in "phase-loss alarm" the unit may continue to run until the timer hits zero and the flash tank falls below the lower setpoint limit.

RACK SHUTDOWN AND STARTUP PROCEDURE FOR ChargeSecure RETROFIT

Shut Down

- Shift the flash tank relief from 45 to 60 bar
- Close King valve and pump down rack
- Allow compressor to pump down MT and LT suction and stop running; this will take several minutes
- Override the Gas Cooler fans to 100%
- Phase trip rack to close the HPV and FGBV

Startup

Once the installation and vacuum is complete:

- Vapor charge piping
- Open isolation valves
- Energize compressors
- Open King valve
- Take override out of Gas Cooler fans
- Energize phase monitor

At this point, the system will restart.

ChargeSecure Fault Tree

Function	Failure	Causes of Failure	Effects	Recommended Action
Unit to start upon rack phase loss + set pressure	Failure to start	No input signal from rack phase loss	AFEA/AFEB - Run enable missing	Ensure that the ChargeSecure VFD is receiving the run-enable signal from rack phase loss (refer to ChargeSecure wiring diagram provided with unit)
		Suction transducer failure	VFD will not recieve high-pressure signal to start or throw an error code related to a transducer failure causing the unit to not start and leading to refrigerant loss in the flash tank	Test transducer for proper operation and replace if needed Ensure VFD is receiving appropppriate signal from transducers Parameter 12.12 - Actual value in Bar
		Backup power not present	Without backup power to the ChargeSecure the VFD will not be able to drive the compressor and valves. This will cause the ChargeSecure to not start leading to refrigerant loss in the flash tank	Verify power from backup UPS or generator and service as needed
Compressor	Compressor failure	Lack of oil	Compressor fails to properly pump refrigerant causing poor system operation	Verify the presence of oil in ChargeSecure oil supply line Verify proper operation of oil solenoid valves Validate no impurities in oil Verify pressure differential in oil line
		Equalization solenoid valve failure	VFD will not receive pressure signal and will throw an error code related to a transducer failure causing the unit to not start and leading to refrigerant loss in the flash tank	Verify proper operation of solenoid valve
		Discharge transducer failed		Test transducer for proper operation and replace if needed Ensure VFD is receiving appropppriate signal from transducers Parameter 12.22 - Actual value in Bar
VFD/Controller	Won't start compressor	High-pressure alarm	Safety chain will be broken resulting in fault 5901 - Safe Torque off	Ensure that high pressure switch is not activated and is properly wired. Investigate potential high-pressure issue Parameter 12.12 - Actual value in Bar
		Overheating due to VFD fan failure or insufficent air flow	Fault A79C - Temperature exceeded	Reset VFD and replace if needed
		Other faults	Various	Refer to the ACS380 machinery control program Firmware manual - Document Number: 3AXD50000029275
Prevent Refrigeration Loss	ChargeSecure not preventing refrigerant loss	Rack MT disc to MT suction leak	Internal system leak causing unintended refrigerant loss in flash tank	Inspect and repair rack internal leaks as needed
		Rack MT suction leak to receiver leak	ChargeSecure will take longer to pull flash-tank pressure leading to higher energy usage. If battery is not sized properly ChargeSecure could shutdown causing refrigerant loss	
		Leaky rack relief valve	Internal system leak causing unintended refrigerant loss	

RETROFIT COMPONENTS & SPARE PARTS

Retrofit Kit Components

Component ID	HPX Part number	Description	QTY	Unit	Used On
V-66 V-663a / V-664 / V-669 / V-639a,b... /V-624a,b... / V-611e 1c	107526	VLV,BALL,CO2,1/4IN FPT X MPT, 3000psig	8	Pc.	CSU.Access valve
	109361	FITTING,MALE,TU.LK,STEL,3/8IN-1/4IN MNPT	2	Pc.	CSU.Access valve adapter
	100532	FITTING,FLARE,7/16-20UNFX1/4NPT	1	Pc.	CSU.Access valve adapter
V-687	100146	VLV,SOL,OIL,CO2,1/4 FPT,2MM,GSR	1	Pc.	CSU.Bypass solenoid valve
V-661c / V-687	110582	COIL,240V,FOR GSR SOL VLV	2	Pc.	CSU.Bypass solenoid coil
V-661c / V-687	110154	CONN, VALVE, DIN, FORM A, 250V	2	Pc.	CSU.Bypass solenoid coil
V-661c	104006	VLV,SOL,OIL,CO2,1/4 FPT,1MM,GSR	1	Pc.	CSU.Bypass solenoid valve
B-617c	107060	FILTER,IN-LINE,SS,1/4IN FNPT, FI SERIES	1	Pc.	CSU.Bypass solenoid filter
B-669	109575	NOZZLE,SS304,1.5MM,1/4MNPTX1/4MNPT	1	Pc.	CSU.Reservoir vent line nozzle
V-668	110687	VLV,CHK,ADJ,CO2,1/4IN,MNPT,50-150PSI	1	Pc.	CSU.Reservoir vent line check valve
	100168	FITTING,MALE,TU.LK,STEEL,8MM-1/4in MNPT	8	Pc.	CSU.Access valve adapter
	100180	FITTING,ELBOW,TU.LK,STEEL,8MMX1/4MNPT	3	Pc.	CSU.Access valve adapter
	100161	FITTING,FEM.,TU.LK,STEEL,8MM-1/4in FNPT	5	Pc.	CSU.Access valve adapter
	100094	FITTING,TEE,1/4in FNPT	3	Pc.	CSU.Access valve adapter
	100217	FITTING,COUP,THREADED,CS,1/2FNPT	2	Pc.	CSU.Access valve adapter
	100101	FITTING,HEX,RED.,BUSH,1/2MNPT X 1/4F	2	Pc.	CSU.Access valve adapter
	109360-2	FITTING,ADAPTER,STEL,3/8IN-1/4IN FNPT	2	Pc.	CSU.Access valve adapter
	100072	FITTING,HEX,ADAPTER,1/4MNPT X 1/4MNPT	4	Pc.	CSU.Access valve adapter
	05500	PIPE,HYD.,8MM DIA X 1MM THICK.,ZINC,	30	Ft.	CSU.Fabricated tube
	06265	COUP, CI, C194, 3/8	12	Pc.	CSU.Access valve adapter
	110837	FITTING,ADAPTER,S316,3/8IN-1/4IN MNPT	2	Pc.	CSU.Access valve adapter
	06590	TUBE,C194,130 BAR, 3/8 IN	60	Ft.	CSU.Fabricated tube
	06288	ELBOW,CI,C194,3/8, 90DEG,FxF	16	Pc.	CSU.Access valve adapter

Recommended Spare Parts List

HPX Part Number	Description
109596	VFD-ABB,15HP,208V,0T-6.6AV/46AC
110464	VFD-ABB, RELAY OUTPUT EXTENSION MODULE
110709	TIME DELAY SWITCH,SPST,5 MINUTE
109362	COMPRESSOR ,HERMETIC,ROTARY,CO2

APPENDIX

A ..... RETROFIT SCHEMATICS

B ..... HY-LOK INSTALLATION PROCEDURE

C ..... FREQUENTLY ASKED QUESTIONS

D ..... WARRANTY VALIDATION CHECKLIST

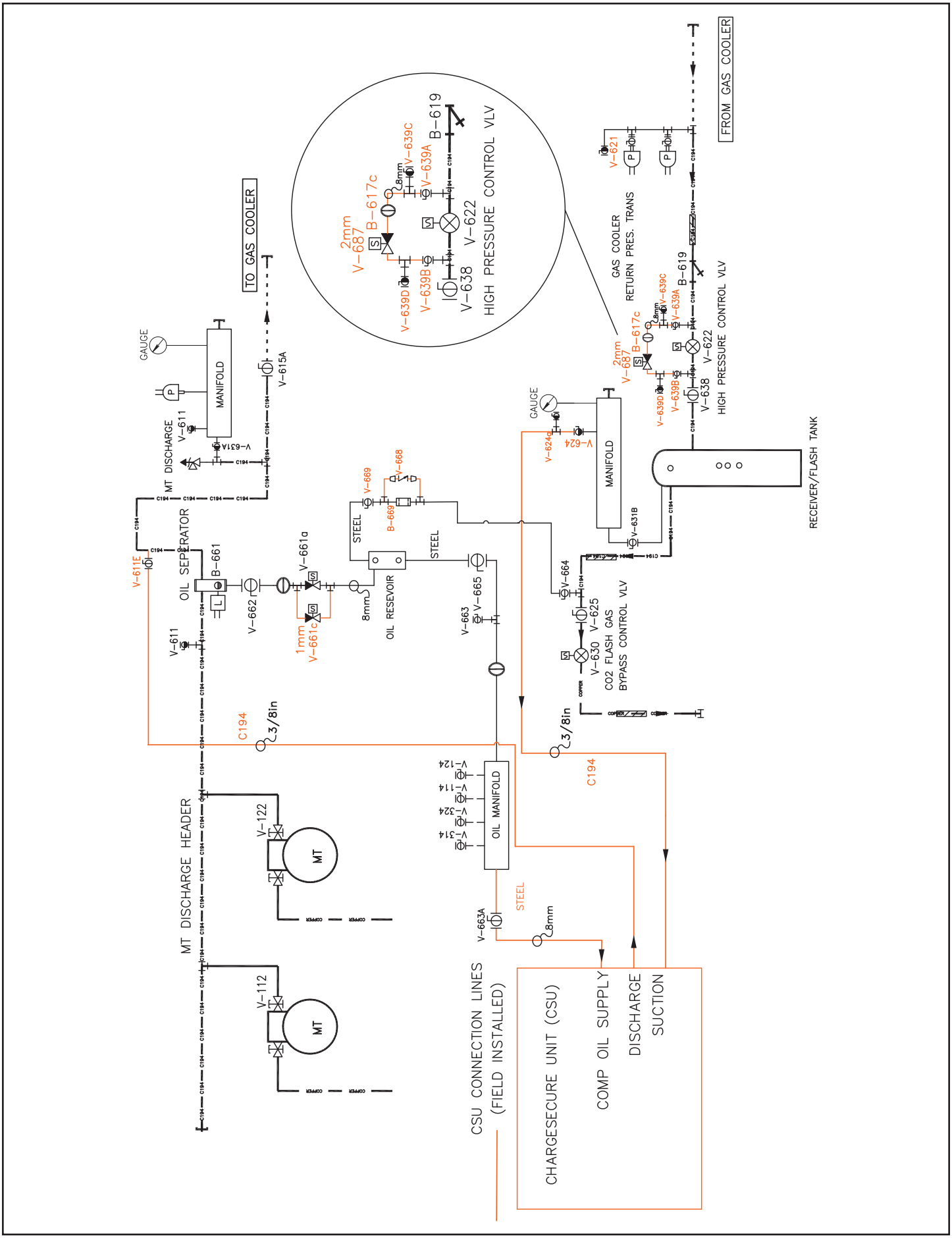


Figure B: ChargeSecure and Rack Piping details

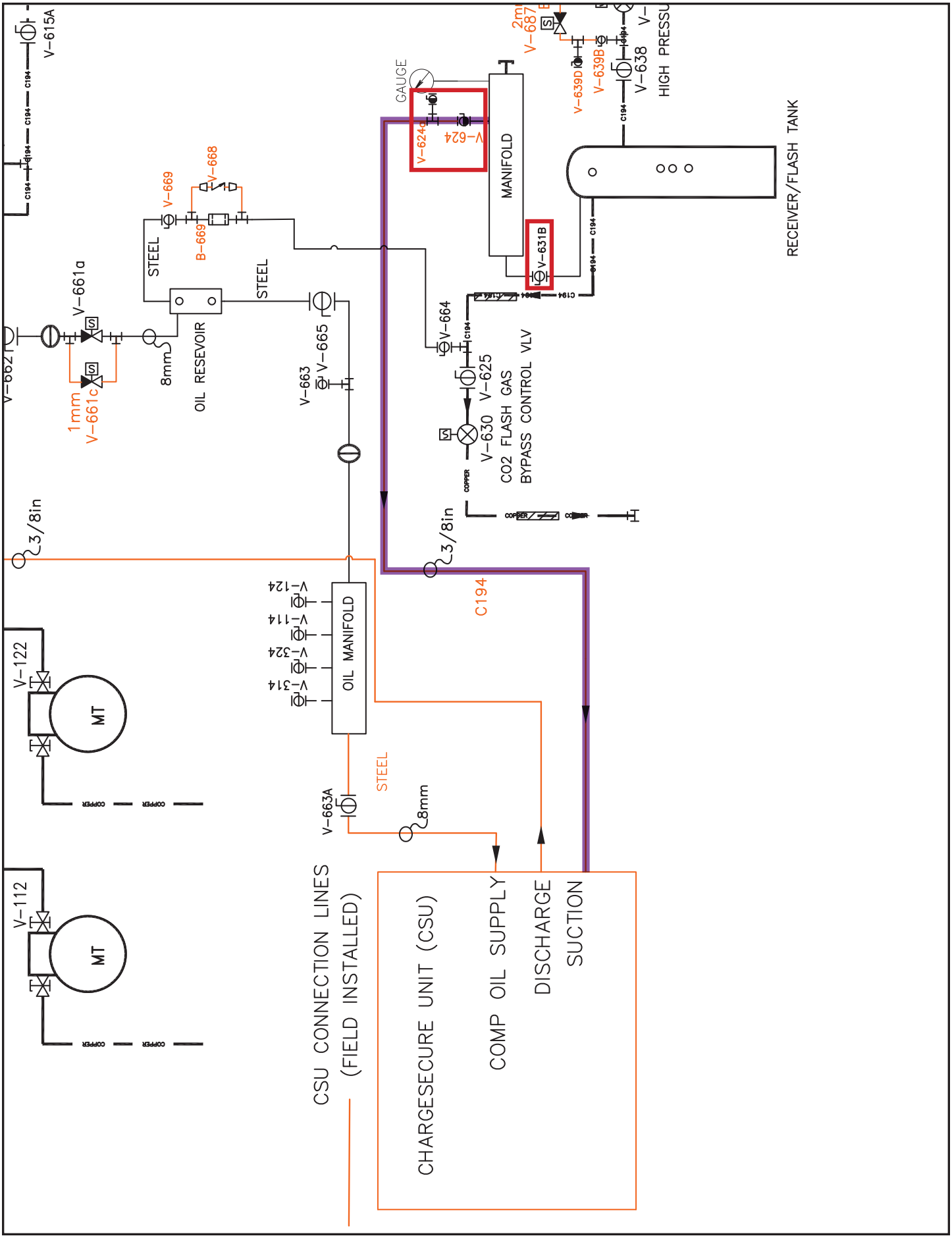


Figure C: ChargeSecure Suction line installation details

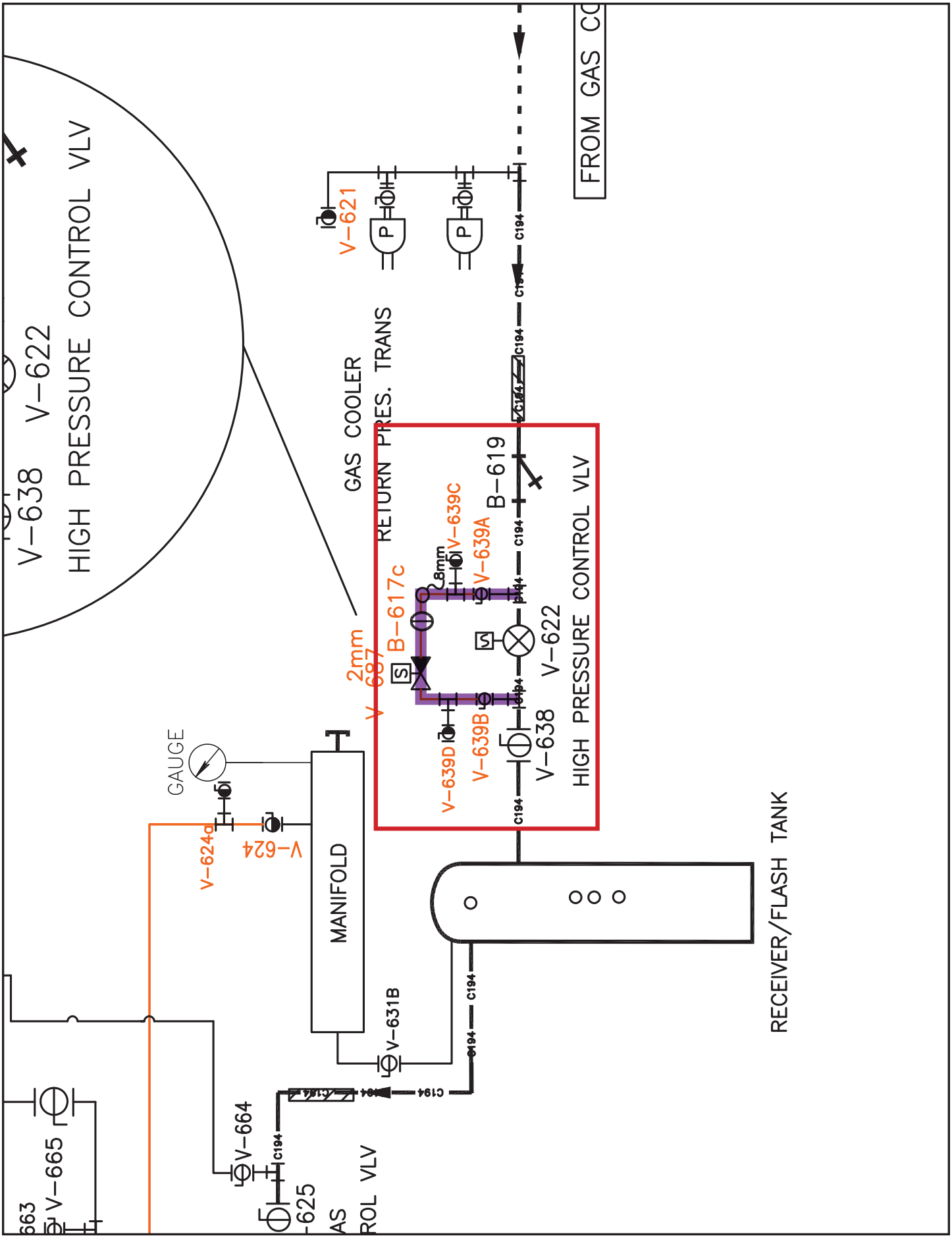


Figure D: High-pressure valve bypass installation details

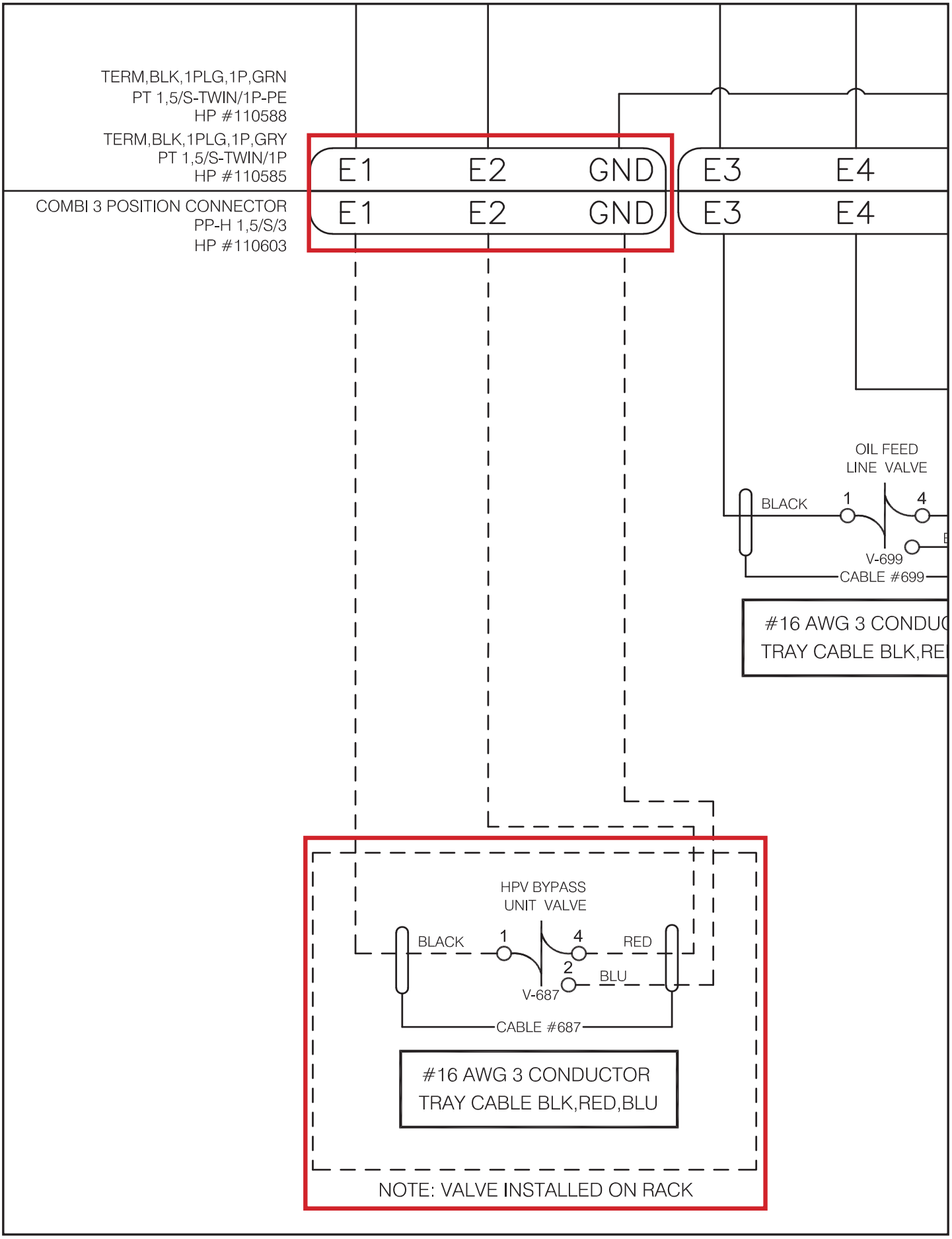


Figure D2 – ChargeSecure wiring diagram excerpt

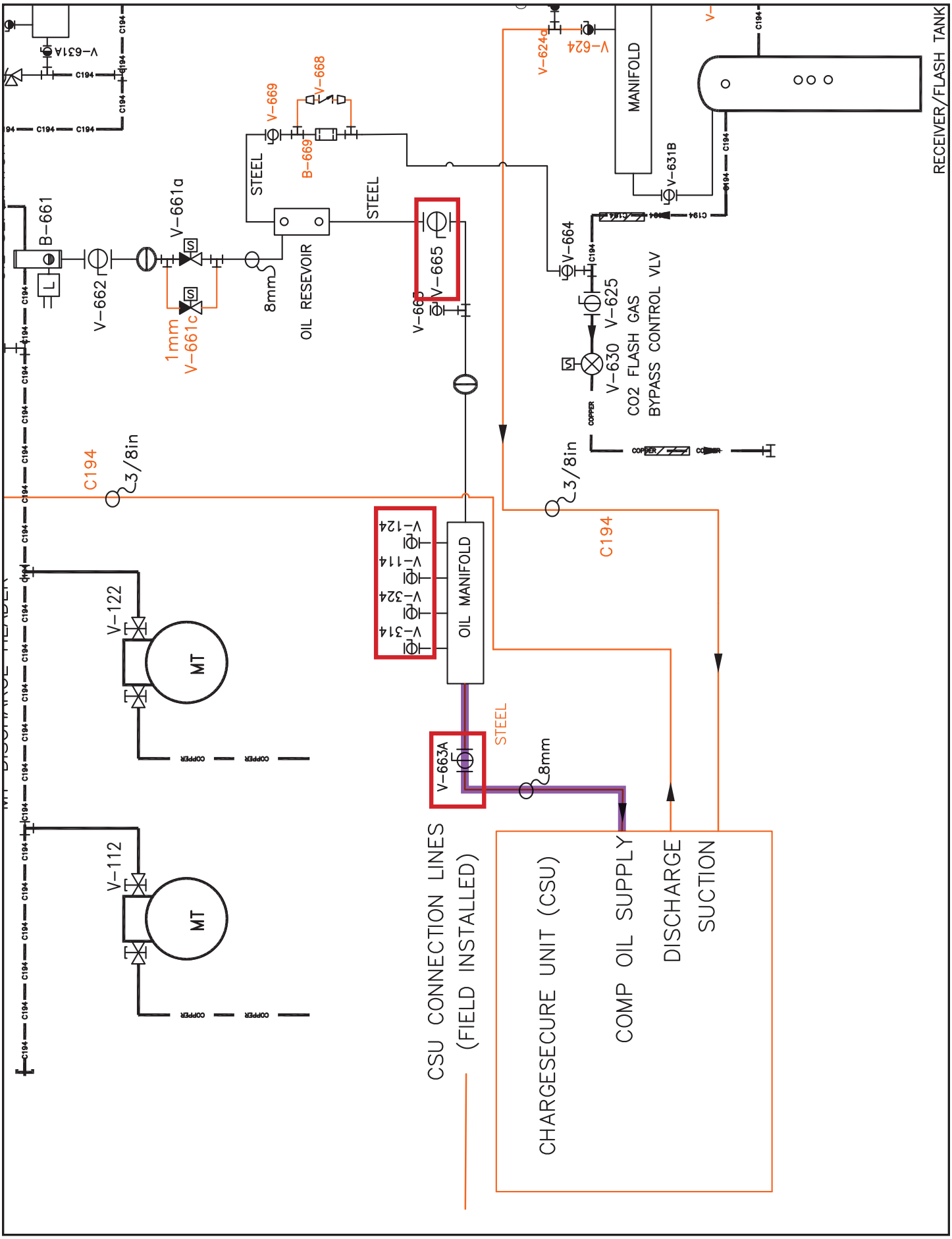


Figure E: ChargeSecure Oil Supply line installation details

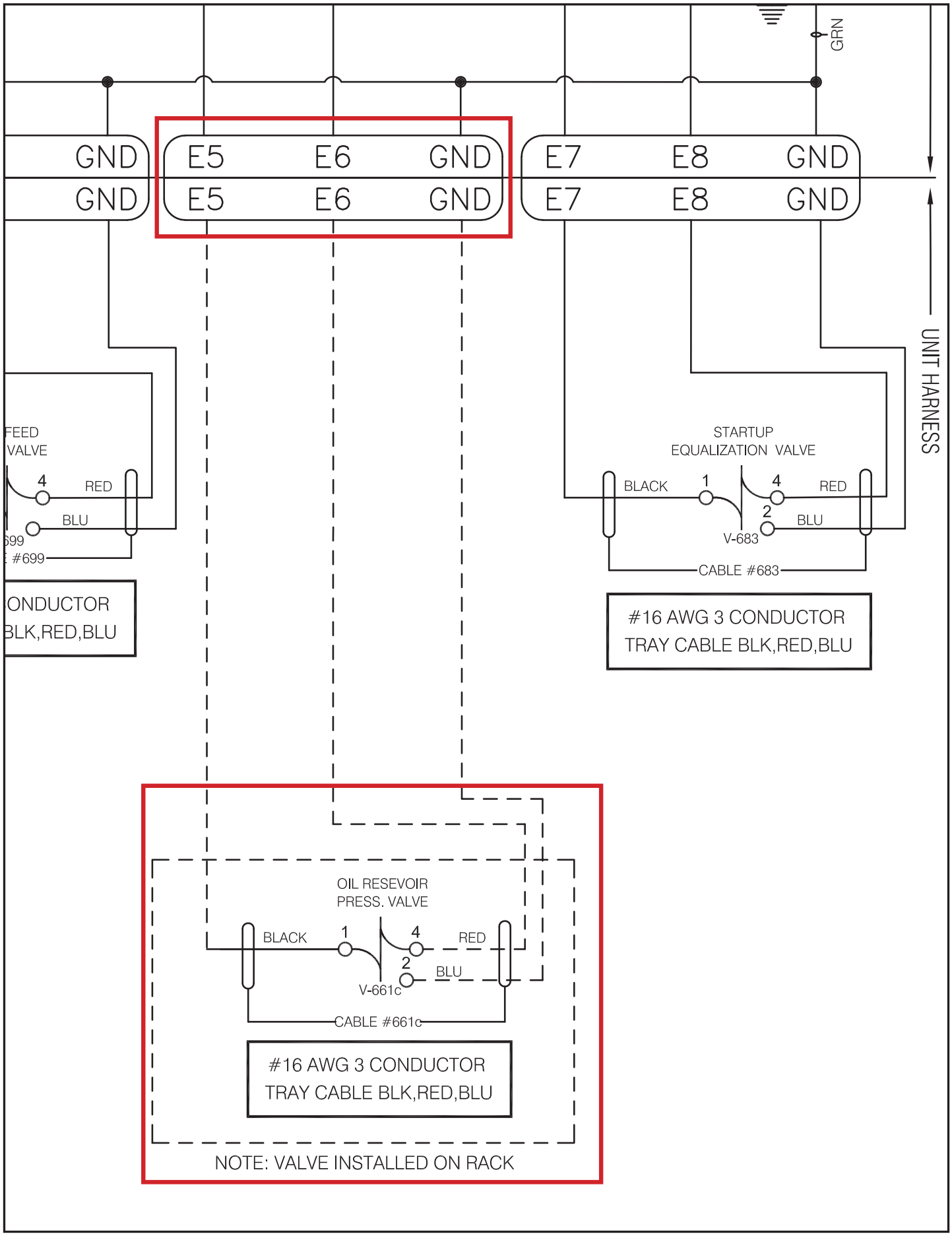


Figure F2 – ChargeSecure wiring diagram excerpt

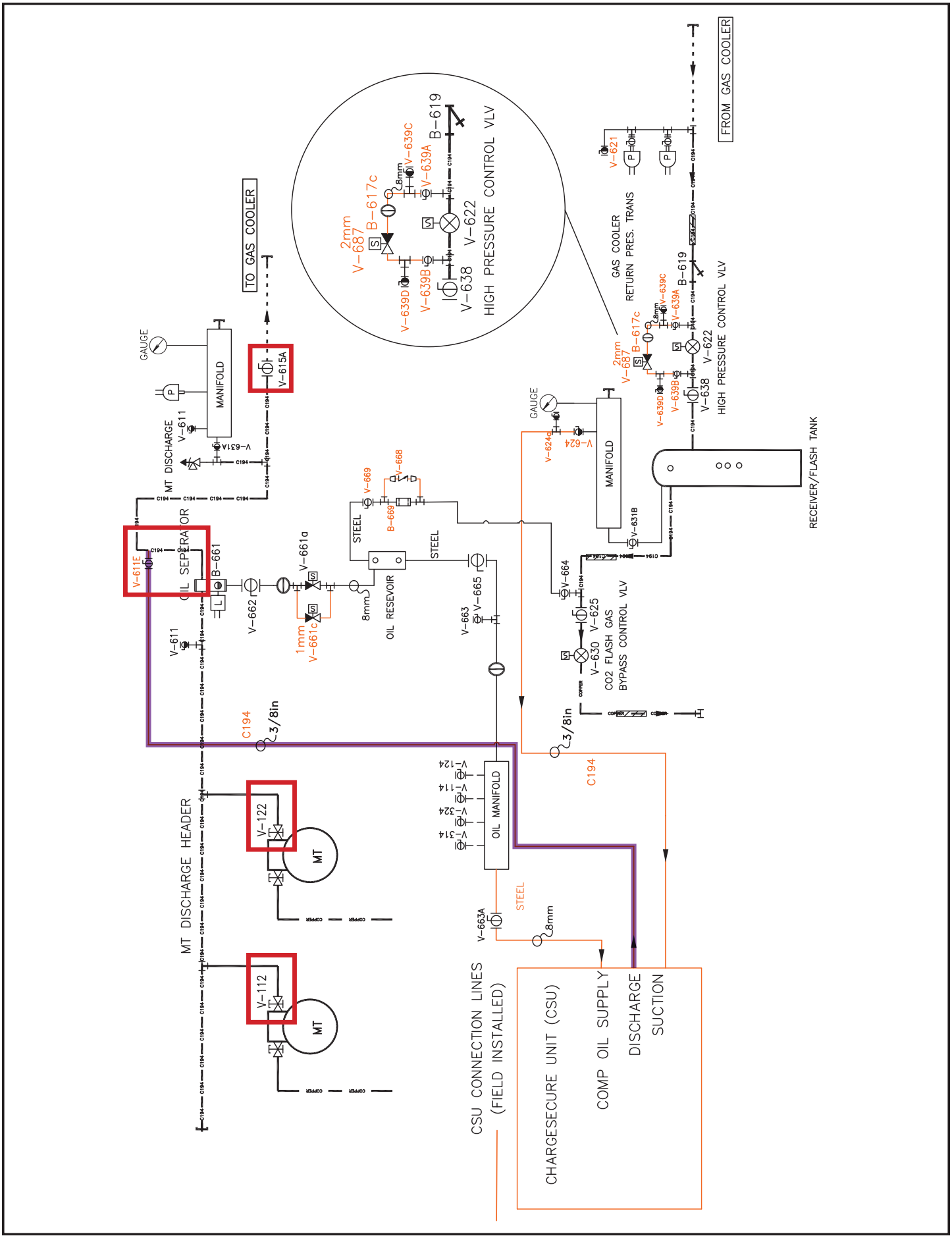


Figure G: ChargeSecure Discharge line installation detail

◯ - DENOTES POWER CABLE RUN THROUGH CONDUIT

REQUIRED ELECTRICAL EQUIPMENT:
POWER CABLE
POWER CABLE CONDUIT

NOTE: THERE IS NO MINIMUM DISTANCE THAT THE CHARGESECURE CAN BE MOUNTED FROM THE FEEDER ELECTRICAL PANEL. HOWEVER, PLEASE RESPECT ALL VOLTAGE DROPS AND SIZE POWER WIRES APPROPRIATELY

CHARGESECURE ELECTRICAL:
FLA: 1.8A
MCA: 6A
MOPD: 15A

— — — — EXISTING WIRING

CIRCUIT DETAILS			
CKT	DESCRIPTION	VOLTAGE/FREQ/PHASE	BREAKER
CIRCUIT 1A	RACK MAIN POWER	575/60/3 460/60/3 208/60/3	PER CUSTOMER LEGEND
CIRCUIT 1B	GAS COOLER MAIN POWER	575/60/3 460/60/3 208/60/3	PER CUSTOMER LEGEND
CIRCUIT 2	RACK CONTROL POWER	208-120/60/1	TYPICAL 20A/2P
CIRCUIT 3A	RACK POWER TO HPX UPS	208/60/1	15A/2P (FIELD INSTALLED IN RACK PANEL)
CIRCUIT 3B	HPX UPS POWER TO CHARGESECURE	208/60/1	NONE

NOTE: CLIMATE CONTROLLED AREA

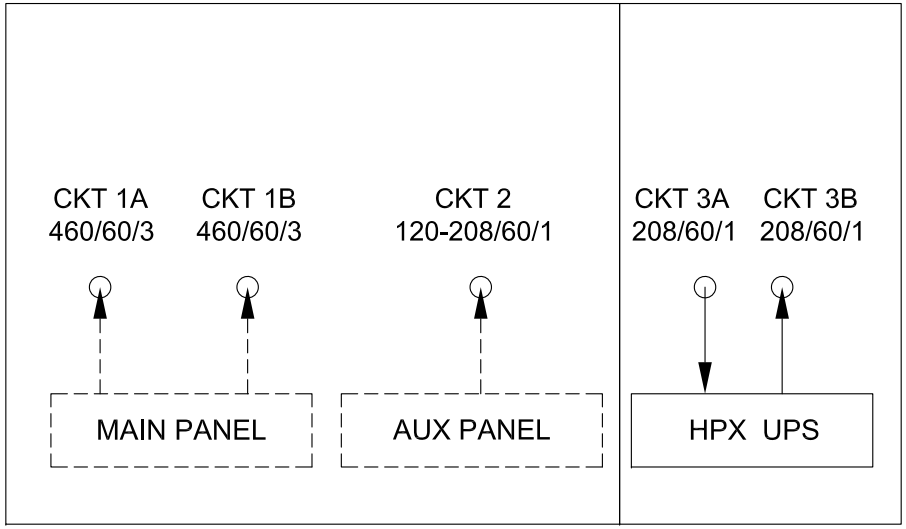


Figure K1: ChargeSecure UPS Wiring Details

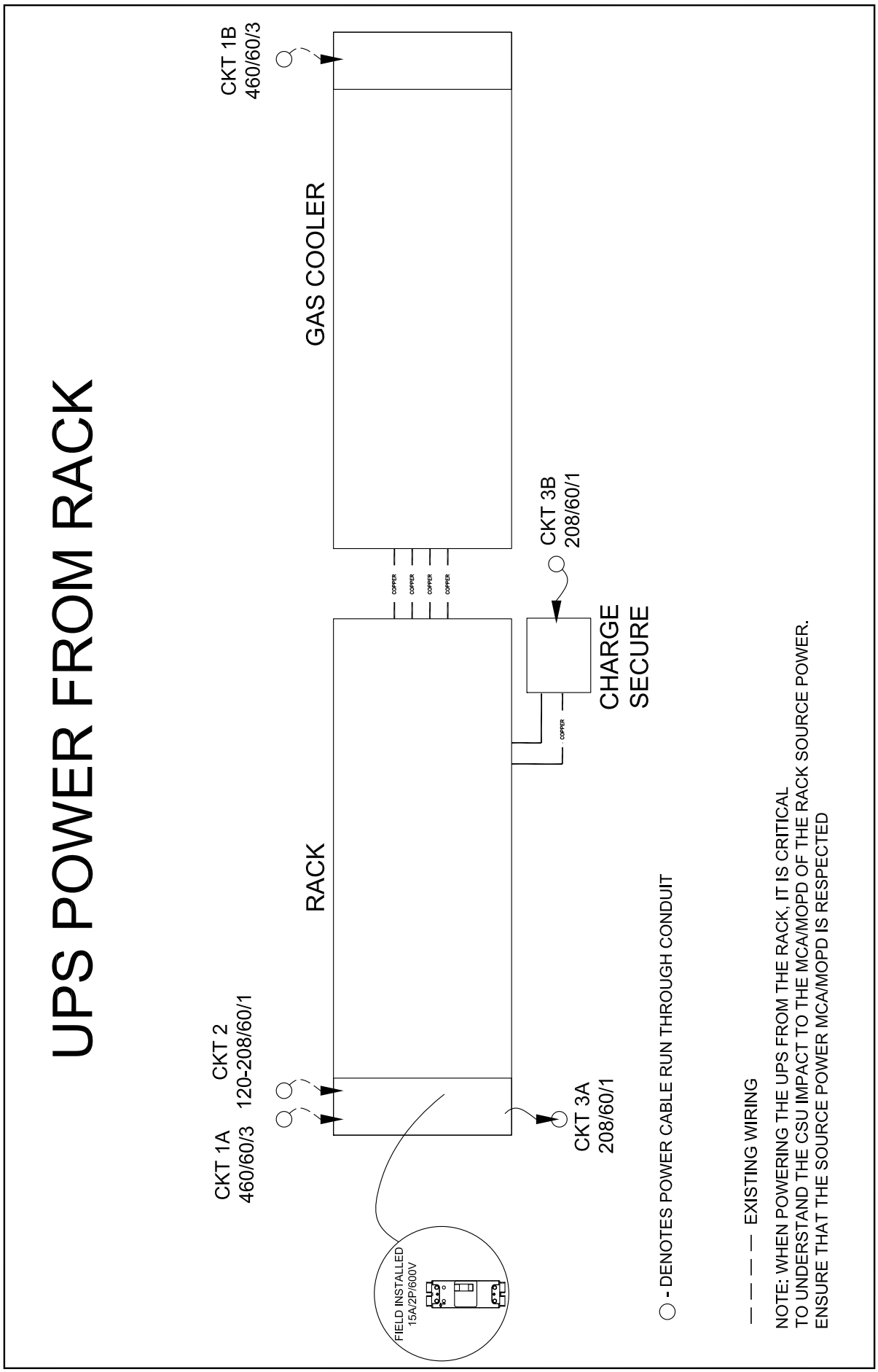


Figure K2: ChargeSecure UPS Wiring Details

I. Tubing Preparation

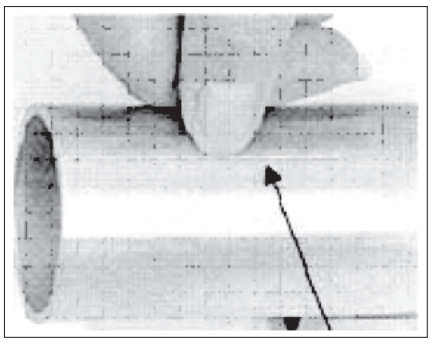
1. Tube

The Hy-Lok Tube Fitting consists of 4 components such as Body, Front ferrule, Back ferrule and Nut. The 5th component is Tubing.

1.1 The way to handle and store the tubing

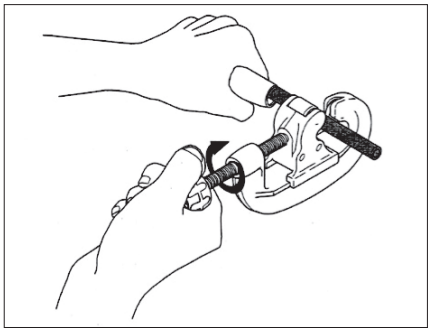
Your carelessness for tubing might affect the tubing quality. But your proper treatment and storage of tubing will make it work perfectly without any leak problems.

a) Surface damage: Damaging a surface scratched by sharp objects
b) Out of round Tube: Be pressed by a heavy load on tube
c) Dirt: Be mingled by oil or dirt

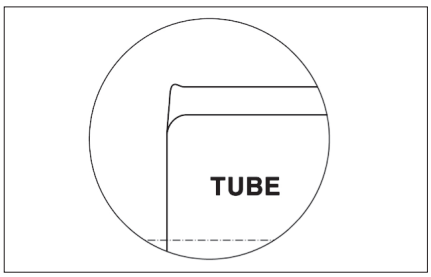


1.2 Tube Cutting

Use the appropriate 'Tube Cutter' to cut the tube and secure 90° Tube end. If not; the tubing could become damaged.



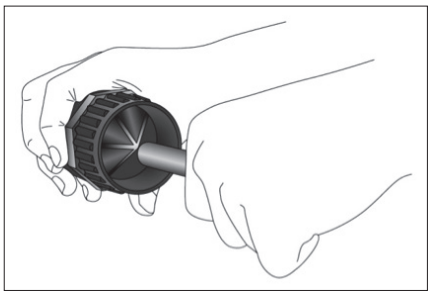
CAUTION
If the Cutting Wheel is too dull, the end of the tubing could crawl up. This could cause the tubing's external diameter to become too large. Make sure you use a sharp Cutting Wheel. (Refer to sketch.)



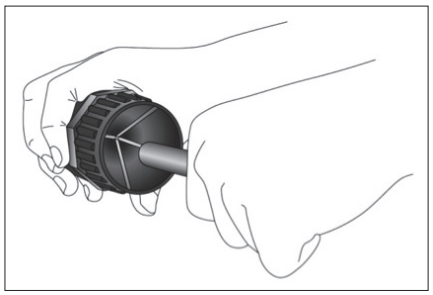
I. Tubing Preparation

1.3 Tube Deburring

Remove the internal / external burr from the tubing by using a Deburring tool.



Internal Deburring



External Deburring

CAUTION
After Deburring, remove all debris.
Do not put fingers inside cutting tool or near cutting edges.

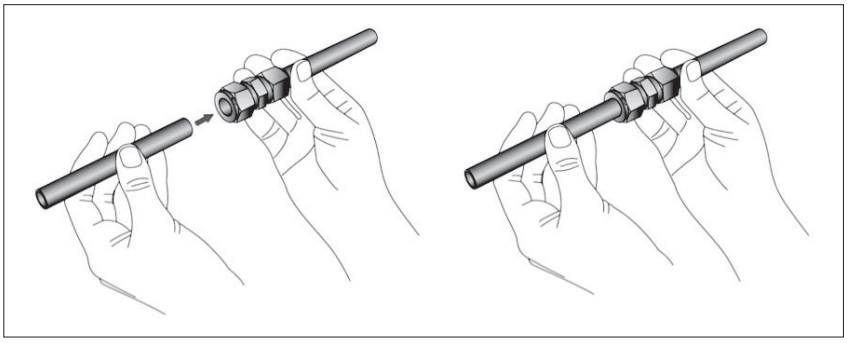
II. Tube Fitting Installation Instruction

1. Hy-Lok Tube Fitting Installation

Hy-Lok Tube Fittings are very easy to install by only using simple equipment. The assembly process divides in 3 steps.

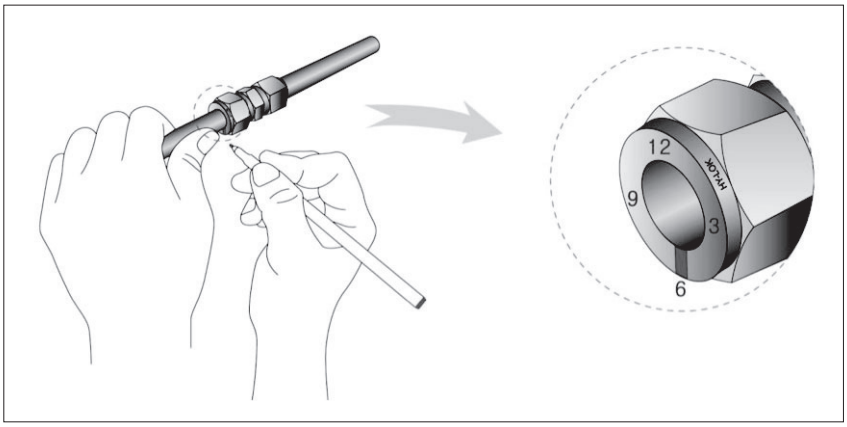
Step 1

Insert the tubing into the Hy-Lok Tube Fitting and make sure the tubing rests firmly on the shoulder of the fitting and the nut is finger tightened.



Step 2

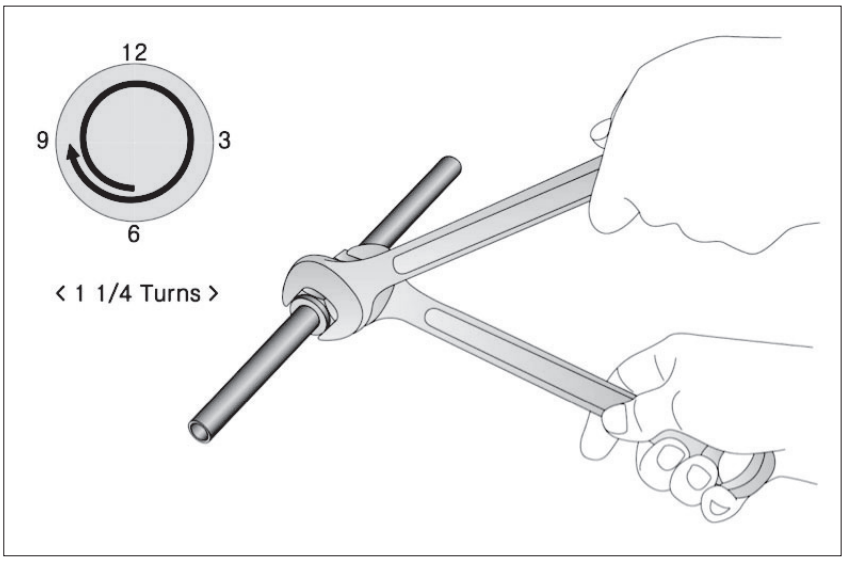
Before tightening the nut, mark the nut at the 6 o'clock position.



II. Tube Fitting Installation Instruction

Step 3

While fixing the fitting using a wrench; tighten the nut 1-1/4 turns/* The mark on the nut turns 1-1/4 and will end at the 9 o'clock position. This will ensure that the fitting has been properly tightened.



*Note: 1/16, 1/8, 3/16 inch, 2, 3 and 4 mm sizes only require to be tightened 3/4's of a turn

CAUTION

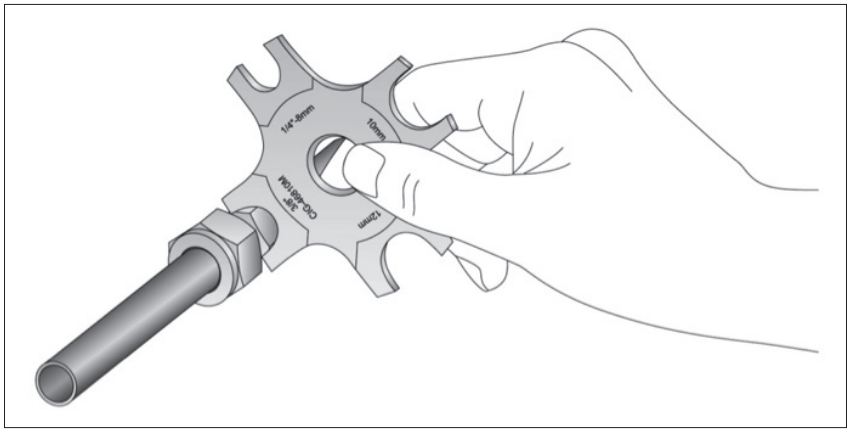
Do not turn the fitting instead of the nut.
It might cause scratching on the sealing surface and could cause a leak problem.

II. Tube Fitting Installation Instruction

2. Gap Inspection

Gap Inspection helps the operator or inspector to check if the fitting has been turned exactly 1 ¼ turns.

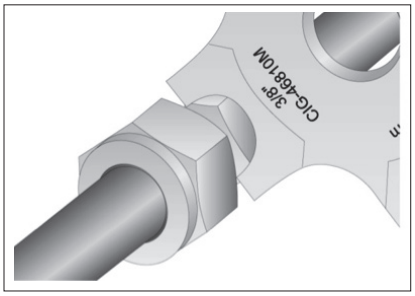
2.1 Only use the Inspection Gauge on the first installation of the fitting



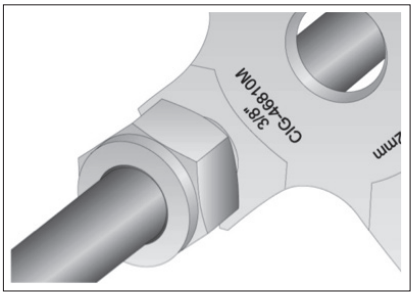
2.2 If the Inspection Gauge doesn't insert between the nut and the body hex, the fitting has been sufficiently tightened.

2.3 If the Inspection Gauge fits between the nut and the body hex, the fitting has NOT been sufficiently tightened.

Thus, tighten the nut until the Inspection Gauge doesn't fit between the nut and the body hex.



No Go
Sufficiently tightened



Go
Insufficiently tightened

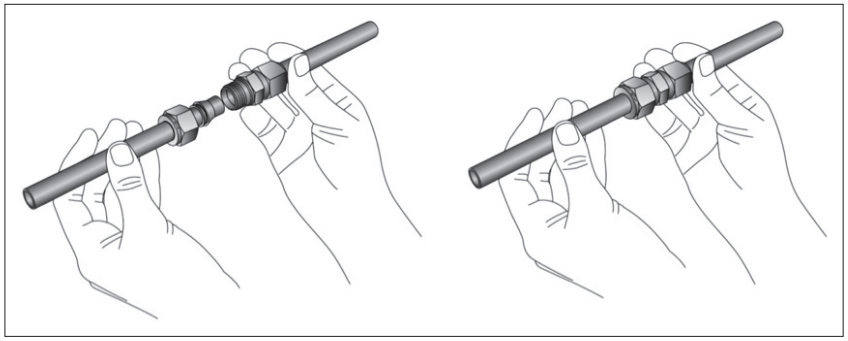
CAUTION
If you are Re-Assembling or Pre-Swaging, please do not use the Inspection Gauge.

II. Tube Fitting Installation Instruction

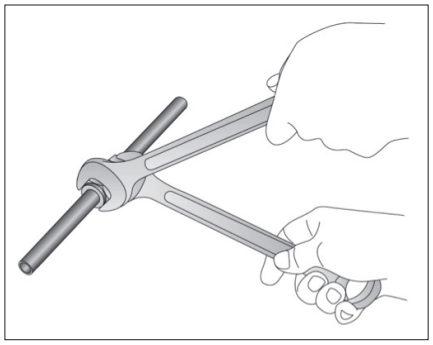
3. Re-Assembling

Hy-Lok Tube Fittings are designed to be disconnected and re-assemble many times.
The same reliable, leak-proof sealing can be obtained every time the connection is made.

3.1 Insert tubing with Pre-Swaged ferrules into fitting body until front ferrule seats, then finger-tighten the nut.



3.2 While securing the fitting body with a back-up wrench, tighten the nut until it is in the 9 o'clock position. At this point, an increase in resistance will be encountered. Then, tighten slightly more, about 1/8 to 1/4 of additional tightening.



CAUTION
Gap Gauge is accurate ONLY for initial fitting pull-up. When the fitting is Re-Assembled, do not use Inspection Gauge.

V. Trouble Shooting

1. Tube Fitting Trouble Shooting

Trouble	Possible Cause	Recommended Corrective Measures
1. Tubing will not fit into fitting	Burrs on tubing from tube cutting operation.	Debur tubing. Use Deburring tool and make clean on tube ends.
	Tubing end is distorted into "out of round" shape.	Cut-off the tube end that is deformed. Then, re-insert it into the fitting.
	Tubing out of round from bending improperly.	Make sure you have enough straight-line of tubing before bending.
	Tubing end raised due to dull tube cutter wheel.	Replace cutting wheel on tube cutter. Use Deburring tool.
2. Fitting cannot be pulled-up to proper amount of turns	Dirt or other contaminants on threads and seal surface.	Remove all contamination on thread and seal surface before assembly.
	Galled threads on nut or fitting body. Damaged parts.	Replace complete fitting.
3. Tubing leaks at fitting after initial installation	Fitting was not pulled-up the minimum 1-1/4 turns.	Check for sufficient pull-up with a Gap Inspection Gauge.
	Tubing not bottomed in fitting body.	Cut-off swaged ferrules on tubing and replace them.
	Tubing has deep longitudinal scratches or is nicked or otherwise damaged.	Replace tubing or cut-off the damaged section of tubing. Then reconnect it.
	Fitting body was turned instead of nut. Galled sealing surfaces of body or front ferrule.	Always connect fittings by turning the nut while holding the body securely.

ChargeSecure Frequently Asked Questions

For additional information please contact:

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dgosselin@doverfoodretail.com

ChargeSecure Q&A

Q: How will ChargeSecure know that it needs to turn on? What activates it?

There are two incidents that need to happen for ChargeSecure to turn on 1) When there is a power outage and 2) When the pressure exceeds the predefined setpoint. ChargeSecure will automatically turn on and reduce the flash tank pressure to below the predefined set point.

Q: How does ChargeSecure work?

When pressure exceeds the predefined setpoint the unit turns on and compresses the gas from the flash tank to the gas cooler, from where the gas is cooled by natural convection and then expands back to the receiver. This consequently reduces the overall pressure of the liquid line.

Q: How is ChargeSecure different than the HFC Auxiliary Backpack unit used today?

ChargeSecure uses the CO_2 and oil present in the system, whereas the HFC system uses HFC. The HFC system condensing unit condenses the gas in the flash tank using a heat exchanger. ChargeSecure is much smaller and can provide a longer run time as it uses only 1.8 amps vs approximately 15 amps with the HFC backup unit.

Q: What charge will ChargeSecure protect?

ChargeSecure preserves charge from the gas cooler to the liquid line up to the EEV's.

Q: Does ChargeSecure have its own controls, or will it be integrated into the rack controls?

ChargeSecure has its own control panel that makes ChargeSecure's operation independent of the rack's controls.

Q: What will ChargeSecure's power source be?

ChargeSecure can run on either a backup battery or can be connected to a backup generator (208V or 240V / 1ph / 60Hz).

Q: Where can the backup battery / UPS be installed?

The backup battery / generator can be installed anywhere indoors (closed chamber) within 300 feet of the ChargeSecure unit. Hillphoenix recommends installing the battery pack indoors to avoid extreme temperatures and battery performance degradation.

Q: What are the ambient temperatures under which the backup battery / UPS can operate?

The backup battery / generator can operate at ambient temperatures between 32°F and 102°F.

Q: For ChargeSecure operation, does the gas cooler need to be running?

No; the charge will be cooled by effect of ambient conditions when it passes through the gas cooler.

Q: Will there be various sizes / capacities of ChargeSecure?

No. ChargeSecure comes in one size that can fit into all Hillphoenix's food retail racks, (Flex, Flex-Mini, and Flex-MAX) (up to and including flash tanks capable of holding 2265 lbs of CO_2). For larger (industrial racks), multiple units can be installed.

Q: Why is ChargeSecure only installed on Hillphoenix racks?

Hillphoenix has no visibility on the competitors' systems and oil management control strategies, hence we cannot and will not guarantee proper operation of ChargeSecure on competitors' racks. Moreover, competitors' racks do not have any piping provisions for proper installation of ChargeSecure.

Q: How long does each battery last? How long will the unit run?

ChargeSecure will run on a single backup battery for approximately 10-12 hours after the unit is triggered to start. The exact duration will vary depending on multiple factors depending on outdoor ambient, flash tank capacity and line run lengths.

Q: What is the life of the battery pack? How often should it be replaced?

ChargeSecure uses standard lead-acid batteries which typically have a life of 10 years.

Q: How much of the CO_2 charge will ChargeSecure protect? What about the remaining charge?

ChargeSecure is designed to protect the charge in the flash tank, gas cooler and liquid lines up to expansion valves, making up to Approximately about 70% of total charge. This constitutes the critical charge in non-airconditioned areas where the charge is more susceptible to faster pressure rise.

Q: What do I need to install a ChargeSecure on an existing rack?

A retrofit kit will be provided by Hillphoenix for installation on existing racks.

Q: Can ChargeSecure be installed outdoors?

Yes; ChargeSecure's enclosure is NEMA 3R rated for outdoor installation.

Q: Does the chargeSecure require an additional cold weather kit for locations below 5°F?

No; ChargeSecure is designed for low ambient temperature installations (built-in insulation). It is designed for ChargeSecure to be installed in temperatures as low as -30°F.

Q: What is the maximum ambient temperature under which ChargeSecure can operate?

ChargeSecure is designed to operate at ambient temperatures up to 113°F.

Q: How can we ensure the proper operation of ChargeSecure?

By following installation and maintenance procedures in the I & O manual. Moreover, it is advised to schedule a monthly manual testing of ChargeSecure for 5 minutes. The testing procedure is detailed on the I & O manual.

For more details on ChargeSecure please go to:
https://www.hillphoenix.com/chargesecure/

D1 HILLPHOENIX WARRANTY VALIDATION CHECKLIST

This checklist provides the means for confirming that the steps and procedures required to start up the ChargeSecure system, as laid out in the guide, have been properly performed. Sign (on the following page) and submit the completed checklist to Hillphoenix for validation of warranty coverage.

Mail: Systems Operations 2016 Gees Mill Rd. Conyers, GA 30013 Fax: 770.285.3080 Email: info@Hillphoenix.com Or your local Field Service Engineer	Contact Information Technician performing checks: Name: _____ Phone: _____ Email: _____

☐ Follow rack startup procedure. Once the rack is properly operating:

1. Ensure all CSU circuit breakers are in the ON position
2. Close the panel door and switch on the disconnect
3. Verify that suction, oil, and discharge isolation valves are open
4. Turn "Run Enable Override" Switch to "Manual"
5. Turn the "Compressor Maintenance Run Timer" to 5 minutes. This will force the unit compressor to start
6. Verify the unit oil solenoid valves are both open for 30 seconds after compressor start (critical to first run oil operation)
7. Monitor the unit suction and discharge pressure for proper operation
8. Once proper operation is verified, turn off the "Start Enable Override" and allow the timer to continue to zero.
9. Note: if the rack is in "phase-loss alarm" the unit may continue to run until the timer hits zero and the flash tank falls below the low setpoint limit

Signature: _____

Date: _____

Hillphoenix

A DOVER COMPANY

LIMITED & GENERAL WARRANTY TERMS

Hill Phoenix, Inc's. (hereinafter "Hillphoenix") products are warranted to be free from defects in materials and workmanship under normal use and maintenance for a period of 14 months from date and place of shipment from Hillphoenix (the "Base Warranty Period"), provided that the installation and maintenance of such products have been performed strictly in accordance with Hillphoenix's designated specifications.

Anthony products supplied as original equipment on Hillphoenix products receive Hillphoenix warranty.

All warranty repairs must be approved in advance before services are started. In the event of a qualifying warranty claim, the extent of Hillphoenix's liability under the Warranty is limited to the repair or replacement, at Hillphoenix's option, of any non-conforming products without charge. If required, a new or rebuilt part to replace any defective part will be provided without charge and will be shipped via standard ground freight, with shipping charges being covered by Hillphoenix during the base warranty period. The replacement part is covered under this warranty for the remainder of the applicable Base Warranty Period. In order to be eligible for warranty coverage, customer must: (i) notify Hillphoenix in writing within twenty-four hours upon discovery of a warrant defect, and (ii) comply with the warranty claim procedures provided by Hillphoenix from time to time. These warranty terms are incorporated into and governed by the Hill Phoenix Terms and Conditions of Sale.

This equipment warranty does not include labor or other costs incurred for diagnosing, repairing, removing, installing, shipping, servicing, or handling of either defective parts or replacement parts. Unauthorized modifications to set-points, parameters, and controls may result in deteriorated performance and/or equipment failure. Any unauthorized modifications could result in the warranty being voided.

The warranty shall not apply:

1. To any unit or any part thereof which has been subject to an accident, alteration, negligence, misuse or abuse, or which has not been operated in accordance with the manufacturer's recommendations, or in conditions outside of Manufacturer's specifications, or if the serial number of the unit has been altered, defaced, or removed.
2. When the unit, or any part thereof, is damaged by fire, flood, or other act of God.
3. To products that are impaired or damaged due to improper installation.
4. When installation and startup forms are not properly completed or returned within two weeks after startup.
5. If the defective part is not returned to the Manufacturer.
6. To service, maintenance or wear and tear parts (such as lights, starters and ballasts).
7. To cosmetic damage (e.g., scratches, dents, chips, and other damage to appliance finishes), unless such damage results from defects in materials and workmanship and is reported to Hillphoenix within 30 days from date of purchase.
8. To shipping damage.
9. To use in a non-commercial application.
10. Corrosion, discoloration, oxidation, or rust due to exposure to predisposed corrosive environments/atmospheres or contact with product damaging material/chemicals.
11. To service trips where no problem is diagnosed or found in the discretion of Hillphoenix.
12. To Removal/reinstallation of product for repair if installed in an inaccessible location.
13. To use of non-OEM parts for warrantable repair unless directed by Hillphoenix.
14. To repair/service tools/items.
15. To service trips to teach customer how to use product.
16. To product pick-up or delivery for repair purposes; repairs should take place on the customer's site unless directed by Hillphoenix.
17. To misdiagnosis or misrepair, including subsequent labor/component repair or replacement.
18. To stolen components.
19. To replacement service parts lost or misplaced on arrival by receiving personnel.
20. To service events on non-DFR products.
21. To excess repair time.
22. To excess required consumables charges, at the discretion of Hillphoenix.
23. If a service contractor takes longer than 120 days from the date of repair completion to submit a warranty invoice/claim.
24. To component/equipment failures, equipment shutdowns, operational performance degradation due to deviations and unauthorized changes to required and/or recommended set-points, parameters, and controls.

Examples of non-warrantable situations include, but are not limited to:

- Non-factory electrical connection or component issues
- Product is operated on low or improper voltages
- Use of extension cords to power the product

- Lack of basic preventative maintenance as outlined by product manuals
- Installation into a mobile application
- Failures or symptoms that result from site mechanical or electrical failures
- Loading of food or other content that prevents the product from operating properly
- 'Yellowing' of lighting products
- Any physical modifications or changes to product(s) will invalidate the warranty

MODIFICATIONS TO GENERAL WARRANTY

The following sets forth certain modifications to the General Warranty for specific products of Manufacturer:

DISPLAY CASE AND SPECIALTY PRODUCTS CLEARVOYANT® LED LIGHTING

The warranty period for Clearvoyant LED lighting components within the Clearvoyant lighting system is five years from date of shipment.

NO WARRANTY FOR NON-STANDARD PRODUCTS

A " Non-Standard Product" is any product that is different in any manner from any Hillphoenix product that has been previously designed and manufactured by Hillphoenix in accordance with its standard specifications. A Non-Standard Product also includes any standard Hillphoenix product that has been specially designed or modified to meet a particular Buyer specification, or that contains any additional or substituted product, part, accessory, equipment, fixture, component or material, or that has been assembled, manufactured, produced, or installed by any method or process, which is different from Hillphoenix' s standard specifications for such product. Hillphoenix expressly disclaims and makes no warranties, express or implied, as to the condition, design, utility, quality, adequacy, or capacity with respect to any standard or Non-Standard Product, including, without limitation, any warranty of merchantability or fitness of such product for a particular purpose or intended use, whether or not such product has been designated by Hillphoenix as a Non-Standard Product. All Non-Standard Products, whether sold separately, or incorporated and/or attached to standard Hillphoenix products, and all services relating to such products, are sold to and accepted by Buyer " as is" and "with all faults". Without limiting any other provision of this purchase order, Hillphoenix shall have no liability to Buyer for any claim, loss, damage, consequential damages or expenses associated with any Non-Standard Product and/or its use or operation, or any other equipment or property of Buyer caused by or alleged by to be caused by any such product or its use or operation, whether directly, indirectly, incidentally or consequentially, or by any inadequacy thereof or deficiency or defect therein. The foregoing exclusion of warranty cannot be modified or waived except as expressly set forth in a writing signed by an officer of Hillphoenix authorized to make such modification or waiver.

REMEDY LIMITATION/DAMAGES EXCLUSION

THE REMEDY OF REPAIR OR PROVISION OF A REPLACEMENT PART WITHOUT CHARGE SHALL BE THE EXCLUSIVE REMEDY FOR ANY WARRANTY CLAIM HEREUNDER. WITHOUT LIMITING THE FOREGOING, HILLPHOENIX SHALL NOT BE LIABLE UNDER ANY CIRCUMSTANCES FOR INCIDENTAL, INDIRECT, LIQUIDATED OR CONSEQUENTIAL DAMAGES, INCLUDING LOSS OF PROFIT, LABOR COST, LOSS OF REFRIGERANT OR FOOD PRODUCTS.

EXCLUSIVE WARRANTY

THE FOREGOING WARRANTY IS THE EXCLUSIVE WARRANTY WITH RESPECT TO THE PRODUCTS. ALL OTHER WARRANTIES, WHETHER EXPRESS OR IMPLIED, INCLUDING WITHOUT LIMITATION, THE WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE, ARE HEREBY DISCLAIMED AND EXCLUDED. NO IMPLIED WARRANTY SHALL BE DEEMED CREATED BY COURSE OF DEALING OR USAGE OF TRADE. NO OTHER PERSON IS AUTHORIZED TO EXPAND OR CREATE ANY OBLIGATION GREATER THAN OR MORE EXPANSIVE THAN THE WARRANTY PROVIDED HEREIN.

THE ABOVE WARRANTY IS GIVEN IN LIEU OF ALL OTHER WARRANTIES, EXPRESSED OR IMPLIED, INCLUDING ANY IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. HILLPHOENIX SHALL NOT BE RESPONSIBLE FOR INCIDENTAL OR CONSEQUENTIAL DAMAGES INCLUDING BUT NOT LIMITED TO INJURY TO PERSONS OR PROPERTY. NOTWITHSTANDING ANYTHING TO THE CONTRARY, HILLPHOENIX'S ENTIRE LIABILITY, AND BUYER'S EXCLUSIVE REMEDY, IN LAW AND EQUITY OR OTHERWISE, WITH RESPECT TO ANY PRODUCTS PROVIDED BY HILLPHOENIX IS SOLELY LIMITED TO THE AMOUNT PAID BY BUYER FOR THE PRODUCTS TO WHICH THE APPLICABLE CLAIM RELATES.

THIS DOCUMENT DOES NOT GOVERN EXTENDED WARRANTIES AND ANY EXTENDED WARRANTIES PROVIDED BY HILLPHOENIX SHALL BE GOVERNED BY A SEPARATE DOCUMENT AGREED UPON BY HILLPHOENIX

Submit warranty claims to: hpx-warranty-wa-invoices@doverfoodretail.com

For warranty service, please contact Hill Phoenix at: Phone: 1-833-280-5714