



FASTEST[®]

PortMax[™] Installation Guide



**High Flow Access Port System for Rapid
Evacuation of Large HVAC-R Packages**



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PortMax™ System

Rapid Evacuation & Refrigerant Charging

The **PortMax™** Access Port System is a high-flow processing solution designed to reduce processing time — specifically the long evacuation times required to degas / dehydrate large-volume refrigerant systems that currently process through packed angle or ball valves. Together, the Access Port and quick-connect Processing Tools form an integrated **ecosystem** that shortens Takt time while improving the quality and serviceability of refrigeration products.

Unlike common access valves — which rely on shaft, rod, or ball “packings,” or on Schrader valves, creating multiple leak paths — the PortMax Access Port seals **hermetically, metal-to-metal**, with no elastomers in the primary seal path. A properly torqued Dust Cap provides a redundant, second hermetic seal for two degrees of leak protection.

The system is centered around the PortMax high-flow Access Port. With a Ø0.5” (12.7 mm) nominal, unobstructed flow path, PortMax delivers **up to a 45% reduction in evacuation time** versus commonly used packed angle / ball valves, and near-zero refrigerant emissions when processed with a reclaim system. It is compatible with current and Next-Gen refrigerants, including transcritical CO₂ applications (contact FasTest), and is compliant with the UL207 standard.

PortMax High-Flow Access Port

- Large, unobstructed Ø0.5” (12.7 mm) flow path for maximum flow and faster processing
- Metal-to-metal hermetic sealing — no elastomers in the seal path
- Plug design eliminates packings / seals for a reliable hermetic seal every time
- Compatible with current and Next-Gen refrigerants, including transcritical CO₂ (contact FasTest)



PortMax Access Port Seat

- Saddle-Mount (Ø.625” / 15.9 mm minimum bore) and ½ NPT seats are standard
- Stub-tube, panel-mount and custom mounts also available (contact FasTest)
- The same high-flow seat is used across every Processing Tool for easy integration into system plumbing
- Tube stop and 1 1/8” wrench hex for ease of assembly and counter-torque





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PortMax™ Ecosystem Overview

The PortMax™ system is not just a component — it is a complete, integrated tooling **ecosystem** built around a single high-flow Access Port. Every station in the refrigeration process connects to the same Seat, so leak testing, evacuation, charging and field service all share one clean, hermetic, high-conductance flow path.



Access Port

Seat, Plug & Dust Cap. Brazed into the system; provides the hermetic, metal-to-metal high-flow connection point.



Processing Tools

Quick-connect Leak Test, Evacuation, Charge & Service Tools with a safety-latch sleeve that will not release under pressure.

A Complete Tooling Solution

- **PortMax™ Access Port** — Saddle-Mount & ½ NPT standard (other versions available; contact FasTest)
- **MBE / Leak Test Tool (CMFT60)** — ball-latch connector for pressure / leak-test processing
- **Evacuation Tool (CMFT80)** — ball-latch connector; retracts the Plug out of the flow path for maximum evacuation flow
- **Charge Tool (CMFT70)** — ball-latch connector for the refrigerant-charge process
- **Torque Tool (SCFTM02)** — calibrated tool that applies proper sealing torque to the Plug and Dust Cap
- **Service / Repair Tool (CMFT90)** — ball-latch tool with internal ball valve; replaces the Plug while the system is under pressure and performs all field processes

System desired outcomes: optimize the evacuation process and reduce total cost of processing; eliminate refrigerant loss to the environment during processing and from leak-prone valves; and provide compatibility with all current and Next-Gen refrigerants (contact FasTest for transcritical CO₂ applications).

PortMax™ High-Flow Access Port

Large Access Port System for Maximum Flow & Faster Processing.



- 1 Designed for refrigeration applications, including Next-Gen refrigerants and transcritical CO₂ applications (contact FasTest)
- 2 Metal-to-metal hermetic sealing — no elastomers in the seal path
- 3 Large, unobstructed flow path
- 4 Multiple Seat options for easy integration into system plumbing — Saddle Mount & NPT thread
- 5 A properly torqued Dust Cap adds a redundant hermetic seal for two degrees of leak protection

SPECIFICATIONS	
Seat Styles	Saddle-Mount (Ø.625" / 15.9 mm minimum bore required) & ½ NPT are standard. Stub-tube, panel-mount and other options available (contact FasTest).
Pressure Rating	20 Micron (0.020 torr) to 2031 psig (140 bar)
Leak Rating	Not measurable, hermetic
Flow Diameter	Ø0.5" (12.7 mm) nominal
Flow Rate	28 scfm (45 Nm³/hr) @ 12 psi (0.83 bar) ΔP (vacuum) with CMFT80 Evacuation Tool 50+ scfm (80 Nm³/hr) @ 120 psi (8.3 bar) ΔP (charging) with CMFT70 Charge Tool
Material	Brass
Tightening Torque	Plug: 12–14 ft-lbs (16–19 N-m) Dust Cap: 12–14 ft-lbs (16–19 N-m) Note: Do not exceed 14 ft-lb (19 N-m) when tightening the Plug. Always apply counter-torque to the Access Port Seat hex when tightening the Plug and Dust Cap to prevent imparting stress to brazed joints.

ORDERING INFORMATION			
Component	Style / Size	Part Number	Installed Length
PortMax™ Seat	Saddle Mount, 5/8"	CMHU16B01	1.94" (49.3 mm)
PortMax™ Seat	Thread Mount, ½ Male NPT	CMHU16E01	1.96" (49.8 mm)
PortMax™ Seat	Stub Tube / Panel Mount	Contact Factory	—
PortMax™ Plug	Mates with PortMax™ Seat	CMC08	—
PortMax™ Dust Cap	1 1/4" hex	CMHU16	—

PortMax™ Processing Tools

Ball-latching connectors with a safety-latch sleeve that will not disconnect under pressure. For repair kits and main seals, contact FasTest.

Leak Test / MBE Tool

PN: CMFT60



Application: Ball-latching connector without an internal valve for highest flow. High-flow MBE design allows rapid fill & vent and lets contamination pass through, minimizing clogging. Connects to the Seat (Plug not installed). No T-Handle mechanism.

Pressure	20 Micron to 2031 psig (140 bar)
Flow Dia.	Ø0.5" (12.7 mm) nominal
Flow Rate	50+ scfm (80 Nm³/hr) @ 120 psi (8.3 bar) ΔP (fill & vent)
Dimensions	3.00" (76 mm) long × Ø1.98" (50 mm)
Material	Stainless Steel

Evacuation Tool

PN: CMFT80



Application: Ball-latching connector with a sliding T-Handle. The Plug loads into the tool; the T-Handle retracts the Plug fully out of the flow path (to its detent) for maximum evacuation flow, then drives & torques the Plug to seal the system.

Pressure	20 Micron to 2031 psig (140 bar)
Flow Dia.	Ø0.5" (12.7 mm) nominal
Flow Rate	28 scfm @ 12 psi ΔP (vac); 50+ scfm @ 120 psi ΔP (charge)
Dimensions	4.14" (105 mm) / 5.87" (149 mm) handle out × Ø1.98"
Material	Stainless Steel

Charge Tool PN: CMFT70

Application: Ball-latching connector with a **fixed** T-Handle (eliminates pressure loading). Externally similar to the Evacuation Tool, but the internals differ and the T-Handle does not slide in & out. Opens the flow path for charging, then drives & torques the Plug to seal the system.

Pressure	20 Micron (0.02 torr) to 2031 psig (140 bar)
Flow Diameter	Ø0.5" (12.7 mm) nominal
Flow Rate	24 scfm (38 Nm³/hr) @ 12 psi ΔP (vacuum); 50+ scfm (80 Nm³/hr) @ 120 psi ΔP (charge)
Dimensions	4.14" (105 mm) long × Ø1.98" (50 mm)
Material	Stainless Steel



Main Seal for all PortMax tools (Qty 10): **S1118N70**. Repair kits: MBE/Leak Test **CMFTR60**, Charge **CMFTR70**, Evacuation **CMFTR80**, Service **CMFTR90**.

Field Service Tool & Torque Accessories

Service Tool PN: CMFT90

An all-in-one tool for installation and service technicians. Combines the functionality of the Evacuation and Charge Tools and adds an internal ball valve, so it can **replace a Plug while the system is under pressure** — with no loss of refrigerant charge. Use to recover refrigerant, leak test, evacuate, charge, and reseat.

- Ball-latching connector with an internal ball valve
- Ergonomic ball & sleeve action; safety latch will not disconnect under pressure
- Pressure-balanced design for easy operation when the system is under pressure
- Recovery / vent port prevents refrigerant emission to the environment
- ½ NPT media port

Pressure	20 Micron (0.02 torr) to 1250 psig (86 bar)
Flow Diameter	Ø0.5" (12.7 mm) nominal
Flow Rate	28 scfm @ 12 psi ΔP (vac); 50+ scfm @ 120 psi ΔP (charge)
Dimensions	14.28" (363 mm) / 19.57" (497 mm) handle out × Ø1.98" (50 mm)
Material	Stainless Steel & Aluminum



Torque Tool & Fittings



Torque Wrench SCFTM02 — preset to 12 ft-lb (16 N-m). Use with the 5/16" socket to torque the Plug, and with the drive adapter + 1 3/16" socket to torque the Dust Cap.

Accessory	Part Number
3/8" Drive × 5/16" Socket (Plug)	CMFT375312DS
3/8" Female × ½" Male Drive Adapter	CMFT37550DA
½" Drive × 1 3/16" Socket (Dust Cap)	CMFT5011875DS
Leak Test Fitting — 3/8 Male Flare × ½ NPT	AE012
Evacuation Fitting — KF16 × ½ NPT	AE016CF

Always apply counter-torque to the Access Port Seat hex when torquing the Plug or Dust Cap, to prevent imparting stress to the braze joint. KF16 evacuation fittings and vacuum hoses are **not** suitable for leak-test or charging applications (max 50 psig / 3.4 bar).

PortMax™ Ecosystem Summary

At-a-glance comparison of the PortMax Access Port and its Processing Tools. Each tool shares the same Ø0.5" (12.7 mm) nominal high-flow path and connects to the same Access Port Seat.

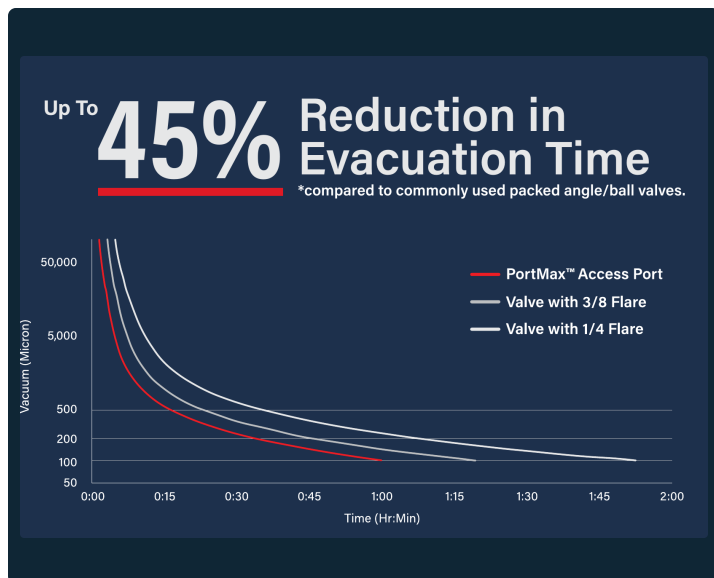
	Access Port (Seat, Plug & Cap)	Leak Test / MBE (CMFT60)	Evacuation (CMFT80)	Charge (CMFT70)	Service (CMFT90)
Function	Hermetic high-flow connection point	Straight-through, not valved. Leak / burst test.	Straight-through with Plug-install. Evacuation.	Straight-through with Plug-install. Charging.	Replaces Plug under pressure; all field processes.
Pressure Rating	2031 psig (140 bar)	2031 psig (140 bar)	2031 psig (140 bar)	2031 psig (140 bar)	1250 psig (86 bar)
Flow Rate	50+ scfm @ 120 psi ΔP (80 Nm ³ /hr)	50+ scfm @ 120 psi ΔP	Dependent on vacuum level	50+ scfm @ 120 psi ΔP	50+ scfm @ 120 psi ΔP
Flow Dia. Ø	Ø0.50" (12.7 mm)	Ø0.50" (12.7 mm)	Ø0.50" (12.7 mm)	Ø0.50" (12.7 mm)	Ø0.50" (12.7 mm)
Size	1.96" (50 mm) installed; 1 1/8" Seat hex, 1 1/4" Cap hex	3.00" (76 mm) × Ø1.98"	4.14"/5.87" handle out × Ø1.98"	4.14" (105 mm) × Ø1.98"	14.28"/19.57" handle out × Ø1.98"
Material	Brass	Stainless Steel	Stainless Steel	Stainless Steel	Stainless Steel & Aluminum

Features & Benefits

- High-flow, high-conductance design; Access Ports seal hermetically
- Quick-connect Processing Tools are easy to use, very durable and work with reclaim systems
- Compatible with current and Next-Gen refrigerants (contact FasTest for transcritical CO₂)
- Compliant with the UL207 standard
- Reduced total cost of processing & improved Takt time / throughput
- Zero refrigerant emissions when processing with reclaim; no more leaky valve packings / seals
- Faster field commissioning and service; increased product quality
- Simple end-of-life refrigerant recovery

Tooling Flow Rate Comparison

The PortMax high-flow Access Port dramatically outperforms the packed angle and ball valves commonly used on large-capacity refrigeration systems — reducing evacuation time and total cost of processing.



Up to 45% Faster Evacuation

Compared to commonly used packed angle / ball valves, the PortMax Access Port reaches target vacuum in substantially less time — the single largest cycle-time driver on large-volume systems.

Metric	Packed Angle / Ball Valve	PortMax™
Charge flow rate	~16 cfm	~50 cfm
Effective flow area	~32% of PortMax	100%
Evacuation time	Baseline	Up to 45% less
Refrigerant emissions	Leak-prone packings	Near-zero w/ reclaim

Estimated savings: \$400+ per unit (\$400,000+ annually based on 1,000 units produced per year).

*Based on estimates from test data. Actual results depend on system specifics — system volume, target vacuum, vacuum pump, etc.

The PortMax System

- Eliminates the cost of leaks associated with process tubes and Schrader valves
- Increases flow rate for greater line throughput and shorter evacuation time
- Dramatically improves sealing to raise first-pass yield and maximize SEER rating
- Ergonomic, production-ready tooling that reduces manufacturing cost
- Compatible with industry-standard field-service tools
- Easy-to-use connector at every process station with automatic shutoff

PortMax™ Integration

Rapid Evacuation & Refrigerant Charging

The PortMax™ System is designed to reduce evacuation and charging times while dramatically reducing leakage rates compared to common processing methods. This is a summary of proper technique and best practice for handling, installing and using the system.

Material Handling

PortMax™ Plugs should remain in their protective packaging until assembly is required, to ensure cleanliness and eliminate damage. Just prior to assembly, remove the Plug from its packaging tray. Prior to use, inspect Seats internally for contamination such as dust or dirt, and confirm the sealing area is clean.

Seat Installation

Braze the Seat into the pipe system using good brazing practices. The pipe should have a burr-free Ø5/8" (.625/.630") hole to receive the stepped diameter of the Seat. Keep material and contamination out of the inside of the Seat so sealing ability is not affected. Braze using a nitrogen purge to minimize oxidation. A 5%–15% silver-content braze alloy works best. (See **Seat Installation**, page 10.)

Plug Installation

Remove the Plug from its protective tray just prior to assembly. Make sure the Plug and the Seat I.D. — especially the sealing area — are free of contamination and foreign particulates. Lightly lubricate the Plug sealing surface with a compatible refrigerant oil. Thread the Plug into the Seat and torque clockwise to 12–14 ft-lb (16–19 N-m) using the Torque Tool with a 5/16" socket. Do not exceed 14 ft-lb (19 N-m).

Lubricate

Lubricate the Plug sealing surface with POE or other suitable oil before installing / torquing into the Seat. Lubricate the tool Main Seals on a regular basis with a silicone or petroleum-jelly grease, and replace them when worn or damaged to maintain leak-free sealing. Lubricate the Evacuation / Service Tool T-Handle shaft with a silicone spray lubricant to assure free rotation and sliding.

Torque

Use a regularly calibrated tool to torque the Plug into the Seat at 12–14 ft-lb (16–19 N-m); **do not exceed 14 ft-lb (19 N-m)**. Always apply **counter-torque** to the 1 1/8" Seat hex while tightening and loosening, to prevent imparting stress on the braze joint. The FastTest torque wrench (Pt # SCFTM02) comes preset to 12 ft-lb (16 N-m): use the 5/16" socket on the Plug (or on the Tool T-Handle 5/16" hex), and the 3/8"-to-1/2" drive adapter with the 1 3/16" socket on the Dust Cap. After torquing, verify the Plug is fully seated; if a leak is suspected, re-check torque or replace the Plug before charging.

PortMax™ Integration

Processing

Testing

A proof or leak test can be performed by several methods: pressure decay, bubble, or helium / hydrogen mass spectrometer. Disengage the connector used to reach the Access Port **before** the test, so the Access Port seal integrity is also tested — installation problems are otherwise not revealed until after the unit is charged. The port may hold helium / test-media residue that leads to a false positive; blow the port with dry nitrogen and re-test before concluding there is a positive leak.

Evacuation

The most common method is a two-step procedure: a rough evacuation followed by a final evacuation with charging once parameters are reached. Load the Plug into the Evacuation Tool until it “snaps” into the Plug Driver retaining ring. Pull the T-Handle fully out to its detent (you will feel a “click”) so the Plug retracts completely out of the flow path for maximum flow. Latch onto the Seat and evacuate to the target vacuum. When reached, push the T-Handle in, thread the Plug into the Seat (CW) until it stops, then torque to 12–14 ft-lb. **Never disconnect the Evacuation Tool while the system is under vacuum** before the Plug is threaded, torqued and sealed. Optionally install the Dust Cap.

Charging

Remove the Dust Cap if installed. Align the Charge Tool drive pins with the Plug holes and latch onto the Seat. Open the flow path by turning the T-Handle CCW to the internal stop (do not overtighten). Weigh the correct charge into the system per the design specification — an automated weight-charging device gives the least opportunity for error. When complete, close the flow path (CW) until the Plug seats, torque to 12 ft-lb, vent / reclaim internal pressure, disconnect, and install the Dust Cap (torque to 12 ft-lb) for a redundant hermetic seal.

Final Testing

When testing for refrigerant leaks after charging, flush the Access Port area with an inert gas such as nitrogen to remove any refrigerant traces left from charging. This avoids false-positive readings caused by residual refrigerant near the port.

Maintenance

A regular maintenance schedule keeps connectors working at peak efficiency. Lubricate the Main Seals with a silicone or petroleum-jelly grease and replace when worn or damaged. Lubricate the Evacuation / Service Tool T-Handle shaft with silicone spray so it rotates and slides freely — the shaft slides and rotates through o-rings that will become “sticky” without regular lubrication. Rebuild high-use connectors with the appropriate PortMax repair kit (CMFTR60 / R70 / R80 / R90) on a scheduled basis.

PortMax™ Seat Installation

The Saddle-Mount Seat (CMHU16B01) is **brazed** into the tube; the ½ NPT Seat (CMHU16E01) is **threaded** into a mating port. Both create the same hermetic, high-flow Access Port once the Plug is installed and torqued.

Brazed Saddle-Mount Seat

Braze the Seat into the pipe system using good brazing practices. The pipe should have a **burr-free Ø5/8" (.625–.630") hole** to receive the stepped diameter of the Seat. Keep material and contamination out of the inside of the Seat so the sealing ability of the Closure (Plug) is not affected. Braze using a **nitrogen purge** to minimize oxidation — blow nitrogen into the Seat from the end where the Plug screws in (especially important on POE oil systems). A 5%–15% silver-content braze alloy works best; some customers use 2% with no issues. Visually inspect and **clean thoroughly** before the next station.



- Braze the **Seat only** — install the Plug afterward, never braze with the Plug installed
- Back-gas with nitrogen, use vapor flux, or induction braze to keep sealing surfaces free of spatter and oxidation
- A clean sealing surface is a must for a good, leak-free joint; avoid overheating

Threaded ½ NPT Seat (CMHU16E01)

- Threads into a matching ½–14 NPT female port — **no brazing required**. Confirm the port is clean, deburred and free of chips.
- Apply a refrigerant-compatible thread sealant to the male NPT threads: 2–3 wraps of **PTFE thread-seal tape** applied clockwise (kept back from the first thread so it can't shred into the system), **or** a POE / refrigerant-rated anaerobic pipe-thread sealant.
- Keep sealant and tape out of the Seat I.D. and sealing area.
- Hand-tighten, then wrench-tighten on the **1 1/8" Seat hex** — typically **2–3 turns past finger-tight (≈ 25–35 ft-lb / 34–47 N-m)**. Reduce for thin-wall or aluminum ports; do not over-torque.

Note: NPT is a tapered thread, so final torque varies with mating-port material and sealant. Values above are a recommended starting point — **confirm the target install torque with FasTest engineering** for your specific port. A contaminated or oxidized sealing surface is the most common cause of a leaking Access Port.

PortMax™ Processing Steps

Processing a large-capacity refrigeration system with the PortMax™ ecosystem follows a simple station-based flow. Each station uses a dedicated quick-connect tool that shares the same high-flow Access Port.

1 Seat Installation	2 Burst / Leak Test	3 Evacuation	4 Refrigerant Charge	5 Fine Leak Check	6 Service
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Station 1 – Seat Installation

Description	Installation of the Access Port Seat onto the refrigeration system.
Assumptions	Saddle-mount tube has the correct Ø0.625" min (15.9 mm) hole, is free of burrs, and has clearance for attaching Processing Tools. Standard brazing practices apply.
Tool Used	No tool required for this station.
Specifics	Braze to the tube with up to 5% (up to 15%) silver solder. Back-gas, vapor-flux, or induction braze to keep sealing surfaces free of weld spatter or oxidation. A clean sealing surface is a must for a leak-free joint.
Concerns / Addressed	Overheating and contamination of the sealing surface → proper tools and operator training required. (See Brazing Tips, page 10.)

Station 2 – Burst / Leak Test • MBE Tool (CMFT60)

Description	Burst test and gross leak test. The high-flow MBE design gives rapid fill & vent and lets contamination pass through the connector, minimizing clogging with debris.
Assumptions	Seat is already brazed onto the system. The Plug is not installed at this station.
Specifics	Tool stays with the station. Check the Seat for debris at the end of the test and clean out if necessary.
Concerns / Addressed	Accidental removal under pressure → the actuation sleeve has an internal mechanism that prevents removal under pressure. Clogging / restricted flow → designed with maximum diameters to let debris clear the Seat.

Processing Steps — Station 3: Evacuation

Evacuation Tool (CMFT80). Looks the same externally as the Charge Tool, but the internals differ to maximize evacuation flow rate. The T-Handle slides in and out of the Evac Tool, moving the Plug out of the flow path to maximize flow (the Charge Tool T-Handle is fixed).

Description	Evacuation of the system — typically the longest cycle time, requiring the greatest flow. The system must remain under vacuum upon exit.
Assumptions	Seat already brazed; Evac Tool connected to a vacuum pump; typically 2–3 connection points per circuit at this station.
Flow Path	Ø0.5" (12.7 mm) nominal, unobstructed.



Procedure

- Step 1** Push the T-Handle forward, then insert the Plug into the Evacuation Tool Plug Driver. The Plug is held in place by a snap ring — make sure you feel it “snap” into the retaining ring.
- Step 2** Pull the T-Handle **all the way out** to its detent (you will feel a “click”), then latch the Evacuation Tool onto the Seat and begin evacuation. The detent holds the Plug out of the flow path for maximum flow.
- Step 3** When evacuation reaches target vacuum, push the T-Handle forward until it stops, rotate clockwise until it stops, then torque the Plug to 12–14 ft-lb (16–19 N-m) using the Torque Tool on the T-Handle 5/16" hex.
- Step 4** If the system passes the vacuum-decay test, disconnect the Evacuation Tool from the Seat. Install the Dust Cap finger-tight to keep the system free of contamination until the refrigerant charge (or torque it now).

Concerns addressed: Push the Plug into the Plug Driver until it snaps into the retaining ring — this assures it threads into the Seat when evacuation is complete. Pull the T-Handle fully out until the detent clicks — this assures the Plug retracts for maximum flow. **Never disconnect the Evacuation Tool while under vacuum** before the Plug is threaded, torqued and sealed.

Processing Steps — Station 4: Refrigerant Charge

Charge Tool (CMFT70). Use for charge and final fill. Looks the same externally as the Evacuation Tool, but the internals differ and the T-Handle is **fixed** — it does not slide in and out as it rotates to drive the Plug open and closed.

Description	Connect to the evacuated, sealed system to charge. The system is under charge pressure upon leaving the station. Trapped refrigerant in the Seat / Tool / hose can be reclaimed prior to disconnect.
Assumptions	Unit is under vacuum on arrival and fully charged on exit. A small amount of air inclusion is acceptable.
Flow Rate	50+ scfm @ 120 psig ΔP , Ø0.5" (12.7 mm) nominal path.



Procedure

- Step 1** Remove the Dust Cap if installed. Align the drive pins of the Tool Plug Driver with the holes in the Plug and latch the Charge Tool onto the Seat by sliding the Sleeve forward.
- Step 2** Open the flow path by turning the T-Handle CCW until the internal stop is reached (do not overtighten).
- Step 3** With the flow path open, charge refrigerant into the system. Weigh the correct charge per the design specification — an automated weight-charging device gives the least opportunity for error.
- Step 4** When charging is complete, close the flow path by turning the T-Handle CW until the Plug is seated, then torque to 12 ft-lb (16 N-m) on the T-Handle 5/16" hex. Apply counter-torque with a wrench on the Seat hex.
- Step 5** Vent internal pressure (reclaim), then disconnect the Charge Tool by sliding the Sleeve back. Install the Dust Cap and torque to 12 ft-lb (16 N-m) — a properly torqued Dust Cap provides a redundant hermetic metal-to-metal seal for two degrees of leak protection.

Concern addressed: disconnecting while under pressure → the Sleeve has an internal safety-lock that will not allow the Tool to be disconnected while under pressure. Zero-emissions potential when a reclaim system is used.

Processing Steps — Stations 5 & 6

Station 5 – Fine Leak Check

Description	Check the system for leaks and make sure the PortMax™ Access Port is sealed.
Assumptions	System is charged and has no gross leaks.
Tool Used	No tooling required for this station.
Concerns / Addressed	Leakage at the Access Port → the PortMax™ System allows easy access for field service. If the Plug is suspected of leaking, check torque or replace the Plug using the Service Tool (rather than the Charge Tool) to change the Plug without depressurizing the system or recovering refrigerant.

Station 6 – Service • Service Tool (CMFT90)

Description	If the Access Port is leaking, the PortMax™ Service Tool can change the Plug without depressurizing the system or recovering refrigerant.
Assumptions	Unit is in a charged state; the system is leaking from the Access Port (or elsewhere).
Tool Used	PortMax™ Service Tool (CMFT90) and a Torque Tool or common torque wrench.
Specifics	If the Plug is leaking: attach the Service Tool to the Seat; unscrew the Plug (CCW); pull the T-Handle back and close the ball valve; remove and inspect / replace the Plug; re-install and torque to 12 ft-lb (16 N-m). Zero-emissions potential with reclaim.
Concerns / Addressed	Proper sealing of the Plug → use proper sealing / torquing technique and always apply counter-torque to the Seat hex.



The Service Tool is primarily intended for installation and service technicians. It combines the functionality of the Evacuation and Charge Tools and adds an internal ball valve, so it can recover refrigerant, leak test, evacuate, charge, and replace a Plug — all while the system remains under pressure.

Installation & Operating Instructions

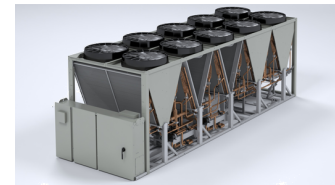
PortMax™ Access Port – Saddle Mount & NPT Seat

Installation between Plug and Seat. Please read all steps before installing the Plug into the Seat.

- Step 1** PortMax™ Plugs should remain in their protective packaging until assembly is required, to ensure cleanliness and eliminate damage. Just prior to assembly, remove the Plug from the packaging tray.
- Step 2** Install the **Seat first** — braze the Saddle-Mount Seat, or thread the ½ NPT Seat into its mating port with sealant — **before** installing / threading the Plug into the Seat. (See **Seat Installation**, page 10.)
- Step 3** Make sure there is no contamination in the I.D. of the Seat, especially the sealing area. (Steps 3–4 apply to all Seat styles.)
- Step 4** Make sure the Plug is free of contamination and foreign particulates. Lightly lubricate the sealing surface with a compatible refrigerant oil.
- Step 5** Thread the Plug into the Seat and torque clockwise to **12–14 ft-lb (16–19 N-m)** using the Torque Tool with a 5/16" socket (or the CMFT70 Charge Tool). Do not exceed 14 ft-lb (19 N-m).



Saddle Mount Seat — CMHU16B01



½ NPT Seat — CMHU16E01

Always apply counter-torque to the Access Port Seat hex when tightening the Plug and Dust Cap, to prevent imparting stress on the seat joint. Saddle-mount installations require a Ø.625" (15.9 mm) minimum bore.

Dust Cap Installation

- After processing, thread the Dust Cap onto the Seat and torque to 12–14 ft-lb (16–19 N-m) using the drive adapter and 1 3/16" socket.
- The properly torqued Dust Cap provides a **redundant hermetic metal-to-metal seal** and prevents contamination of the sealing surfaces.

Installation & Operating Instructions

MBE / Leak Test Tool Operation – CMFT60

- Step 1** Pull the sleeve (knurled portion) back and slide the connector over the Seat until it stops.
- Step 2** Release the sleeve — it snaps forward, pushing the latching balls into the groove on the Seat. Make sure the balls are locked into the groove before processing.
- Step 3** Perform the pressure / leak test (fill & vent) through the port. Check the Seat for debris at the end of the test and clean if necessary.
- Step 4** Once complete, pull the sleeve back and remove the connector.



WARNING: This connector is **not** internally valved. All pressure must be dissipated before disconnection. The safety-latch sleeve will not disconnect while under pressure.

Evacuation Tool Operation – CMFT80

- Step 1** Push the T-Handle forward and load the Plug into the Plug Driver until it “snaps” into the retaining ring.
- Step 2** Pull the T-Handle fully out to its detent (“click”), latch the tool onto the Seat, and begin evacuation.
- Step 3** At target vacuum, push the T-Handle in, rotate CW until the Plug stops, then torque to 12–14 ft-lb (16–19 N-m) on the 5/16” hex.
- Step 4** After a passing decay test, disconnect and install the Dust Cap to keep the system clean until charging.



Never disconnect the Evacuation Tool while the system is under vacuum before the Plug is threaded, torqued and sealed.

Installation & Operating Instructions

Charge Tool Operation – CMFT70

- Step 1** Remove the Dust Cap if installed. Align the drive pins of the Plug Driver with the holes in the Plug and latch the tool onto the Seat by sliding the Sleeve forward.
- Step 2** Open the flow path by turning the T-Handle CCW until the internal stop is reached (do not overtighten). The Charge Tool T-Handle is fixed — it does not slide in and out.
- Step 3** Charge refrigerant into the system per the design specification.
- Step 4** When complete, close the flow path (CW) until the Plug seats, then torque to 12 ft-lb (16 N-m) on the 5/16" hex. Apply counter-torque on the Seat hex.
- Step 5** Vent / reclaim internal pressure, slide the Sleeve back to disconnect, and install the Dust Cap (torque to 12 ft-lb / 16 N-m).



WARNING: The Sleeve has an internal safety-lock that will not allow disconnection while under pressure. Vent / reclaim before removing the tool.

Service Tool Operation – CMFT90

Use to recover refrigerant, leak test, evacuate, charge, or replace a Plug while the system is under pressure. The internal ball valve isolates the tool so the Plug can be changed with no loss of refrigerant.

- Step 1** Attach the Service Tool to the Seat (slide Sleeve forward to latch).
- Step 2** To replace a Plug: unscrew the Plug (CCW), pull the T-Handle back, and close the ball valve to isolate the process flow.
- Step 3** Inspect / replace the Plug, re-open the valve, thread the Plug into the Seat (CW), and torque to 12 ft-lb (16 N-m). Vent / reclaim, then disconnect.



Torque Tool, Accessories & Fittings



Torque Wrench SCFTM02 — preset to 12 ft-lb (16 N-m).

- **Plug:** use the 5/16" socket (CMFT375312DS) on the Plug or the Tool T-Handle 5/16" hex
- **Dust Cap:** use the 3/8"-to-1/2" drive adapter (CMFT37550DA) with the 1 3/16" socket (CMFT5011875DS)
- Always apply counter-torque to the 1 1/8" Seat hex to protect the braze joint

Leak Test Fitting AE012

- 3/8 Male Flare × 1/2 NPT; pressure rating 2031 psig (140 bar)
- Connects the PortMax™ Tool to a leak-test fill hose

Evacuation Fitting AE016CF

- KF16 × 1/2 NPT; connects the Tool to high-vacuum evacuation hoses
- **Not** suitable for leak-test or charging (max 50 psig / 3.4 bar)

Note: The PortMax™ Service Tool will require each of the fittings depending on the operation being performed.

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