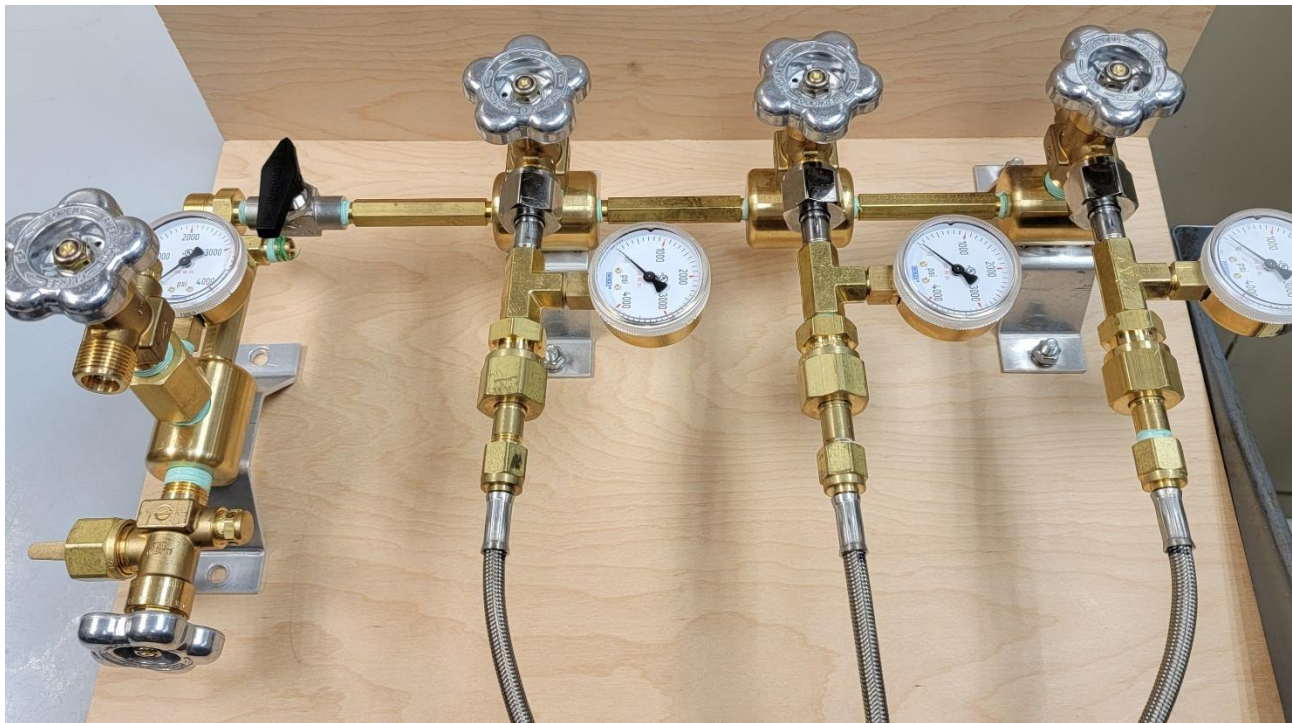




Transfill Cascade System

The Flotec **Transfill Cascade System** is a wall mounted manifold that is used to refill smaller cylinders (the target) from large cylinders (the source) in an efficient and safe process. Available in two, three, four, or six target valves, and one or two source valves, plus a safety pressure release valve.

- Unique Gauge Assembly (TCS-TGA) to track individual source cylinder pressure
- Hose, Stainless Steel braided cover over PTFE inner core with CGA 540 each end & one end hand tight
- Master Shut-Off between source manifold and delivery regulator for safety
- Precision Regulator for controlling outlet pressure
- System Vent Valve
- Snubber orifice with gauge to limit fill rate at 100 psi per minute for safety and efficiency
- One or two outlet whips for filling CGA 870 and CGA 540 target cylinders with lengths up to 20'
- Mounting brackets included



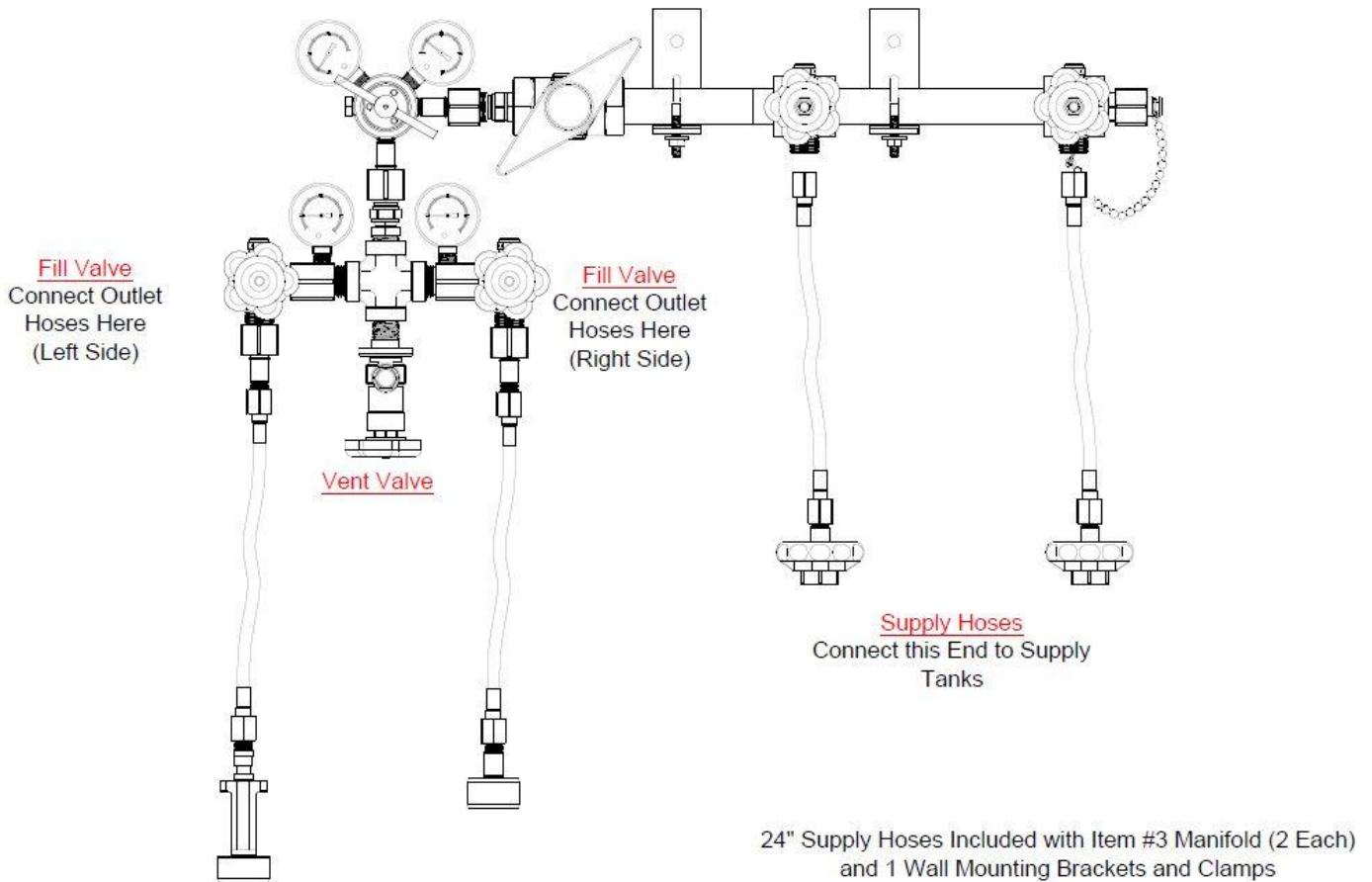
TCS-
131-
02

Transfill Cascade System, shown with one of three inlet High Pressure Stainless Steel Braided Source Cylinder Hoses with Hand tight CGA 540 Connection. Also shown is the one outlet High Pressure Stainless Steel Braided Source Cylinder Hose with a Hand tight CGA 870 Connection.





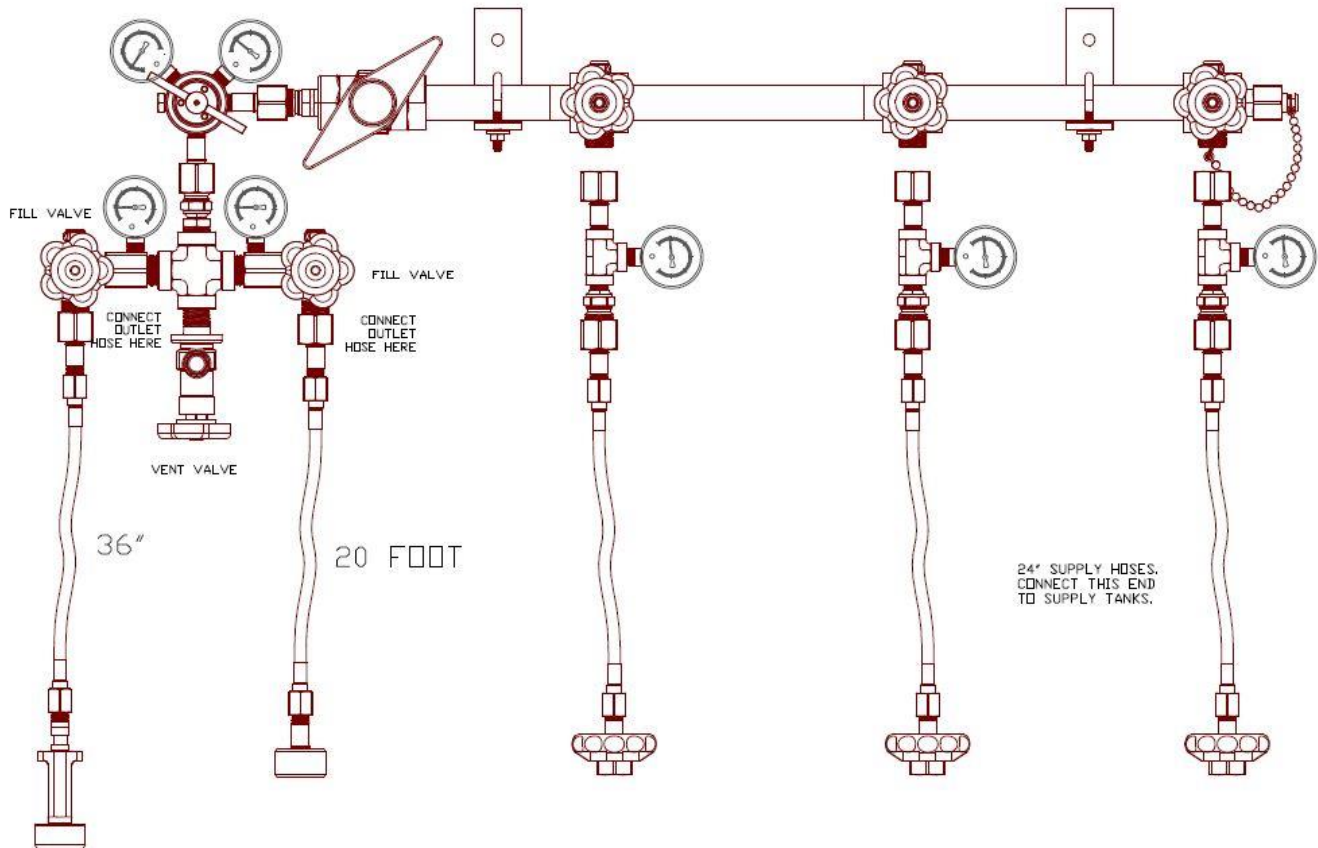
Part # **TCS-122-2K**



- No Inlet Gauge Assembly
- Two CGA 540 Valves w/ Two 24" Hoses (CGA 540 Female Hex Nut to CGA 540 Female Knurled Nut)
- Master Shut-Off Valve
- Regulator, Gauges, Two Vertical (down) CGA 540 OUTLETS w/ One CGA 540 VENT Valve
- Two Snubber Orifices with individual Target Cylinder Gauges
- 36" CGA 540 inlet to CGA 870 outlet (010-6281-002) left outlet
- 240" CGA 540 inlet to CGA 540 outlet (010-6283-002) left outlet
- Two Mounting brackets included



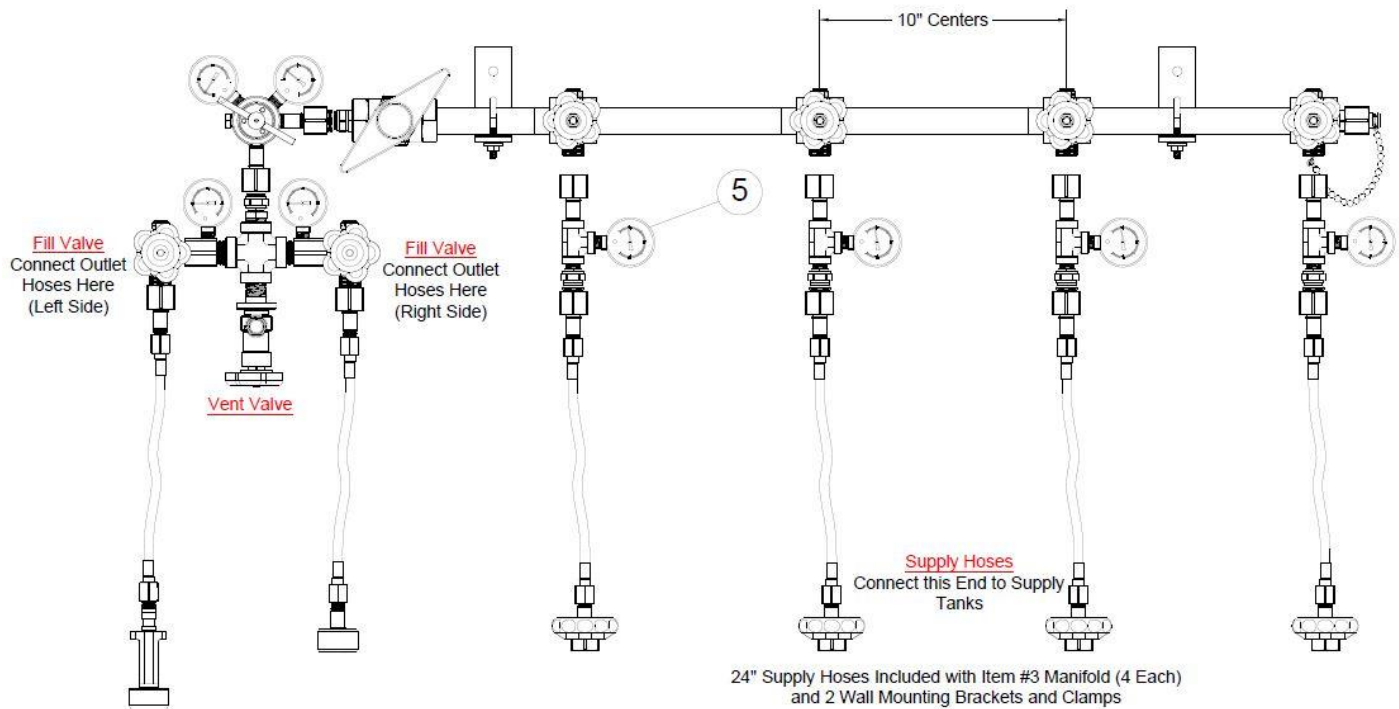
Part # TCS-232-2K



- Inlet Pressure Gauge Assembly (TCS-TGA)
- Three CGA 540 Valves w/ Two 24" Hoses (CGA 540 Female Hex Nut to CGA 540 Female Knurled Nut)
- Master Shut-Off Valve
- Regulator, Gauges, Two Vertical (down) CGA 540 OUTLETS w/ One CGA 540 VENT Valve
- Two Snubber Orifices with individual Target Cylinder Gauges
- 36" CGA 540 inlet to CGA 870 outlet (010-6281-002) left outlet
- 24" CGA 540 inlet to CGA 540 outlet (010-6283-002) left outlet
- Two Mounting brackets included



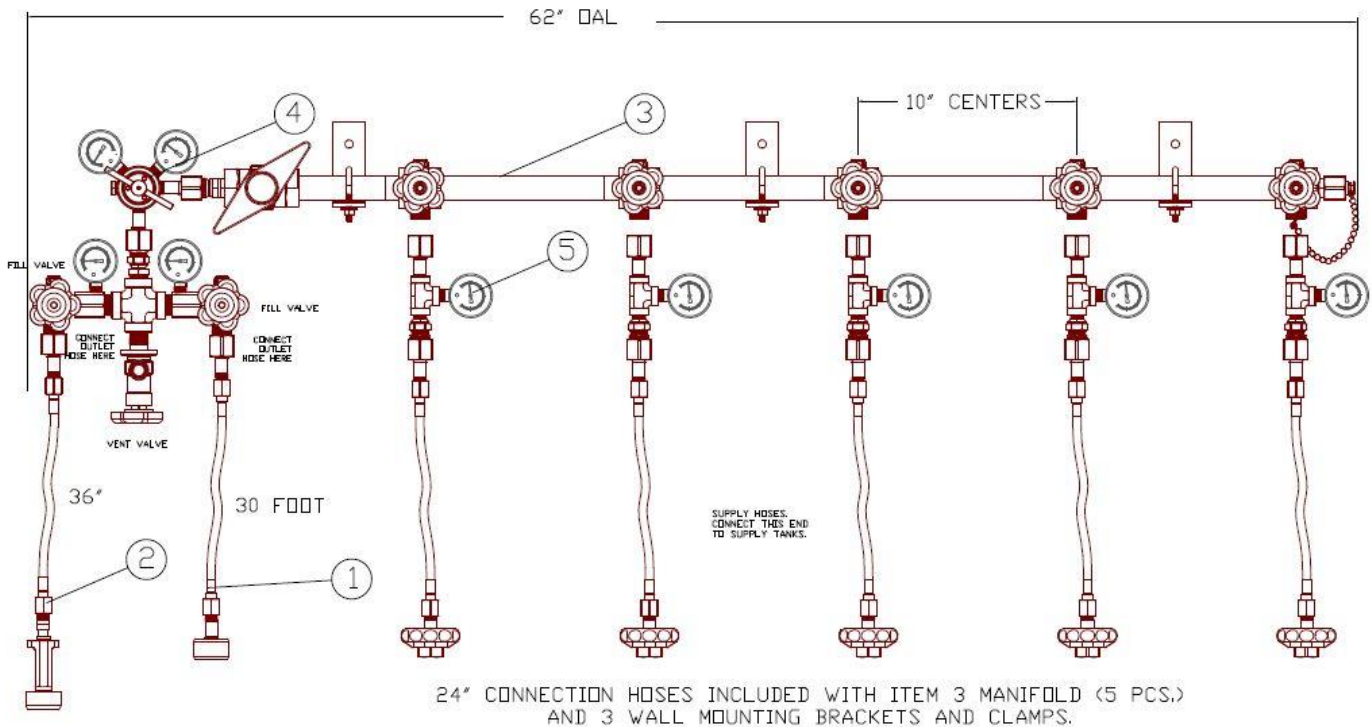
Part # TCS-242-2K



- Inlet Pressure Gauge Assembly (TCS-TGA)
- Four CGA 540 Valves w/ Two 24" Hoses (CGA 540 Female Hex Nut to CGA 540 Female Knurled Nut)
- Master Shut-Off Valve
- Regulator, Gauges, Two Vertical (down) CGA 540 OUTLETS w/ One CGA 540 VENT Valve
- Two Snubber Orifices with individual Target Cylinder Gauges
- 36" CGA 540 inlet to CGA 870 outlet (010-6281-002) left outlet
- 240" CGA 540 inlet to CGA 540 outlet (010-6283-002) left outlet
- Two Mounting brackets included



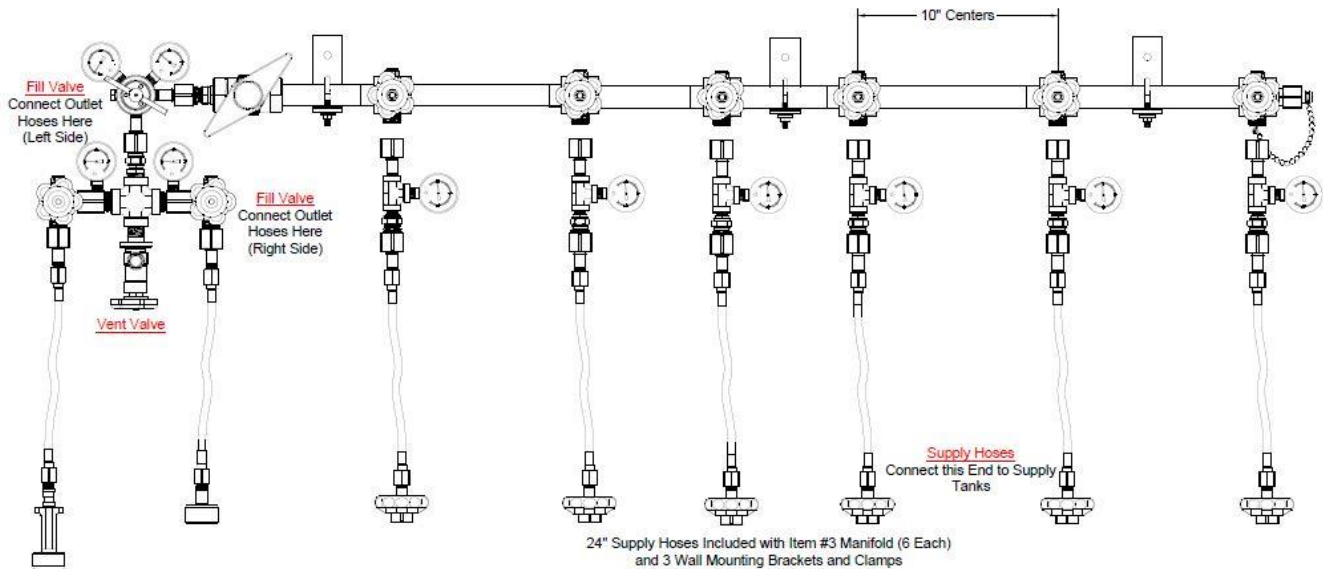
Part # TCS-252-2K



- Inlet Pressure Gauge Assembly (TCS-TGA)
- Five CGA 540 Valves w/ Two 24" Hoses (CGA 540 Female Hex Nut to CGA 540 Female Knurled Nut)
- Master Shut-Off Valve
- Regulator, Gauges, Two Vertical (down) CGA 540 OUTLETS w/ One CGA 540 VENT Valve
- Two Snubber Orifices with individual Target Cylinder Gauges
- 36" CGA 540 inlet to CGA 870 outlet (010-6281-002) left outlet
- 24" CGA 540 inlet to CGA 540 outlet (010-6283-002) left outlet
- Two Mounting brackets included



Part # TCS-262-2K



- Inlet Pressure Gauge Assembly (TCS-TGA)
- Five CGA 540 Valves w/ Two 24" Hoses (CGA 540 Female Hex Nut to CGA 540 Female Knurled Nut)
- Master Shut-Off Valve
- Regulator, Gauges, Two Vertical (down) CGA 540 OUTLETS w/ One CGA 540 VENT Valve
- Two Snubber Orifices with individual Target Cylinder Gauges
- 36" CGA 540 inlet to CGA 870 outlet (010-6281-002) left outlet
- 240" CGA 540 inlet to CGA 540 outlet (010-6283-002) left outlet
- Two Mounting brackets included

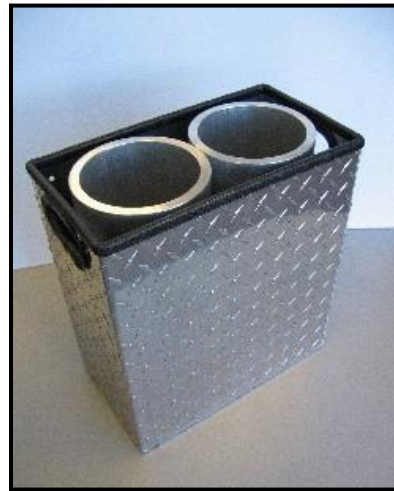


Cylinder Fill Pots

Part # **TCS-FP1**



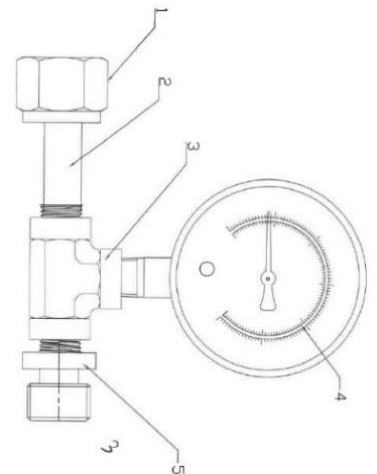
Part # **TCS-FP2**

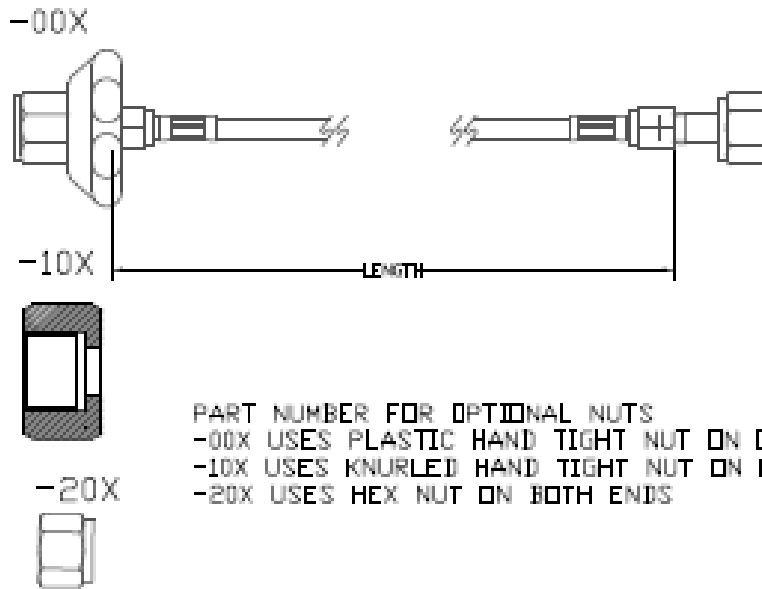


Water tight Aluminum Tread Plate outer shell and ½” Aluminum Extruded Seamless Inner shell that is cross drilled to allow water pass through.

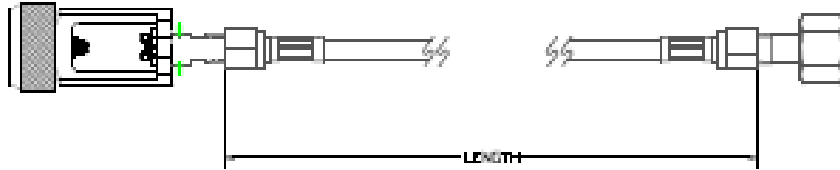
Replacement Parts

The optional **TCS-TGA** allows the operator to keep track of pressure in each source cylinder. This helps selecting the cylinder with the lowest pressure in each stage of the transfilling process.





010-6283-X01	540 TCS Whlp Assembly, 2 foot
010-6283-X02	540 TCS Whlp Assembly, 20 foot
010-6283-X03	540 TCS Whlp Assembly, 30 foot
010-6283-X04	540 TCS Whlp Assembly, 50 foot
010-6283-X05	540 TCS Whlp Assembly, 3 foot
010-6283-X06	540 TCS Whlp Assembly, 7 foot
010-6283-X07	540 TCS Whlp Assembly, 12 foot
010-6283-X08	540 TCS Whlp Assembly, 5 foot
010-6283-X09	540 TCS Whlp Assembly, 6 foot
010-6283-X10	540 TCS Whlp Assembly, 4 foot



010-6281-001	870 TCS Whlp Assembly, 2 foot
010-6281-002	870 TCS Whlp Assembly, 3 foot
010-6281-003	870 TCS Whlp Assembly, 7 foot
010-6281-004	870 TCS Whlp Assembly, 12 foot
010-6281-005	870 TCS Whlp Assembly, 20 foot
010-6281-006	870 TCS Whlp Assembly, 30 foot
010-6281-007	870 TCS Whlp Assembly, 50 foot
010-6281-008	870 TCS Whlp Assembly, 5 foot



How to order Transfill Cascade System

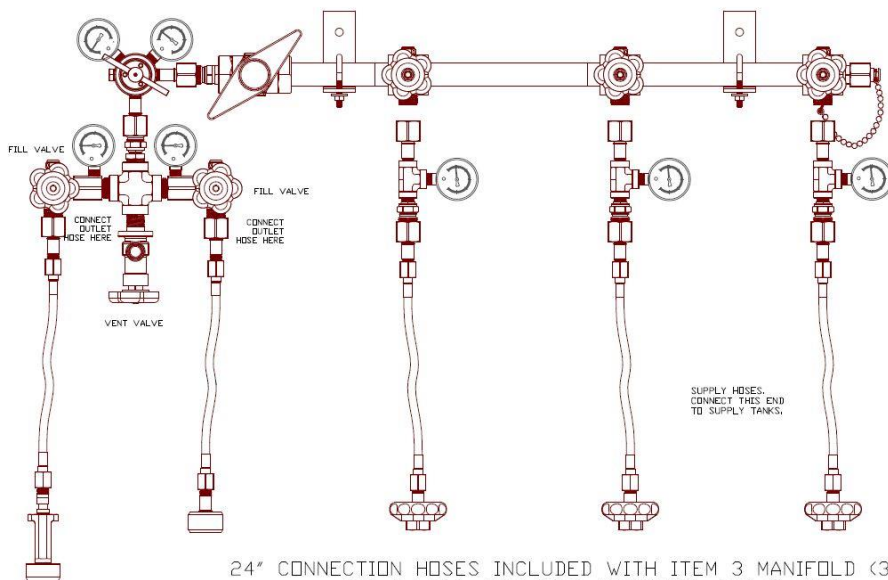
The Flotec Transfill Cascade System consists of an inlet manifold which is designed to allow supply tanks to be used to refill tanks connected to the outlet section. The outlet includes a regulator to control pressure and a vent valve to bleed off the supply pressure remaining in the line after transfilling. Customers may order a system that contains from two (2) to six (6) supply tanks. The inlet hoses, between the manifold and the supply tanks, have optional pressure gauges that show the amount of gas in each supply tank. To specify a Transfill Cascade part number, move across the list of options, selecting the code that represents the option. When finished, you will have an assembly number.

For example: TCS-232-2K identifies a:

TCS - Transfill Cascade System

-
- 2 - Inlet Pressure Gauge Assembly for each source hose
- 3 - Three CGA 540 Valves and 24" Hoses (CGA 540 Female Hex Nut to CGA 540 Female Knurled Nut
- 2 - Regulator, Orifices, Gauges, Two Vertical (down) CGA 540 OUTLETS with one CGA 540 Vent Valve
-
- 2 - 36" Hose CGA 540 Female Hex Nut to CGA 870 Yoke Assemble with Dome Handle, left outlet
- K - 240" Hose CGA 540 Female Hex Nut to CGA 540 Female Knurled Nut, right outlet

The picture below shows this system as configured for part number **TCS-232-2K**



24" CONNECTION HOSES INCLUDED WITH ITEM 3 MANIFOLD (3 PCS.) AND 2 WALL MOUNTING BRACKETS AND CLAMPS.



TCS -- 2 3 2 -- A K B-Transfill Cascade System Code (2021-09-07).xlsx.pdf

----- Right Outlet Hose Type and Length

- 0 - none
- 1 - 24" CGA 540 inlet to CGA 870 outlet
- 2 - 36" CGA 540 inlet to CGA 870 outlet
- A - 36" CGA 540 inlet to CGA 540 outlet
- H - 84" CGA 540 inlet to CGA 540 outlet
- J - 140" CGA 540 inlet to CGA 540 outlet
- K - 240" CGA 540 inlet to CGA 540 outlet
- M - 360" CGA 540 inlet to CGA 540 outlet
- N - 600" CGA 540 inlet to CGA 540 outlet

----- Left Outlet Hose Type and Length

- 0 - none
- 1 - 24" CGA 540 inlet to CGA 870 outlet
- 2 - 36" CGA 540 inlet to CGA 870 outlet
- A - 36" CGA 540 inlet to CGA 540 outlet
- H - 84" CGA 540 inlet to CGA 540 outlet
- J - 140" CGA 540 inlet to CGA 540 outlet
- K - 240" CGA 540 inlet to CGA 540 outlet
- M - 360" CGA 540 inlet to CGA 540 outlet
- N - 600" CGA 540 inlet to CGA 540 outlet

----- Number of Outlets in addition to vent outlet (High Pressure, Braided Stainless Steel over Teflon Tube)

- 0 - none
- 1 - Regulator, Snuber Orifice, Pressure Gauge, One CGA 540 OUTLET with One CGA 540 VENT Valve
- 2 - Regulator, Snuber Orifices, Pressure Gauges, Two CGA 540 OUTLETS pointing DOWN with One CGA 540 VENT Valve
- 3 - Regulator, Snuber Orifices, Pressure Gauges, Two CGA 540 OUTLETS pointing OUT with One CGA 540 VENT Valve
- A - No Regulator, Orifice, Gauge, One CGA 540 OUTLET with One CGA 540 VENT Valve
- B - No Regulator, Orifices, Gauges, Two Vertical (down) CGA 540 OUTLETS with One CGA 540 VENT Valve
- C - No Regulator, Orifices, Gauges, Two Horizontal (out) CGA 540 OUTLETS with One CGA 540 VENT Valve

----- Number of INLETS (Braided Stainless Steel over Teflon Tube w/ CGA 540 Hex Nut and Hand Tight Knurled Nut)

- 2 - Two CGA 540 Valves with Two 24" Hoses (CGA 540 Female Hex Nut to CGA 540 Female Knurled Nut)
- 3 - Three CGA 540 Valves with Three 24" Hoses (CGA 540 Female Hex Nut to CGA 540 Female Knurled Nut)
- 4 - Four CGA 540 Valves with Four 24" Hoses (CGA 540 Female Hex Nut to CGA 540 Female Knurled Nut)
- 5 - Five CGA 540 Valves with Five 24" Hoses (CGA 540 Female Hex Nut to CGA 540 Female Knurled Nut)
- 6 - Six CGA 540 Valves with Six 24" Hoses (CGA 540 Female Hex Nut to CGA 540 Female Knurled Nut)
- B - Two CGA 540 Valves with Two 24" Hoses (CGA 540 Female Hex Nut to CGA 870 Yoke Assembly w/ Dome Handle)
- C - Three CGA 540 Valves with Three 24" Hoses (CGA 540 Female Hex Nut to CGA 870 Yoke Assembly w/ Dome Handle)
- D - Four CGA 540 Valves with Four 24" Hoses (CGA 540 Female Hex Nut to CGA 870 Yoke Assembly w/ Dome Handle)
- E - Five CGA 540 Valves with Five 24" Hoses (CGA 540 Female Hex Nut to CGA 870 Yoke Assembly w/ Dome Handle)
- F - Six CGA 540 Valves with Six 24" Hoses (CGA 540 Female Hex Nut to CGA 870 Yoke Assembly w/ Dome Handle)

----- Inlet Gauge Option

- 1 - No Inlet Pressure Gauge Assemblies
- 2 - Inlet Pressure Gauge Assemblies (TCS-TGA)

----- PRODUCT GROUP:

TCS - Transfill Cascade System



Transfill System Instructions for Use

The TCS Transfill system is designed to maximize the pressurization potential of your pressurized supply cylinders. In order to utilize the system's benefits, you must follow the numbered instructions listed below. The TCS Transfill system maximizes your pressurization potential by saving your most highly pressurized supply cylinder for the very end of the pressurization process. It is important to number the pressurized supply cylinders in order to remember which of your supply cylinders is the most highly pressurized. When you begin to fill the unpressurized tank with your first pressurized supply cylinder, the tank will fill with pressurized air until the pressure inside both the supply cylinder and the tank is equal. This new pressure will be lower than the pressurized supply cylinder's initial pressure because the same amount of pressurized air will be filling a larger volume. This decrease in the pressure of the pressurized supply cylinder will change through each step of the process. The decrease in pressure of the final supply cylinder in the TCS Transfill system will be very small because the difference in pressure between the tank being filled and the pressurized supply cylinder will be nearly negligible by the end of the pressurization process. Thus, the TCS Transfill system ensures more high pressure fills per pressurized supply cylinder.



Figure 1



Figure 1 shows a three-supply tank system with one outlet. The greater the number of supply tanks the better utilization of the gas supply because the supply tanks can be drained to lower pressures while maintaining a higher final pressure in the tank being filled.

1. Label the pressurized supply cylinders with numbers in order to easily identify the order of use. The lowest pressure supply tank should be labeled one, the second lowest, two and so on.
2. Attach the empty tank to the outlet fill hose and open its tank valve.
3. In some cases, FDA guidelines require that the tank be vented and evacuated prior to refilling. This is done using the venting valve. It is oriented to face the wall to reduce the possibility of injury from debris ejected during the venting process. If you use a vacuum pump for evacuation, it may be connected to the vent port after venting.
4. When you have attached the tank, you wish to pressurize to the system, open the supply manifold master shutoff valve.
5. Next, begin to pressurize the empty tank by shutting the evacuation/venting valve, opening the supply manifold valve attached to the first pressurized supply tank.
6. Once the two tanks are equal in pressure, close the first supply manifold valve and open the second supply manifold valve, then continue with each valve until you have equalized with the highest-pressure supply tank. Be sure to close each successive valve before opening the next fill valve to avoid equalizing the supply tanks. This will reduce the effectiveness of the system. Note that there is a filtered restrictor to control the fill rate to maintain a safe rate of fill to prevent excessive heating of the gas, which can cause oxygen fires. This will extend the equalization time during filling. If this time interval increases significantly, the filter orifice may need replacement.
7. Close all valves (including the supply manifold master shutoff valve) and remove the now pressurized tank.
8. When your highest-pressure supply tank depletes to below your highest desired fill pressure rotate a fresh tank into the highest numbered tank and renumber the supply tanks accordingly.

For additional information and tips for using Transfill systems visit the following URLs.

<http://www.fda.gov/downloads/drugs/guidancecomplianceregulatoryinformation/guidances/ucm070270.pdf>

<http://www.fda.gov/MedicalDevices/Safety/AlertsandNotices/PublicHealthNotifications/ucm062088.htm>