TRAE+ Balanced-Port Thermal Expansion Valves

FEATURES

TRAE+ Thermal Expansion Valves are designed to meet the specific demands of refrigerated display cases, reach-in and walk-in coolers and freezers, and commercial applications ranging from medium (+50°F) to low (-50) temperature, with proper charge.

- Bar-stock body - ODF connections
- External equalizer
- Wrench flats on External Equalizer - SAE
- Corrosion-resistant materials
- Interchangeable with currently available commercial refrigeration TEVs
- Field-replaceable power assembly
- Stainless Steel Power Assembly
- Copper Connections

SAFETY INSTRUCTIONS

Warning: Before opening any system, make sure the pressure in the system is brought to and remains at atmospheric pressure. Use approved refrigerant recovery methods when necessary. Failure to comply can result in system damage and/or **personal injury**.

1. Read installation instructions thoroughly. Failure to follow instructions may result in valve failure, system damage, or **personal injury**.
2. Do not use on service conditions or fluids not specifically cataloged, without prior written approval of Emerson Climate Technologies Flow Controls Division Applications Engineering Department. Use of thermal expansion valves on applications not specifically cataloged can result in valve failure and/or system damage.
3. Protect against excessive vibration, it may cause a tubing break which will cause valve failure and/or personal injury.
4. Do not exceed maximum working pressure of 450 psig, excess internal pressure could cause damage to diaphragm, resulting in valve malfunction.
5. Do not exceed maximum working temperature (see table 1) - excess temperature could cause internal damage, resulting in valve malfunction.

TABLE 1
Maximum Dehydration Temperature °F

	THERMOSTATIC CHARGE		
REFRIGERANT	**C**	**Z**	**WMOP/CA**
R12	190	250	250
R22	160	185	250
R502	150	170	250

This Table refers to the maximum dehydration temperatures when the bulb and valve body are subjected to the same temperature. On L, C, and Z charges, 250°F maximum valve body temperature is permissible (**if the bulb temperature**) does not exceed those shown in the table.

APPLICATION/OPERATION

The TRAE+ valve is currently replacing conventional TEV's on air conditioning and refrigeration systems with any combination of the following system operating conditions:

- Widely varying evaporator loads.
- Widely varying head pressures.
- Widely varying pressure drop available across the thermostatic expansion valve and refrigerant distributor.
- Fluctuating or extremely low liquid temperatures.

Severe conditions are those which drastically increase a conventional expansion valve's maximum capacity: high head pressures for example, also, low liquid temperatures that would be experienced on a system with mechanical subcoolers during summer operation. TRAE+ high system performance is possible because the large diaphragm allows the valve to operate with the valve pin controlling very close to the seat. This provides stable control at minimum changes in stroke, enabling a large port to handle small loads. Compared to a standard TEV, the larger port will improve system pulldown.

Problems can occur with refrigeration systems during both high and low ambient conditions when the condensing temperature is allowed to follow the ambient. As the evaporator temperature remains reasonably constant, this results in extreme pressure drop changes across the valve. These pressure drop changes can result in a conventional valve not maintaining a constant superheat at the evaporator outlet. These superheat changes can result in the evaporator starving in low ambient conditions and flooding in the higher ambient, depending on the valve design. Another variable factor for this situation is how low the head pressure is allowed to decrease. This of course depends on whether heat reclaim is utilized for heating purposes, or if hot gas will **be used for evaporator defrost**.

TRAE	**+**	**20**	**H**	**C**
Valve Series	ODF Copper Connections	Capacity Nominal Rating in Tons	Refrigerant Code F = R-12 H = R-22 R = R-502	Charge Code C = med temp Z = low temp W = WMOP (if needed)

INSTALLATION INSTRUCTIONS

1. **Warning:** Before opening any system, make sure the pressure in the system is brought to and remains at atmospheric pressure. Use approved refrigerant recovery methods when necessary. Failure to comply can result in system damage and/or personal injury.
2. Valves may be installed in any position, but should be located as close as possible to the distributor or evaporator inlet.
3. Foreign matter in the thermal expansion valve may cause diaphragm failure, flooding, or starving of the valve. Use of an Emerson liquid line filter-drier is strongly recommended.
4. Valves are factory-set to a specific superheat. If adjustment is needed, refer to Superheat Adjustment section for proper procedure. Improper adjustment of superheat can result in system damage.
5. Proper valve sizing is important. An oversized valve may result in erratic control. An undersized valve considerably reduces system capacity.
6. Be sure valve is installed with its flow arrow corresponding to the flow direction thru the piping.
7. On valves with solder connections, **wrap wet cloths around valve**. Direct torch away from valve to avoid valve damage.
8. Use backup wrench on all wrench flats. Over-torquing can result in valve body damage.
9. Install line connections to valve. On valves with solder connections, wrap wet cloths around the valve to prevent valve damage while brazing. Direct torch away from valve (see Figure 1). Use backup wrench on all wrench flats.
10. Attach the remote bulb to the suction line as close to the evaporator outlet as possible. Position the bulb at the 4 or 8 o'clock position. Clean surface of suction line where the remote bulb is to be attached, and then securely fasten the bulb with straps provided. If the remote bulb can be affected by the surrounding ambient, then the bulb should be insulated with a material that will not absorb water. See figure 2.
11. Connect one end of the external equalizer line to the valve. Use backup wrench on wrench flats. Connect the other end to the suction line slightly downstream from the remote bulb location and positioned so that it cannot siphon oil from the suction line.
12. Check of leaks, sufficient system refrigerant charge, and be sure no flash gas is present before attempting to check valve operation.
13. The expansion valve must be free of all contaminants – install an Emerson liquid line filter-drier before the valve.
14. Support cap tube at power element when unrolling to prevent premature failure.
15. Avoid excessive bending of cap tube to prevent work hardening which will result in premature failure.
16. It is good service practice not to make any sharp bends in the cap tube within one inch of the power element and bulb.

Figure 1

Always direct torch flame away from valve body when brazing.

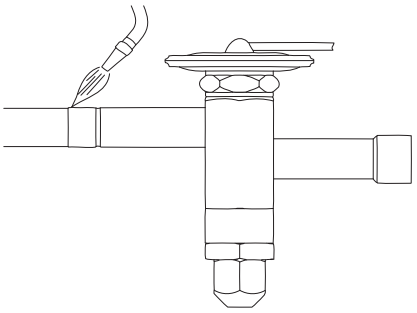
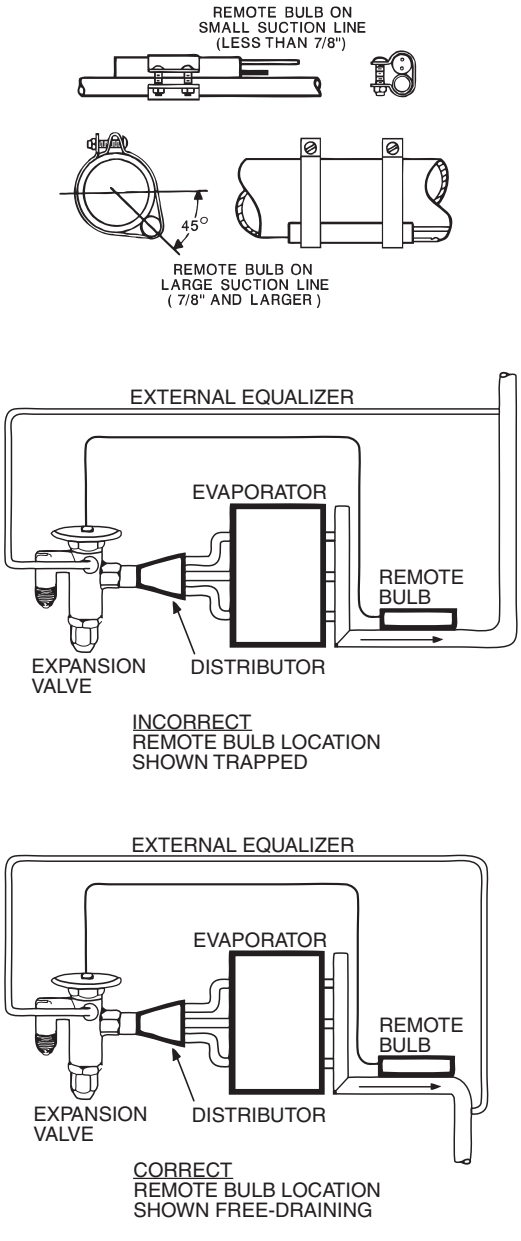


Figure 2



MEASURING SUPERHEAT

1. Determine the suction pressure with an accurate gauge at the evaporator outlet (see **P** in figure 3). On self-contained systems, the suction pressure may be read at the compressor suction connection.
2. From refrigerant pressure-temperature tables, determine saturation temperature at observed suction pressure ($TEMP_P$).
3. Measure temperature of suction gas at thermal expansion valve remote bulb location ($TEMP_T$).
4. Subtract saturation temperature (read from tables in step 2) from temperature measured in step 3, the difference is the superheat of the suction gas.

SUPERHEAT ADJUSTMENT

Emerson thermal expansion valves are factory-set to a specific superheat - however, the superheat should be adjusted for the application. To adjust the valve to other superheat settings:

1. Remove the seal cap from bottom of valve.
2. Turn the adjustment screw clockwise to increase superheat and counterclockwise to decrease superheat. One complete 360° turn changes the superheat approximately 3-4°F, regardless of the refrigerant type. As much as 30 minutes may be required for the system to stabilize after the adjustment is made.
3. Replace and hand-tighten seal cap.

Caution: There are 10 turns on the adjustment stem. When adjusting superheat setting - when stop is reached, any further turning adjustment will damage valve.

POWER ASSEMBLY REPLACEMENT

Warning: Before removing any power assembly, the system must be brought to, and remain at, atmospheric pressure. Failure to comply can result in system damage and/or personal injury.

1. To remove the power assembly, first ensure the valve is free of any moisture or ice. Do not heat valve with torch. Use "heat gun" or apply hot rags to valve to melt ice.
2. Remove the remote bulb from suction line.
3. Turn power assembly counterclockwise with proper size wrench, being careful not to damage body.
4. With power assembly removed, care must be taken to prevent any foreign material from entering the valve.
5. Care must also be taken not to damage the threads or surface area.
6. Install new power assembly with no oil or thread compound, and torque to 375-425 in. lbs.
7. **Warning**: Do not place open flame on or near bulb!

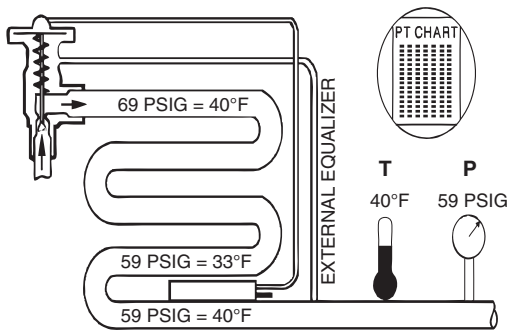


Figure 3

REPLACEMENT PARTS

Part#	Description
X-28458	Power Assembly
KT20294	Cage Removal Tool
27676-1	Seal Cap

NOMINAL CAPACITIES					
Valve Type	R-134a Tons @ 60 psi ▲ Pressure	Valve Type	R-22 Tons @ 100 psi ▲ Pressure	Valve Type	R-404A/R-507 Tons @ 100 psi ▲ Pressure
TRAE9M*	7½	TRAE10H	10	TRAE8*	8
TRAE13M	10	TRAE15H	15	TRAE12	12
TRAE14M	12	TRAE20H	20	TRAE14	14
TRAE22M	18	TRAE30H	30	TRAE20	20
TRAE30M	25	TRAE40H	40	TRAE30	30

* Select correct charge code.

CAGE REPLACEMENT INSTRUCTIONS

1. Before removing superheat adjustment assembly, make sure system is at atmospheric pressure using EPA approved methods. Failure to comply can result in system damage or personal injury.
2. Remove superheat adjustment assembly, superheat spring and spring guide. Care must be taken not to damage threads on surface area.
3. Using X-29151 tool provided, remove cage turning in a counterclockwise direction.
4. Before installing cage, ensure there is no foreign material inside valve or on cage.
5. Lightly oil all seals with same type oil that is in system.
6. Carefully install cage taking care not to damage seals or threads. Torque cage to 60 to 65 inch pounds.
7. Reassemble spring guide superheat spring and adjustment assembly. Torque assembly to 400 to 425 inch pounds.
8. Leak check valve.
9. Adjust superheat to manufacturers recommendations.