



## **MYSTICCOOL<sup>®</sup>MAX Valve System with X-STREAM<sup>®</sup> and A.R.M.E.D.<sup>®</sup> Technologies Service & Installation Instructions**

### ***WHY should I install the MYSTICCOOL<sup>®</sup>MAX Valve System?***

- MYSTICCOOL<sup>®</sup>MAX is more efficient, saving on power consumption.
- Use of MYSTICCOOL<sup>®</sup>MAX system decreases defrost cycles.
- Total system capacity is increased when using MYSTICCOOL<sup>®</sup>MAX.
- MYSTICCOOL<sup>®</sup>MAX maintains more consistent product temperatures, increasing shelf life of products in the refrigerated system.
- MYSTICCOOL<sup>®</sup>MAX helps maintain higher humidity levels in the refrigerated case or the box.

### ***WHAT is the MYSTICCOOL<sup>®</sup>MAX System?***

The MYSTICCOOL<sup>®</sup>MAX valve is a multi-functional valve that changes the characteristics of the refrigerant flow pattern through the evaporator [heat pump system-indoor coil]. This valve can be installed close to the evaporator [heat pump system-the valve is installed in the indoor coil or outdoor coil compartment], adjacent to the rack, or inside the condensing unit on any direct expansion cooling system. MYSTICCOOL<sup>®</sup>MAX needs to be installed in conjunction with the other required system components to allow for the desired system performance.

### ***WHAT are the components of the MYSTICCOOL<sup>®</sup>MAX Valve System?***

The component list consists of the MYSTICCOOL<sup>®</sup>MAX valve and a Thermostatic Expansion valve, and Evaporator [heat pump system-indoor coil] Inlet Line (EIL), a built-in A.R.M.E.D.<sup>®</sup> (Adjustable Refrigerant Metering Evaporator Device), and a Solenoid Valve (optional).

The MYSTICCOOL<sup>®</sup>MAX valve can be a part of a kit.

Refrigeration Component Kits Include: MYSTICCOOL<sup>®</sup>MAX Valve, Insulating Jacket, Expansion Valve, and Filter Drier

HVAC Component Kits Include: MYSTICCOOL<sup>®</sup>MAX Valve(s), Insulating Jacket(s), Expansion Valve(s), Filter Drier(s), and Distributor(s). Distributors are included in bulleted system kits only. Heat Pump Optimizer Kits are included for Heat Pump Systems.

**MYSTICCOOL<sup>®</sup>MAX:** A forged static refrigerant valve which, by design, changes the consistency of the refrigerant flow into the evaporator [heat pump system-indoor coil] and regulates flow, creates pressure drop, and corrects the inaccuracy of the TXV.

1. Thermostatic Expansion Valve: Regulates and controls the feed of refrigerant through the system.
2. Heat Pump Optimizer Kit for Heat Pump Systems: The Heat Pump Optimizer Kit includes A.R.M.E.D.<sup>®</sup> and a check valve(s). This kit ensures higher pressures in the indoor coil when the system is in heat mode. Higher pressures are necessary for adequate heating. The heat pump optimizer kit allows for a separate route for refrigerant flow during cooling and heating modes.

### ***HOW do I install the MYSTICCOOL<sup>®</sup>MAX Valve System?***

#### **Thermostatic Expansion Valve**

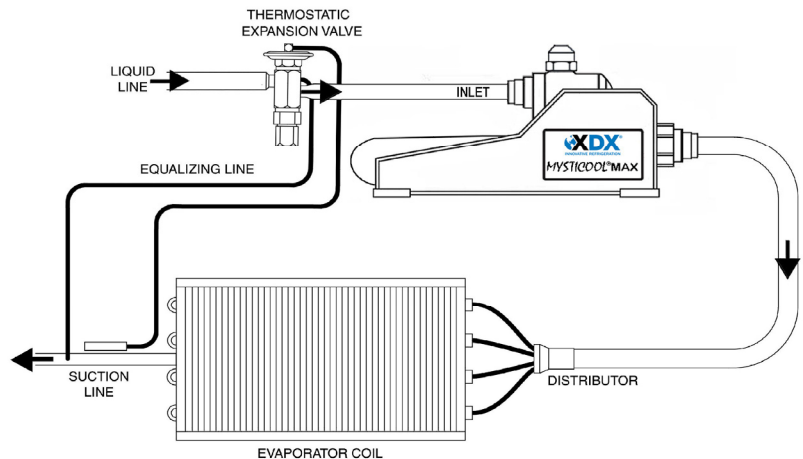
Down-stream of the solenoid valve, install the XDX<sup>®</sup> recommended externally equalized thermostatic expansion valve into the liquid line. When used with A.R.M.E.D.<sup>®</sup>, this should be sized using a 1.5

multiplier based on the evaporator [heat pump system-indoor coil] capacity. Air-conditioning and heat pump systems: confirm that the system is equipped for use with a thermostatic expansion valve.

### MYSTICCOOL®MAX

To install the *MYSTICCOOL®MAX*, remove or drill out completely, any distributor nozzle or orifice that may be installed in the existing distributor.

From the outlet of the thermostatic expansion valve, within 4 inches [10.2 cm], pipe directly into the *MYSTICCOOL®MAX* valve assembly inlet, using reducing couplings as necessary. Insulate this connection, between the thermostatic expansion valve and the *MYSTICCOOL®MAX* valve and then between the *MYSTICCOOL®MAX* valve and the distributor with insulation that has a wall dimension of at least 3/4" [1.9 cm] in thickness. Make sure to support all copper lines connected to the *MYSTICCOOL®MAX* valve to eliminate any stress on the fittings or solder joints. Secure using the supplied mounting brackets.



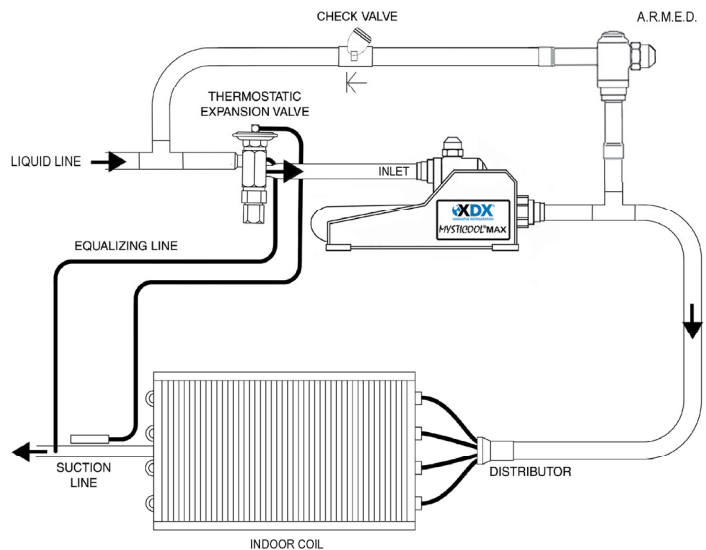
### Heat Pump Optimizer Kit for Heat Pump Systems

Install a bypass loop around the XDX® components as shown in the following diagrams, ensuring that the check valve opposes refrigerant flow in Cool Mode. Install A.R.M.E.D.® upstream of check valve in Heat Mode.

Upon installation of the Heat Pump Optimizer Kit and bypass loop, it will be necessary to make an adjustment to the 4829/5829 [4819] A.R.M.E.D.® valve. The Heat Pump Optimizer A.R.M.E.D.® is initially set to the largest nozzle setting when shipped from the factory. After installation, the A.R.M.E.D.® will be adjusted to the 420 [406] position using the provided gray dog tag. This will be the initial set point, but this 420 [406]

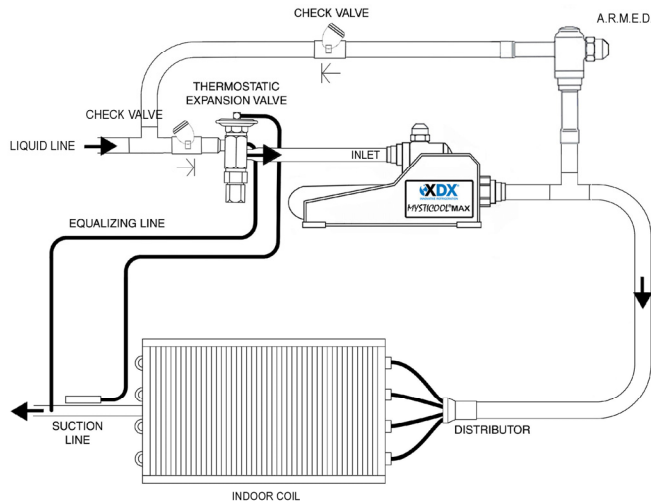
position can be fine tuned during the heat mode operation to maximize indoor coil heat temperature output. When fine tuning the Heat Pump optimizer, always confirm proper compressor amperage and refrigerant pressure performance charts. Proper amp draw can be confirmed by checking the compressor data plate. In order to achieve maximum heat output and maintain compressor amp draw and refrigerant pressures within manufacture's specifications, adjust the A.R.M.E.D.® valve one nozzle setting larger, to the 424 [408]

### **HEAT PUMP COOL MODE OPERATION**



position or a smaller nozzle opening 416 [404]. It will be necessary to monitor temperature rise, compressor amperage and pressure after each adjustment to maintain safe and satisfactory equipment operation. Continue to make adjustments as needed in a counter-clockwise direction to a larger nozzle opening or clockwise direction to a smaller nozzle opening to provide the warmest indoor coil discharge temperature and always ensuring safe and satisfactory compressor and equipment operation.

**HEAT PUMP COOL MODE OPERATION -  
"ERZE" MODEL TXV: SYSTEMS REQUIRE 2 CHECK VALVES**

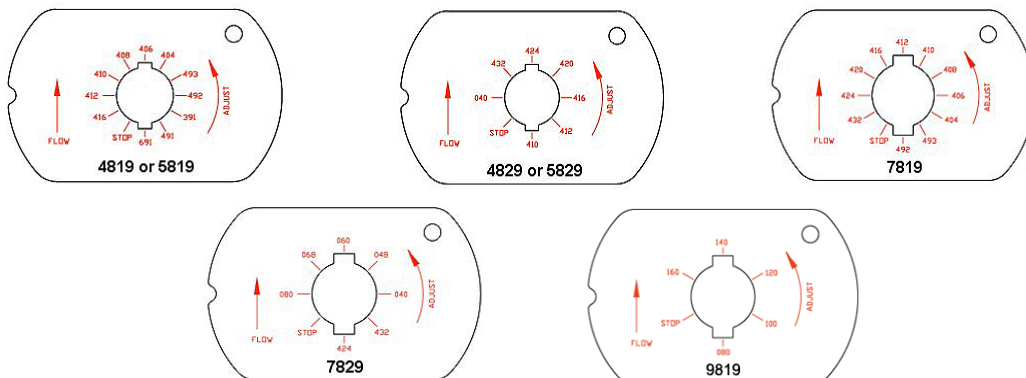


Heat Pump Systems that require an "ERZE" model expansion valve require a 2<sup>nd</sup> check valve. At the indoor coil install the check valve in a horizontal position prior to the new expansion valve, ensuring correct refrigerant flow (see diagram), then install a Sporlan ERZE model thermostatic expansion valve, piped directly (within 4 inches) into the *MYSTICCOOL*<sup>®</sup> MAX Inlet.

**A.R.M.E.D.<sup>®</sup> Technology & A.R.M.E.D.<sup>®</sup> Adjustments**

A.R.M.E.D.<sup>®</sup> is an internal component of the *MYSTICCOOL*<sup>®</sup> MAX valve used to regulate flow through pressure drop. The A.R.M.E.D.<sup>®</sup> is designed with multiple settings for fine-tuning your system. A.R.M.E.D.<sup>®</sup> is accessed by removing the brass cap of the *MYSTICCOOL*<sup>®</sup> MAX valve.

When installing, allow top access for adjustments. Make all necessary adjustments in a counter-clockwise direction. Evacuation of the system is most efficient when the A.R.M.E.D.<sup>®</sup> adjustment indicator is set perpendicular to the inlet pipe.



- Tightening of the A.R.M.E.D.<sup>®</sup> cap is necessary to eliminate refrigerant leakage.
- The "stop" position is not intended for use as a permanent system shut-off valve.



Confirm that you have the appropriate setting and adjust this valve to the proper manufacturer recommended setting, as referenced by the following diagram:

After setting the evaporator [heat pump system-indoor coil] superheat to the lowest possible setting (1-3°F, 0.5-1.5°C), A.R.M.E.D.<sup>®</sup> can be used for fine-tuning the evaporator [heat pump system-indoor coil] performance.

- Monitor the evaporator [heat pump system-indoor coil] coil refrigerant inlet temperature after one pass through the coil. At the same time, monitor the evaporator [heat pump system-indoor coil] coil refrigerant outlet temperature at the expansion valve bulb location. Determine the total evaporator [heat pump system-indoor coil] coil refrigerant temperature difference.

Ideally this difference would be 1-3°F [0.5-1.5°C]. If necessary, adjust A.R.M.E.D.<sup>®</sup> to achieve a closer evaporator [heat pump system-indoor coil] coil temperature difference from inlet to outlet. Typical XDX<sup>®</sup> operation should demonstrate a colder evaporator [heat pump system-indoor coil] outlet temperature as compared to the evaporator [heat pump system-indoor coil] inlet temperature. Adjustments should only require minor changes from the XDX<sup>®</sup> recommended setting, usually only one position up or down. This adjustment should reflect good refrigerant feed at the inlet to the evaporator [heat pump system-indoor coil] coil.

- To achieve a more accurate refrigerant quality reference, utilize the pressure port at the evaporator coil inlet [heat pump system-indoor coil inlet] and relate this to the actual inlet temperature.
- Evaporator [heat pump system-indoor coil] superheat will need to be reconfirmed and possibly readjusted after these changes are made.
- If outside the evaporator [heat pump system-indoor coil] housing, insulate all components between the thermostatic expansion valve and the evaporator [heat pump system-indoor coil]. Insulation with a wall dimension of at least ¾" (1.9 cm) in thickness should be used.

#### Evaporator [Heat Pump System-Indoor Coil] Inlet Line (EIL)

From the outlet of the *MYSTICCOOL*<sup>®</sup>MAX valve, pipe about 18 inches [45.7 cm] or less of copper directly into the inlet of the distributor. Use the same OD size copper as the distributor inlet. This is the Evaporator [heat pump system-indoor coil] Inlet Line (EIL). Contact XDX<sup>®</sup> for lengths that vary from this recommended dimension. XDX<sup>®</sup> recommends using only soft copper and no pre-bent elbows. No linear deduction is necessary for bent elbows using soft copper. Use reducing couplings, as necessary, to connect to the *MYSTICCOOL*<sup>®</sup>MAX valve, the distributor assembly, or the evaporator [heat pump system-indoor coil] inlet.

- If outside of the evaporator [heat pump system-indoor coil] housing, insulate from the outlet of the XDX<sup>®</sup> valve to the inlet of the evaporator [heat pump system-indoor coil]. Insulation with a wall dimension of at least ¾ inch [1.9 cm] in thickness should be used.

#### Solenoid (Optional)

Certain air-conditioning systems may require wiring of a solenoid into a system or circuit thermostat device and utilized for pump-down operation or refrigerant flow stoppage during the off-cycle. Install into the liquid line, prior to any thermostatic expansion valve, a system or circuit solenoid valve sized for the proper capacity. The solenoid valve may be located anywhere along the liquid line, down-stream from the condenser or receiver where one is present.

#### TXV Power Head

HVAC: Attach the thermostatic expansion valve bulb on a horizontal section of suction line at the outlet of the evaporator [heat pump system-indoor coil], or on the adjacent suction line if the *MYSTICCOOL*<sup>®</sup>MAX valve is mounted at a different location in the system. The bulb should be mounted at either the 4 or 8 o'clock



position on the side of the horizontal line. Never mount the bulb near or after any oil trap. Confirm that there is good contact between the bulb and the suction line and use two straps to secure it in place. Check to make sure that a CP100/180 or air-conditioning application power head is being used.

High Temperature-HVAC      45°F (7.2°C) SST or higher      “CP100/180” charge

REFRIGERATION: Attach the thermostatic expansion valve bulb on a horizontal section of suction line at the outlet of the evaporator, or on the adjacent suction line. The bulb should be mounted at either the 4 or 8 o’clock position on the side of the horizontal line. Never mount the bulb near or after any oil trap. Confirm that there is good contact between the bulb and the suction line and use two straps to secure it in place. Check to make sure that the proper power head is being used:

High Temperature	40°F (4.4°C) SST or higher	“C” charge
Medium Temperature	10°F to 39.9°F [-12°C to 4.3°C] SST	“C” charge
Low Temperature	Below 10°F [-12°C] SST	“Z” or “ZP” charge

Equalizing Line

At the outlet of the evaporator [heat pump system-indoor coil], immediately down-stream of the bulb, install the thermostatic expansion valve external equalizing line to the suction line. If the MYSTICOOL®MAX valve is mounted at a different location in the system, install equalizing line on the adjacent suction line. The thermostatic expansion valve will not function if this line is not connected or if this line is capped.

**HOW do I adjust the MYSTICOOL®MAX Valve System?**

The MYSTICOOL®MAX valve system is fine tuned by gradually adjusting the superheat of the thermostatic expansion valve using the pressure-temperature method (the temperature difference method of checking superheat is not recommended or endorsed by XDX®). Target evaporator [heat pump system-indoor coil] superheat is between 1-3°F [0.5-1.5°C], without compromising the compressor superheat requirements. These recommendations are usually at least 10°F [5.5°C] to 15°F [8.3°C] superheat, at the compressor, for air conditioning systems.

- If system is close coupled to the condensing unit and suction line run from the outlet of the evaporator [heat pump system-indoor coil] to the compressor is less than 10 feet [3.048 meters], a minimum compressor superheat of 10°F [5.5°C] is required.
- If system has a remote condensing unit and suction line run from the outlet of the evaporator [heat pump system-indoor coil] to the compressor is greater than 10 feet [3.048 meters], a minimum compressor superheat of 15°F [8.3°C] is required.

Checking correct “Superheat”-

1. Determine the temperature of the suction line at the bulb location.
2. Determine the pressure of the suction line at the bulb location or the evaporator [heat pump system-indoor coil] outlet. (Achieve this by either measuring the pressure at that location directly or by measuring the pressure at the compressor suction valve and adding the determined pressure drop back to the evaporator [heat pump system-indoor coil].)
3. Convert the pressure determined in step 2 to the saturated evaporator [heat pump system-indoor coil] temperature by using a pressure-temperature chart for the appropriate refrigerant.
4. The difference of the temperatures in step 1 and 3 is the superheat.
  - The temperature difference method of checking superheat, while acceptable to some manufacturers, is not recommended or endorsed by XDX®, although it can be used as a method for checking evaporator [heat pump system-indoor coil] coil performance.

The reduction of superheat is accomplished by turning the expansion valve adjusting stem in a counter-clockwise direction. The increase of superheat is accomplished by turning the expansion valve adjusting stem in a clockwise direction. After adjustment, allow at least thirty minutes for stabilization of flow. A maximum of one turn of the expansion valve should be adjusted at a time to closely observe any change and to prevent over-shooting the desired setting.

Some system factors that can affect the necessary thermostatic expansion valve adjustment are:

- Compressor and evaporator [heat pump system-indoor coil] balance
- Capacity of system condenser
- System installation with multiple evaporators [heat pump system-indoor coil]
- Expansion valve bulb location
- Head pressure variance due to extreme ambient change

### **HOW should I adjust the defrost periods and what can I expect?**

Due to the increased capacity of the evaporator coil, the defrost cycles will, in most cases, be able to be reduced from their conventional settings. The best way to accomplish this is by a gradual reduction of defrost frequencies. Initially, leave the defrost cycles as they were conventionally and allow for stabilization of the system after start-up. Monitor operation before the first couple of defrost cycles and visually note if there is a need for that specific defrost period. Then gradually eliminate defrost cycles until the need to defrost is satisfied by the least number of defrost cycles in a twenty-four hour period.

Normally this will be twenty-five to fifty percent of the defrost time that is usually necessary in the conventional operation. Note that the reduction of defrost cycles is based on many system and surrounding factors, so that there can be no guarantee as to specific defrost reduction or the quantity of defrost cycles necessary.

### **WHAT are some of the precautions?**

1. Confirmation of the proper refrigerant level is mandatory prior to making any adjustments.
2. Always mount the *MYSTICOOL*<sup>®</sup>MAX valve in a horizontal position with the arrow stamped on the side of the body and the brass cap up.
3. If the *MYSTICOOL*<sup>®</sup>MAX valve is mounted outside the evaporator [heat pump system-indoor coil] housing, ensure valve and piping is installed in such a manner that allows regular cleanings. Make sure valve is not flush against a wall or hidden behind the evaporator [heat pump system-indoor coil]. Always use the included insulation jacket.
4. Wrap all system components with a wet rag when soldering to protect the *MYSTICOOL*<sup>®</sup>MAX valve from damage. Excessive heat will void the manufacturer's warranty.
5. Mount the *MYSTICOOL*<sup>®</sup>MAX valve with at least two straps or secure to a firm base at the time of installation.
6. Avoid mounting XDX<sup>®</sup> components where repairs or maintenance may require the removal of equipment parts.
7. Acid in the system needs to be controlled, as acid and contaminants can cause damage to internal seals.
8. Contaminants, moisture, and oil can commonly cause irregularity or failure of any thermostatic expansion valve. Erratic system feed is often related to the performance of the thermostatic expansion valve.
9. Due to the benefit of increased refrigerant flow and improved oil return, monitoring oil level is necessary.
10. Filter drier pressure drop should be monitored to confirm that it never exceeds 2 PSI [.14 BAR].



11. Evacuate the entire system using the triple evacuation method.
12. For optimal operation, the *MYSTICOOL*<sup>®</sup>MAX valve should be positioned at the same height or higher than the evaporator [heat pump system-indoor coil](s) in that same system.
13. Never adjust the thermostatic expansion valve without monitoring for proper superheat.
14. Due to system parameters, actual performance may vary.
15. Do not alter any of the XDX<sup>®</sup> system components. Alteration will void warranty.

#### **WHAT can you tell me about piping and soldering?**

The *MYSTICOOL*<sup>®</sup>MAX valve system may be installed using any of the commonly acceptable solders. Always disassemble individual components as necessary, direct the flame away from the system components, and wrap a wet rag around them to eliminate excessive heat build-up when soldering. Follow good soldering practices including cleaning copper connections thoroughly, removing burrs from any pieces of cut copper, and purging copper lines with nitrogen during brazing.

Use ACR grade copper tubing and keep it dry and clean. Use only long radius elbows. Install all components in accordance with local and national codes and in conformance with good refrigeration practice for proper system operation.

The suction line must be sized for a high enough refrigerant velocity to assure proper oil return and with a low enough pressure drop to prevent system capacity decrease. The recommended suction line pressure drop should not exceed 2 PSI [.14 BAR]. Suction line risers should have an oil trap at the bottom and at ten-foot [3.0 meter] intervals up the riser. Risers should never exceed the horizontal run in diameter.

Liquid lines must be sized in accordance with system capacity requirements. Over or under sizing the liquid line can result in excessive flash gas or greater than necessary refrigerant charge. Liquid sub-cooling will affect system performance and should be addressed at the time of the *MYSTICOOL*<sup>®</sup>MAX valve installation.

---

**WHAT do I do when these problems occurs?**

---

<b>PROBLEM</b>	<b>POSSIBLE CAUSES OR REMEDY</b>
Refrigerant will not feed through the <i>MYSTICCOOL</i> <sup>®</sup> MAX Valve	Moisture in system Low refrigerant charge Bad power head on TX valve Low side restriction Undersized TX valve Improper superheat setting
Erratic or “hunting” Expansion Valve	Oversized TX valve Poor TX valve bulb location Improper superheat setting Low refrigerant charge Too much liquid sub-cooling
Continued excessive frost buildup on the evaporator coil	Too few defrost cycles Unit not cycling properly Thermostat setting too low Defective defrost timer
Excessive buildup of frost onto the suction line and compressor service valve	Improper superheat setting Confirm compressor superheat
Case or Box temperatures too high	Thermostat set too high Low refrigerant charge Improper superheat setting Iced evaporator

---

**WHAT should I do if something is damaged in shipment?**

Notify your local carrier office immediately and request inspection. Record model and serial number then contact XDX<sup>®</sup> shipping department for assistance or replacement of damaged merchandise.

**WHAT can I expect for warranty claims?**

XDX<sup>®</sup> warrants, to its direct purchasers that all products manufactured by XDX<sup>®</sup> shall be free of all defects, in material or workmanship, under normal use and service for a period of one (1) year from the date of purchase.

While these installation instructions reference the installation of the *MYSTICCOOL*<sup>®</sup>MAX valve assembly adjacent to the evaporator the system needs to include either a remote condenser or a sub-cooling circuit downstream of the condenser outlet, if the *MYSTICCOOL*<sup>®</sup>MAX valve assembly is located substantially close to the condenser.