



## **MYSTICCOOL Max<sup>®</sup> Valve System with Xstream<sup>®</sup> and A.R.M.E.D.<sup>®</sup> Technology**

### **Service & Installation Instructions**

#### **Page 1**

- **WHY should I install the MYSTICCOOL Max<sup>®</sup> Valve System?**

- XDX<sup>®</sup> is more efficient, saving on power consumption.
- XDX<sup>®</sup> system decreases defrost cycles.
- XDX<sup>®</sup> maintains more consistent temperatures.
- Total system capacity is increased when using XDX<sup>®</sup>.
- XDX<sup>®</sup> helps maintain higher humidity levels (in refrigeration applications)

- **WHAT is the MYSTICCOOL Max<sup>®</sup> Valve System?**

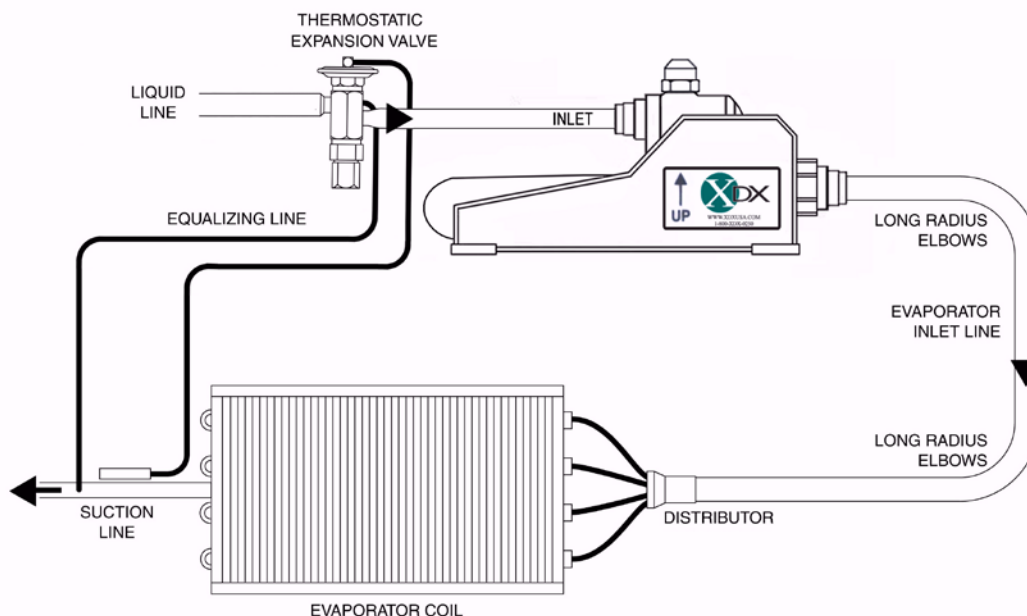
The MYSTICCOOL Max<sup>®</sup> valve is a multi-functional valve that changes the characteristics of the refrigerant flow pattern through the evaporator. This valve can be installed close to the evaporator, adjacent to the rack, or inside the condensing unit on any direct expansion cooling system. MYSTICCOOL Max<sup>®</sup> 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 Max<sup>®</sup> Valve System?**

The component list consists of the MYSTICCOOL Max<sup>®</sup> valve and a Thermostatic Expansion valve.

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

1. MYSTICCOOL Max<sup>®</sup> valve- A casted static refrigerant valve which, by design, changes the consistency of the refrigerant flow into the evaporator and regulates flow, creates pressure drop, and corrects the inaccuracy of the TXV.
2. Thermostatic Expansion Valve- Regulates and controls the feed of refrigerant through the system.



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• **HOW do I install the MYSTICCOOL Max<sup>®</sup> 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 capacity.

MYSTICCOOL Max<sup>®</sup>

To install the MYSTICCOOL Max<sup>®</sup>, remove or drill out completely, any distributor nozzle or orifice that may be installed in the existing distributor. Within four inches of the outlet of the thermostatic expansion valve, install the MYSTICCOOL Max<sup>®</sup> valve by piping from the thermal expansion valve outlet into the MYSTICCOOL Max<sup>®</sup> valve inlet. The directional arrow on the side of each device and the “inlet” sticker will confirm that it is installed in the proper direction. Secure using the supplied mounting brackets.

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

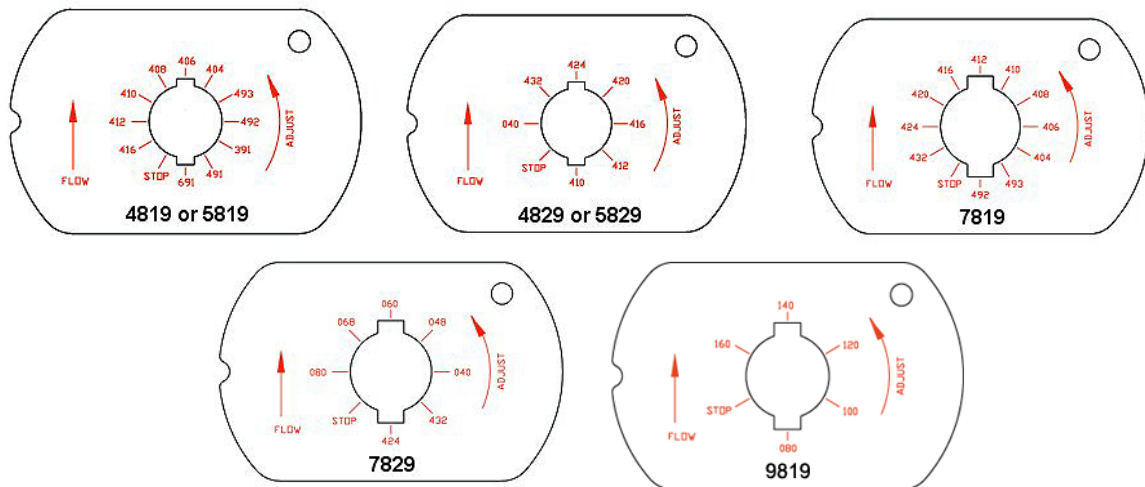
A.R.M.E.D.<sup>®</sup> is an internal component of the MYSTICCOOL Max<sup>®</sup> valve used to regulate flow through pressure drop and is designed with multiple settings for fine-tuning your system. A.R.M.E.D.<sup>®</sup> is accessed by removing the brass cap of the MYSTICCOOL Max<sup>®</sup> valve.

The A.R.M.E.D.<sup>®</sup> currently comes with multiple nozzle openings. 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 nozzle and adjust this valve to the proper manufacturer recommended setting, as referenced by the following diagram:





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After setting the evaporator superheat to the lowest possible setting (1-3 degrees), A.R.M.E.D.<sup>®</sup> can be used for fine-tuning the evaporator performance.

*\*Monitor the evaporator coil refrigerant temperature inlet after one pass through the coil. At the same time, monitor the evaporator coil refrigerant temperature outlet at the expansion valve bulb location. Determine the total evaporator coil refrigerant temperature difference.*

Ideally this difference would be two to four degrees Fahrenheit. If necessary, adjust A.R.M.E.D.<sup>®</sup> to achieve a closer evaporator coil temperature difference from inlet to outlet. Typical XDX<sup>®</sup> operation should demonstrate a colder evaporator outlet temperature as compared to the evaporator 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 coil.

*\*To achieve a more accurate refrigerant quality reference, utilize the pressure port at the evaporator coil inlet and relate this to the actual inlet temperature.*

*\*\*Evaporator Superheat will need to be reconfirmed and possibly readjusted after these changes are made.*

*\*\*\* If outside the evaporator housing, insulate all components between the thermostatic expansion valve and the MYSTICOOL Max<sup>®</sup> valve. Insulation with a wall dimension of at least ¾ of an inch in thickness should be used.*

#### Evaporator Inlet Line (EIL)

From the outlet of the Mysticool Max<sup>®</sup> valve, pipe about eighteen inches 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 Inlet Line (EIL). Contact XDX<sup>®</sup> for lengths that vary from this recommended dimension. XDX 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 Mysticool Max<sup>®</sup> valve, the distributor assembly, or the evaporator inlet.

*\*If outside of the evaporator housing, insulate from the outlet of the XDX valve to the inlet of the evaporator. Insulation with a wall dimension of at least ¾ of an inch in thickness should be used.*

#### TXV Power Head

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 if the MYSTICOOL Max<sup>®</sup> 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 the proper power head is being used:

- |                |                               |                    |
|----------------|-------------------------------|--------------------|
| ▪ High Temp-   | 35 degree SST and higher      | “CPI00” charge     |
| ▪ Medium Temp- | 10 degree SST – 35 degree SST | “C” charge         |
| ▪ Low Temp-    | Below 10 degree SST           | “Z” or “ZP” charge |

#### Equalizing Line

At the outlet of the evaporator, immediately down stream of the bulb, install the thermostatic expansion valve external equalizing line to the suction line. If the MYSTICOOL Max<sup>®</sup> 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.



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#### **HOW do I adjust the MYSTICCOOL Max<sup>®</sup> Valve System?**

The MYSTICCOOL Max<sup>®</sup> 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<sup>®</sup>) Target evaporator superheat is between two and three degrees, without compromising the compressor superheat requirements.

-If system is close coupled to the condensing unit and suction line run from the outlet of the evaporator to the compressor is less than 10 feet, a minimum compressor superheat of 10 degrees Fahrenheit is required.

-If system has a remote condensing unit and suction line run from the outlet of the evaporator to the compressor is greater than 10 feet, a minimum compressor superheat of 15 degrees Fahrenheit 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 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.)
3. Convert the pressure determined in step 2 to the saturated evaporator 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<sup>®</sup>, although it can be used as a method for checking evaporator 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 balance
- Capacity of system condenser
- System installation with multiple evaporators
- 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. 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.*



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

1. Confirmation of the proper refrigerant level is mandatory prior to making any adjustments.
2. Always mount the *MYSTICCOOL Max<sup>®</sup>* valve in a horizontal position with the arrow on the sticker and brass cap up.
3. If *MYSTICCOOL Max* valve is mounted outside the evaporator 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. Always use the included insulation jacket.
4. Wrap all system components with a wet rag when soldering to protect the *MYSTICCOOL Max<sup>®</sup>* valve from damage. Excessive heat will void the manufacturer's warranty.
5. Mount the *MYSTICCOOL Max<sup>®</sup>* valve with at least two straps or secure to a firm base at the time of installation.
6. Do not alter any of the XDX components. Alteration will void the warranty.
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. Be conscious of future maintenance that may be required and attempt to install the XDX components in a manner that allows system components to be replaced without much interference.
11. Suction filter pressure drop should be monitored to confirm that it never exceeds 2 PSI.
12. Evacuate the entire system using the triple evacuation method.
13. For optimal operation, the *MYSTICCOOL Max<sup>®</sup>* valve should be positioned at the same height or higher than the evaporator(s) in that same system.
14. Never open the thermostatic expansion valve without monitoring for proper superheat.
15. Due to system parameters, actual performance may vary.

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

- The *MYSTICCOOL Max<sup>®</sup>* 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. Suction line risers should have an oil trap at the bottom and at ten-foot 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 *MYSTICCOOL Max<sup>®</sup>* valve installation.



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

**Problem**

*Refrigerant will not feed through the  
MYSTICCOOL Max<sup>®</sup> Valve*

**Possible Causes or Remedy**

Moisture in system  
Low refrigerant charge  
Bad power head on TX valve  
Low side restriction  
Undersized TX valve  
Improper superheat setting

*Erratic or “hunting” Thermostatic 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, Box or Room 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.

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