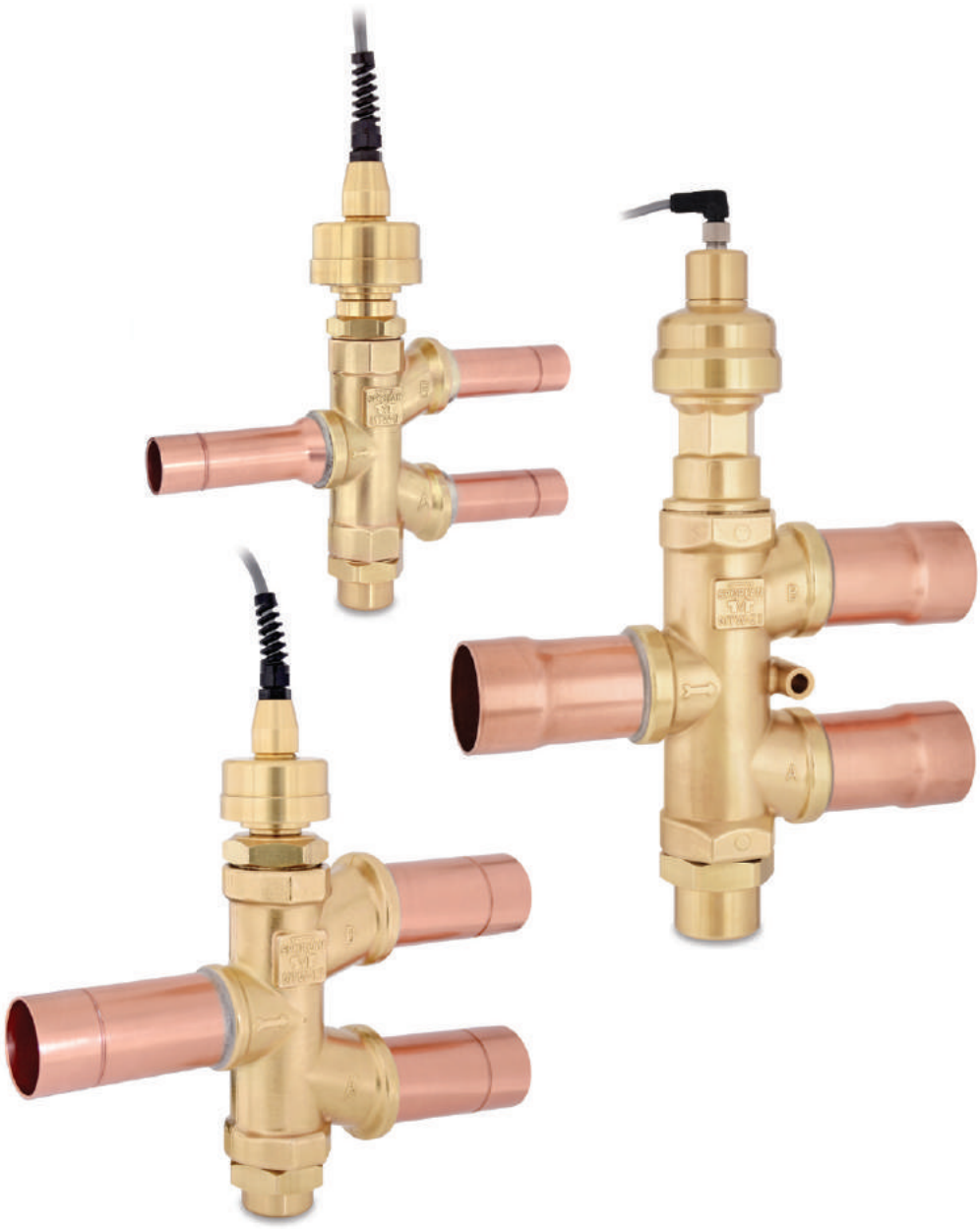
March 2020 / **BULLETIN 100-40-3**

SPORLAN

# Modulating 3-Way Valve

## Types MTW-9S, -17S, -21S



Patents: US 9371920, EP2956697 and other International Patents Pending

Parker

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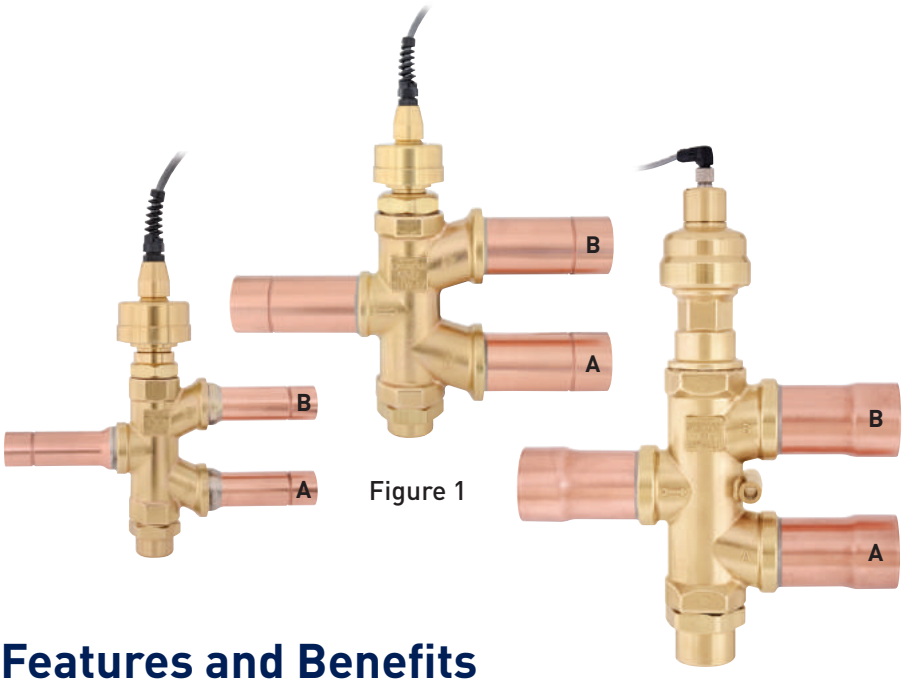
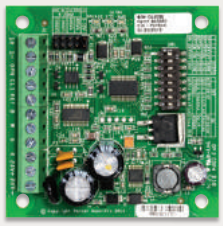



Figure 1

## Compatible Controllers

### IB-G Interface Board

- Simplify MTW control – 0-10 VDC or 4-20 mA
- See Bulletin 100-50-2.1 for more information on the IB-G Interface Board.



### Kelvin II Series

- The temperature and pressure controls allow precise stand-alone control of air temperature or pressure.
- See Bulletin 100-50-5 for more information about the Kelvin II Series Controls.


Temperature Control


Pressure Control

## Features and Benefits

- Improved performance from modulated control
- Reduction in number of modulation valves required per system
  - Simplified system piping enables piping material cost reduction
  - Reduced install time enables labor cost reduction
  - Single actuator reduces control and wiring complexity
- Bi-sealing piston assembly

## Description

The Modulating 3-Way (MTW) valve allows control of refrigerant flow through two outlet ports. Two valve pistons are attached to a connecting rod and also to the stepper motor. As the MTW valve modulates one port opens and the other port closes. The movement of the valve pistons relative to the two ports is inversely proportional.

## Application

The MTW valve is typically located in the discharge line for dehumidification, reheat and heat reclaim applications. Sporlan recommends piping Outlet A to the normal condenser and Outlet B to the reclaim/reheat condenser. Outlet connections A and B are designated on the valve body. See Figure 1.

See capacity tables beginning on page 4. For additional refrigerant capacities and other applications, please contact Sporlan Division technical support.

# Specifications

| SPECIFICATION | MTW-9S and MTW-17S | MTW-21S |
|---|---|---|
| **Motor Type** | Permanent Magnet Bipolar Internal (Wet) Motor | |
| **Compatible Refrigerant** | All Common HCFC, HFC & HFO Refrigerants | |
| **Compatible Oil** | All Common Mineral, Polyolester & Aklylbenzene Oils | |
| **Supply Voltage** | 12 Volts DC ± 10% | 12 Volts DC +5% / -10% |
| **Cable** | Hermetic (20' Standard) | Removable M12 Connection, 20' Standard |
| **Phase Resistance** | 75 Ohms ±10% | 40 Ohms ± 10% |
| **Holding Current** | Not Recommended | |
| **Number of Full Steps** | 6,386 Full Steps | |
| **Step Rate** | 200 Steps per Second (PPS) | |
| **Initialization** | 6,386 Steps Closing | |
| **Overdriving** | Recommended on 10% Overdrive Closed per Day Maximum | |
| **MRP/MAP/MWP** | 700 PSIG (48.3 Barg) | |
| **MOPD** | 700 PSIG (48.3 Barg) | |
| **Maximum Internal Leakage** | 400 CC/Min at 100 PSID (6.9 Bar) Dry Air | |
| **Maximum External Leakage** | 0.10 Oz/yr. at 300 PSIG (2.8 g/year at 20 Bar) | |
| **Maximum Fluid Temperature Range** | -40°F to 240°F (-40°C to 116°C) | |
| **Ambient Temperature Range** | -40°F to 140°F (-40°C to 60°C) | |
| **Installation Maximum Temperature** | 240°F (116°C) for 15 Minutes (Wet Rag Required for Brazing) | |
| **Relative Humidity** | 0-100% (Condensing) | |
| **Mounting Orientation** | Motor Assembly Above Horizontal | |
| **Flow Direction** | Forward Flow Only | |
| **Certification** | UL File: SA5460, CCN: SFJQ2/SFJQ8 (MTW-9S and -17S) | |
| **Clearance to Remove Motor** | 5-1/4" (MTW-9S), 6-3/4" (MTW-17S) | 8-5/8" |
| **Clearance to Remove Bottom Plug** | 2-1/4" (MTW-9S), 2-3/4"( MTW-17S) | 2-5/8" |

# Nomenclature

| MTW | -9(S) | -9 ODF | -20’ | -S |
|---|---|---|---|---|
| Modulating 3-Way Valve | Valve Model (Serviceable) | Fitting Size and Type | Cable Length | Stripped and Tinned Cable Ends |

# Wiring

In normal valve operation direction, 100% open = “A” port closed.

# Product Offering

| PART DESCRIPTION | PART NUMBER |
|---|---|
| **MTW-9S - 9 ODF 20'-S** | 183918 |
| **MTW-9S - 7 ODF 20'-S** | 183919 |
| **MTW-9S - 5 ODF 20'-S** | 183920 |
| **MTW-17S - 17 ODF 20'-S** | 183921 |
| **MTW-17S - 13 ODF 20'-S** | 183922 |
| **MTW-17S - 11 ODF 20'-S** | 183923 |
| **MTW-21S - 21 ODF - M12 20'-S** | 183932 |
| **MTW-21S - 17 ODF - M12 20'-S** | 183831 |
| **MTW-21S - 13 ODF - M12 20'-S** | 183930 |
| **KIT MTW-9S 20'-S** | 183924 |
| **KIT MTW-17S 20'-S** | 183925 |

# Flow Capacity

## Discharge - Tons

| Valve Model | Evaporator Temp (°F) | Refrigerant | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | R-22 | | | | | R-134a | | | | | R-407A | | | | | R-407C | | | | |
| | | Pressure Drop Across Valve (psid) | | | | | | | | | | | | | | | | | | | |
| | | 0.5 | 1 | 3 | 5 | 10 | 0.5 | 1 | 3 | 5 | 10 | 0.5 | 1 | 3 | 5 | 10 | 0.5 | 1 | 3 | 5 | 10 |
| MTW-9S | 40 | 5.0 | 7.0 | 12.1 | 15.7 | 22.3 | 4.3 | 6.0 | 10.5 | 13.6 | 19.4 | 5.0 | 7.1 | 12.2 | 15.8 | 22.5 | 5.1 | 7.2 | 12.4 | 16.0 | 22.8 |
| | 20 | 4.8 | 6.8 | 11.7 | 15.2 | 21.6 | 4.1 | 5.8 | 10.0 | 13.0 | 18.6 | 4.8 | 6.8 | 11.8 | 15.2 | 21.6 | 4.9 | 6.9 | 11.9 | 15.4 | 21.9 |
| | 0 | 4.6 | 6.5 | 11.3 | 14.6 | 20.7 | 3.9 | 5.5 | 9.6 | 12.4 | 17.8 | 4.6 | 6.5 | 11.3 | 14.6 | 20.7 | 4.7 | 6.6 | 11.4 | 14.8 | 21.0 |
| | -20 | 4.4 | 6.3 | 10.8 | 14.0 | 19.9 | 3.7 | 5.3 | 9.1 | 11.8 | 16.9 | 4.4 | 6.2 | 10.8 | 13.9 | 19.8 | 4.5 | 6.3 | 10.9 | 14.1 | 20.1 |
| | -40 | 4.2 | 6.0 | 10.3 | 13.3 | 19.0 | 3.5 | 5.0 | 8.7 | 11.2 | 16.1 | 4.2 | 5.9 | 10.2 | 13.2 | 18.7 | 4.3 | 6.0 | 10.4 | 13.4 | 19.0 |
| MTW-17S | 40 | 9.5 | 13.2 | 22.5 | 28.9 | 40.8 | 8.1 | 11.4 | 19.5 | 25.1 | 35.6 | 9.5 | 13.3 | 22.7 | 29.1 | 41.1 | 9.6 | 13.5 | 23.0 | 29.5 | 41.6 |
| | 20 | 9.1 | 12.8 | 21.8 | 28.0 | 39.5 | 7.8 | 10.9 | 18.7 | 24.1 | 34.1 | 9.2 | 12.8 | 21.8 | 28.0 | 39.5 | 9.3 | 13.0 | 22.1 | 28.4 | 40.1 |
| | 0 | 8.8 | 12.3 | 21.0 | 26.9 | 38.0 | 7.5 | 10.5 | 17.9 | 23.0 | 32.7 | 8.8 | 12.3 | 20.9 | 26.9 | 37.9 | 8.9 | 12.4 | 21.2 | 27.3 | 38.5 |
| | -20 | 8.4 | 11.8 | 20.1 | 25.8 | 36.4 | 7.1 | 10.0 | 17.0 | 21.9 | 31.1 | 8.4 | 11.7 | 19.9 | 25.6 | 36.1 | 8.5 | 11.9 | 20.3 | 26.0 | 36.7 |
| | -40 | 8.0 | 11.2 | 19.2 | 24.6 | 34.7 | 6.7 | 9.4 | 16.1 | 20.8 | 29.5 | 7.9 | 11.1 | 18.9 | 24.3 | 34.2 | 8.1 | 11.3 | 19.2 | 24.7 | 34.9 |
| MTW-21S | 40 | 19.3 | 25.7 | 40.7 | 50.4 | 67.7 | 16.8 | 22.5 | 35.6 | 44.3 | 59.8 | 19.2 | 25.6 | 40.5 | 50.2 | 67.5 | 19.6 | 26.1 | 41.3 | 51.3 | 68.9 |
| | 20 | 18.7 | 24.9 | 39.4 | 48.8 | 65.6 | 16.2 | 21.6 | 34.2 | 42.5 | 57.5 | 18.5 | 24.7 | 39.0 | 48.4 | 65.0 | 18.9 | 25.2 | 39.9 | 49.5 | 66.5 |
| | 0 | 18.0 | 24.0 | 38.0 | 47.1 | 63.2 | 15.5 | 20.7 | 32.8 | 40.7 | 55.0 | 17.7 | 23.7 | 37.4 | 46.4 | 62.4 | 18.2 | 24.2 | 38.3 | 47.5 | 63.9 |
| | -20 | 17.3 | 23.1 | 36.5 | 45.2 | 60.7 | 14.8 | 19.7 | 31.2 | 38.8 | 52.4 | 16.9 | 22.6 | 35.7 | 44.3 | 59.5 | 17.4 | 23.2 | 36.6 | 45.4 | 61.0 |
| | -40 | 16.5 | 22.1 | 34.9 | 43.2 | 58.1 | 14.0 | 18.7 | 29.6 | 36.8 | 49.7 | 16.1 | 21.5 | 34.0 | 42.1 | 56.6 | 16.5 | 22.0 | 34.8 | 43.2 | 58.1 |

| Valve Model | Evaporator Temp (°F) | Refrigerant | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | R-407F | | | | | R-404A | | | | | R-507A | | | | | R-410A | | | | |
| | | Pressure Drop Across Valve (psid) | | | | | | | | | | | | | | | | | | | |
| | | 0.5 | 1 | 3 | 5 | 10 | 0.5 | 1 | 3 | 5 | 10 | 0.5 | 1 | 3 | 5 | 10 | 0.5 | 1 | 3 | 5 | 10 |
| MTW-9S | 40 | 5.3 | 7.5 | 13.0 | 16.8 | 23.9 | 4.7 | 6.6 | 11.4 | 14.8 | 21.0 | 4.7 | 6.6 | 11.4 | 14.7 | 20.9 | 6.2 | 8.7 | 15.0 | 19.4 | 27.5 |
| | 20 | 5.2 | 7.3 | 12.6 | 16.2 | 23.1 | 4.5 | 6.3 | 11.0 | 14.1 | 20.1 | 4.5 | 6.3 | 10.9 | 14.1 | 20.1 | 6.0 | 8.5 | 14.6 | 18.8 | 26.7 |
| | 0 | 5.0 | 7.0 | 12.1 | 15.6 | 22.1 | 4.3 | 6.0 | 10.4 | 13.5 | 19.2 | 4.3 | 6.0 | 10.4 | 13.5 | 19.1 | 5.8 | 8.2 | 14.1 | 18.2 | 25.7 |
| | -20 | 4.7 | 6.7 | 11.5 | 14.9 | 21.1 | 4.1 | 5.7 | 9.9 | 12.8 | 18.2 | 4.1 | 5.7 | 9.9 | 12.7 | 18.1 | 5.6 | 7.8 | 13.5 | 17.4 | 24.7 |
| | -40 | 4.5 | 6.3 | 10.9 | 14.1 | 20.1 | 3.8 | 5.4 | 9.3 | 12.0 | 17.1 | 3.8 | 5.4 | 9.3 | 12.0 | 17.1 | 5.3 | 7.5 | 12.9 | 16.6 | 23.6 |
| MTW-17S | 40 | 10.1 | 14.2 | 24.1 | 31.0 | 43.7 | 8.9 | 12.4 | 21.1 | 27.1 | 38.2 | 8.8 | 12.4 | 21.1 | 27.0 | 38.1 | 11.7 | 16.3 | 27.8 | 35.6 | 50.1 |
| | 20 | 9.8 | 13.7 | 23.3 | 29.9 | 42.1 | 8.5 | 11.9 | 20.2 | 26.0 | 36.6 | 8.5 | 11.8 | 20.2 | 25.9 | 36.5 | 11.3 | 15.8 | 27.0 | 34.6 | 48.6 |
| | 0 | 9.4 | 13.1 | 22.4 | 28.7 | 40.5 | 8.1 | 11.3 | 19.3 | 24.8 | 34.9 | 8.1 | 11.3 | 19.2 | 24.7 | 34.8 | 10.9 | 15.3 | 26.0 | 33.4 | 46.9 |
| | -20 | 9.0 | 12.5 | 21.4 | 27.4 | 38.7 | 7.7 | 10.7 | 18.3 | 23.5 | 33.1 | 7.7 | 10.7 | 18.2 | 23.4 | 33.0 | 10.5 | 14.7 | 25.0 | 32.1 | 45.1 |
| | -40 | 8.5 | 11.9 | 20.3 | 26.1 | 36.8 | 7.2 | 10.1 | 17.2 | 22.1 | 31.2 | 7.2 | 10.1 | 17.2 | 22.0 | 31.1 | 10.0 | 14.0 | 23.9 | 30.6 | 43.1 |
| MTW-21S | 40 | 20.5 | 27.4 | 43.3 | 53.7 | 72.1 | 17.6 | 23.5 | 37.1 | 46.0 | 61.7 | 17.5 | 23.3 | 36.9 | 45.7 | 61.4 | 23.3 | 31.1 | 49.1 | 60.7 | 81.4 |
| | 20 | 19.8 | 26.5 | 41.8 | 51.8 | 69.6 | 16.9 | 22.5 | 35.6 | 44.1 | 59.2 | 16.8 | 22.4 | 35.4 | 43.8 | 58.9 | 22.6 | 30.2 | 47.7 | 59.1 | 79.1 |
| | 0 | 19.1 | 25.4 | 40.2 | 49.9 | 67.0 | 16.1 | 21.5 | 33.9 | 42.1 | 56.5 | 16.0 | 21.3 | 33.7 | 41.8 | 56.1 | 21.9 | 29.2 | 46.1 | 57.1 | 76.5 |
| | -20 | 18.3 | 24.4 | 38.5 | 47.7 | 64.1 | 15.3 | 20.4 | 32.2 | 39.9 | 53.6 | 15.2 | 20.2 | 32.0 | 39.6 | 53.2 | 21.1 | 28.1 | 44.4 | 55.0 | 73.7 |
| | -40 | 17.4 | 23.2 | 36.7 | 45.5 | 61.1 | 14.4 | 19.2 | 30.4 | 37.6 | 50.6 | 14.3 | 19.1 | 30.1 | 37.4 | 50.2 | 20.2 | 26.9 | 42.5 | 52.7 | 70.6 |

Capacities based upon 100°F condensing temperature, 60°F liquid entering expansion valve, isentropic compression plus 50°F, evaporator temperature as shown plus 25°F superheat suction gas. Reference the table below for liquid correction factors.

# Correction Factors

## Discharge and Suction Applications - (°F)

| REFRIGERANT | Liquid Temperature Entering Expansion Valve (°F) | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | 0° | 10° | 20° | 30° | 40° | 50° | 60° | 70° | 80° | 90° | 100° |
| | Correction Factor, CF Liquid Temperature | | | | | | | | | | |
| R-22 | 1.22 | 1.18 | 1.15 | 1.11 | 1.07 | 1.04 | 1.0 | 0.96 | 0.92 | 0.88 | 0.84 |
| R-134a | 1.27 | 1.22 | 1.18 | 1.14 | 1.09 | 1.05 | 1.0 | 0.95 | 0.91 | 0.86 | 0.81 |
| R-407A | 1.28 | 1.23 | 1.19 | 1.14 | 1.10 | 1.05 | 1.0 | 0.95 | 0.90 | 0.85 | 0.79 |
| R-407C | 1.26 | 1.22 | 1.18 | 1.13 | 1.09 | 1.05 | 1.0 | 0.95 | 0.91 | 0.86 | 0.81 |
| R-407F | 1.26 | 1.22 | 1.18 | 1.13 | 1.09 | 1.05 | 1.0 | 0.95 | 0.91 | 0.86 | 0.81 |
| R-404A | 1.34 | 1.29 | 1.23 | 1.17 | 1.12 | 1.06 | 1.0 | 0.94 | 0.88 | 0.81 | 0.74 |
| R-507A | 1.35 | 1.29 | 1.24 | 1.18 | 1.12 | 1.06 | 1.0 | 0.94 | 0.87 | 0.81 | 0.74 |
| R-410A | 1.26 | 1.22 | 1.18 | 1.13 | 1.09 | 1.05 | 1.0 | 0.95 | 0.90 | 0.85 | 0.80 |

These correction factors correct for net refrigerating effect and are based on an evaporator temperature of 0°F (-15°C), however they may be used for any evaporator temperature because the variation in the factors across the range is insignificant.

# Flow Capacity

## Discharge - kW

| Valve Model | Evaporator Temp (°C) | Refrigerant | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | R-22 | | | | | R-134a | | | | | R-407A | | | | | R-407C | | | | |
| | | Pressure Drop Across Valve (bar) | | | | | | | | | | | | | | | | | | | |
| | | 0.03 | 0.06 | 0.2 | 0.4 | 0.7 | 0.03 | 0.06 | 0.2 | 0.4 | 0.7 | 0.03 | 0.06 | 0.2 | 0.4 | 0.7 | 0.03 | 0.06 | 0.2 | 0.4 | 0.7 |
| MTW-9 | 5 | 15.0 | 21.1 | 38.4 | 54.5 | 72.5 | 12.8 | 18.0 | 32.9 | 46.9 | 62.7 | 15.0 | 21.1 | 38.5 | 54.5 | 72.5 | 15.2 | 21.4 | 39.0 | 55.2 | 73.5 |
| | -5 | 14.6 | 20.5 | 37.3 | 52.9 | 70.4 | 12.4 | 17.4 | 31.8 | 45.2 | 60.5 | 14.5 | 20.5 | 37.2 | 52.8 | 70.2 | 14.7 | 20.7 | 37.7 | 53.5 | 71.2 |
| | -15 | 14.1 | 19.9 | 36.1 | 51.2 | 68.2 | 11.9 | 16.8 | 30.6 | 43.5 | 58.2 | 14.0 | 19.7 | 35.9 | 50.9 | 67.7 | 14.2 | 20.0 | 36.4 | 51.6 | 68.7 |
| | -25 | 13.6 | 19.2 | 34.9 | 49.4 | 65.8 | 11.4 | 16.1 | 29.3 | 41.7 | 55.8 | 13.4 | 18.9 | 34.5 | 48.9 | 65.0 | 13.6 | 19.2 | 35.0 | 49.6 | 66.1 |
| | -35 | 13.1 | 18.4 | 33.5 | 47.5 | 63.3 | 10.9 | 15.3 | 28.0 | 39.9 | 53.3 | 12.9 | 18.1 | 33.0 | 46.7 | 62.2 | 13.1 | 18.4 | 33.5 | 47.5 | 63.3 |
| MTW-17 | 5 | 28.5 | 39.9 | 71.6 | 101 | 133 | 24.4 | 34.2 | 61.5 | 86.7 | 115 | 28.5 | 39.9 | 71.5 | 100 | 133 | 28.9 | 40.4 | 72.5 | 102 | 135 |
| | -5 | 27.7 | 38.8 | 69.5 | 97.7 | 129 | 23.6 | 33.0 | 59.4 | 83.7 | 111 | 27.6 | 38.6 | 69.2 | 97.2 | 129 | 28.0 | 39.1 | 70.2 | 98.7 | 131 |
| | -15 | 26.9 | 37.5 | 67.3 | 94.6 | 125 | 22.7 | 31.7 | 57.1 | 80.6 | 107 | 26.6 | 37.2 | 66.8 | 93.8 | 124 | 27.0 | 37.8 | 67.8 | 95.3 | 126 |
| | -25 | 25.9 | 36.2 | 65.0 | 91.3 | 121 | 21.8 | 30.4 | 54.8 | 77.2 | 103 | 25.6 | 35.8 | 64.1 | 90.1 | 119 | 26.0 | 36.3 | 65.2 | 91.6 | 121 |
| | -35 | 24.9 | 34.8 | 62.5 | 87.8 | 116 | 20.8 | 29.1 | 52.3 | 73.8 | 98.1 | 24.5 | 34.2 | 61.4 | 86.2 | 114 | 24.9 | 34.8 | 62.5 | 87.8 | 116 |
| MTW-21S | 5 | 59.5 | 79.3 | 131 | 176 | 223 | 51.8 | 69.0 | 114 | 154 | 196 | 58.9 | 78.5 | 130 | 174 | 221 | 60.2 | 80.3 | 133 | 178 | 226 |
| | -5 | 57.9 | 77.1 | 127 | 171 | 217 | 50.0 | 66.7 | 110 | 148 | 189 | 57.1 | 76.1 | 126 | 168 | 214 | 58.4 | 77.8 | 129 | 172 | 219 |
| | -15 | 56.1 | 74.8 | 124 | 166 | 210 | 48.1 | 64.2 | 106 | 143 | 182 | 55.1 | 73.4 | 121 | 163 | 207 | 56.4 | 75.2 | 124 | 167 | 212 |
| | -25 | 54.2 | 72.3 | 120 | 160 | 203 | 46.2 | 61.6 | 102 | 137 | 175 | 53.0 | 70.6 | 117 | 156 | 199 | 54.3 | 72.4 | 120 | 160 | 204 |
| | -35 | 52.3 | 69.7 | 115 | 154 | 196 | 44.1 | 58.9 | 97.5 | 131 | 167 | 50.7 | 67.7 | 112 | 150 | 190 | 52.1 | 69.5 | 115 | 154 | 196 |

| Valve Model | Evaporator Temp (°C) | Refrigerant | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | R-407F | | | | | R-404A | | | | | R-507A | | | | | R-410A | | | | |
| | | Pressure Drop Across Valve (bar) | | | | | | | | | | | | | | | | | | | |
| | | 0.03 | 0.06 | 0.2 | 0.4 | 0.7 | 0.03 | 0.06 | 0.2 | 0.4 | 0.7 | 0.03 | 0.06 | 0.2 | 0.4 | 0.7 | 0.03 | 0.06 | 0.2 | 0.4 | 0.7 |
| MTW-9 | 5 | 16.0 | 22.5 | 41.0 | 58.0 | 77.2 | 13.9 | 19.6 | 35.7 | 50.6 | 67.3 | 13.9 | 19.6 | 35.6 | 50.5 | 67.1 | 18.4 | 26.0 | 47.2 | 66.7 | 88.5 |
| | -5 | 15.5 | 21.8 | 39.7 | 56.3 | 74.9 | 13.4 | 18.9 | 34.5 | 48.8 | 64.9 | 13.4 | 18.9 | 34.4 | 48.7 | 64.7 | 18.0 | 25.3 | 46.1 | 65.1 | 86.4 |
| | -15 | 15.0 | 21.1 | 38.4 | 54.4 | 72.4 | 12.9 | 18.2 | 33.1 | 46.8 | 62.3 | 12.9 | 18.1 | 33.0 | 46.7 | 62.1 | 17.5 | 24.6 | 44.7 | 63.3 | 83.9 |
| | -25 | 14.4 | 20.3 | 37.0 | 52.4 | 69.7 | 12.3 | 17.4 | 31.6 | 44.8 | 59.5 | 12.3 | 17.3 | 31.5 | 44.6 | 59.3 | 16.9 | 23.8 | 43.3 | 61.2 | 81.2 |
| | -35 | 13.8 | 19.5 | 35.5 | 50.2 | 66.8 | 11.7 | 16.5 | 30.1 | 42.6 | 56.6 | 11.7 | 16.5 | 29.9 | 42.4 | 56.4 | 16.3 | 23.0 | 41.7 | 59.0 | 78.2 |
| MTW-17 | 5 | 30.4 | 42.5 | 76.2 | 107 | 141 | 26.4 | 36.9 | 66.2 | 93.0 | 123 | 26.3 | 36.8 | 66.0 | 92.7 | 122 | 35.0 | 48.9 | 87.5 | 123 | 162 |
| | -5 | 29.5 | 41.2 | 73.9 | 104 | 137 | 25.5 | 35.6 | 63.9 | 89.7 | 118 | 25.4 | 35.5 | 63.7 | 89.4 | 118 | 34.1 | 47.7 | 85.4 | 120 | 158 |
| | -15 | 28.5 | 39.8 | 71.5 | 100 | 133 | 24.5 | 34.2 | 61.3 | 86.1 | 114 | 24.4 | 34.1 | 61.1 | 85.8 | 113 | 33.2 | 46.4 | 83.0 | 116 | 153 |
| | -25 | 27.5 | 38.4 | 68.8 | 96.7 | 128 | 23.4 | 32.7 | 58.6 | 82.3 | 109 | 23.3 | 32.6 | 58.4 | 82.0 | 108 | 32.1 | 44.9 | 80.4 | 113 | 148 |
| | -35 | 26.3 | 36.8 | 66.0 | 92.7 | 122 | 22.2 | 31.1 | 55.7 | 78.3 | 103 | 22.1 | 30.9 | 55.5 | 77.9 | 103 | 31.0 | 43.2 | 77.5 | 109 | 143 |
| MTW-21S | 5 | 63.0 | 84.1 | 139 | 186 | 236 | 53.7 | 71.6 | 118 | 158 | 201 | 53.4 | 71.2 | 118 | 157 | 200 | 71.4 | 95.2 | 157 | 210 | 266 |
| | -5 | 61.2 | 81.6 | 135 | 181 | 229 | 51.8 | 69.1 | 114 | 153 | 194 | 51.5 | 68.7 | 113 | 152 | 193 | 69.8 | 93.0 | 153 | 205 | 260 |
| | -15 | 59.2 | 79.0 | 130 | 175 | 222 | 49.8 | 66.4 | 110 | 147 | 186 | 49.5 | 65.9 | 109 | 146 | 185 | 67.9 | 90.5 | 149 | 200 | 253 |
| | -25 | 57.1 | 76.2 | 126 | 168 | 214 | 47.6 | 63.5 | 105 | 140 | 178 | 47.3 | 63.0 | 104 | 139 | 177 | 65.8 | 87.7 | 145 | 194 | 245 |
| | -35 | 54.9 | 73.2 | 121 | 162 | 206 | 45.3 | 60.4 | 99.8 | 134 | 170 | 45.0 | 60.0 | 99.0 | 133 | 168 | 63.5 | 84.7 | 140 | 187 | 237 |

Capacities based upon 35°C condensing temperature, 15°C liquid entering expansion valve, isentropic compression plus 30°C, evaporator temperature as shown plus 15°C superheat suction gas. Reference the table below for liquid correction factors.

# Correction Factors

## Discharge and Suction Applications - (°C)

| REFRIGERANT | Liquid Temperature Entering Expansion Valve (°C) | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | -15° | -10° | -5° | 0° | 5° | 10° | 15° | 20° | 25° | 30° | 35° |
| | Correction Factor, CF Liquid Temperature | | | | | | | | | | |
| R-22 | 1.19 | 1.16 | 1.13 | 1.10 | 1.07 | 1.03 | 1.0 | 0.97 | 0.93 | 0.90 | 0.86 |
| R-134a | 1.24 | 1.20 | 1.16 | 1.12 | 1.08 | 1.04 | 1.0 | 0.96 | 0.92 | 0.87 | 0.83 |
| R-407A | 1.25 | 1.21 | 1.17 | 1.13 | 1.09 | 1.04 | 1.0 | 0.96 | 0.91 | 0.87 | 0.82 |
| R-407C | 1.23 | 1.20 | 1.16 | 1.12 | 1.08 | 1.04 | 1.0 | 0.96 | 0.92 | 0.87 | 0.83 |
| R-407F | 1.24 | 1.20 | 1.16 | 1.12 | 1.09 | 1.05 | 1.0 | 0.96 | 0.92 | 0.88 | 0.83 |
| R-404A | 1.30 | 1.25 | 1.20 | 1.15 | 1.10 | 1.05 | 1.0 | 0.95 | 0.89 | 0.83 | 0.77 |
| R-507A | 1.31 | 1.26 | 1.21 | 1.16 | 1.11 | 1.05 | 1.0 | 0.94 | 0.89 | 0.83 | 0.77 |
| R-410A | 1.23 | 1.20 | 1.16 | 1.12 | 1.08 | 1.04 | 1.0 | 0.96 | 0.92 | 0.87 | 0.83 |

These correction factors correct for net refrigerating effect and are based on an evaporator temperature of 0°F (-15°C), however they may be used for any evaporator temperature because the variation in the factors across the range is insignificant.

# Flow Capacity

## Suction - Tons

| Valve Model | Evaporator Temp (°F) | Refrigerant | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | R-22 | | | | | R-134a | | | | | R-407A | | | | | R-407C | | | | |
| | | Pressure Drop Across Valve (psid) | | | | | | | | | | | | | | | | | | | |
| | | 0.5 | 1 | 3 | 5 | 10 | 0.5 | 1 | 3 | 5 | 10 | 0.5 | 1 | 3 | 5 | 10 | 0.5 | 1 | 3 | 5 | 10 |
| MTW-9S | 40 | 3.5 | 4.9 | 8.5 | 10.9 | 14.8 | 2.8 | 3.9 | 6.8 | 8.4 | 11.2 | 3.4 | 4.8 | 8.2 | 10.5 | 14.3 | 3.4 | 4.8 | 8.3 | 10.6 | 14.3 |
| | 20 | 2.9 | 4.1 | 7.0 | 9.0 | 11.8 | 2.2 | 3.1 | 5.2 | 6.5 | 8.3 | 2.7 | 3.8 | 6.6 | 8.2 | 11.1 | 2.7 | 3.9 | 6.7 | 8.3 | 11.1 |
| | 0 | 2.3 | 3.3 | 5.7 | 6.9 | 9.1 | 1.7 | 2.4 | 3.9 | 4.8 | 5.7 | 2.2 | 3.0 | 5.2 | 6.3 | 8.3 | 2.2 | 3.1 | 5.1 | 6.3 | 8.2 |
| | -20 | 1.8 | 2.6 | 4.2 | 5.2 | 6.6 | 1.3 | 1.9 | 2.8 | 3.3 | 3.5 | 1.7 | 2.3 | 3.8 | 4.6 | 5.7 | 1.7 | 2.4 | 3.8 | 4.6 | 5.6 |
| | -40 | 1.4 | 2.0 | 3.1 | 3.7 | 4.2 | 1.0 | 1.3 | 1.8 | 1.9 | 1.9 | 1.2 | 1.8 | 2.7 | 3.2 | 3.4 | 1.3 | 1.8 | 2.7 | 3.1 | 3.3 |
| MTW-17S | 40 | 6.7 | 9.4 | 15.9 | 20.3 | 28.2 | 5.4 | 7.5 | 12.7 | 16.0 | 21.0 | 6.5 | 9.0 | 15.3 | 19.6 | 27.1 | 6.5 | 9.1 | 15.5 | 19.8 | 27.2 |
| | 20 | 5.5 | 7.7 | 13.1 | 16.8 | 22.3 | 4.3 | 6.0 | 9.9 | 12.2 | 15.4 | 5.2 | 7.3 | 12.4 | 15.7 | 20.9 | 5.3 | 7.4 | 12.5 | 15.8 | 20.9 |
| | 0 | 4.5 | 6.3 | 10.7 | 13.1 | 16.9 | 3.4 | 4.7 | 7.4 | 8.9 | 10.2 | 4.2 | 5.8 | 9.8 | 12.0 | 15.3 | 4.2 | 5.9 | 9.7 | 12.0 | 15.2 |
| | -20 | 3.6 | 5.0 | 8.1 | 9.8 | 11.9 | 2.6 | 3.6 | 5.2 | 5.9 | 6.1 | 3.2 | 4.5 | 7.2 | 8.7 | 10.3 | 3.3 | 4.5 | 7.2 | 8.6 | 10.0 |
| | -40 | 2.8 | 3.9 | 5.9 | 6.9 | 7.4 | 1.9 | 2.4 | 3.3 | 3.4 | 3.4 | 2.4 | 3.4 | 5.0 | 5.8 | 6.0 | 2.5 | 3.4 | 5.0 | 5.6 | 5.7 |
| MTW-21S | 40 | 14.3 | 19.1 | 30.1 | 37.2 | 67.0 | 11.8 | 15.7 | 24.7 | 38.2 | 46.8 | 13.8 | 18.4 | 28.9 | 35.7 | 64.4 | 14.0 | 18.7 | 29.5 | 36.4 | 64.1 |
| | 20 | 12.1 | 16.2 | 25.5 | 31.5 | 51.2 | 9.7 | 12.9 | 23.8 | 28.2 | 31.2 | 11.4 | 15.2 | 24.0 | 38.0 | 47.7 | 11.7 | 15.5 | 24.5 | 37.9 | 47.1 |
| | 0 | 10.1 | 13.5 | 21.3 | 30.9 | 36.4 | 7.8 | 10.4 | 17.2 | 19.2 | 19.3 | 9.3 | 12.4 | 19.6 | 28.1 | 32.4 | 9.5 | 12.7 | 23.3 | 27.9 | 31.4 |
| | -20 | 8.3 | 11.1 | 19.1 | 22.1 | 23.2 | 6.2 | 8.2 | 11.3 | 11.4 | 11.4 | 7.5 | 9.9 | 16.8 | 19.2 | 19.7 | 7.6 | 10.1 | 16.7 | 18.7 | 19.0 |
| | -40 | 6.7 | 8.9 | 13.3 | 14.0 | 14.0 | 4.8 | 5.6 | 6.4 | 6.4 | 6.4 | 5.8 | 7.8 | 11.0 | 11.3 | 11.3 | 6.0 | 7.9 | 10.8 | 10.9 | 10.9 |

| Valve Model | Evaporator Temp (°F) | Refrigerant | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | R-407F | | | | | R-404A | | | | | R-507A | | | | | R-410A | | | | |
| | | Pressure Drop Across Valve (psid) | | | | | | | | | | | | | | | | | | | |
| | | 0.5 | 1 | 3 | 5 | 10 | 0.5 | 1 | 3 | 5 | 10 | 0.5 | 1 | 3 | 5 | 10 | 0.5 | 1 | 3 | 5 | 10 |
| MTW-9S | 40 | 3.6 | 5.1 | 8.8 | 11.3 | 15.4 | 3.2 | 4.6 | 7.8 | 10.1 | 13.8 | 3.2 | 4.6 | 7.8 | 10.1 | 13.9 | 4.4 | 6.2 | 10.6 | 13.7 | 19.3 |
| | 20 | 2.9 | 4.1 | 7.1 | 9.2 | 12.0 | 2.6 | 3.7 | 6.3 | 8.1 | 10.9 | 2.6 | 3.7 | 6.3 | 8.2 | 10.9 | 3.6 | 5.1 | 8.8 | 11.3 | 15.4 |
| | 0 | 2.3 | 3.3 | 5.6 | 6.9 | 9.0 | 2.1 | 2.9 | 5.0 | 6.2 | 8.3 | 2.1 | 2.9 | 5.0 | 6.3 | 8.3 | 2.9 | 4.1 | 7.1 | 9.2 | 12.1 |
| | -20 | 1.8 | 2.5 | 4.1 | 5.1 | 6.3 | 1.6 | 2.3 | 3.7 | 4.7 | 5.9 | 1.6 | 2.3 | 3.8 | 4.7 | 6.0 | 2.3 | 3.3 | 5.7 | 6.9 | 9.2 |
| | -40 | 1.4 | 1.9 | 3.0 | 3.5 | 3.9 | 1.2 | 1.7 | 2.7 | 3.3 | 3.9 | 1.2 | 1.7 | 2.8 | 3.4 | 4.0 | 1.8 | 2.6 | 4.2 | 5.2 | 6.5 |
| MTW-17S | 40 | 6.9 | 9.7 | 16.5 | 21.0 | 29.2 | 6.2 | 8.6 | 14.6 | 18.7 | 26.3 | 6.2 | 8.6 | 14.6 | 18.7 | 26.4 | 8.4 | 11.7 | 19.8 | 25.4 | 35.4 |
| | 20 | 5.6 | 7.9 | 13.4 | 17.1 | 22.7 | 5.0 | 7.0 | 11.9 | 15.2 | 20.6 | 5.0 | 7.0 | 11.9 | 15.2 | 20.7 | 6.9 | 9.7 | 16.5 | 21.0 | 29.4 |
| | 0 | 4.5 | 6.3 | 10.7 | 13.1 | 16.8 | 4.0 | 5.6 | 9.5 | 11.8 | 15.5 | 4.0 | 5.6 | 9.5 | 11.9 | 15.6 | 5.7 | 7.9 | 13.4 | 17.2 | 23.0 |
| | -20 | 3.5 | 4.9 | 7.9 | 9.6 | 11.5 | 3.1 | 4.4 | 7.1 | 8.8 | 10.9 | 3.1 | 4.4 | 7.2 | 8.9 | 11.2 | 4.5 | 6.3 | 10.7 | 13.2 | 17.2 |
| | -40 | 2.7 | 3.7 | 5.6 | 6.5 | 6.8 | 2.4 | 3.3 | 5.2 | 6.1 | 6.9 | 2.4 | 3.3 | 5.2 | 6.3 | 7.1 | 3.5 | 4.9 | 7.9 | 9.7 | 11.8 |
| MTW-21S | 40 | 14.8 | 19.8 | 31.1 | 38.5 | 69.7 | 12.9 | 17.2 | 27.0 | 33.4 | 63.1 | 12.8 | 17.1 | 27.0 | 33.3 | 63.6 | 17.5 | 23.3 | 36.7 | 45.4 | 60.5 |
| | 20 | 12.4 | 16.5 | 26.0 | 32.1 | 52.3 | 10.7 | 14.3 | 22.5 | 27.8 | 48.0 | 10.7 | 14.2 | 22.4 | 27.7 | 48.5 | 14.9 | 19.8 | 31.2 | 38.5 | 70.6 |
| | 0 | 10.1 | 13.5 | 21.3 | 30.8 | 36.1 | 8.8 | 11.7 | 18.4 | 28.2 | 34.2 | 8.7 | 11.7 | 18.4 | 28.5 | 34.9 | 12.4 | 16.5 | 26.1 | 32.2 | 53.4 |
| | -20 | 8.2 | 10.9 | 18.6 | 21.3 | 22.1 | 7.0 | 9.4 | 17.1 | 20.1 | 21.9 | 7.0 | 9.4 | 17.3 | 20.5 | 22.6 | 10.2 | 13.6 | 21.4 | 31.3 | 37.4 |
| | -40 | 6.4 | 8.6 | 12.4 | 12.8 | 12.8 | 5.5 | 7.4 | 11.9 | 13.0 | 13.0 | 5.5 | 7.4 | 12.1 | 13.4 | 13.5 | 8.2 | 11.0 | 18.9 | 21.9 | 23.0 |

Capacities based upon 60°F liquid and 25°F superheated vapor. Reference the table below for liquid correction factors..

# Correction Factors

## Discharge and Suction Applications - (°F)

| REFRIGERANT | Liquid Temperature Entering Expansion Valve (°F) | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | 0° | 10° | 20° | 30° | 40° | 50° | 60° | 70° | 80° | 90° | 100° |
| | Correction Factor, CF Liquid Temperature | | | | | | | | | | |
| R-22 | 1.22 | 1.18 | 1.15 | 1.11 | 1.07 | 1.04 | 1.0 | 0.96 | 0.92 | 0.88 | 0.84 |
| R-134a | 1.27 | 1.22 | 1.18 | 1.14 | 1.09 | 1.05 | 1.0 | 0.95 | 0.91 | 0.86 | 0.81 |
| R-407A | 1.28 | 1.23 | 1.19 | 1.14 | 1.10 | 1.05 | 1.0 | 0.95 | 0.90 | 0.85 | 0.79 |
| R-407C | 1.26 | 1.22 | 1.18 | 1.13 | 1.09 | 1.05 | 1.0 | 0.95 | 0.91 | 0.86 | 0.81 |
| R-407F | 1.26 | 1.22 | 1.18 | 1.13 | 1.09 | 1.05 | 1.0 | 0.95 | 0.91 | 0.86 | 0.81 |
| R-404A | 1.34 | 1.29 | 1.23 | 1.17 | 1.12 | 1.06 | 1.0 | 0.94 | 0.88 | 0.81 | 0.74 |
| R-507A | 1.35 | 1.29 | 1.24 | 1.18 | 1.12 | 1.06 | 1.0 | 0.94 | 0.87 | 0.81 | 0.74 |
| R-410A | 1.26 | 1.22 | 1.18 | 1.13 | 1.09 | 1.05 | 1.0 | 0.95 | 0.90 | 0.85 | 0.80 |

These correction factors correct for net refrigerating effect and are based on an evaporator temperature of 0°F (-15°C), however they may be used for any evaporator temperature because the variation in the factors across the range is insignificant.

# Flow Capacity

## Suction - kW

| Valve Model | Evaporator Temp (°C) | Refrigerant | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | R-22 | | | | | R-134a | | | | | R-407A | | | | | R-407C | | | | |
| | | Pressure Drop Across Valve (bar) | | | | | | | | | | | | | | | | | | | |
| | | 0.03 | 0.06 | 0.2 | 0.4 | 0.7 | 0.03 | 0.06 | 0.2 | 0.4 | 0.7 | 0.03 | 0.06 | 0.2 | 0.4 | 0.7 | 0.03 | 0.06 | 0.2 | 0.4 | 0.7 |
| MTW-9S | 5 | 11.2 | 15.8 | 28.6 | 40.3 | 51.1 | 9.0 | 12.7 | 22.9 | 30.8 | 38.7 | 10.8 | 15.3 | 27.6 | 38.9 | 49.3 | 10.9 | 15.4 | 27.9 | 39.3 | 49.4 |
| | -5 | 9.4 | 13.3 | 24.1 | 32.9 | 41.8 | 7.3 | 10.3 | 18.1 | 24.3 | 29.8 | 8.9 | 12.6 | 22.8 | 31.1 | 39.4 | 9.0 | 12.7 | 23.0 | 31.2 | 39.4 |
| | -15 | 7.8 | 11.0 | 20.0 | 26.6 | 33.2 | 5.9 | 8.3 | 14.1 | 18.5 | 21.6 | 7.3 | 10.2 | 18.5 | 24.5 | 30.5 | 7.3 | 10.3 | 18.7 | 24.6 | 30.3 |
| | -25 | 6.4 | 9.0 | 15.6 | 20.9 | 25.3 | 4.6 | 6.5 | 10.7 | 13.3 | 14.2 | 5.8 | 8.2 | 14.1 | 18.7 | 22.4 | 5.9 | 8.2 | 14.1 | 18.6 | 22.0 |
| | -35 | 5.1 | 7.2 | 12.1 | 15.7 | 17.8 | 3.6 | 4.8 | 7.6 | 8.6 | 8.6 | 4.5 | 6.4 | 10.6 | 13.5 | 14.9 | 4.6 | 6.4 | 10.6 | 13.3 | 14.4 |
| MTW-17S | 5 | 21.5 | 30.1 | 53.7 | 75.0 | 97.1 | 17.3 | 24.2 | 43.2 | 58.5 | 72.6 | 20.8 | 29.0 | 51.8 | 72.3 | 93.5 | 21.0 | 29.3 | 52.3 | 73.1 | 93.7 |
| | -5 | 18.2 | 25.4 | 45.3 | 62.6 | 79.0 | 14.2 | 19.8 | 34.5 | 45.9 | 55.1 | 17.2 | 24.0 | 42.9 | 59.1 | 74.4 | 17.4 | 24.3 | 43.4 | 59.3 | 74.2 |
| | -15 | 15.1 | 21.1 | 37.8 | 50.5 | 62.1 | 11.4 | 16.0 | 26.8 | 34.6 | 39.0 | 14.1 | 19.6 | 35.0 | 46.5 | 56.9 | 14.2 | 19.8 | 35.4 | 46.5 | 56.4 |
| | -25 | 12.4 | 17.3 | 29.8 | 39.3 | 46.4 | 9.1 | 12.7 | 20.1 | 24.3 | 24.9 | 11.3 | 15.7 | 26.8 | 35.1 | 40.9 | 11.4 | 15.9 | 26.8 | 34.9 | 40.0 |
| | -35 | 10.0 | 14.0 | 23.0 | 29.0 | 31.7 | 7.0 | 9.1 | 14.1 | 15.1 | 15.1 | 8.9 | 12.4 | 20.0 | 24.8 | 26.2 | 8.9 | 12.5 | 19.9 | 24.3 | 25.2 |
| MTW-21S | 5 | 46.7 | 62.2 | 102 | 136 | 231 | 38.5 | 51.3 | 84.4 | 139 | 162 | 44.8 | 59.8 | 98.4 | 131 | 222 | 45.7 | 60.9 | 100 | 134 | 221 |
| | -5 | 40.3 | 53.6 | 88.3 | 151 | 182 | 32.3 | 43.0 | 83.4 | 105 | 113 | 38.0 | 50.7 | 83.4 | 142 | 170 | 38.8 | 51.6 | 85.0 | 142 | 168 |
| | -15 | 34.3 | 45.7 | 75.2 | 119 | 136 | 26.7 | 35.6 | 63.2 | 73.9 | 74.3 | 31.8 | 42.4 | 69.8 | 108 | 122 | 32.4 | 43.2 | 71.1 | 108 | 119 |
| | -25 | 28.8 | 38.4 | 71.5 | 88.3 | 92.5 | 21.7 | 29.0 | 45.0 | 46.9 | 46.9 | 26.2 | 34.9 | 64.0 | 77.6 | 79.7 | 26.7 | 35.6 | 63.6 | 75.9 | 76.9 |
| | -35 | 23.8 | 31.8 | 53.3 | 59.8 | 59.8 | 17.4 | 21.8 | 28.4 | 28.4 | 28.4 | 21.2 | 28.2 | 45.7 | 49.4 | 49.4 | 21.6 | 28.8 | 45.0 | 47.6 | 47.6 |

| Valve Model | Evaporator Temp (°C) | Refrigerant | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | R-407F | | | | | R-404A | | | | | R-507A | | | | | R-410A | | | | |
| | | Pressure Drop Across Valve (bar) | | | | | | | | | | | | | | | | | | | |
| | | 0.03 | 0.06 | 0.2 | 0.4 | 0.7 | 0.03 | 0.06 | 0.2 | 0.4 | 0.7 | 0.03 | 0.06 | 0.2 | 0.4 | 0.7 | 0.03 | 0.06 | 0.2 | 0.4 | 0.7 |
| MTW-9S | 5 | 11.6 | 16.4 | 29.6 | 41.7 | 53.0 | 10.3 | 14.5 | 26.3 | 37.1 | 47.5 | 10.3 | 14.6 | 26.4 | 37.1 | 47.7 | 14.0 | 19.7 | 35.6 | 50.2 | 66.2 |
| | -5 | 9.6 | 13.6 | 24.6 | 33.5 | 42.7 | 8.6 | 12.1 | 21.8 | 30.8 | 38.4 | 8.6 | 12.1 | 21.9 | 30.8 | 38.7 | 11.8 | 16.6 | 30.1 | 42.4 | 54.3 |
| | -15 | 7.9 | 11.1 | 20.1 | 26.7 | 33.3 | 7.0 | 9.8 | 17.8 | 24.0 | 30.3 | 7.0 | 9.9 | 17.9 | 24.2 | 30.5 | 9.8 | 13.8 | 25.1 | 35.3 | 44.0 |
| | -25 | 6.3 | 8.9 | 15.4 | 20.5 | 24.7 | 5.6 | 7.9 | 13.9 | 18.7 | 22.9 | 5.6 | 7.9 | 14.4 | 18.9 | 23.2 | 8.1 | 11.3 | 20.6 | 27.6 | 34.7 |
| | -35 | 5.0 | 7.0 | 11.6 | 15.0 | 16.8 | 4.4 | 6.2 | 10.6 | 13.9 | 16.3 | 4.5 | 6.3 | 10.7 | 14.1 | 16.6 | 6.5 | 9.1 | 15.9 | 21.4 | 26.0 |
| MTW-17S | 5 | 22.3 | 31.1 | 55.5 | 77.6 | 101 | 19.7 | 27.5 | 49.2 | 68.7 | 90.4 | 19.7 | 27.6 | 49.2 | 68.7 | 90.8 | 26.7 | 37.3 | 66.6 | 92.9 | 122 |
| | -5 | 18.5 | 25.9 | 46.3 | 63.9 | 80.6 | 16.4 | 22.9 | 40.9 | 57.2 | 72.8 | 16.4 | 23.0 | 41.0 | 57.3 | 73.3 | 22.6 | 31.6 | 56.5 | 78.8 | 103 |
| | -15 | 15.2 | 21.2 | 37.9 | 50.6 | 62.2 | 13.5 | 18.8 | 33.6 | 45.7 | 56.9 | 13.5 | 18.8 | 33.7 | 46.0 | 57.4 | 18.9 | 26.4 | 47.2 | 65.9 | 83.4 |
| | -25 | 12.3 | 17.1 | 29.3 | 38.5 | 45.3 | 10.9 | 15.2 | 26.4 | 35.3 | 42.5 | 10.9 | 15.2 | 27.2 | 35.6 | 43.1 | 15.6 | 21.8 | 38.9 | 52.4 | 65.1 |
| | -35 | 9.7 | 13.5 | 22.0 | 27.6 | 29.6 | 8.6 | 12.0 | 20.2 | 26.0 | 29.4 | 8.6 | 12.1 | 20.4 | 26.4 | 30.2 | 12.6 | 17.6 | 30.3 | 40.3 | 48.1 |
| MTW-21S | 5 | 48.2 | 64.3 | 106 | 141 | 240 | 41.8 | 55.7 | 91.7 | 122 | 217 | 41.7 | 55.5 | 91.4 | 122 | 218 | 56.6 | 75.4 | 124 | 165 | 208 |
| | -5 | 41.1 | 54.7 | 90.1 | 154 | 186 | 35.5 | 47.3 | 77.9 | 104 | 170 | 35.4 | 47.2 | 77.7 | 104 | 172 | 49.0 | 65.3 | 107 | 143 | 248 |
| | -15 | 34.5 | 46.0 | 75.7 | 119 | 136 | 29.8 | 39.7 | 65.3 | 109 | 127 | 29.7 | 39.6 | 65.2 | 110 | 130 | 41.9 | 55.8 | 91.9 | 122 | 195 |
| | -25 | 28.6 | 38.0 | 70.1 | 86.1 | 89.4 | 24.6 | 32.8 | 64.0 | 80.9 | 87.8 | 24.6 | 32.8 | 54.0 | 82.2 | 90.3 | 35.4 | 47.1 | 77.5 | 124 | 145 |
| | -35 | 23.2 | 30.9 | 50.8 | 55.8 | 55.8 | 20.0 | 26.7 | 47.5 | 55.6 | 55.9 | 20.0 | 26.7 | 48.3 | 57.2 | 57.8 | 29.4 | 39.1 | 73.2 | 91.6 | 97.7 |

Capacities based upon 15°C liquid and 15°C superheated vapor. Reference the table below for liquid correction factors.

# Correction Factors

## Discharge and Suction Applications - (°C)

| REFRIGERANT | Liquid Temperature Entering Expansion Valve (°C) | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | -15° | -10° | -5° | 0° | 5° | 10° | 15° | 20° | 25° | 30° | 35° |
| | Correction Factor, CF Liquid Temperature | | | | | | | | | | |
| R-22 | 1.19 | 1.16 | 1.13 | 1.10 | 1.07 | 1.03 | 1.0 | 0.97 | 0.93 | 0.90 | 0.86 |
| R-134a | 1.24 | 1.20 | 1.16 | 1.12 | 1.08 | 1.04 | 1.0 | 0.96 | 0.92 | 0.87 | 0.83 |
| R-407A | 1.25 | 1.21 | 1.17 | 1.13 | 1.09 | 1.04 | 1.0 | 0.96 | 0.91 | 0.87 | 0.82 |
| R-407C | 1.23 | 1.20 | 1.16 | 1.12 | 1.08 | 1.04 | 1.0 | 0.96 | 0.92 | 0.87 | 0.83 |
| R-407F | 1.24 | 1.20 | 1.16 | 1.12 | 1.09 | 1.05 | 1.0 | 0.96 | 0.92 | 0.88 | 0.83 |
| R-404A | 1.30 | 1.25 | 1.20 | 1.15 | 1.10 | 1.05 | 1.0 | 0.95 | 0.89 | 0.83 | 0.77 |
| R-507A | 1.31 | 1.26 | 1.21 | 1.16 | 1.11 | 1.05 | 1.0 | 0.94 | 0.89 | 0.83 | 0.77 |
| R-410A | 1.23 | 1.20 | 1.16 | 1.12 | 1.08 | 1.04 | 1.0 | 0.96 | 0.92 | 0.87 | 0.83 |

These correction factors correct for net refrigerating effect and are based on an evaporator temperature of 0°F (-15°C), however they may be used for any evaporator temperature because the variation in the factors across the range is insignificant.

# Flow Capacity

## Liquid - Tons

| Valve Model | Evaporator Temp (°F) | Refrigerant | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | R-22 | | | | | R-134a | | | | | R-407A | | | | | R-407C | | | | |
| | | Pressure Drop Across Valve (psid) | | | | | | | | | | | | | | | | | | | |
| | | 0.5 | 1 | 3 | 5 | 10 | 0.5 | 1 | 3 | 5 | 10 | 0.5 | 1 | 3 | 5 | 10 | 0.5 | 1 | 3 | 5 | 10 |
| MTW-9S | 40 | 25.2 | 35.4 | 61.0 | 78.5 | 111 | 24.2 | 34.1 | 58.7 | 75.5 | 106 | 23.2 | 32.7 | 56.2 | 72.4 | 102 | 24.8 | 35.0 | 60.1 | 77.4 | 109 |
| | 20 | 24.6 | 34.7 | 59.6 | 76.7 | 108 | 23.3 | 32.9 | 56.5 | 72.8 | 103 | 22.5 | 31.7 | 54.5 | 70.2 | 98.8 | 24.1 | 34.0 | 58.4 | 75.2 | 106 |
| | 0 | 24.0 | 33.8 | 58.2 | 74.9 | 105 | 22.4 | 31.6 | 54.3 | 69.9 | 98.5 | 21.8 | 30.6 | 52.7 | 67.8 | 95.5 | 23.3 | 32.9 | 56.5 | 72.8 | 103 |
| | -20 | 23.4 | 32.9 | 56.6 | 72.8 | 103 | 21.5 | 30.3 | 52.1 | 67.0 | 94.4 | 21.0 | 29.5 | 50.7 | 65.3 | 92.0 | 22.5 | 31.7 | 54.6 | 70.2 | 98.9 |
| | -40 | 22.7 | 32.0 | 55.0 | 70.7 | 99.6 | 20.6 | 29.0 | 49.8 | 64.1 | 90.2 | 20.1 | 28.3 | 48.7 | 62.7 | 88.3 | 21.7 | 30.5 | 52.5 | 67.6 | 95.2 |
| MTW-17S | 40 | 45.9 | 64.1 | 109 | 139 | 194 | 44.2 | 61.7 | 105 | 134 | 187 | 42.4 | 59.1 | 100 | 128 | 179 | 45.3 | 63.3 | 107 | 137 | 192 |
| | 20 | 44.9 | 62.7 | 106 | 136 | 190 | 42.6 | 59.4 | 101 | 129 | 180 | 41.1 | 57.4 | 97.4 | 125 | 174 | 44.0 | 61.4 | 104 | 133 | 186 |
| | 0 | 43.8 | 61.2 | 104 | 133 | 185 | 40.9 | 57.1 | 97.0 | 124 | 173 | 39.7 | 55.4 | 94.1 | 120 | 168 | 42.6 | 59.5 | 101 | 129 | 180 |
| | -20 | 42.6 | 59.5 | 101 | 129 | 181 | 39.2 | 54.8 | 93.0 | 119 | 166 | 38.2 | 53.4 | 90.6 | 116 | 162 | 41.1 | 57.4 | 97.5 | 125 | 174 |
| | -40 | 41.4 | 57.8 | 98.1 | 126 | 175 | 37.5 | 52.4 | 88.9 | 114 | 159 | 36.7 | 51.3 | 87.0 | 111 | 155 | 39.6 | 55.3 | 93.8 | 120 | 168 |
| MTW-21S | 40 | 74.9 | 99.9 | 157 | 194 | 259 | 72.0 | 96.0 | 151 | 187 | 249 | 69.3 | 92.3 | 146 | 180 | 240 | 74.1 | 98.8 | 156 | 192 | 256 |
| | 20 | 73.3 | 97.7 | 154 | 190 | 253 | 69.4 | 92.5 | 146 | 180 | 240 | 67.2 | 89.5 | 141 | 174 | 232 | 72.0 | 96.0 | 151 | 187 | 249 |
| | 0 | 71.5 | 95.3 | 150 | 186 | 247 | 66.7 | 88.9 | 140 | 173 | 231 | 64.9 | 86.5 | 136 | 168 | 224 | 69.7 | 92.9 | 146 | 181 | 241 |
| | -20 | 69.6 | 92.7 | 146 | 181 | 241 | 64.0 | 85.2 | 134 | 166 | 221 | 62.5 | 83.3 | 131 | 162 | 216 | 67.3 | 89.7 | 141 | 175 | 233 |
| | -40 | 67.6 | 90.0 | 142 | 175 | 234 | 61.2 | 81.5 | 128 | 159 | 211 | 60.0 | 80.0 | 126 | 156 | 208 | 64.8 | 86.3 | 136 | 168 | 224 |

| Valve Model | Evaporator Temp (°F) | Refrigerant | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | R-407F | | | | | R-404A | | | | | R-507A | | | | | R-410A | | | | |
| | | Pressure Drop Across Valve (psid) | | | | | | | | | | | | | | | | | | | |
| | | 0.5 | 1 | 3 | 5 | 10 | 0.5 | 1 | 3 | 5 | 10 | 0.5 | 1 | 3 | 5 | 10 | 0.5 | 1 | 3 | 5 | 10 |
| MTW-9S | 40 | 25.2 | 35.4 | 60.9 | 78.4 | 110 | 18.4 | 26.0 | 44.7 | 57.5 | 80.9 | 18.0 | 25.4 | 43.7 | 56.2 | 79.1 | 25.3 | 35.6 | 61.2 | 78.8 | 111 |
| | 20 | 24.5 | 34.5 | 59.3 | 76.4 | 108 | 17.7 | 25.0 | 43.0 | 55.3 | 77.9 | 17.3 | 24.4 | 42.0 | 54.0 | 76.1 | 24.8 | 35.0 | 60.2 | 77.4 | 109 |
| | 0 | 23.8 | 33.5 | 57.6 | 74.1 | 104 | 17.0 | 23.9 | 41.1 | 52.9 | 74.5 | 16.6 | 23.3 | 40.2 | 51.7 | 72.8 | 24.3 | 34.2 | 58.9 | 75.8 | 107 |
| | -20 | 23.0 | 32.4 | 55.8 | 71.7 | 101 | 16.2 | 22.8 | 39.2 | 50.4 | 71.0 | 15.8 | 22.2 | 38.2 | 49.2 | 69.3 | 23.7 | 33.4 | 57.4 | 73.9 | 104 |
| | -40 | 22.2 | 31.3 | 53.8 | 69.2 | 97.5 | 15.4 | 21.6 | 37.2 | 47.9 | 67.4 | 15.0 | 21.1 | 36.2 | 46.6 | 65.7 | 23.0 | 32.5 | 55.8 | 71.8 | 101 |
| MTW-17S | 40 | 45.9 | 64.1 | 109 | 139 | 194 | 33.7 | 47.0 | 79.9 | 102 | 143 | 32.9 | 46.0 | 78.0 | 99.8 | 139 | 46.2 | 64.5 | 109 | 140 | 196 |
| | 20 | 44.7 | 62.4 | 106 | 136 | 189 | 32.4 | 45.2 | 76.8 | 98.2 | 137 | 31.6 | 44.2 | 75.0 | 96.0 | 134 | 45.4 | 63.4 | 108 | 138 | 192 |
| | 0 | 43.4 | 60.6 | 103 | 132 | 184 | 31.0 | 43.3 | 73.5 | 94.0 | 131 | 30.3 | 42.3 | 71.8 | 91.8 | 128 | 44.4 | 62.0 | 105 | 135 | 188 |
| | -20 | 42.0 | 58.7 | 99.6 | 127 | 178 | 29.6 | 41.3 | 70.1 | 89.6 | 125 | 28.8 | 40.3 | 68.3 | 87.4 | 122 | 43.3 | 60.5 | 103 | 131 | 183 |
| | -40 | 40.5 | 56.6 | 96.1 | 123 | 172 | 28.0 | 39.2 | 66.5 | 85.0 | 119 | 27.3 | 38.2 | 64.8 | 82.8 | 116 | 42.1 | 58.8 | 99.8 | 128 | 178 |
| MTW-21S | 40 | 75.2 | 100 | 158 | 195 | 260 | 55.4 | 73.8 | 116 | 144 | 192 | 54.1 | 72.1 | 114 | 141 | 187 | 75.9 | 101 | 159 | 197 | 262 |
| | 20 | 73.3 | 97.6 | 154 | 190 | 253 | 53.3 | 71.0 | 112 | 138 | 184 | 52.1 | 69.4 | 109 | 135 | 180 | 74.6 | 99.3 | 157 | 193 | 258 |
| | 0 | 71.1 | 94.8 | 149 | 185 | 246 | 51.0 | 68.0 | 107 | 132 | 176 | 49.8 | 66.3 | 105 | 129 | 172 | 73.0 | 97.2 | 153 | 189 | 252 |
| | -20 | 68.8 | 91.7 | 145 | 179 | 238 | 48.6 | 64.8 | 102 | 126 | 168 | 47.4 | 63.2 | 99.6 | 123 | 164 | 71.2 | 94.8 | 149 | 185 | 246 |
| | -40 | 66.4 | 88.5 | 140 | 172 | 230 | 46.1 | 61.5 | 96.9 | 120 | 160 | 44.9 | 59.9 | 94.4 | 117 | 155 | 69.2 | 92.2 | 145 | 180 | 239 |

Capacity based upon 60°F liquid. Reference the table below for liquid correction factors.

# Correction Factors

## Liquid Applications - (°F)

| REFRIGERANT | Liquid Temperature Entering Expansion Valve (°F) | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | 0° | 10° | 20° | 30° | 40° | 50° | 60° | 70° | 80° | 90° | 100° |
| | Correction Factor, CF Liquid Temperature | | | | | | | | | | |
| R-22 | 1.27 | 1.22 | 1.18 | 1.14 | 1.09 | 1.05 | 1.00 | 0.95 | 0.91 | 0.86 | 0.81 |
| R-134a | 1.32 | 1.27 | 1.21 | 1.16 | 1.11 | 1.05 | 1.00 | 0.95 | 0.89 | 0.84 | 0.78 |
| R-407A | 1.34 | 1.29 | 1.23 | 1.17 | 1.12 | 1.06 | 1.00 | 0.94 | 0.88 | 0.82 | 0.76 |
| R-407C | 1.32 | 1.27 | 1.22 | 1.16 | 1.11 | 1.05 | 1.00 | 0.94 | 0.89 | 0.83 | 0.77 |
| R-407F | 1.33 | 1.27 | 1.22 | 1.16 | 1.11 | 1.06 | 1.00 | 0.94 | 0.88 | 0.83 | 0.77 |
| R-404A | 1.34 | 1.29 | 1.23 | 1.17 | 0.12 | 1.06 | 1.00 | 0.94 | 0.88 | 0.82 | 0.76 |
| R-507A | 1.42 | 1.35 | 1.28 | 1.21 | 1.14 | 1.07 | 1.00 | 0.93 | 0.85 | 0.78 | 0.70 |
| R-410A | 1.33 | 1.28 | 1.22 | 1.17 | 1.11 | 1.06 | 1.00 | 0.94 | 0.88 | 0.82 | 0.76 |

These correction factors correct for net refrigerating effect and are based on an evaporator temperature of 0°F (-15°C), however they may be used for any evaporator temperature because the variation in the factors across the range is insignificant.

# Flow Capacity

## Liquid - kW

| Valve Model | Evaporator Temp (°C) | Refrigerant | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | R-22 | | | | | R-134a | | | | | R-407A | | | | | R-407C | | | | |
| | | Pressure Drop Across Valve (bar) | | | | | | | | | | | | | | | | | | | |
| | | 0.03 | 0.06 | 0.2 | 0.4 | 0.7 | 0.03 | 0.06 | 0.2 | 0.4 | 0.7 | 0.03 | 0.06 | 0.2 | 0.4 | 0.7 | 0.03 | 0.06 | 0.2 | 0.4 | 0.7 |
| MTW-9S | 5 | 83.1 | 117 | 212 | 299 | 394 | 80.1 | 113 | 204 | 288 | 379 | 76.7 | 108 | 196 | 276 | 363 | 82.0 | 116 | 209 | 295 | 388 |
| | -5 | 81.5 | 115 | 208 | 293 | 386 | 77.5 | 109 | 198 | 278 | 367 | 74.7 | 105 | 191 | 268 | 354 | 79.9 | 113 | 204 | 287 | 379 |
| | -15 | 79.7 | 112 | 203 | 286 | 378 | 74.8 | 105 | 191 | 269 | 354 | 72.5 | 102 | 185 | 260 | 343 | 77.7 | 109 | 198 | 279 | 368 |
| | -25 | 77.8 | 110 | 199 | 280 | 369 | 72.1 | 101 | 184 | 259 | 341 | 70.1 | 98.7 | 179 | 252 | 332 | 75.3 | 106 | 192 | 271 | 357 |
| | -35 | 75.9 | 107 | 194 | 273 | 359 | 69.3 | 97.6 | 177 | 249 | 328 | 67.7 | 95.3 | 173 | 243 | 321 | 72.9 | 103 | 186 | 262 | 345 |
| MTW-17S | 5 | 152 | 212 | 379 | 529 | 692 | 146 | 204 | 365 | 509 | 667 | 140 | 196 | 350 | 488 | 639 | 150 | 209 | 374 | 522 | 684 |
| | -5 | 149 | 208 | 371 | 518 | 679 | 142 | 198 | 353 | 493 | 645 | 136 | 191 | 340 | 475 | 622 | 146 | 204 | 364 | 509 | 666 |
| | -15 | 146 | 203 | 363 | 507 | 664 | 137 | 191 | 341 | 476 | 623 | 132 | 185 | 330 | 461 | 604 | 142 | 198 | 354 | 495 | 648 |
| | -25 | 142 | 199 | 355 | 495 | 649 | 132 | 184 | 328 | 459 | 600 | 128 | 179 | 320 | 446 | 584 | 138 | 192 | 343 | 480 | 628 |
| | -35 | 139 | 194 | 346 | 483 | 632 | 127 | 177 | 316 | 441 | 577 | 124 | 173 | 309 | 431 | 564 | 133 | 186 | 332 | 464 | 608 |
| MTW-21S | 5 | 250 | 333 | 549 | 731 | 922 | 241 | 321 | 528 | 704 | 887 | 232 | 309 | 508 | 677 | 853 | 248 | 330 | 543 | 724 | 913 |
| | -5 | 245 | 327 | 538 | 717 | 904 | 233 | 310 | 511 | 681 | 858 | 225 | 300 | 494 | 659 | 830 | 241 | 322 | 529 | 705 | 889 |
| | -15 | 240 | 320 | 526 | 701 | 884 | 225 | 300 | 493 | 657 | 829 | 219 | 291 | 480 | 639 | 806 | 235 | 313 | 515 | 686 | 864 |
| | -25 | 234 | 312 | 514 | 685 | 863 | 217 | 289 | 475 | 633 | 799 | 212 | 282 | 464 | 618 | 780 | 228 | 303 | 499 | 665 | 838 |
| | -35 | 228 | 304 | 501 | 667 | 841 | 208 | 278 | 457 | 609 | 768 | 204 | 272 | 448 | 597 | 753 | 220 | 293 | 483 | 643 | 811 |

| Valve Model | Evaporator Temp (°C) | Refrigerant | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | R-407F | | | | | R-404A | | | | | R-507A | | | | | R-410A | | | | |
| | | Pressure Drop Across Valve (bar) | | | | | | | | | | | | | | | | | | | |
| | | 0.03 | 0.06 | 0.2 | 0.4 | 0.7 | 0.03 | 0.06 | 0.2 | 0.4 | 0.7 | 0.03 | 0.06 | 0.2 | 0.4 | 0.7 | 0.03 | 0.06 | 0.2 | 0.4 | 0.7 |
| MTW-9S | 5 | 83.1 | 117 | 212 | 299 | 394 | 61.0 | 85.9 | 156 | 219 | 289 | 59.7 | 84.0 | 152 | 214 | 283 | 83.5 | 118 | 213 | 300 | 395 |
| | -5 | 81.2 | 114 | 207 | 292 | 385 | 59.0 | 83.0 | 150 | 212 | 279 | 57.6 | 81.1 | 147 | 207 | 273 | 82.2 | 116 | 210 | 295 | 389 |
| | -15 | 79.1 | 111 | 202 | 284 | 375 | 56.8 | 79.9 | 145 | 204 | 269 | 55.4 | 78.0 | 141 | 199 | 263 | 80.7 | 114 | 206 | 290 | 382 |
| | -25 | 76.9 | 108 | 196 | 276 | 364 | 54.4 | 76.6 | 139 | 196 | 258 | 53.1 | 74.8 | 136 | 191 | 252 | 79.0 | 111 | 202 | 284 | 374 |
| | -35 | 74.5 | 105 | 190 | 268 | 353 | 52.0 | 73.2 | 133 | 187 | 246 | 50.7 | 71.4 | 129 | 182 | 240 | 77.1 | 109 | 197 | 277 | 365 |
| MTW-17S | 5 | 152 | 212 | 379 | 529 | 693 | 112 | 156 | 278 | 389 | 509 | 109 | 152 | 272 | 380 | 498 | 153 | 213 | 381 | 532 | 696 |
| | -5 | 148 | 207 | 370 | 517 | 677 | 108 | 151 | 269 | 376 | 492 | 105 | 147 | 263 | 367 | 481 | 150 | 210 | 375 | 524 | 686 |
| | -15 | 145 | 202 | 361 | 504 | 660 | 104 | 145 | 259 | 362 | 473 | 101 | 142 | 253 | 353 | 462 | 148 | 206 | 368 | 514 | 673 |
| | -25 | 141 | 196 | 351 | 490 | 641 | 99.6 | 139 | 248 | 347 | 454 | 97.2 | 136 | 242 | 338 | 443 | 144 | 202 | 360 | 503 | 659 |
| | -35 | 136 | 190 | 340 | 475 | 621 | 95.1 | 133 | 237 | 331 | 434 | 92.8 | 130 | 231 | 323 | 423 | 141 | 197 | 352 | 491 | 643 |
| MTW-21S | 5 | 251 | 335 | 551 | 734 | 926 | 185 | 247 | 407 | 542 | 683 | 181 | 241 | 397 | 530 | 668 | 253 | 338 | 556 | 740 | 933 |
| | -5 | 246 | 327 | 538 | 717 | 905 | 179 | 239 | 393 | 524 | 660 | 175 | 233 | 384 | 511 | 645 | 250 | 332 | 547 | 729 | 919 |
| | -15 | 239 | 319 | 525 | 699 | 881 | 172 | 230 | 378 | 504 | 635 | 168 | 224 | 369 | 492 | 620 | 245 | 326 | 537 | 716 | 902 |
| | -25 | 232 | 310 | 510 | 679 | 857 | 165 | 220 | 363 | 483 | 609 | 161 | 215 | 354 | 471 | 594 | 240 | 319 | 526 | 700 | 883 |
| | -35 | 225 | 300 | 494 | 659 | 830 | 158 | 211 | 347 | 462 | 582 | 154 | 205 | 338 | 450 | 567 | 234 | 312 | 513 | 684 | 862 |

Capacity based upon 15°C liquid. Reference the table below for liquid correction factors.

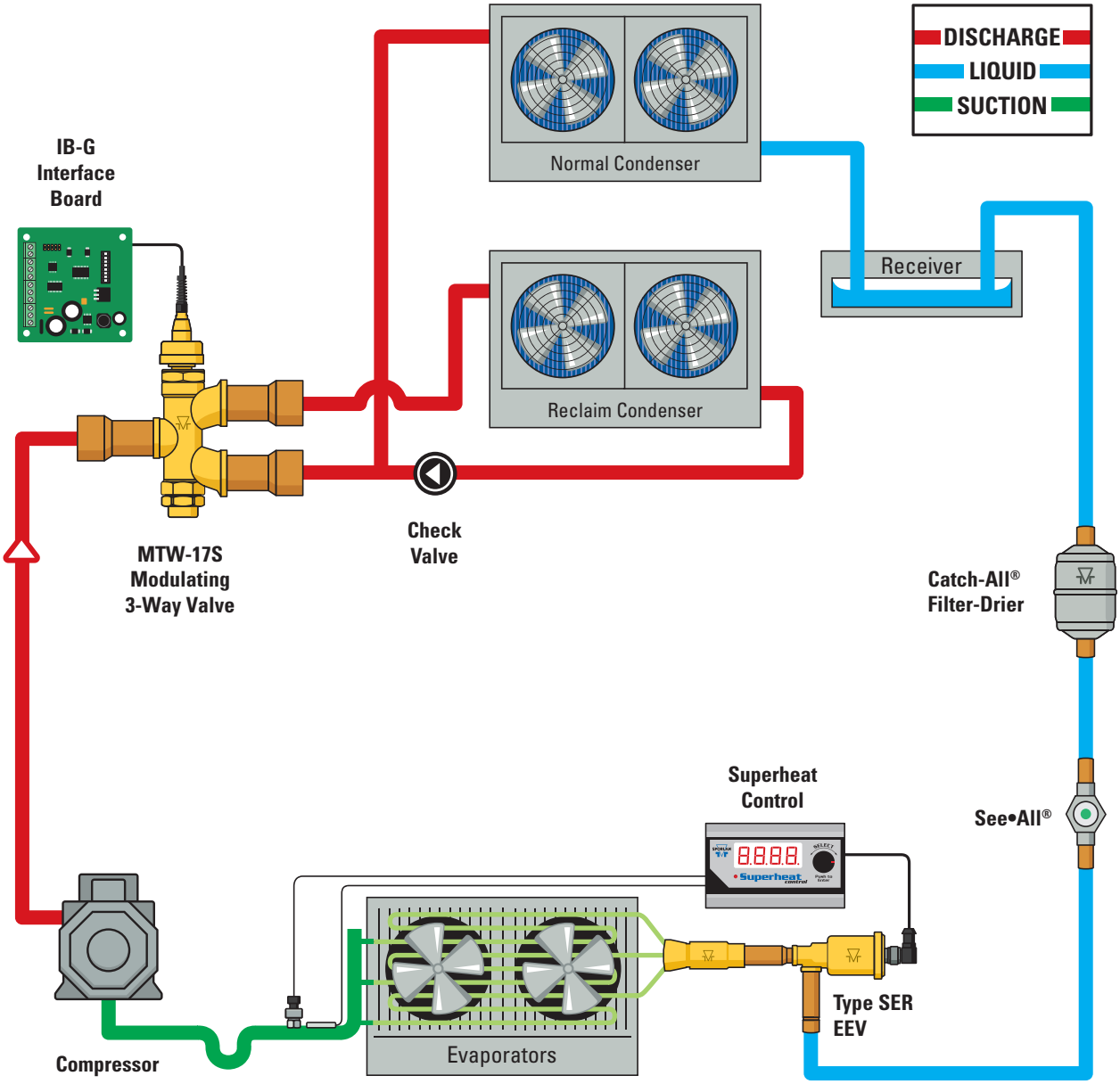
# Correction Factors

## Liquid Applications - (°C)

| REFRIGERANT | Liquid Temperature Entering Expansion Valve (°C) | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | -15° | -10° | -5° | 0° | 5° | 10° | 15° | 20° | 25° | 30° | 35° |
| | Correction Factor, CF Liquid Temperature | | | | | | | | | | |
| R-22 | 1.24 | 1.20 | 1.16 | 1.12 | 1.08 | 1.04 | 1.0 | 0.96 | 0.92 | 0.88 | 0.83 |
| R-134a | 1.28 | 1.24 | 1.19 | 1.14 | 1.10 | 1.05 | 1.0 | 0.95 | 0.90 | 0.86 | 0.81 |
| R-407A | 1.30 | 1.25 | 1.20 | 1.15 | 1.10 | 1.05 | 1.0 | 0.95 | 0.90 | 0.84 | 0.79 |
| R-407C | 1.29 | 1.24 | 1.19 | 1.15 | 1.10 | 1.05 | 1.0 | 0.95 | 0.90 | 0.85 | 0.80 |
| R-407F | 1.29 | 1.24 | 1.19 | 1.15 | 1.10 | 1.05 | 1.0 | 0.95 | 0.90 | 0.85 | 0.80 |
| R-404A | 1.37 | 1.31 | 1.25 | 1.19 | 1.12 | 1.06 | 1.0 | 0.94 | 0.87 | 0.81 | 0.74 |
| R-507A | 1.37 | 1.31 | 1.25 | 1.19 | 1.13 | 1.06 | 1.0 | 0.94 | 0.87 | 0.80 | 0.73 |
| R-410A | 1.29 | 1.25 | 1.20 | 1.15 | 1.10 | 1.05 | 1.0 | 0.95 | 0.90 | 0.84 | 0.79 |

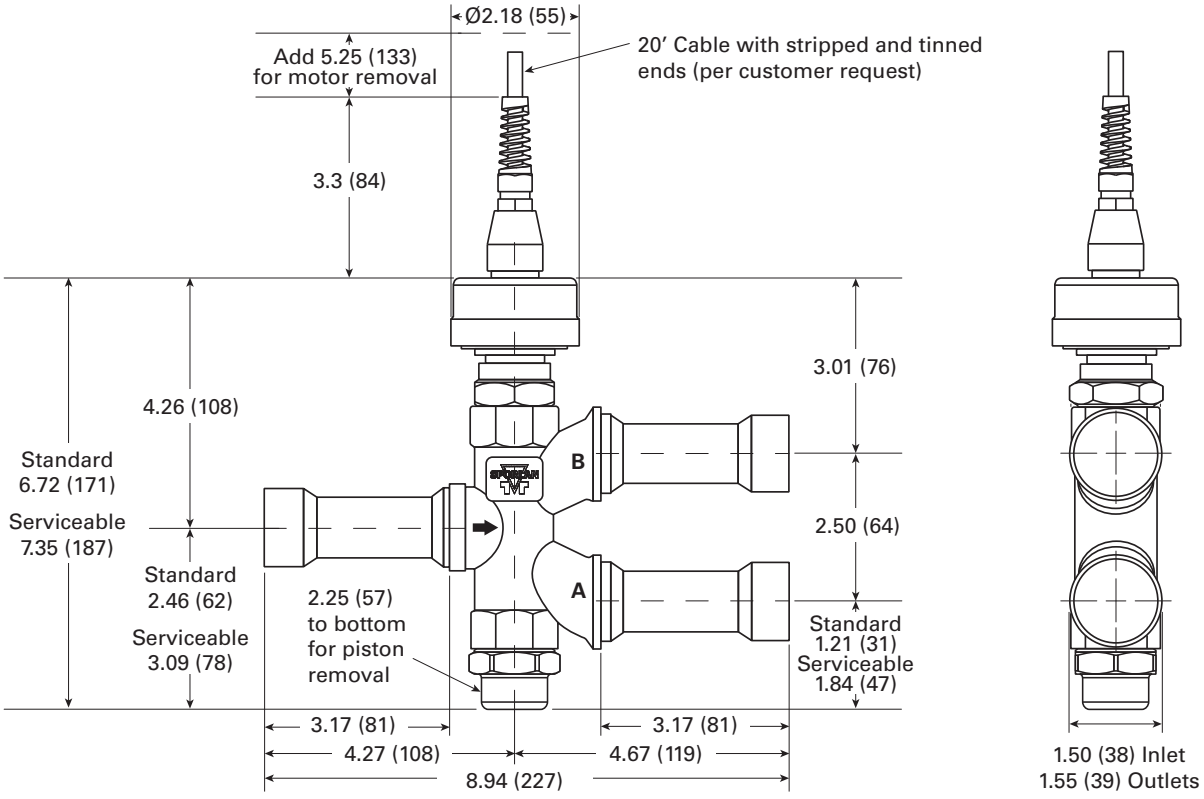
These correction factors correct for net refrigerating effect and are based on an evaporator temperature of 0°F (-15°C), however they may be used for any evaporator temperature because the variation in the factors across the range is insignificant.

# Piping Diagram
## Modulating 3-Way Valve

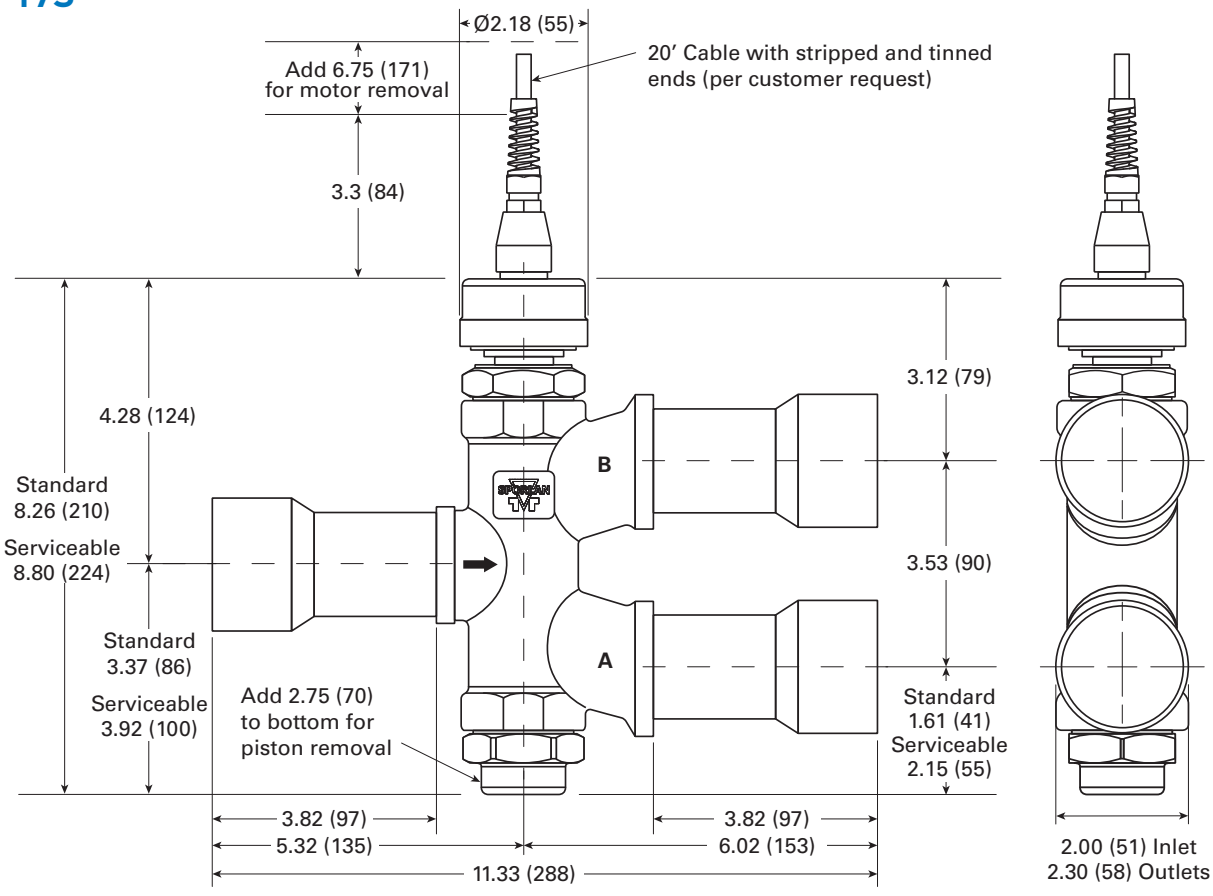


# Dimensions - Inches (mm)

## MTW-9S

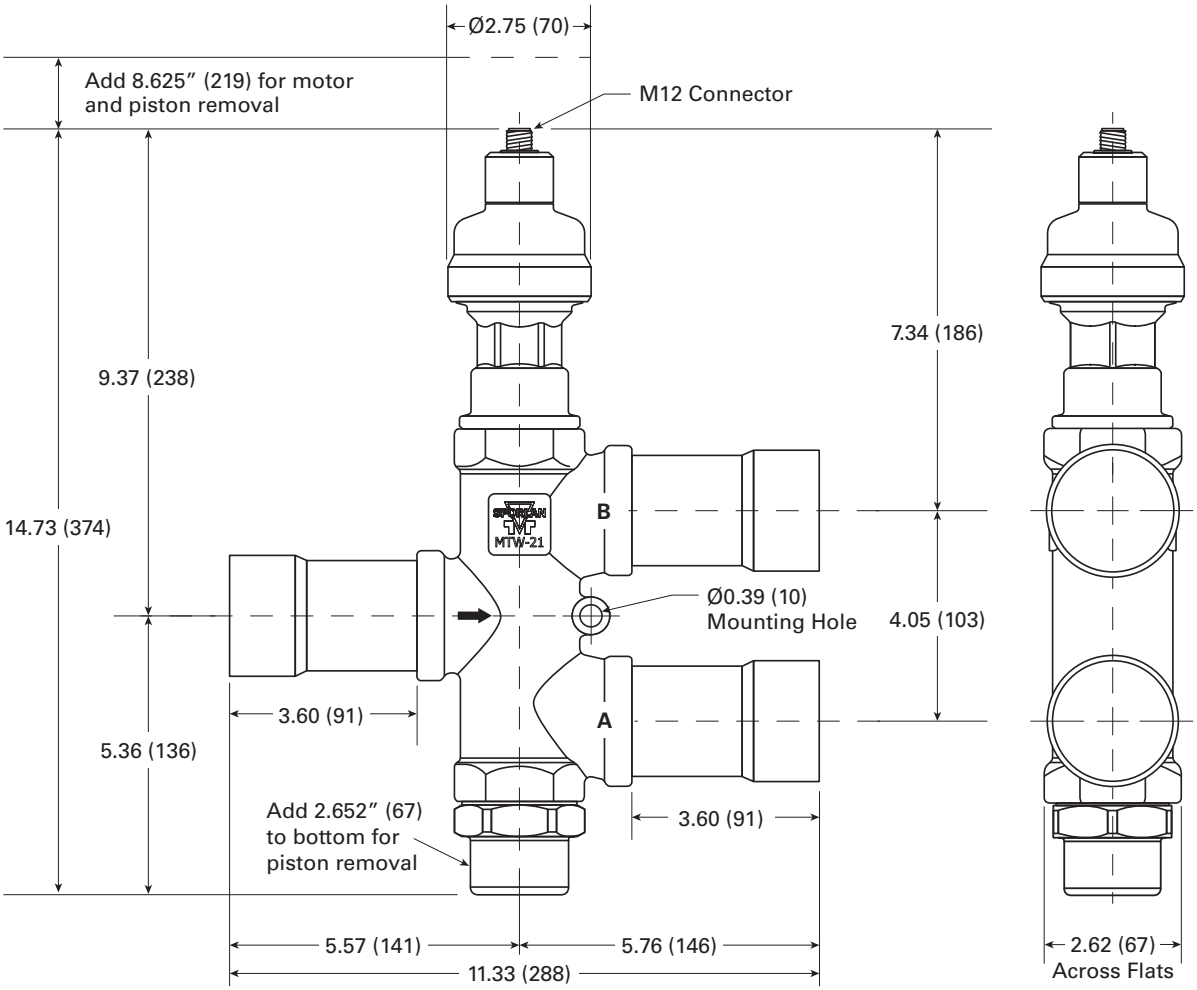



## MTW-17S



# Dimensions - Inches (mm)

## MTW-21S





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