HEAVY DUTY PRESSURE TRANSDUCERS FOR POTENTIAL USE IN INDUSTRIAL REFRIGERATION APPLICATIONS

MIP SERIES

Application Note

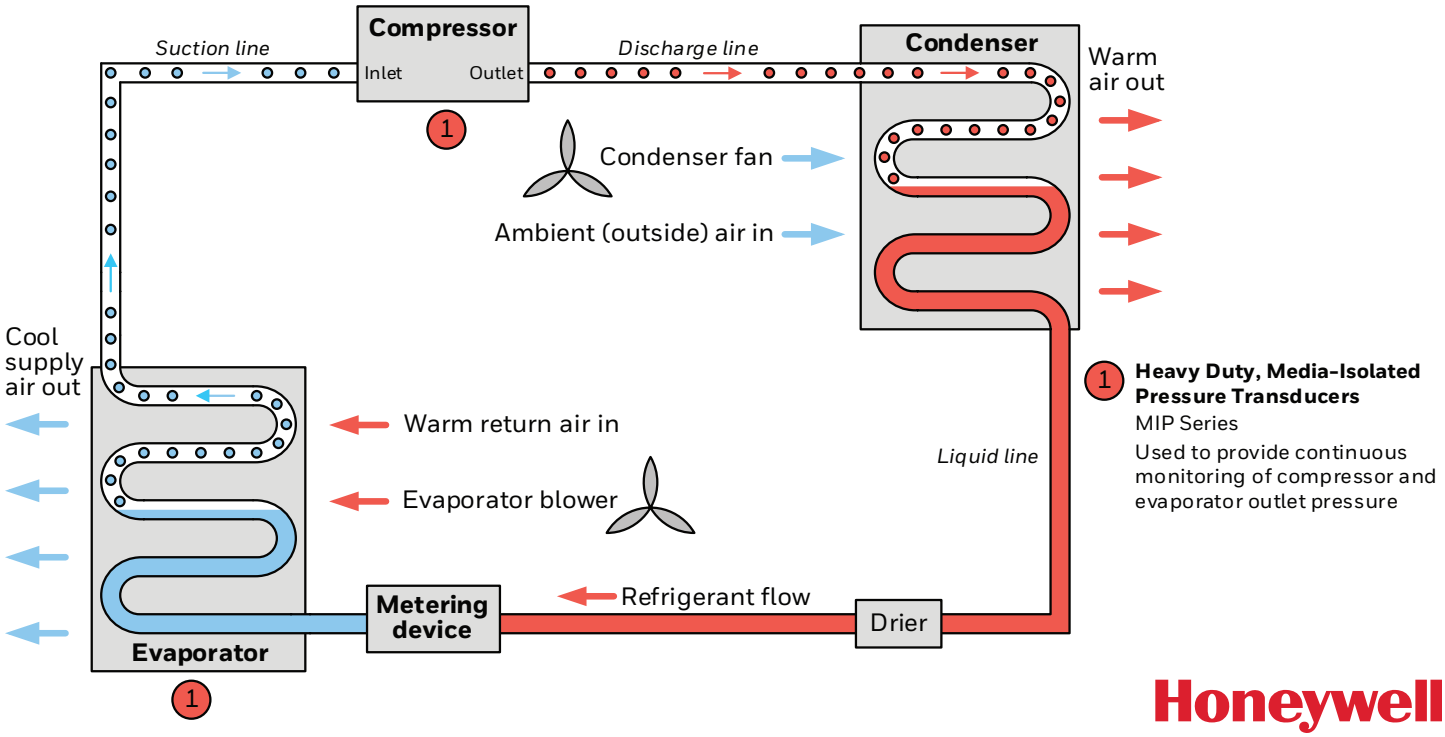
There are four basic components in the HVAC/R cycle used by an industrial refrigeration unit (see Figure 1):

1. **Compressor:** Low pressure vapor full of latent heat from the evaporator is compressed and pumped to the condenser.
2. **Condenser:** Receives hot, high pressure vapor from the compressor and releases its latent heat to the ambient air. Refrigerant condenses a hot liquid.
3. **Metering device:** Hot liquid from the condenser is forced through a flow restriction to reduce the pressure and change the hot liquid to a cold liquid.
4. **Evaporator:** Takes the cold liquid from the metering device and absorbs latent heat from the return air and changes to a cool gas.

Due to the high cost of energy, refrigeration systems need to be efficient. Controlling the high side and low side pressure to match refrigeration needs helps to increase efficiency and reduce energy costs.

The refrigeration cycle works because, as the refrigerant changes from one state to another, there is a large release or absorption of latent energy. By controlling the pressure of the refrigerant, the temperature of the phase change can be controlled. At low pressure, the refrigerant will change from a liquid to a gas and absorb latent heat energy at a lower temperature. At high pressure, the refrigerant gas can change from a gas to a liquid at higher temperatures, releasing latent energy.

FIGURE 1. MIP SERIES HEAVY DUTY, MEDIA-ISOLATED PRESSSURE TRANSDUCERS IN POTENTIAL HVAC/R APPLICATIONS



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SOLUTION

Honeywell's MIP Series transducers are designed to provide continuous monitoring of compressor outlet pressure and evaporator outlet pressure to help control the flow of refrigerant (see Table 1).

The MIP Series is designed to more effectively resist several cycles of freeze-thaw without frequent failure (see FIgure 2 and Table 1).

FIGURE 2. MIP SERIES UNDERGOING FREEZE/THAW CYCLE TESTING

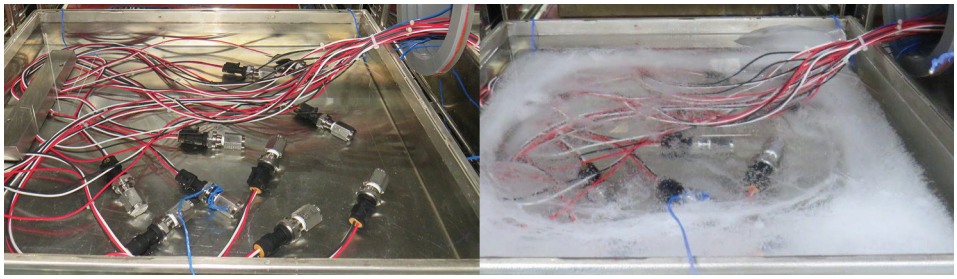

TABLE 1: MIP SERIES SPECIFICATIONS

CHARACTERISTIC	PARAMETER 
Operating, compensated, and storage temperature range	-40°C to 125°C [-40°F to 257°F]
Total Error Band	-40°C to 125°C [-40°F to 257°F]: • ±1.0 %FSS (≤10 bar) • ±0.75 %FSS (>10 bar)
Pressure range	• 1 bar to 60 bar • 15 psi to 870 psi
Pressure reference	• absolute • sealed gage
Pressure port material	stainless steel 304L
Output transfer function	ratiometric to 5 Vdc supply: 0.5 Vdc to 4.5 Vdc
EMC (radiated immunity)	100 V/m (200 MHz to 2 GHz) per ISO 11452-2
Ingress protection	IP67 (Metri-Pack 150)
External freeze/thaw resistance	>6 cycles from -30°C to 50°C [-22°F to 122°F]
Media compatibility	• **Industrial:** - pumps: water, hydraulic fluids - compressors: compressed air - process: food, beverage, oil, gas, steam • **HVAC/R:** refrigerants (butane, propane, ammonia, CO_2, R134A, R407C, R410A, R448A/ Solstice® N40, R32 and R1234ze, R1234yf, glycol + water • **Transportation:** gasoline, diesel fuel, engine oil, brake fluid, coolants, CNG • **Medical:** O_2, N_2, CO_2, N_2O, air

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