

**Temperature Control Units**

Water & Oil  
30° - 500°F

**Portable Chillers**

Air & Water-Cooled  
20° - 70°F

**Central Chillers**

Air & Water-Cooled  
Packages & Modules  
20° - 70°F

**Pump Tank Stations**

Chilled or Tower Water  
200 - 3600 gallons

**Cooling Tower Cells**

45 - 540 tons

**Filters**

**Heat Exchangers**

**WARRANTY**

**1 Year:**  
Covering parts and labor

**2nd Year:**  
**FREE** preventative  
maintenance visit

**CUSTOM UNITS**

If one of our standard Maximum portable chiller models does not meet your application needs, then we can custom build a unit that will! Call us at 317-887-0729 for more details.

## MAXIMUM SERIES with Digital Scroll Technology

- 5, 10 & 15 Ton Models
- Air & Water-Cooled
- 20°F to 80°F Fluid Temperatures
- R410A Non Ozone Depleting Refrigerant
- Energy Efficient Control from 20-100% Capacity



M1D-10W shown



M1D-10A shown



Copeland Scroll Digital™ compressors offer energy efficient control from 20 - 100% capacity.



Advantage M1D Digital Scroll Chiller Control



# HOW IT WORKS

The Copeland Scroll Digital™ compressor controlled by Advantage's M1D advanced microprocessor control instrument uses a simple and effective method to modulate chiller capacity from 20 - 100 %, giving unparalleled energy efficient performance in the modulation field.

The scroll compressor uses a simple concept first patented in 1905 and has been deployed in industrial process chillers and air conditioning systems for many years. Scroll compressors provide a very smooth compression process and have fewer moving parts compared with traditional reciprocating compressors.

The Copeland Scroll Digital™ compressor improves on the basic scroll design by having axial and radial compliance, which allows the fixed scroll to move in both the axial and radial directions by very small amounts. This ensures that the fixed and orbiting scrolls are always loaded together with the optimal force, thereby maximizing efficiency.

Compliance helps to protect the compressor from damage by debris or liquid. A compressor is designed to only compress gas. Having debris and/or liquid in the compression cycle will damage the compressor. Compliance (the ability of the scrolls to separate axially and radially) allows unexpected debris or liquid to be safely discharged.

The Copeland Scroll Digital™ compressor uses axial compliance as its basic principle, but takes it further by controlling the separation of the scrolls.

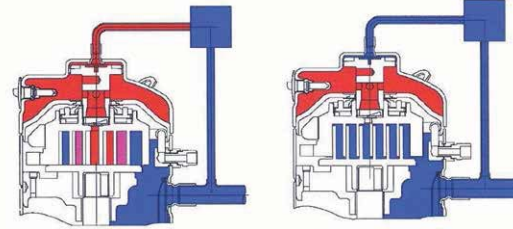
The Advantage M1D microprocessor control instrument controls the axial separation of the scrolls by using a solenoid valve and a bypass connection between the discharge chamber and the intake gas. The scrolls are designed so that the upper scroll can separate from the bottom scroll by 1 mm vertically.

The Copeland Scroll Digital™ operates in two stages - the loaded state, when the solenoid valve is normally closed and unloaded

## Copeland Scroll Digital™ Technology

Solenoid Valve Closed

Solenoid Valve Open



Loaded

Unloaded

Scroll engaged  
full compression

Scroll separated  
no compression

state, when the solenoid valve is open. During the loaded state, the compressor operates like a standard Scroll and delivers full capacity and mass flow. During the unloaded state, there is no capacity and no mass flow through the compressor.

By controlling the amount of time that the compressor is in the loaded and unloaded state, the Advantage M1D control instrument can effectively and efficiently modulate the chiller capacity from 20 to 100% while maintaining temperature stability.

Since there is no compression when the compressor is in the 'unloaded state' far less energy is consumed. Testing shows that compressor energy is reduced by approximately 8% when running at 75% capacity, 12% when running at 50% capacity and 18% when running at 25% capacity as compared to traditional portable chillers that use hot gas bypass for capacity modulation.

Additionally, compressor starts and stops are reduced providing longer compressor life while providing stable cooling fluid temperatures.

# SPECIFICATIONS

MODEL	CAPACITY <sup>1</sup> TONS	STYLE	PUMP			TANK CAPACITY	DIMENSIONS (H x W x D)	FLA <sup>2</sup>	AVAILABLE VOLTAGES
			HP	FLOW	PRESSURE				
M1D-5A	5	Air-Cooled	2	12 gpm	52 psi	25 gallons	60" x 34" x 45"	16.5	230 / 460
M1D-5W	5	Water-Cooled	2	12 gpm	52 psi	25 gallons	60" x 34" x 45"	16.5	230 / 460
M1D-10A	10	Air-Cooled	2	24 gpm	48 psi	25 gallons	60" x 34" x 56"	28	230 / 460 / 575
M1D-10W	10	Water-Cooled	2	24 gpm	48 psi	25 gallons	40" x 32" x 40"	24	230 / 460 / 575
M1D-15A	14.5	Air-Cooled	3	36 gpm	55 psi	65 gallons	57" x 34" x 80"	38	230 / 460 / 575
M1D-15W	15	Water-Cooled	3	36 gpm	55 psi	65 gallons	66" x 59" x 58"	34	230 / 460 / 575

**Notes:**

1. Tons capacity at 50°F LWT and 95°F ambient (air-cooled models), 85°F condensing water (water-cooled models).  
 2. 3A, 3W, 5A & 5W available 230/460/3/60 only. 10A & 10W available 230/460/575/3/60. 460/3/60 amps shown.

