## UNIVERSAL ELECTRONIC CONTACTOR UPGRADE – SURESWITCH™ 79

| Description | Model(s) | Page(s) |
|---|---|---|
| SureSwitch | **49P11-843** | 79 |

## CONTACTORS 80 – 82

| Description | Model(s) | Page(s) |
|---|---|---|
| 1 Pole | **94-388 Thru 94-395** | 80 |
| 2 Pole | **90-244 Thru 90-249** | 81 |
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## DEMAND DEFROST / BLOWER TIME DELAY RELAY 83 – 84

| Description | Model(s) | Page(s) |
|---|---|---|
| Demand Defrost Controls | **47D Series** | 83 |
| Blower Time Delay Relay | **57T01-843** | 84 |

## EVAPORATIVE COOLING 85

| Description | Model(s) | Page(s) |
|---|---|---|
| Evaporative Cooling Controls | **1F51 / 8A18Z / 21D28** | 85 |

## DIGITAL / MECHANICAL TEMPERATURE CONTROLS 86 – 88

| Description | Model(s) | Page(s) |
|---|---|---|
| Electronic Temperature Control | **16E09** | 86 |
| Refrigeration Temperature Control | **1609 / 1687 / 201** | 87–88 |
| Manual Reset Freeze Protection Control | **16A60-9** | 88 |

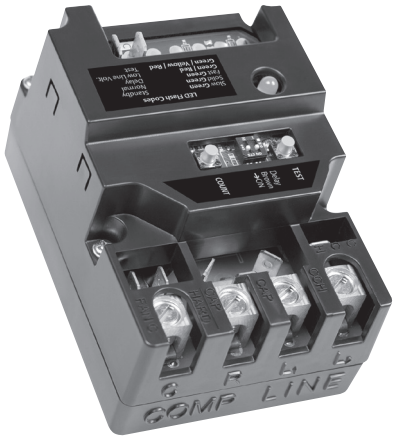
## FILTER DRIERS 89 – 92

| Description | Model(s) | Page(s) |
|---|---|---|
| Liquid Line Filter | **96-TD** | 89 |
| Suction Line Driers | **96-TS** | 90 |
| Suction Line Driers | **96-TSC** | 91 |
| Bi-Directional Heat Pump Driers | **96-TBF** | 92 |


## REFRIGERATION CONTROLS INDEXED BY RANGE

| Range Max. | Range Min. | Differential Max. | Differential Min. | Model | Electrical Rating * | Element | Capillary Length | Switch Action | Page Number |
|---|---|---|---|---|---|---|---|---|---|
| 50°F | -20°F | 25°F | 3°F | **1609-90** | HH2C | Remote Bulb | 8 feet | Close on Rise | 87 |
| 50°F | -20°F | Manual Reset | Manual Reset | **16A60-9** | HH | Remote Bulb | 10 feet | Close on Rise | 88 |
| 90°F | -30°F | 40°F | 3.5°F | **1609-101** | FGH | Remote Bulb | 5 feet | Close on Rise | 87 |
| 90°F | -30°F | 40°F | 3.5°F | **1609-103** | FGH | Remote Bulb | 10 feet | Close on Rise | 87 |
| 90°F | -30°F | 40°F | 3.5°F | **1609-104** | FGH | Remote Bulb | 20 feet | Close on Rise | 87 |
| 90°F | -30°F | 40°F | 3.5°F | **1609-105** | FGH | Remote Bulb | 5 feet | Close on Rise | 87 |
| 90°F | -30°F | 40°F | 4.5°F | **1687-9** | SPDT | Remote Bulb | 8 feet | SPDT | 87 |
| 90°F | -30°F | 20°F | 3°F | **201-20** | FGH | Self Contained | | Close on Rise | 88 |
| 90°F | 20°F | 20°F | 3°F | **201-8** | FGH | Self Contained | | Close on Rise | 88 |
| 200°F | -40°F | 30°F | 1°F | **16E09-101** | See Catalog page 86 | Remote Bulb | 7.5 feet extendable to 400 feet | SPDT | 86 |

* See page 222 for full electrical ratings **U.S. Models only**




SureSwitch™

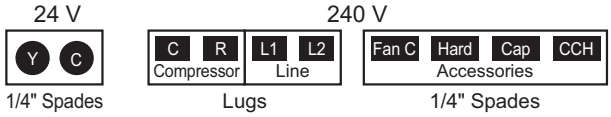
## 49P11-843 SURESWITCH™

Universal Electronic Upgrade for Mechanical Compressor Contactors.
5x Contactor Life, Sealed to Keep Out Ants and Debris

### FEATURES

- Microprocessor controlled sealed compressor switching.
- Line voltage brownout protection, short cycle protection, tricolor LED displays.
- Heavy-duty lug connectors, zero chatter latching relay.
- Four-hole mounting matches mechanical contactors.
- Random start delay on power up and brownout recovery.
- Compressor test and cycle count by push-button.

### TERMINAL DESIGNATIONS




### SPECIFICATIONS

**Electrical Ratings**

Line Voltage Input . . . . . 240 VAC, 50/60 Hz
Full Load Amperes (FLA) . . . . . 40A
Locked Rotor Amperes (LRA) . . . . . 200A
Control (Coil) Voltage (Y,C) . . . . . 24 VAC, 50/60 Hz

**Recommended Terminal Torque – C, R, L1 and L2**

#4 – 6 AWG . . . . . 45 in-lbs
#8 AWG . . . . . 40 in-lbs
#10 - 14 AWG . . . . . 35 in-lbs
24 VAC (Y, C) Terminals are 1/4" Male QC's accepting #12-24 AWG wire

**Timings**

Anti-Short-Cycle Delay . . . . . 0s or 180s (selectable) at 60 Hz
0s or 216s (selectable) at 50 Hz
Compressor Test . . . . . 5s at 60 Hz, 6s at 50 Hz
Dimensions . . . . . $2^{3}/_{4}$″W x $2^{3}/_{8}$″H x $3^{7}/_{8}$″L
Operating Temperature Range . . . . . -40° to 158°F (-40 to 70°C)
Humidity Range . . . . . 5 to 95% relative Humidity (non-condensing)

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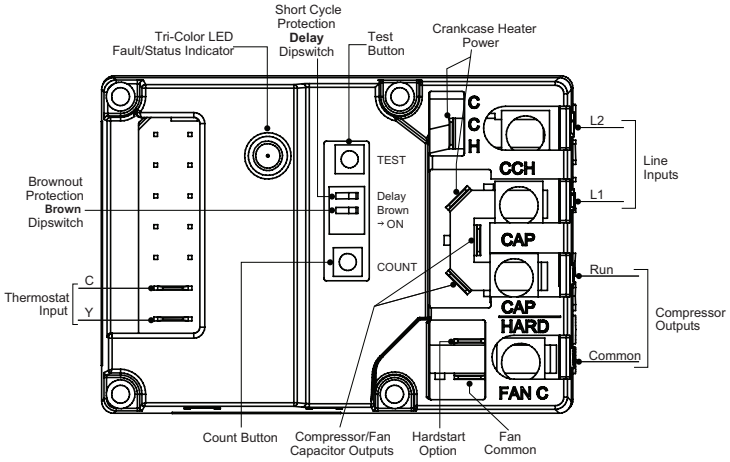
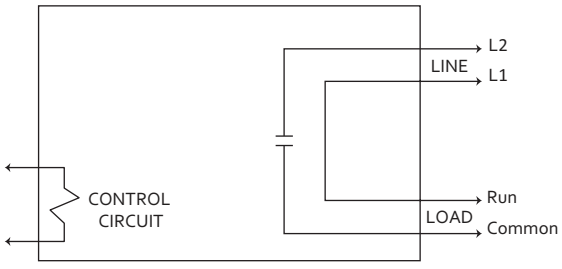
| Model Number | Coil | Line Voltage Input | Amp Rating | Poles |
|---|---|---|---|---|
| 49P11-843 | 24 VAC | 240 VAC | 40 FLA, 200 LRA | 1 or 1.5 |

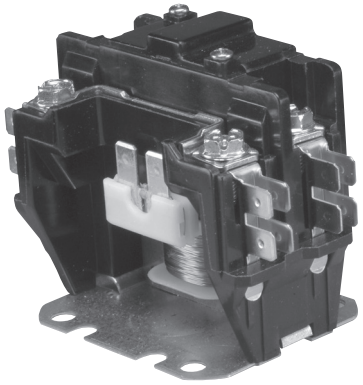



**49P11-843 Terminals and Switches**




**Electrical Diagram**

**40 Amp Model (with cover)**



Approximate Overall Dimensions
3 1/4″ x 2″ x 2 1/2″

## 94-388 THRU 94-395 CONTACTORS – WR/RBM TYPE 121

Straight-Through Wiring, Replaces 1 1/2 Pole Devices Used Primarily in Residential Central Air Conditioning

### FEATURES

- Replaces many contactors used by OEM's.
- Universal style mounting bracket fits existing mounting holes.
- Screw terminals and 1/4″ quick connect terminals for easy installation.

### SPECIFICATIONS

| | |
|---|---|
| Temperature Range | -40°F to 150°F |
| Mechanical Life (no load) | Conforms to UL and ARI specifications |
| Electrical Life | Conforms to ARI specifications<br>**94-388 thru 94-389** achieve 200,000 cycles, make LRA at .5 pf, break 125% of FLA at .75 pf at rated voltage, 10,000 cycles make and break LRA at .5 pf rated voltage<br>**94-394 thru 94-395** achieve 100,000 cycles, make LRA at .5 pf, break 125% of FLA at .75 pf at rated voltage, 6,000 cycles make and break LRA at .5 pf rated voltage |
| Weight (approximate) | 7 oz. |
| Agency | U.L. file number E12139 |
| Coils Frequency | 50 / 60 Hz |
| Coil Insulation | Class B (130°C) |
| Termination | Screw and Double 1/4″ Q.C. |
| Operate | 85% of nominal coil voltage; 110% maximum safe operate |
| Duty Cycle | Continuous |

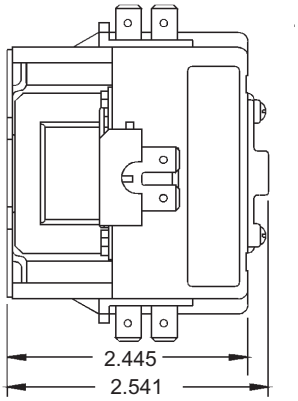
### COIL DATA

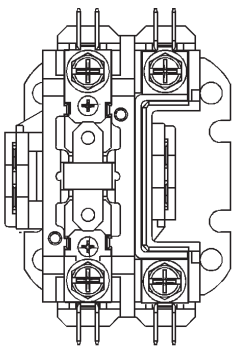
| Model Number | | Voltage AC | Res DC OHMS | Current MA | Nominal VA | Max. Inrush VA |
|---|---|---|---|---|---|---|
| * 30 Amp | ** 40 Amp | | | | | |
| **94-388** | **94-394** | 24 | 16.5 | 208 | 5 | 20 |
| **94-389** | **94-395** | 120 | 420 | 42 | 5 | 20 |

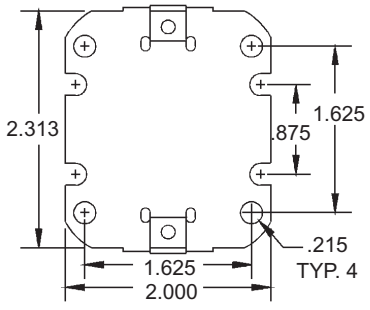
* 30 amp models have no cover on top as in line drawing below
** 40 amp models have cover on top as in picture above

### CONTACT RATINGS

| Type | Voltage | FLA | LRA | RES |
|---|---|---|---|---|
| 94-388 thru 94-390 | 277 | 30 | 150 | 40 |
| | 480 | 30 | 125 | 40 |
| | 600 | 30 | 100 | 40 |
| 94-394 thru 94-396 | 277 | 40 | 200 | 50 |
| | 480 | 40 | 160 | 50 |
| | 600 | 40 | 120 | 50 |

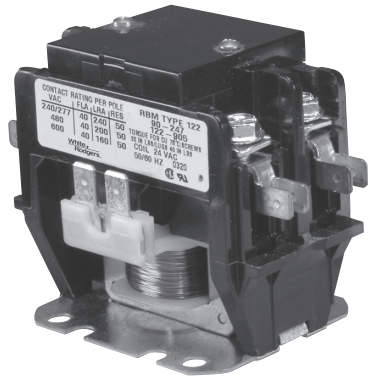





**30 Amp Model (No Cover)**

**40 Amp Model (with cover)**



Approximate Overall Dimensions
3 1/4″ x 2″ x 2 5/8″

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PAGE 201

# 90-244 THRU 90-249 CONTACTORS – WR/RBM TYPE 122

Designed for Air Conditioning and Heating Equipment

## FEATURES

- Low VA coil for cooler operation and increased life.
- Quiet operation.
- Universal style mounting bracket fits existing mounting holes.
- Double break contacts ensure positive make and break.
- Screw terminals or pressure connectors and double 1/4″ quick connects provided on all models for easy installation.

## SPECIFICATIONS

| | |
|---|---|
| Insulating Material | Contact block and carrier are high quality electrical-grade thermosetting resin |
| Temperature Range | -40°F to 150°F |
| Mechanical Life | Conforms to UL and ARI specifications |
| Electrical Life | Conforms to UL and ARI specifications |
| Weight (approximate) | 9.5 oz. |
| Agency | U.L. file number E12139 |
| Coils Frequency | 50 / 60 Hz |
| Coil Insulation | Class B (130°C) |
| Termination | Pressure Connectors and Double 1/4″ Q.C. |
| Operate | 85% of nominal coil voltage; 110% maximum safe operate |
| Duty Cycle | Continuous |



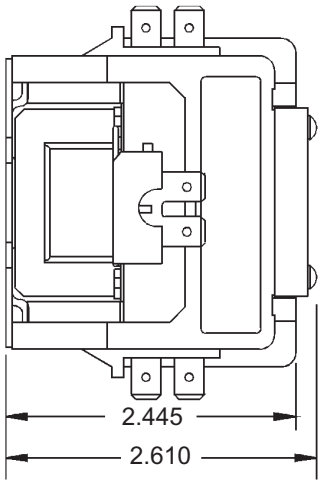
### COIL DATA

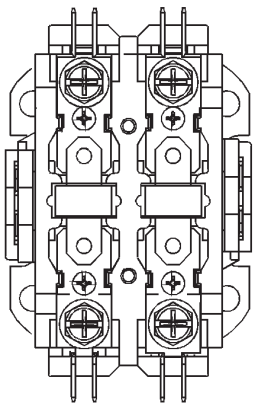
| Model Number | | Voltage AC | Res DC OHMS | Current MA | Nominal VA | Max. Inrush VA |
|---|---|---|---|---|---|---|
| * 30 Amp | ** 40 Amp | | | | | |
| 90-244 | 90-247 | 24 | 11 | 250 | 6 | 32 |
| 90-245 | 90-248 | 120 | 224 | 50 | 6 | 32 |
| 90-246 | 90-249 | 208 / 240 | 997 | 25 | 6 | 32 |

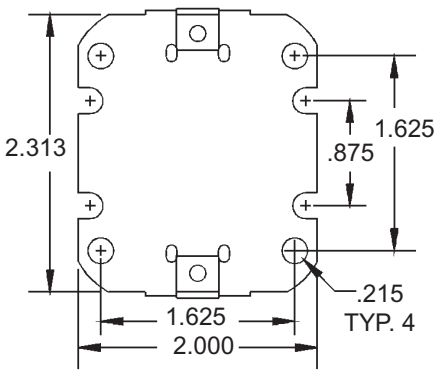
* 30 amp models have no cover on top as in line drawing below
** 40 amp models have cover on top as in picture above

### CONTACT RATINGS

| Type | Voltage | FLA | LRA | RES |
|---|---|---|---|---|
| 94-244 thru 94-246 | 277 | 30 | 150 | 40 |
| | 480 | 30 | 125 | 40 |
| | 600 | 30 | 100 | 40 |
| 94-247 thru 94-249 | 277 | 40 | 200 | 50 |
| | 480 | 40 | 160 | 50 |
| | 600 | 40 | 120 | 50 |

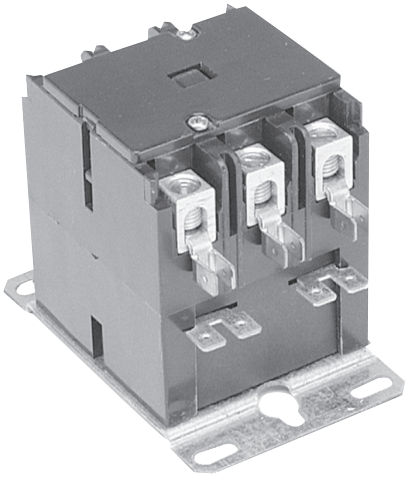





**30 Amp Model (No Cover)**

**40 Amp with Cover**



Approximate Overall Dimensions
$3\frac{3}{4}$″ x $2\frac{3}{8}$″ x 3″

Pressure Connectors line and load sides for #14 thru #4 wire. 1/4″ Double Quick Connect auxiliary and coil terminals.

TECH PAGE 201

# 90-163 THRU 90-172 CONTACTORS – WR/RBM TYPE 154

Designed for Central Air Conditioning and Heating Equipment

## FEATURES

- Any position mounting.
- Interchangeable mounting plate.
- Low wattage coil.
- Double break contacts ensure positive make and break.

## SPECIFICATIONS

| | |
|---|---|
| Insulating Material | Contact block and carrier are high quality electrical-grade thermosetting resin |
| Temperature Range | -40°F to 150°F |
| Mechanical Life | Conforms to UL and ARI specifications |
| Electrical Life | Conforms to UL and ARI specifications |
| Weight (approximate) | 16 oz. |
| Agency | U.L. file number E12139 |
| Coils Frequency | 50 / 60 Hz |
| Coil Insulation | Class B (130°C) |
| | 24 through 208 / 240 Volts AC |
| Termination | Pressure connector and Double 1/4″ Q.C. |
| Operate | 85% of nominal coil voltage; 110% maximum safe operate |
| Duty Cycle | Continuous |

**COIL DATA** – 30 and 40 Amp, 600 Volt Three Pole Normally Open (3 P.N.O.)

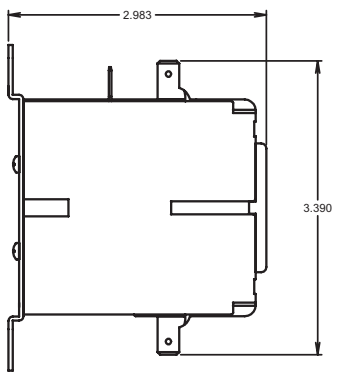
| Model Number | | Voltage AC | Res DC OHMS | Current MA | Nominal VA | Max. Inrush VA |
|---|---|---|---|---|---|---|
| 30 Amp | 40 Amp | | | | | |
| 90-163 | 90-170 | 24 | 7.2 | 187 | 4.5 | 52 |
| 90-164 | 90-171 | 120 | 180 | 37 | 4.5 | 52 |
| 90-165 | 90-172 | 208/240 | 720 | 19 | 4.5 | 52 |

**CONTACT RATINGS** – 30 Amp, 600 Volt Three Pole Normally Open (3 P.N.O.)

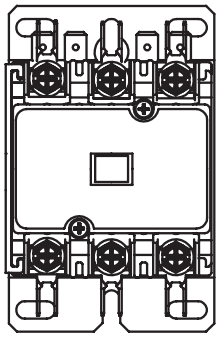
| Type | Voltage | 277 VAC | LRA | RES |
|---|---|---|---|---|
| 90-163 thru 90-165 | Full Load | 30 A. | 30 A. | 30 A. |
| | Lock Rotor | 180 A. | 150 A. | 120 A. |
| | Resistive | 40 A. | 40 A. | 40 A. |

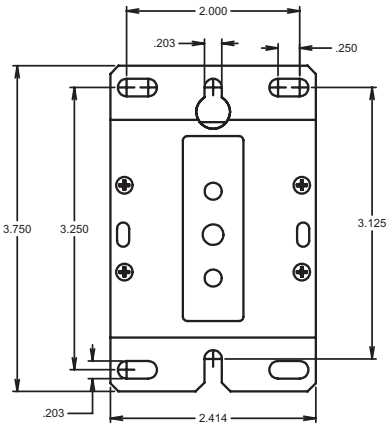
**CONTACT RATINGS** – 40 Amp, 600 Volt Three Pole Normally Open (3 P.N.O.)

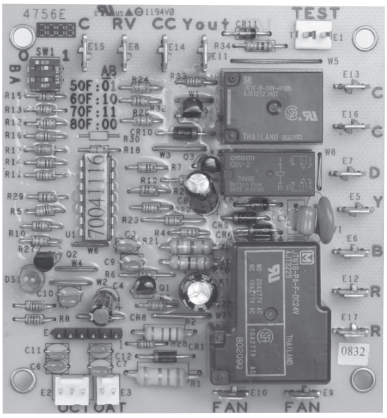
| Type | Voltage | 277 VAC | LRA | RES |
|---|---|---|---|---|
| 90-170 thru 90-172 | Full Load | 40 A. | 40 A. | 40 A. |
| | Lock Rotor | 240 A. | 200 A. | 160 A. |
| | Resistive | 50 A. | 50 A. | 50 A. |




**90-160 thru 90-172**








47D Series

## 47D SERIES DEMAND DEFROST CONTROL

Microprocessor-Based Controls Designed to Detect Ice Build-Up on the Outdoor Coil in a Heat Pump System and Defrost the Coil by Reversing the Direction of Refrigerant Flow. Replaces Rheem Models

### FEATURES

- Demand defrost algorithm “self-calibrates” to the heat pump system.
- Compressor contactor relay control for short-cycle protection, and noise reduction while reversing valve shifts.
- Dipswitch-selectable defrost termination temperature (50/60/70/80ºF).
- Kits Include replaceable ambient and coil temperature sensors.
- LED diagnostic display.

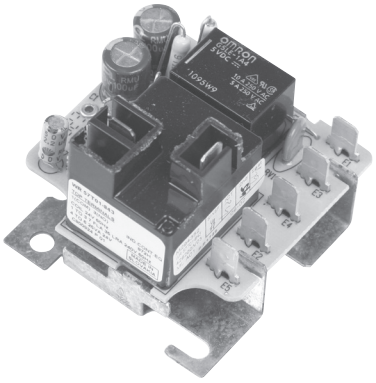
### SPECIFICATIONS

| | |
|---|---|
| Electrical Ratings [@ 77ºF (25ºC)]: | |
| Rated Voltage | 24 VAC |
| Rated Voltage Range | 18-30 VAC |
| Max. Power Consumption @ 24 VAC | 4.08 VA |
| Nominal Frequency | 50/60 Hz |
| Relay Load Ratings: | |
| Compressor Contactor Relay (CC, only used in 47D40-801) | 20 VA in rush, 6 VA holding |
| Reversing Valve Relay (RV) | 24 VA |
| Auxiliary Heat Relay (D) | 1 Amp. 0.6 P.F. |
| Operating Temperature Range | -40º to 150ºF (-40o to 65ºC) |
| Humidity Range | 5% to 95% relative humidity (non-condensing) |

| Timing Specifications @ 60Hz* | Nom. | Units |
|---|---|---|
| Defrost Lockout Time | 34 | Mins |
| Maximum Defrost Time | 15 | Mins. |
| Maximum Frosting Time | 6 | Hrs. |
| Short Cycle Lockout Time | 5 | Mins. |
| Noise Abatement Time | 5 | Sec. |

**NOTE:** 50Hz Timings are 20% longer

| Model Number | Hi/Lo Pressure Switch Inputs | Outdoor Fan Relay | Mounting | Dimensions |
|---|---|---|---|---|
| **47D40-801** | No | PSC 1-speed | Metal Standoffs | 3.375″ x 3.625″ |
| **47D43-811** | Yes | PSC or ECM, 1-speed | Plastic Standoffs | 3.5″ x 5.5″ |



57T01-843



## 57T01-843 BLOWER TIME DELAY RELAY

The 57T01-843 Time Delay Relay is for Use in Air Handlers Installed in Compressor-Run Air Conditioning and Heat Pump Systems to Delay the Blower Shut-Off After the Compressor has Shut Off.
**Replaces Trane Part Numbers D155079P01 and RLY 2807**

### FEATURES

- Allows residual cooled air to be blown into the controlled space, increasing the efficiency of the system in cooling.
- Depending on electrical hookup in a heat pump system, delay of blower shut-off could also occur in heating.

### SPECIFICATIONS

Electrical Ratings:

| Model Number | Contact Ratings: Power Pole (Amperes per pole)- | |
|---|---|---|
| | | 208/240/277 VAC |
| 57T01-843 | Full Load | 7 |
| | Locked Rotor | 36 |
| | Resistive | 15 |
| | U.L. Approved Horsepower | 3/4 HP |

Pilot Duty Pole . . . . . 3 VA at 24 VAC (Minimum)
25V at 24 VAC (Maximum)
Input Voltage. . . . . 24 VAC nominal
Total Power Consumption. . . . . 0.5 VA (relay de-energized)
4.0 VA (relay energized)

21D28-6

## EVAPORATIVE COOLING THERMOSTAT & CONTROL BOX

Functions as a Switching Device for the Thermostat to Provide an Even Level of Cooling Plus a Choice of High and Low Speed Control of the Fan on Evaporative Coolers

### FEATURES

- Grey plastic case is lightweight, weather-resistant and meets all code requirements.
- Fully automatic, system designed with a fan delay (approximately 60 seconds) to pre-wet the cooler pads before the fan starts.
- Separate fan and pump relays. High or low fan speed selection.
- Relay panel is removable from enclosure to facilitate field wiring.
- Integral transformer 120 / 240 VAC to 24 VAC 60 Hz.

### SPECIFICATIONS

Dimensions 1F51N-619 . . . . . $3^1/_4$″H x $4^1/_2$″W x $1^5/_8$″D
Dimensions 8A18Z-2 . . . . . 8″H x 6″W x 3″D
Electrical Rating 1F51N-619 . . . . . 24 VAC (30 VAC maximum)
Fixed anticipator

| Model Number | Package Consists of: |
|---|---|
| **21D28-6** | 1F51N-619 / 8A18Z-2 |

| Model Number | Color | Range | Differential | System Switch Positions | |
|---|---|---|---|---|---|
| | | | | System | Fan |
| **1F51N-619** | Classic White | Scale 1-2-3-4-5 (55 to 95°F) ① | 1°F | Off – Cool – Vent | Hi – Lo |

① No thermometer

### CONTACT RATINGS

| Model Number | Input Voltage | Combined Relay Loads | | Pump Relay | | Fan Relay | |
|---|---|---|---|---|---|---|---|
| | | Full Load | Locked Rotor | Full Load | Locked Rotor | Full Load | Locked Rotor |
| **8A18Z-2** ① | 120 VAC | 16.0A | 96.0A | 10.0A | 60.0A | 12.0A | 72.0A |
| | 240 VAC | 8.0A | 48.0A | 5.0A | 30.0A | 6.0A | 36.0A |

① U.L. listed


16E09-101

# ELECTRONIC TEMPERATURE CONTROL

Superior Temperature Control and Accuracy for Both Refrigeration and Heating Applications

## FEATURES

- Multiple Input Voltages (24/120/208/240 volts).
- No common wire required (electrical load must be greater than 2.5 amps and uninterrupted).
- Electronic temperature accuracy/digital display.
- Alarm output (with selectable delay - up to 99 minutes).
- Adjustable anti-short cycle delay.
- Setpoint locking function.
- Reduces inventory - replaces most competitive mechanical and electronic refrigeration controls.
- Multiple sensor option can be used with 1 or 4 sensors.

## SPECIFICATIONS

| | | | |
|---|---|---|---|
| Electrical Rating (Contacts): | | | |
| *Voltage | 120 VAC | 208VAC | 240 VAC |
| *Full Load Amps | 16 Amps | 9.2 Amps | 8 Amps |
| *Locked Rotor Amps | 96 Amps | 55.2 Amps | 48 Amps |
| *Non-inductive Amps | 16 Amps | 16 Amps | 16 Amps |
| *Horsepower | 1 HP | 1 HP | 1 HP |
| *24 VAC | 100 VA, 30 VAC Max. (Class 2) | | |
| *Pilot Duty | 125 VA, 24 to 240 VAC | | |
| *Minimum Load | 1 Amp @ 24 VAC | | |
| Alarm Relay (N.O. Contacts) | 1 Amp (5 to 24 volts AC or DC) | | |
| Setpoint Range | -40° to 220°F (-40° to 104° C) | | |
| Differential Range | 1° to 30°F (1° to 30° C) | | |
| Operating Temperature | -29°F to 140°F (-34° to 60°C) | | |
| Storage Temperature | -40°F to 185° (-40° to 85°F) | | |
| Operating Humidity | 0 to 95% Relative Humidity, Non-Condensing | | |
| Maximum Dew Point | 85°F (29°C) | | |
| Switch Action | SPDT | | |

NCT sensor, with a cable length of 7.5 can be extended up to 400 feet by splicing and adding cable wire (22 AWG or larger diameter) as needed.
Can be connected to an existing PTC (positive temperature coefficient) sensor.

| | |
|---|---|
| Finish | Grey |
| Cover and Case | NEMA 1 enclosure |
| Flammability Rating | UL94VO |
| Dimension | $6\frac{3}{4}$″H x 3″W x $2\frac{9}{16}$D″ |

* For use on single phase circuits only

| Model Number | Range | Differential | Switch Action |
|---|---|---|---|
| 16E09-101 | -40° to 220°F | 1° to 30°F | SPDT |

## PARTS AND ACCESSORIES See end of this section for additional parts and accessories

- F136-0114 — Replacement 7.5-ft NTC remote sensor

## TECHNICAL HELP

Wiring and Operation . . . . . See pages 199–200

TECH PAGES 199–200

1609-101

# REFRIGERATION TEMPERATURE CONTROL

Provide Positive Control of Refrigeration Applications where Remote Control is Desired

## FEATURES

- Hydraulic action element.
- Dustproof steel case with top and bottom knockouts.
- Temperature dial graduated in °F and °C and can be adjusted through cover.
- High electrical ratings allow operation of most equipment without use of relays or motor starters.
- Model 1609-90 — For use in zoning systems where all thermostats control a common compressor & a separate solenoid refrigerant valve in each zone.

## SPECIFICATIONS

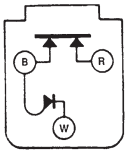
Dimensions . . . . . $5^{3}/_{8}$″H + $2^{5}/_{16}$″W x $2^{9}/_{16}$″D
Finish . . . . . Grey
Bulb Mounting. . . . . Clamp included with all models except 1609-90
Agency . . . . . U.L. listed and C.S.A. approved

## PARTS AND ACCESSORIES

- F89-0027 Refrigeration Well
- F55-0088 Packing Nut

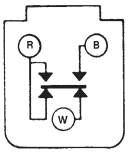
| Model Number | Range | Differential | Capillary Length | Bulb Size | Switch Action | Full Electrical Rating | Motor Rating (Full Load) | |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | 120 VAC | 240 VAC |
| **1609-90** | -20 to +50°F (-29 to +10°C) | Adj. 3 to 25°F (2 to 14°C) | 8 ft. | $5^{1}/_{4}$″ x $^{3}/_{8}$″ | Close on Rise | HH2C see page 222 | 7.4A | 3.7A |
| **1609-101** | -30 to +90°F (-34 to +32°C) | Adj. 3.5 to 40°F (2 to 22°C) | 5 ft. | $5^{1}/_{4}$″ x $^{3}/_{8}$″ | Close on Rise | FGH see page 222 | 16.0A | 8.0A |
| **1609-103** | -30 to +90°F (-34 to +32°C) | Adj. 3.5 to 40°F (2 to 22°C) | 10 ft. | $5^{1}/_{4}$″ x $^{3}/_{8}$″ | Close on Rise | FGH see page 222 | 16.0A | 8.0A |
| **1609-104** | -30 to +90°F (-34 to +32°C) | Adj. 3.5 to 40°F (2 to 22°C) | 20 ft. | $5^{1}/_{4}$″ x $^{3}/_{8}$″ | Close on Rise | FGH see page 222 | 16.0A | 8.0A |
| **1609-105** ① | -30 to +90°F (-34 to +32°C) | Adj. 3.5 to 40°F (2 to 22°C) | 5 ft. | $5^{1}/_{4}$″ x $^{3}/_{8}$″ | Close on Rise | FGH see page 222 | 16.0A | 8.0A |
| **1687-9** | -30 to +90°F (-34 to +32°C) | Adj. 4.5 to 40°F (2.5 to 22°C) | 8 ft. | $5^{1}/_{4}$″ x $^{3}/_{8}$″ | SPDT | SPDT see page 222 | 7.4A | 3.7A |

① Knob adjustment




**HH2C Contact Structure**
HH2C Rated Controls

**Switch Action**
Double pole, single throw.
B terminal is common.
B-R and B-W contacts both close on a rise of temperature.




**SPDT Contact Structure**
SPDT Rated Controls

**Switch Action**
R-B Open on Rise
R-W Close on Rise

201-8

## REFRIGERATION TEMPERATURE CONTROLS FOR WALK-IN BOXES

Designed for Use in Garages, Factories, Warehouses and Similar Commercial and Industrial Installations

### FEATURES

- Dust, moisture and vermin resistant heavy metal case.
- Handles inductive and non-inductive loads.
- No leveling required — Mounts in any position.
- Quick response to temperature changes.
- Nickel plated element.

### SPECIFICATIONS

Dimensions . . . . . $5^{3}/_{8}$″H + $2^{1}/_{2}$″coil x $2^{5}/_{16}$″W x $2^{9}/_{16}$″D
Finish . . . . . Grey
Agency . . . . . U.L. listed and C.S.A. approved

| Model Number | Range | Differential | Switch Action | Full Electrical Rating | Motor Rating (Full Load) | | Resistive (Non-Inductive) | |
|---|---|---|---|---|---|---|---|---|
| | | | | | 120 VAC | 240 VAC | 120 VAC | 240 VAC |
| **201-8** | 20 to 90°F (-6 to 32°C) | Adj. 3 to 20°F (2 to 11°C) | Close on Rise | FGH See page 222 | 16.0A | 8.0A | 25.0A | 22.0A |
| **201-20** | -30 to 90°F (-34 to 32°C) | Adj. 3 to 20°F (2 to 11°C) | Close on Rise | FGH See page 222 | 16.0A | 8.0A | 25.0A | 22.0A |


16A60-9

## MANUAL RESET FREEZE PROTECTION CONTROL

Designed to Shut Down Cooling Equipment Before Undesirably Low Temperatures are Reached

### FEATURES

- Temperature dial graduated in °F and °C scales.
- Adjustable dial stop to limit minimum setting — Shipped at 36°F (2°C).
- Dustproof steel case with top and bottom knockouts.
- Hydraulic action element — Unaffected by vibration — No leveling required.
- Equipped with special $^{1}/_{2}$″ packing nut assembly.

### SPECIFICATIONS

Dimensions . . . . . $5^{3}/_{8}$″H x $2^{5}/_{16}$″W x $2^{9}/_{16}$″D
Finish . . . . . Grey
Thread Size (packing nut) . . . . . $^{1}/_{2}$″NPT
Agency . . . . . U.L. listed and C.S.A. approved

| Model Number | Range | Differential | Capillary Length | Bulb Size | Switch Action | Full Electrical Rating | Motor Rating (Full Load) | |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | 120 VAC | 240 VAC |
| **16A60-9** | -30 to 50°F (-34 to 10°C) | Manual Reset | 10 ft. | $5^{3}/_{4}$″ x $^{3}/_{8}$″ | Open on Fall | HH see page 222 | 7.4A | 3.7A |

96-TD

# 96-TD LIQUID LINE FILTER-DRIERS

Filter-Driers Designed to Offer Complete Protection to Your Refrigerant System. The 96-TD Series Removes Moisture, Acid and Foreign Materials to Protect the Compressor, Solenoid Valves, Expansion Valves, Capillary Tubes and Other Close Tolerance Parts of Your Refrigeration System

## FEATURES

- Solid block desiccant core: a composite of molecular sieve and activated alumina.
- Provides high moisture, organic and inorganic acid removal.
- For use with HCFCs, CFCs and the lubricants that go with them.
- Nickel plated SAE flare and solid copper ODF fittings.
- Corrosion resistant paint.

## SPECIFICATIONS

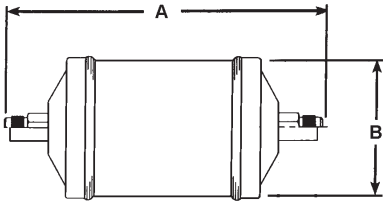
Maximum Working Pressure . . . . . 680 psig
Agency . . . . . UL / CUL file number SA11002

**INSTALLATION NOTE**: The 96-TD liquid line filter-drier may be installed in any position. Best results are achieved when located as close as possible to the inlet of the expansion device. If using a liquid line solenoid or moisture indicator, locate the filter-drier upstream. This will provide protection to the solenoid valve and allow the moisture indicator to measure the drier effectiveness. Install the drier in as cold a location as possible in the direction of the flow arrow on the unit.

**SELECTION NOTE**: Given the proper liquid line size and connection type, the correct drier may be selected using the charts below. Choosing a unit size with sufficient water capacity to reduce moisture content of the system to a safe level should be considered.

COOLING / REFRIGERATION

### 96-TD Series Dimensional Drawing




① All ratings in accordance with ARI standard 710-86:
86°F Liquid Refrigerant Temperature,
5°F Saturated Temperature,
4.0 lbs./min./ton for R-134a,
2.9 lbs./min./ton for R-22,
4.4 lbs./min./ton for R-404A/R-507

**SELECTION**

| Model Number | Connection | Flow Capacity in Tons Refrigerant[1] @ psi (For kW, Multiply Tons By 3.5)[2] | | | |
|---|---|---|---|---|---|
| | | R-134a | R-22 | R-410A | R-404A/R507 |
| 96-TD032 | 1/4 SAE | 1.7 | 1.9 | 1.9 | 1.2 |
| 96-TD032S | 1/4 ODF | 2.1 | 2.2 | 2.2 | 1.5 |
| 96-TD052 | 1/4 SAE | 1.8 | 2.0 | 2.0 | 1.3 |
| 96-TD052S | 1/4 ODF | 2.6 | 2.8 | 2.9 | 1.9 |
| 96-TD053S | 3/8 ODF | 4.1 | 4.4 | 4.5 | 2.9 |
| 96-TD082S | 1/4 ODF | 2.8 | 3.0 | 3.1 | 2.0 |
| 96-TD083S | 3/8 ODF | 3.8 | 4.1 | 4.2 | 2.7 |
| 96-TD084S | 1/2 ODF | 7.0 | 7.6 | 7.6 | 5.1 |
| 96-TD163 | 3/8 SAE | 4.0 | 4.3 | 4.4 | 2.9 |
| 96-TD163S | 3/8 ODF | 4.4 | 4.8 | 4.9 | 3.2 |
| 96-TD164S | 1/2 ODF | 7.7 | 8.4 | 8.6 | 5.6 |
| 96-TD165S | 5/8 ODF | 11.8 | 12.8 | 13.1 | 8.5 |
| 96-TD303S | 3/8 ODF | 5.7 | 6.1 | 6.2 | 4.1 |
| 96-TD304S | 1/2 ODF | 7.9 | 8.6 | 8.8 | 5.7 |
| 96-TD305S | 5/8 ODF | 13.1 | 14.1 | 14.4 | 9.5 |

[1] All Ratings in accordance with ARI standard 710-04 liquid refrigerant Temperature
5°F Saturated vapor temperature
3.1 lbs/min/ton R134a
2.9 lbs/min/ton R22 and R407C
4.0 lbs/min/ton R404A/507 and R-12
4.4 lbs/min/ton R502
2.7 lbs/min/ton R410A
[2] Example: 1.0 tons x 3.5 = 3.5 KW

**CONNECTIONS, DIMENSIONS, FLOW CAPACITORS**

| Model Number | Connection | Dimension | | Refrigeration Low Temperature & -Commercial Installations | | | Air Conditioning Field Replacement & Field Installations | | Air Conditioning OEM Self Contained | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | A | B | R-134a | R-22 | R-404A/R507 | R-134a | R-22/R-407C/R-410A | R-134a | R-22/R-407C/R-410A |
| 96-TD032 | 1/4 SAE | 4.32 | 1.63 | 1/2 | 1/2 | 1/2 | 1 | 1 1/2 | 3/4 | 1 |
| 96-TD032S | 1/4 ODF | 3.76 | 1.63 | | | | | | | |
| 96-TD052 | 1/4 SAE | 4.88 | 2.50 | 3/4 | 3/4 | | | | 1 | 1 1/2 |
| 96-TD052S | 1/4 ODF | 4.33 | 2.50 | | | | | | | |
| 96-TD053S | 3/8 ODF | 4.53 | 2.50 | 1 1/2 | 2 | 1 1/2 | 3 | 4 | 2 | 3 |
| 96-TD082S | 1/4 ODF | 5.24 | 2.50 | 1 | 1 | 3/4 | 1 1/2 | 2 | 2 | 4 |
| 96-TD083S | 3/8 ODF | 5.43 | 2.50 | 2 | 3 | 2 | 4 | 5 | 3 | 4 |
| 96-TD163 | 3/8 SAE | 6.89 | 2.50 | 3 | 5 | 3 | 4 | 5 | 4 | 7 1/2 |
| 96-TD163S | 3/8 ODF | 6.22 | 2.50 | | | | | | | |
| 96-TD164S | 1/2 ODF | 6.27 | 2.50 | | | | 5 | 10 | 5 | 7 1/2 |
| 96-TD165S | 5/8 ODF | 6.54 | 2.50 | | 7 1/2 | | 7 1/2 | 12 | 7 1/2 | 10 |
| 96-TD303S | 3/8 ODF | 8.90 | 3.00 | 4 | 5 | | 4 | 6 | 4 | 5 |
| 96-TD304S | 1/2 ODF | 8.94 | 3.00 | | 7 1/2 | 4 | 7 1/2 | 10 | 7 1/2 | 9 |
| 96-TD305S | 5/8 ODF | 9.21 | 3.00 | 7 1/2 | 10 | 5 | 10 | 15 | 10 | 14 |

[1] All Ratings in accordance with ARI standard 710-04 liquid refrigerant Temperature
5°F Saturated vapor temperature
[2] Example: 1.0 tons x 3.5 = 3.5 KW
2.9 lbs/min/ton R22 and R407C
4.0 lbs/min/ton R404A/507 and R-12
3.1 lbs/min/ton R134A
4.4 lbs/min/ton R502
2.7 lbs/min/ton R410A

96-TS

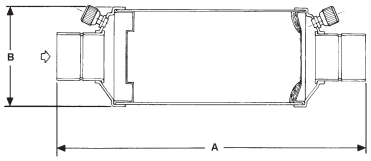
## 96-TS SUCTION LINE DRIERS

Driers Designed to Clean Up Your Refrigerant System After a Compressor Burnout has Occurred. Removes Solid Contaminants and Harmful Acids that are Created During a Motor Burnout. Another Application: The 96-TS Installed as a Suction Line Filter-Drier in Remote Systems with Long Refrigerant Lines. The Filter-Drier will Collect and Hold Any Dirt that is in the Evaporator or Suction Line at Start-Up



### FEATURES

- Dual access valve on each end of the drier for accurate pressure drop readings across the drier.
- Solid block desiccant core effectively removes and holds a maximum amount of contaminants with minimal pressure drop.
- Provides high moisture, organic and inorganic acid removal.
- Binding material within the core protects the core from acid decomposition and allows the core to collect and hold the acids from a motor burnout.
- Inlet deflector spreads the refrigerant flow evenly across the molded core to provide full filtration capacity and to prevent erosion of the core.
- For use with HCFCs, CFCs and the lubricants that go with them.
- Nickel plated SAE flare and solid copper ODF fittings.
- Corrosion resistant paint.




96-TS Series
Dimensional Drawing

### SPECIFICATIONS

Maximum Working Pressure . . . . . 500 psig
Minimum Burst Pressure . . . . . 2500 psig
Agency . . . . . UL/CUL file number SA11002

**INSTALLATION NOTE**: The 96-TS suction line filter-drier may be installed in any position in the suction line as close to the compressor as possible, ahead of the accumulator if there is one in the system.

In low temperature applications, the drier should be installed in a vertical position with the flow in a downward direction to prevent oil accumulation.

**SELECTION NOTE**: Given the proper suction line size, connection type and tonnage of the refrigerant system, the correct drier may be selected using the chart below.

**SELECTION:**
**CONNECTIONS, DIMENSIONS, FLOW CAPACITIES① IN REFRIGERANT TONS AT SELECTED EVAPORATOR TEMPERATURES**

| | | | | Flow Capacity in Tons Refrigerant[1] (For kW, Multiply Tons By 3.5)[2] | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | R-134a | | | | R-22 | | | | | R-410A | | | | | R502 | | | | |
| | | | | Evaporator Temperature (°F) | | | | Evaporator Temperature (°F) | | | | | Evaporator Temperature (°F) | | | | | Evaporator Temperature (°F) | | | | |
| | | | | 40 | 20 | 0 | -20 | 40 | 20 | 0 | -20 | -40 | 40 | 20 | 0 | -20 | -40 | 40 | 20 | 0 | -20 | -40 |
| | | Dimension | | Pressure Drop (PSI) | | | | Pressure Drop (PSI) | | | | | Pressure Drop (PSI) | | | | | Pressure Drop (PSI) | | | | |
| Model Number | Connection | A | B | 2 | 1.5 | 1 | 0.5 | 3 | 2 | 1.5 | 1 | 0.5 | 3 | 2 | 1.5 | 1 | 0.5 | 3 | 2 | 1.5 | 1 | 0.5 |
| 96-TS085S | 5/8 ODF | 5.74 | 2.5 | 2.4 | 1.6 | 1.0 | 0.5 | 3.8 | 2.5 | 1.7 | 1.1 | 0.6 | 3.9 | 2.6 | 1.7 | 1.1 | 0.6 | 2.5 | 1.6 | 1.1 | 0.7 | 0.4 |
| 96-TS164S | 1/2 ODF | 6.27 | 2.5 | 1.7 | 1.2 | 0.7 | 0.4 | 2.7 | 1.8 | 1.2 | 0.8 | 0.4 | 2.8 | 1.8 | 1.2 | 0.8 | 0.4 | 1.8 | 1.2 | 0.8 | 0.5 | 0.3 |
| 96-TS165S | 5/8 ODF | 6.54 | 2.5 | 2.2 | 1.5 | 0.9 | 0.5 | 3.4 | 2.2 | 1.5 | 1.0 | 0.5 | 3.5 | 2.2 | 1.5 | 1.0 | 0.5 | 2.2 | 1.4 | 1.0 | 0.6 | 0.3 |
| 96-TS166S | 3/4 ODF | 6.95 | 2.5 | 2.6 | 1.8 | 1.1 | 0.6 | 4.1 | 2.7 | 1.8 | 1.2 | 0.6 | 4.2 | 2.8 | 1.8 | 1.2 | 0.6 | 2.7 | 1.8 | 1.2 | 0.8 | 0.4 |
| 96-TS167S | 7/8 ODF | 7.13 | 2.5 | 2.6 | 1.8 | 1.1 | 0.6 | 4.1 | 2.7 | 1.8 | 1.2 | 0.6 | 4.2 | 2.8 | 1.8 | 1.2 | 0.6 | 2.7 | 1.8 | 1.2 | 0.8 | 0.4 |
| 96-TS306S | 3/4 ODF | 9.63 | 3.0 | 3.4 | 2.3 | 1.4 | 0.8 | 5.4 | 3.5 | 2.4 | 1.5 | 0.8 | 5.5 | 3.6 | 2.4 | 1.5 | 0.8 | 3.5 | 2.3 | 1.6 | 1.0 | 0.5 |
| 96-TS307S | 7/8 ODF | 9.80 | 3.0 | 3.8 | 2.5 | 1.6 | 0.8 | 5.9 | 3.9 | 2.6 | 1.7 | 0.9 | 6.0 | 4.0 | 2.6 | 1.7 | 0.9 | 3.8 | 2.5 | 1.7 | 1.1 | 0.6 |
| 96-TS309S | 9/8 ODF | 9.80 | 3.0 | 3.9 | 2.6 | 1.6 | 0.8 | 6.1 | 4.0 | 2.7 | 1.7 | 0.9 | 6.2 | 4.1 | 2.8 | 1.7 | 0.9 | 4.0 | 2.6 | 1.8 | 1.1 | 0.6 |

[1] All Ratings in accordance with ARI standard 700-04
[2] Example: 1.0 tons x 3.5 = 3.5 KW

96-TSC

## 96-TSC COMPACT SUCTION LINE DRIERS

96-TSC Suction Line Filter-Driers are Designed for Use in Air-Conditioning, Heat Pump, and Refrigeration Systems in which the Available Space in the Suction Line is Limited. Especially Useful in Heat Pump Systems where the Drier Must be Placed Between the Reversing Valve and the Compressor

### FEATURES

- High organic and inorganic acid removal.
- Dual access valves.
- Solid block desiccant core.
- For use with HCFCs, CFCs and the lubricants that go with them.
- Solid copper ODF fittings.
- Corrosion resistant paint.

### SPECIFICATIONS

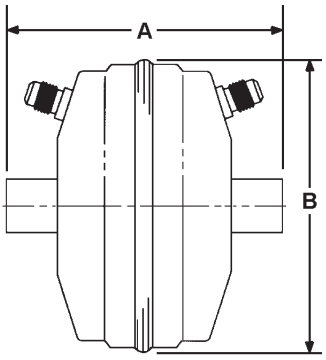
Maximum working pressure . . . . . 400 psig
Minimum burst pressure . . . . . 2000 psig
Agency . . . . . UL/cUL listed file number SA11002



**CONNECTIONS, DIMENSIONS, FLOW CAPACITIES① IN REFRIGERANT TONS AT SELECTED EVAPORATOR TEMPERATURES**

| | | | | Flow Capacity in Tons Refrigerant[1] (For kW, Multiply Tons By 3.5)[2] | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | R-134a | | | | R-22 | | | | | R-410A | | | | | R502 | | | | |
| | | | | Evaporator Temperature (°F) | | | | Evaporator Temperature (°F) | | | | | Evaporator Temperature (°F) | | | | | Evaporator Temperature (°F) | | | | |
| | | | | 40 | 20 | 0 | -20 | 40 | 20 | 0 | -20 | -40 | 40 | 20 | 0 | -20 | -40 | 40 | 20 | 0 | -20 | -40 |
| | | Dimension | | | | | | Pressure Drop (PSI) | | | | | Pressure Drop (PSI) | | | | | Pressure Drop (PSI) | | | | |
| Model Number | Connection | A | B | 2 | 1.5 | 1 | 0.5 | 3 | 2 | 1.5 | 1 | 0.5 | 3 | 2 | 1.5 | 1 | 0.5 | 3 | 2 | 1.5 | 1 | 0.5 |
| 96-TSC146S | 5/8 ODF | 4.49 | 4.57 | 2.3 | 1.5 | 0.9 | 0.5 | 3.6 | 2.5 | 2.4 | 1.0 | 0.5 | 3.7 | 2.4 | 1.6 | 1.0 | 0.5 | 2.6 | 1.7 | 1.1 | 0.7 | 0.3 |
| 96-TSC147S | 1/2 ODF | 4.55 | 4.57 | 3.3 | 2.2 | 1.4 | 0.7 | 5.2 | 3.4 | 2.3 | 1.5 | 0.8 | 5.3 | 3.5 | 2.3 | 1.5 | 0.8 | 3.6 | 2.3 | 1.5 | 0.9 | 0.5 |

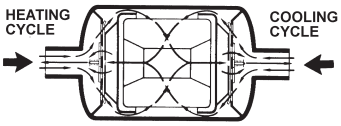
[1] All Ratings in accordance with ARI standard 730-04
[2] Example: 1.0 tons x 3.5 = 3.5 KW

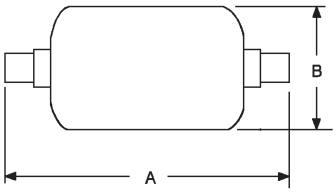



96-TSC
Dimensional Drawing

96-TBF






**96-TBF Series Dimensional Drawing**

## 96-TBF BI-DIRECTIONAL HEAT PUMP DRIERS

Bi-Directional Driers Designed to Provide Complete Protection to Your Heat Pump or Reverse Cycle System. This Compact Design Filters Contaminants, Removes Moisture and Acids During the Cooling and Heating Cycles During Winter and Summer. Internal Check Valves Prevent the Release of Collected Contaminants when the Heat Pump Cycles from the Heating to Cooling Modes

### FEATURES

- Proven, nylon internal check valves.
- Solid block desiccant core: a composite of molecular sieve and activated alumina.
- Provides high moisture, organic and inorganic acid removal.
- The addition of charcoal to the desiccant core allows for the removal of wax that may occur at low evaporator temperatures.
- Solid copper ODF fittings.
- Corrosion resistant paint.

### SPECIFICATIONS

Maximum Working Pressure . . . . . 680 psig
Minimum Burst Pressure . . . . . 2500 psig
Agency . . . . . U.L. file number SA11002
C.S.A. file number LR100624

**INSTALLATION NOTE**: The drier may be installed in any position in the reversing liquid line.

**SELECTION NOTE**: Given the proper liquid line size, connection type and tonnage of the refrigerant system, the correct drier may be selected using the chart below. Choosing a unit size with sufficient water capacity to reduce moisture content of the system to a safe level should be considered.

**SELECTION: CONNECTIONS, DIMENSIONS, FLOW CAPACITIES**

| Model Number | Connection | Dimension | | Flow Capacity in Tons @ 1 PSI ΔP#$ (for kW, Multiply Tons By 3.5) | | |
|---|---|---|---|---|---|---|
| | | A | B | R-22 | R-410A | R-407C |
| 96-TBF083S | 3/8 ODF | 5.29 | 2.31 | 4.0 | 4.1 | 3.9 |
| 96-TBF163S | 3/8 ODF | 6.08 | 3.06 | 4.5 | 4.6 | 4.4 |
| 96-TBF164S | 1/2 ODF | 6.17 | 3.17 | 5.2 | 5.3 | 5.1 |
| 96-TBF165S | 5/8 ODF | 6.39 | 3.17 | 6.0 | 6.1 | 5.9 |

# All ratings in accordance with ARI standard 710-86. 86°F liquid refrigerant temperature
5°F Saturated vapor temperature
3.1 lbs/min./ton R-134a
2.9 lbs/min./ton R-22 and R-407C
4.0 lbs/min./ton R-404A/507 and R-12
4.4 lbs/min./ton R-502
2.7 lbs/min./ton R-410A

$ for 2 PSI ΔP, multiply values by 1.4