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# Filter-Driers

Catalog A-1, January 2020



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Catalog A-1, January 2020 supersedes Catalog A-1, February 2019 and all prior publications.

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# Introduction to Filter-Driers

The function of a filter-drier in a refrigeration system is to remove contaminants that are harmful. If these contaminants remain at elevated levels, they will jeopardize the longevity of the system. Contaminants that are frequently found include moisture, acid, copper oxides, metal chips, wax-like compounds and others.

Selecting a filter-drier for a particular application requires various technical factors to be considered. These factors include the type of system, connecting line size, water capacity, flow capacity (size of system), filtration capability, acid capacity, material of construction (steel vs. copper), and design pressures. Evaluation of each factor is necessary to ensure proper and economical filter-drier design.

Parker has developed filter-drier recommendations based on current technical data, as well as many years of actual field experience. Products are tested for flow and water capacity using the American Society of Heating, Refrigeration and Air Conditioning Engineers (ASHRAE) Standard 63.1 and are rated for use based on the Air Conditioning, Heating and Refrigeration Institute's guideline AHRI-710. Data obtained from this testing is shown in the capacities tables for liquid line filter-driers and can be used for comparison purposes. However, other factors must be considered for various types of equipment.

## Moisture Removal

The ability to remove moisture from a refrigerant system is a primary function of the filter-drier. Moisture can come from many sources such as trapped air from improper evacuation, system leaks, and motor windings, to name a few. Another source is due to improper handling of polyolester (POE) and polyvinyl ether (PVE) lubricants, which are hygroscopic; that is, they readily absorb moisture. POEs and PVEs can pick up more moisture from their surroundings and hold it much tighter than the mineral oils which have been used for

many years. This moisture can cause freeze-ups and corrosion of metallic components. Moisture in the system can hydrolyze the POE lubricant, forming organic acids. These acids, if they exist in significant quantity, will react with materials within the system and can adversely affect component operation. To prevent the formation of these acids, the moisture must be minimized. This is accomplished by the use of a filter-drier that utilizes molecular sieve and activated alumina.

Molecular sieves are crystalline sodium aluminosilicates (synthetic zeolites) having cubic crystals which selectively adsorb molecules based on molecular size and polarity. The crystal structure is honeycombed with regularly spaced cavities or pores. Each of these cavities or pores are uniform in size. This permits molecules, such as water, to be adsorbed, while allowing other larger molecules, such as the refrigerant, lubricant and acids to pass by. The surface of the desiccant is charged positively with cations, which act as a magnet and will therefore adsorb polarized molecules, such as water, and hold them tightly on the structure.

## Acid Removal

Refrigerants by themselves are very stable, even when heated to a high temperature. However, certain conditions do occur which can result in the formation of acids. The reaction of refrigerants with water may cause hydrolysis and the formation of hydrochloric and hydrofluoric acids. These acids are usually present as a gas in the system and are highly corrosive. In ordinary usage this reaction is negligible, but in a very wet system operating at abnormally high temperature, some hydrolysis may occur.

Another significant source of acidity in refrigeration systems is organic acid formed from lubricant breakdown. As previously discussed, this can be the by-product of the hydrolyzed lubricant. However, organic acids can

result from an oxidation reaction of the lubricant (from air left in the system) or if the thermal stability of the lubricant is exceeded for a period of time from an improper operating system.

Activated alumina is the desiccant of choice if added acid capacity is desired in the filter-drier. Many of the copper spun filter-driers referenced in this catalog are made with a 100% molecular sieve formulation and are not equipped with activated alumina. This is often all that is required for the type of system where they are used, since they minimize the potential of hydrolysis reactions of the lubricant and/or refrigerant. Copper filter-driers are designed with a molecular sieve to achieve the maximum water capacity because they are typically smaller than the steel counterpart and need this capacity. However, copper spun filter-driers are available with molecular sieve/activated alumina formulations if desired.

For steel shell filter-driers, catalog products often utilize a molecular sieve/activated alumina formulation appropriate with current system chemistries. These products come standard with this desiccant blend because these products often find numerous applications in service where the type and amount of contaminants are unknown. For these applications, filter-driers with a blend of molecular sieve and activated alumina is advantageous.

## Filtration

Scale, solder particles, metallic fines and all types of foreign substances must be removed to protect the compressor, solenoid valves, expansion valves, capillary tubes and other close tolerance parts of a refrigeration system.

The solution to system filtration is the use of a filter-drier. The filter-drier can be constructed in two different formats to perform this function. The filter-drier can be a spring load desiccant design that utilizes multiple layers of a fibrous media that captures the circulating

# Introduction to Filter-Driers

particulate. The alternate design (always used in large systems) is a molded core made with a specific desiccant formulation. The desiccants are sized and bonded in such a way that the useable shape provides the filtration. The large particles are caught on the surface of the core and the smaller solids are captured as the refrigerant channels through the desiccant core.

## Steel vs. Copper

The major differences in using steel vs. copper filter-driers are the system sizes and applications. Copper filter-driers are normally used in 5 ton and smaller, less

complex applications, including systems with less pressure fluctuations and lower vibration tendencies. Some smaller systems do not require high filtration capabilities; however, some of the smaller systems will require better filtration. In order to meet these requirements, a molded core construction and filter-driers with additional fibrous media and screen should be considered. Also, copper is typically the most economical option for smaller systems. Because copper driers are used for smaller applications, the refrigerant charge required will generally be smaller than in the steel filter-drier.

Information regarding operating pressure is required to adequately size the wall thickness of the filter-drier to attain the ultimate burst pressure, for both copper and steel. In accordance with Underwriters Laboratories (UL), the burst pressure is rated as five times the design working pressure of the system, or three times the design working pressure of the system when evaluated using the fatigue stress test outlined in UL 207. Typically, for copper filter-driers, the design working pressure can be correlated to tube diameter and wall thickness to meet specific UL specifications.

## Copper Service Filter-Driers

Parker's copper service filter-driers adsorb moisture and provide filtration to systems in the field. The features of the copper service filter-driers are provided below.

### Applications

- Air conditioning, heat pump, and small refrigeration systems

### Features and Benefits

- Made in the USA
- Worldwide OEM acceptance and usage
- All copper construction for corrosion resistance and simplified brazing
- 100% molecular sieve
- Compatible with commercially available refrigerants and lubricants
- UL Recognized SMGT2/SMGT8-SA1756

#### MMS-80

Working psi: 700

#### MMS-100

Working psi: 500

#### MMS-200

Working psi: 700

#### 712

Working psi: 500

#### 319F

Working psi: 750

#### 619/620

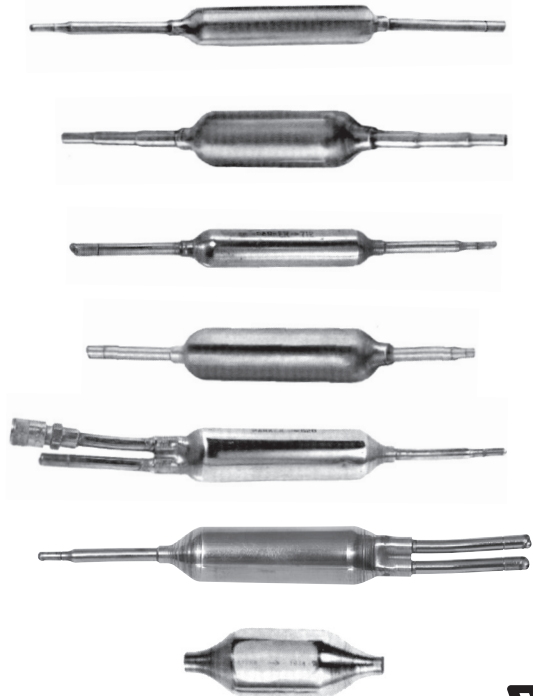
Working psi: 750

#### 621

Working psi: 750

#### 1638F (Formerly C073S)

Working psi: 750



**Note:** For models 319F and 1638F, the "F" represents UL fatigue qualification, not flare fittings.



# Copper Service Filter-Driers

## Specifications

| U.L.<br>Model No.         | Part No.  | Molecular<br>Sieve<br>(wt.) | Description                                            | MRP |      | Tube<br>Diameter |    | Overall<br>Length |     | Inlet<br>Tube Size<br>(Inches) |      | Outlet<br>Tube Size<br>(Inches) |                       |
|---------------------------|-----------|-----------------------------|--------------------------------------------------------|-----|------|------------------|----|-------------------|-----|--------------------------------|------|---------------------------------|-----------------------|
|                           |           |                             |                                                        | psi | bar  | Inches           | mm | Inches            | mm  | OD                             | ID   | OD                              | ID                    |
| MMS-80                    | 058070-01 | 10g                         | 3/4" Non-directional<br>(Not for Bi-Flow applications) | 700 | 48.3 | 0.75             | 19 | 7.24              | 184 | 1/4                            | 3/16 | 1/4                             | 3/16                  |
| MMS-100                   | 058198-01 | 10g                         | 3/4" directional                                       | 500 | 34.5 | 0.75             | 19 | 7.24              | 184 | 1/4                            | 3/16 | 1/4                             | 3/16                  |
| MMS-200                   | 032134-01 | 20g                         | 1" directional with 3 step<br>down fitting sizes       | 700 | 48.3 | 1.00             | 25 | 10.07             | 256 | 1/4                            | 3/16 | 1/4                             | 3/16                  |
|                           |           |                             |                                                        |     |      |                  |    |                   |     | 5/16                           | 1/4  | 5/16                            | 1/4                   |
|                           |           |                             |                                                        |     |      |                  |    |                   |     | 3/8                            | 5/16 | 3/8                             | 5/16                  |
| 712                       | 032092-01 | 10g                         | 3/4" directional                                       | 500 | 34.5 | 0.75             | 19 | 7.31              | 186 | 1/4                            | 3/16 | —                               | .089 - .092 cap. tube |
| 319F                      | 032144-01 | 30g                         | 1-3/16" directional                                    | 750 | 51.7 | 1.19             | 30 | 8.63              | 219 | 5/16                           | 1/4  | —                               | .127 - .130 cap. tube |
| 619                       | 032142-01 | 10g                         | 3/4" w/access valve                                    |     |      | 0.75             | 19 | 7.98              | 203 | 1/4                            | 3/16 | —                               | .089 - .092 cap. tube |
| 620                       | 032133-02 | 20g                         | 1" w/access valve                                      |     |      | 1.00             | 25 | 8.54              | 217 | 5/16                           | 1/4  | —                               | .127 - .130 cap. tube |
| 621                       | 032143-01 | 20g                         | 1" w/double inlet                                      |     |      | 1.00             | 25 | 7.87              | 200 | 5/16                           | 1/4  | —                               | .127 - .130 cap. tube |
| 1638F<br>(Formerly C073S) | 032145-00 | 28g                         | 1-5/8" directional                                     |     |      | 1.63             | 41 | 4.38              | 111 | —                              | 3/8  | —                               | 3/8                   |

| U.L.<br>Model No.         | Part No.  | Recommended Tonnages / kW |      |                      |       |      |      |        |       |
|---------------------------|-----------|---------------------------|------|----------------------|-------|------|------|--------|-------|
|                           |           | R-134a                    |      | R-404A, R-502, R-507 |       | R-22 |      | R-410A |       |
|                           |           | Tons                      | kW   | Tons                 | kW    | Tons | kW   | Tons   | kW    |
| MMS-80                    | 058070-01 | 1/3                       | 1.17 | 1/4                  | 0.91  | 1/2  | 1.76 | 1/2    | 1.80  |
| MMS-100                   | 058198-01 | 1/3                       | 1.17 | 1/4                  | 0.91  | 1/2  | 1.76 | 1/2    | 1.80  |
| MMS-200                   | 032134-01 | 3/4                       | 2.64 | 1/2                  | 2.05  | 1    | 3.52 | 1      | 3.60  |
| 712                       | 032092-01 | 1/3                       | 1.17 | 1/4                  | 0.91  | 1/2  | 1.76 | 1/2    | 1.80  |
| 319F                      | 032144-01 | 1                         | 3.52 | 3/4                  | 2.73  | 2    | 7.03 | 2      | 7.20  |
| 619                       | 032142-01 | 1/3                       | 1.17 | 1/4                  | 0.91  | 1/2  | 1.76 | 1/2    | 1.80  |
| 620                       | 032133-02 | 1                         | 3.52 | 3/4                  | 2.73  | 2    | 7.03 | 2      | 7.20  |
| 621                       | 032143-01 | 1                         | 3.52 | 3/4                  | 2.73  | 2    | 7.03 | 2      | 7.20  |
| 1638F<br>(Formerly C073S) | 032145-00 | 4                         | 14.1 | 3                    | 10.94 | 4    | 14.1 | 4      | 14.41 |

## Water Capacity In Drops (Grams\*) at AHRI-710 Conditions

| U.L.<br>Model No.         | Part No.  | Water Capacity in Drops |                 |                |                 |                |                 |                |                 |                |                 |
|---------------------------|-----------|-------------------------|-----------------|----------------|-----------------|----------------|-----------------|----------------|-----------------|----------------|-----------------|
|                           |           | R-12                    |                 | R-22           |                 | R-134a         |                 | R-401A, R-401B |                 | R-402A, R-402B |                 |
|                           |           | 75°F<br>(24°C)          | 125°F<br>(52°C) | 75°F<br>(24°C) | 125°F<br>(52°C) | 75°F<br>(24°C) | 125°F<br>(52°C) | 75°F<br>(24°C) | 125°F<br>(52°C) | 75°F<br>(24°C) | 125°F<br>(52°C) |
| MMS-80                    | 058070-01 | 33                      | 30              | 29             | 27              | 32             | 31              | 32             | 30              | 33             | 30              |
| MMS-100                   | 058198-01 | 33                      | 30              | 29             | 27              | 32             | 31              | 32             | 30              | 33             | 30              |
| MMS-200                   | 032134-01 | 66                      | 61              | 59             | 54              | 65             | 62              | 65             | 60              | 66             | 61              |
| 712                       | 032092-01 | 33                      | 30              | 29             | 27              | 32             | 31              | 32             | 30              | 33             | 30              |
| 319F                      | 032144-01 | 99                      | 91              | 89             | 82              | 97             | 93              | 97             | 90              | 99             | 91              |
| 619                       | 032142-01 | 33                      | 30              | 29             | 27              | 32             | 31              | 32             | 30              | 33             | 30              |
| 620                       | 032133-02 | 66                      | 61              | 59             | 54              | 65             | 62              | 65             | 60              | 66             | 61              |
| 621                       | 032143-01 | 66                      | 61              | 59             | 54              | 65             | 62              | 65             | 60              | 66             | 61              |
| 1638F<br>(Formerly C073S) | 032145-00 | 92                      | 85              | 83             | 76              | 91             | 86              | 91             | 84              | 92             | 85              |

| U.L.<br>Model No.         | Part No.  | Water Capacity in Drops |              |             |              |             |              |             |              |
|---------------------------|-----------|-------------------------|--------------|-------------|--------------|-------------|--------------|-------------|--------------|
|                           |           | R-404A, R-507           |              | R-407C      |              | R-410A      |              | R-502       |              |
|                           |           | 75°F (24°C)             | 125°F (52°C) | 75°F (24°C) | 125°F (52°C) | 75°F (24°C) | 125°F (52°C) | 75°F (24°C) | 125°F (52°C) |
| MMS-80                    | 058070-01 | 32                      | 30           | 26          | 23           | 19          | 17           | 30          | 28           |
| MMS-100                   | 058198-01 | 32                      | 30           | 26          | 23           | 19          | 17           | 30          | 28           |
| MMS-200                   | 032134-01 | 65                      | 61           | 52          | 47           | 39          | 34           | 60          | 57           |
| 712                       | 032092-01 | 32                      | 30           | 26          | 23           | 19          | 17           | 30          | 28           |
| 319F                      | 032144-01 | 98                      | 91           | 78          | 70           | 59          | 52           | 91          | 85           |
| 619                       | 032142-01 | 32                      | 30           | 26          | 23           | 19          | 17           | 30          | 28           |
| 620                       | 032133-02 | 65                      | 61           | 52          | 47           | 39          | 34           | 60          | 57           |
| 621                       | 032143-01 | 65                      | 61           | 52          | 47           | 39          | 34           | 60          | 57           |
| 1638F<br>(Formerly C073S) | 032145-00 | 91                      | 85           | 73          | 66           | 55          | 48           | 85          | 80           |

\* 20 Drops = 1 Gram = 1 cc

# Gold Label™ Series Liquid Line Filter-Driers

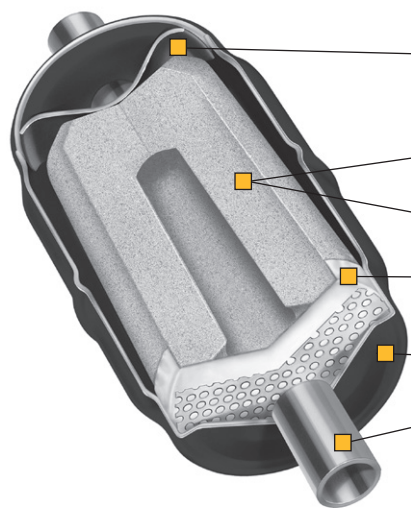
## LLD Series

### Features and Benefits

- Made in the USA
- Unsurpassed moisture capacity and maximum filtration capability for today's systems
- Compatible with all commercially available refrigerants including R-410A
- Compatible with mineral oil, alkylbenzene and POE lubricants
- Solid molecular sieve core
- Solid copper ODF solder fittings and nickel plated steel SAE fittings
- Powder paint exterior coating surpasses 500 hour ASTM salt spray test to resist corrosion
- Maximum Rated Pressure of 650 psig (44.8 bar).
- UL Listed under SMGT/SMGT7-SA1756



c  US  
LISTED



Leaf-spring holds core firmly in place and provides shockproof assembly for rugged handling

Solid molecular sieve core delivers outstanding filtration capability while providing exceptional water and acid capacity

Robust molded core eliminates the possibility of desiccant breakdown

Polyester pad seals core to shell wall to prevent refrigerant bypassing core, provides added filtration

Corrosion resistant epoxy coating

Solid copper fittings

Compatible with HCFC, HFC and the new HFO/R32 blend refrigerants

### Water Capacity In Drops (Grams\*) at AHRI-710 Conditions

| Model Series | R-22<br>(60 ppm) |              | R-134a<br>(50 ppm) |              | R-404A, R-507<br>(50 ppm) |              | R-407C<br>(50 ppm) |              | R-410A<br>(50 ppm) |              |
|--------------|------------------|--------------|--------------------|--------------|---------------------------|--------------|--------------------|--------------|--------------------|--------------|
|              | 75°F (24°C)      | 125°F (52°C) | 75°F (24°C)        | 125°F (52°C) | 75°F (24°C)               | 125°F (52°C) | 75°F (24°C)        | 125°F (52°C) | 75°F (24°C)        | 125°F (52°C) |
| LLD-030      | 71               | 66           | 78                 | 74           | 78                        | 73           | 55                 | 49           | 42                 | 37           |
| LLD-050      | 177              | 160          | 196                | 185          | 194                       | 182          | 127                | 115          | 87                 | 78           |
| LLD-080      | 250              | 230          | 277                | 262          | 273                       | 257          | 180                | 162          | 124                | 111          |
| LLD-160      | 358              | 325          | 395                | 375          | 389                       | 367          | 258                | 232          | 178                | 159          |
| LLD-300+     | 755              | 698          | 826                | 786          | 822                       | 773          | 579                | 521          | 446                | 397          |
| LLD-410+     | 1053             | 973          | 1151               | 1096         | 1145                      | 1078         | 806                | 726          | 622                | 554          |
| LLD-600+     | 1607             | 1485         | 1757               | 1673         | 1748                      | 1645         | 1231               | 1109         | 949                | 846          |

\* 20 Drops = 1 Gram = 1 cc

+ Molded solid core

### Refrigerant Holding Capacity – Ounces (kg) of Refrigerant @ 100°F (38°C)

| Model Series | R-12   |      | R-22   |      | R-134a |      | R-404A, R-507 |      | R-407C |      | R-410A |      | R-502  |      |
|--------------|--------|------|--------|------|--------|------|---------------|------|--------|------|--------|------|--------|------|
|              | Ounces | kg   | Ounces | kg   | Ounces | kg   | Ounces        | kg   | Ounces | kg   | Ounces | kg   | Ounces | kg   |
| LLD-030      | 1.9    | 0.05 | 1.7    | 0.05 | 1.8    | 0.05 | 1.5           | 0.04 | 1.5    | 0.04 | 1.5    | 0.04 | 1.8    | 0.05 |
| LLD-050      | 3.3    | 0.09 | 3.0    | 0.09 | 3.0    | 0.09 | 2.6           | 0.07 | 2.8    | 0.08 | 2.6    | 0.07 | 2.9    | 0.08 |
| LLD-080      | 6.1    | 0.17 | 5.5    | 0.16 | 5.6    | 0.16 | 4.8           | 0.14 | 5.3    | 0.15 | 4.8    | 0.14 | 5.4    | 0.15 |
| LLD-160      | 9.1    | 0.26 | 8.2    | 0.23 | 8.4    | 0.24 | 7.1           | 0.20 | 7.8    | 0.22 | 7.2    | 0.20 | 8.0    | 0.23 |
| LLD-300      | 26.7   | 0.76 | 24.2   | 0.69 | 24.5   | 0.69 | 20.7          | 0.59 | 20.8   | 0.59 | 21.1   | 0.60 | 24.4   | 0.69 |
| LLD-410      | 37.3   | 1.06 | 33.8   | 0.96 | 34.2   | 0.97 | 29.0          | 0.82 | 29.0   | 0.82 | 29.4   | 0.83 | 34.1   | 0.97 |
| LLD-600      | 71.3   | 2.02 | 64.5   | 1.83 | 65.3   | 1.85 | 55.3          | 1.57 | 56.5   | 1.60 | 56.2   | 1.59 | 65.2   | 1.85 |

# Gold Label™ Series Liquid Line Filter-Driers

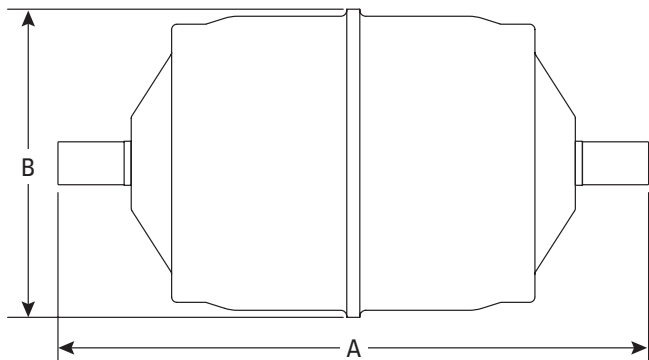
## Type LLD

Flow Capacity – Tons of Refrigeration at 1 psid (0.07 bar)

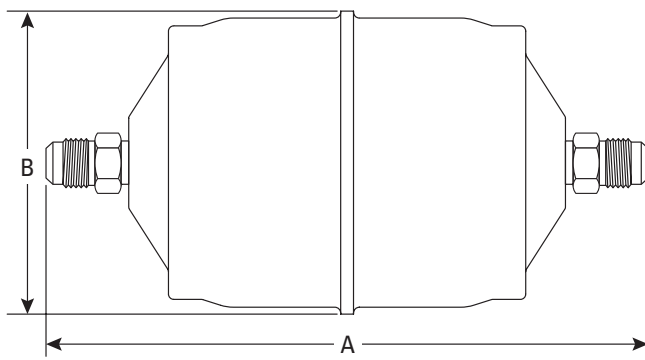
| Model No. | Part Number | Fitting Type (Inches)   | Overall Length "A" |     | Shell Diameter "B" |     | Flow Capacity – Tons (kW) @ 1 psid (0.07 bar) |      |        |      |               |      |        |      |        |      |
|-----------|-------------|-------------------------|--------------------|-----|--------------------|-----|-----------------------------------------------|------|--------|------|---------------|------|--------|------|--------|------|
|           |             |                         |                    |     |                    |     | R-22                                          |      | R-134a |      | R-404A, R-507 |      | R-407C |      | R-410A |      |
|           |             |                         | Inches             | mm  | Inches             | mm  | Tons                                          | kW   | Tons   | kW   | Tons          | kW   | Tons   | kW   | Tons   | kW   |
| 032       | 450270-001  | 1/4 SAE Flare           | 4.24               | 108 | 1.78               | 45  | 1.50                                          | 5.3  | 1.3    | 4.6  | 1.0           | 3.5  | 1.3    | 4.6  | 1.4    | 4.9  |
| 032S      | 450273-001  | 1/4 ODF Solder          | 3.78               | 96  | 1.78               | 45  |                                               |      |        |      |               |      |        |      |        |      |
| 032MF     | 450272-001  | 1/4 male x female flare | 3.93               | 100 | 1.78               | 45  |                                               |      |        |      |               |      |        |      |        |      |
| 052       | 450274-001  | 1/4 SAE Flare           | 4.72               | 120 | 2.45               | 62  | 2.1                                           | 7.4  | 1.9    | 6.7  | 1.4           | 4.9  | 1.9    | 6.7  | 2.0    | 7.0  |
| 052S      | 450275-001  | 1/4 ODF Solder          | 4.26               | 108 | 2.45               | 62  | 4.1                                           | 14.4 | 3.8    | 13.3 | 2.7           | 9.5  | 3.8    | 13.3 | 4.0    | 14.0 |
| 053       | 450276-001  | 3/8 SAE Flare           | 5.16               | 131 | 2.45               | 62  |                                               |      |        |      |               |      |        |      |        |      |
| 053S      | 450277-001  | 3/8 ODF Solder          | 4.40               | 112 | 2.45               | 62  |                                               |      |        |      |               |      |        |      |        |      |
| 082       | 450278-001  | 1/4 SAE Flare           | 5.62               | 143 | 2.69               | 68  | 2.1                                           | 7.4  | 1.9    | 6.7  | 1.4           | 4.9  | 1.9    | 6.7  | 2.0    | 7.0  |
| 082S      | 450279-001  | 1/4 ODF Solder          | 5.16               | 131 | 2.69               | 68  | 4.5                                           | 15.8 | 4.2    | 14.7 | 3.0           | 10.5 | 4.2    | 14.7 | 4.4    | 15.4 |
| 083       | 450280-001  | 3/8 SAE Flare           | 6.06               | 154 | 2.69               | 68  |                                               |      |        |      |               |      |        |      |        |      |
| 083S      | 450283-001  | 3/8 ODF Solder          | 5.30               | 135 | 2.69               | 68  |                                               |      |        |      |               |      |        |      |        |      |
| DSG-083S+ | 450294-001  | 3/8 ODF Solder          | 7.66               | 194 | 2.69               | 68  | 5.2                                           | 18.3 | 4.7    | 16.5 | 3.4           | 11.9 | 4.7    | 16.5 | 5.0    | 17.6 |
| 084       | 450284-001  | 1/2 SAE Flare           | 6.32               | 161 | 2.69               | 68  | 8.1                                           | 28.4 | 7.4    | 26.0 | 5.5           | 19.3 | 7.5    | 26.3 | 7.9    | 27.7 |
| 084S      | 450285-001  | 1/2 ODF Solder          | 5.42               | 138 | 2.69               | 68  | 8.7                                           | 30.5 | 7.9    | 27.7 | 5.9           | 20.7 | 8.0    | 28.1 | 8.5    | 29.8 |
| 163       | 450286-001  | 3/8 SAE Flare           | 6.72               | 171 | 3.03               | 77  | 4.5                                           | 15.8 | 4.2    | 14.7 | 3.0           | 10.5 | 4.2    | 14.7 | 4.4    | 15.4 |
| 163S      | 450288-001  | 3/8 ODF Solder          | 5.96               | 151 | 3.03               | 77  | 5.2                                           | 18.3 | 4.7    | 16.5 | 3.4           | 11.9 | 4.7    | 16.5 | 5.0    | 17.6 |
| DSG-163S+ | 450295-001  | 3/8 ODF Solder          | 8.30               | 211 | 3.03               | 77  | 5.2                                           | 18.3 | 4.7    | 16.5 | 3.4           | 11.9 | 4.7    | 16.5 | 5.0    | 17.6 |
| 164       | 450289-001  | 1/2 SAE Flare           | 6.98               | 177 | 3.03               | 77  | 10.1                                          | 35.5 | 9.3    | 32.6 | 6.8           | 23.9 | 9.3    | 32.6 | 9.8    | 34.4 |
| 164S      | 450291-001  | 1/2 ODF Solder          | 6.08               | 154 | 3.03               | 77  | 11.0                                          | 38.6 | 10.1   | 35.5 | 7.3           | 25.6 | 10.1   | 35.5 | 10.7   | 37.6 |
| 165       | 450292-001  | 5/8 SAE Flare           | 7.28               | 185 | 3.03               | 77  | 12.1                                          | 42.5 | 11.0   | 38.6 | 8.2           | 28.8 | 11.1   | 39.0 | 11.7   | 41.1 |
| 165S      | 450293-001  | 5/8 ODF Solder          | 6.32               | 161 | 3.03               | 77  | 13.8                                          | 48.4 | 12.6   | 44.2 | 9.2           | 32.3 | 12.7   | 44.6 | 13.4   | 47.0 |
| 303       | 450030-001  | 3/8 SAE Flare           | 9.69               | 246 | 3.00               | 76  | 5.44                                          | 19.2 | 4.89   | 17.1 | 3.49          | 12.2 | 5.19   | 18.2 | 5.29   | 18.5 |
| 303S      | 450031-001  | 3/8 ODF Solder          | 8.86               | 225 | 3.00               | 76  | 6.15                                          | 21.5 | 5.57   | 19.5 | 3.98          | 13.9 | 5.92   | 20.7 | 6.03   | 21.1 |
| 304       | 450032-001  | 1/2 SAE Flare           | 9.94               | 252 | 3.00               | 76  | 10.75                                         | 31.6 | 9.69   | 33.9 | 6.92          | 24.2 | 10.30  | 36.1 | 10.48  | 36.7 |
| 304S      | 450046-001  | 1/2 ODF Solder          | 9.00               | 229 | 3.00               | 76  | 12.44                                         | 43.5 | 11.23  | 39.3 | 8.02          | 28.1 | 11.94  | 41.8 | 12.15  | 42.5 |
| 305       | 450033-002  | 5/8 SAE Flare           | 10.19              | 259 | 3.00               | 76  | 14.71                                         | 51.4 | 13.29  | 46.5 | 9.49          | 33.2 | 14.13  | 49.5 | 14.38  | 50.3 |
| 305S      | 450043-001  | 5/8 ODF Solder          | 9.24               | 235 | 3.00               | 76  | 16.26                                         | 56.9 | 14.66  | 51.3 | 10.47         | 36.6 | 15.58  | 54.5 | 15.86  | 55.5 |
| 307S      | 450055-001  | 7/8 ODF Solder          | 9.30               | 236 | 3.00               | 76  | 20.15                                         | 70.5 | 18.18  | 63.6 | 12.98         | 45.4 | 19.32  | 67.6 | 19.67  | 68.8 |
| 415       | 450057-001  | 5/8 SAE Flare           | 10.38              | 264 | 3.50               | 311 | 14.71                                         | 51.4 | 13.29  | 46.5 | 9.49          | 33.2 | 14.13  | 49.5 | 14.38  | 50.3 |
| 415S      | 450047-001  | 5/8 ODF Solder          | 9.43               | 240 | 3.50               | 311 | 16.26                                         | 56.9 | 14.66  | 51.3 | 10.47         | 36.6 | 15.58  | 54.5 | 15.86  | 55.5 |
| 417S      | 450058-001  | 7/8 ODF Solder          | 9.49               | 241 | 3.50               | 311 | 23.12                                         | 80.9 | 20.84  | 72.9 | 14.88         | 52.1 | 22.15  | 77.5 | 22.54  | 78.9 |
| 607S      | 450118-001  | 7/8 ODF Solder          | 15.11              | 384 | 3.50               | 311 | 24.32                                         | 85.1 | 22.04  | 77.1 | 15.74         | 55.1 | 23.42  | 82.0 | 23.84  | 83.4 |
| 609S      | 450117-001  | 1-1/8 ODF Solder        | 15.99              | 406 | 3.50               | 311 | 26.80                                         | 93.8 | 24.27  | 84.9 | 17.33         | 60.7 | 25.79  | 90.3 | 26.26  | 91.9 |

+ DSG models include Integrated PSG Moisture Indicator Sight Glass.

ODF Solder



SAE Flare





# Gold Label™ Series Liquid Line Filter-Driers

## Type LLD

### Installation Recommendations – Tons (kW)

| Model No. | Refrigeration<br>Commercial Low Temp. Equipment |                     |                      |                     |                  |                     | Air Conditioning<br>Field Replacement or Field Build-up Equipment |                     |                      |                      |
|-----------|-------------------------------------------------|---------------------|----------------------|---------------------|------------------|---------------------|-------------------------------------------------------------------|---------------------|----------------------|----------------------|
|           | R-134a                                          |                     | R-22                 |                     | R-404A, R-507    |                     | R-134a                                                            |                     | R-22, R-407C, R-410A |                      |
|           | Tons                                            | kW                  | Tons                 | kW                  | Tons             | kW                  | Tons                                                              | kW                  | Tons                 | kW                   |
| 032       | 1/4                                             | 0.9                 | 1/4                  | 0.9                 | 1/4              | 0.9                 | 1/2                                                               | 1.8                 | 1/2                  | 1.8                  |
| 032S      |                                                 |                     |                      |                     |                  |                     |                                                                   |                     |                      |                      |
| 032MF     |                                                 |                     |                      |                     |                  |                     |                                                                   |                     |                      |                      |
| 052       | 1/3                                             | 1.2                 | 1/3                  | 1.2                 | 1/3              | 1.2                 | 3/4<br>thru<br>1                                                  | 2.6<br>thru<br>3.5  | 3/4<br>thru<br>2     | 2.6<br>thru<br>7     |
| 052S      |                                                 |                     |                      |                     |                  |                     |                                                                   |                     |                      |                      |
| 053       |                                                 |                     |                      |                     |                  |                     |                                                                   |                     |                      |                      |
| 053S      |                                                 |                     |                      |                     |                  |                     |                                                                   |                     |                      |                      |
| 082       | 1/2<br>thru<br>1-1/2                            | 1.8<br>thru<br>5.3  | 1/2<br>thru<br>1-1/2 | 1.8<br>thru<br>5.3  | 1/2<br>thru<br>1 | 1.8<br>thru<br>3.5  | 3/4<br>thru<br>2                                                  | 2.6<br>thru<br>7    | 1<br>thru<br>2       | 3.5<br>thru<br>7     |
| 082S      |                                                 |                     |                      |                     |                  |                     |                                                                   |                     |                      |                      |
| 083       |                                                 |                     |                      |                     |                  |                     |                                                                   |                     |                      |                      |
| 083S      |                                                 |                     |                      |                     |                  |                     |                                                                   |                     |                      |                      |
| 084       | 1<br>thru<br>2                                  | 3.5<br>thru<br>7    | 1-1/2<br>thru<br>3   | 5.3<br>thru<br>10.5 | 3/4<br>thru<br>2 | 2.6<br>thru<br>7    | 1<br>thru<br>5                                                    | 3.5<br>thru<br>17.5 | 1-1/2<br>thru<br>5   | 1.8<br>thru<br>17.5  |
| 084S      |                                                 |                     |                      |                     |                  |                     |                                                                   |                     |                      |                      |
| 163       |                                                 |                     |                      |                     |                  |                     |                                                                   |                     |                      |                      |
| 163S      |                                                 |                     |                      |                     |                  |                     |                                                                   |                     |                      |                      |
| 164       | 3<br>thru<br>5                                  | 5.3<br>thru<br>17.5 | 3<br>thru<br>5       | 5.3<br>thru<br>17.5 | 2<br>thru<br>5   | 2.6<br>thru<br>17.5 | 3<br>thru<br>7-1/2                                                | 5.3<br>thru<br>26.3 | 4<br>thru<br>10      | 14<br>thru<br>35     |
| 164S      |                                                 |                     |                      |                     |                  |                     |                                                                   |                     |                      |                      |
| 165       |                                                 |                     |                      |                     |                  |                     |                                                                   |                     |                      |                      |
| 165S      |                                                 |                     |                      |                     |                  |                     |                                                                   |                     |                      |                      |
| 303       | 5<br>thru<br>10                                 | 17.5<br>thru<br>35  | 5<br>thru<br>12      | 17.5<br>thru<br>42  | 5<br>thru<br>10  | 17.5<br>thru<br>35  | 5<br>thru<br>12                                                   | 17.5<br>thru<br>42  | 7-1/2<br>thru<br>15  | 26.3<br>thru<br>52.5 |
| 303S      |                                                 |                     |                      |                     |                  |                     |                                                                   |                     |                      |                      |
| 304       |                                                 |                     |                      |                     |                  |                     |                                                                   |                     |                      |                      |
| 304S      |                                                 |                     |                      |                     |                  |                     |                                                                   |                     |                      |                      |
| 305       | 15                                              | 52.5                | 15                   | 52.5                | 10               | 35                  | 15                                                                | 52.5                | 20                   | 70                   |
| 305S      |                                                 |                     |                      |                     |                  |                     |                                                                   |                     |                      |                      |
| 307S      |                                                 |                     |                      |                     |                  |                     |                                                                   |                     |                      |                      |
| 415       | 15                                              | 52.5                | 15                   | 52.5                | 10               | 35                  | 15                                                                | 52.5                | 20                   | 70                   |
| 415S      |                                                 |                     |                      |                     |                  |                     |                                                                   |                     |                      |                      |
| 417S      |                                                 |                     |                      |                     |                  |                     |                                                                   |                     |                      |                      |
| 607S      | 15                                              | 52.5                | 15                   | 52.5                | 10               | 35                  | 15                                                                | 52.5                | 20                   | 70                   |
| 609S      |                                                 |                     |                      |                     |                  |                     |                                                                   |                     |                      |                      |

# Sahara Series™ Liquid Line Filter-Driers

## Type SS

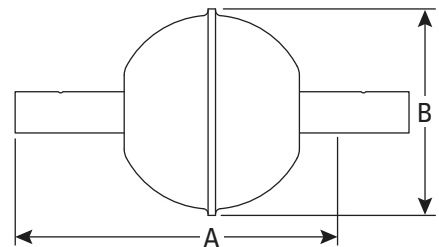
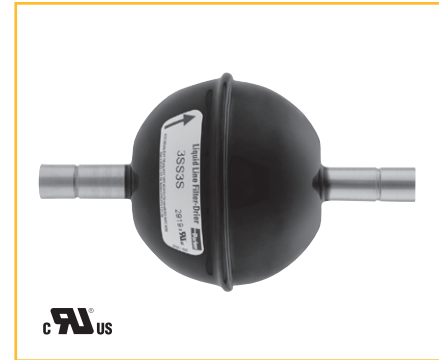
The new Sahara Series filter-driers are ideal for protecting air-conditioning systems from the harmful effects of moisture, acid, and solid debris. The compact design reduces lay-in requirements. Multiple size products are available to optimize contaminant control. Replaced the existing Sahara Series Liquid Line Filter-Driers in a reduced size.

### Features and Benefits

- High capacity solid core design for excellent moisture and acid protection in R-410A AC systems
- High filtration capacity for solid debris protection
- Unique, compact shape minimizes pressure drop and reduces refrigerant requirements
- Solid copper fittings for easy brazing
- High performance epoxy powder paint for excellent corrosion protection
- Minimal free internal volume reduces refrigerant filling needs
- UL Recognized component (File SA1756, cURus)

### Specifications

- 650 psi (45 bar) Maximum Rated Pressure
- 100% molecular sieve to maximize water absorption
- 10 micron outlet filter (@ 50% efficiency)
- 500 hour salt spray per ASTM B117
- Patented spherical design
- RoHS and REACH Compliant
- No CE marking according to Art. 3.3 PED 97/23 EC.



### Dimensions

| Model Number | Replaced Model | Part Number | Recommended Tonnage Air-Conditioning | Connection Size (Inches) | Overall Length |     | Lay-In Length "A" |     | Body Diameter "B" |    |
|--------------|----------------|-------------|--------------------------------------|--------------------------|----------------|-----|-------------------|-----|-------------------|----|
|              |                |             |                                      |                          | Inches         | mm  | Inches            | mm  | Inches            | mm |
| 2SS3S        | SS-053S        | 407400      | 1/2 – 2                              | 3/8                      | 4.24           | 108 | 3.36              | 85  | 2.23              | 57 |
| 3SS3S        | SS-083S        | 407401      | 1 – 3                                | 3/8                      | 4.71           | 120 | 3.83              | 97  | 2.77              | 70 |
| 5SS3S        | SS-163S        | 407402      | 2 – 5                                | 3/8                      | 5.29           | 134 | 4.41              | 112 | 3.46              | 88 |

### Performance Ratings with R-410A at AHRI Standard Conditions

| Model Number | Water Capacity |              | Flow Capacity   |                  | Liquid Refrigerant Holding Capacity |           |
|--------------|----------------|--------------|-----------------|------------------|-------------------------------------|-----------|
|              | Drops @ 125°F  | Grams @ 52°C | Tons @ 1 psi ΔP | kW @ 0.07 bar ΔP | Ounces @ 100°F                      | kg @ 38°C |
| 2SS3S        | 50             | 2.5          | 4.8             | 16.8             | 1.1                                 | 0.03      |
| 3SS3S        | 100            | 5            | 5.2             | 18.3             | 2.2                                 | 0.06      |
| 5SS3S        | 200            | 10           | 5.3             | 18.6             | 4.4                                 | 0.12      |

# Gold Label™ Series Bi-Flow Filter-Driers

## Type BF

The Gold Label bi-flow filter-drier is designed specifically for heat pump or reverse cycle applications. External check valves are not required since they are incorporated within the filter-drier.

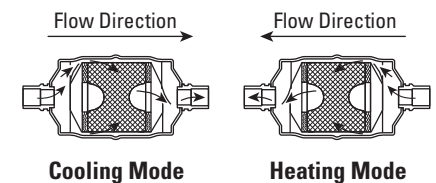
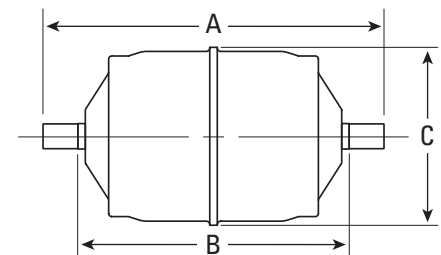
### Features and Benefits

- Made in the USA
- 100% copper ODF solder
- Desiccant core provides reliable and effective removal of solid contaminants, acid and moisture
- Core is cushioned in fiber gaskets to protect core and to ensure trouble-free performance
- Powder paint exterior coating surpasses 500 hour ASTM salt spray test to resist corrosion
- 650 psig (45 bar) MRP
- UL Listed under SMGT/SMGT7-SA1756



### Dimensions

| Model No.  | Part Number | Fitting Size (Inches) | System Cutout |     |            |     | Shell Diameter "C" |    |
|------------|-------------|-----------------------|---------------|-----|------------|-----|--------------------|----|
|            |             |                       | Length "A"    |     | Length "B" |     |                    |    |
| ODF Solder |             |                       | Inches        | mm  | Inches     | mm  | Inches             | mm |
| BF083S     | 450300-001  | 3/8                   | 5.46          | 139 | 4.58       | 117 | 3                  | 76 |
| BF084S     | 450301-001  | 1/2                   | 5.58          | 142 | 4.58       | 116 | 3                  | 76 |
| BF163S     | 450302-001  | 3/8                   | 5.88          | 149 | 5.00       | 127 | 3                  | 76 |
| BF164S     | 450303-001  | 1/2                   | 6.00          | 152 | 5.00       | 127 | 3                  | 76 |
| BF165S     | 450304-001  | 5/8                   | 6.31          | 160 | 5.07       | 128 | 3                  | 76 |



### Refrigerant Holding Capacity

#### Ounces (kg) of Refrigerant @ 100°F (38°C)

| Model Series | R-22   |      | R-407C |      | R-410A |      |
|--------------|--------|------|--------|------|--------|------|
|              | Ounces | kg   | Ounces | kg   | Ounces | kg   |
| BF080        | 8.5    | 0.24 | 8.0    | 0.23 | 7.4    | 0.21 |
| BF160        | 8.7    | 0.25 | 8.3    | 0.24 | 7.6    | 0.22 |

### Water Capacity In Drops (Grams\*) at AHRI-710 Conditions

| Model Series | R-22 (60 ppm) |              | R-407C (50 ppm) |              | R-410A (50 ppm) |              |
|--------------|---------------|--------------|-----------------|--------------|-----------------|--------------|
|              | 75°F (24°C)   | 125°F (52°C) | 75°F (24°C)     | 125°F (52°C) | 75°F (24°C)     | 125°F (52°C) |
| BF080        | 194           | 158          | 163             | 53           | 85              | 63           |
| BF160        | 215           | 176          | 181             | 80           | 94              | 70           |

\* 20 Drops = 1 Gram = 1 cc

### Flow Capacity — Tons (kW) of Refrigeration at 1 psid (0.07 bar)

| Model No. | Filter Area (sq. inches) | R-22 |      | R-407C |      | R-410A |      |
|-----------|--------------------------|------|------|--------|------|--------|------|
|           |                          | Tons | kW   | Tons   | kW   | Tons   | kW   |
| BF083S    | 15                       | 3.7  | 13.0 | 3.4    | 11.9 | 3.6    | 12.6 |
| BF084S    |                          | 4.1  | 14.4 | 3.8    | 13.3 | 4.0    | 14.0 |
| BF163S    | 18                       | 5.5  | 19.3 | 5.1    | 17.9 | 5.4    | 19.0 |
| BF164S    |                          | 7.4  | 26.0 | 6.8    | 23.9 | 7.0    | 24.6 |
| BF165S    |                          | 9.0  | 31.7 | 8.2    | 28.8 | 8.5    | 29.9 |

# Sahara Series™ Bi-Flow Liquid Line Filter-Driers

## Type SSBF

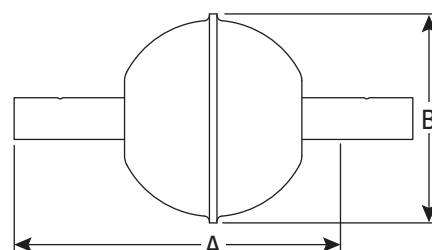
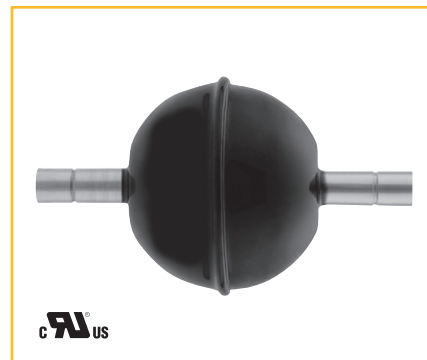
The Sahara Series bi-flow filter-drier is designed specifically for heat pump or reverse cycle applications. External check valves are not required.

### Features and Benefits

- High capacity solid core design for excellent moisture and acid protection in AC and heat pump systems
- High filtration capacity for solid debris protection
- Unique, compact shape minimizes pressure drop and reduces refrigerant requirements
- Solid copper fittings for easy brazing
- High performance epoxy powder paint for excellent corrosion protection
- Minimal free internal volume reduces refrigerant filling needs
- UL Recognized component (File SA1756, cURus)

### Specifications

- 650 psi (45 bar) Maximum Rated Pressure
- 100% molecular sieve to maximize water absorption
- 10 micron outlet filter (@ 50% efficiency)
- 500 hour salt spray per ASTM B117
- Patent pending design
- RoHS and REACH Compliant
- No CE marking according to Art. 3.3 PED 97/23 EC.



### Dimensions

| Model Number | Replaced Model | Part Number | Recommended Tonnage Air-Conditioning | Connection Size (Inches) | Overall Length |     | Lay-In Length "A" |     | Body Diameter "B" |    |
|--------------|----------------|-------------|--------------------------------------|--------------------------|----------------|-----|-------------------|-----|-------------------|----|
|              |                |             |                                      |                          | Inches         | mm  | Inches            | mm  | Inches            | mm |
| 3SSBF3S      | SSBF-083S      | 451007      | 1 – 3                                | 3/8                      | 4.71           | 120 | 3.83              | 97  | 2.77              | 70 |
| 5SSBF3S      | SSBF-163S      | 451020      | 2 – 5                                | 3/8                      | 5.29           | 134 | 4.41              | 112 | 3.46              | 88 |

### Performance Ratings with R-410A at AHRI Standard Conditions

| Model Number | Water Capacity |              | Flow Capacity   |                  | Liquid Refrigerant Holding Capacity |           |
|--------------|----------------|--------------|-----------------|------------------|-------------------------------------|-----------|
|              | Drops @ 125°F  | Grams @ 52°C | Tons @ 1 psi ΔP | kW @ 0.07 bar ΔP | Ounces @ 100°F                      | kg @ 38°C |
| 3SSBF3S      | 100            | 5            | 5.2             | 18.3             | 2.6                                 | 0.07      |
| 5SSBF3S      | 200            | 10           | 5.3             | 18.6             | 5.2                                 | 0.15      |

# Gold Label™ Premium Suction Line Filter-Driers

## SLD Series - For Refrigeration and Air Conditioning

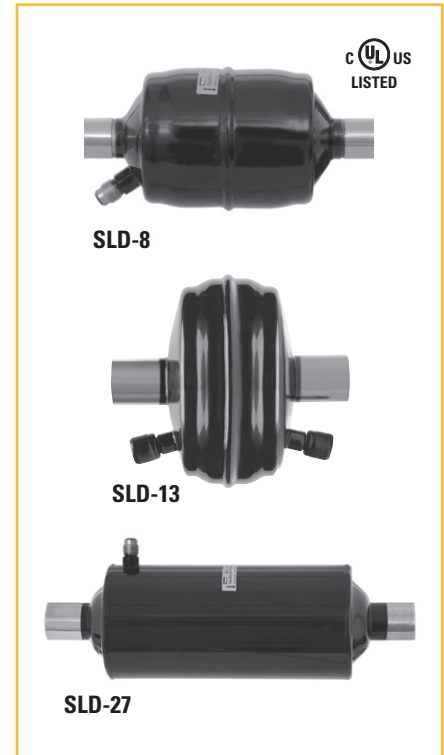
The SLD Series is a solid core clean-up filter-drier for use in the suction line for both refrigeration and air conditioning systems. The compact design incorporates a large outside diameter shell, which results in a shorter lay-in length, and a larger core, which provides a greater filtration area for maximum operating efficiency.

The core material has controlled porosity which effectively removes and holds a maximum amount of contaminants with a minimal pressure drop. In addition, the core material collects and holds acids and other harmful contaminants present after a motor burnout.

Access valves make it easy to measure pressure accurately. The SLD-8 and SLD-27 each have one access fitting. The SLD-13 and SLD-15 each have two access fittings. Occasionally, enough contaminant matter may collect in the filter core to cause a slight pressure drop.

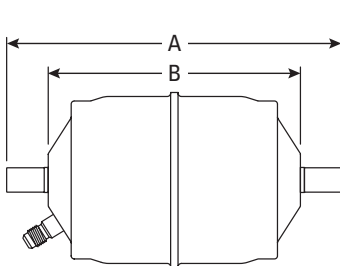
### Features and Benefits

- Made in the USA
- Molded porous core
- High acid capacity
- Low pressure drop — exceptionally high flow rates
- Designed for system clean-up
- 500 hours salt spray protection
- Short system cut-out lengths allow installation in tight areas
- Access valves simplify pressure drop measurement
- ODF Solder fittings
- 355 psig (24.5 bar) MRP
- UL Listed under SMGT/SMGT7-SA1756

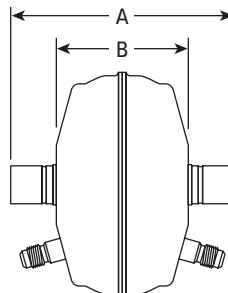


### Premium Suction Line Filter-Drier – Specifications

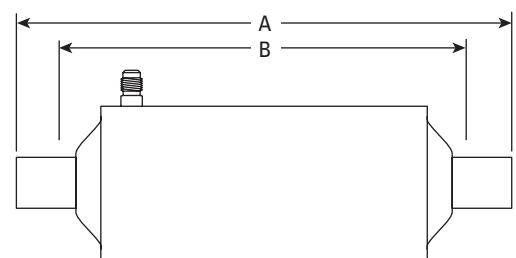
| Model No.     | Part Number | Fitting (Inches) | Desiccant (Cu. In.) | Filter Area (Sq. In.) | Overall Length "A" |     | System Cutout Length "B" |     | Shell Diameter |     |
|---------------|-------------|------------------|---------------------|-----------------------|--------------------|-----|--------------------------|-----|----------------|-----|
|               |             |                  |                     |                       | Inches             | mm  | Inches                   | mm  | Inches         | mm  |
| SLD 8-3SV-HH  | 450044-001  | 3/8 ODF Solder   | 8                   | 21                    | 5.30               | 135 | 4.42                     | 112 | 2.69           | 68  |
| SLD 8-4SV-HH  | 450039-001  | 1/2 ODF Solder   | 8                   | 21                    | 5.42               | 138 | 4.42                     | 112 | 2.69           | 68  |
| SLD 8-5SV-HH  | 450020-001  | 5/8 ODF Solder   | 8                   | 21                    | 5.66               | 144 | 4.42                     | 112 | 2.69           | 68  |
| SLD 8-6SV-HH  | 450027-001  | 3/4 ODF Solder   | 8                   | 21                    | 5.98               | 152 | 4.60                     | 117 | 2.69           | 68  |
| SLD 13-5SV-HH | 450040-001  | 5/8 ODF Solder   | 14                  | 27                    | 4.38               | 111 | 4.00                     | 102 | 4.42           | 112 |
| SLD 13-6SV-HH | 450023-001  | 3/4 ODF Solder   | 14                  | 27                    | 4.83               | 123 | 3.45                     | 88  | 4.42           | 112 |
| SLD 13-7SV-HH | 450022-001  | 7/8 ODF Solder   | 14                  | 27                    | 4.98               | 126 | 3.48                     | 88  | 4.42           | 112 |
| SLD 13-9SV-HH | 450053-001  | 1-1/8 ODF Solder | 14                  | 27                    | 4.93               | 125 | 3.11                     | 79  | 4.42           | 112 |
| SLD 27-6SV-HH | 450230-001  | 3/4 ODF Solder   | 27                  | 53                    | 9.67               | 246 | 8.29                     | 210 | 3.03           | 77  |
| SLD 27-7SV-HH | 450042-001  | 7/8 ODF Solder   | 27                  | 53                    | 9.82               | 249 | 8.32                     | 211 | 3.03           | 77  |
| SLD 27-9SV-HH | 450041-001  | 1-1/8 ODF Solder | 27                  | 53                    | 9.75               | 248 | 7.93                     | 201 | 3.03           | 77  |



SLD 8 Model



SLD 13 Model



SLD 27 Model



# Gold Label™ Premium Suction Line Filter-Driers

## SLD Series - For Refrigeration and Air Conditioning

### Flow Capacity – Tons of Refrigeration

| Refrigerant        | R-22/407 |     |     | R-134a |     | R-404A/507 |     |     | R-410A |     |     |
|--------------------|----------|-----|-----|--------|-----|------------|-----|-----|--------|-----|-----|
| Evaporator Temp °F | 40       | 0   | -20 | 40     | 0   | 20         | 0   | -40 | 40     | 0   | -20 |
| Pressure Drop PSI  | 3        | 1.5 | 1   | 2.0    | 1.0 | 3          | 1.5 | 0.5 | 3.0    | 1.5 | 1.0 |
| SLD 8-3SV-HH       | 2.1      | 0.9 | 0.5 | 1.3    | 0.5 | 1.5        | 0.6 | 0.2 | 2.6    | 1.1 | 0.7 |
| SLD 8-4SV-HH       | 2.1      | 0.9 | 0.5 | 1.3    | 0.5 | 1.5        | 0.6 | 0.2 | 2.6    | 1.1 | 0.7 |
| SLD 8-5SV-HH       | 3.0      | 1.2 | 0.7 | 1.8    | 0.7 | 2.1        | 0.8 | 0.3 | 3.8    | 1.6 | 0.9 |
| SLD 8-6SV-HH       | 4.0      | 1.6 | 1.0 | 2.4    | 0.9 | 2.8        | 1.1 | 0.4 | 5.0    | 2.1 | 1.2 |
| SLD 13-5SV-HH      | 3.6      | 1.5 | 0.9 | 2.2    | 0.8 | 2.5        | 1.0 | 0.3 | 4.5    | 1.9 | 1.1 |
| SLD 13-6SV-HH      | 4.9      | 2.0 | 1.2 | 2.9    | 1.1 | 3.4        | 1.4 | 0.5 | 6.2    | 2.5 | 1.5 |
| SLD 13-7SV-HH      | 5.4      | 2.2 | 1.3 | 3.2    | 1.2 | 3.8        | 1.5 | 0.5 | 6.8    | 2.8 | 1.7 |
| SLD 13-9SV-HH      | 7.1      | 2.9 | 1.8 | 4.3    | 1.6 | 5.0        | 2.0 | 0.7 | 8.9    | 3.7 | 2.2 |
| SLD 27-6SV-HH      | 4.4      | 1.8 | 1.1 | 2.8    | 1.1 | 2.9        | 1.3 | 0.5 | 5.8    | 2.4 | 1.4 |
| SLD 27-7SV-HH      | 5.3      | 2.2 | 1.3 | 3.2    | 1.2 | 3.7        | 1.5 | 0.5 | 6.7    | 2.7 | 1.6 |
| SLD 27-9SV-HH      | 5.9      | 2.4 | 1.5 | 3.5    | 1.3 | 4.1        | 1.6 | 0.6 | 7.4    | 3.1 | 1.8 |

### Flow Capacity – kW of Refrigeration

| Refrigerant        | R-22/407 |      |      | R-134a |      | R-404A/507 |      |      | R-410A |      |      |
|--------------------|----------|------|------|--------|------|------------|------|------|--------|------|------|
| Evaporator Temp °C | 4        | -18  | -29  | 4      | -18  | -6         | -18  | -40  | 4      | -18  | -29  |
| Pressure Drop Bar  | 0.21     | 0.11 | 0.07 | 0.14   | 0.07 | 0.21       | 0.11 | 0.04 | 0.21   | 0.11 | 0.07 |
| SLD 8-3SV-HH       | 7.4      | 3.0  | 1.8  | 4.4    | 1.6  | 5.1        | 2.0  | 0.7  | 9.3    | 3.8  | 2.3  |
| SLD 8-4SV-HH       | 7.4      | 3.0  | 1.8  | 4.4    | 1.6  | 5.1        | 2.0  | 0.7  | 9.3    | 3.8  | 2.3  |
| SLD 8-5SV-HH       | 10.5     | 4.3  | 2.6  | 6.3    | 2.3  | 7.4        | 2.9  | 1.0  | 13.2   | 5.4  | 3.3  |
| SLD 8-6SV-HH       | 14.0     | 5.7  | 3.5  | 8.4    | 3.1  | 9.8        | 3.9  | 1.4  | 17.6   | 7.3  | 4.3  |
| SLD 13-5SV-HH      | 12.6     | 5.2  | 3.1  | 7.6    | 2.8  | 8.8        | 3.5  | 1.2  | 15.9   | 6.5  | 3.9  |
| SLD 13-6SV-HH      | 17.2     | 7.0  | 4.2  | 10.3   | 3.8  | 12.0       | 4.8  | 1.7  | 21.6   | 8.9  | 5.3  |
| SLD 13-7SV-HH      | 18.9     | 7.7  | 4.7  | 11.3   | 4.2  | 13.2       | 5.2  | 1.8  | 23.8   | 9.8  | 5.9  |
| SLD 13-9SV-HH      | 24.9     | 10.2 | 6.1  | 14.9   | 5.5  | 17.4       | 6.9  | 2.4  | 31.3   | 12.9 | 7.7  |
| SLD 27-6SV-HH      | 15.4     | 6.3  | 3.8  | 9.8    | 3.8  | 10.2       | 4.5  | 1.8  | 20.4   | 8.4  | 4.9  |
| SLD 27-7SV-HH      | 18.6     | 7.6  | 4.6  | 11.1   | 4.1  | 13.0       | 5.1  | 1.8  | 23.4   | 9.6  | 5.8  |
| SLD 27-9SV-HH      | 20.7     | 8.5  | 5.1  | 12.4   | 4.5  | 14.5       | 5.7  | 2.0  | 26.0   | 10.7 | 6.4  |

# Replaceable Core Filter-Drier Shells

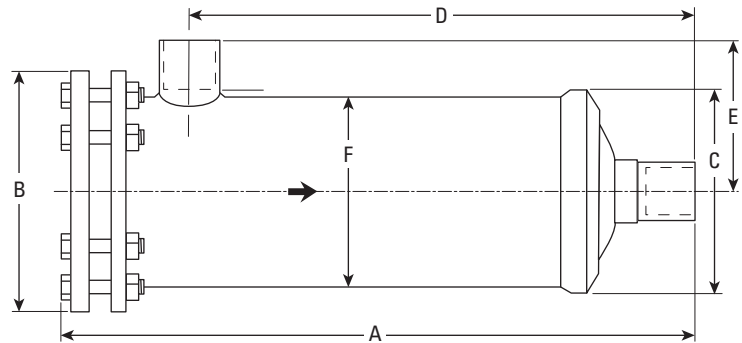
Parker replaceable core filter-drier shells are designed to provide flexibility over a wide range of applications. All models are designed for use in both the liquid and suction line of air conditioning or refrigeration systems. In single or multiple-core applications, cores may be loaded individually for ease of installation in tight spots. A wide range of fittings for suction-line applications and interchangeable lay-in dimensions with other manufactured models increase product versatility.

The internal assembly allows the use of Parker's PCX-48, PCK-48 or PCK-48HH molded cores for the removal of moisture, acid, particles, resins and wax. The assembly allows the use of the Parker PFE-48BF filter element which removes solid contaminants such as copper oxides, chips and other metal fines.



## Features and Benefits

- Made in the USA
- ODF Solder fittings – 5/8" to 3-1/8"
- Powder paint exterior coating surpasses 500 hour ASTM salt spray test to resist corrosion
- Aluminum end plate with access port
- Rated 650 psig (44.8 bar) for R-410A
- UL Recognized under SMGT/SMGT8-SA1756



## Replaceable Core Shell Dimensions

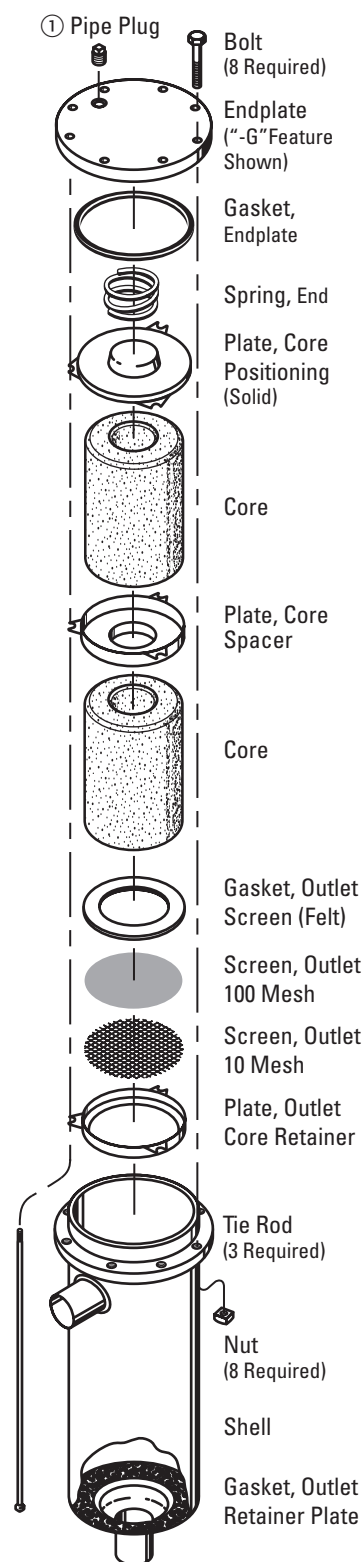
| Model Number | Part Number | No. of Cores | Connection Size & Type (Inches) | Dimensions |     |        |     |        |     |        |     |        |     |        |     |
|--------------|-------------|--------------|---------------------------------|------------|-----|--------|-----|--------|-----|--------|-----|--------|-----|--------|-----|
|              |             |              |                                 | A          |     | B      |     | C      |     | D      |     | E      |     | F      |     |
|              |             |              |                                 | Inches     | mm  | Inches | mm  | Inches | mm  | Inches | mm  | Inches | mm  | Inches | mm  |
| P485         | 400700      | 1            | 5/8 ODF                         | 9.15       | 232 | 6.00   | 152 | 5.00   | 127 | 5.92   | 150 | 3.50   | 88  | 4.75   | 121 |
| P487         | 400701      | 1            | 7/8 ODF                         | 9.30       | 236 | 6.00   | 152 | 5.00   | 127 | 6.07   | 154 | 3.97   | 101 | 4.75   | 121 |
| P489         | 400708      | 1            | 1-1/8 ODF                       | 9.50       | 241 | 6.00   | 152 | 5.00   | 127 | 6.37   | 162 | 4.19   | 106 | 4.75   | 121 |
| P967         | 400702      | 2            | 7/8 ODF                         | 14.84      | 377 | 6.00   | 152 | 5.00   | 127 | 11.61  | 295 | 3.97   | 101 | 4.75   | 121 |
| P969         | 400703      | 2            | 1-1/8 ODF                       | 15.04      | 382 | 6.00   | 152 | 5.00   | 127 | 11.81  | 300 | 4.19   | 106 | 4.75   | 121 |

# Replaceable Core Filter-Drier Shells

## Internal Component Kits for Replaceable Core Shells

| Model Number      | Part Number | Description      | Contents                                                                                                                                                                                     |
|-------------------|-------------|------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| –                 | 481289      | Bolts            | 5/16" x 1-3/4" Semagard coated steel (8 required, sold individually)                                                                                                                         |
| –                 | 481287      | Nuts             | 5/16" stainless steel (8 required, sold individually)                                                                                                                                        |
| <b>K-RC480-C</b>  | 481349      | One Core Shell   | (1) Outer retainer plate gasket<br>(1) Core positioning plate<br>(1) Outlet core retainer plate<br>(1) Outlet screen 100 mesh<br>(1) End spring<br>(3) Tie rod                               |
| <b>K-RC960-C</b>  | 481359      | Two Core Shell   | (1) Outer retainer plate gasket<br>(1) Core positioning plate<br>(1) Core spacer plate<br>(1) Outlet core retainer plate<br>(1) Outlet screen 100 mesh<br>(1) End spring<br>(3) Tie rod      |
| <b>K-RC1440-C</b> | 481369      | Three Core Shell | (1) Outer retainer plate gasket,<br>(1) Core positioning plate,<br>(2) Core spacer plate,<br>(1) Outlet core retainer plate,<br>(1) Outlet screen 100 mesh,<br>(1) End spring<br>(3) Tie rod |
| <b>K-RC1920-C</b> | 481379      | Four Core Shell  | (1) Outer retainer plate gasket<br>(1) Core positioning plate<br>(3) Core spacer plate,<br>(1) Outlet core retainer plate,<br>(1) Outlet screen 100 mesh,<br>(1) End spring<br>(3) Tie rod   |
| <b>1288-001</b>   | 481125      | End Plate Gasket | (1) 1/16" thick endplate gasket                                                                                                                                                              |
| –                 | 183174      | Access Valve Kit | 1/4" SAE X 1/4" NPT, for endplate                                                                                                                                                            |

① Access valve (P/N: 183174) is available. Valve core (P/N: 480088) can be purchased separately.



# Replacement Filter Element and Cores

## **PCX-48 High Capacity Gold Label Core (Part Number 450096)**

For use in either liquid or suction line applications, the PCX-48 offers added moisture capacity and good acid capacity when compared to the PCK-48 core.



## **PCK-48 Clean-up Core (Part Number 450094-001)**

For use in either liquid or suction line applications, the PCK-48 is specifically formulated for burnouts where wax is not the issue. It's formulation allows for superior clean-up of acids, varnishes, sludge and moisture.



## **PCK-48HH Charcoal Burnout Core (Part Number 450095-001)**

Formulated with charcoal to remove wax on low temperature systems even before problems occur. The PCK-48HH can be used in either liquid or suction line applications and also removes acids, water, solids and sludge. Recommended for refrigerant reclaim/recovery units.



# Replacement Filter Element and Cores

## Water Capacity In Drops (Grams\*) at AHRI-710 Conditions

| Core Model | R-22<br>(60 ppm) |              | R-134a<br>(50 ppm) |              | R-404A, R-507A<br>(50 ppm) |              | R-407C<br>(50 ppm) |              |
|------------|------------------|--------------|--------------------|--------------|----------------------------|--------------|--------------------|--------------|
|            | 75°F (24°C)      | 125°F (52°C) | 75°F (24°C)        | 125°F (52°C) | 75°F (24°C)                | 125°F (52°C) | 75°F (24°C)        | 125°F (52°C) |
| PCX-48     | 697              | 524          | 762                | 591          | 766                        | 584          | 534                | 392          |
| PCK-48HH   | 474              | 322          | 518                | 363          | 521                        | 359          | 363                | 241          |
| PCK-48     | 549              | 386          | 600                | 435          | 604                        | 430          | 420                | 288          |

\* 20 Drops = 1 Gram = 1 cc

## Liquid Line Selection Recommendations – Tons (kW)

| Shell | No. of Cores | Connection Size and Type | Refrigeration Low Temp. & Commercial Installations |      |      |      |               |      |      | Air Conditioning                        |      |                     |      |               |      |                                |      |                     |      |              |      |
|-------|--------------|--------------------------|----------------------------------------------------|------|------|------|---------------|------|------|-----------------------------------------|------|---------------------|------|---------------|------|--------------------------------|------|---------------------|------|--------------|------|
|       |              |                          |                                                    |      |      |      |               |      |      | Field Replacement & Field Installations |      |                     |      |               |      | OEM / Self Contained Equipment |      |                     |      |              |      |
|       |              |                          | R-134a                                             |      | R-22 |      | R-404A, R-507 |      |      | R-134a                                  |      | R-22, R-407C R-410A |      | R-404A, R-507 |      | R-134a                         |      | R-22, R-407C R-410A |      | R-404A R-507 |      |
|       |              |                          | Tons                                               | kW   | Tons | kW   | Tons          | kW   | Tons | kW                                      | Tons | kW                  | Tons | kW            | Tons | kW                             | Tons | kW                  | Tons | kW           | Tons |
| P485  | 1            | 5/8 ODF                  | 8                                                  | 28.1 | 10   | 35.2 | 8             | 28.1 | 8    | 28.1                                    | 10   | 35.2                | 8    | 28.1          | 10   | 35.2                           | 15   | 52.8                | 10   | 35.2         |      |
| P487  | 1            | 7/8 ODF                  | 12                                                 | 42.2 | 15   | 52.8 | 10            | 35.2 | 11   | 38.7                                    | 14   | 49.2                | 10   | 35.2          | 13   | 45.7                           | 20   | 70.3                | 13   | 45.7         |      |
| P489  | 1            | 1-1/8 ODF                | 12                                                 | 42.2 | 15   | 52.8 | 10            | 35.2 | 13   | 45.7                                    | 17   | 59.8                | 10   | 35.2          | 15   | 52.8                           | 25   | 87.9                | 15   | 52.8         |      |
| P967  | 2            | 7/8 ODF                  | 20                                                 | 70.3 | 25   | 87.9 | 15            | 52.8 | 20   | 70.3                                    | 25   | 87.9                | 15   | 52.8          | 20   | 70.3                           | 35   | 123                 | 20   | 70.3         |      |
| P969  | 2            | 1-1/8 ODF                | 25                                                 | 87.9 | 35   | 123  | 20            | 70.3 | 25   | 87.9                                    | 33   | 116                 | 20   | 70.3          | 25   | 87.9                           | 40   | 141                 | 25   | 87.9         |      |

## Suction Line Selection Recommendations – Horsepower (kW)

| Shell | No. of Cores | Connection Size and Type | Core Part Number   | Filter Element Part No. | Refrigerant 22 & 407C             |      |                                                                         |      | Refrigerant 12, 134a, 404A, 502, 507 |     |                                                                         |     |
|-------|--------------|--------------------------|--------------------|-------------------------|-----------------------------------|------|-------------------------------------------------------------------------|------|--------------------------------------|-----|-------------------------------------------------------------------------|-----|
|       |              |                          |                    |                         | Permanent Installation with Cores |      | Temporary Installation Cores for cleanup; Filter elements after cleanup |      | Permanent Installation with Cores    |     | Temporary Installation Cores for cleanup; Filter elements after cleanup |     |
|       |              |                          |                    |                         | HP                                | kW   | HP                                                                      | kW   | HP                                   | kW  | HP                                                                      | kW  |
| P485  | 1            | 5/8 ODF                  | PCK-48HH or PCK-48 | PFE-48BF                | 10                                | 7.5  | 10                                                                      | 7.5  | 3                                    | 2.2 | 5                                                                       | 3.7 |
| P487  | 1            | 7/8 ODF                  |                    |                         | 10                                | 7.5  | 10                                                                      | 7.5  | 3                                    | 2.2 | 5                                                                       | 3.7 |
| P489  | 1            | 1-1/8 ODF                |                    |                         | 10                                | 7.5  | 20                                                                      | 14.9 | 5                                    | 3.7 | 10                                                                      | 7.5 |
| P967  | 2            | 7/8 ODF                  |                    |                         | 10                                | 7.5  | 10                                                                      | 7.5  | 5                                    | 3.7 | 5                                                                       | 3.7 |
| P969  | 2            | 1-1/8 ODF                |                    |                         | 15                                | 11.2 | 20                                                                      | 14.9 | 8                                    | 6.0 | 10                                                                      | 7.5 |

# Recovery and Reclaim Filters and Pre-Filters

Parker provides a large selection of components for recovery, recycle and reclaim machines, protecting them from the many types of contaminants that are encountered during the servicing of systems.

## PF Series

The PF 052 and PF 052MF are designed to provide a filtration level of 15 microns. When installed on the inlet of your machine it can prevent costly damage by filtering solid contaminants out of the refrigerant before it enters your machine. The Parker pre-filter is for temporary use only and should be changed after servicing a maximum of six to eight systems. Change out may be needed sooner depending on actual system conditions. Various fitting combinations are available.



## Features and Benefits

- Made in the USA
- Female outlet fitting allows direct mounting to the machine
- Extended female end fitting provides valve handle clearance
- Male-to-male fittings allow connection to, or between, hoses
- Enlarged depth filtering area
- 500 psig (34.5 bar) MRP
- UL Listed under SMGT/SMGT8-SA1756

## Dimensions

| Model    | Part Number | Inlet Fitting (Inches) | Outlet Fitting (Inches) | Overall Length |     | Shell Diameter |      |
|----------|-------------|------------------------|-------------------------|----------------|-----|----------------|------|
|          |             |                        |                         | Inches         | mm  | Inches         | mm   |
| PF 052   | 450098-001  | 1/4 SAE male flare     | 1/4 SAE male flare      | 4.38           | 111 | 2.38           | 60.5 |
| PF 0532  | 450199      | 3/8 SAE male flare     | 1/4-18 PTF short        | 4.85           | 123 | 2.38           | 60.5 |
| PF 052FM | 450198      | 1/4 SAE female flare   | 1/4 SAE male flare      | 4.33           | 110 | 2.38           | 60.5 |
| PF 052MF | 450099-001  | 1/4 SAE male flare     | 1/4 SAE female flare    | 5.02           | 128 | 2.38           | 60.5 |

## SPD Series

The SPD series is an enlarged version of the PF Series with drying capabilities. This Super Pre-Filter-Drier should be installed at the inlet of the machine and used where there are concentrations of contaminants in the refrigerant. Moisture capacity of this unit size exceeds anything else currently available in the market. The Super SPD series is the ideal solution when transferring large amounts of refrigerant for reclaim or recycle.



## Features and Benefits

- Made in the USA
- Super high capacity for acid and moisture removal
- Removes 504 (25.2 grams) drops of moisture vs. industry standard of 150 (7.5 grams) drops
- Compatible with all HCFC, CFC and other refrigerants and blends
- 500 psig (34.5 bar) MRP
- UL Listed under SMGT/SMGT8-SA1756

## Dimensions

| Model | Part Number | Inlet Fitting (Inches) | Outlet Fitting (Inches) | Overall Length |     | Shell Diameter |      |
|-------|-------------|------------------------|-------------------------|----------------|-----|----------------|------|
|       |             |                        |                         | Inches         | mm  | Inches         | mm   |
| 302V  | 450202      | 7/16-20 ACME           | 7/16-20 ACME            | 9.28           | 236 | 3.00           | 76.2 |
| 304V  | 450209      | 7/16-20 ACME           | 7/16-20 ACME            | 9.28           | 236 | 3.00           | 76.2 |

\* 1-3/16" diameter copper spun reclaim filter-driers available upon request.



# Loose-Fill Copper Filter-Driers – OEM

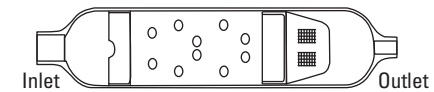
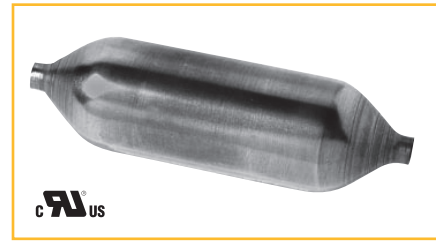
Parker's loose-fill copper filter-driers adsorb moisture and provide physical filtration in systems between 1/4 and 2 tons (.9 to 7.0 kW). Applications include refrigerators, freezers, ice makers, dispensers, water coolers, cryogenics and walk-ins.

## Applications

- Refrigeration systems between 1/4 and 2 tons (.9 to 7.0 kW)
- Up to 30 grams of 100% molecular sieve provide maximum water adsorption

## Features and Benefits

- Made in the USA
- One-piece copper shells in 3/4" to 1" O.D. (19.1 to 25.4 mm), spun ODF solder connections in a variety of sizes, provide easy installation, simple brazing, and corrosion resistance
- Filter-driers also available with standard charging tubes, SAE flare fittings, stepped-tubes on the inlet/outlet, and coiled capillary or bent tubing to match the unique requirements of a unit
- UL Recognized under SMGT2/SMGT8-SA1756



**Recommended tonnages:** 1/4 to 2 tons (.9 to 7.0 kW) depending on application and system. Consult Parker.

## 3/4" O.D. Shell Diameter – Specifications

| Part No.  | Molecular Sieve (wt.) | Description                 | UL Model | Maximum Rated Pressure |      | Tube Diameter |    | Overall Length |     | Inlet (Inches) | Outlet (Inches)    |
|-----------|-----------------------|-----------------------------|----------|------------------------|------|---------------|----|----------------|-----|----------------|--------------------|
|           |                       |                             |          | PSIG*                  | bar  | Inches        | mm | Inches         | mm  |                |                    |
| 032519-00 | 10 g                  | 3/4" two inlets, one outlet | 700      | 540                    | 37.2 | 0.75          | 19 | 4.80           | 122 | (2) 1/4        | 1/4                |
| 057967-00 |                       | 3/4" one inlet, two outlets |          |                        |      |               |    | 4.38           | 111 | 1/4            | (2) 1/4            |
| 057980-02 |                       | 3/4" directional            |          |                        |      |               |    | 4.00           | 102 | 1/4            | .095-.100 cap tube |

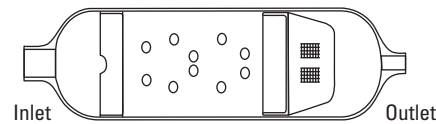
One and two inlets are available as well as cap tube sizes on outlet from .081 to .125.

\* Filter-driers are available with higher working pressures for R-410A.

## 3/4" O.D. Shell Diameter – Water Capacity In Drops (Grams\*) at AHRI-710 Conditions

| Part No.  | Water Capacity in Drops |              |                 |              |                        |              |                 |              |                 |              |
|-----------|-------------------------|--------------|-----------------|--------------|------------------------|--------------|-----------------|--------------|-----------------|--------------|
|           | R-22 (60 ppm)           |              | R-134a (50 ppm) |              | R-404A, R-507 (50 ppm) |              | R-407C (50 ppm) |              | R-410A (50 ppm) |              |
|           | 75°F (24°C)             | 125°F (52°C) | 75°F (24°C)     | 125°F (52°C) | 75°F (24°C)            | 125°F (52°C) | 75°F (24°C)     | 125°F (52°C) | 75°F (24°C)     | 125°F (52°C) |
| 032519-00 | 29.8                    | 27.4         | 32.6            | 31.0         | 32.8                   | 30.6         | 26.2            | 23.6         | 19.8            | 17.4         |
| 057967-00 |                         |              |                 |              |                        |              |                 |              |                 |              |
| 057980-02 |                         |              |                 |              |                        |              |                 |              |                 |              |

\* 20 Drops = 1 Gram = 1 cc



## 1" O.D. Shell Diameter Copper Filter-Drier Data

| Part No.  | Molecular Sieve (wt.) | Description                | UL Model | Maximum Rated Pressure |      | Tube Diameter |     | Overall Length |     | Inlet (Inches) | Outlet (Inches)    |
|-----------|-----------------------|----------------------------|----------|------------------------|------|---------------|-----|----------------|-----|----------------|--------------------|
|           |                       |                            |          | PSIG*                  | bar  | Inches        | mm  | Inches         | mm  |                |                    |
| 032083-00 | 12 g                  | 1" directional             | 1025     | 700                    | 48.3 | 1.00          | 2.5 | 4.00           | 102 | 1/4            | .093-.098 cap tube |
| 058066-00 | 15 g                  | 1" two inlets, directional | 1035     | 750                    | 51.7 |               |     | 4.19           | 106 | 1/4 3/8        | 3/16               |
| 057404-00 | 16 g                  | 1" directional             | 1025     | 700                    | 48.3 |               |     | 3.81           | 97  | 5/16           | 5/16               |

**Recommended Tonnages (Part Numbers 032083-00 and 058066-00):** 1/4 to 1/2 tons (.9 to 1.8 kW) depending on application and system. Consult Parker.

**(Part Number 057404-00):** R-22 = 2 tons (7.0 kW), R-134a = 2 tons (7.0 kW), R-404A = 1.3 tons (4.6 kW), R-410A = 2 tons (7.0 kW), R-507 = 1.3 tons (4.6 kW)

## 1" O.D. Shell Diameter – Water Capacity In Drops (Grams\*) at AHRI-710 Conditions

| Part No.  | Water Capacity in Drops |              |                 |              |                        |              |                 |              |                 |              |
|-----------|-------------------------|--------------|-----------------|--------------|------------------------|--------------|-----------------|--------------|-----------------|--------------|
|           | R-22 (60 ppm)           |              | R-134a (50 ppm) |              | R-404A, R-507 (50 ppm) |              | R-407C (50 ppm) |              | R-410A (50 ppm) |              |
|           | 75°F (24°C)             | 125°F (52°C) | 75°F (24°C)     | 125°F (52°C) | 75°F (24°C)            | 125°F (52°C) | 75°F (24°C)     | 125°F (52°C) | 75°F (24°C)     | 125°F (52°C) |
| 032083-00 | N/R                     | N/R          | 40.3            | 37.7         | N/R                    | N/R          | N/R             | N/R          | N/R             | N/R          |
| 058066-00 | 44.7                    | 41.1         | 48.9            | 46.5         | 49.2                   | 45.9         | 39.3            | 35.4         | 29.7            | 26.1         |
| 057404-00 | 54.7                    | 50.6         | 59.8            | 57.0         | 59.5                   | 56.0         | 41.9            | 37.8         | 32.3            | 28.8         |

N/R = not rated. Consult Parker for more information.

\* 20 Drops = 1 Gram = 1 cc

# Loose-Fill Spring-Loaded Copper Filter-Driers – OEM

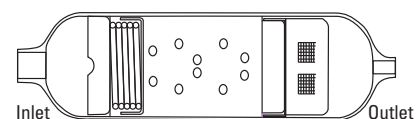
Parker's loose-fill spring-loaded copper filter-driers adsorb moisture and provide physical filtration to air conditioning and heat-pump systems between 1/4 and 5 tons (.9 and 17.6 kW). Filter-driers utilize spring-loaded desiccant bed to prevent desiccant attrition.

## Application

- Air conditioning and heat pump systems between 1/4 and 5 tons (.9 and 17.6 kW)

## Features and Benefits

- Made in the USA
- One-piece copper shells in 1" to 1-5/8" O.D. (25.4 to 41.3 mm), along with spun ODF solder fittings in a variety of sizes, provide easy installation, simplified brazing and corrosion resistance
- Up to 90 grams of 100% molecular sieve provide maximum water adsorption
- Filter-driers also available with standard charging tubes, SAE flare fittings, stepped-tubes on the inlet/outlet, and coiled capillary or bent tubing to match the unique requirements of a unit
- Filter-driers are available with a fiber-glass pad for improved filtration – removes down to 20 micron sized particles
- UL Recognized under SMGT2/SMGT8-SA1756



## 1" O.D. Shell Diameter – Specifications

| Part No.  | Molecular Sieve (wt.) | Description                | UL Model | Maximum Rated Pressure |      | Tube Diameter |    | Overall Length |     | Inlet (Inches) | Outlet (Inches) |
|-----------|-----------------------|----------------------------|----------|------------------------|------|---------------|----|----------------|-----|----------------|-----------------|
|           |                       |                            |          | PSIG                   | bar  | Inches        | mm | Inches         | mm  |                |                 |
| 032231-00 | 10 g                  | 1" two inlets, directional | 1035     | 750                    | 51.7 | 1.00          | 25 | 4.25           | 108 | 3/16<br>3/8    | .125 cap tube   |
| 054625-01 | 13.5 g                | 1" directional             |          |                        |      |               |    | 4.38           | 111 | 1/4            | 1/4             |
| 056242-03 | 13.5 g                | 1" directional             |          |                        |      |               |    | 4.38           | 111 | 3/8            | 3/8             |
| 053817-01 | 25 g                  | 1" directional             |          |                        |      |               |    | 5.69           | 145 | 3/8            | 3/8             |

One and two inlets are available as well as cap tube sizes on outlet from .125 to .50.

## Flow Capacity – Tons @ 1psi ΔP (kW @ 0.07 bar ΔP)

| Part No.  | R-22                                                                                                     |      | R-134a |      | R-404A |     | R-407C |      | R-410A |      | R-507 |     |
|-----------|----------------------------------------------------------------------------------------------------------|------|--------|------|--------|-----|--------|------|--------|------|-------|-----|
|           | Tons                                                                                                     | kW   | Tons   | kW   | Tons   | kW  | Tons   | kW   | Tons   | kW   | Tons  | kW  |
| 032231-00 | Recommended Tonnages: 1/2 to 1 tons (1.8 to 3.5 kW) depending on application and system. Consult Parker. |      |        |      |        |     |        |      |        |      |       |     |
| 054625-01 | 1.5                                                                                                      | 5.3  | 1.6    | 5.6  | 1.2    | 4.2 | 1.4    | 4.9  | 1.7    | 6.0  | 1.2   | 4.2 |
| 056242-03 | 3.6                                                                                                      | 12.7 | 3.3    | 11.6 | 2.4    | 8.4 | 3.5    | 12.3 | 3.5    | 12.3 | 2.3   | 8.1 |
| 053817-01 | 3                                                                                                        | 10.6 | 2.7    | 9.5  | 2      | 7.0 | 2.9    | 10.2 | 2.9    | 10.2 | 2     | 7.0 |

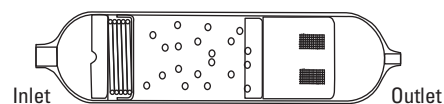
Tonnage (kW) ratings will vary depending on the inlet and outlet requested.

## 1" O.D. Shell Diameter – Water Capacity In Drops (Grams\*) at AHRI-710 Conditions

| Part No.  | Water Capacity in Drops |              |                 |              |                        |              |                 |              |                 |              |
|-----------|-------------------------|--------------|-----------------|--------------|------------------------|--------------|-----------------|--------------|-----------------|--------------|
|           | R-22 (60 ppm)           |              | R-134a (50 ppm) |              | R-404A, R-507 (50 ppm) |              | R-407C (50 ppm) |              | R-410A (50 ppm) |              |
|           | 75°F (24°C)             | 125°F (52°C) | 75°F (24°C)     | 125°F (52°C) | 75°F (24°C)            | 125°F (52°C) | 75°F (24°C)     | 125°F (52°C) | 75°F (24°C)     | 125°F (52°C) |
| 032231-00 | 29.8                    | 27.4         | 32.6            | 31.0         | 32.8                   | 30.6         | 26.2            | 23.6         | 19.8            | 17.4         |
| 054625-01 | 46.2                    | 42.7         | 50.5            | 48.1         | 50.2                   | 47.3         | 49.4            | 44.8         | 27.3            | 24.3         |
| 056242-03 | 46.2                    | 42.7         | 50.5            | 48.1         | 50.2                   | 47.3         | 49.4            | 44.8         | 27.3            | 24.3         |
| 053817-01 | 85.5                    | 79.0         | 93.5            | 89.0         | 93.0                   | 87.5         | 91.5            | 83.0         | 50.5            | 45.0         |

\* 20 Drops = 1 Gram = 1 cc

# Loose-Fill Spring-Loaded Copper Filter-Driers – OEM



## 1-3/16" O.D. Shell Diameter – Specifications

| Part No.  | Molecular Sieve (wt.) | Description           | UL Model | Maximum Rated Pressure |      | Tube Diameter |    | Overall Length |     | Inlet (Inches) | Outlet (Inches) |
|-----------|-----------------------|-----------------------|----------|------------------------|------|---------------|----|----------------|-----|----------------|-----------------|
|           |                       |                       |          | PSIG*                  | bar  | Inches        | mm | Inches         | mm  |                |                 |
| 056243-03 | 25 g                  | 1-3/16 OD 3/8" x 3/8" | 319F     | 750                    | 51.7 | 1.19          | 30 | 5.13           | 130 | 3/8            | 3/8             |
| 056243-04 |                       | 1-3/16 OD 1/2" x 1/2" |          |                        |      |               |    |                |     | 1/2            | 1/2             |

One and two inlets are available as well as cap tube sizes on outlet from .125 to .50.

## Flow Capacity – Tons @ 1psi ΔP (kW @ 0.07 bar ΔP)

| Part No.  | R-22 |      | R-134a |      | R-404A, R-507 |      | R-407C |      | R-410A |      | R-507 |      |
|-----------|------|------|--------|------|---------------|------|--------|------|--------|------|-------|------|
|           | Tons | kW   | Tons   | kW   | Tons          | kW   | Tons   | kW   | Tons   | kW   | Tons  | kW   |
| 056243-04 | 4.8  | 16.9 | 4.4    | 15.5 | 3.1           | 10.9 | 4.6    | 16.2 | 4.7    | 16.5 | 3.1   | 10.9 |
| 056243-03 | 3.6  | 12.7 | 3.3    | 11.6 | 2.3           | 8.1  | 3.5    | 12.3 | 3.5    | 12.3 | 2.3   | 8.1  |

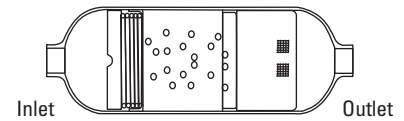
Tonnage (kW) ratings will vary depending on the inlet and outlet requested.

## 1-3/16" O.D. Shell Diameter – Water Capacity In Drops (Grams\*) at AHRI-710 Conditions

| Part No.  | Water Capacity in Drops |              |                 |              |                        |              |                 |              |                 |              |
|-----------|-------------------------|--------------|-----------------|--------------|------------------------|--------------|-----------------|--------------|-----------------|--------------|
|           | R-22 (60 ppm)           |              | R-134a (50 ppm) |              | R-404A, R-507 (50 ppm) |              | R-407C (50 ppm) |              | R-410A (50 ppm) |              |
|           | 75°F (24°C)             | 125°F (52°C) | 75°F (24°C)     | 125°F (52°C) | 75°F (24°C)            | 125°F (52°C) | 75°F (24°C)     | 125°F (52°C) | 75°F (24°C)     | 125°F (52°C) |
| 056243-04 | 85.5                    | 79.0         | 93.5            | 89.0         | 93.0                   | 87.5         | 65.5            | 59.0         | 50.5            | 45.0         |
| 056243-03 | 85.5                    | 79.0         | 93.5            | 89.0         | 93.0                   | 87.5         | 65.5            | 59.0         | 50.5            | 45.0         |

\* 20 Drops = 1 Gram = 1 cc

# Loose-Fill Spring-Loaded Copper Filter-Driers – OEM



## 1-5/8" O.D. Shell Diameter – Specifications

| Part No.  | Molecular Sieve (wt.) | Description                                                 | UL Model | Maximum Rated Pressure |      | Tube Diameter |    | Overall Length |     | Inlet (Inches) | Outlet (Inches) |
|-----------|-----------------------|-------------------------------------------------------------|----------|------------------------|------|---------------|----|----------------|-----|----------------|-----------------|
|           |                       |                                                             |          | PSIG*                  | bar  | Inches        | mm | Inches         | mm  |                |                 |
| 032040-01 | 45 g                  | 1-5/8 OD 3/8"x3/8" 45g                                      | 1638F    | 850                    | 58.6 | 1.63          | 41 | 6.00           | 152 | 3/8            | 3/8             |
| 032145-00 | 28 g                  | 1-5/8 OD 3/8"x3/8" 28g                                      |          |                        |      |               |    | 4.38           | 111 | 3/8            | 3/8             |
| 031805-03 | 35 g                  | 1-5/8 OD 3/8"x3/8" 35g                                      |          |                        |      |               |    | 5.50           | 140 | 3/8            | 3/8             |
| 056244-01 | 45 g                  | 1-5/8 OD 3/8"x3/8" 45g (w/ 2x the filter area of 031805-03) |          |                        |      |               |    | 5.38           | 137 | 3/8            | 3/8             |
| 056156-01 | 90 g                  | 1-5/8 OD 3/8"x3/8" 90g (w/ 2x the filter area of 031805-03) |          |                        |      |               |    | 7.00           | 178 | 1/4            | 1/4             |

One and two inlets are available as well as cap tube sizes on outlet from .125 to .50.

## Flow Capacity – Tons @ 1psi ΔP (kW @ 0.07 bar ΔP)

| Part No.  | R-22 |      | R-134a |      | R-404A, R-507 |      | R-407C |      | R-410A |      | R-507 |      |
|-----------|------|------|--------|------|---------------|------|--------|------|--------|------|-------|------|
|           | Tons | kW   | Tons   | kW   | Tons          | kW   | Tons   | kW   | Tons   | kW   | Tons  | kW   |
| 032040-00 | 5.8  | 20.4 | 5.3    | 18.6 | 3.8           | 13.4 | 5.6    | 19.7 | 5.7    | 20   | 3.8   | 13.4 |
| 032145-00 | 4.7  | 16.5 | 4.3    | 15.1 | 3.1           | 10.9 | 4.5    | 15.8 | 4.6    | 16.2 | 3.1   | 10.9 |
| 031805-03 | 5.1  | 17.9 | 4.7    | 16.5 | 3.3           | 11.6 | 4.9    | 17.2 | 5      | 17.6 | 3.3   | 11.6 |
| 056244-01 | 5    | 17.6 | 4.5    | 15.8 | 3.2           | 11.3 | 4.8    | 16.9 | 4.8    | 16.9 | 3.2   | 11.3 |
| 056156-01 | 1.8  | 6.3  | 1.6    | 5.6  | 1.2           | 4.2  | 1.7    | 6.0  | 1.7    | 6.0  | 1.2   | 4.2  |

Tonnage (kW) ratings will vary depending on the inlet and outlet requested.

## 1-5/8" O.D. Shell Diameter – Water Capacity In Drops (Grams\*) at AHRI-710 Conditions

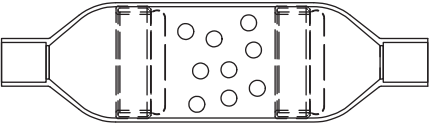
| Part No.  | Water Capacity in Drops |              |                 |              |                        |              |                 |              |                 |              |
|-----------|-------------------------|--------------|-----------------|--------------|------------------------|--------------|-----------------|--------------|-----------------|--------------|
|           | R-22 (60 ppm)           |              | R-134a (50 ppm) |              | R-404A, R-507 (50 ppm) |              | R-407C (50 ppm) |              | R-410A (50 ppm) |              |
|           | 75°F (24°C)             | 125°F (52°C) | 75°F (24°C)     | 125°F (52°C) | 75°F (24°C)            | 125°F (52°C) | 75°F (24°C)     | 125°F (52°C) | 75°F (24°C)     | 125°F (52°C) |
| 032040-00 | 153.9                   | 142.2        | 168.3           | 160.2        | 167.4                  | 157.5        | 117.9           | 106.2        | 90.9            | 81.0         |
| 032145-00 | 83.4                    | 76.7         | 91.3            | 86.8         | 91.8                   | 85.7         | 73.4            | 66.1         | 55.4            | 48.7         |
| 031805-03 | 119.7                   | 110.6        | 130.9           | 124.6        | 130.2                  | 122.5        | 91.7            | 82.6         | 70.7            | 63.0         |
| 056244-01 | 153.9                   | 142.2        | 168.3           | 160.2        | 167.4                  | 157.5        | 117.9           | 106.2        | 90.9            | 81.0         |
| 056156-01 | 307.8                   | 284.4        | 336.6           | 320.4        | 334.8                  | 315.0        | 235.8           | 212.4        | 181.8           | 162.0        |

\* 20 Drops = 1 Gram = 1 cc

# Hydrocarbon Optimized Filter-Drier

## Features and Benefits

- Made in the USA
- 3/4" shell OD, 1/4" ODF
- Loose fill style, 100% MS
- Moisture Capacity:** 16 drops of water at 50 ppm, 125 deg. R-290
- Refrigerant Holding Capacity:** 2.36 g of R-290 at 100°F
- Contaminant Holding:** 120 mesh brass screen
- UL Recognized under SMGT2/SMGT8-SA1756



Model 058832-00



## Dimensions and Flow Capacities

| Part No.  | Connection Size<br>ODF Solder Inches | Overall Length |    | Socket Depth |     | R-290 Holding Capacity @ 100°F |       | UL Model | MRP  |      |
|-----------|--------------------------------------|----------------|----|--------------|-----|--------------------------------|-------|----------|------|------|
|           |                                      | Inches         | mm | Inches       | mm  | Ounces                         | Grams |          | psig | bar  |
| 058832-00 | 1/4                                  | 2.7            | 69 | 0.25         | 6.4 | 0.08                           | 2.36  | 700      | 540  | 37.2 |

## OFFER OF SALE

The items described in this document and other documents and descriptions provided by Parker Hannifin Corporation, its subsidiaries and its authorized distributors ("Seller") are hereby offered for sale at prices to be established by Seller. This offer and its acceptance by any customer ("Buyer") shall be governed by all of the following Terms and Conditions. Buyer's order for any item described in its document, when communicated to Seller verbally, or in writing, shall constitute acceptance of this offer. All goods or work described will be referred to as "Products".

1. **Terms and Conditions.** Seller's willingness to offer Products, or accept an order for Products, to or from Buyer is expressly conditioned on Buyer's assent to these Terms and Conditions and to the terms and conditions found on-line at [www.parker.com/saleterms/](http://www.parker.com/saleterms/). Seller objects to any contrary or additional term or condition of Buyer's order or any other document issued by Buyer.

2. **Price Adjustments; Payments.** Prices stated on the reverse side or preceding pages of this document are valid for 30 days. After 30 days, Seller may change prices to reflect any increase in its costs resulting from state, federal or local legislation, price increases from its suppliers, or any change in the rate, charge, or classification of any carrier. The prices stated on the reverse or preceding pages of this document do not include any sales, use, or other taxes unless so stated specifically. Unless otherwise specified by Seller, all prices are F.O.B. Seller's facility, and payment is due 30 days from the date of invoice. After 30 days, Buyer shall pay interest on any unpaid invoices at the rate of 1.5% per month or the maximum allowable rate under applicable law.

3. **Delivery Dates; Title and Risk; Shipment.** All delivery dates are approximate and Seller shall not be responsible for any damages resulting from any delay. Regardless of the manner of shipment, title to any products and risk of loss or damage shall pass to Buyer upon tender to the carrier at Seller's facility (i.e., when it's on the truck, it's yours). Unless otherwise stated, Seller may exercise its judgment in choosing the carrier and means of delivery. No deferment of shipment at Buyers' request beyond the respective dates indicated will be made except on terms that will indemnify, defend and hold Seller harmless against all loss and additional expense. Buyer shall be responsible for any additional shipping charges incurred by Seller due to Buyer's changes in shipping, product specifications or in accordance with Section 13, herein.

4. **Warranty.** Seller warrants that the Products sold hereunder shall be free from defects in material or workmanship for a period of five years from the date of delivery to Buyer. This warranty is made only to Buyer and does not extend to anyone to whom Products are sold after purchased from Seller. The prices charged for Seller's products are based upon the exclusive limited warranty stated above, and upon the following disclaimer: **DISCLAIMER OF WARRANTY: THIS WARRANTY COMPRISES THE SOLE AND ENTIRE WARRANTY PERTAINING TO PRODUCTS PROVIDED HEREUNDER. SELLER DISCLAIMS ALL OTHER WARRANTIES, EXPRESS AND IMPLIED, INCLUDING MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE.**

5. **Claims; Commencement of Actions.** Buyer shall promptly inspect all Products upon delivery. No claims for shortages will be allowed unless reported to the Seller within 10 days of delivery. No other claims against Seller will be allowed unless asserted in writing within 60 days after delivery or, in the case of an alleged breach of warranty, within 30 days after the date within the warranty period on which the defect is or should have been discovered by Buyer. Any action based upon breach of this agreement or upon any other claim arising out of this sale (other than an action by Seller for any amount due to Seller from Buyer) must be commenced within thirteen months from the date of tender of delivery by Seller or, for a cause of action based upon an alleged breach of warranty, within thirteen months from the date within the warranty period on which the defect is or should have been discovered by Buyer.

6. **LIMITATION OF LIABILITY.** UPON NOTIFICATION, SELLER WILL, AT ITS OPTION, REPAIR OR REPLACE A DEFECTIVE PRODUCT, OR REFUND THE PURCHASE PRICE. **IN NO EVENT SHALL SELLER BE LIABLE TO BUYER FOR ANY SPECIAL, INDIRECT, INCIDENTAL OR CONSEQUENTIAL DAMAGES ARISING OUT OF, OR AS THE RESULT OF, THE SALE, DELIVERY, NON-DELIVERY, SERVICING, USE OR LOSS OF USE OF THE PRODUCTS OR ANY PART THEREOF, OR FOR ANY CHARGES OR EXPENSES OF ANY NATURE INCURRED WITHOUT SELLER'S WRITTEN CONSENT, EVEN IF SELLER**

**HAS BEEN NEGLIGENT, WHETHER IN CONTRACT, TORT OR OTHER LEGAL THEORY. IN NO EVENT SHALL SELLER'S LIABILITY UNDER ANY CLAIM MADE BY BUYER EXCEED THE PURCHASE PRICE OF THE PRODUCTS.**

7. **Contingencies.** Seller shall not be liable for any default or delay in performance if caused by circumstances beyond the reasonable control of Seller.

8. **User Responsibility.** The user, through its own analysis and testing, is solely responsible for making the final selection of the system and Product and assuring that all performance, endurance, maintenance, safety and warning requirements of the application are met. The user must analyze all aspects of the application and follow applicable industry standards and Product information. If Seller provides Product or system options, the user is responsible for determining that such data and specifications are suitable and sufficient for all applications and reasonably foreseeable uses of the Products or systems.

9. **Loss to Buyer's Property.** Any designs, tools, patterns, materials, drawings, confidential information or equipment furnished by Buyer or any other items which become Buyer's property, may be considered obsolete and may be destroyed by Seller after two consecutive years have elapsed without Buyer placing an order for the items which are manufactured using such property. Seller shall not be responsible for any loss or damage to such property while it is in Seller's possession or control.

10. **Special Tooling.** A tooling charge may be imposed for any special tooling, including without limitation, dies, fixtures, molds and patterns, acquired to manufacture Products. Such special tooling shall be and remain Seller's property notwithstanding payment of any charges by Buyer. In no event will Buyer acquire any interest in apparatus belonging to Seller which is utilized in the manufacture of the Products, even if such apparatus has been specially converted or adapted for such manufacture and notwithstanding any charges paid by Buyer. Unless otherwise agreed, Seller shall have the right to alter, discard or otherwise dispose of any special tooling or other property in its sole discretion at any time.

11. **Buyer's Obligation; Rights of Seller.** To secure payment of all sums due or otherwise, Seller shall retain a security interest in the goods delivered and this agreement shall be deemed a Security Agreement under the Uniform Commercial Code. Buyer authorizes Seller as its attorney to execute and file on Buyer's behalf all documents Seller deems necessary to perfect its security interest. Seller shall have a security interest in, and lien upon, any property of Buyer in Seller's possession as security for the payment of any amounts owed to Seller by Buyer.

12. **Improper use and Indemnity.** Buyer shall indemnify, defend, and hold Seller harmless from any claim, liability, damages, lawsuits, and costs (including attorney fees), whether for personal injury, property damage, patent, trademark or copyright infringement or any other claim, brought by or incurred by Buyer, Buyer's employees, or any other person, arising out of: (a) improper selection, improper application or other misuse of Products purchased by Buyer from Seller; (b) any act or omission, negligent or otherwise, of Buyer; (c) Seller's use of patterns, plans, drawings, or specifications furnished by Buyer to manufacture Product; or (d) Buyer's failure to comply with these terms and conditions. Seller shall not indemnify Buyer under any circumstance except as otherwise provided.

13. **Cancellations and Changes.** Orders shall not be subject to cancellation or change by Buyer for any reason, except with Seller's written consent and upon terms that will indemnify, defend and hold Seller harmless against all direct, incidental and consequential loss or damage. Seller may change product features, specifications, designs and availability with notice to Buyer.

14. **Limitation on Assignment.** Buyer may not assign its rights or obligations under this agreement without the prior written consent of Seller.

15. **Entire Agreement.** This agreement contains the entire agreement between the Buyer and Seller and constitutes the final, complete and exclusive expression of the terms of the agreement. All prior or

contemporaneous written or oral agreements or negotiations with respect to the subject matter are herein merged.

16. **Waiver and Severability.** Failure to enforce any provision of this agreement will not waive that provision nor will any such failure prejudice Seller's right to enforce that provision in the future. Invalidation of any provision of this agreement by legislation or other rule of law shall not invalidate any other provision herein. The remaining provisions of this agreement will remain in full force and effect.

17. **Termination.** This agreement may be terminated by Seller for any reason and at any time by giving Buyer thirty (30) days written notice of termination. In addition, Seller may by written notice immediately terminate this agreement for the following: (a) Buyer commits a breach of any provision of this agreement (b) the appointment of a trustee, receiver or custodian for all or any part of Buyer's property (c) the filing of a petition for relief in bankruptcy of the other Party on its own behalf, or by a third party (d) an assignment for the benefit of creditors, or (e) the dissolution or liquidation of the Buyer.

18. **Governing Law.** This agreement and the sale and delivery of all Products hereunder shall be deemed to have taken place in and shall be governed and construed in accordance with the laws of the State of Ohio, as applicable to contracts executed and wholly performed therein and without regard to conflicts of laws principles. Buyer irrevocably agrees and consents to the exclusive jurisdiction and venue of the courts of Cuyahoga County, Ohio with respect to any dispute, controversy or claim arising out of or relating to this agreement. Disputes between the parties shall not be settled by arbitration unless, after a dispute has arisen, both parties expressly agree in writing to arbitrate the dispute.

19. **Indemnity for Infringement of Intellectual Property Rights.** Seller shall have no liability for infringement of any patents, trademarks, copyrights, trade dress, trade secrets or similar rights except as provided in this Section. Seller will defend and indemnify Buyer against allegations of infringement of U.S. patents, U.S. trademarks, copyrights, trade dress and trade secrets ("Intellectual Property Rights"). Seller will defend at its expense and will pay the cost of any settlement or damages awarded in an action brought against Buyer based on an allegation that a Product sold pursuant to this Agreement infringes the Intellectual Property Rights of a third party. Seller's obligation to defend and indemnify Buyer is contingent on Buyer notifying Seller within ten (10) days after Buyer becomes aware of such allegations of infringement, and Seller having sole control over the defense of any allegations or actions including all negotiations for settlement or compromise. If a Product is subject to a claim that it infringes the Intellectual Property Rights of a third party, Seller may, at its sole expense and option, procure for Buyer the right to continue using the Product, replace or modify the Product so as to make it noninfringing, or offer to accept return of the Product and return the purchase price less a reasonable allowance for depreciation. Notwithstanding the foregoing, Seller shall have no liability for claims of infringement based on information provided by Buyer, or directed to Products delivered hereunder for which the designs are specified in whole or part by Buyer, or infringements resulting from the modification, combination or use in a system of any Product sold hereunder. The foregoing provisions of this Section shall constitute Seller's sole and exclusive liability and Buyer's sole and exclusive remedy for infringement of Intellectual Property Rights.

20. **Taxes.** Unless otherwise indicated, all prices and charges are exclusive of excise, sales, use, property, occupational or like taxes which may be imposed by any taxing authority upon the manufacture, sale or delivery of Products.

21. **Equal Opportunity Clause.** For the performance of government contracts and where dollar value of the Products exceed \$10,000, the equal employment opportunity clauses in Executive Order 11246, VEVRAA, and 41 C.F.R. §§ 60-1.4(a), 60-741.5(a), and 60-250.4, are hereby incorporated.



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