

VACUUM FILTRATION

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Introduction

Vacuum filtration is used primarily in microbiological and analytical procedures that involve collecting a particulate (bacteria, precipitate, etc.) from a liquid suspension. Liquid poured into a funnel passes through a filter, which retains the particulate, and filtrate can be collected into a filter flask, directly or via a vacuum manifold. Applying vacuum reduces process time compared to gravity flow.

Advantec supplies a wide range of vacuum filter holders and accessories. Select from glass, polysulfone, or stainless steel assemblies with funnels holding from 22 to 1,100 mL. See facing page for more details on supports.

| | | | |
|------------------------------------|---|--|---|
| Typical Applications | DNA/RNA hybridization, protein binding, receptor binding studies and gravimetric analysis | Coliform, yeast, mold, total bacteria, sterility testing | Colony hybridization, procedures requiring larger filtration area |
| Recommended Models | | | |
| Glass with glass frit | KG-25 | KG-47 | KG-90 |
| Glass with stainless steel support | KGS-25 | KGS-47 | KGS-90 |
| Glass with all-PTFE seal | - | KGS-47-TF | - |
| Polysulfone | - | KP-47 | - |
| Stainless steel | - | KSF-47 | - |
| Filter Specifications | | | |
| Membrane diameter | 25 mm | 47 mm | 90 mm |
| Filtration area | 2.1 cm ² | 9.6 cm ² * | 43 cm ² |

* See individual models for exceptions.

25 mm Glass Microanalysis Holders

- **Use for filtering small volumes** for biological or particulate contamination
- Available with sintered glass or stainless steel support
- **Use stainless steel screen** when producing ultra-clean filtrate or when filtering proteinaceous solutions

SPECIFICATIONS

| | KG-25 | KGS-25 |
|---------------------------------------|--|--------|
| Materials: | | |
| Support screen | Sintered glass | SUS316 |
| Funnel, base | Borosilicate glass | |
| Stopper | Silicone rubber | |
| Clamp | Anodized aluminum | |
| Connection: | | |
| Included | #4 stopper adapts to standard 125 mL vacuum filter flask | |
| Pressure: | Vacuum | |
| Weight: | 0.19 kg (0.45 lb) | |
| Membrane Filter Compatibility: | | |
| Filter size | 25 mm | |
| Prefilter size | 16 mm | |
| Filtration area | 2.1 cm ² | |
| Funnel Capacity: | 22 mL | |



KG-25



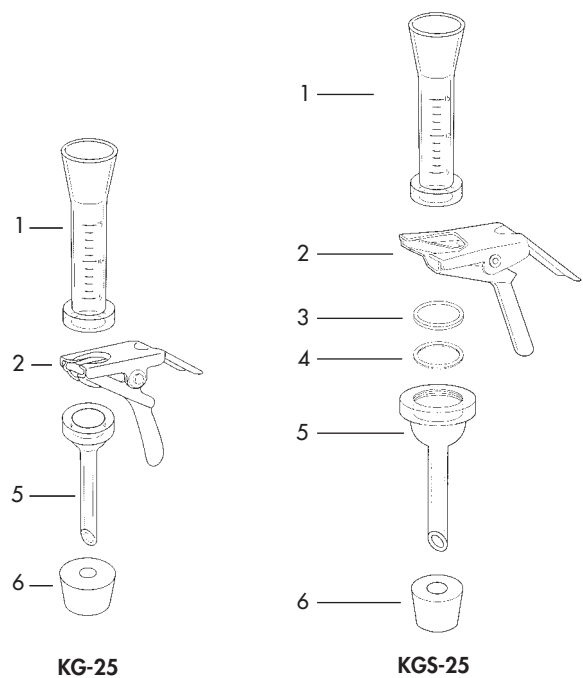
KGS-25

ORDERING INFORMATION

| Model | KG-25 | KGS-25 |
|--------------|----------------|------------------------|
| Catalog No. | 17311200 | 17311300 |
| Support Type | Sintered glass | Stainless steel screen |

Replacement Parts

| | KG-25 | KGS-25 |
|---|-------------------------|----------|
| 1 | Funnel, 22 mL | |
| 2 | Clamp | |
| 3 | Support screen (SUS316) | - |
| 4 | Gasket (PTFE) | - |
| 5 | Base | 19311302 |
| 6 | Stopper, #4 | |



47 mm Glass Microanalysis Holders

- **Standard size** for microbiology and particulate analysis
- Available with sintered glass or stainless steel

SPECIFICATIONS

| | KG-47 | KGS-47 |
|---------------------------------------|---|--------|
| Materials: | | |
| Support screen | Sintered glass | SUS316 |
| Funnel, base | Borosilicate glass | |
| Stopper | Silicone rubber | |
| Clamp | Anodized aluminum | |
| Connections (included): | #8A stopper adapts to standard 1 L vacuum filter flask or vacuum manifold cup | |
| Pressure: | Vacuum | |
| Weight: | 0.6 kg (1.2 lb) | |
| Membrane Filter Compatibility: | | |
| Filter size | 47 mm | |
| Prefilter size | 35 mm | |
| Filtration area | 9.6 cm ² | |
| Funnel Capacity: | 320 mL | |

ORDERING INFORMATION

| Model | KG-47 | KGS-47 |
|--------------|----------------|------------------------|
| Catalog No. | 17311400 | 17311500 |
| Support Type | Sintered glass | Stainless steel screen |

Replacement Parts

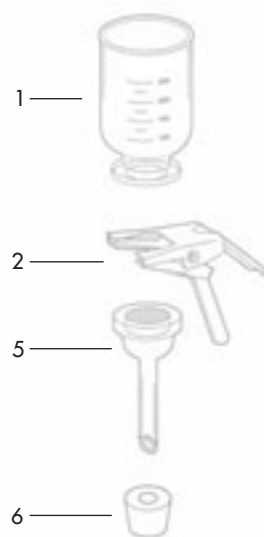
| | KG-47 | KGS-47 |
|---|----------------|-------------------------|
| 1 | Funnel, 320 mL | |
| 2 | Clamp | |
| 3 | - | Support screen (SUS316) |
| 4 | - | Gasket (PTFE) |
| 5 | Base | 19311502 |
| 6 | Stopper, #8A | |



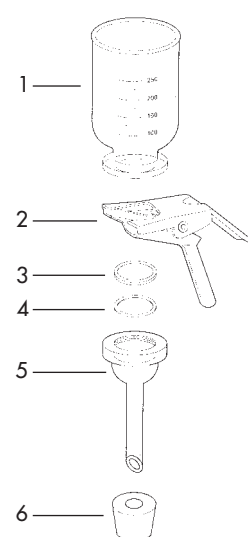
KG-47



KGS-47



KG-47



KGS-47

47 mm Glass Microanalysis Holders – With All-PTFE Seal

- **Filter sealed between PTFE surfaces:**

- Bottom of funnel is coated with PTFE
- PTFE flange covers contact surface on glass base

SPECIFICATIONS

As for corresponding basic model (Page 82) with the addition of PTFE coating on bottom of funnel and PTFE flange for KGS-47-TF.

SPECIFICATIONS

| | KGS-47-TF |
|---------------------------------------|---|
| Materials: | |
| Support screen | SUS316 |
| Funnel, base | Borosilicate glass |
| Stopper | Silicone rubber |
| Clamp | Anodized aluminum |
| Connections (included): | #8A stopper adapts to standard 1 L vacuum filter flask or vacuum manifold cup |
| Pressure: | Vacuum |
| Weight: | 0.6 kg (1.2 lb) |
| Membrane Filter Compatibility: | |
| Filter size | 47 mm |
| Prefilter size | 35 mm |
| Filtration area | 9.6 cm ² |



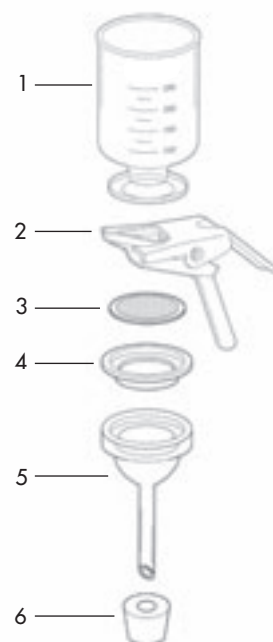
KGS-47-TF

ORDERING INFORMATION

| Model | KGS-47-TF |
|--------------|------------------------|
| Catalog No. | 17311600 |
| Support Type | Stainless steel screen |

Replacement Parts

| | | KGS-47-TF |
|---|---------------------------------|-----------|
| 1 | Funnel coated with PTFE, 320 mL | 19311601 |
| 2 | Clamp | 19311403 |
| 3 | Support screen (SUS316) | 19311504 |
| 4 | Flange (PTFE) | 19311605 |
| 5 | Base | 19311602 |
| 6 | Stopper, #8A | 19311404 |



KGS-47-TF

90 mm Glass Microanalysis Holders

- **Larger filtration** area for filtering larger volumes up to 1,000 mL
- **Use for viscous samples** or those with a heavy particle or bioburden that would clog a 47 mm filter
- **Available with sintered glass or stainless steel support**

SPECIFICATIONS

| | KG-90 | KGS-90 |
|---------------------------------------|---|--------|
| Materials: | | |
| Support screen | Sintered glass | SUS316 |
| Funnel, base | Borosilicate glass | |
| Stopper | Silicone rubber | |
| Clamp | Anodized aluminum | |
| Connection (Included): | #8A stopper adapts to standard 1 L vacuum filter flask or vacuum manifold cup | |
| Pressure: | Vacuum | |
| Weight: | 1.2 kg (2.82 lb) | |
| Membrane Filter Compatibility: | | |
| Filter size | 90 mm | |
| Prefilter size | 70 mm | |
| Filtration area | 43 cm ² | |
| Funnel Capacity: | 1,100 mL | |

ORDERING INFORMATION

| Model | KG-90 | KGS-90 |
|--------------|----------------|------------------------|
| Catalog No. | 17312100 | 17312200 |
| Support Type | Sintered glass | Stainless steel screen |

Replacement Parts

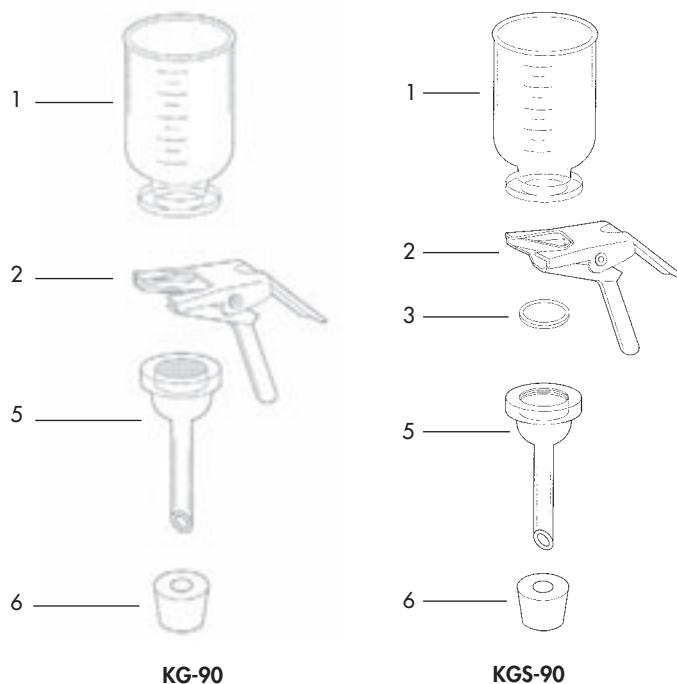
| | KG-90 | KGS-90 |
|---|------------------|-------------------------|
| 1 | Funnel, 1,100 mL | |
| 2 | Clamp | |
| 3 | - | Support screen (SUS316) |
| 5 | Base | Base |
| 6 | #8A Stopper | |



KG-90



KGS-90



Stainless Steel Filter Holders – KSF-47

- **Nonbreakable stainless steel unit** may be flame sterilized to sanitize the holder
- **Set pins and a locking nut** on the funnel to help prevent twisting and tearing of the membrane
- **Autoclavable** with membrane in place

SPECIFICATIONS

| KSF-47 | |
|---------------------------------------|---|
| Materials: | |
| Support screen | SUS316 |
| Funnel, base | SUS304 |
| Stopper | Silicone rubber |
| Gasket | PTFE |
| Connections (included): | #8A stopper adapts to standard 1 L vacuum filter flask or vacuum manifold cup |
| Capacity: | |
| Funnel | 500 mL |
| Pressure: | Vacuum |
| Weight: | 0.5 kg (1.17 lb) |
| Membrane Filter Compatibility: | |
| Filter size | 47 mm |
| Prefilter size | 35 mm |
| Filtration area | 9.3 cm ² |



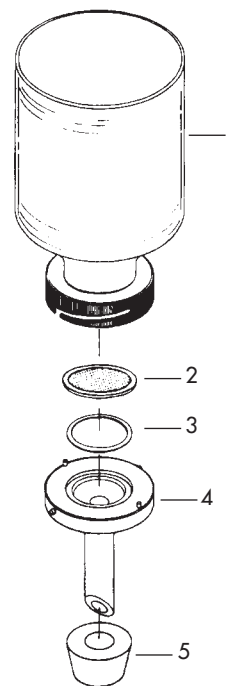
KSF-47

ORDERING INFORMATION

| Model | KSF-47 |
|-------------|----------|
| Catalog No. | 17312600 |

Replacement Parts

| | | KSF-47 |
|---|----------------|----------|
| 1 | Funnel | |
| 2 | Support screen | 19311504 |
| 3 | PTFE gasket | 19311505 |
| 4 | Base | |
| 5 | #8A Stopper | 19311404 |



KSF-47

Polysulfone Filter Holders

- **Can be used aseptically**
- **Recessed filter support** provides sufficient clearance so that the membrane will not twist or tear when the funnel is secured
- **Graduated funnel** in 300 mL (standard) or 500 mL (wide mouth) capacities
- **Receiver flask** (KP-47S) is interchangeable with all other models
- **Funnel cover** can be vented aseptically using disposable syringe filter (13JP050AN, see page 16)



KP-47H



KP-47U



KP-47W



KP-47S

SPECIFICATIONS

| | KP-47H | KP-47U | KP-47W | KP-47S |
|---------------------------------------|--|--------------------|--------------------|--------------------|
| Materials: | | | | |
| Support screen | Polypropylene | | | |
| Funnel and base | Polysulfone | | | |
| Receiver flask | - | - | - | Polysulfone |
| Stopper, O-rings | Silicone rubber | | | |
| Caps | - | Silicone rubber | - | Silicone rubber |
| Vacuum adapter | - | - | - | Polypropylene |
| Connection: | | | | |
| Outlet | #8B stopper adapts to standard 1 L vacuum filter flask or vacuum manifold cup; KP-47S screws onto receiver flask | | | |
| Receiving flask port | - | - | - | Luer slip |
| Funnel cover port | - | Luer slip | - | Luer slip |
| Capacity: | | | | |
| Funnel | 300 mL | 300 mL | 500 mL | 300 mL |
| Receiver | - | - | - | 300 mL |
| Pressure: | | | | |
| | Vacuum (25 in Hg maximum) | | | |
| Weight: | 0.15 kg (0.33 lb.) | 0.16 kg (0.36 lb.) | 0.15 kg (0.33 lb.) | 0.26 kg (0.58 lb.) |
| Membrane Filter Compatibility: | | | | |
| Filter size | 47 mm | | | |
| Prefilter size | 41 mm | | | |
| Filtration area | 13.5 cm ² | | | |

ORDERING INFORMATION

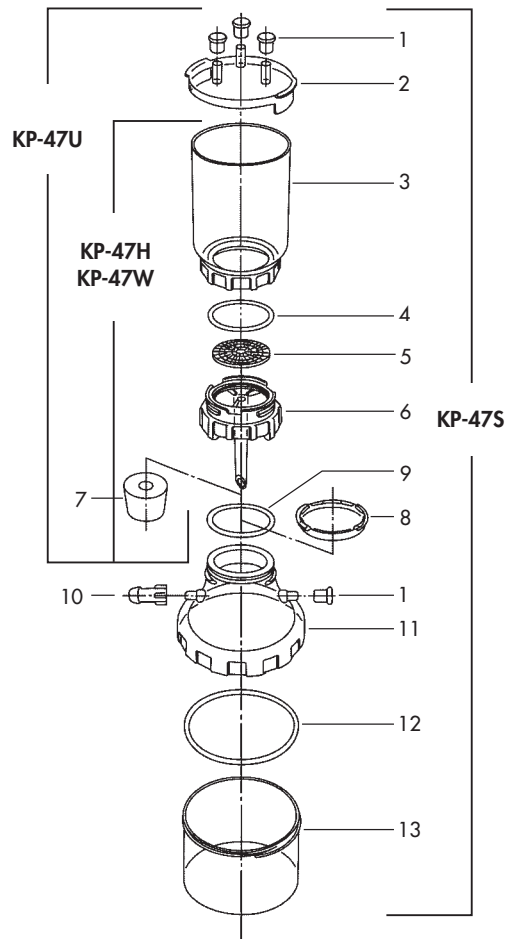
| Model | Description | Main Components | Catalog No. |
|--------|--------------------------------------|-------------------------------|-------------|
| KP-47H | Polysulfone Filter Holder | Funnel, base | 43301030 |
| KP-47U | Polysulfone Aseptic Filter Unit | Funnel, base, cover | 43301020 |
| KP-47W | Wide Mouth Polysulfone Filter Holder | Funnel, base | 43301050 |
| KP-47S | Polysulfone Aseptic Filter System | Funnel, base, cover, receiver | 43301010 |

Replacement Parts – Funnel assembly

| Model | | KP-47H | KP-47U | KP-47W | KP-47S |
|-------------|----------------|----------|----------|----------|----------|
| Catalog No. | | 43301030 | 43301020 | 43301050 | 43301010 |
| 1 | Rubber cap | - | 44501010 | - | 44501010 |
| 2 | Funnel cover | - | 44501001 | - | 44501001 |
| 3 | Funnel | 44501002 | | 44501102 | 44501002 |
| 4 | Funnel O-ring | 44501008 | | | |
| 5 | Support screen | 44501004 | | | |
| 6 | Base | 44501003 | | | |
| 7 | #8B Stopper | 19311008 | | | |

Replacement Parts – Receiver flask

| Model | | KP-47S |
|-------|-------------------------|----------|
| 8 | Receiver cover | 44501005 |
| 9 | Receiver adapter O-ring | 44501009 |
| 10 | Vacuum adapter | 44501013 |
| 11 | Receiver adapter | 44501007 |
| 12 | Receiver O-ring | 44501015 |
| 13 | Receiver flask | 44501006 |



PVC Vacuum Manifolds

- **Lightweight**
- **Resistant to acids**
- **Cup** accepts a #8A and #8B stopper to adapt microanalysis units and other devices
- **2-way** valve with PTFE stopcock in PVC body
- Not autoclavable

SPECIFICATIONS

| | |
|---------------------|---|
| Materials: | |
| Body and branches | Polyvinylchloride (PVC) |
| Valves | PTFE stopcock, PVC body |
| Connections: | |
| Outlet | 1/4" male PT to hose barb fitting connects main manifold to 11mm ID vacuum tubing |
| Cup | Accepts #8A and #8B stopper |
| Temperature: | |
| Maximum | 60°C (140°F) |

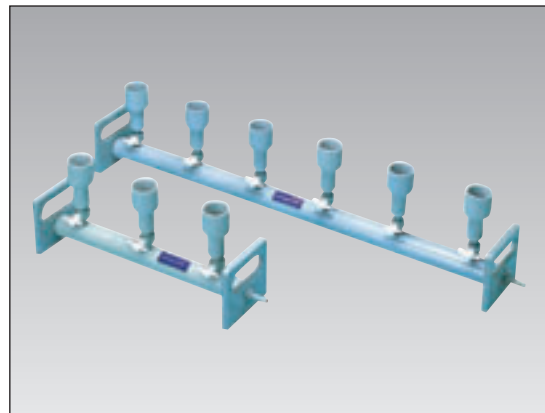
| Dimensions: | L x W x H | Distance between stations (center to center) | Weight |
|-------------|------------------|---|--------|
| | cm | | |
| 3 station | 45.1 x 12 x 17.8 | 14 | 1.5 |
| 6 station | 87.6 x 12 x 17.8 | 14 | 2.5 |

ORDERING INFORMATION

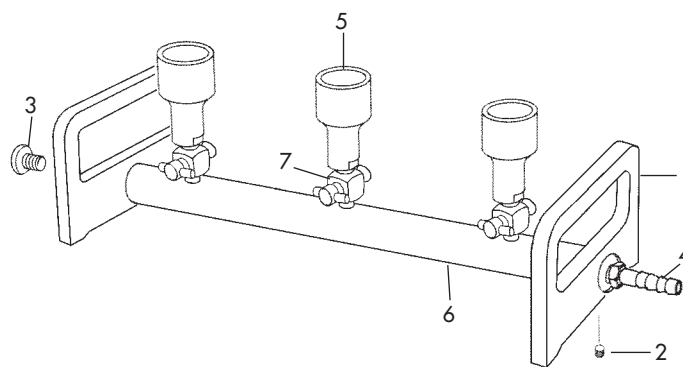
| Model | KMP-3 | KMP-6 |
|-------------------|-----------|-----------|
| Catalog No. | 17313400 | 17313600 |
| Number of station | 3 station | 6 station |

Replacement Parts

| | | |
|---|--------------------------|----------|
| 1 | Handle | |
| 2 | Handle set screw | |
| 3 | Pipe plug | |
| 4 | PVC Hose barb | 19313411 |
| 5 | Branch (Standard cup) | |
| 6 | Main manifold: | |
| | 3 station | |
| | 6 station | |
| 7 | Stopcock assembly, 2-way | 19313405 |



KMP-6
KMP-3



KMP-3

Stainless Steel Vacuum Manifolds

- **Autoclavable**
- **3-way valve** is useful when the manifold is used under closed conditions and must be vented to atmosphere without breaking the vacuum connection. 3-way valve vent is female luer slip, accepts standard disposable syringe filter (Page 16) or stainless steel syringe filter holder (KS-13, page 93)
- **Cup** accepts a #8A & #8B stopper to adapt microanalysis units and other devices
- **Sterility Test Manifold** features rear mounted flushing manifold for use in bacteria retentive method

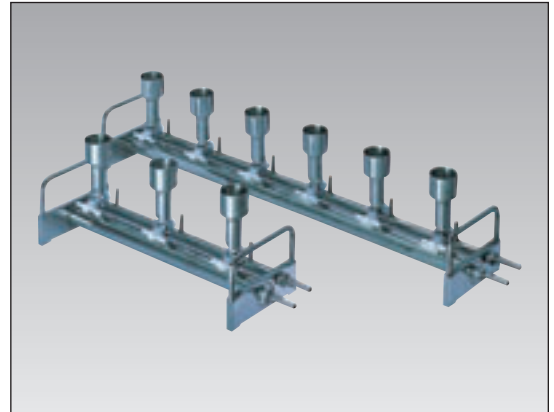
SPECIFICATIONS

| Materials: | |
|-------------------|---|
| Body and branches | Type 304 stainless steel |
| Valves | PTFE stopcock, chrome plated brass body |
| Connections: | |
| Outlet | 1/4" male PT to hose barb fitting connects main manifold to 11mm ID vacuum tubing |
| Standard cup | Accepts #8A and #8B stopper |

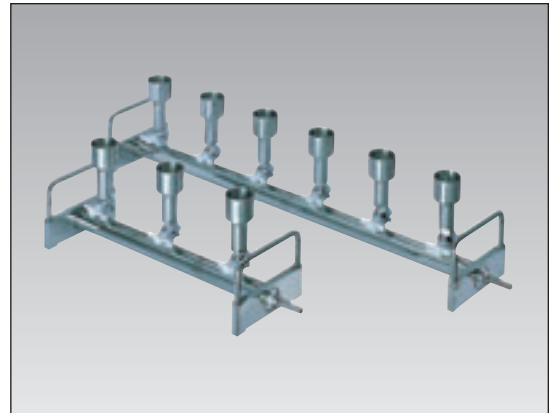
| Dimensions: | L x W x H | Distance between stations (center to center) | Weight |
|-------------|------------------|---|--------|
| | cm | | |
| 3 station | 45.7 x 12 x 17.8 | 14 | 5.0 |
| 6 station | 72.4 x 12 x 17.8 | 14 | 8.0 |

ORDERING INFORMATION

| Model | KM-3N | KM-6N | KM-3 | KM-6 |
|-------------------|-----------|-----------|-----------|-----------|
| Catalog No | 17313100 | 17313300 | 17313000 | 17313200 |
| Number of Station | 3 station | 6 station | 3 station | 6 station |
| Flushing Manifold | - | - | ○ | ○ |



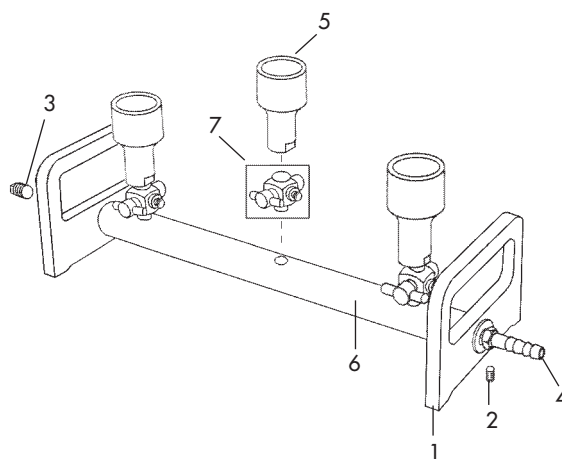
KM-3 · 6



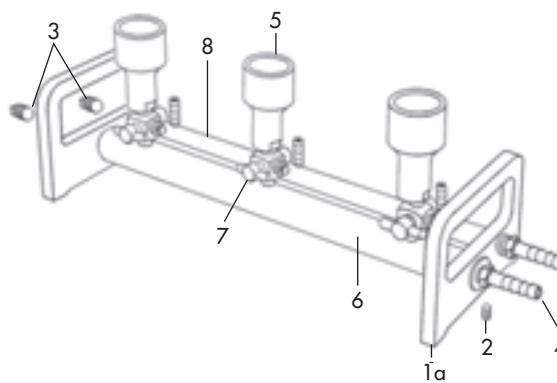
KM-3N · 6N

Replacement Parts

| | | |
|----|-------------------------------------|----------|
| 1 | Handle standard | |
| 1a | Handle (sterility test) | |
| 2 | Handle set screw | |
| 3 | Pipe plug | |
| 4 | Hose barb | 19313011 |
| 5 | Cup | |
| 6 | Main manifold: | |
| | 3 station | |
| | 6 station | |
| 7 | 3-way stopcock assembly | 19313005 |
| 8 | Flushing manifold (sterility test): | |
| | 3 station | |
| | 6 station | |



KM3-N



KM-3

PRESSURE FILTRATION

| | |
|--|-----|
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Introduction

Pressure type filter holders can be used for ultracleaning or sterilizing liquids and gases. Advantec holders have been designed to maximize flow rates and to minimize holder resistance and can be used in either batch or continuous filtration procedures.

Advantages of Pressure Filtration

- Higher differential pressures are possible, resulting in higher flow rates. The pressure differential across the membrane is not limited to atmospheric pressure (≥ 14.7 psi)
- Unintentional contamination downstream of the membrane is minimized
- Denaturation of proteins and other biological polymers due to foaming downstream of the membrane is avoided
- Vapor accumulation and possible explosion can be avoided using an inert gas to pressurize solvents and combustible or flammable liquids

RECOMMENDED PRESSURE FILTER HOLDERS FOR TYPICAL APPLICATIONS AND VOLUMES

| | Volume to be Filtered | | | | | |
|---------------------------------------|-------------------------------|--|--|---|---|---|
| | <10 mL | <50 mL | <1 liter | <5 liters | <20 liters | >20 liters |
| Typical Applications | Enzymes, Radiolabeled samples | Proteins, enzymes, Radiolabeled samples, gases | Biological media, electrolyte solution for counters, gases | Biological media, ultrapure water, serum, gases | Biological media, ultrapure water, serum, gases | Pharmaceuticals, cosmetics, large scale biologicals |
| Recommended Models | | | | | | |
| Luer Connection | KS-13 | KS-25 PP-25 PFA-25 | PP-47 | - | - | - |
| Threaded Connection | - | LS-25 | KS-47 LS-47 LS-47-HP PP-47 PFA-47 | KS-90 KS-90-UH | KS-142 KS-142-UH | KS-293 KS-293-UH |
| Sanitary Connection | - | KS-25F | KS-47F | KS-90-ST | KS-142-ST | KS-293-ST |
| Holders with Reservoir | - | - | KST-47 | KST-90 | KST-142 | - |
| Filter Specifications | | | | | | |
| Membrane Diameter (mm) | 13 | 25 | 47 | 90 | 142 | 293 |
| Prefilter Diameter* ¹ (mm) | 8 | 21 or 25 | 35, 38, 42 or 47 | 76 | 124 | 257 |
| Filtration Area (cm ²) | 0.9 | 3.5 or 3.8 | 12.5 or 13.5 | 45.3 | 113 | 530 |

*1. Prefilter size varies with model – refer to individual model specifications before choosing a prefilter.

Stainless Steel Syringe Holders

- **Can be sterilized** by standard procedures including autoclaving
- **Luer fittings** fit typical syringes
- **Can be tightened securely**, wrench set included

APPLICATIONS

- Filter or clean small volumes of liquid such as eyewash or photoresist
- Clear turbid solutions such as serum
- Purify virus solutions

SPECIFICATIONS

| | KS-13 | KS-25 |
|--------------------------------|---------------------|---------------------|
| Materials: | | |
| Body and support screen | SUS304 | |
| Gasket | PTFE | |
| O-ring | PTFE | |
| Connections: | | |
| Inlet | Female Luer-lock | |
| Outlet | Male Luer slip | |
| Dead volume | 0.2 mL | 0.4 mL |
| Pressure: | | |
| Inlet | 0.68 MPa (99 psi) | |
| Differential | 0.29 MPa (42 psi) | |
| Membrane Compatibility: | | |
| Filter size | 13 mm | 25 mm |
| Pre-filter size | 8 mm | 21 mm |
| Filtration area | 0.9 cm ² | 3.8 cm ² |
| Dimensions: | | |
| Diameter | 16 mm (0.6") | 33 mm (1.30") |
| Length | 39 mm (1.54") | 36 mm (1.42") |
| Weight: | 0.1 kg (0.25 lb) | 0.2 kg (0.38 lb) |



KS-13



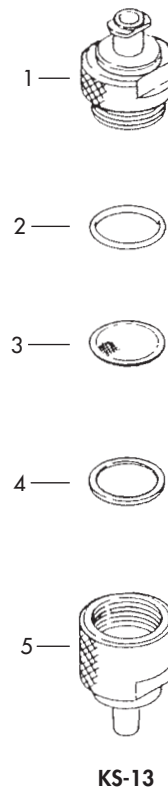
KS-25

ORDERING INFORMATION

| Model | KS-13 | KS-25 |
|-------------|----------|----------|
| Catalog No. | 17301000 | 17301200 |

Replacement Parts

| | | KS-13 | KS-25 |
|---|-------------------------|----------|----------|
| 1 | Inlet, male | | |
| 2 | O-ring (PTFE) | 19301004 | 19301204 |
| 3 | Support screen (SUS304) | 19301003 | 19301203 |
| 4 | Gasket (PTFE) | 19301002 | 19301202 |
| 5 | Outlet, female | | |



Stainless Steel Gas Line Holders

- **Female threaded locking ring** enables filter changes without removing the holder from connecting gas lines
- **Dual support screens** protect the membrane filter from reverse pressure surges and allow forward and reverse flow from either inlet or outlet

APPLICATIONS

- Ultraclean and sterilize air and other gases including compressed gases
- In-line between pressurizing source (pump or gas cylinder) and dispensing vessel



LS-25



LS-47

SPECIFICATIONS

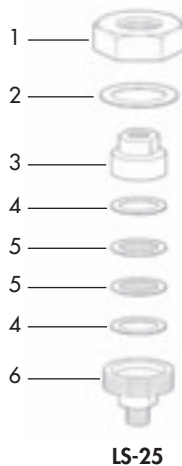
| | LS-25 | LS-47 |
|-------------------------------|---------------------|----------------------|
| Materials: | | |
| Body and support screen | SUS304 | |
| Locking ring | Chrome-plated brass | |
| Gaskets | PTFE | |
| O-ring (standard) | PTFE | Silicone |
| Connections: | | |
| Inlet | 1/4" NPTF | |
| Outlet | 1/4" NPTM | |
| Pressure: | | |
| Inlet | 0.49 MPa (71 psi) | |
| Differential | 0.19 MPa (29 psi) | |
| Filter Specifications: | | |
| Filter size | 25 mm | 47 mm |
| Prefilter size | 25 mm | 47 mm |
| Filtration area | 3.8 cm ² | 12.5 cm ² |
| Dimensions: | | |
| Diameter | 38 mm (1.5") | 69 mm (2.7") |
| Length | 50 mm (2.0") | 57 mm (2.2") |
| Weight: | 0.3 kg (0.63 lb) | 0.8 kg (1.75 lb) |

ORDERING INFORMATION

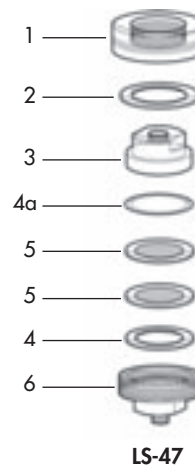
| Model | LS-25 | LS-47 |
|-------------|----------|----------|
| Catalog No. | 17304500 | 17304700 |

Replacement Parts, Accessories, and Optional O-rings

| | LS-25 | LS-47 |
|----|--------------------------------------|----------|
| 1 | Locking ring (Chrome - plated brass) | |
| 2 | 19304504 | 19304704 |
| 3 | Inlet body (1/4" NPTF) | |
| 4 | 19301202 | 19304702 |
| 4a | - | 19304712 |
| 5 | 19301203 | 19304703 |
| 6 | Outlet body (1/4" NPTM) | |



LS-25



LS-47

High Pressure Stainless Steel Holder

- **Operate at high pressure**, up to 9.8 MPa (1420 psi)
- **Standard Viton O-rings** compatible with many aggressive liquids and gases
- **Back pressure support screen available** to prevent membrane rupture and deflect flow at very high pressures

APPLICATIONS

- Filter liquids or gases under high pressure

SPECIFICATIONS

| | LS-47-HP |
|--------------------------------|----------------------|
| Materials: | |
| Body and support screen | SUS304 |
| O-rings | FPM |
| Connections: | |
| Inlet and Outlet | 1/4" NPTF |
| Pressure: | |
| Inlet | 9.8 MPa (1422 psi) |
| Differential | 1.9 MPa (276 psi) |
| Dead volume: | |
| Upstream | 3 mL |
| Downstream | 6.5 mL |
| Membrane Compatibility: | |
| Membrane filter size | 47 mm |
| Prefilter size | 38 mm |
| Filtration area | 12.5 cm ² |
| Dimensions: | |
| Diameter | 88 mm (3.5") |
| Height (including adapters) | 94 mm (3.7") |
| Weight: | 2.7 kg (6.0 lb) |

ORDERING INFORMATION

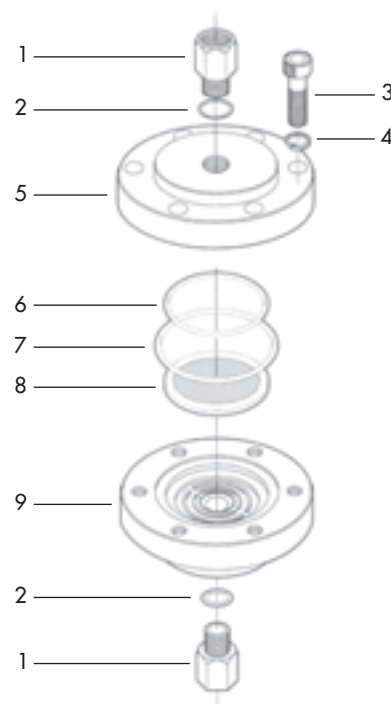
| Model | LS-47-HP |
|-------------|----------|
| Catalog No. | 17304900 |

Replacement Parts and Accessories

| | LS-47-HP | |
|---|-------------------------|----------|
| 1 | Inlet/outlet adapter | |
| 2 | Adapter O-ring | 19304905 |
| 3 | Hex cap screw, M-8 | |
| 4 | Cap screw washer | |
| 5 | Inlet plate | |
| 6 | Inner O-ring | 19304906 |
| 7 | Outer O-ring | 19304910 |
| 8 | Support screen (SUS304) | 19304903 |
| 9 | Outlet plate | |



LS-47-HP



LS-47-HP

Polypropylene In-Line and Aerosol Holders

- **Compatible** with a wide range of chemicals and temperatures
- **Exterior locking ring** design allows the unit to be assembled quickly and efficiently without tearing the membrane

APPLICATIONS

- Ultraclean and sterilize liquids
- Aseptic sampling of liquids or gases at point-of-use
- Environmental air sampling (PPO-47)



Polypropylene In-Line and Aerosol Holders

SPECIFICATIONS

| | PP-25 | PP-47 | PPO-47 |
|-------------------------------|---|--|--|
| Materials: | | | |
| Body and support screen | Polypropylene | | |
| O-rings (standard) | Silicone | | Silicone/PTFE |
| Connections: | | | |
| Inlet | Female Luer-Lock | Combination 1/4" NPTM, Female Luer slip | Open Face |
| Outlet | Male Luer slip | Combination 1/4" NPTM, Female Luer slip | Combination 1/4" NPTM, Female Luer slip |
| Pressure: | | | |
| Maximum operating | 0.29 MPa (42 psi) | 0.49 MPa (71 psi) | - |
| Temperature: | | | |
| Maximum operating | 80°C (176°F) | | |
| Autoclave | 121°C (250°F), 15 psi, 20 min slow exhaust only | | |
| Filter Specifications: | | | |
| Filter size | 25 mm | 47 mm | |
| Prefilter size | 21 mm | 42 mm | - |
| Filtration area | 3.5 cm ² | 13.5 cm ² | |
| Recommended volume | <50 mL | Up to 1 liter | - |
| Dimensions: | | | |
| Diameter | 30 mm (1.2") | 65 mm (2.6") | |
| Height | 30 mm (1.2") | 50 mm (2.0") | 40 mm (1.6") |
| Weight: | 0.41 oz (12g) | 1.2 oz (47g) | 1.4 oz (40g) |

ORDERING INFORMATION

| Model | PP-25 | PP-47 | PPO-47 |
|------------------|----------|----------|----------|
| Catalog No. | 43303010 | 43303020 | 43305010 |
| Package (pc/box) | 6 | 1 | |

Typical initial liquid flow rates (in mL/min)

| Membrane Pore size (µm) | PP-25 | PP-47 |
|-------------------------|-------|-------|
| 0.20 | 35 | 250 |
| 0.45 | 80 | 600 |
| 1.00 | 320 | 1,700 |
| 3.00 | 740 | 2,800 |

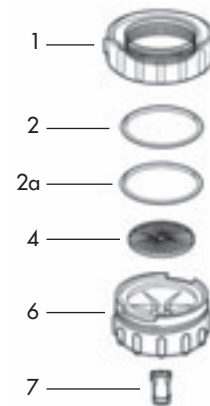
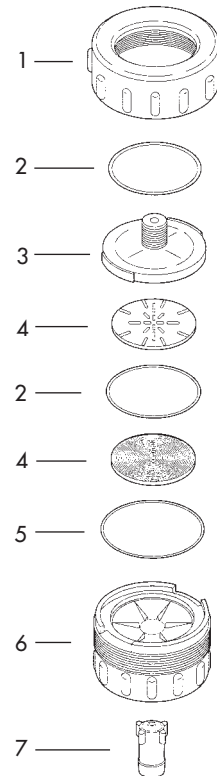
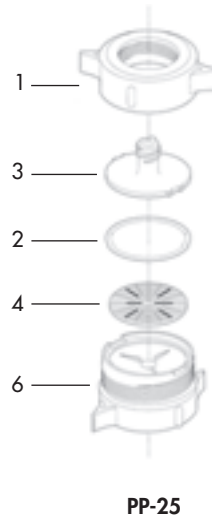
Conditions: Initial flow rates of water being filtered through a mixed cellulose esters (MCE) at a differential pressure of 1 kg/cm² (14 psi) at 20°C.

Replacement Parts and Optional O-rings

| | | PP-25 |
|---|-----------------------------|----------|
| 1 | Locking ring, outer | 44540101 |
| 2 | Inlet cap O-ring (silicone) | 44540106 |
| 3 | Inlet cap | 44540102 |
| 4 | Support screen | 44540104 |
| 6 | Outlet base | 44540103 |

| | | PP-47 |
|---|--|----------|
| 1 | Locking ring, outer | 44501201 |
| 2 | Inlet cap O-ring (silicone) | 44501204 |
| 3 | Inlet cap | 44501202 |
| 4 | Support screen | 44501004 |
| 5 | Outlet base O-ring (silicone) | 44501208 |
| 6 | Outlet base | 44501203 |
| 7 | Outlet adapter (male luer slip to hose barb) | 44501013 |

| | | PPO-47 |
|----|--|----------|
| 1 | Locking ring, outer | 44501201 |
| 2 | Inlet cap O-ring (silicone) | 44501204 |
| 2a | Sealing O-ring (PTFE) | 44501301 |
| 4 | Support screen | 44501004 |
| 6 | Outlet base | 44501203 |
| 7 | Outlet adapter (male luer slip to hose barb) | 44501013 |



PFA In-Line Filter Holders

- **Superior chemical compatibility** – can be used with chemically aggressive liquids
- **Dual support screens** allow for flow in either direction
- **Exterior locking ring** for quick assembly without tearing the membrane

APPLICATIONS

- Sterilize and ultraclean liquids under positive pressure
- Ideal for filtering small volumes of high purity acids, alkalis or organic solvents

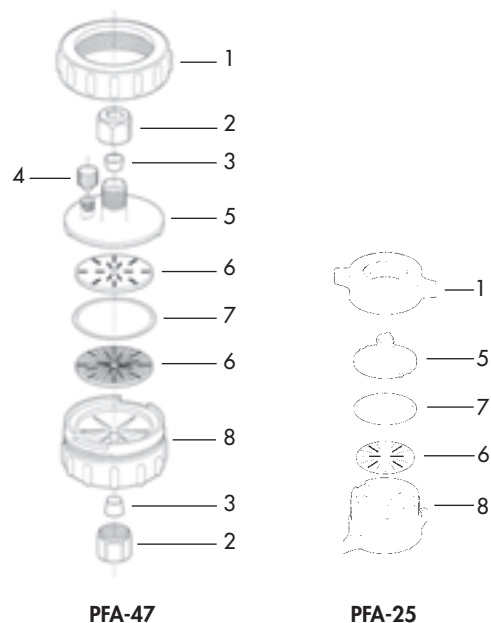
Note: PFA-47 unit has an air/bleed vent

SPECIFICATIONS

| | PFA-25 | PFA-47 |
|--------------------------------|---|---|
| Materials: | | |
| Body and support screen | PFA | |
| O-ring (standard) | Perfluoroelastomer | |
| Connections: | | |
| Inlet | Female Luer-Lock | Combination 1/4" NPTM, 1/4" tubing adapter |
| Outlet | Male Luer slip | |
| Pressure: | | |
| Maximum operating | 0.29 MPa (42 psi) | |
| Temperature: | | |
| Maximum operating | 121°C (250°F) | |
| Autoclave | 121°C (250°F), 15 min | |
| Weight: | 0.8 oz (22g) | 5.2 oz (120g) |
| Dimensions: | | |
| Diameter | 32 mm (1.3") | 65 mm (2.6") |
| Height | 32 mm (1.3") | 70 mm (2.8") |
| Membrane Compatibility: | | |
| Filter size | 25 mm | 47 mm |
| Prefilter size | 21 mm | 42 mm |
| Filtration area | 3.5 cm ² | 13.5 cm ² |
| Flow Rate: | | |
| Pore size (PTFE membrane) | Typical methanol flow rate at 1 kg/cm ² , 20°C | |
| 0.2 µm (T020) | 60 mL/min | 400 mL/min |
| 0.5 µm (T050) | 150 mL/min | 700 mL/min |
| 1.0 µm (T100) | 350 mL/min | 1200 mL/min |



PFA-25, PFA-47



ORDERING INFORMATION

| Model | PFA-25 | PFA-47 |
|-------------|----------|----------|
| Catalog No. | 43307010 | 43307020 |

Replacement Parts

| | | PFA-25 | PFA-47 |
|---|----------------------|----------|----------|
| 1 | Locking ring | 44530201 | 44530101 |
| 2 | Inlet/Outlet adapter | - | 44530111 |
| 3 | Tubing adapter | - | 44530110 |
| 4 | Vent cap | - | 44530105 |
| 5 | Inlet cap | 44530202 | 44530102 |
| 6 | Support screen | 44530204 | 44530104 |
| 7 | Inlet O-ring | 44530206 | 44530106 |
| 8 | Outlet | 44530203 | 44530103 |

Sanitary In-Line Stainless Steel Holders

- **Sanitary inlet and outlet connections** are non-threaded and can be completely disassembled for thorough cleaning
- **47 mm holder features vent** to allow air venting on upstream side of the membrane at any time during filtration

APPLICATIONS

- Point of use filtration on sterile filling machines
- Flow decay studies for scale up to larger filtration systems
- Liquid or gas

SPECIFICATIONS

| | KS-25F | KS-47F |
|--------------------------------|----------------------|----------------------|
| Materials: | | |
| Body and support screen | SUS304 | |
| O-rings | FPM and Silicone | |
| Gasket | PTFE | |
| Connections: | | |
| Inlet/Outlet | 6 mm (0.24") OD barb | 8 mm (0.32") OD barb |
| Pressure: | | |
| Inlet | 0.49 MPa (71 psi) | |
| Differential | 0.29 MPa (42 psi) | |
| Weight: | 0.45 kg (1 lb) | 0.9 kg (2 lb) |
| Dimensions: | | |
| Diameter (without clamp) | 50 mm (2.0") | 64 mm (2.5") |
| Length (with vent valve) | 72 mm (2.8") | 78 mm (3.1") |
| Membrane Compatibility: | | |
| Filter size | 25 mm | 47 mm |
| Prefilter size | 21 mm | 35 mm (47 mm)* |
| Filtration area | 3.8 cm ² | 12.5 cm ² |

* If a membrane filter is used as a prefilter, use a 47 mm filter and place a polyester mesh separator between the 2 membranes (See page 14).

ORDERING INFORMATION

| Model | KS-25F | KS-47F |
|-------------|----------|----------|
| Catalog No. | 17307000 | 17307200 |

Replacement Parts

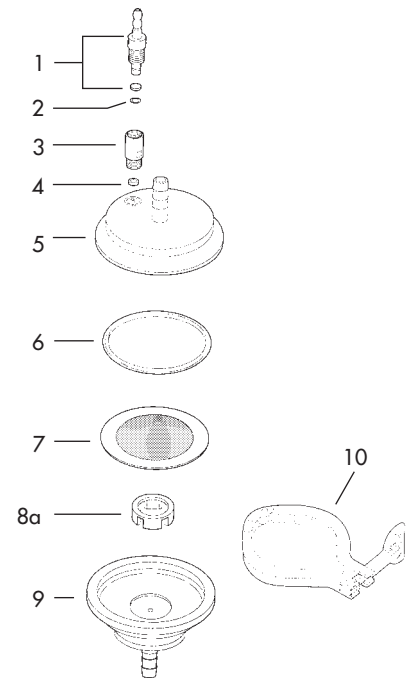
| | KS-25F | KS-47F |
|----|----------|----------|
| 1 | | |
| 2 | - | 19307220 |
| 3 | | |
| 4 | | |
| 5 | | |
| 6 | 19307003 | 19304712 |
| 7 | 19301203 | 19304703 |
| 8 | 19307004 | - |
| 8a | - | 19307204 |
| 9 | | |
| 10 | 19306000 | 19306300 |



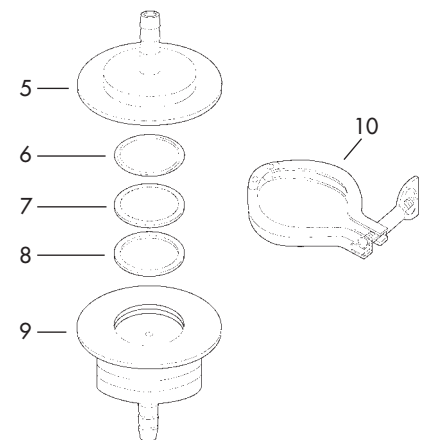
KS-25F



KS-47F



KS-47F



KS-25F

Vented In-Line Stainless Steel Holder

- **Support screen is PTFE coated** to prevent membrane sticking during autoclaving
- **Back pressure support screen** prevents membrane rupture during reverse pressure surges
- **Vent valve** in inlet body enables venting at any time during filtration

APPLICATIONS

- Sterilize and ultraclean liquids or gases under positive pressure
- Sterilize with a membrane in place for microbiological studies
- Install for point of use filtration on filling machines

Note: When using the KS-47 inline to filter gases, a second support screen should be used upstream of the membrane



KS-47

SPECIFICATIONS

| | | KS-47 |
|--------------------------------|--|-------------------------------|
| Materials: | | |
| Body and support screen | | SUS304 |
| O-rings (standard) | | FPM and silicone |
| Support screen | | PTFE coated stainless steel |
| Gasket | | PTFE |
| Connections: | | |
| Inlet/Outlet | | 1/4" PS to hose barb (9.5 mm) |
| Pressure: | | |
| Inlet | | 0.68 MPa (99 psi) |
| Differential | | 0.29 MPa (42 psi) |
| Dead Volume: | | |
| Upstream | | 5 mL |
| Downstream | | 2 mL |
| Weight: | | |
| | | 0.8 kg (1.8 lb) |
| Membrane Compatibility: | | |
| Filter size | | 47 mm |
| Prefilter size | | 35 mm (47 mm)* |
| Filtration size | | 12.5 cm ² |

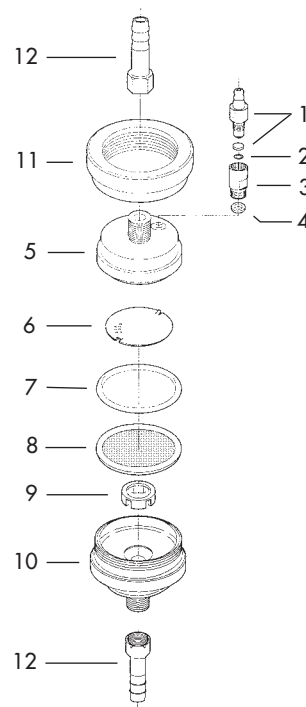
* If a membrane filter is used as a prefilter, use a 47 mm filter and place a polyester mesh separator between the 2 membranes (See page 14).

Replacement Parts

| | | KS-47 |
|----|---------------------------------|----------|
| 1 | Vent valve set | 19307220 |
| 2 | | |
| 3 | | |
| 4 | | |
| 5 | Inlet body | |
| 6 | Back pressure support | 19307404 |
| 7 | O-ring (silicone) | 19304712 |
| 8 | Support screen (SUS304) | 19304715 |
| 9 | Underdrain support | 19307204 |
| 10 | Outlet body | |
| 11 | Locking ring | |
| 12 | Inlet/outlet adapter | 19301510 |
| | Gasket for inlet/outlet adapter | 19321014 |

ORDERING INFORMATION

| Model | KS-47 |
|-------------|----------|
| Catalog No. | 17307400 |



KS-47

Large Standard Stainless Steel Holders – 90, 142, 293mm

- **Seal membrane by hand tightening** locking wing nuts
- **Optimal holder design** minimizes resistance and maximizes flow rate
- **Each unit labeled** with identifying serial numbers on the outside of both the inlet and outlet plates

APPLICATIONS

- Use in-line for filtering gases or liquids
- Use with pressure vessel for batch type operations



KS-90

SPECIFICATIONS

| | KS-90 | KS-142 | KS-293 |
|--------------------------------|---|-----------------------------------|---------------------|
| Materials: | | | |
| Body | SUS304 | | |
| Support screen | PTFE coated photoetched stainless steel | | |
| O-rings (standard) | Silicone | | |
| Gasket | PTFE | | |
| Connections: | | | |
| Inlet / Outlet | 3/4" PS to 11 mm (3/8") hose barb | 3/4" PS to 16 mm (5/8") hose barb | |
| Pressure: | | | |
| Inlet | 0.68 MPa (99 psi) | | |
| Differential | 0.29 MPa (42 psi) | | |
| Weight: | 4 kg (8.8 lb) | 6 kg (13 lb) | 19 kg (42 lb) |
| Membrane Compatibility: | | | |
| Membrane filter size | 90 mm | 142 mm | 293 mm |
| Prefilter size | 76 mm | 124 mm | 257 mm |
| Filtration area | 45.3 cm ² | 113 cm ² | 530 cm ² |

Supplied with aluminum wrench (spanner) and 6 mm allen wrench (hex key).

ORDERING INFORMATION

| Model | KS-90 | KS-142 | KS-293 |
|-------------|----------|----------|----------|
| Catalog No. | 17301700 | 17301900 | 17302500 |



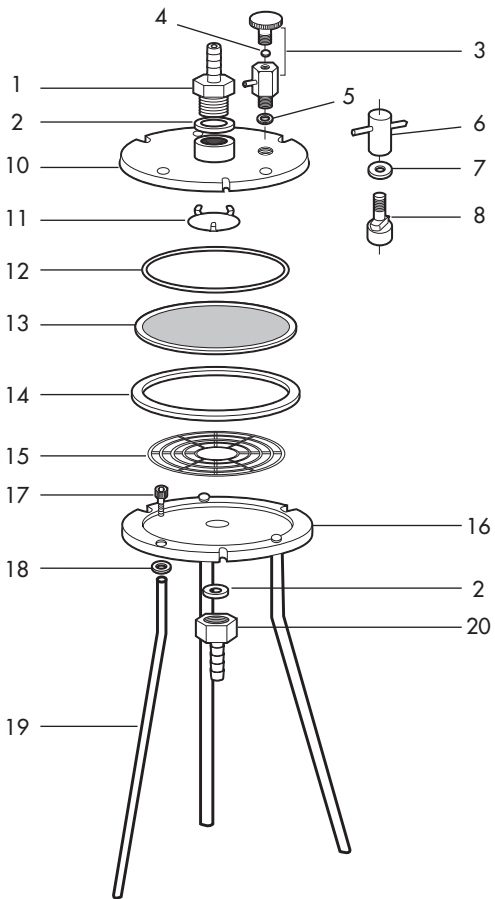
KS-142



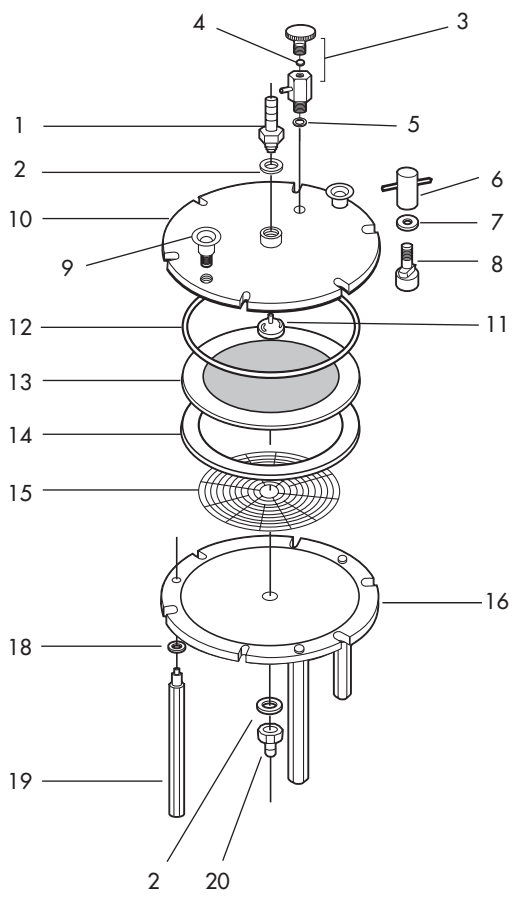
KS-293

Replacement Parts

| | | Material | KS-90 | KS-142 | KS-293 |
|----|--------------------------|----------------|----------|----------|----------|
| 1 | 3/4" PSM Inlet adapter | SUS304 | 19301713 | | 19302510 |
| 2 | Gasket for Inlet adapter | PTFE | 19301710 | | |
| 3 | Vent valve | SUS304 | 19301711 | 19301911 | |
| 4 | Stopsheet for vent valve | PTFE | | | |
| 5 | Gasket for vent valve | PTFE | 19301712 | 19301912 | 19302512 |
| 6 | Sealing wing nut | SUS304 | - | 19301770 | 19301773 |
| 7 | Sealing washer | SUS304 | | | |
| 8 | Sealing bolt | SUS304 | | | |
| 9 | Handle for Inlet plate | SUS304 | - | - | |
| 10 | Inlet plate | SUS304 | | | |
| 11 | Flow deflector | SUS304 | | | |
| 12 | O-ring | Silicone | 19301705 | 19301905 | 19302505 |
| 13 | Support screen | PTFE coated SS | 19301704 | 19301904 | 19302504 |
| 14 | Gasket | PTFE | 19301703 | 19301903 | 19302503 |
| 15 | Underdrain support | SUS304 | 19301702 | 19301902 | 19302502 |
| 16 | Outlet plate | SUS304 | | | |
| 17 | Leg bolt | SUS304 | 19301760 | | - |
| 18 | Leg washer | SUS304 | | | |
| 19 | Leg | SUS304 | | | |
| 20 | 3/4" PSF Outlet adapter | SUS304 | 19301717 | | 19302511 |



KS-142



KS-293

Large Sanitary Stainless Steel Holders – 90, 142, 293 mm

- **Sanitary connections** are threadless and can be completely disassembled for thorough cleaning
- **Designed for minimal resistance and maximal flow**
- **Removable wing nuts** tighten easily by hand to seal membrane
- **Both inlet and outlet plates clearly marked** with identifying serial number

APPLICATIONS

- Ultraclean or sterilize gases or liquids
- Use with a pressure vessel for large volumes and batch type operations



KS-90-ST

SPECIFICATIONS

| | KS-90-ST | KS-142-ST | KS-293-ST |
|--------------------------------|---|---------------------|---|
| Materials: | | | |
| Body | SUS304 | | |
| Support screen | PTFE coated photoetched stainless steel | | |
| O-rings (standard) | Silicone | | |
| Gasket | PTFE | | |
| Connections: | | | |
| Inlet / Outlet | 1" sanitary fitting to 16 mm (5/8") hose barb | | 1.5" sanitary fitting to 16 mm (5/8") hose barb |
| Pressure: | | | |
| Inlet | 0.68 MPa (99 psi) | | |
| Differential | 0.29 MPa (42 psi) | | |
| Weight: | 4 kg (8.8 lb) | 6 kg (13 lb) | 19 kg (42 lb) |
| Membrane Compatibility: | | | |
| Membrane filter size | 90 mm | 142 mm | 293 mm |
| Prefilter size | 76 mm | 124 mm | 257 mm |
| Filtration area | 45.3 cm ² | 113 cm ² | 530 cm ² |

Supplied with aluminum wrench (spanner) and 6 mm allen wrench (hex key).



KS-142-ST



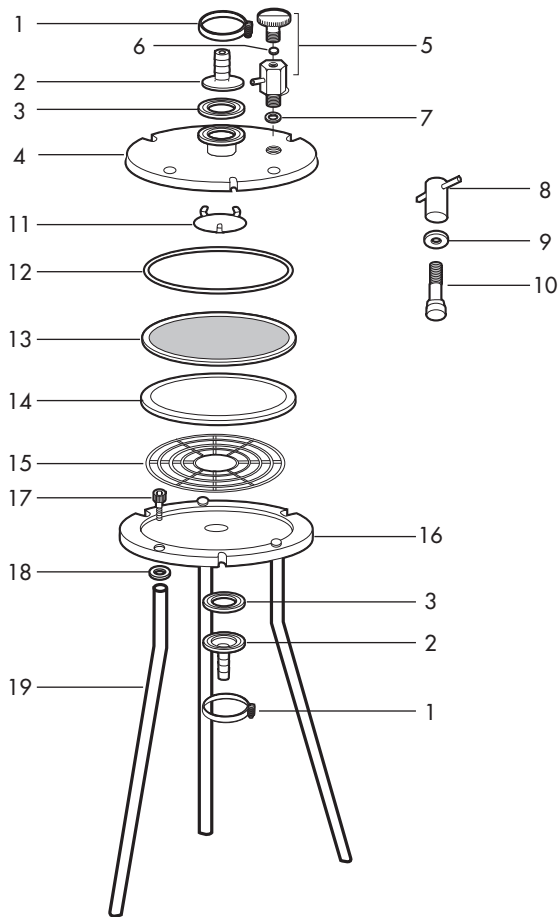
KS-293-ST

ORDERING INFORMATION

| Model | KS-90-ST | KS-142-ST | KS-293-ST |
|-------------|----------|-----------|-----------|
| Catalog No. | 17301800 | 17302100 | 17302700 |

Replacement Parts

| | | Material | KS-90-ST | KS-142-ST | KS-293-ST |
|----|--------------------------|----------------|----------|-----------|-----------|
| 1 | Clamp, 1.5S | SUS304 | 19306000 | | |
| 2 | Inlet/Outlet adapter | SUS304 | 19306200 | | |
| 3 | Inlet/Outlet Gasket | Silicone | 19306100 | 19306108 | |
| 4 | Inlet plate | SUS304 | | | |
| 5 | Vent valve | SUS304 | 19301711 | 19301911 | |
| 6 | Stopsheet for vent valve | PTFE | | | |
| 7 | Gasket for vent valve | PTFE | 19301712 | 19301912 | 19302512 |
| 8 | Sealing wing nut | SUS304 | 19301770 | | 19301773 |
| 9 | Sealing washer | SUS304 | | | |
| 10 | Sealing bolt | SUS304 | | | |
| 11 | Flow deflector | SUS304 | | | |
| 12 | O-ring | Silicone | 19301705 | 19301905 | 19302505 |
| 13 | Support screen | PTFE coated SS | 19301704 | 19301904 | 19302504 |
| 14 | Gasket | PTFE | 19301703 | 19301903 | 19302503 |
| 15 | Underdrain support | SUS304 | 19301702 | 19301902 | 19302502 |
| 16 | Outlet plate | SUS304 | | | |
| 17 | Leg bolt | SUS304 | 19301760 | | - |
| 18 | Leg washer | SUS304 | | | |
| 19 | Leg | SUS304 | | | |



KS-142-ST

Large Stainless Steel Holders with Reservoirs

- **Designed for filtering small batches** of liquid without having to use a separate pressure vessel
- **Separate ports** for pressurizing the reservoir and for adding additional sample
- **Membrane sealed internally** by hand-tightening locking wing nuts

APPLICATIONS

- Sterilizing, ultracleaning, and flow decay tests for pilot studies
- Suitable for hazardous toxicity testing and TCLP
- Optional back pressure screen recommended for intermittent fill operations



KST-47



KST-90



KST-142

SPECIFICATIONS

| | KST-47 | KST-90 | KST-142 |
|--------------------------------|--|--|---------------------|
| Materials: | | | |
| Body | SUS304 | | |
| Support screen | Photoetched SUS304 | PTFE coated photoetched SUS304 | |
| O-rings (standard) | Silicone | | |
| Gasket (standard) | Silicone/PTFE | PTFE | |
| Connections: | | | |
| Inlet | 1/4" PS | 1/4" PT | |
| Inlet adapter | Stepped hose barb (7 mm, 10.5mm, 13mm) | Ball valve with stepped hose barb (7 mm, 10.5 mm, 13 mm) | |
| Outlet | 1/4" PS | 3/4" PS | |
| Outlet adapter | 9.5 mm hose barb | 11 mm hose barb | |
| Pressure: | | | |
| Inlet | 0.49 MPa (71 psi) | | |
| Differential | 0.29 MPa (42 psi) | | |
| Vent relief valve | 0.44 ± 0.04 MPa (64 ± 6 psi) | | |
| Weight: | 1 kg (2.2 lb) | 5 kg (11 lb) | 6 kg (13 lb) |
| Capacity: | 200 mL | 750 mL | 1,500mL |
| Membrane Compatibility: | | | |
| Membrane filter size | 47 mm | 90 mm | 142 mm |
| Prefilter size | 35 mm | 76 mm | 124 mm |
| Filtration area | 12.5 cm ² | 45.3 cm ² | 113 cm ² |

Supplied with aluminum wrench (spanner) and 6 mm allen wrench (hex key) except KST-47.

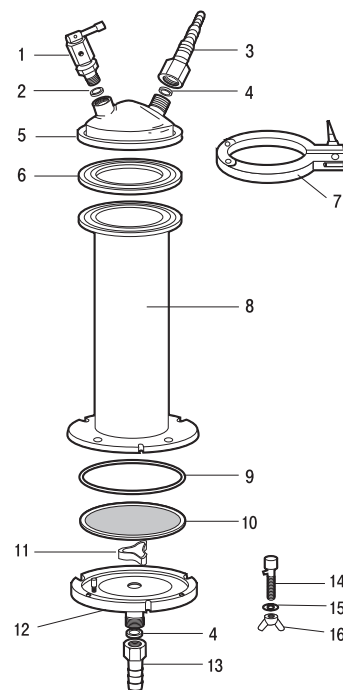
ORDERING INFORMATION

| | KST-47 | KST-90 | KST-142 |
|-------------|----------|----------|----------|
| Catalog No. | 17301500 | 17301600 | 17302300 |

Assemblies are available with PTFE coating by special order.

Replacement Parts

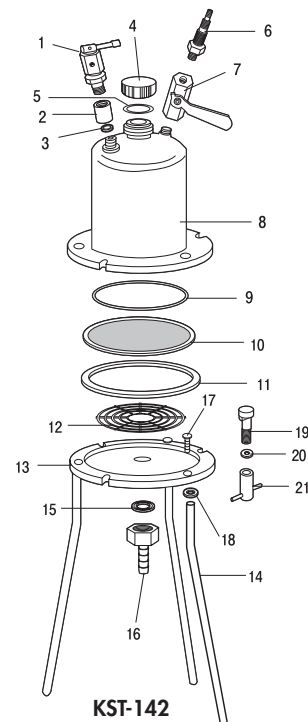
| | | Material | KST-47 |
|----|-------------------------------------|------------|----------|
| 1 | Vent relief valve | SUS304/FPM | 19301525 |
| 2 | Gasket for vent relief valve | PTFE | 19301509 |
| 3 | Inlet adapter (1/4" PSF hose barb) | SUS304 | 19321011 |
| 4 | Gasket for Inlet adapter | PTFE | 19321014 |
| 5 | Inlet Cap | SUS304 | |
| 6 | Inlet Cap Gasket | Silicone | 19306108 |
| 7 | Clamp, 1.5S | SUS304 | 19306000 |
| 8 | Reservoir | SUS304 | |
| 9 | O-ring | Silicone | 19304712 |
| 10 | Support screen | SUS304 | 19304703 |
| 11 | Underdrain support | SUS304 | 19301515 |
| 12 | Outlet plate | SUS304 | |
| 13 | Outlet adapter (1/4" PSF hose barb) | SUS304 | 19301510 |
| 14 | Wing-type bolt | SUS304 | 19301178 |
| 15 | Sealing washer | SUS304 | |
| 16 | Wing-type nut | SUS304 | |



KST-47

Replacement Parts

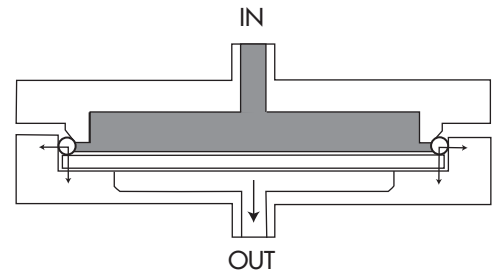
| | | Material | KST-90 | KST-142 |
|----|-------------------------------------|----------------|----------|----------|
| 1 | Vent relief valve | SUS304/FPM | | 19321025 |
| 2 | Vent Socket | SUS304 | | 19302314 |
| 3 | Gasket for vent relief valve | PTFE | | 19321014 |
| 4 | Inlet Cap | SUS304 | 19301610 | 19302310 |
| 5 | Inlet Cap O-ring | Silicone | 19301609 | 19302309 |
| 6 | Inlet adapter (1/4" PTM hose barb) | SUS304 | 19321611 | |
| 7 | Valve | SUS304 | 19302320 | |
| 8 | Reservoir | SUS304 | | |
| 9 | O-ring | Silicone | 19301705 | 19301905 |
| 10 | Support screen | PTFE coated SS | 19301704 | 19301904 |
| 11 | Gasket | PTFE | 19301703 | 19301903 |
| 12 | Underdrain support | SUS304 | 19301702 | 19301902 |
| 13 | Outlet plate | SUS304 | | |
| 14 | Leg | SUS304 | | |
| 15 | Gasket for Outlet adapter | PTFE | 19301710 | |
| 16 | Outlet adapter (3/4" PSF hose barb) | SUS304 | 19301717 | |
| 17 | Sealing Bolt | SUS304 | 19301760 | |
| 18 | Locking Washer | SUS304 | | |
| 19 | Wing-type bolt | SUS304 | 19301770 | |
| 20 | Sealing washer | SUS304 | | |
| 21 | Wing-type nut | SUS304 | | |



KST-142

Multi-Media Pressure Sealing Holders

- **Dual sealing mechanism** compresses the filter between the inside wall of the outlet plate and the O-ring on the outer edge
- **Broad range of media thickness**, including filter pads, can be used



Dual sealing mechanism



KS-90-UH



KS-142-UH



KS-293-UH

SPECIFICATIONS

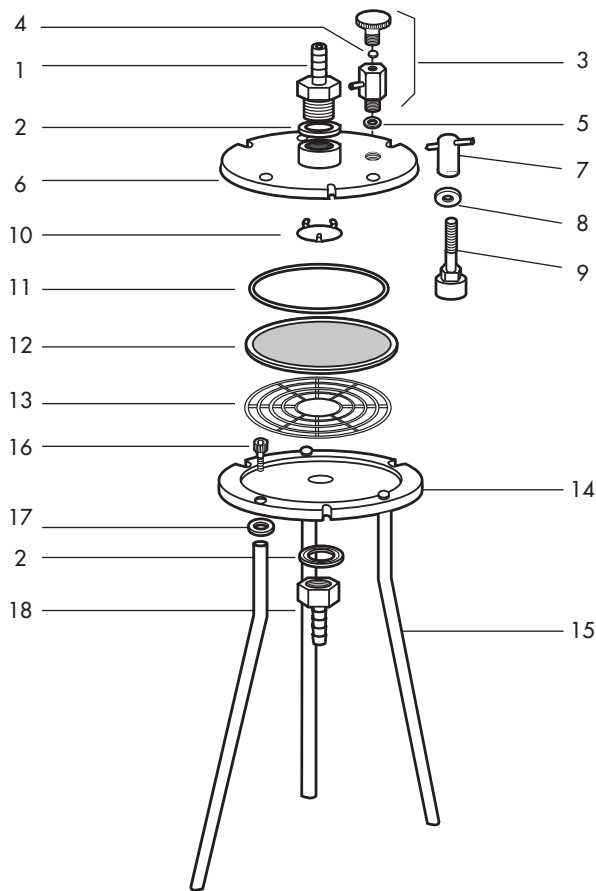
| | KS-90-UH | KS-142-UH | KS-293-UH |
|--------------------------------|---|---------------------|---------------------|
| Materials: | | | |
| Body | SUS304 | | |
| Support screen | PTFE coated photoetched stainless steel | | |
| O-ring | Silicone | | |
| Connections: | | | |
| Inlet/Outlet | 3/4" PS | | |
| Adapter | 11 mm hose barb | 16 mm hose barb | |
| Pressure: | | | |
| Inlet | 0.68 MPa (99 psi) | | |
| Differential | 0.29 MPa (42 psi) | | |
| Weight: | 4.5 kg (9.9 lb) | 7 kg (15.4 lb) | 21 kg (46 lb) |
| Membrane Compatibility: | | | |
| Membrane filter size | 90 mm | 142 mm | 293 mm |
| Prefilter size | 76 mm | 124 mm | 257 mm |
| Filtration area | 45.3 cm ² | 113 cm ² | 530 cm ² |

ORDERING INFORMATION

| Model | KS-90-UH | KS-142-UH | KS-293-UH |
|-------------|----------|-----------|-----------|
| Catalog No. | 17301790 | 17301990 | 17302590 |

Replacement Parts

| | | Material | KS-90-UH | KS-142-UH | KS-293-UH |
|----|--------------------------|----------------|----------|-----------|-----------|
| 1 | 3/4" PSM Inlet adapter | SUS304 | 19301713 | | 19302510 |
| 2 | Gasket for Inlet adapter | PTFE | 19301710 | | |
| 3 | Vent valve | SUS304 | 19301711 | 19301911 | |
| 4 | Stopsheet for vent valve | PTFE | | | |
| 5 | Gasket for vent valve | PTFE | 19301712 | 19301912 | 19302512 |
| 6 | Inlet plate | SUS304 | | | |
| 7 | Sealing wing nut | SUS304 | - | 19301771 | 19301774 |
| 8 | Sealing washer | SUS304 | | | |
| 9 | Sealing bolt | SUS304 | | | |
| 10 | Flow deflector | SUS304 | | | |
| 11 | O-ring | Silicone | 19301795 | 19301995 | 19303704 |
| 12 | Support screen | PTFE coated SS | 19301794 | 19301994 | 19302594 |
| 13 | Underdrain support | SUS304 | 19301702 | 19301902 | 19302502 |
| 14 | Outlet plate | SUS304 | | | |
| 15 | Leg | SUS304 | | | |
| 16 | Leg bolt | SUS304 | 19301761 | | - |
| 17 | Leg washer | SUS304 | | | |
| 18 | 3/4" PSF Outlet adapter | SUS304 | 19301717 | 19302511 | |



KS-142-UH