

EPF *iprotect*[®]

(Ecological Pressure Filter)

High Pressure Filters
Max 700 l/min - 450 bar



A compact, cost effective pressure filter solution

Designed with the *iprotect*[®] patented filtration technology

The Parker EPF *iprotect*[®] (Ecological High Pressure Filter) is designed to provide high quality filtration of hydraulic systems, providing new possibilities to reduce the cost of ownership by improving their productivity and profitability.

A radical, innovative approach was applied with the design of the EPF *iprotect*[®], suitable for a flow capacity up to 700 l/min at 450 bar working pressure.

A new patented design of the filter element allows integration of the bypass valve and element core as re-usable parts in the filter bowl. This makes the product fool proof as there is no risk of forgetting to re-install re-usable parts.

With less space being available for filters, Parker has taken on board the requirement to provide more compact solutions. A unique feature is the filter element remains inside the filter bowl when changing the filter element. This can save over 500mm of space envelope in comparison with traditional high pressure filters.



Product Features:

The patented element design guarantees the quality of filtration, which directly impacts the oil cleanliness level as the usage of pirate type after market filters with unknown quality of filter media is excluded. This in-built safety has a direct, positive impact on the productivity and profitability of equipment.

- Guaranteed quality of filtration
- More compact solutions are possible
- Filter element remains in filter bowl during filter service
- Reduce waste of 50%
- No risk of installation mistakes due to a 'foolproof' design
- Unique OEM branding opportunities
- Easy to integrate into hydraulic manifold solutions



ENGINEERING YOUR SUCCESS.

EPF *iprotect*®

High Pressure Filters

| Features | Advantages | Benefits |
|--|--|---|
| Patented filter element | Avoid use of non-genuine parts | Guaranteed quality of filtration |
| Filter element remains in filter bowl | Less space needed to change/service filter | More compact solutions are possible |
| Environmentally-friendly design | Reduces environmental waste over 50% | Reduce service time for filter over 40% |
| Service-friendly product design | No handling of loose re-usable parts | Lower disposal cost |
| Bypass valve integral part of filter bowl | Easy to integrate in manifold systems | No risk of making mistakes during change of element |
| | Lower pressure lost across filter | More compact and lower cost of manifold (only one cavity is needed) |
| Wide range of differential pressure indicators | Continuous feedback of condition filter elements | Saving energy, improving system efficiency |
| | | Optimizing filter element life |
| | | Contributes to scheduled maintenance |

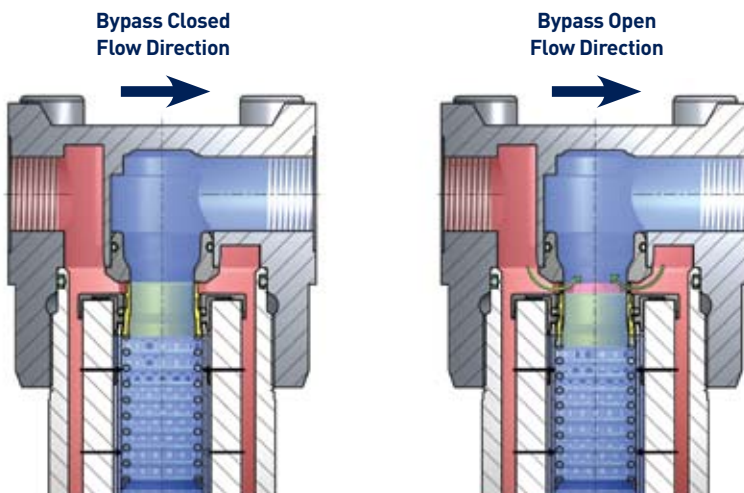
Typical Applications

- Mobile working hydraulics
- Mobile drive system
- Pilot line filtration
- Servo controls
- Reverse flow valve applications
- Industrial working hydraulics
- Control systems

The Parker EPF *iprotect*® series patented bypass valve technology

Bypass settings are available up to 7 bar or completely blocked in conjunction with patented, high strength filter elements (available October 2010). The principle is

based on differential pressure measurement across the filter element. During bypass only a part of the mainflow is flowing through the bypass valve.



EPF *iprotect*® applies the latest generation of Microglass III filter media. The patented element design guarantees the quality of filtration.

WARNING — USER RESPONSIBILITY

FAILURE OR IMPROPER SELECTION OR IMPROPER USE OF THE PRODUCTS DESCRIBED HEREIN OR RELATED ITEMS CAN CAUSE DEATH, PERSONAL INJURY AND PROPERTY DAMAGE.

- This document and other information from Parker-Hannifin Corporation, its subsidiaries and authorized distributors provide product or system options for further investigation by users having technical expertise.
- The user, through its own analysis and testing, is solely responsible for making the final selection of the system and components 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, follow applicable industry standards, and follow the information concerning the product in the current product catalogue and in any other materials provided from Parker or its subsidiaries or authorized distributors.
- To the extent that Parker or its subsidiaries or authorized distributors provide component or system options based upon data or specifications provided by the user, the user is responsible for determining that such data and specifications are suitable and sufficient for all applications and reasonably foreseeable uses of the components or systems.

Protecting your system and the environment

Protect your system performance and profit

The new *iprotect*® generation of filter elements provide high filtration performance combined with patented technology. The bespoke design prevents the use of pirate type alternatives.



Less space needed to accommodate the filter

More compact solutions are possible as the filter element remains in the filter bowl during change of filter element. Compared to traditional solutions it does not only save space, it also reduces the required manual handling during the filter change process.



Saving cost and our environment

What does it take to introduce a new ground-breaking design which saves the environment? Parker's EPF *iprotect*® applies a re-usable element core and bypass, both integral parts of the filter bowl. This solution avoids the handling of re-usable parts during element change and reduces over 50% disposal weight.



Smart valve technology

Parker hydraulic control valve technology is applied for the reusable bypass valve. This leakage-free valve has a patented interface with the filter element, which ensures that genuine parts are always applied. With bypass settings up to 7 bar filtration during cold start conditions, more compact solutions, can be realised. The valve also optimizes the flow path, reducing the pressure lost across the filter.



Easier to integrate

Parker has set the trend to integrate filtration into manifolds. With Parker's EPF *iprotect*® we have taken the design one step further. Only one cavity is needed to accommodate the filter instead of two, this is because the re-usable bypass valve is integrated into the filter bowl, reducing space and cost.



Customized solutions

Parker's motion & control technologies provide new opportunities for our customers. Customized manifolds or duplex filters, as in this example offer complete automatic change-over. The EPF *iprotect*® contributes to realizing new solutions, improving your productivity and profitability.



A protective 'gene'

The performance and profitability of systems directly depends upon the filter media.



It goes without saying that Parker's patented products aim to avoid the use of unknown filter performance, jeopardizing safety and performance. Our Microglass III media is continuously upgraded and acts as a protective 'gene' in the system.

When going into reverse

Parker's EPF can be equipped with an optional reverse flow. This valve assembly is integrated in the element end cap and isolates the filter medium during reverse flow conditions.



A new patented design of the filter element allows integration of the bypass valve and element core as re-usable parts in the filter bowl. This results in cost reduction when integrating the high pressure filter in manifold type solutions. But it also reduces the waste when changing the filter element by over 50% as the element core is an integral part of the filter bowl.

The design of the EPF *iprotect*®, is unique, there is no need to re-install any re-usable parts as with some other filters in the market. This makes the product fool proof as there is no risk of forgetting to re-install re-usable parts.



Replacing the filter element:

- Drain the filter housing using the plugged drain port.
- Thanks to the filter lock the element remains in the bowl.
- Pull out the old element. The re-usable element core and bypass valve are integral parts of the bowl.
- Filtration is from 'Out to In,' the element core is located in the clean oil side.
- Just drop the new element in the bowl.
- Screw the bowl, including element into the filter head.

EPF *iprotect*®

Size 1

Specification EPF *iprotect*® Size 1

Specification

Nominal flow 40 l/min

Pressure ratings

Maximum allowable operating pressure 450 bar
Filter housing pressure pulse fatigue tested 10⁶ pulses 0-450 bar

Connections

Inlet and outlet connections are threaded internally

Connection style

Thread G½
Thread SAE 8

Filter housing

Head material cast iron (GSI)
Bowl material steel

Seal material

Nitrile or Fluorelastomer

Operating temperature range

Seal material Nitrile : -40C to +100 C
Seal material Fluorelastomer : -20C to +120 C

Bypass valve & Indicator settings

| Bypass | Indicator |
|---------|-----------|
| 3.5 bar | 2.5 bar |
| 5.0 bar | 3.5 bar |
| 7.0 bar | 5.0 bar |
| Blocked | 5.0 bar |

Filter element

Degree of filtration
Determined by multipass test in accordance to ISO16889

Flow fatigue characteristics

Filter media is supported so that the optimal fatigue life is achieved (ISO 3724)

Microglass III

Supported with epoxy coated metal wire mesh, end cap material reinforced composite and reusable metal inner core. Collapse pressure 25 bar (ISO 2941)

High collapse elements

To be used when bypass blocked option is selected Collapse pressure 210 bar (ISO 2941)

Indicator options

Indicating differential pressure:

2.5 +/- 0.3 bar
3.5 +/- 0.3 bar
5.0 +/- 0.3 bar

Visual M3

Electrical T1

Electronic F1 (PNP)

Electronic F2 (NPN)

Atex versions are available on request

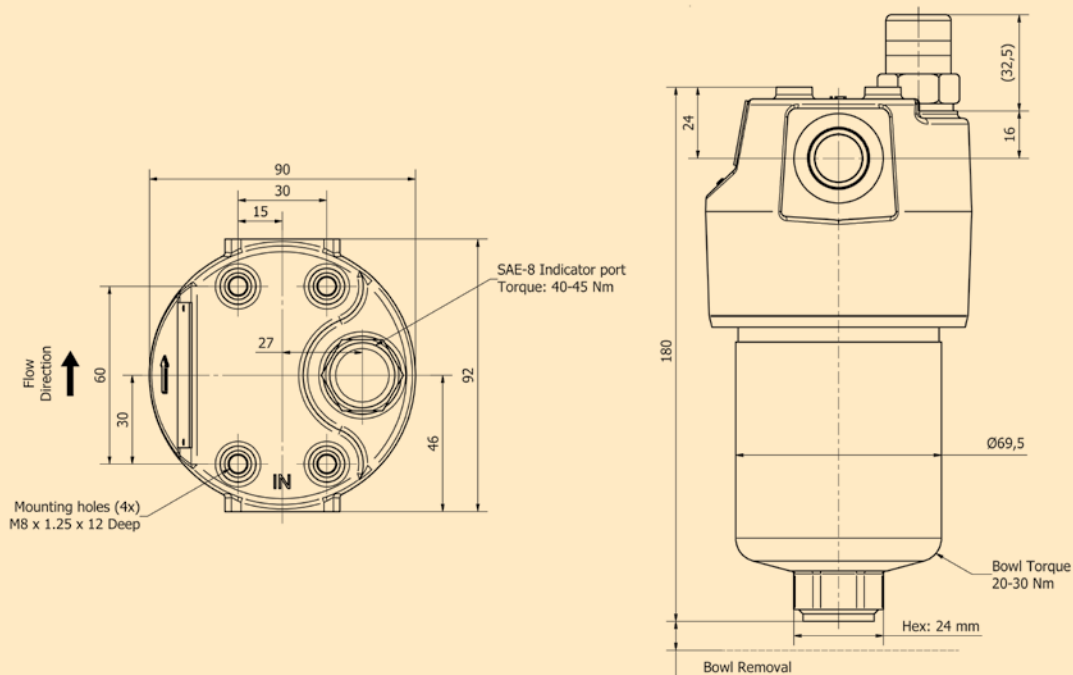
Weights (kg)

EPF Size 1: 3

Fluid compatibility

- Hydraulic mineral oils H to class HLPD (DIN51524)
- Operating fluids DIN ISO 2943
- Lubrication fluids ISO6743, APJ, DIN 51517, ACEA, ASTM
- Vegetable oils
- 60/40 Water Glycols
- On request - Industrial grade phosphate esters
- Non aggressive synthetic oils
- Non aggressive bio-degradable oils (HETG, HEPG and HEES to VDMA 24568)

EPF *iprotect*® - Size 1 (Inline)



EPF *iprotect*® Size 1 Pressure Drop Curves

With 3.5 bar bypass the recommended initial pressure drop max is 1.2 bar

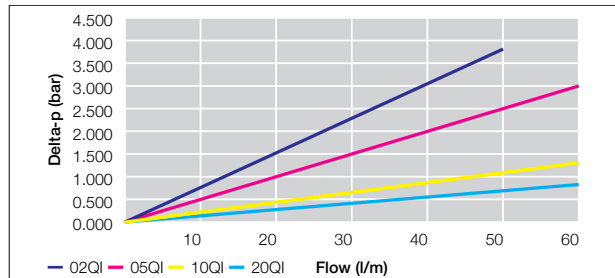
With 7.0 bar bypass the recommended initial pressure drop max is 2.3 bar

If the medium used has a viscosity different from 30cSt, pressure drop over the filter can be estimated as follows:

The total $\Delta p = \text{housing } \Delta p_h + (\text{element } \Delta p_e \times \text{working viscosity}/30)$.

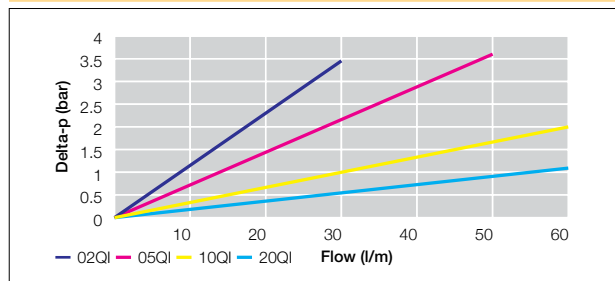
| Size 1 L1 | Dp Standard Elements (bar) | | | |
|--------------|----------------------------|-------|-------|--------|
| Flow (l/min) | 02QI | 05QI | 10QI | 20QI |
| 0 | 0.000 | 0.000 | 0.000 | 0.000 |
| 10 | 0.765 | 0.487 | 0.223 | 0.128 |
| 20 | 1.530 | 0.973 | 0.447 | 0.256 |
| 30 | 2.295 | 1.460 | 0.670 | 0.385 |
| 40 | 3.060 | 1.947 | 0.893 | 0.513 |
| 50 | 3.825 | 2.433 | 1.117 | 0.6420 |
| 60 | | 2.920 | 1.340 | 0.77 |

EPF Size 1 Filter Elements



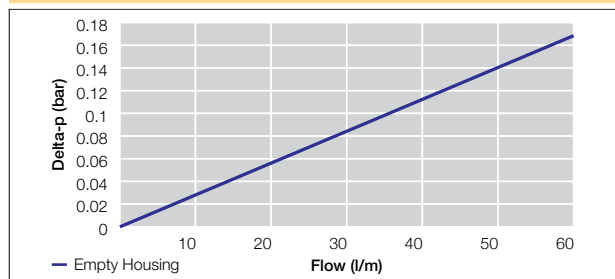
| Size 1 L1 | Dp Elements with reverse flow valve (bar) | | | |
|--------------|---|-------|-------|-------|
| Flow (l/min) | 02QIR | 05QIR | 10QIR | 20QIR |
| 0 | 0 | 0 | 0 | 0 |
| 10 | 1.15 | 0.73 | 0.33 | 0.19 |
| 20 | 2.30 | 1.46 | 0.67 | 0.38 |
| 30 | 3.44 | 2.19 | 1.01 | 0.58 |
| 40 | | 2.92 | 1.34 | 0.77 |
| 50 | | 3.65 | 1.68 | 0.96 |
| 60 | | | 2.01 | 1.16 |

EPF Size 1 Filter Elements with reverse flow valve



| Empty Housing (bar) | |
|---------------------|---------|
| Flow (l/min) | Housing |
| 0 | 0 |
| 10 | 0.028 |
| 20 | 0.057 |
| 30 | 0.085 |
| 40 | 0.113 |
| 50 | 0.142 |
| 60 | 0.17 |

EPF Size 1 empty housing



EPF *iprotect*®

Size 2

Specification EPF *iprotect*® Size 2

Specification

Nominal flow >100 l/min

Pressure ratings

Maximum allowable operating pressure 450 bar
Filter housing pressure pulse fatigue tested 10⁶ pulses 0-450 bar

Connections

Inlet and outlet connections are threaded internally

Connection style

Thread G $\frac{3}{4}$
Thread SAE 12
Thread M27, ISO 6149
SAE flange $\frac{3}{4}$ = 6000M
SAE flange $\frac{3}{4}$ = 6000
Manifold $\frac{3}{4}$ = 6000M

Filter housing

Head material cast iron (GSI)
Bowl material steel

Seal material

Nitrile of Fluorelastomer

Operating temperature range

Seal material Nitrile : -40C to +100 C
Seal material Fluorelastomer : -20C to +120 C

Bypass valve & Indicator settings

| Bypass | Indicator |
|---------|-----------|
| 3.5 bar | 2.5 bar |
| 5.0 bar | 3.5 bar |
| 7.0 bar | 5.0 bar |
| Blocked | 5.0 bar |

Filter element

Degree of filtration
Determined by multipass test in accordance to ISO16889

Flow fatigue characteristics

Filter media is supported so that the optimal fatigue life is achieved (ISO 3724)

Microglass III

Supported with epoxy coated metal wire mesh, end cap material reinforced composite and reusable metal inner core. Collapse pressure 25 bar (ISO 2941)

High collapse elements

To be used when bypass blocked option is selected

Collapse pressure 210 bar (ISO 2941)

Indicator options

Indicating differential pressure:

2.5 +/- 0.3 bar
3.5 +/- 0.3 bar
5.0 +/- 0.3 bar

Visual M3

Electrical T1

Electronic F1 (PNP)

Electronic F2 (NPN)

Atex versions are available on request

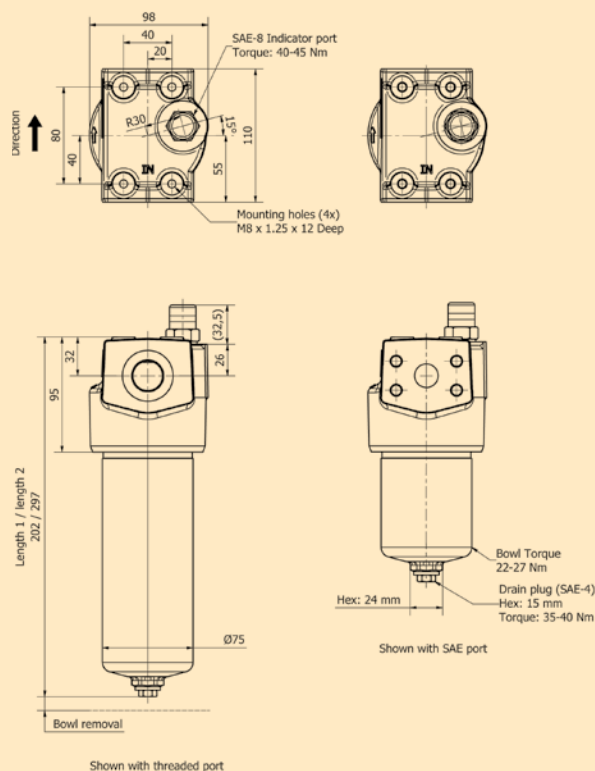
Weights (kg)

EPF Size 2 length 1: 4,2
EPF Size 2 length 2: 5,7

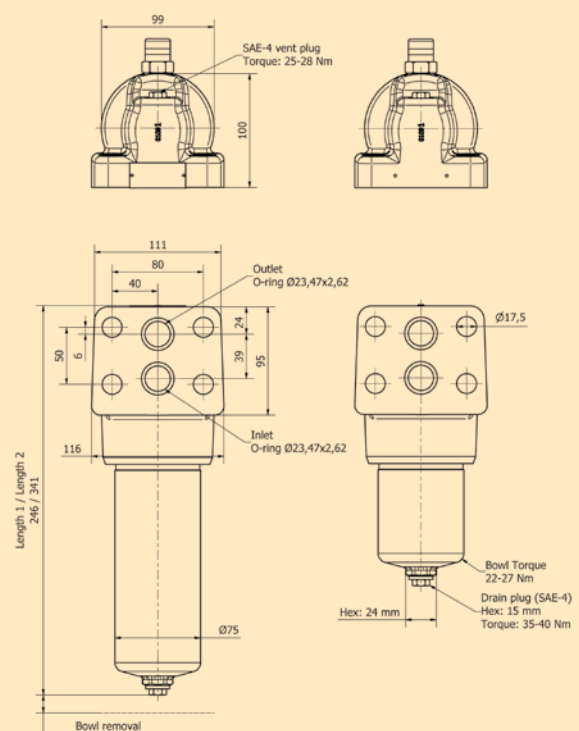
Fluid compatibility

- Hydraulic mineral oils H to class HLPD (DIN51524)
- Operating fluids DIN ISO 2943
- Lubrication fluids ISO6743, APJ, DIN 51517, ACEA, ASTM
- Vegetable oils
- 60/40 Water Glycols
- On request - Industrial grade phosphate esters
- Non aggressive synthetic oils
- Non aggressive bio-degradable oils (HETG, HEPG and HEES to VDMA 24568)

EPF *iprotect*® - Size 2 (Inline)



EPF *iprotect*® - Size 2 (Manifold)



EPF iprotect® Size 2 Pressure Drop Curves

With 3.5 bar bypass the recommended initial pressure drop max is 1.2 bar

With 7.0 bar bypass the recommended initial pressure drop max is 2.3 bar

If the medium used has a viscosity different from 30cSt, pressure drop over the filter can be estimated as follows:

The total Δp = housing Δp_h + (element Δp_e x working viscosity/30).

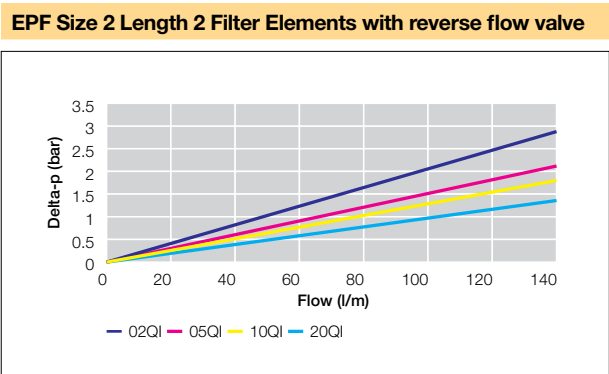
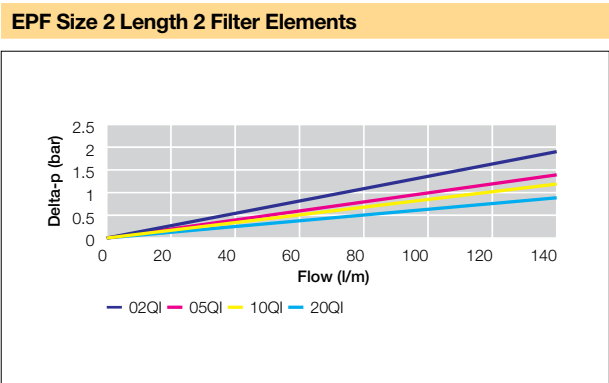
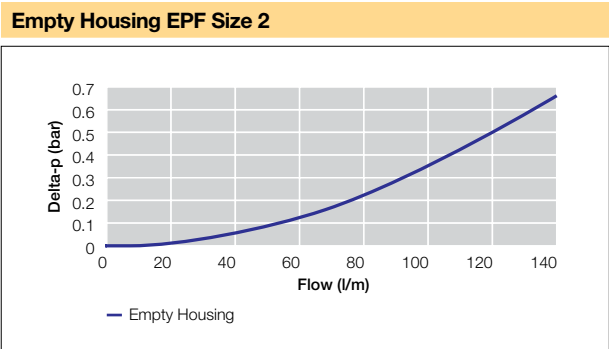
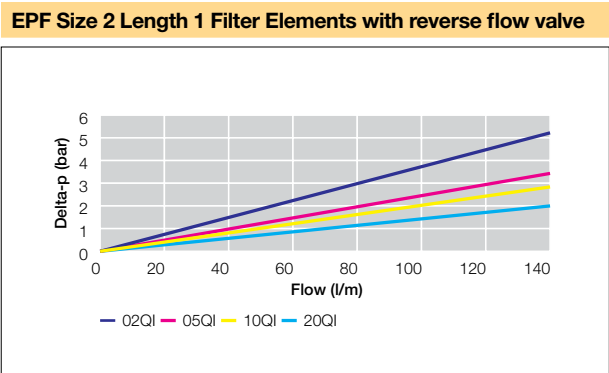
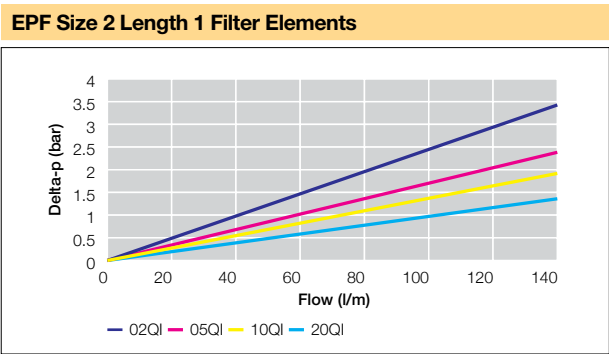
| EPF2 L1 | Dp Elements EPF2 L1 (bar) | | | |
|--------------|---------------------------|------|------|------|
| Flow (l/min) | 02QI | 05QI | 10QI | 20QI |
| 0 | 0 | 0 | 0 | 0 |
| 20 | 0.49 | 0.33 | 0.27 | 0.19 |
| 40 | 0.98 | 0.67 | 0.54 | 0.38 |
| 60 | 1.47 | 1.00 | 0.81 | 0.57 |
| 80 | 1.96 | 1.33 | 1.09 | 0.76 |
| 100 | 2.45 | 1.66 | 1.36 | 0.95 |
| 120 | 2.94 | 2.00 | 1.63 | 1.14 |
| 140 | 3.43 | 2.33 | 1.90 | 1.33 |

| EPF2 L1 | Dp Elements with Reverse Flow Valve EPF2 L1 (bar) | | | |
|--------------|---|-------|-------|-------|
| Flow (l/min) | 02QIR | 05QIR | 10QIR | 20QIR |
| 0 | 0 | 0 | 0 | 0.00 |
| 20 | 0.74 | 0.50 | 0.41 | 0.29 |
| 40 | 1.47 | 1.00 | 0.81 | 0.57 |
| 60 | 2.21 | 1.50 | 1.22 | 0.86 |
| 80 | 2.94 | 2.00 | 1.63 | 1.15 |
| 100 | 3.68 | 2.50 | 2.04 | 1.43 |
| 120 | 4.41 | 3.00 | 2.44 | 1.71 |
| 140 | 5.14 | 3.49 | 2.86 | 2.00 |

| Empty Housing (bar) | |
|---------------------|---------|
| Flow (l/min) | Housing |
| 0 | 0 |
| 20 | 0.01 |
| 40 | 0.06 |
| 60 | 0.14 |
| 80 | 0.24 |
| 100 | 0.36 |
| 120 | 0.49 |
| 140 | 0.65 |

| EPF2 L2 | Dp Elements EPF2 L2 (bar) | | | |
|--------------|---------------------------|------|-------|-------|
| Flow (l/min) | 02QI | 05QI | 10QI | 20QI |
| 0 | 0 | 0 | 0 | 0 |
| 20 | 0.274 | 0.2 | 0.171 | 0.133 |
| 40 | 0.549 | 0.4 | 0.343 | 0.266 |
| 60 | 0.823 | 0.6 | 0.514 | 0.399 |
| 80 | 1.097 | 0.8 | 0.686 | 0.531 |
| 100 | 1.371 | 1 | 0.857 | 0.664 |
| 120 | 1.646 | 1.2 | 1.03 | 0.797 |
| 140 | 1.92 | 1.4 | 1.2 | 0.93 |

| EPF2 L2 | Dp Elements with Reverse Flow Valve EPF2 L2 (bar) | | | |
|--------------|---|-------|--------|--------|
| Flow (l/min) | 02QIR | 05QIR | 10QIR | 20QIR |
| 0 | 0 | 0 | 0 | 0 |
| 20 | 0.411 | 0.3 | 0.2565 | 0.1995 |
| 40 | 0.8235 | 0.6 | 0.5145 | 0.399 |
| 60 | 1.2345 | 0.9 | 0.771 | 0.5985 |
| 80 | 1.6455 | 1.2 | 1.029 | 0.7965 |
| 100 | 2.0565 | 1.5 | 1.2855 | 0.996 |
| 120 | 2.469 | 1.8 | 1.545 | 1.1955 |
| 140 | 2.88 | 2.1 | 1.8 | 1.395 |



EPF *iprotect*®

Size 3

Specification EPF *iprotect*® Size 3

Specification

Nominal flow >160 l/min

Pressure ratings

Maximum allowable operating pressure 450 bar
Filter housing pressure pulse fatigue tested 10⁶ pulses 0-450 bar

Connections

Inlet and outlet connections are threaded internally

Connection style

Thread G1
Thread SAE 16
Thread M33, ISO 6149
SAE flange 1 = 6000M
SAE flange 1 = 6000

Filter housing

Head material cast iron (GSI)
Bowl material steel

Seal material

Nitrile or Fluorelastomer

Operating temperature range

Seal material Nitrile : -40C to +100 C
Seal material Fluorelastomer : -20C to +120 C

Bypass valve & Indicator settings

| Bypass | Indicator |
|---------|-----------|
| 3.5 bar | 2.5 bar |
| 5.0 bar | 3.5 bar |
| 7.0 bar | 5.0 bar |
| Blocked | 5.0 bar |

Filter element

Degree of filtration
Determined by multipass test in accordance to ISO16889

Flow fatigue characteristics

Filter media is supported so that the optimal fatigue life is achieved (ISO 3724)

Microglass III

Supported with epoxy coated metal wire mesh, end cap material reinforced composite and reusable metal inner core. Collapse pressure 25 bar (ISO 2941)

High collapse elements

To be used when bypass blocked option is selected
Collapse pressure 210 bar (ISO 2941)

Indicator options

Indicating differential pressure:

2.5 +/- 0.3 bar
3.5 +/- 0.3 bar
5.0 +/- 0.3 bar

Visual M3

Electrical T1

Electronic F1 (PNP)

Electronic F2 (NPN)

Atex versions are available on request

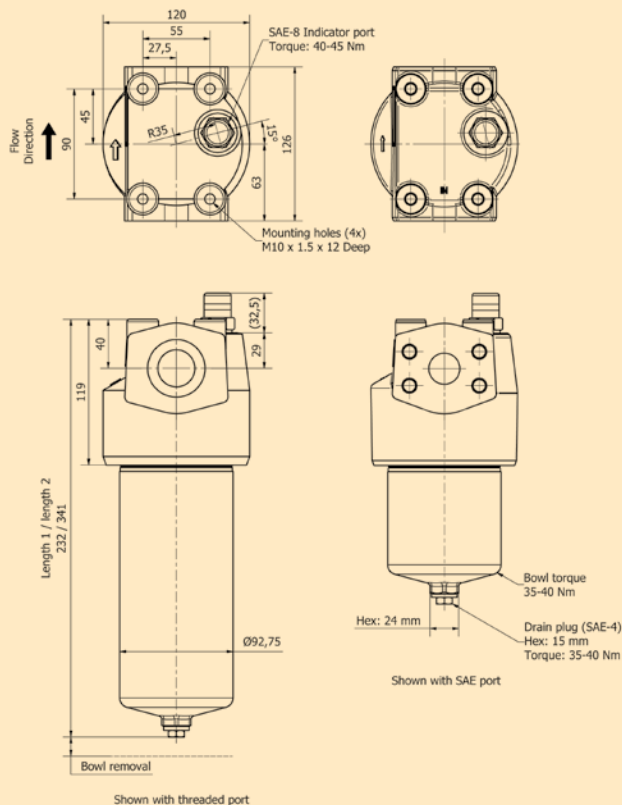
Weights (kg)

EPF Size 3 length 1: 6,7
EPF Size 3 length 2: 9,2

Fluid compatibility

- Hydraulic mineral oils H to class HLPD (DIN51524)
- Operating fluids DIN ISO 2943
- Lubrication fluids ISO6743, APJ, DIN 51517, ACEA, ASTM
- Vegetable oils
- 60/40 Water Glycols
- On request - Industrial grade phosphate esters
- Non aggressive synthetic oils
- Non aggressive bio-degradable oils (HETG, HEPG and HEES to VDMA 24568)

EPF *iprotect*® - Size 3 (Inline)



EPF *iprotect*® Size 3 Pressure Drop Curves

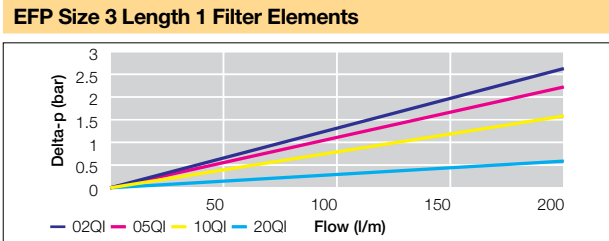
With 3.5 bar bypass the recommended initial pressure drop max is 1.2 bar

With 7.0 bar bypass the recommended initial pressure drop max is 2.3 bar

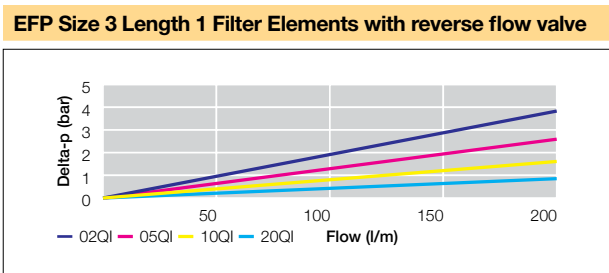
If the medium used has a viscosity different from 30cSt, pressure drop over the filter can be estimated as follows:

The total Δp = housing Δp_h + (element $\Delta p_e \times$ working viscosity/30).

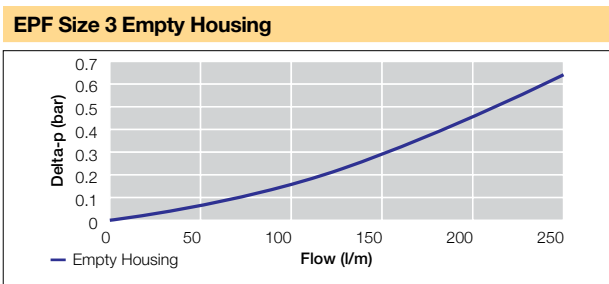
| Size 3 L1 | EPF Size 3 Length 1 Dp Elements (bar) | | | |
|--------------|---------------------------------------|------|------|------|
| Flow (l/min) | 02QI | 05QI | 10QI | 20QI |
| 0 | 0 | 0 | 0 | 0 |
| 50 | 0.65 | 0.43 | 0.26 | 0.16 |
| 100 | 1.29 | 0.87 | 0.53 | 0.32 |
| 150 | 1.94 | 1.30 | 0.79 | 0.47 |
| 200 | 2.58 | 1.73 | 1.05 | 0.63 |



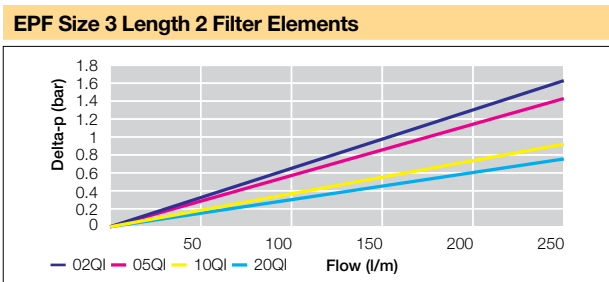
| Size 3 L1 | EPF Size 3 Length 1 Dp Elements with reverse flow valve (bar) | | | |
|--------------|---|-------|-------|-------|
| Flow (l/min) | 02QIR | 05QIR | 10QIR | 20QIR |
| 0 | 0 | 0 | 0 | 0 |
| 50 | 0.97 | 0.65 | 0.39 | 0.24 |
| 100 | 1.94 | 1.30 | 0.79 | 0.47 |
| 150 | 2.90 | 1.95 | 1.18 | 0.71 |
| 200 | 3.87 | 2.60 | 1.58 | 0.95 |



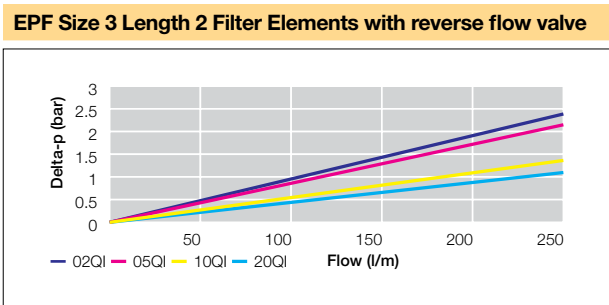
| Size 3 | Empty Housing (bar) | |
|--------------|---------------------|---------|
| Flow (l/min) | | Housing |
| 0 | | 0 |
| 50 | | 0.06 |
| 100 | | 0.17 |
| 150 | | 0.3 |
| 200 | | 0.47 |
| 250 | | 0.64 |



| Size 3 L2 | EPF Size 3 Length 2 Dp Elements (bar) | | | |
|--------------|---------------------------------------|------|------|------|
| Flow (l/min) | 02QI | 05QI | 10QI | 20QI |
| 0 | 0 | 0 | 0 | 0 |
| 50 | 0.32 | 0.28 | 0.18 | 0.15 |
| 100 | 0.64 | 0.56 | 0.37 | 0.30 |
| 150 | 0.97 | 0.85 | 0.55 | 0.45 |
| 200 | 1.29 | 1.13 | 0.74 | 0.60 |
| 250 | 1.61 | 1.41 | 0.92 | 0.75 |



| Size 3 L2 | EPF Size 3 Length 2 Dp Elements with reverse flow valve (bar) | | | |
|--------------|---|-------|-------|-------|
| Flow (l/min) | 02QIR | 05QIR | 10QIR | 20QIR |
| 0 | 0 | 0 | 0 | 0 |
| 50 | 0.48 | 0.42 | 0.28 | 0.23 |
| 100 | 0.97 | 0.85 | 0.55 | 0.45 |
| 150 | 1.45 | 1.27 | 0.83 | 0.68 |
| 200 | 1.93 | 1.69 | 1.10 | 0.90 |
| 250 | 2.42 | 2.11 | 1.38 | 1.13 |



EPF *iprotect*®

Size 4

Specification EPF *iprotect*® Size 4

Specification

Nominal flow >320 l/min

Pressure ratings

Maximum allowable operating pressure 450 bar
Filter housing pressure pulse fatigue tested 10⁶ pulses 0-450 bar

Connections

Inlet and outlet connections are threaded internally

Connection style

Thread G11/4
Thread G11/2
Thread SAE 20
Thread SAE 24
Thread M42, ISO 6149
SAE flange 1 1/4 = 6000M
SAE flange 1 1/4 = 6000
Manifold 1 1/4 = 6000M

Filter housing

Head material cast iron (GSI)
Bowl material steel
Seal material
Nitrile or Fluorelastomer

Operating temperature range

Seal material Nitrile : -40C to +100 C
Seal material Fluorelastomer : -20C to +120 C

Bypass valve & Indicator settings

| Bypass | Indicator |
|---------|-----------|
| 3.5 bar | 2.5 bar |
| 5.0 bar | 3.5 bar |
| 7.0 bar | 5.0 bar |
| Blocked | 7.0 bar |

Filter element

Degree of filtration
Determined by multipass test in accordance to ISO16889

Flow fatigue characteristics

Filter media is supported so that the optimal fatigue life is achieved (ISO 3724)

Microglass III

Supported with epoxy coated metal wire mesh, end cap material reinforced composite and reusable metal inner core. Collapse pressure 25 bar (ISO 2941)

High collapse elements

To be used when bypass blocked option is selected
Collapse pressure 210 bar (ISO 2941)

Indicator options

Indicating differential pressure:

2.5 +/- 0.3 bar
3.5 +/- 0.3 bar
5.0 +/- 0.3 bar

Visual M3

Electrical T1

Electronic F1 (PNP)

Electronic F2 (NPN)

Atex versions are available on request

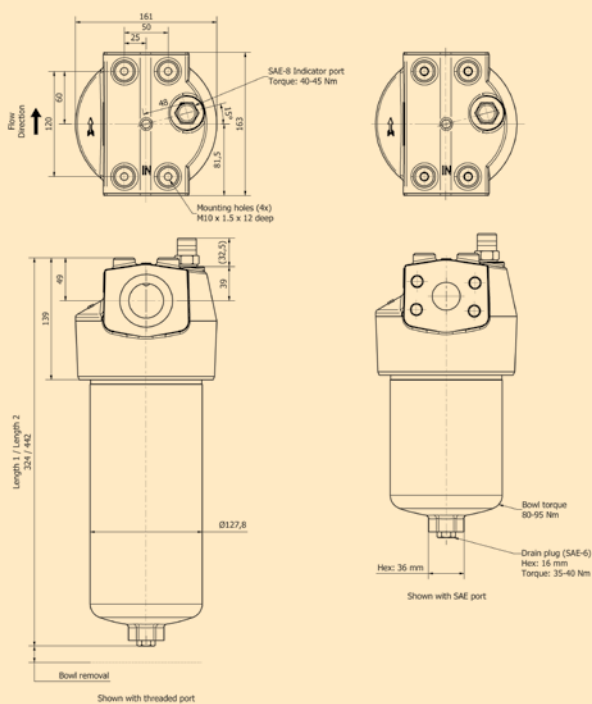
Weights (kg)

EPF Size 4 length 1: 15,8
EPF Size 4 length 2: 20,3

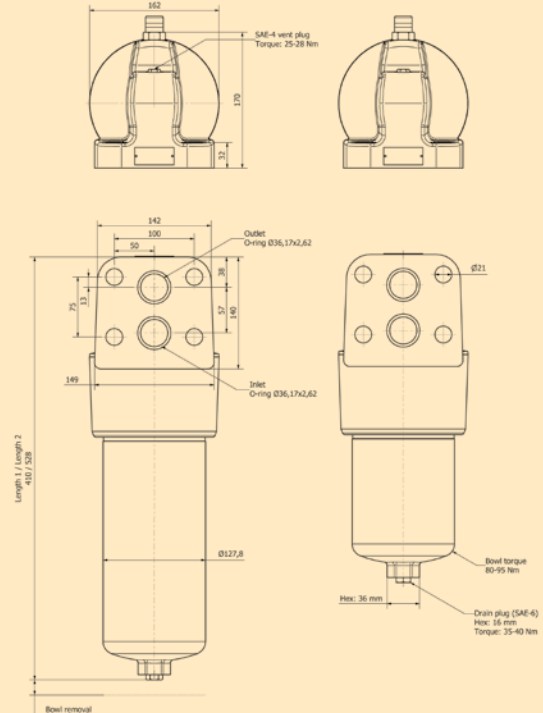
Fluid compatibility

- Hydraulic mineral oils H to class HLPD (DIN51524)
- Operating fluids DIN ISO 2943
- Lubrication fluids ISO6743, APJ, DIN 51517, ACEA, ASTM
- Vegetable oils
- 60/40 Water Glycols
- On request - Industrial grade phosphate esters
- Non aggressive synthetic oils
- Non aggressive bio-degradable oils (HETG, HEPG and HEES to VDMA 24568)

EPF *iprotect*® - Size 4 (Inline)



EPF *iprotect*® - Size 4 (Manifold)



EPF *iprotect*® Size 4 Pressure Drop Curves

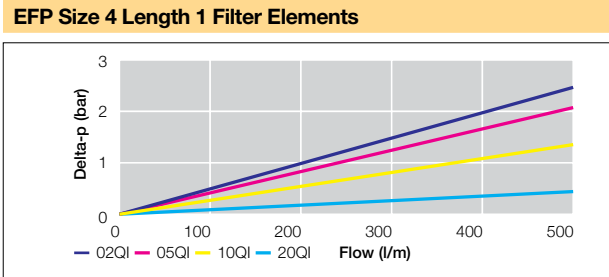
With 3.5 bar bypass the recommended initial pressure drop max is 1.2 bar

With 7.0 bar bypass the recommended initial pressure drop max is 2.3 bar

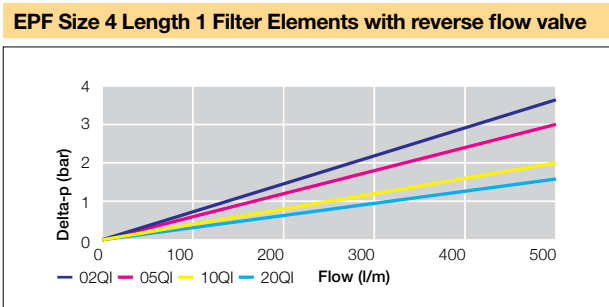
If the medium used has a viscosity different from 30cSt, pressure drop over the filter can be estimated as follows:

The total $\Delta p = \text{housing } \Delta p_h + (\text{element } \Delta p_e \times \text{working viscosity}/30)$.

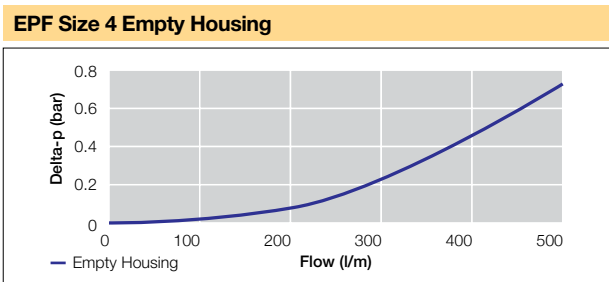
| Size 4 L1 | EPF Size 4 Length 1 Filter Elements | | | |
|--------------|-------------------------------------|------|------|------|
| Flow (l/min) | 02QI | 05QI | 10QI | 20QI |
| 0 | 0 | 0 | 0 | 0 |
| 100 | 0.48 | 0.4 | 0.26 | 0.2 |
| 200 | 0.96 | 0.8 | 0.52 | 0.4 |
| 300 | 1.44 | 1.2 | 0.78 | 0.6 |
| 400 | 1.92 | 1.6 | 1.04 | 0.8 |
| 500 | 2.4 | 2 | 1.3 | 1 |



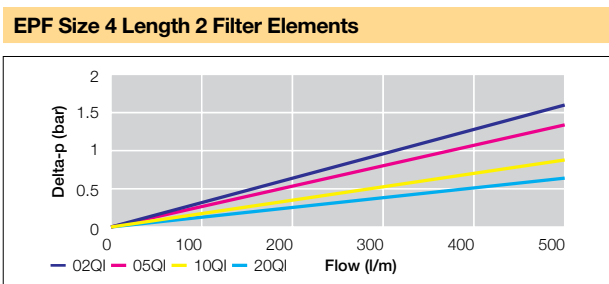
| Size 4 L1 | EPF Size 4 Length 1 Filter Elements with reverse flow valve | | | |
|--------------|---|-------|-------|-------|
| Flow (l/min) | 02QIR | 05QIR | 10QIR | 20QIR |
| 0 | 0 | 0 | 0 | 0 |
| 100 | 0.72 | 0.6 | 0.39 | 0.3 |
| 200 | 1.44 | 1.2 | 0.78 | 0.6 |
| 300 | 2.16 | 1.8 | 1.17 | 0.9 |
| 400 | 2.88 | 2.4 | 1.56 | 1.2 |
| 500 | 3.6 | 3 | 1.95 | 1.5 |



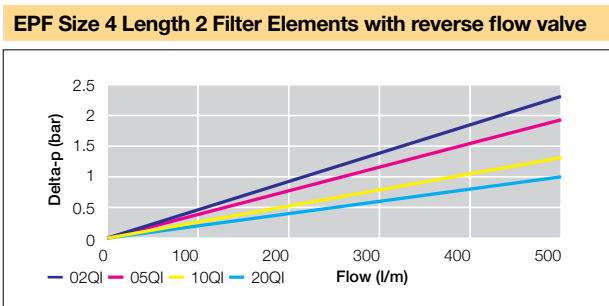
| Size 4 | EPF Size 4 Empty Housing (bar) |
|--------------|--------------------------------|
| Flow (l/min) | Housing |
| 0 | 0 |
| 100 | 0.03 |
| 200 | 0.14 |
| 300 | 0.29 |
| 400 | 0.5 |
| 500 | 0.7 |



| Size 4 L2 | EPF Size 4 Length 2 Filter Elements (bar) | | | |
|--------------|---|------|-------|-------|
| Flow (l/min) | 02QI | 05QI | 10QI | 20QI |
| 0 | 0 | 0 | 0 | 0 |
| 100 | 0.31 | 0.26 | 0.176 | 0.132 |
| 200 | 0.62 | 0.52 | 0.352 | 0.26 |
| 300 | 0.94 | 0.78 | 0.528 | 0.40 |
| 400 | 1.25 | 1.04 | 0.704 | 0.528 |
| 500 | 1.56 | 1.3 | 0.88 | 0.66 |



| Size 4 L2 | EPF Size 4 Length 2 Filter Elements with Reverse Flow Valve | | | |
|--------------|---|-------|-------|-------|
| Flow (l/min) | 02Q1R | 05Q1R | 10Q1R | 20Q1R |
| 0 | 0 | 0 | 0 | 0 |
| 100 | 0.47 | 0.39 | 0.26 | 0.20 |
| 200 | 0.94 | 0.78 | 0.53 | 0.40 |
| 300 | 1.40 | 1.17 | 0.79 | 0.59 |
| 400 | 1.87 | 1.56 | 1.06 | 0.79 |
| 500 | 2.34 | 1.95 | 1.32 | 0.99 |



EPF *iprotect*®

Size 5

Specification EPF *iprotect*® Size 5

Specification

Nominal flow >320 l/min

Pressure ratings

Maximum allowable operating pressure 450 bar
Filter housing pressure pulse fatigue tested 10⁶ pulses 0-450 bar

Connections

Inlet and outlet connections are threaded internally

Connection style

Thread G11/2
Thread SAE 24
Manifold SAE flange 1½ - 6000M

Filter housing

Head material cast iron (GSI)
Bowl material steel
Seal material
Nitrile of Fluorelastomer

Operating temperature range

Seal material Nitrile : -40C to +100 C
Seal material Fluorelastomer : -20C to +120 C

Bypass valve & Indicator settings

| Bypass | Indicator |
|---------|-----------|
| 3.5 bar | 2.5 bar |
| 5.0 bar | 3.5 bar |
| 7.0 bar | 5.0 bar |
| Blocked | 5.0 bar |

Filter element

Degree of filtration
Determined by multipass test in accordance to ISO16889

Flow fatigue characteristics

Filter media is supported so that the optimal fatigue life is achieved (ISO 3724)

Microglass III

Supported with epoxy coated metal wire mesh, end cap material reinforced composite and reusable metal inner core. Collapse pressure 25 bar (ISO 2941)

High collapse elements

To be used when bypass blocked option is selected
Collapse pressure 210 bar (ISO 2941)

Indicator options

Indicating differential pressure:

2.5 +/- 0.3 bar
3.5 +/- 0.3 bar
5.0 +/- 0.3 bar

Visual M3

Electrical T1

Electronic F1 (PNP)

Electronic F2 (NPN)

Atex versions are available on request

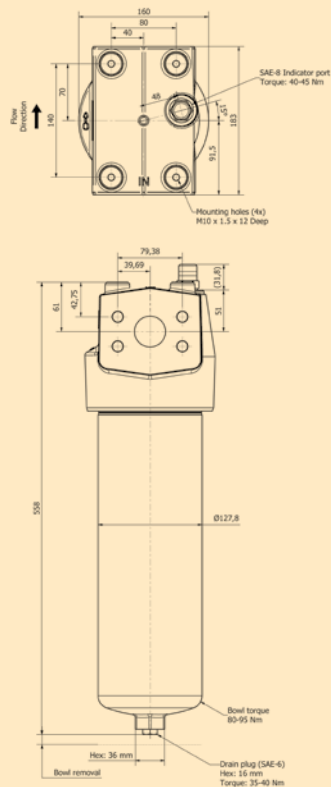
Weights (kg)

EPF Size 5 length 1: 31

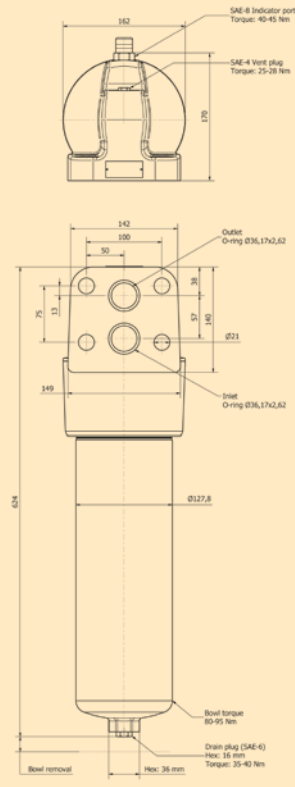
Fluid compatibility

- Hydraulic mineral oils H to class HLPD (DIN51524)
- Operating fluids DIN ISO 2943
- Lubrication fluids ISO6743, APJ, DIN 51517, ACEA, ASTM
- Vegetable oils
- 60/40 Water Glycols
- On request - Industrial grade phosphate esters
- Non aggressive synthetic oils
- Non aggressive bio-degradable oils (HETG, HEPG and HEES to VDMA 24568)

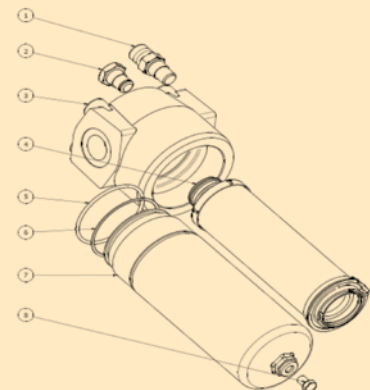
EPF *iprotect*® - Size 5 (Inline)



EPF *iprotect*® - Size (Manifold)



Exploded view spare parts drawing



See opposite for parts list and seal kit numbers

EPF *iprotect*® Size 5 Pressure Drop Curves

With 3.5 bar bypass the recommended initial pressure drop max is 1.2 bar

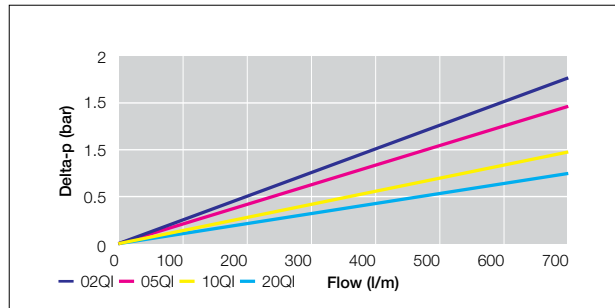
With 7.0 bar bypass the recommended initial pressure drop max is 2.3 bar

If the medium used has a viscosity different from 30cSt, pressure drop over the filter can be estimated as follows:

The total $\Delta p = \text{housing } \Delta p_h + (\text{element } \Delta p_e \times \text{working viscosity}/30)$.

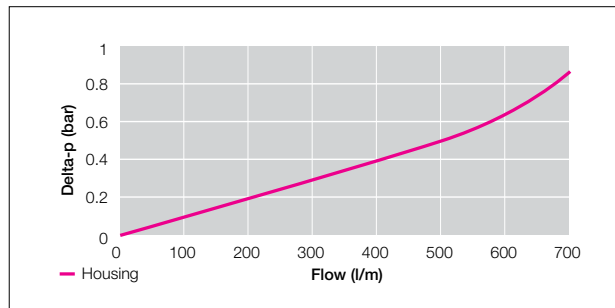
| Size 5 | EPF Size 5 Length 1 Filter Elements (bar) | | | |
|--------------|---|-------|------|-------|
| Flow (l/min) | 02QI | 05QI | 10QI | 20QI |
| 0 | 0 | 0 | 0 | 0 |
| 100 | 0.25 | 0.21 | 0.14 | 0.11 |
| 200 | 0.50 | 0.42 | 0.28 | 0.21 |
| 300 | 0.75 | 0.62 | 0.42 | 0.32 |
| 400 | 1.00 | 0.83 | 0.56 | 0.42 |
| 500 | 1.25 | 1.04 | 0.70 | 0.53 |
| 600 | 1.50 | 1.248 | 0.84 | 0.636 |
| 700 | 1.75 | 1.456 | 0.98 | 0.742 |

EPF Size 5 Length 1 Filter Elements



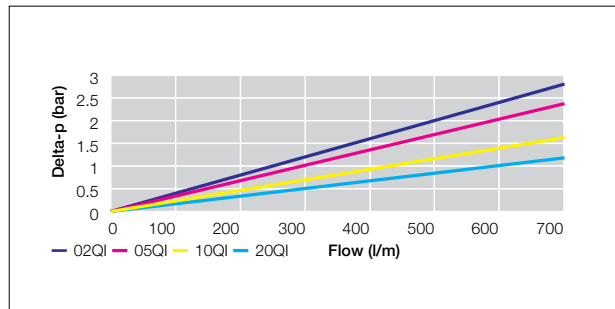
| Size 5 | EPF Size 5 Empty housing | |
|--------------|--------------------------|--|
| Flow (l/min) | Housing | |
| 0 | 0 | |
| 100 | 0.1 | |
| 200 | 0.2 | |
| 300 | 0.3 | |
| 400 | 0.4 | |
| 500 | 0.51 | |
| 600 | 0.66 | |
| 700 | 0.88 | |

EPF Size 5 Empty Housing



| Size 5 | EPF Size 5 Length 1 Filter Elements | | | |
|--------------|-------------------------------------|--------|-------|--------|
| Flow (l/min) | 02QIR | 05QIR | 10QIR | 20QIR |
| 0 | 0 | 0 | 0 | 0 |
| 100 | 0.40 | 0.33 | 0.22 | 0.17 |
| 200 | 0.80 | 0.67 | 0.45 | 0.34 |
| 300 | 1.20 | 1.00 | 0.67 | 0.51 |
| 400 | 1.60 | 1.33 | 0.90 | 0.68 |
| 500 | 2.00 | 1.66 | 1.13 | 0.84 |
| 600 | 2.40 | 1.9968 | 1.344 | 1.0176 |
| 700 | 2.80 | 2.3296 | 1.568 | 1.1872 |

EPF Size 5 Length 1 Filter Elements with reverse flow valve



Parts list

| Index | Description | Part number |
|-------|----------------|------------------------------------|
| 1 | Indicator | On Request |
| 2 | Plug | On Request |
| 3 | Filter head | On Request |
| 4 | Filter element | See element table |
| 5 | Back-up ring | In seal kit/spare filter elements |
| 6 | O-ring | In seal kit/ spare filter elements |
| 7 | Filter bowl | On Request |
| 8 | Drain plug | On Request |

Seal kit numbers

| Filter | Nitrile | Fluorelastomer |
|--------|----------|----------------|
| EPF 1 | EPFSK001 | EPFSK011 |
| EPF 2 | EPFSK002 | EPFSK012 |
| EPF 3 | EPFSK003 | EPFSK013 |
| EPF 4 | EPFSK004 | EPFSK014 |
| EPF 5 | EPFSK005 | EPFSK015 |

Indicator Options

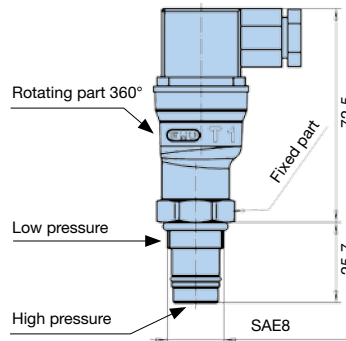
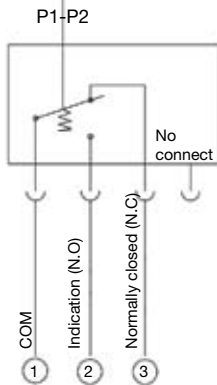
FMU Δp-Indicators and Pressure Indicators

FMUT Electrical

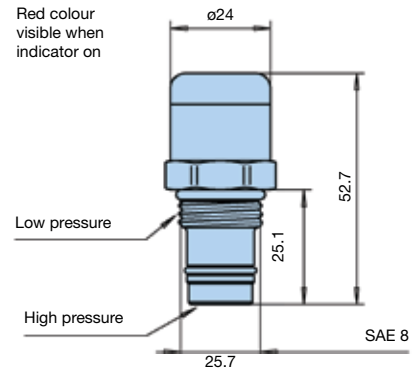
| Rated voltage | Non-inductive load (A) | | | | Inductive load (A) | | | | Inrush current (A) | |
|---------------|------------------------|------|-----------|------|--------------------|------|------------|---------|--------------------|------|
| | Resistive load | | Lamp load | | Inductive load | | Motor load | | N.C. | N.O. |
| | N.C. | N.O. | N.C. | N.O. | N.C. | N.O. | N.C. | N.O. | | |
| 125VAC | 5 | 1.5 | 0.7 | 3 | 2.5 | 1.3 | 20 max. | 10 max. | | |
| 250VAC | 3 | 1.0 | 0.5 | 2 | 1.5 | 0.8 | | | | |
| 8VDC | 5 | 2 | 5 | 4 | 3 | | | | | |
| 14VDC | 5 | 2 | 4 | 4 | 3 | | | | | |
| 30VDC | 4 | 2 | 3 | 3 | 3 | | | | | |
| 125VDC | 0.4 | 0.05 | 0.4 | 0.4 | 0.05 | | | | | |
| 250VDC | 0.2 | 0.03 | 0.2 | 0.2 | 0.03 | | | | | |

| | |
|----------------------|----------------|
| Enclosure class | IP65 |
| Electrical connector | DIN 43650 |
| Overvoltage category | II (EN61010-1) |

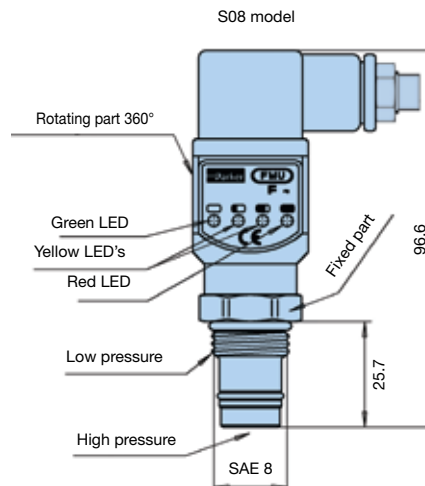
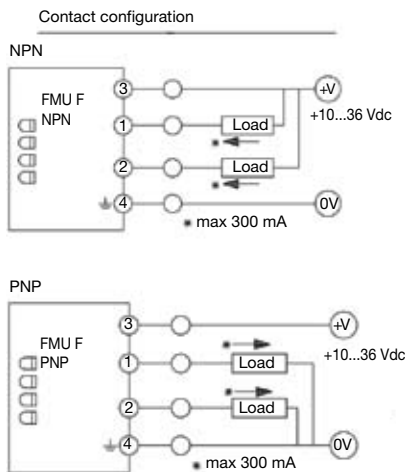
Contact configuration Electrical Indicator Type T1



FMUM3 Visual Auto Reset Operation



FMUF Electronic



Thermal lock-out (standard setting +20°C)

- Indicator operates only when temperature is above setting.

| Ind. press. setting | LED status | | | | Output |
|---------------------|------------|----|----|---|----------|
| | G | Y1 | Y2 | R | |
| < 50 % | ⊗ | | | | - |
| 50 % | ⊗ | ⊗ | | | - |
| 75 % | ⊗ | ⊗ | ⊗ | | 2 active |
| 100 % | ⊗ | ⊗ | ⊗ | ⊗ | 1 active |

| | |
|----------------------|---|
| Enclosure class | IP65 |
| Electrical connector | DIN 43650, cable connection PG9 or optionally M12 4-pin |
| Input supply voltage | +10 to 36 Vdc |
| *Indication output | max. 300 mA/36 Vdc |
| Output type: | N.O. or N.C./NPN or PNP |

Note: Do not connect output terminals 1 or 2 directly (without load) to power supply terminals, because this will damage the equipment.

Filter media efficiency

| Degree of filtration | | | | | | Code | |
|---|-----------------|-----------------|------------------|------------------|-------------------|------------------------------|---------------------------------------|
| Average filtration beta ratio β (ISO 16889) / particle size μm [c] | | | | | | | |
| $\beta_x(c)=2$ | $\beta_x(c)=10$ | $\beta_x(c)=75$ | $\beta_x(c)=100$ | $\beta_x(c)=200$ | $\beta_x(c)=1000$ | Disposable Microglass III | Element with reverse flow valve |
| % efficiency, based on the above beta ration (β_x) | | | | | | | |
| 50.0% | 90.0% | 98.7% | 99.0% | 99.5% | 99.9% | | |
| N/A | N/A | N/A | N/A | N/A | 4.5% | 02QI | 02QIR |
| N/A | N/A | 4.5 | 5 | 6 | 7 | 05QI | 05QIR |
| N/A | 6 | 8.5 | 9 | 10 | 12 | 10QI | 10QIR |
| 6 | 11 | 17 | 18 | 20 | 22 | 20QI | 20QIR |

Ordering information. Standard part numbers

| Filter Assemblies | Part Number | Flow (l/min) | Model Number | Element length | Media Rating (micron) | Seals | Indicator | Bypass (bar) | Ports | Replacement elements |
|-------------------|------------------|--------------|--------------|----------------|-----------------------|---------|--------------|--------------|--------|----------------------|
| | EPF1105QIBPMG081 | 40 | EPF1 | 1 | 5 | Nitrile | Plugged port | 7 | G1/2" | 944419Q |
| | EPF1110QIBPMG081 | 40 | EPF1 | 1 | 10 | Nitrile | Plugged port | 7 | G1/2" | 944420Q |
| | EPF1120QIBPMG081 | 40 | EPF1 | 1 | 20 | Nitrile | Plugged port | 7 | G1/2" | 944421Q |
| | EPF2205QIBPMG121 | 140 | EPF2 | 2 | 5 | Nitrile | Plugged port | 7 | G3/4" | 944431Q |
| | EPF2220QIBPMG121 | 140 | EPF2 | 2 | 10 | Nitrile | Plugged port | 7 | G3/4" | 944432Q |
| | EPF2220QIBPMG121 | 140 | EPF2 | 2 | 20 | Nitrile | Plugged port | 7 | G3/4" | 944433Q |
| | EPF3205QIBPMG161 | 250 | EPF3 | 2 | 5 | Nitrile | Plugged port | 7 | G1" | 944439Q |
| | EPF3220QIBPMG161 | 250 | EPF3 | 2 | 10 | Nitrile | Plugged port | 7 | G1" | 944440Q |
| | EPF3220QIBPMG161 | 250 | EPF3 | 2 | 20 | Nitrile | Plugged port | 7 | G1" | 944441Q |
| | EPF4205QIBPMG201 | 450 | EPF4 | 2 | 5 | Nitrile | Plugged port | 7 | G11/4" | 944447Q |
| | EPF4210QIBPMG201 | 450 | EPF4 | 2 | 10 | Nitrile | Plugged port | 7 | G11/4" | 944448Q |
| | EPF4220QIBPMG201 | 450 | EPF4 | 2 | 20 | Nitrile | Plugged port | 7 | G11/4" | 944449Q |
| | EPF5105QIBPMG241 | 500 | EPF5 | 1 | 5 | Nitrile | Plugged port | 7 | G11/2" | 944451Q |
| | EPF5110QIBPMG241 | 500 | EPF5 | 1 | 10 | Nitrile | Plugged port | 7 | G11/2" | 944452Q |
| | EPF5120QIBPMG241 | 500 | EPF5 | 1 | 20 | Nitrile | Plugged port | 7 | G11/2" | 944453Q |

| Visual Indicators | Part Number | Setting (bar) | Switch Type |
|-------------------|-------------|---------------|----------------|
| | FMUM3MVMS08 | 5 | Not applicable |

| Electrical Indicators | Part Number | Setting (bar) | Switch Type | Additional |
|-----------------------|-------------|---------------|-------------|-----------------------|
| | FMUT1MVMS08 | 5 | NO/NC | |
| | FMUF1MVMS08 | 5 | NO | Electronic 4 LED, PNP |
| | FMUF2MVMS08 | 5 | NO | Electronic 4 LED, NPN |
| | FMUF3MVMS08 | 5 | NC | Electronic 4 LED, PNP |
| | FMUF4MVMS08 | 5 | NC | Electronic 4 LED, NPN |

Spare elements (Type QI only. Type QIR and QIH on request)

| | |
|-------------------------|---------|
| EPF Size1 L1 2 micron | 944418Q |
| EPF Size1 L1 5 micron | 944419Q |
| EPF Size1 L1 10 micron | 944420Q |
| EPF Size1 L1 20 micron | 944421Q |
| EPF Size 2 L1 2 micron | 944426Q |
| EPF Size 2 L1 5 micron | 944427Q |
| EPF Size 2 L1 10 micron | 944428Q |
| EPF Size 2 L1 20 micron | 944429Q |
| EPF Size 2 L2 2 micron | 944430Q |
| EPF Size 2 L2 5 micron | 944431Q |
| EPF Size 2 L2 10 micron | 944432Q |

| | |
|-------------------------|---------|
| EPF Size 2 L2 20 micron | 944433Q |
| EPF Size 3 L1 2 micron | 944434Q |
| EPF Size 3 L1 5 micron | 944435Q |
| EPF Size 3 L1 10 micron | 944436Q |
| EPF Size 3 L1 20 micron | 944437Q |
| EPF Size 3 L2 2 micron | 944438Q |
| EPF Size 3 L2 5 micron | 944439Q |
| EPF Size 3 L2 10 micron | 944440Q |
| EPF Size 3 L2 20 micron | 944441Q |
| EPF Size 4 L1 2 micron | 944442Q |
| EPF Size 4 L1 5 micron | 944443Q |

| | |
|-------------------------|---------|
| EPF Size 4 L1 10 micron | 944444Q |
| EPF Size 4 L1 20 micron | 944445Q |
| EPF Size 4 L2 2 micron | 944446Q |
| EPF Size 4 L2 5 micron | 944447Q |
| EPF Size 4 L2 10 micron | 944448Q |
| EPF Size 4 L2 20 micron | 944449Q |
| EPF Size 5 L1 2 micron | 944450Q |
| EPF Size 5 L1 5 micron | 944451Q |
| EPF Size 5 L1 10 micron | 944452Q |
| EPF Size 5 L1 20 micron | 944453Q |

EPF *iprotect*[®]

High Pressure Filter

Ordering Information

| | | | | | | | |
|-------------|----------|-------------|----------|----------|----------|------------|----------|
| Box 1 | Box 2 | Box 3 | Box 4 | Box 5 | Box 6 | Box 7 | Box 8 |
| EPF3 | 2 | 02QI | B | P | M | G16 | 1 |

Box 1

| Capacity | |
|-----------------------|-------------|
| Model | Code |
| Size 1 (40 l/min) | EPF1 |
| Size 2 (replaces 18P) | EPF2 |
| Size 3 (replaces 28P) | EPF3 |
| Size 4 (replaces 38P) | EPF4 |
| Size 5 | EPF5 |

Box 2

| Filter Length | |
|---|----------|
| | Code |
| Length 1 | 1 |
| Length 2 (not for Size 1 and Size 5) | 2 |

Highlights Key (Denotes part number availability)

| | |
|------------|-------------------------------|
| 123 | Item is standard |
| 123 | Item is standard green option |
| 123 | Item is semi standard |
| 123 | Item is non standard |

Box 3

| Degree of filtration | | | | |
|---|-------------|-------------|-------------|-------------|
| | Media code | | | |
| <i>iprotect</i> [®] Glassfibre element | 02QI | 05QI | 10QI | 20QI |
| <i>iprotect</i> [®] with reverse flow valve(*) | 02QIR | 05QIR | 10QIR | 20QIR |

(*Note: Only in combination with 3.5 bar bypass)

Box 4

| Seal Material | |
|----------------|----------|
| | Code |
| Nitrile | B |
| Fluorelastomer | V |

Box 5

| Indicator | |
|---------------------------|-----------|
| | Code |
| Visual Indicator | M3 |
| Electrical Indicator | T1 |
| Electronic 4 LED, PNP, NO | F1 |
| Electronic 4 LED, NPN, NO | F2 |
| Electronic 4 LED, PNP, NC | F3 |
| Electronic 4 LED, NPN, NC | F4 |
| Plugged with Steel plug | P |
| No indicator port | N |

Other versions like ATEX on request
All electrical indicators are CE-certified

Box 6

| Bypass Setting | | |
|----------------|-------------------|----------|
| | Indicator Setting | Code |
| 3.5 bar | 2.5 bar | K |
| 5.0 bar | 3.5 bar | L |
| 7.0 bar | 5.0 bar | M |
| No bypass | 5.0 bar | M |
| No bypass | No indicator | X |

Important notes: When no bypass is selected Parker strongly advises the usage of high strength elements

Box 8

| Options | | |
|--------------------|---|----------|
| | | Code |
| Standard | | 1 |
| No bypass | | 2 |
| Reverse flow valve | Safeguard valve only in combination with 3.5 bar bypass | RFV |

Box 7

| Filter Connection | | |
|-------------------|--------------------------|------------|
| | Connection type & size | Code |
| Size 1 | Thread G1/2 | G08 |
| | Thread SAE 8 | S08 |
| Size 2 | Thread G3/4 | G12 |
| | Thread SAE 12 | S12 |
| | Thread M27, ISO 6149 | M27 |
| | SAE flange 3/4 - 6000M | H12 |
| | SAE flange 3/4 - 6000 | F12 |
| | Manifold | X12 |
| Size 3 | Thread G1 | G16 |
| | Thread SAE 16 | S16 |
| | Thread M33, ISO 6149 | M33 |
| | SAE flange 1 - 6000M | H16 |
| | SAE flange 1 - 6000 | F16 |
| | Manifold | X16 |
| Size 4 | Thread G1 1/4 | G20 |
| | Thread G1 1/2 | G24 |
| | Thread SAE20 | S20 |
| | Thread SAE24 | S24 |
| | Thread M42, ISO 6149 | M42 |
| | SAE flange 1 1/4 - 6000M | H20 |
| | SAE flange 1 1/4 - 6000 | F20 |
| | Manifold | X20 |
| | Manifold | X20 |
| Size 5 | Thread G1 1/2 | G24 |
| | Thread SAE 24 | S24 |
| | SAE flange 1 1/2 - 6000M | H24 |
| | Manifold | X20 |



Parker Hannifin

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