



# Hydraulic Motor/Pump

Series F11/F12  
Fixed Displacement

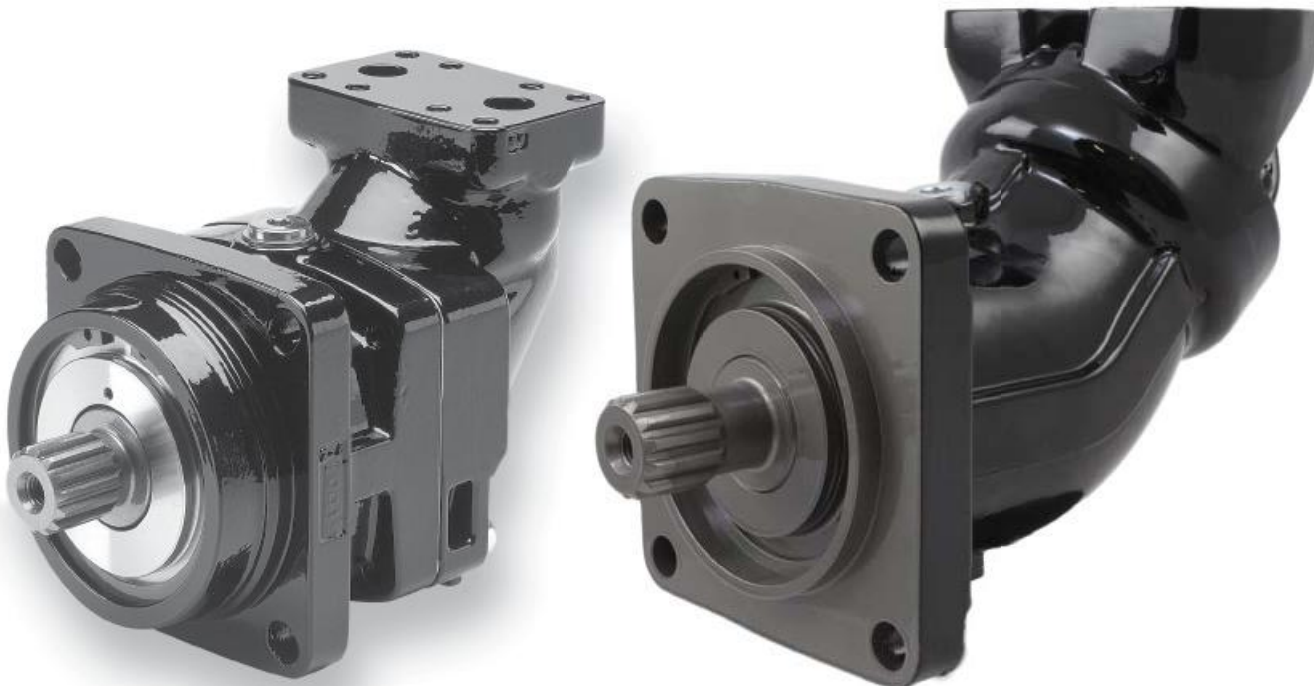


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# F12



**3**

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| Frame size F12                                    | -030 | -040 | -060 | -080  | -090  | -110  | -125  | -152  | -162  | -182  | -250  |
|---|------|------|------|-------|-------|-------|-------|-------|-------|-------|-------|
| <b>Displacement</b> [cm <sup>3</sup> /rev]        | 30.0 | 40.0 | 59.8 | 80.4  | 93.0  | 110.1 | 125.0 | 149.8 | 163.1 | 179.8 | 242   |
| <b>Operating pressure</b>                         |      |      |      |       |       |       |       |       |       |       |       |
| max intermittent <sup>1)</sup> [bar]              | 480  | 480  | 480  | 480   | 420   | 480   | 480   | 480   | 480   | 480   | 420   |
| max continuous [bar]                              | 420  | 420  | 420  | 420   | 350   | 420   | 420   | 420   | 420   | 420   | 350   |
| <b>Motor operating speed</b> [rpm]                |      |      |      |       |       |       |       |       |       |       |       |
| max intermittent <sup>1)</sup>                    | 8600 | 6700 | 5800 | 5300  | 5000  | 4800  | 4600  | 4000  | 4000  | 4000  | 3000  |
| max continuous <sup>3)</sup>                      | 6700 | 6100 | 5300 | 4800  | 4600  | 4400  | 4200  | 3700  | 3700  | 3700  | 2700  |
| min continuous                                    | 50   | 50   | 50   | 50    | 50    | 50    | 50    | 50    | 50    | 50    | 50    |
| <b>Max pump selfpriming speed</b> <sup>2)</sup>   |      |      |      |       |       |       |       |       |       |       |       |
| L or R function; max [rpm]                        | 3150 | 2870 | 2500 | 2300  | 2250  | 2200  | 2100  | 1700  | 1600  | 1500  | 1500  |
| <b>Motor input flow</b>                           |      |      |      |       |       |       |       |       |       |       |       |
| max intermittent <sup>1)</sup> [l/min]            | 219  | 268  | 347  | 426   | 465   | 528   | 575   | 608   | 648   | 728   | 726   |
| max continuous [l/min]                            | 201  | 244  | 317  | 386   | 428   | 484   | 525   | 547   | 583   | 655   | 653   |
| <b>Drain temperature</b> <sup>3)</sup> , max [°C] |      |      |      |       |       |       |       |       |       |       |       |
| min [°C]  | -40  | -40  | -40  | -40   | -40   | -40   | -40   | -40   | -40   | -40   | -40   |
| <b>Theoretical torque at 100 bar</b> [Nm]         | 47.6 | 63.5 | 94.9 | 127.6 | 147.6 | 174.8 | 198.4 | 241   | 257   | 289   | 384.1 |
| <b>Mass moment of inertia</b>                     |      |      |      |       |       |       |       |       |       |       |       |
| (x10 <sup>-3</sup> ) [kg m <sup>2</sup> ]         | 1.7  | 2.9  | 5    | 8.4   | 8.4   | 11.2  | 11.2  | 21    | 21    | 21    | 46    |
| <b>Weight</b> [kg]                                | 11.5 | 15.7 | 18.6 | 25.7  | 25.7  | 33    | 33    | 40    | 40    | 40    | 77    |

1) Intermittent: max 6 seconds in any one minute.  
2) Selfpriming speed valid at sea level. Find more info on page 42  
3) See also installation information. Page 69

**Efficiency**

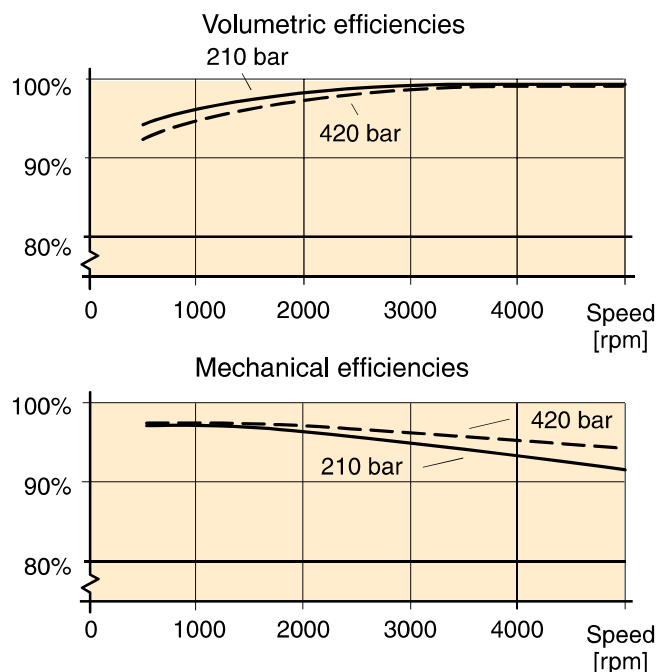
Because of its high overall efficiency, driving a motor/pump from series F12 requires less fuel or electric power.

Also, it allows the use of a small reservoir and heat exchanger, which in turn reduce cost, weight, and installation size.

The diagrams to the right show volumetric and mechanical efficiencies of an F12-030 motor.

F12-030 motors can be equipped with Power Boost which in high speed applications can decrease the mechanical losses by up to 15%, see page 7.

Contact Parker Hannifin for efficiency information on a particular F12 frame size that is being considered.



**3**

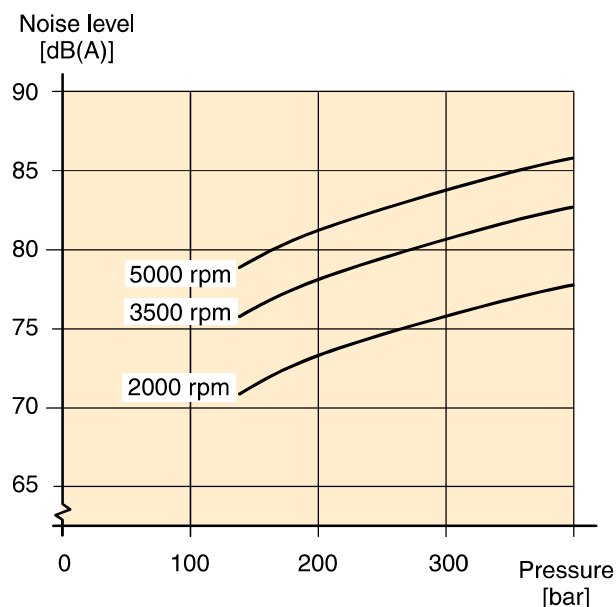
**Noise level**

Series F12 feature low noise levels from low to high speeds and pressures.

As an example, the diagram to the right shows the noise level of an F12-030 pump/motor.

The noise level is measured in a semi-anechoic room, 1 m behind the unit.

The noise level for a particular motor/pump may vary ±2 dB(A) compared to what is shown in the diagram.



NOTE: Noise information for F12 frame sizes are available from Parker Hannifin.

**Selfpriming speed and required inlet pressure**

**Series F12**

When operating the F12 as a pump (with L or R valve plate) above the selfpriming speed, the inlet must be pressurized. Increased noise and deteriorating performance may otherwise be experienced.

Diagrams 2 and 3 shows required pump inlet pressure vs. shaft speed.

The F12 motor (type M valve plate) sometimes operates as a pump e.g. when used in a propel transmission and the vehicle is going downhill.

Minimum required inlet pressure versus shaft speed is shown in the diagrams.

The inlet pressure can be charged by external pump, pressurized reservoir or using BLA Boost unit.

Find more info about the BLA unit at page 68.

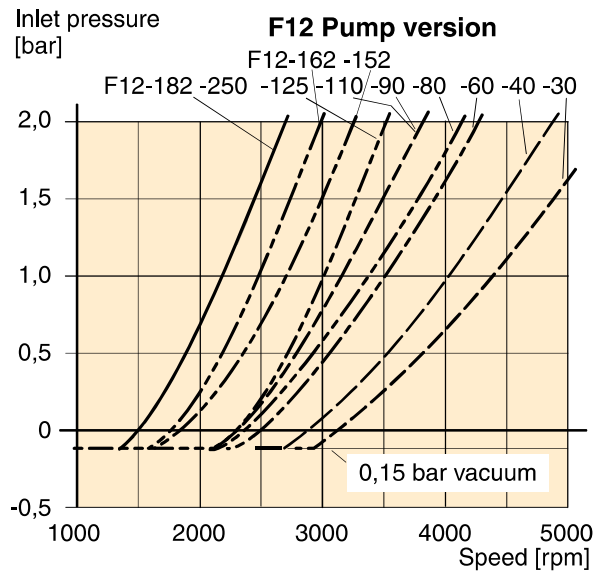


Diagram 2. Min. required pump (F12-L or -R) inlet press.

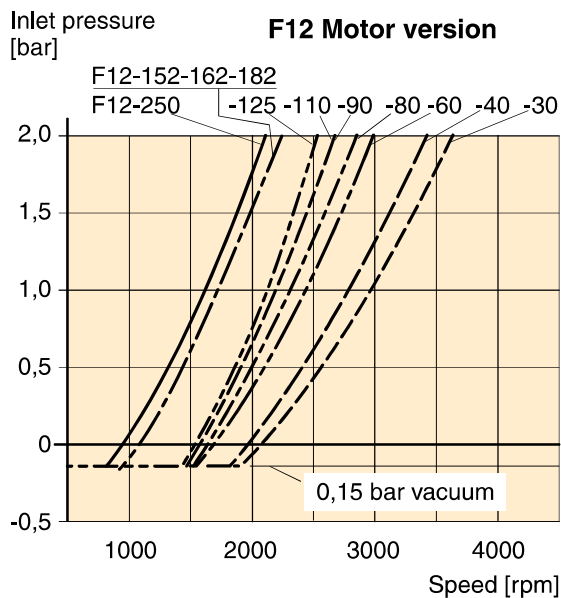
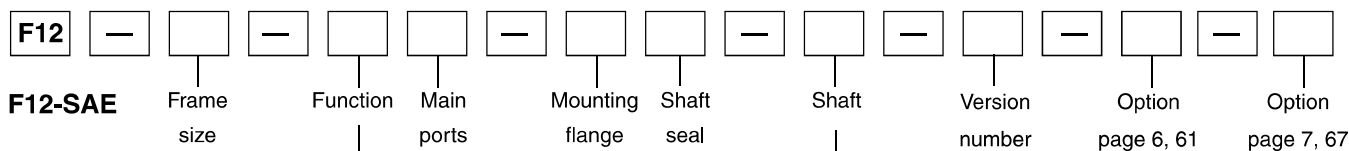


Diagram 3. Min. required motor (F12-M) inlet pressure.



| Frame size |                                   |
|------------|-----------------------------------|
| Code       | Displacem. (cm <sup>3</sup> /rev) |
| 030        | 30.0                              |
| 040        | 40.0                              |
| 060        | 59.8                              |
| 080        | 80.4                              |
| 090        | 93.0                              |
| 110        | 110.1                             |
| 125        | 125.0                             |
| 152        | 149.8                             |
| 162        | 163.1                             |
| 182        | 179.8                             |
| 250        | 242.0                             |

Version number  
 (assigned for special versions)

| Frame size                      | 30  | 40  | 60  | 80  | 90  | 110 | 125 | 152 | 162 | 182 | 250 |
|---------------------------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| <b>M</b> Motor                  | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | -   |
| S Motor, high speed             | (x) | (x) | (x) | -   | -   | -   | -   | (x) | (x) | (x) | -   |
| Q Motor                         | -   | -   | -   | -   | -   | -   | -   | -   | -   | -   | x   |
| R Pump, clockwise rotation      | (x) | (x) | (x) | (x) | (x) | (x) | (x) | (x) | (x) | (x) | (x) |
| L Pump, counter clockwise rot'n | (x) | (x) | (x) | (x) | (x) | (x) | (x) | (x) | (x) | (x) | (x) |

For other versions, contact Parker Hannifin

| Frame size                              | 30  | 40  | 60  | 80  | 90  | 110 | 125 | 152 | 162 | 182 | 250 |
|---|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| <b>S</b> SAE 6000 psi flange            | x   | x   | x   | x   | x   | x   | x   | -   | -   | -   | -   |
| <b>U</b> SAE UN threads <sup>4)</sup>   | (x) | (x) | (x) | (x) | (x) | (x) | (x) | -   | -   | -   | -   |
| F SAE 6000 psi flange <sup>2)</sup>     | -   | -   | -   | -   | -   | -   | -   | x   | x   | x   | x   |
| D SAE 6000 psi Horizontal <sup>2)</sup> | -   | -   | -   | -   | -   | -   | -   | (x) | (x) | (x) | -   |
| A SAE 6000 psi Axial <sup>2)</sup>      | -   | -   | -   | -   | -   | -   | -   | (x) | (x) | (x) | -   |
| K SAE 6000 psi Rear <sup>2)</sup>       | -   | -   | -   | -   | -   | -   | -   | (x) | (x) | (x) | -   |
| M SAE 6000 psi Side <sup>2)</sup>       | -   | -   | -   | -   | -   | -   | -   | (x) | (x) | (x) | -   |

| Frame size          | 30 | 40 | 60 | 80  | 90  | 110 | 125 | 152 | 162 | 182 | 250 |
|---------------------|----|----|----|-----|-----|-----|-----|-----|-----|-----|-----|
| <b>S</b> SAE 4 bolt | x  | x  | x  | x   | x   | x   | x   | x   | x   | x   | x   |
| R SAE 4 bolt        | -  | -  | -  | (x) | (x) | -   | -   | -   | -   | -   | -   |
| <b>T</b> SAE 2 bolt | x  | x  | x  | -   | -   | -   | -   | -   | -   | -   | -   |

x: Available (x): Optional - : Not available

- 1) F12-110 and -125: Accessory valve block (page 62)
- 2) Metric threads
- 3) Pressure setting on page 63
- 4) Not in combination with any valve options

**NOTE:** All combinations are not valid, please contact Parker Hannifin

| Frame size                 | 30  | 40  | 60  | 80  | 90  | 110 | 125 | 152 | 162 | 182 | 250 |
|----------------------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| <b>T</b> SAE key, Standard | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   |
| R SAE key, Optional        | -   | -   | -   | (x) | (x) | -   | -   | -   | -   | -   | -   |
| S SAE Spline, Optional     | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   |
| F SAE Spline, Optional     | -   | -   | -   | (x) | (x) | -   | -   | (x) | (x) | (x) | (x) |
| U SAE Spline, Optional     | -   | -   | -   | (x) | (x) | -   | -   | -   | -   | -   | -   |
| K Metric key, Standard     | -   | -   | -   | -   | -   | -   | -   | -   | -   | -   | x   |
| D Spline DIN 5480          | -   | -   | -   | -   | -   | -   | -   | -   | -   | -   | (x) |
| V Tapered shaft            | (x) | (x) | (x) | -   | -   | (x) | (x) | -   | -   | -   | -   |

\*See also dimensional drawings on pages 52 - 59.

| Frame size   | 30  | 40  | 60  | 80  | 90  | 110                | 125                | 152 | 162 | 182 | 250 |
|--|-----|-----|-----|-----|-----|--------------------|--------------------|-----|-----|-----|-----|
| <b>0000</b> Standard   | x   | x   | x   | x   | x   | x                  | x                  | x   | x   | x   | x   |
| L130 Flushing valve 1.3 mm orifice                                 | (x) | (x) | (x) | (x) | (x) | (x) <sup>-1)</sup> | (x) <sup>-1)</sup> | -   | -   | -   | -   |
| MUVR Make up/Anti cavitation valve clockwise rotation              | (x) | -   | -   | -   | -   | -                  | -                  | -   | -   | -   | -   |
| MUVR Make up/Anti cavitation valve counter clockwise rotation      | (x) | -   | -   | -   | -   | -                  | -                  | -   | -   | -   | -   |
| P <sub>3)</sub> R Pressure relief valve clockwise rotation         | (x) | (x) | (x) | -   | -   | -                  | -                  | -   | -   | -   | -   |
| P <sub>3)</sub> L Pressure relief valve counter clockwise rotation | (x) | (x) | (x) | -   | -   | -                  | -                  | -   | -   | -   | -   |

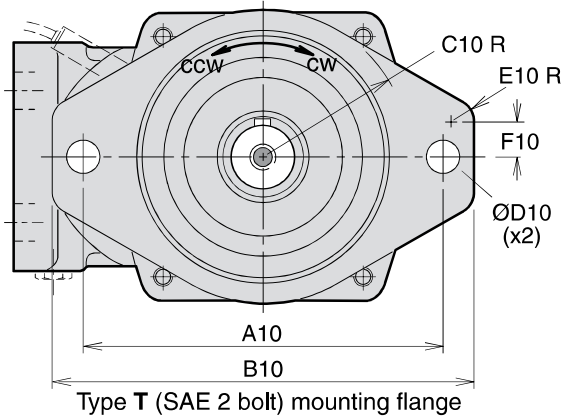
| Frame size   | 30  | 40  | 60  | 80  | 90  | 110 | 125 | 152 | 162 | 182 | 250 |
|--|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| <b>00</b> Standard                                       | -   | -   | -   | -   | -   | -   | -   | -   | -   | -   | x   |
| <b>P<sub>-</sub></b> Prepared for speed sensor           | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | (x) |
| B <sub>-</sub> Power Boost and Prepared for speed sensor | (x) | -   | -   | -   | -   | -   | -   | -   | -   | -   | -   |
| <b>_T</b> Painted Black                                  | (x) | (x) | (x) | (x) | (x) | (x) | (x) | (x) | (x) | (x) | (x) |

| Frame size                                    | 30 | 40 | 60 | 80 | 90 | 110 | 125 | 152 | 162 | 182 | 250 |
|---|----|----|----|----|----|-----|-----|-----|-----|-----|-----|
| <b>V</b> FPM, high pressure, high temperature | x  | x  | x  | x  | x  | x   | x   | x   | x   | x   | x   |

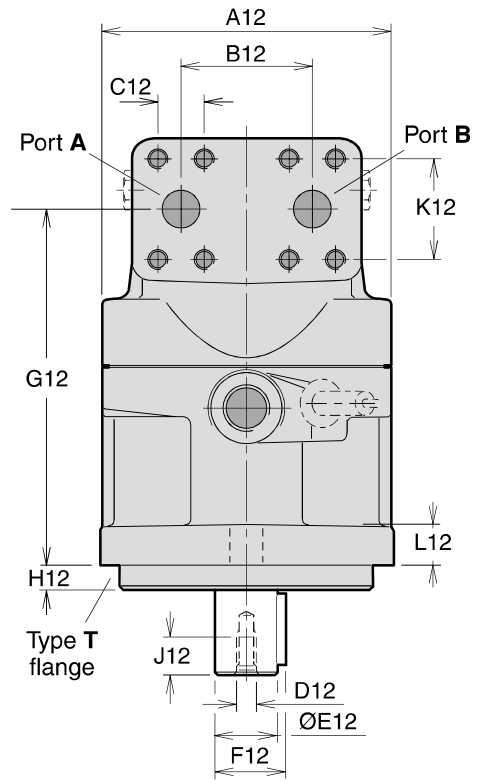
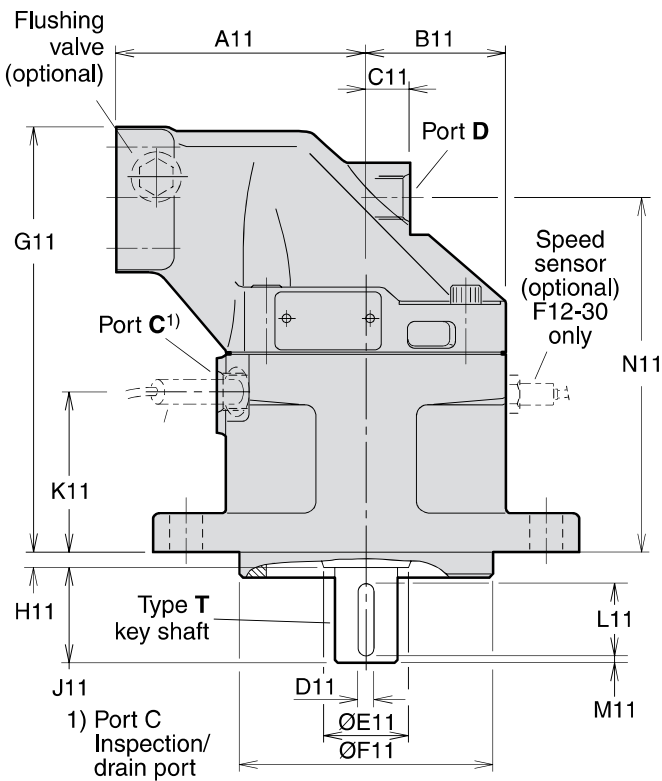
For other versions, contact Parker Hannifin



**F12-30, -40, and -60**  
 (SAE versions with 2 bolt flange)



Shown: F12-60 with 2 bolt flange

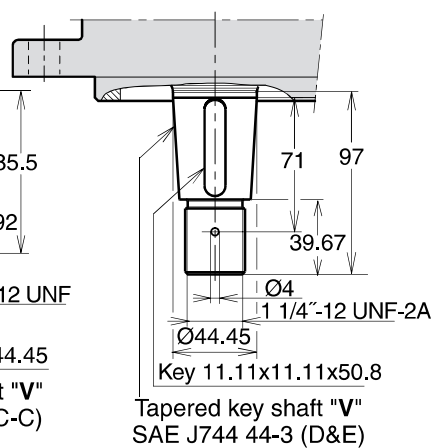
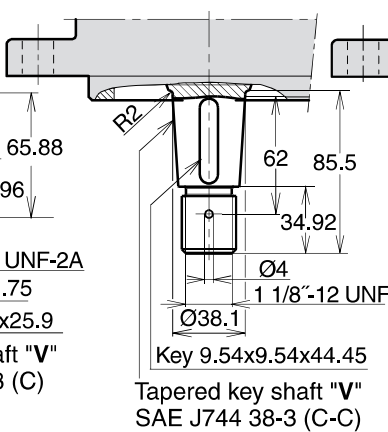
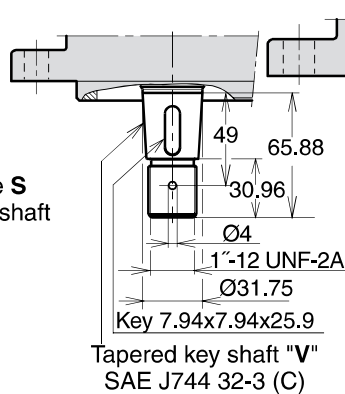
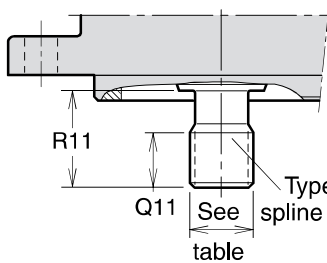


**Shaft option S**

**Shaft option V (F12-30)**

**Shaft option V (F12-40)**

**Shaft option V (F12-60)**



| Dim.              | F12-30                            | F12-40                           | F12-60                           |
|-------------------|-----------------------------------|----------------------------------|----------------------------------|
| A10               | 146                               | 181                              | 181                              |
| B10               | 176                               | 215                              | 215                              |
| C10               | 63                                | 74                               | 74                               |
| D10               | 14.4                              | 17.5                             | 17.5                             |
| E10               | 10                                | 16                               | 16                               |
| F10               | 10                                | 15.5                             | 15.5                             |
| A11               | 100                               | 110                              | 125                              |
| B11               | 59                                | 65                               | 70                               |
| C11               | 25                                | 26                               | 22                               |
| D11               | 6.35                              | 7.94                             | 7.94                             |
| E11               | 33                                | 42                               | 42                               |
| F11               | 101.60/<br>101.55                 | 127.00/<br>126.95                | 127.00/<br>126.95                |
| G11               | 189.5                             | 197                              | 214                              |
| H11               | 8                                 | 8                                | 8                                |
| J11               | 38                                | 48                               | 48                               |
| K11               | 71                                | 77                               | 81.5                             |
| L11               | 31.8                              | 38.1                             | 38.1                             |
| M11               | 2.5                               | 4                                | 4                                |
| N11               | 154                               | 161                              | 178.5                            |
| Q11               | 26                                | 27                               | 27                               |
| R11               | 33                                | 48                               | 48                               |
| A12               | 122                               | 134                              | 144                              |
| B12               | 66                                | 66                               | 66                               |
| C12               | 23.8                              | 23.8                             | 23.8                             |
| D12 <sup>1)</sup> | <sup>5</sup> / <sub>16</sub> "-24 | <sup>3</sup> / <sub>8</sub> "-24 | <sup>3</sup> / <sub>8</sub> "-24 |
| E12               | 25.40/<br>25.35                   | 31.75/<br>31.70                  | 31.75/<br>31.70                  |
| F12               | 28.2                              | 35.2                             | 35.2                             |
| G12               | 154                               | 161                              | 178.5                            |
| H12               | 9.7                               | 12.7                             | 12.7                             |
| J12               | 16                                | 19                               | 19                               |
| K12               | 50.8                              | 50.8                             | 50.8                             |
| L12               | 18                                | 20                               | 20                               |

1) UNF-2B thread

6) Max operating pressure 350 bar

| Ports           | F12-30                                  | F12-40                                  | F12-60                                  |
|-----------------|---|---|---|
| A, B size       | 19 ( <sup>3</sup> / <sub>4</sub> "      | 19 ( <sup>3</sup> / <sub>4</sub> "      | 19 ( <sup>3</sup> / <sub>4</sub> "      |
| Screw thread *) | <sup>3</sup> / <sub>8</sub> "-16<br>x22 | <sup>3</sup> / <sub>8</sub> "-16<br>x20 | <sup>3</sup> / <sub>8</sub> "-16<br>x22 |
| C thread        | <sup>3</sup> / <sub>4</sub> "-16        | <sup>3</sup> / <sub>4</sub> "-16        | <sup>7</sup> / <sub>8</sub> "-14        |
| D thread        | <sup>3</sup> / <sub>4</sub> "-16        | <sup>3</sup> / <sub>4</sub> "-16        | <sup>7</sup> / <sub>8</sub> "-14        |

A, B (main ports): SAE J518c (6000 psi)  
 C, D (drain ports): O-ring boss (SAE J514)  
 \*) UN thread

| Main ports A and B, type U (optional) |  |
|---------------------------------------|--|
| F12-30                                | 1 <sup>1</sup> / <sub>16</sub> " - 12 UN <sup>6)</sup> |
| -40                                   | 1 <sup>5</sup> / <sub>16</sub> " - 12 UN <sup>6)</sup> |
| -60                                   | 1 <sup>5</sup> / <sub>16</sub> " - 12 UN <sup>6)</sup> |

O-ring ports according to SAE J514d

| Mounting flange T (SAE J744) |                 |
|------------------------------|-----------------|
| F12-30                       | SAE 'B', 2 bolt |
| -40                          | SAE 'C', 2 bolt |
| -60                          | SAE 'C', 2 bolt |

| Spline shaft S<br>(SAE J498b, class 1, flat root, side fit) |                           |
|---|---------------------------|
| F12-30  | SAE 'B'<br>13 T; 16/32 DP |
| -40   | SAE 'C'<br>14 T; 12/24 DP |
| -60   | SAE 'C'<br>14 T; 12/24 DP |

Key shaft (SAE J744)

|        | T (Standard)   | V (optional) |
|--------|--|--------------|
| F12-30 | SAE 'B-B'<br>Ø25.4 mm/1"                             | 32-3         |
| -40    | SAE 'C'<br>Ø31.75 mm/1 <sup>1</sup> / <sub>4</sub> " | 38-3         |
| -60    | SAE 'C'<br>Ø31.75 mm/1 <sup>1</sup> / <sub>4</sub> " | 44-3         |