

C055 Variable Displacement Axial Piston Pump Service Information

HY28-2705-02/C/US January 2017



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

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Offer of Sale

The items described in this document are hereby offered for sale by Parker-Hannifin Corporation, its subsidiaries or its authorized distributor. This offer and its acceptance are governed by the provisions stated in the detailed "Offer of Sale" elsewhere in this document.

Installation Information

Guidelines

Pump case should be filled prior to start up and plumbed to ensure it remains filled with fluid under all conditions. Pump case pressure should not exceed 4 bar (58 PSI) continuous pressure, 6 bar (87 PSI) on cold start up.

Care should be taken to ensure line velocities are not above standard design specifications as noted in *Table 1*. Raised line velocities will cause an increase in pressure loss in the hoses and cause premature failure under certain conditions. Pressure in the suction line of the pump should never be below .8 bar (11.6 PSI) absolute. Maximum suction pressure is 4 bar (58 PSI) continuous and 6 bar (87 PSI) on cold startup.

Long line lengths and sharp turns in the fluid conveyance will add additional pressure loss or restriction to the system. It is recommended to keep the line lengths as short as possible and to avoid as many fluid direction changes in the system as possible.

| Table 1 | |
|------------|-------------------------------|
| Function | Fluid Velocity m/sec (Ft/sec) |
| Suction | 0.6-1.2 (2-4) |
| Case Drain | 1.5-3 (5-10) |
| Pressure | 3-6 (10-20) |

Orientation

The C series pump can be installed in many different orientations, see *Figure A* for examples. If you want to mount the unit in an orientation not shown, please contact technical support.

It is suggested that the pump be mounted so that it is level or below minimum fluid level in the hydraulic reservoir. The pump can be mounted above fluid level but extra attention must be paid to ensure that the case remains filled at all times and proper suction pressure is maintained.

Regardless of installation orientation, the highest case drain port (L1, L2) should always be used and should return below fluid level.

Air bleed port should only be used while filling the case of the unit to ensure the unit is completely filled with fluid. Once the unit is filled, the air bleed port should be closed via a port plug or shut-off valve.

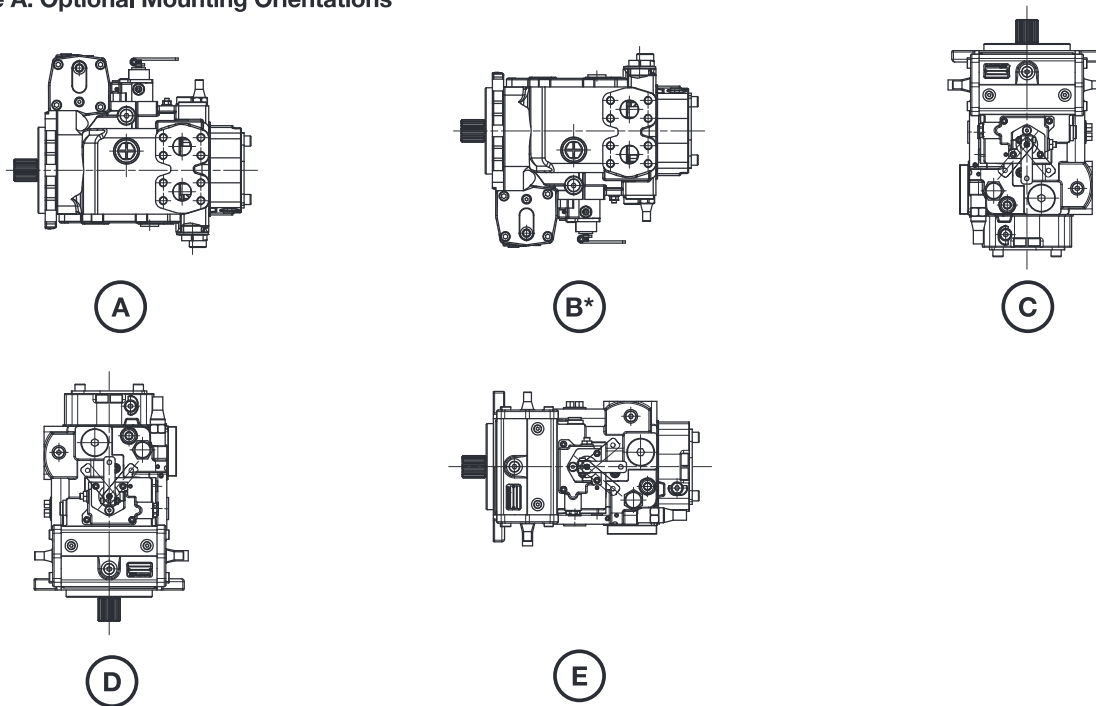
Fluid

Parker recommends using a fluid with a petroleum base that contains agents which provide oxidation inhibition and antirust, antifoam and de-aerating properties as described in Parker standard HF-1. Where antiwear additive fluids are specified, see Parker standard HF-0.

Use fluids with a minimum viscosity index of 90. Higher viscosity index extends the range of operating temperatures but may reduce the service life of the fluid.

It is recommended that the reservoir, hydraulic fluid and fluid conveyance items be cleaned prior to use. Filtration of the fluid is recommended before and during use. Maximum fluid contamination level is 20/18/15 per ISO 4406:1999. Better cleanliness levels will increase the life of the system.

Figure A: Optional Mounting Orientations



**Contamination can cause issues when mounting in this orientation. Ensure system is clean when this orientation is used.*

Unit Identification

All Parker Hydraulic Pump and Power Systems Division products are supplied with an identification plate. Units can be properly identified only if all information is supplied.

DO NOT REMOVE, ALTER OR DAMAGE THE DATA PLATE.

C Series Identification Tag

The Identification tag on the C series pumps will have the following layout:

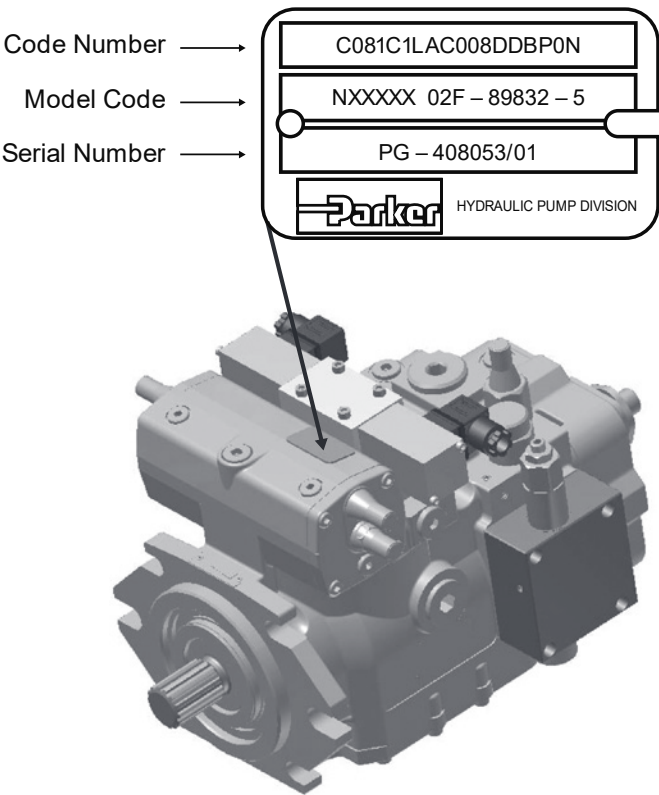
The top line of the model code will contain the model code for the unit.

The second line of the tag will also have model code information. It is also important to note the final digit of the model code is truncated as it would not leave enough space for the code number, which will also be on the second line of the identification tag. The code number is generated by Parker Hydraulic Pump and Power Systems Division and will be specific to a single model code combination.

The third line of the model code will contain the unit serial number. Serial number provides month and year of production as well as the batch number.

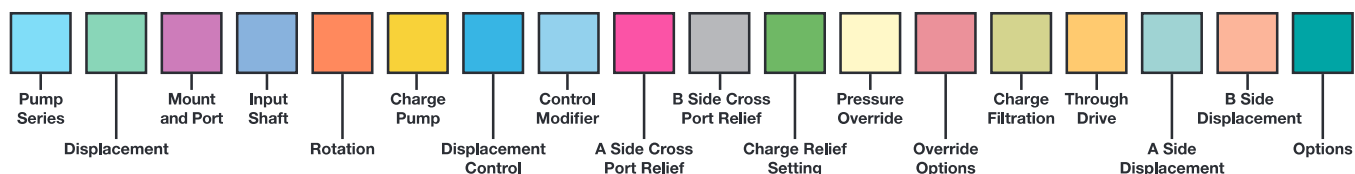
Serial Number Detail

The first two digits of the serial number provide the year and month of production. The letter in position 1 indicates the year of production while the letter in position 2 indicates the month of production. See the tables for details on positions 1 and 2. The remaining digits identify the batch number the unit was produced in.



| Position 1 Letter | Year |
|-------------------|------|
| A | 2001 |
| B | 2002 |
| C | 2003 |
| D | 2004 |
| E | 2005 |
| F | 2006 |
| G | 2007 |
| H | 2008 |
| J | 2009 |
| K | 2010 |
| L | 2011 |
| M | 2012 |
| N | 2013 |
| P | 2014 |
| Q | 2015 |
| R | 2016 |
| S | 2017 |
| T | 2018 |
| U | 2019 |
| V | 2020 |
| W | 2021 |
| X | 2022 |
| Y | 2023 |
| Z | 2024 |

| Position 2 Letter | Month |
|-------------------|-----------|
| A | January |
| B | February |
| C | March |
| D | April |
| E | May |
| F | June |
| G | July |
| H | August |
| J | September |
| K | October |
| L | November |
| M | December |

Model Codes**Variable Displacement Axial
Piston Pump C055 Service Information**

| Pump Series | |
|-------------|------------------------------|
| C | C Series closed circuit pump |

| Displacement | |
|--------------|-----------------------|
| 055 | 055 cc/rev (3,35 CIR) |
| 081 | 081 cc/rev (4,94 CIR) |
| 136 | 136 cc/rev (8,3 CIR) |

| Mount and Port Options | |
|------------------------|--|
| C | SAE C 2/4 bolt mount with SAE ports (55 and 81 only) |
| D | SAE D 2/4 bolt mount with SAE ports (55 and 81 only) |
| G | SAE C 2/4 bolt mount with ISO ports (136 only) |
| H | SAE D 2/4 bolt mount with ISO ports (136 only) |

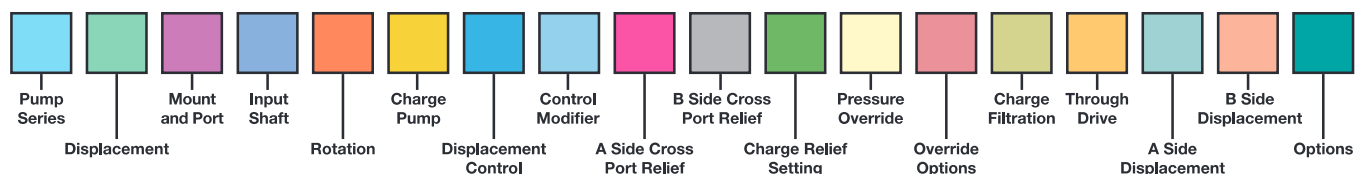
| Rotation | |
|--------------------------------|-------------------------|
| R | CW (clockwise) |
| L | CCW (counter clockwise) |
| As viewed looking at the shaft | |

| Charge Pump | 055 | 081 | 136 |
|---|-----|-----|-----|
| A 18 cc/rev (1,1 CIR) | # | # | — |
| B 23.1 cc/rev (1,41 CIR) | — | X | X |
| C 27.3 cc/rev (1,65 CIR) | — | X | # |
| D 11 cc/rev (0,67 CIR) | X | — | — |
| E 14 cc/rev (0,85 CIR) | X | — | — |
| X No charge pump | X | X | X |
| # = Standard option X = Available — = Not available | | | |

| Pump Control | |
|--------------|---|
| A | Manual lever |
| C | Hydraulic proportional control with internal feedback |
| D | Hydraulic proportional control without internal feedback |
| E | Electric non proportional |
| F | Electric proportional with internal feedback |
| G | Electric proportional without internal feedback |
| H | Electric proportional with internal feedback and hydraulic override |
| J | Automotive control electrical |
| K | Automotive control hydraulic |

| Input Shaft | | 055 | 081 | 136 |
|---|--|-----|-----|-----|
| 1 | SAE C 14T 12/24 DP 1 1/4" OD ANSI B92.1a-1976 | # | # | — |
| 2 | 21T 16/32 DP 1 3/8" OD ANSI B92.1a-1976 | X | X | — |
| 3 | SAE D-E 13T 8/16 DP 1 3/4" OD ANSI B92.1a-1976 | — | — | # |
| 4 | SAE F 15T 8/16 DP 2" OD ANSI B92.1a-1976 | — | — | X |
| 5 | 23T 16/32 DP 1 1/2" OD ANSI B92.1a-1976 | — | — | X |
| 6 | 27T 16/32 DP 1 3/4" OD ANSI B92.1a-1976 | — | — | X |
| 7 | W40x2x30x18 DIN 5480 | — | — | X |
| 8 | W45x2x30x21 DIN 5480 | — | — | X |
| # = Standard option X = Available — = Not available | | | | |

Model Codes

Variable Displacement Axial
Piston Pump C055 Service Information

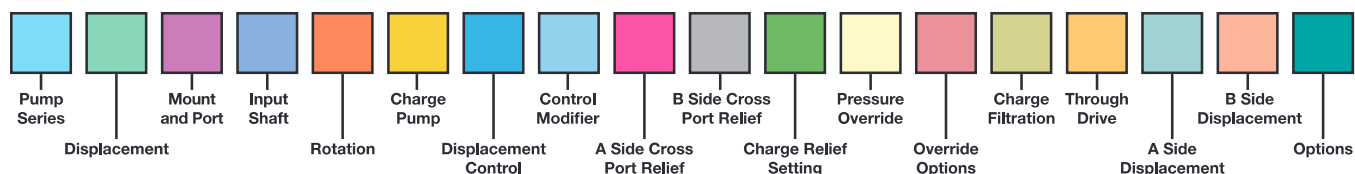
| Pump Control | | | | | | | | | | Control Modifier | | | |
|---|---|---|---|---|---|---|---|---|-----|---|---|---|--|
| A | C | D | E | F | G | H | J | K | | Pump control selection determines what modifier is used | | | |
| # | — | A | — | — | — | — | — | — | <-> | 0 | 0 | 0 | No control orifices |
| — | — | X | — | — | — | — | — | — | <-> | 0 | 0 | 5 | 0.5 mm (.019 in) Control orifice |
| — | X | X | — | — | — | — | — | — | <-> | 0 | 0 | 6 | 0.6 mm (.024 in) Control orifice |
| — | X | X | — | — | — | — | — | — | <-> | 0 | 0 | 7 | 0.7 mm (.027 in) Control orifice |
| — | # | X | — | — | — | — | — | — | <-> | 0 | 0 | 8 | 0.8 mm (.031 in) Control orifice |
| — | X | # | — | — | — | — | — | — | <-> | 0 | 0 | 9 | 0.9 mm (.035 in) Control orifice |
| — | X | X | — | — | — | — | — | — | <-> | 0 | 1 | 2 | 1.2 mm (.047 in) Control orifice |
| — | — | — | — | X | — | — | — | — | <-> | 2 | 0 | 0 | 12 VDC, No control orifice |
| — | — | — | — | X | — | — | — | — | <-> | 2 | 0 | 6 | 12 VDC, 0.6 mm (.024 in) Control orifice |
| — | — | — | — | X | — | — | — | — | <-> | 2 | 0 | 7 | 12 VDC, 0.7 mm (.027 in) Control orifice |
| — | — | — | — | # | X | X | — | — | <-> | 2 | 0 | 8 | 12 VDC, 0.8 mm (.031 in) Control orifice |
| — | — | — | X | X | — | — | — | — | <-> | 2 | 1 | 2 | 12 VDC, 1.2 mm (.047 in) Control orifice |
| — | — | — | — | X | — | — | — | — | <-> | 2 | 2 | 0 | 12 VDC, 2.0 mm (.079 in) Control orifice |
| — | — | — | — | X | — | — | — | — | <-> | 4 | 0 | 0 | 24 VDC, No control orifice |
| — | — | — | — | X | — | — | — | — | <-> | 4 | 0 | 6 | 24 VDC, 0.6 mm (.024 in) Control orifice |
| — | — | — | — | X | — | — | — | — | <-> | 4 | 0 | 7 | 24 VDC, 0.7 mm (.027 in) Control orifice |
| — | — | — | — | # | # | # | — | — | <-> | 4 | 0 | 8 | 24 VDC, 0.8 mm (.031 in) Control orifice |
| — | — | — | X | X | — | — | — | — | <-> | 4 | 1 | 2 | 24 VDC, 1.2 mm (.047 in) Control orifice |
| — | — | — | — | X | — | — | — | — | <-> | 4 | 2 | 0 | 24 VDC, 2.0 mm (.079 in) Control orifice |
| — | — | — | — | — | — | — | X | — | <-> | D | | | No inching valve, 12 VDC coils, J control only |
| — | — | — | — | — | — | — | X | — | <-> | E | | | Hydraulic inching valve, 12 VDC coils, J control only |
| — | — | — | — | — | — | — | X | — | <-> | F | | | No inching valve, 24 VDC coils, J control only |
| — | — | — | — | — | — | — | X | — | <-> | G | | | Hydraulic inching valve, 24 VDC coils, J control only |
| — | — | — | — | — | — | — | — | X | <-> | H | | | Hydraulic inching valve, K control only |
| — | — | — | — | — | — | — | — | X | <-> | X | | | No inching valve, K control only |
| — | — | — | — | — | — | — | X | X | <-> | | 2 | | 1.2 mm (.047 in) Control orifice |
| — | — | — | — | — | — | — | X | X | <-> | | 5 | | 1.5 mm (.059 in) Control orifice |
| — | — | — | — | — | — | — | X | X | <-> | | | P | Prepared for flushing valve |
| — | — | — | — | — | — | — | X | X | <-> | | | 1 | Flushing valve installed with 1.5 mm orifice |
| — | — | — | — | — | — | — | X | X | <-> | | | 2 | Flushing valve installed with 2.0 mm orifice |
| — | — | — | — | — | — | — | X | X | <-> | | | 3 | Flushing valve installed with 2.5 mm orifice |
| # = Standard option X = Available — = Not available A = Without pressure override only | | | | | | | | | | Example modifier with J/K control | | | |
| | | | | | | | | | | G | 5 | P | Hydraulic inching valve, 24VDC coils with a 1.5 mm control orifice and prepared for flushing |
| | | | | | | | | | | When ordering J/K control specify starting input RPM, input RPM at rated torque and rated input torque (NM) | | | |

| A Side Cross Port Relief | |
|--------------------------|--------------------|
| A | 250 Bar (3625 PSI) |
| B | 350 Bar (5075 PSI) |
| C | 420 Bar (6090 PSI) |
| D | 450 Bar (6525 PSI) |

| B Side Cross Port Relief | |
|--------------------------|--------------------|
| A | 250 Bar (3625 PSI) |
| B | 350 Bar (5075 PSI) |
| C | 420 Bar (6090 PSI) |
| D | 450 Bar (6525 PSI) |

| Charge Relief Setting | | 055 | 081 | 136 |
|-----------------------|------------------|-----|-----|-----|
| A | 20 Bar (290 PSI) | X | X | — |
| B | 22 Bar (319 PSI) | # | # | # |
| C | 25 Bar (362 PSI) | X | X | X |

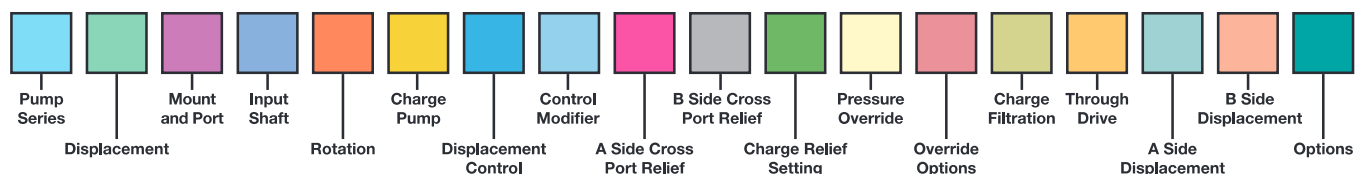
= Standard option
X = Available
— = Not available

Model Codes**Variable Displacement Axial
Piston Pump C055 Service Information**

| Pressure Override | |
|---|--|
| X | No pressure override |
| P | Hydraulic internal pressure override |
| E | Electrical override |
| C | Electrical override and hydraulic internal pressure override |
| Override not available on J/K control. Pressure override should be set 20-30 bar below cross port relief settings. | |

| Pressure Override | | | | | Override Options | | |
|-------------------|----------|----------|----------|----|--|----------|--|
| X | P | E | C | | Pressure override selection determines override option | | |
| X | — | — | — | <> | X | X | No pressure override |
| — | X | — | — | <> | 0 | A | Locked |
| — | X | — | — | <> | 0 | B | 100 Bar (1450 PSI) |
| — | X | — | — | <> | 0 | C | 150 Bar (2175 PSI) |
| — | X | — | — | <> | 0 | D | 200 Bar (2900 PSI) |
| — | X | — | — | <> | 0 | E | 250 Bar (3625 PSI) |
| — | X | — | — | <> | 0 | F | 280 Bar (4060 PSI) |
| — | X | — | — | <> | 0 | G | 300 Bar (4350 PSI) |
| — | X | — | — | <> | 0 | H | 320 Bar (4712 PSI) |
| — | X | — | — | <> | 0 | J | 330 Bar (4785 PSI) |
| — | X | — | — | <> | 0 | K | 350 Bar (5075 PSI) |
| — | X | — | — | <> | 0 | M | 380 Bar (5510 PSI) |
| — | X | — | — | <> | 0 | N | 400 Bar (5800 PSI) |
| — | — | X | — | <> | 1 | 2 | 12 VDC coil |
| — | — | X | — | <> | 2 | 4 | 24 VDC coil |
| — | — | — | X | <> | 2 | A | 12VDC coil locked override |
| — | — | — | X | <> | 2 | B | 12VDC coil, 100 Bar (1450 PSI) override |
| — | — | — | X | <> | 2 | C | 12VDC coil, 150 Bar (2175 PSI) override |
| — | — | — | X | <> | 2 | D | 12VDC coil, 200 Bar (2900 PSI) override |
| — | — | — | X | <> | 2 | E | 12VDC coil, 250 Bar (3625 PSI) override |
| — | — | — | X | <> | 2 | G | 12VDC coil, 300 Bar (4350 PSI) override |
| — | — | — | X | <> | 2 | K | 12VDC coil, 350 Bar (5075 PSI) override |
| — | — | — | X | <> | 2 | M | 12VDC coil, 380 Bar (5510 PSI) override |
| — | — | — | X | <> | 2 | N | 12VDC coil, 400 Bar (5800 PSI) override |
| — | — | — | X | <> | 4 | A | 24 VDC coil locked override |
| — | — | — | X | <> | 4 | B | 24 VDC coil, 100 Bar (1450 PSI) override |
| — | — | — | X | <> | 4 | C | 24 VDC coil, 150 Bar (2175 PSI) override |
| — | — | — | X | <> | 4 | D | 24 VDC coil, 200 Bar (2900 PSI) override |
| — | — | — | X | <> | 4 | E | 24 VDC coil, 250 Bar (3625 PSI) override |
| — | — | — | X | <> | 4 | G | 24 VDC coil, 300 Bar (4350 PSI) override |
| — | — | — | X | <> | 4 | K | 24 VDC coil, 350 Bar (5075 PSI) override |
| — | — | — | X | <> | 4 | M | 24 VDC coil, 380 Bar (5510 PSI) override |
| — | — | — | X | <> | 4 | N | 24 VDC coil, 400 Bar (5800 PSI) override |

X = Available
— = Not available

Model Codes**Variable Displacement Axial
Piston Pump C055 Service Information**

| Charge Filtration | | 055 | 081 | 136 |
|-------------------|--|-----|-----|-----|
| X | No charge filter | # | # | # |
| N | Charge filter with 8 Bar (116 PSI) mechanical bypass indicator | X | X | X |
| G | Charge filter with 8 Bar (116 PSI) electrical bypass indicator | X | X | X |
| R | Prepared for remote charge pressure filtration | X | X | X |

= Standard option
X = Available
— = Not available

| A Side Displacement | |
|---------------------|--|
| 00-99 | Set displacement of A side between 0-99% |
| XX | XX = 100% displacement |

| B Side Displacement | |
|---------------------|--|
| 00-99 | Set displacement of B side between 0-99% |
| XX | XX = 100% displacement |

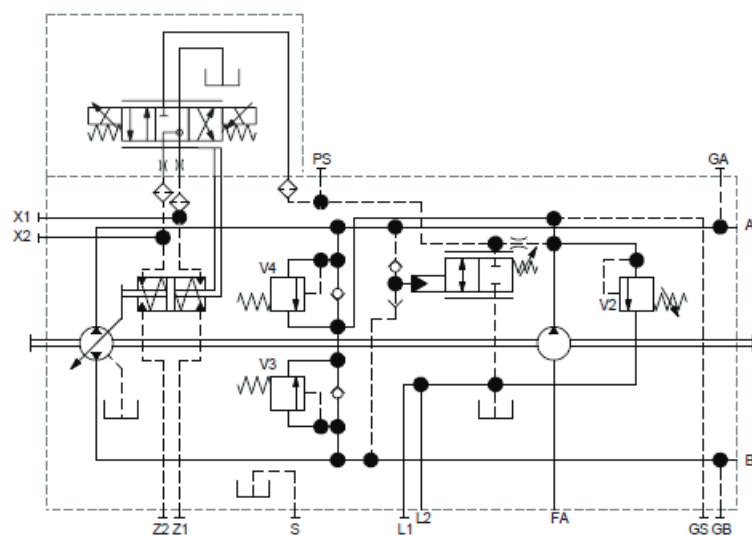
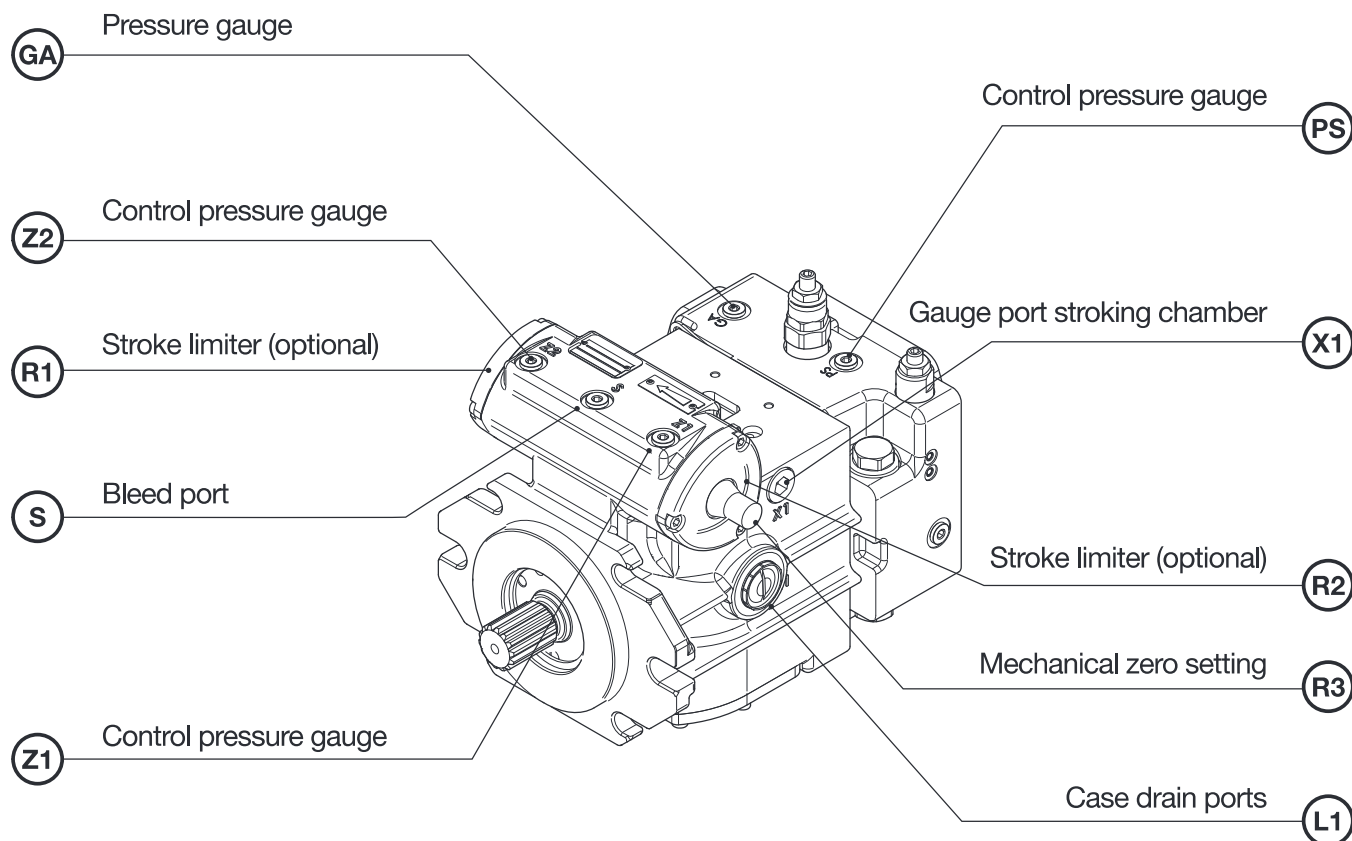
| Options | | 055 | 081 | 136 |
|----------|--|-----|-----|-----|
| X | No paint, no bypass valve | # | # | # |
| Y | No paint with bypass valve | X | X | — |
| P | Paint black, no bypass valve | X | X | X |
| D | Paint black with bypass valve | X | X | — |
| M | Special modification contact technical support | | | |

= Standard option
X = Available all displacements
— = Not available

| Through Drive | | 055 | 081 | 136 |
|---------------|-------------------------------|-----|-----|-----|
| X | No through drive | # | # | # |
| A | SAE A mount, 9T spline shaft | X | X | X |
| B | SAE B mount, 13T spline shaft | X | X | X |
| G | SAE B mount, 15T spline shaft | X | X | X |
| C | SAE C mount, 14T spline shaft | X | X | X |
| H | SAE C mount, 17T spline shaft | X | X | X |
| D | SAE D mount, 13T spline shaft | X | X | X |

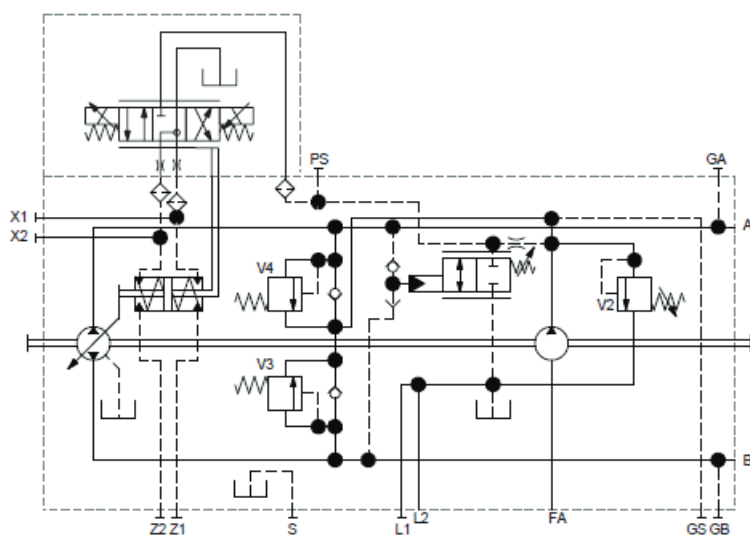
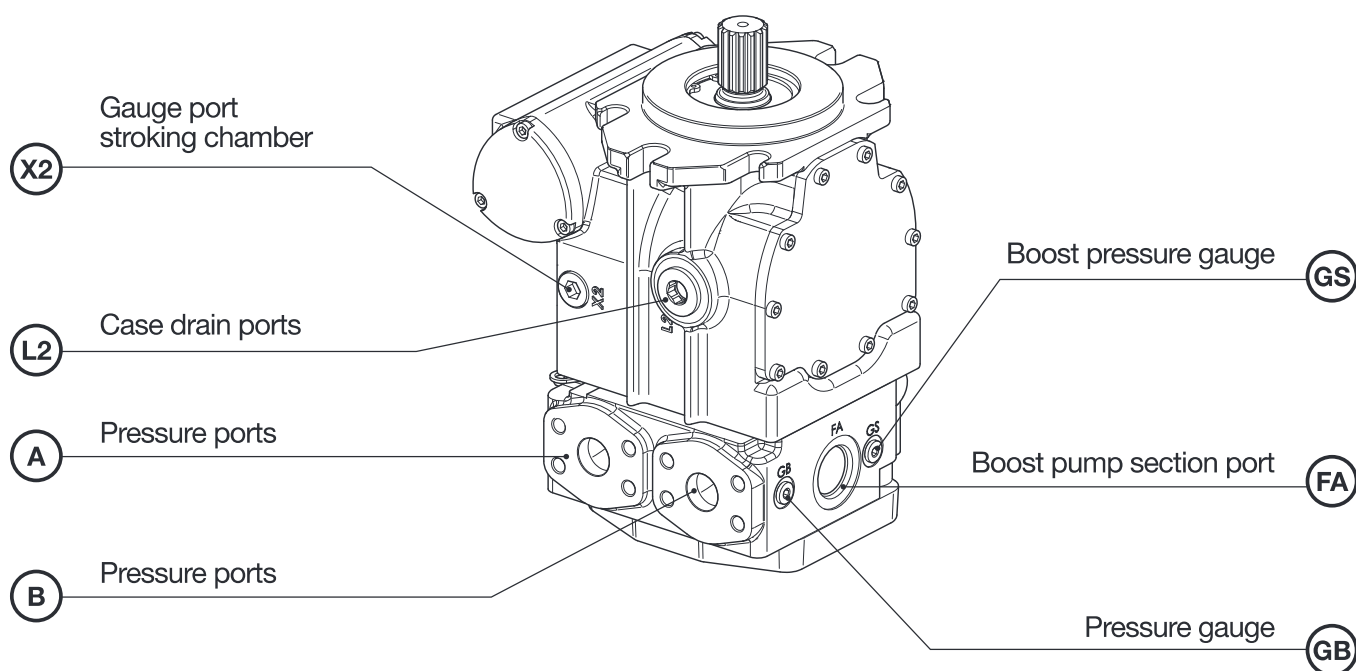
= Standard option
X = Available
— = Not available

Example Model Code**C081C1RAF208BBBP0HRAXXXXP****C081** = 81cc frame**C** = SAE C 2/4 bolt mount with SAE ports**1** = SAE C 14T 12/24 DP 1-1/4" OD ANSI B92.1A-1976**R** = CW rotation (looking at the shaft)**A** = 81cc frame 18cc/rev (1.1 CIR) charge pump**F** = Electric proportional with internal feedback displacement control**208** = 12 VDC, 0.8mm (.031 in) control orifice**B** = A side cross port relief set to 350 bar (5075 PSI)**B** = B side cross port relief set to 350 bar (5075 PSI)**B** = Charge relief set to 22 bar (319 PSI)**P** = Hydraulic internal pressure override**0H** = Pressure override set to 320 bar (4712 PSI)**R** = Prepared for remote charge pressure filtration**A** = SAE A mount through drive with 9T spline shaft coupling**XX** = A side displacement set to 100%**XX** = B side displacement set to 100%**P** = Paint black, no bypass valve



| C055 Port Sizes | | |
|-----------------|----------------|----------------|
| Port | Mount C | Mount G |
| A | 1" SAE Code 62 | 1" SAE Code 62 |
| B | 1" SAE Code 62 | 1" SAE Code 62 |
| L1 | -12 SAE ORB | 3/4" G |
| L2 | -12 SAE ORB | 3/4" G |
| FA | -16 SAE ORB | 1" G |
| GA | -4 SAE ORB | 1/4" G |
| GB | -4 SAE ORB | 1/4" G |
| GS | -4 SAE ORB | 1/4" G |
| PS | -4 SAE ORB | 1/4" G |
| S | -4 SAE ORB | 1/4" G |
| X1 | -6 SAE ORB | 3/8" G |
| X2 | -6 SAE ORB | 3/8" G |
| Z1 | -4 SAE ORB | 1/4" G |
| Z2 | -4 SAE ORB | 1/4" G |

Schematic shown is a C055 with "F" control and pressure override.

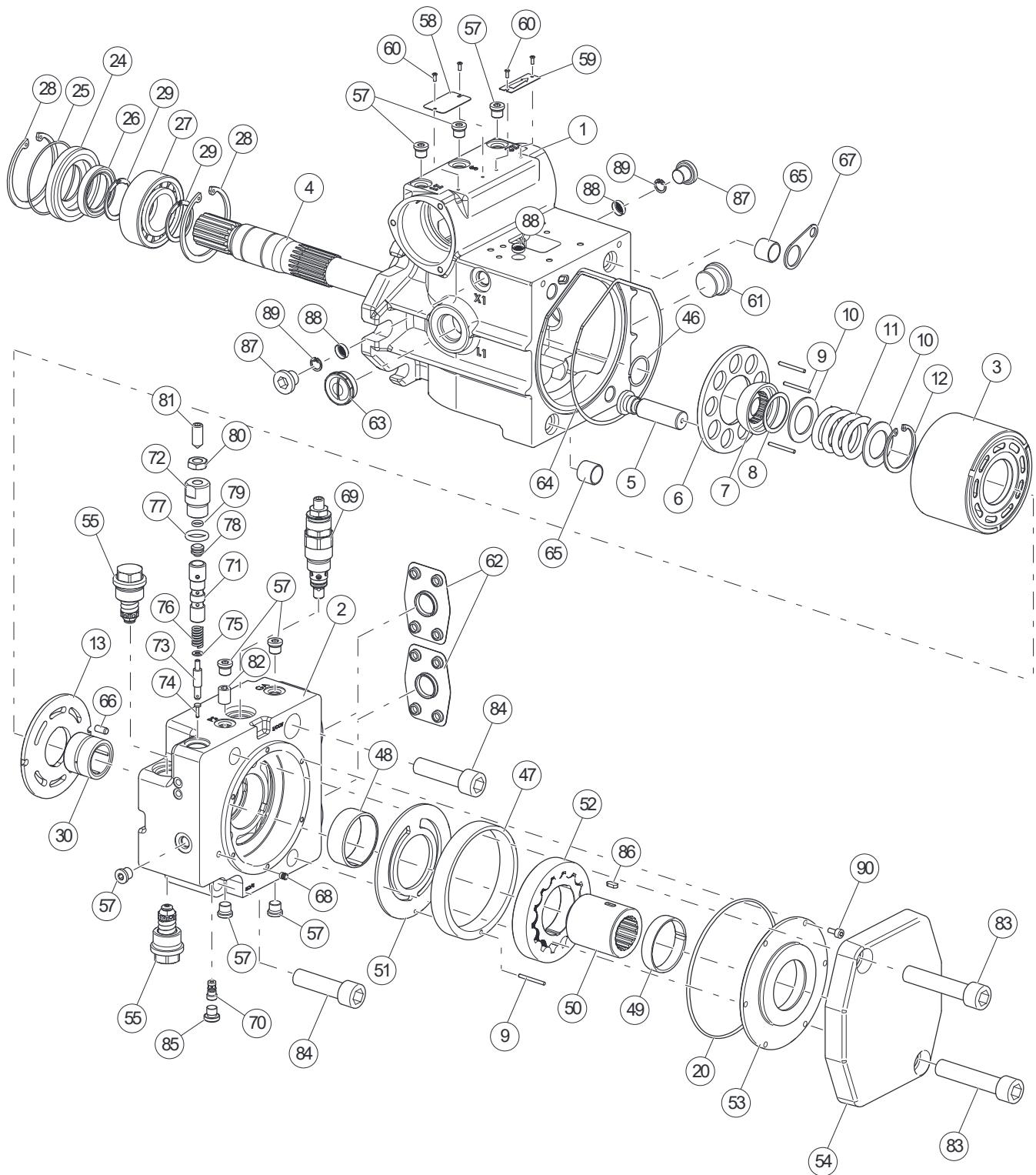


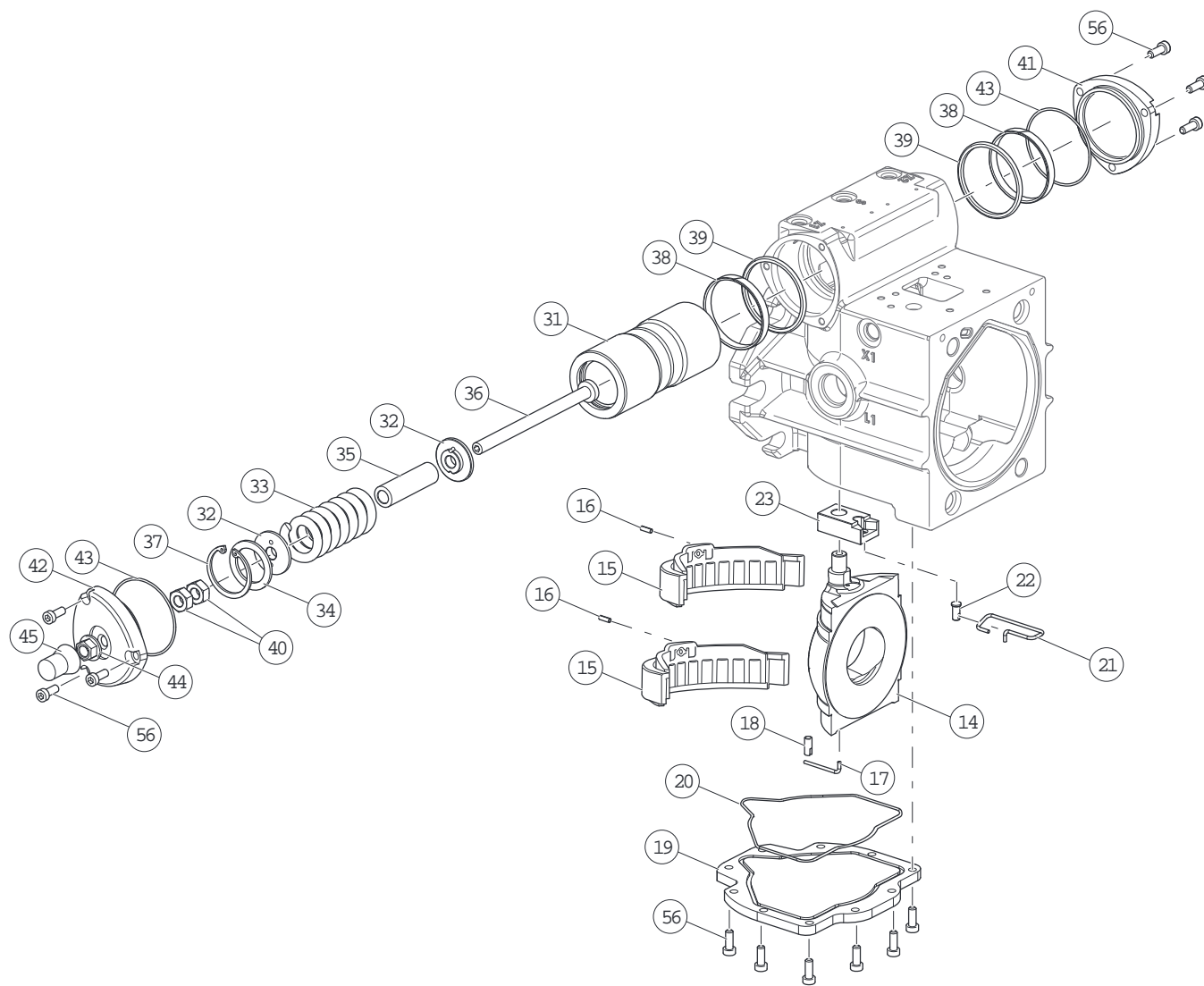
| C055 Port Sizes | | |
|-----------------|----------------|----------------|
| Port | Mount C | Mount G |
| A | 1" SAE Code 62 | 1" SAE Code 62 |
| B | 1" SAE Code 62 | 1" SAE Code 62 |
| L1 | -12 SAE ORB | 3/4" G |
| L2 | -12 SAE ORB | 3/4" G |
| FA | -16 SAE ORB | 1" G |
| GA | -4 SAE ORB | 1/4" G |
| GB | -4 SAE ORB | 1/4" G |
| GS | -4 SAE ORB | 1/4" G |
| PS | -4 SAE ORB | 1/4" G |
| S | -4 SAE ORB | 1/4" G |
| X1 | -6 SAE ORB | 3/8" G |
| X2 | -6 SAE ORB | 3/8" G |
| Z1 | -4 SAE ORB | 1/4" G |
| Z2 | -4 SAE ORB | 1/4" G |

Schematic shown is a C055 with "F" control and pressure override.

| C Series Displacement Controls | | | | |
|---|--------------|------------------|---|-------------|
| Mount | Control Code | Control Modifier | Description | Part Number |
| All | A | 000 | A000 controller, manual lever | S2F-19950-5 |
| C/D | C | SELECT KIT | C CONT NO ORF HPDCF SAE S2 | S2F-20229-5 |
| G/H | C | SELECT KIT | C CONT, NO ORF HPDCF ISO S2 | S2F-20228-5 |
| C/D | D | 000 | D000 controller, HPDCN, no orifice, SAE | S2F-19962-5 |
| G/H | D | 000 | D000 controller, HPDCN, no orifice, ISO | S2F-19963-5 |
| C/D | D | 005 | D005 controller, HPDCN, .5 mm orifice, SAE | S2F-19964-5 |
| G/H | D | 005 | D005 controller, HPDCN, .5 mm orifice, ISO | S2F-19965-5 |
| C/D | D | 009 | D009 controller, HPDCN, .9 mm orifice, SAE | S2F-19966-5 |
| G/H | D | 009 | D009 controller, HPDCN, .9 mm orifice, ISO | S2F-19967-5 |
| All | E/J | 212/D2*/E2* | E212 controller, ENPDC, 1.2 mm orifice, 12V S2 | S2F-19968-5 |
| All | E/J | 212/F2*/G2* | E412 controller, ENPDC, 1.2 mm orifice, 24V S2 | S2F-19973-5 |
| All | F | SELECT KIT | F CONT, NO ORF EPDCF 12V S2 | S2F-20230-5 |
| All | F | SELECT KIT | F CONT, NO ORF EPDCF 24V S2 | S2F-20231-5 |
| All | G | 208 | G208 controller, EPDCN, 0.8 mm orifice, 12VDC | S2F-19984-5 |
| All | G | 408 | G408 controller, EPDCN, 0.8 mm orifice, 24VDC | S2F-19985-5 |
| C/D | H | SELECT KIT | H CONT, NO ORF EPDCFH 12V SAE | S2F-20232-5 |
| C/D | H | SELECT KIT | H CONT, NO ORF EPDCFH 24V SAE | S2F-20233-5 |
| C/D | H | SELECT KIT | H CONT, NO ORF EPDCFH 12V ISO | S2F-20234-5 |
| C/D | H | SELECT KIT | H CONT, NO ORF EPDCFH 24V ISO | S2F-20235-5 |
| All | J | D5*/E5* | E215 controller, ENPDC, 1.5 mm orifice, 12VDC, J control only | S2F-19990-5 |
| All | J | F5*/G5* | E415 controller, ENPDC, 1.5 mm orifice, 24VDC, J control only | S2F-19991-5 |
| C/D | K | Any | K control only, SAE ports | S2F-19992-5 |
| G/H | K | Any | K control only, ISO ports | S2F-19993-5 |
| Use control modifier in unit model code to select correct control orifice kit for "C", "F", and "H" controls. | | | | |
| Please note that "C", "F", and "H" controls above do not have orifices installed. Orifices must be installed prior to installation onto unit. For more information reference product update bulletin PC-0061. | | | | |

| Control Orifice Kits | |
|----------------------|-------------|
| Description | Part Number |
| Orifice Kit, 0.6 mm | S2F-20236-5 |
| Orifice Kit, 0.7 mm | S2F-20237-5 |
| Orifice Kit, 0.8 mm | S2F-20238-5 |
| Orifice Kit, 0.9 mm | S2F-20239-5 |
| Orifice Kit, 1.0 mm | S2F-20240-5 |
| Orifice Kit, 1.2 mm | S2F-20241-5 |
| Orifice Kit, 1.5 mm | S2F-20242-5 |
| Orifice Kit, 2.0 mm | S2F-20244-5 |

Exploded View**Variable Displacement Axial
Piston Pump C055 Service Information**



Bill of Material**Variable Displacement Axial
Piston Pump C055 Service Information**

| C055 Bill of Material | | | |
|-----------------------|-------------------------------|-----|--|
| Balloon # | Description | Qty | Kit |
| 1 | Housing | 1 | Housing kit |
| 2 | Port block | 1 | Port block kit |
| 3 | Barrel | 1 | Rotating group kit |
| 4 | Pump shaft | 1 | Shaft assembly kit |
| 5 | Piston | 9 | Rotating group kit |
| 6 | Retainer | 1 | Rotating group kit |
| 7 | Ball seat | 1 | Rotating group kit |
| 8 | Spacer | 1 | Rotating group kit |
| 9 | Pin | 4 | Rotating group kit/ charge pump kit |
| 10 | Spacer | 2 | Rotating group kit |
| 11 | Spring | 1 | Rotating group kit |
| 12 | Snap ring | 1 | Rotating group kit |
| 13 | Valve plate | 1 | Valve plate kit |
| 14 | Swash plate | 1 | Swash plate kit |
| 15 | Swash plate bearing | 2 | Swash plate kit |
| 16 | Pin | 2 | Swash plate kit |
| 17 | Bottom timing spring | 1 | Swash plate kit |
| 18 | Timing pin | 1 | Swash plate kit |
| 19 | Lower cover | 1 | Housing cover kit |
| 20 | O-ring | 2 | Housing cover kit/seal kit |
| 21 | Top timing spring | 1 | Swash plate kit |
| 22 | Top timing pin | 1 | Swash plate kit |
| 23 | Feedback link | 1 | Swash plate kit |
| 24 | Seal retainer | 1 | Shaft retainer kit |
| 25 | O-ring | 1 | Shaft retainer kit |
| 26 | Shaft seal | 1 | Shaft retainer kit/seal kit |
| 27 | Bearing | 1 | Shaft assembly kit |
| 28 | Snap ring | 2 | Shaft assembly kit |
| 29 | Snap ring | 2 | Shaft assembly kit |
| 30 | Bearing | 1 | Bushing kit |
| 31 | Servo piston | 1 | Servo piston kit |
| 32 | Spring guide | 2 | Servo piston kit |
| 33 | Spring | 1 | Servo piston kit |
| 34 | Spacer | 1 | Servo piston kit |
| 35 | Spacer | 1 | Servo piston kit |
| 36 | Threaded rod | 1 | Servo piston kit |
| 37 | Snap ring | 1 | Servo piston kit |
| 38 | Seal guide | 2 | Seal kit |
| 39 | Ring seal | 2 | Seal kit |
| 40 | Nut | 2 | Servo piston kit |
| 41 | Servo cover with centering | 1 | Servo piston kit |
| 42 | Servo cover | 1 | Servo piston kit |
| 43 | O-ring | 2 | Seal kit |
| 44 | Seal nut | 1 | Servo piston kit |
| 45 | Protective cap | 1 | NO KIT |

| C055 Bill of Material | | | |
|-----------------------|---------------------|-----|--------------------------------|
| Balloon # | Description | Qty | Kit |
| 46 | O-ring | 1 | Seal kit |
| 47 | Gerotor eccentric | 1 | Charge pump kit |
| 48 | Bushing | 1 | Bushing kit |
| 49 | Bushing | 1 | Charge pump kit |
| 50 | Coupling | 1 | Charge pump kit |
| 51 | Charge spacer | 1 | Charge pump kit |
| 52 | Gerotor | 1 | Charge pump kit |
| 53 | Gerotor cap | 1 | Charge pump kit |
| 54 | Through drive cover | 1 | Through drive kit |
| 55 | Cross port relief | 2 | Relief assembly kit |
| 56 | Socket head screw | 16 | Servo piston/housing cover kit |
| 57 | Socket head screw | 8 | Housing kit |
| 58 | Name plate | 1 | NO KIT |
| 59 | Rotation plate | 1 | NO KIT |
| 60 | Rivets | 4 | NO KIT |
| 61 | Socket head plug | 1 | Housing kit |
| 62 | Plastic cover | 2 | NO KIT |
| 63 | Plastic plug | 1 | NO KIT |
| 64 | O-ring | 1 | Seal kit |
| 65 | Guide ring | 2 | Housing kit |
| 66 | Pin | 1 | Valve plate kit |
| 67 | Lifting eye | 1 | Housing kit |
| 68 | Expansion plug | 1 | Port block kit |
| 69 | Charge relief | 1 | Charge relief kit |
| 70 | Shuttle valve | 1 | Port block kit |
| 71 | Valve body | 1 | Pressure override kit |
| 72 | Valve plug | 1 | Pressure override kit |
| 73 | Valve spool | 1 | Pressure override kit |
| 74 | Valve pin | 1 | Pressure override kit |
| 75 | Spacer | 1 | Pressure override kit |
| 76 | Spring | 1 | Pressure override kit |
| 77 | O-ring | 1 | Pressure override kit |
| 78 | Cap | 1 | Pressure override kit |
| 79 | O-ring | 1 | Pressure override kit |
| 80 | Hex nut | 1 | Pressure override kit |
| 81 | Setting screw | 1 | Pressure override kit |
| 82 | Orifice | 1 | Port block kit |
| 83 | Socket head screw | 1 | Through drive kit |
| 84 | Socket head screw | 2 | Port block kit |
| 85 | Socket head plug | 2 | Port block kit |
| 86 | Charge pump key | 1 | Charge pump kit |
| 87 | Socket head plug | 2 | Housing kit |
| 88 | Filter screen | 3 | Housing kit |
| 89 | Snap ring | 2 | Housing kit |
| 90 | Socket head screw | 6 | Charge pump kit |

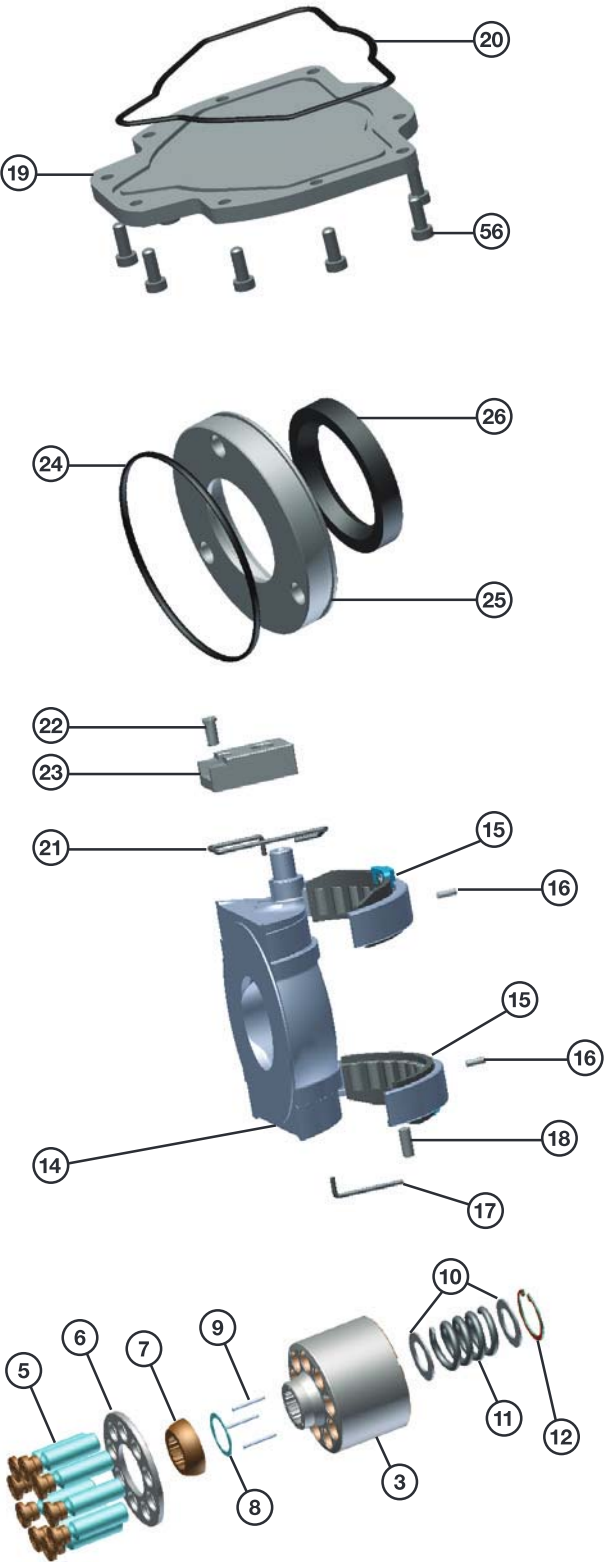
| Seal Kit | |
|---------------------------------|-------------|
| Contains all seals for the pump | S2F-20414-5 |

| Housing Cover Kit | |
|-------------------|-------------|
| Part number | S2F-20413-5 |

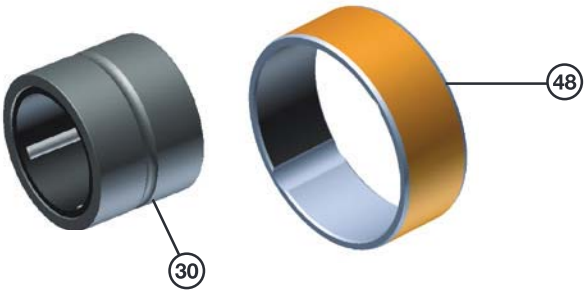
| Seal Retainer Kit | |
|-------------------|-------------|
| Part number | S2F-20386-5 |

| Swashplate Kit | |
|----------------|-------------|
| Part number | S2F-20412-5 |

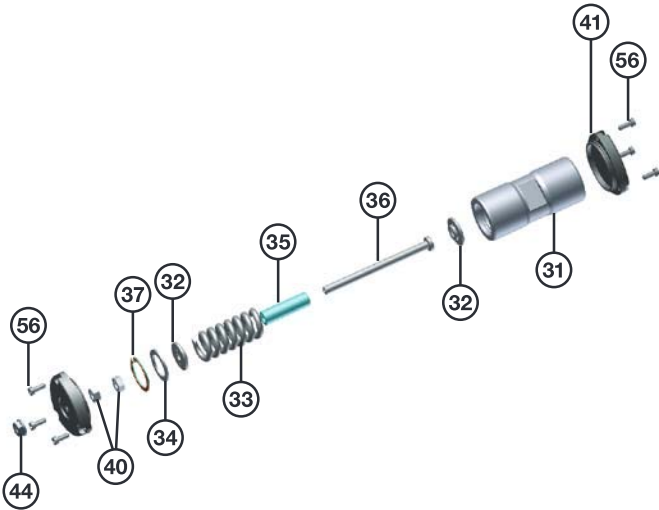
| Rotating Group Kit | |
|--------------------|-------------|
| Part number | S2F-20389-5 |



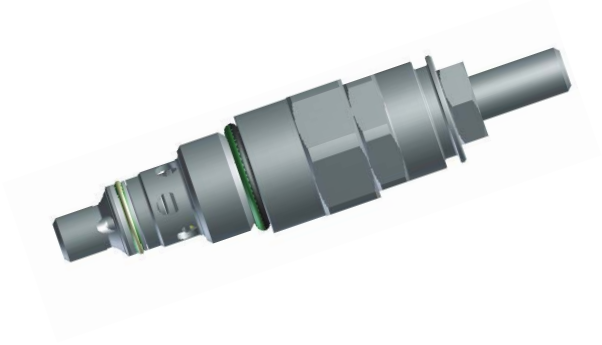
| Bushings Kit | |
|--------------|-------------|
| Part number | S2F-20400-5 |



| Servo Piston Kit | |
|------------------|-------------|
| Part number | S2F-20411-5 |



| Charge Pressure Relief Kit | |
|----------------------------|-------------|
| Part number | S2F-20397-5 |



| Pressure Override Kit | |
|-----------------------|-------------|
| Part number | S2F-20392-5 |

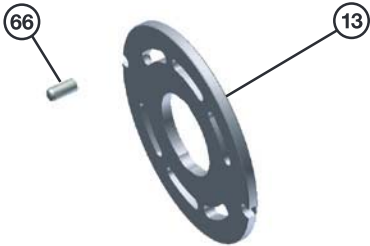
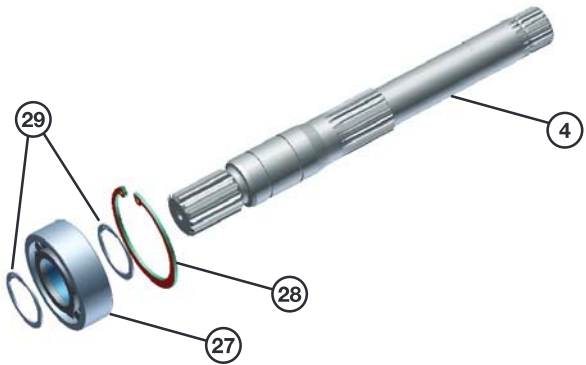
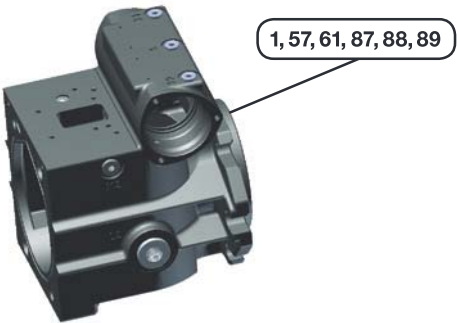


| Cross Port Relief Kits | |
|------------------------|-------------|
| Relief Option | Part Number |
| A | S2F-20393-5 |
| B | S2F-20394-5 |
| C | S2F-20395-5 |
| D | S2F-20396-5 |

| Housing Kit | | |
|-------------|---------------------------------|-------------|
| Mount | Description | Part Number |
| C | C055 SAE C 2/4 bolt MT SAE port | S2F-20387-5 |
| G | C055 SAE C 2/4 bolt MT ISO port | S2F-20388-5 |

| Shaft Assembly Kit | | |
|--------------------|------------------------------|-------------|
| Shaft Option | Description | Part Number |
| 1 | Kit shaft SAE C 14T SPL C055 | S2F-20384-5 |
| 2 | Kit shaft SAE 21T 16/32 C055 | S2F-20385-5 |

| Valve Plate Kit | | |
|-----------------|---------------------------|-------------|
| Rotation | Description | Part Number |
| R | Kit, CW valve plate C055 | S2F-20390-5 |
| L | Kit, CCW valve plate C055 | S2F-20391-5 |

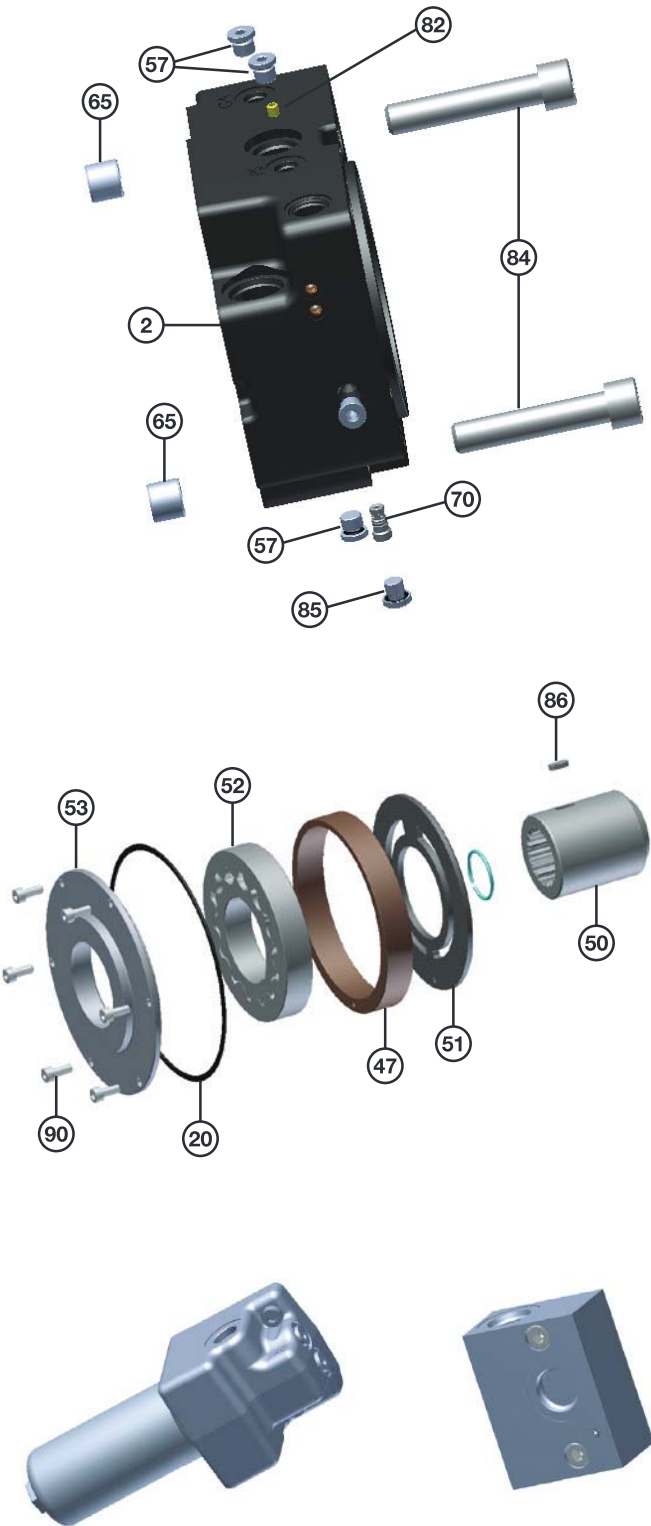


| Port Block Kit | | |
|----------------|---------------------------|-------------|
| Mount | Description | Part Number |
| C | Kit, port block, SAE C055 | S2F-20398-5 |
| G | Kit, port block, ISO C055 | S2F-20399-5 |

| Through Drive Kit | | |
|----------------------|-----------------------------------|-------------|
| Through Drive Option | Description | Part Number |
| X | Kit, through drive, blanking C055 | S2F-20405-5 |
| A | Kit, SAE A through drive C055 | S2F-20406-5 |
| B | Kit, SAE B through drive C055 | S2F-20407-5 |
| G | Kit, SAE B-B through drive C055 | S2F-20408-5 |
| C | Kit, SAE C through drive C055 | S2F-20409-5 |
| H | Kit, SAE C-C through drive C055 | S2F-20410-5 |

| Charge Pump Kit | | |
|--------------------|--------------------------------|-------------|
| Charge Pump Option | Description | Part Number |
| A | Kit, 18CC charge pump C055 | S2F-20403-5 |
| D | Kit, 11CC charge pump C055 | S2F-20401-5 |
| E | Kit, 14CC charge pump C055 | S2F-20402-5 |
| X | Kit, charge pump blanking C055 | S2F-20404-5 |

| Charge Filter Kit | | |
|--------------------|--|-------------|
| Charge Pump Option | Description | Part Number |
| X | No charge filter | |
| N | Charge filter with mechanical 8 bar indicator C055 | S2F-20444-5 |
| G | Charge filter with electrical 8 bar indicator C055 | S2F-20445-5 |
| R | Remote charge filter block C055 | S2F-20446-5 |
| | Charge filter element | S2F-20440-5 |



Introduction

Before removing the pump you need to take all the precautions necessary to ensure safety. Stop the machine. Check that the system is not under pressure. Discharge or disconnect accumulators. Verify that there are no suspended loads connected to the machine.

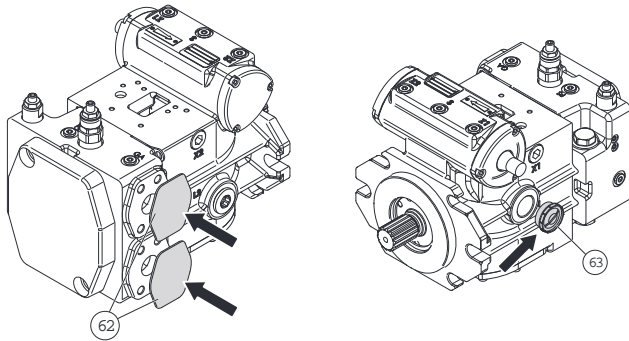
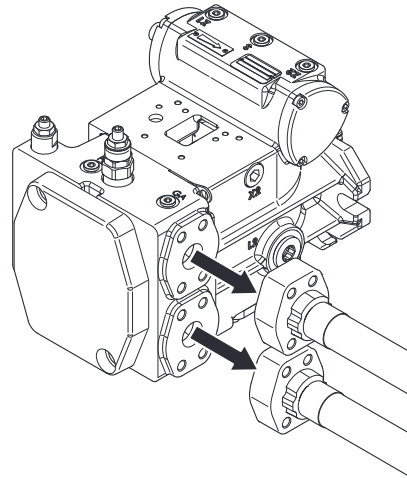
Before disconnecting the various pipes or hoses, clean the pump to avoid the accidental ingress of dirt. If there are electrical connections, check that they are not under tension.

Remove the pressure, case drain and pilot lines and any electrical connections.



CAUTION:

The hydraulic circuit and the pump may be hot! Start the disassembly operations only after cooling.

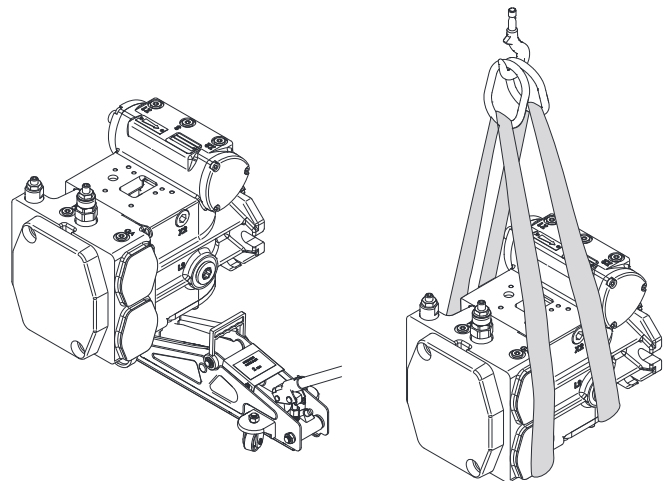


After removing the hoses, apply protections at all open ports to prevent the ingress of foreign bodies.

Move the pump by the means of lifting straps, eye bolts or, if not possible, lift it with a hydraulic trolley jack.



Make sure you apply the straps firmly to the pump before you move it to prevent an accidental fall and damage of objects and/or injury to persons. If you use a jack, make sure the pump is securely resting on the plate.



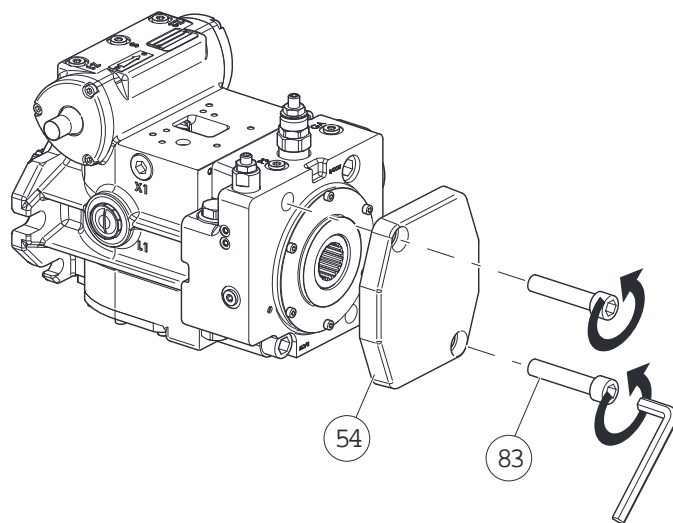


Figure 1

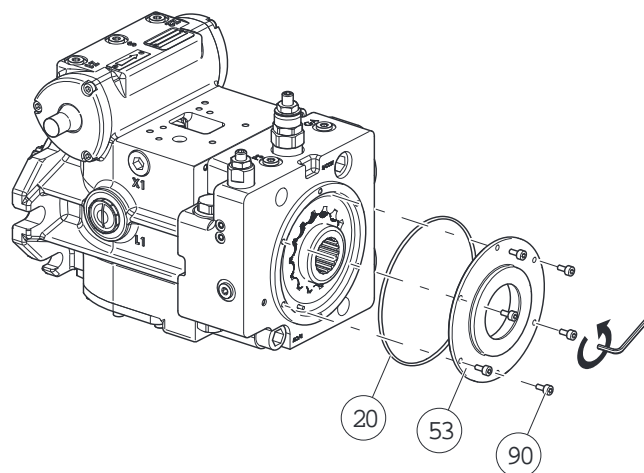


Figure 2

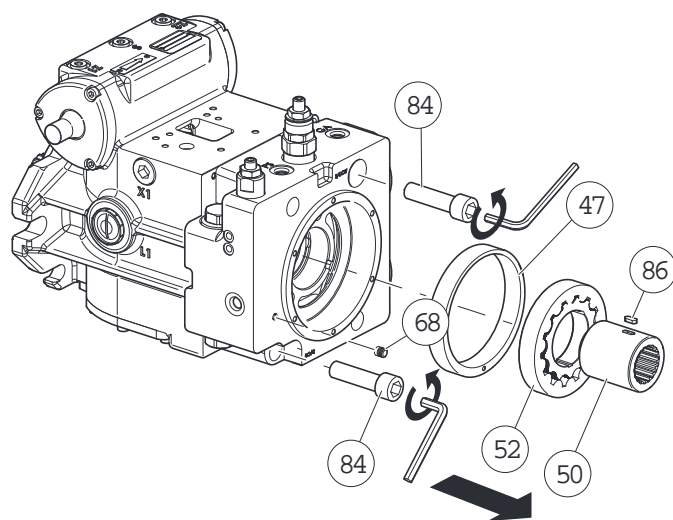


Figure 3

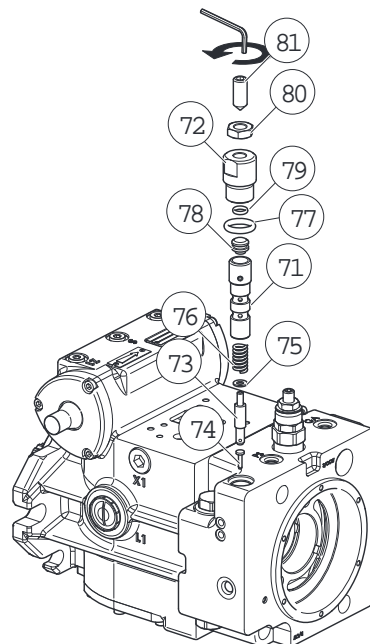


Figure 4

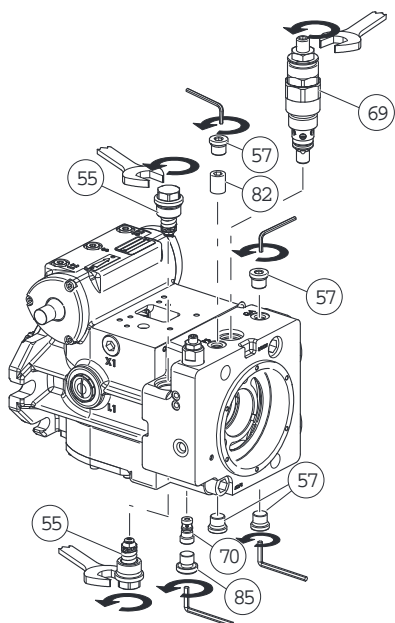


Figure 5

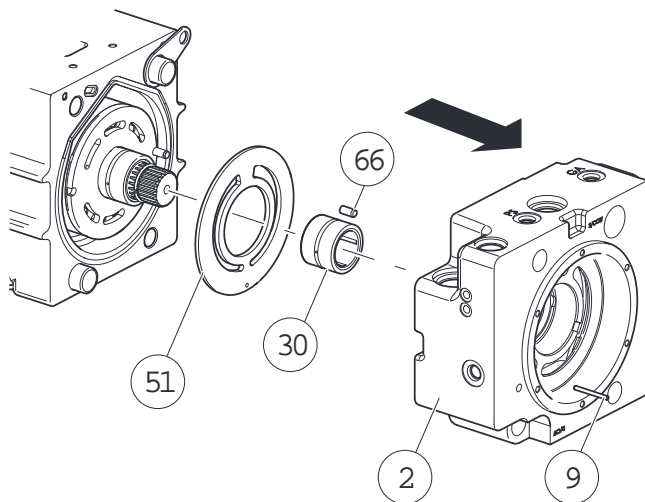


Figure 6

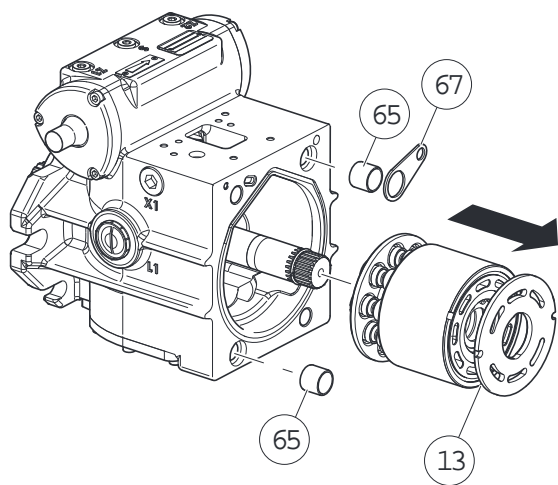


Figure 7

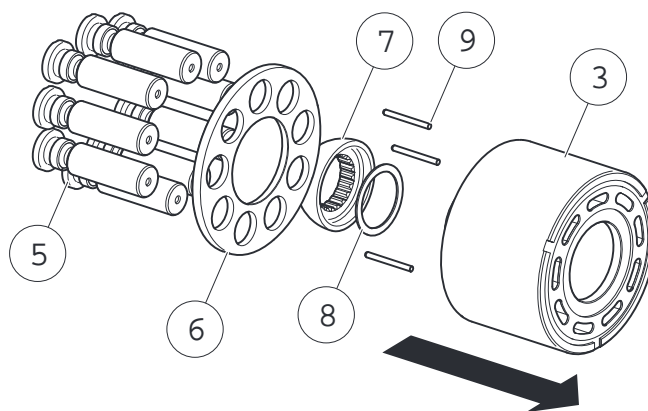
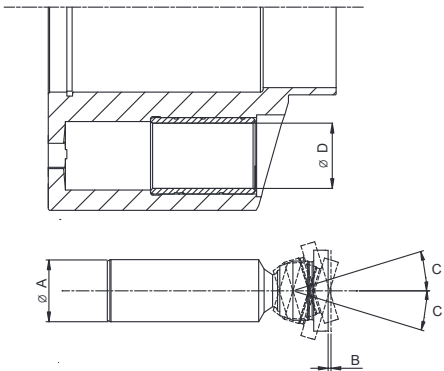


Figure 8



Handle with care to avoid damage.
Check clearances and diameters of the
components as shown in the table in *Figure 9*.



| Piston Diameter A (Mm) | Piston-Slider Axial End Float B (Mm) | Slider Rotation (Max.) C (°) | Piston Bore Diameter D (Mm) |
|------------------------|--------------------------------------|------------------------------|-----------------------------|
| Ø18 0.015/-0.010 | 0.05-0.10 | 17 | Ø18 +0.02/+0.035 |

Figure 9

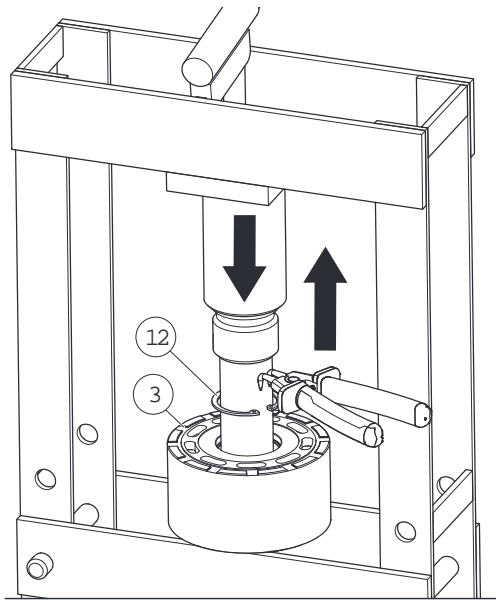
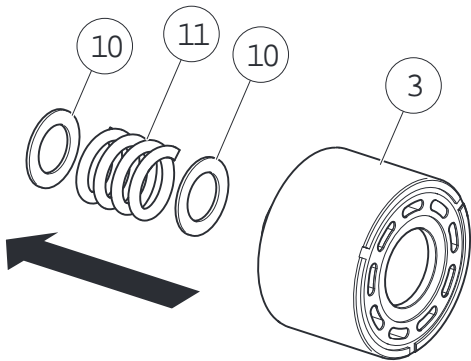


Figure 10



Compress the internal spring of the rotating unit (3) with a press so that the snap ring (12) can be removed.



WARNING:
The kit is subject to elastic load. Do not remove the snap ring before compressing the spring.

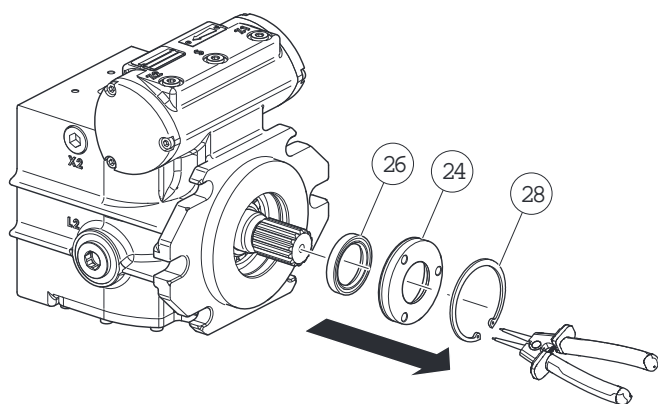
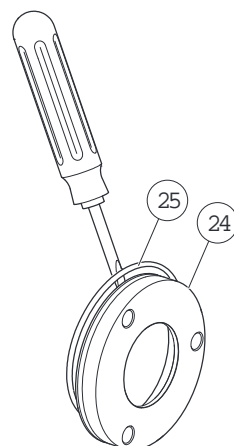


Figure 11



Remove the O-ring (25), taking care not to damage it with sharp or pointed tools.

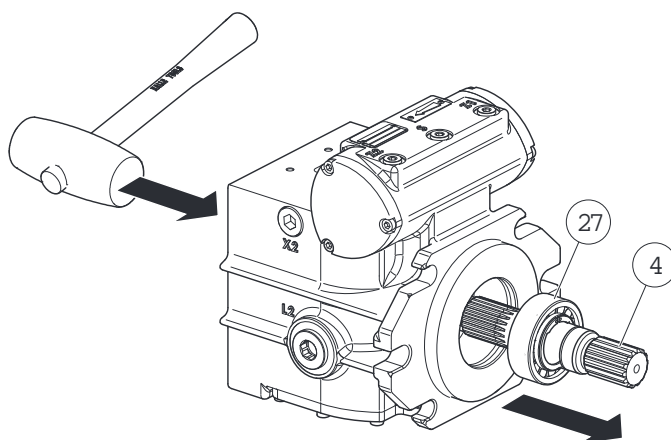


Figure 12

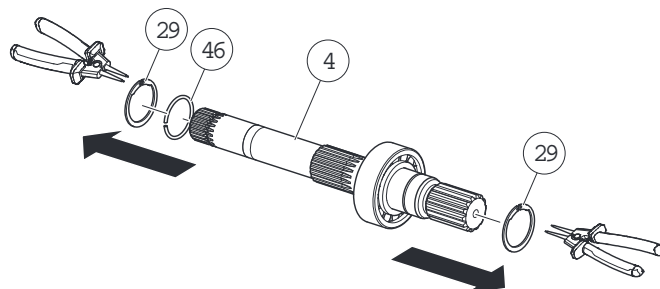
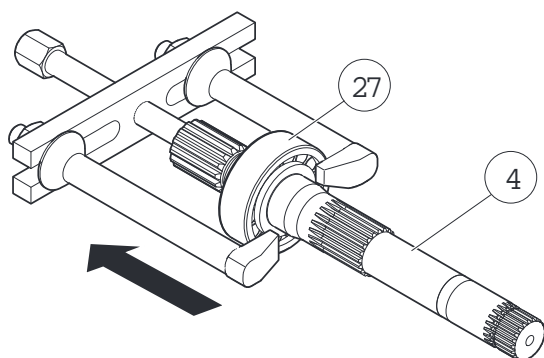


Figure 13



Remove the shaft, using a rubber mallet, gently tapping on the back end.



Remove the bearing with a puller.

Figure 14

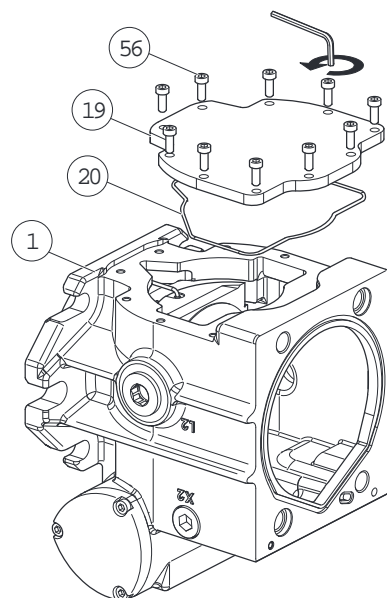


Figure 15

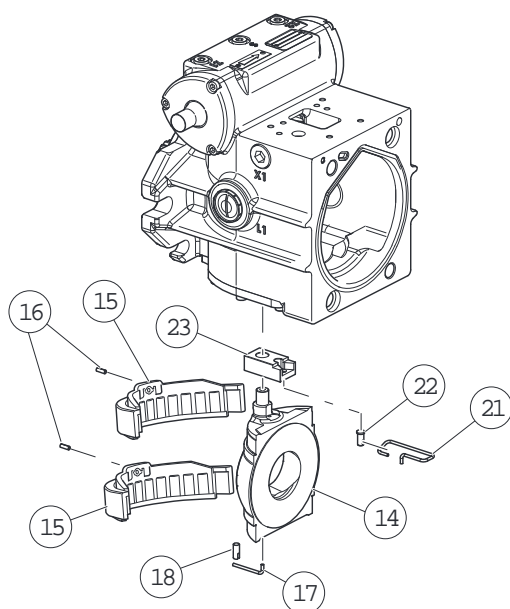


Figure 16

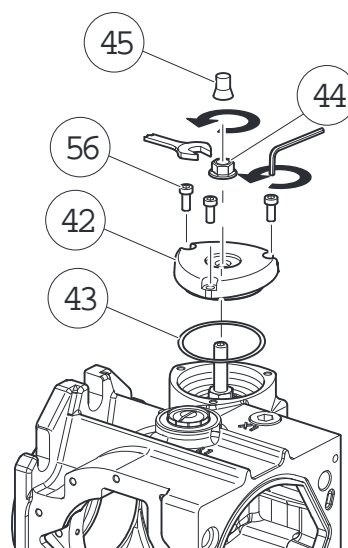


Figure 17

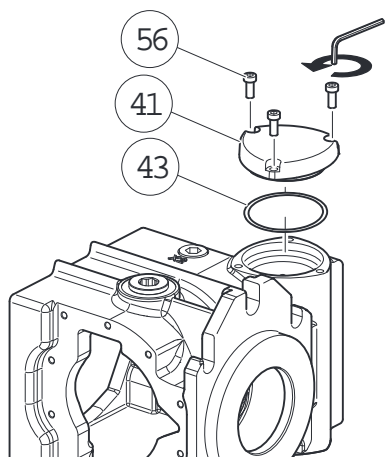


Figure 18

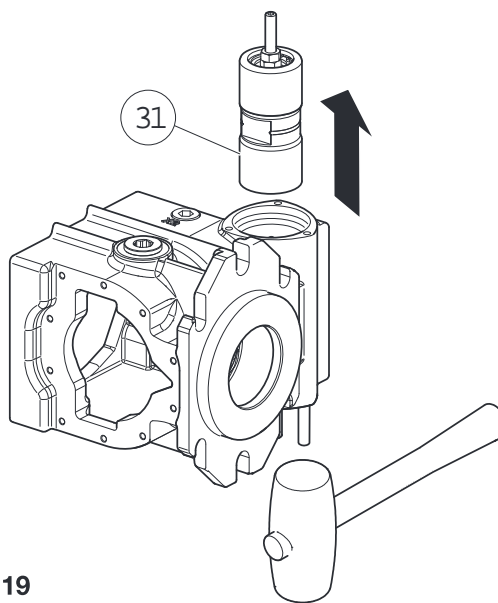


Figure 19

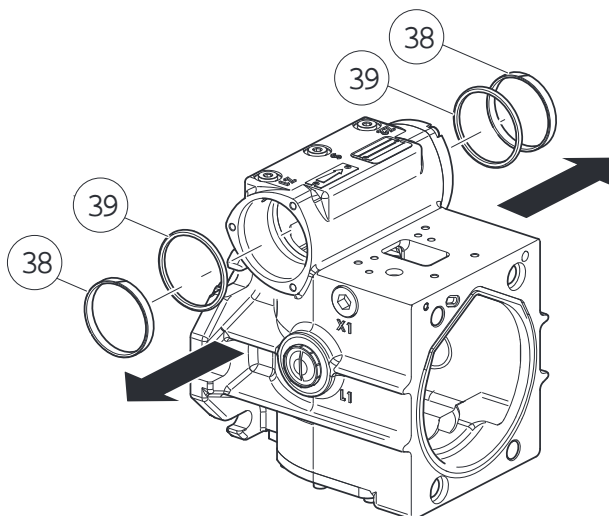


Figure 20

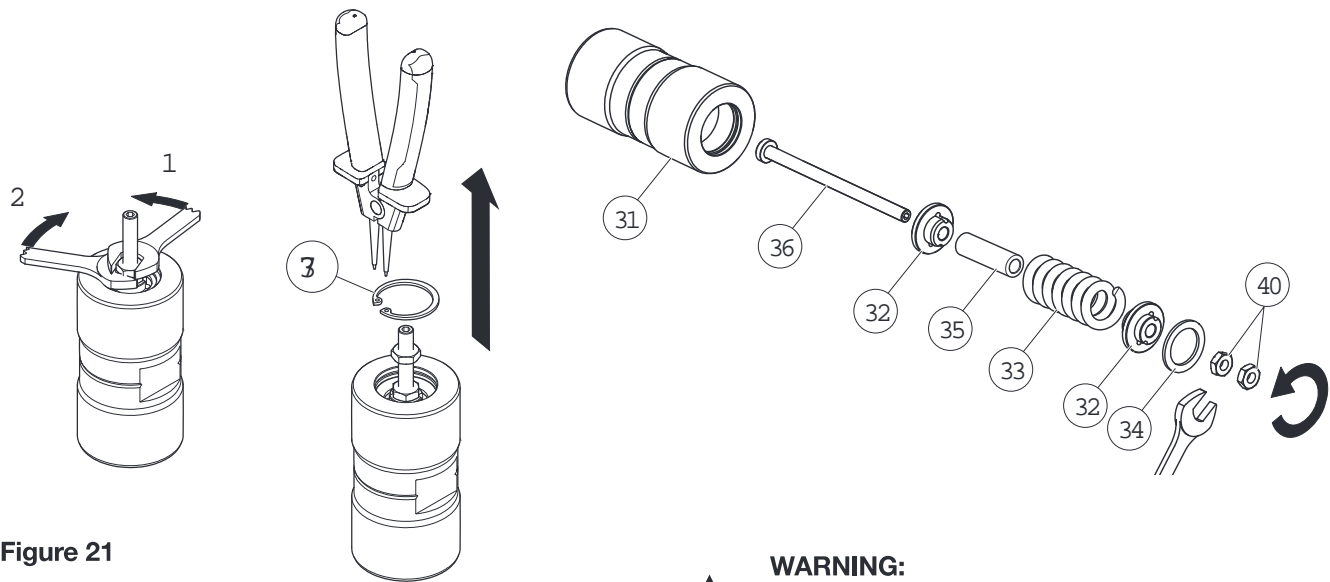


Figure 21



WARNING:
Assembly subjected to elastic load.
Never remove the snap ring (37)
before you compress the spring (33)
by tightening the nut (40).

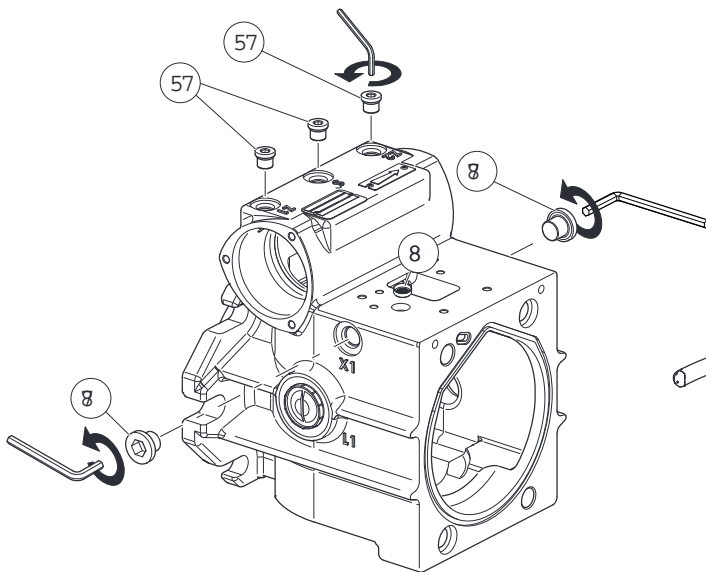


Figure 22

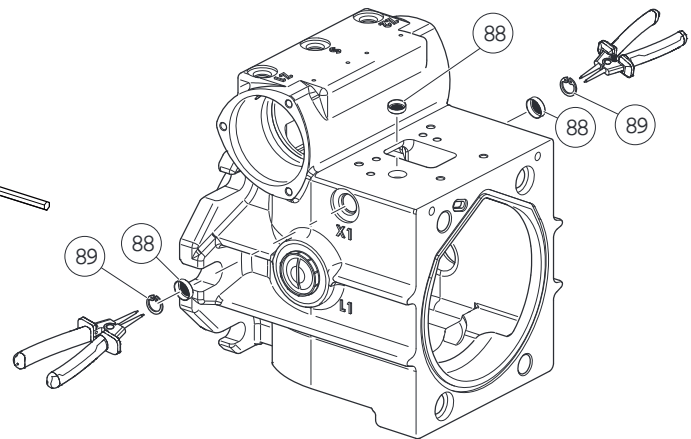


Figure 23



Check the condition and cleanliness of the
filter (88).

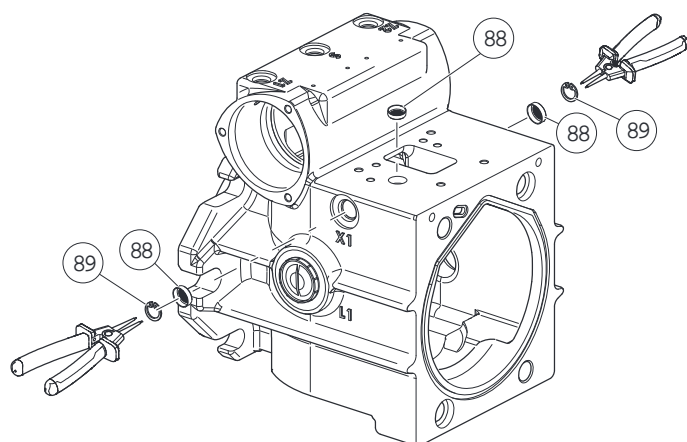


Figure 30

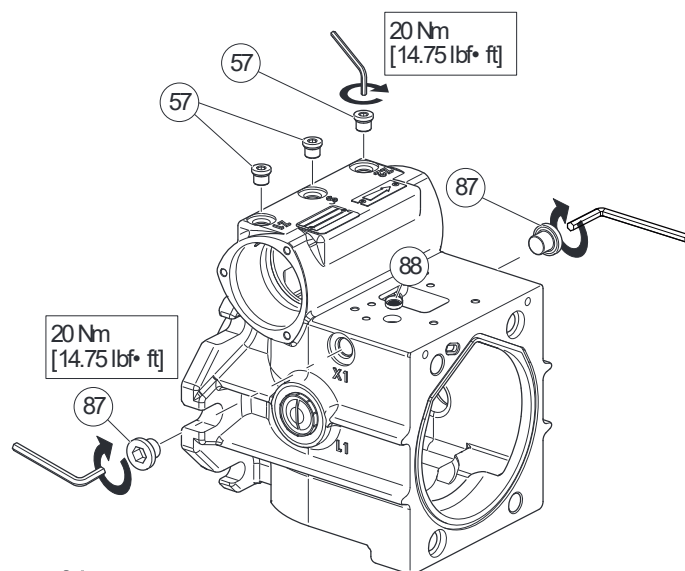


Figure 31

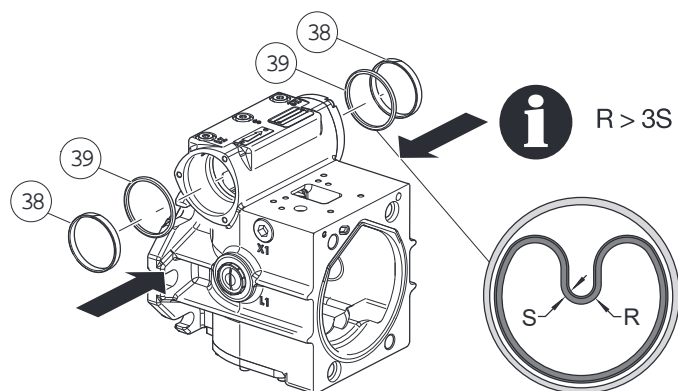


Figure 32

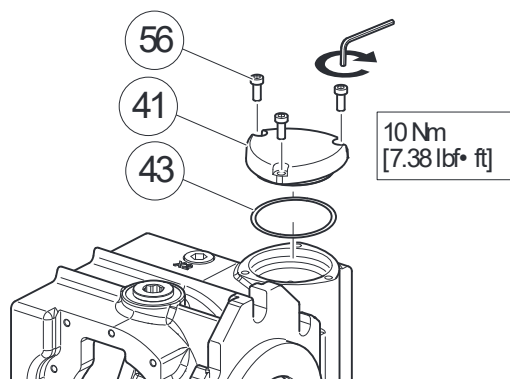


Figure 33

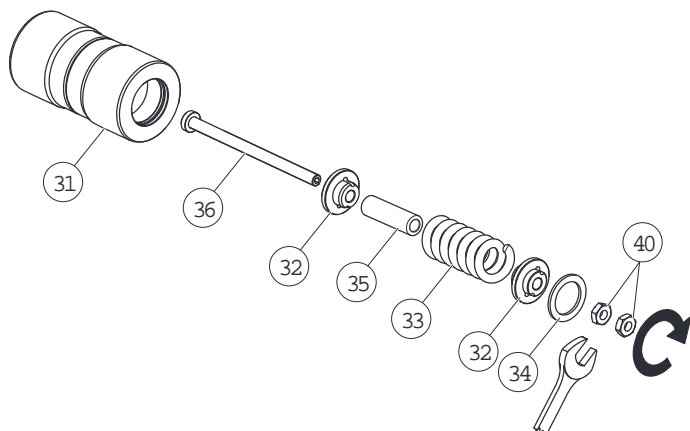


Figure 34

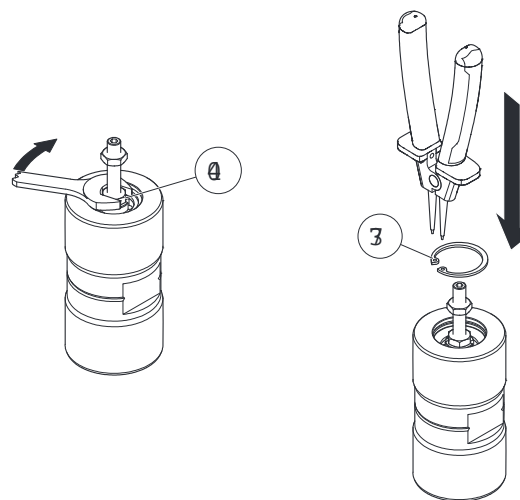


Figure 35

Screw the nut (40) until the seat of the snap ring is completely visible.

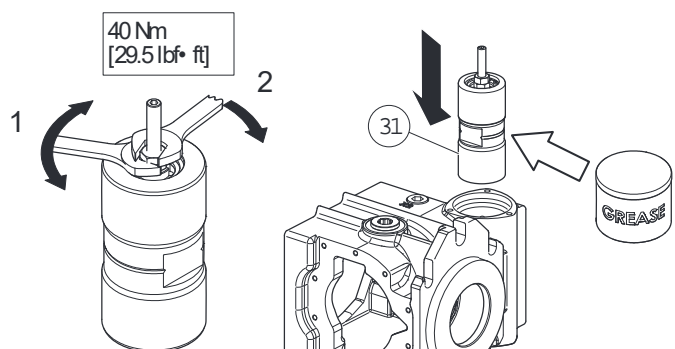


Figure 36

Adjustment of the lock nuts: act on the first of the two nuts (40) so as to eliminate all axial float between the various components, then tighten the second lock nut. Insert the piston into the pump housing. Place the milling plane of the piston facing the lower side of the body and as much as possible aligned with respect to the axis. Check the piston is free to move with only the friction due to the seals.

**WARNING:**

When inserting the piston, one can gently tap on the end by the means of a plastic hammer. Do not use steel hammers.

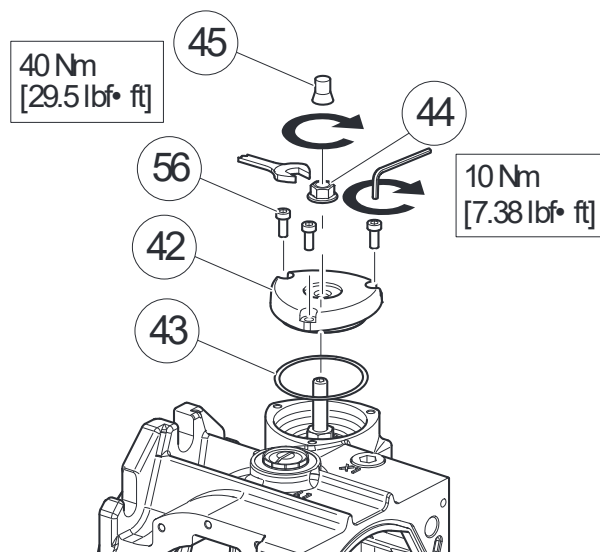


Figure 37

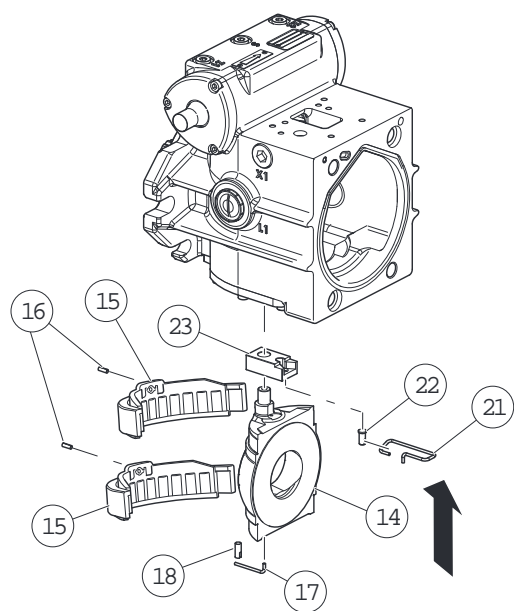


Figure 38

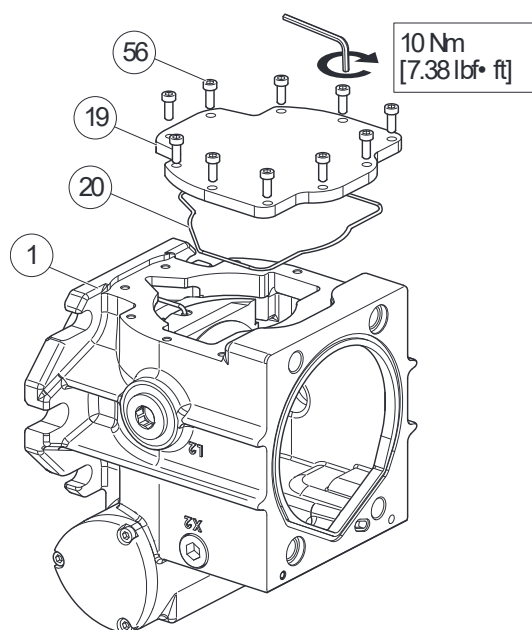


Figure 39

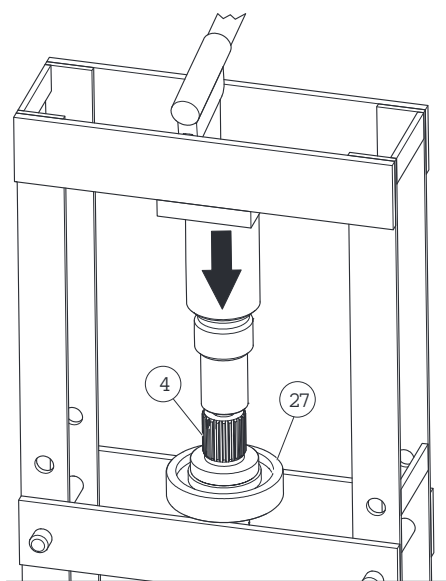


Figure 40

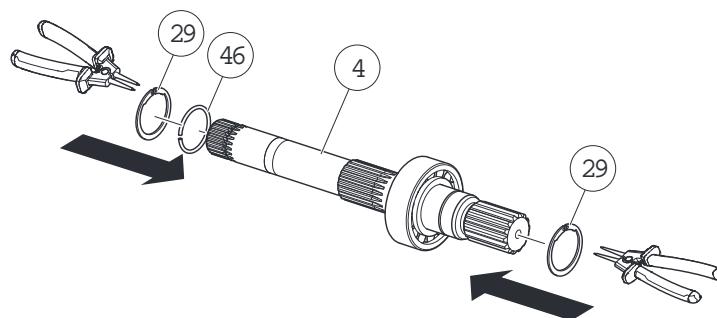


Figure 41

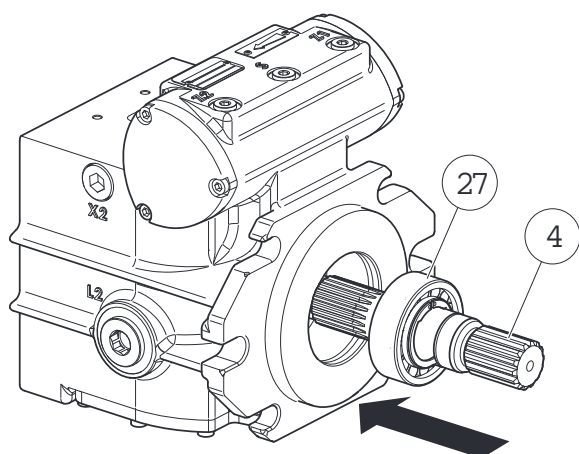


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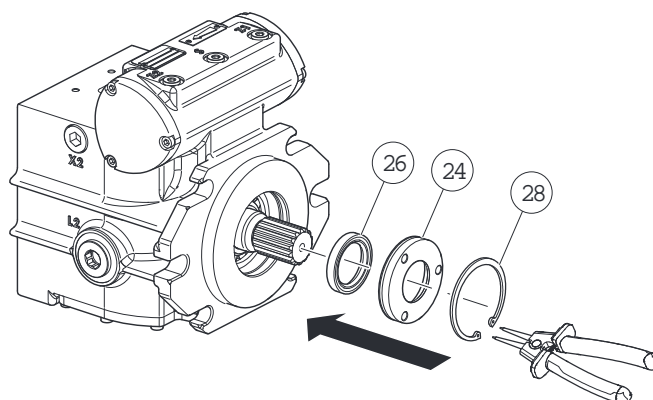


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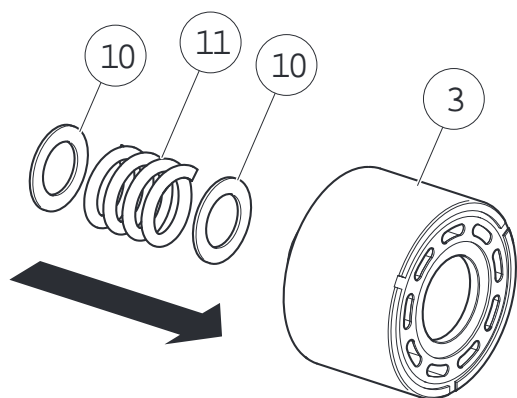


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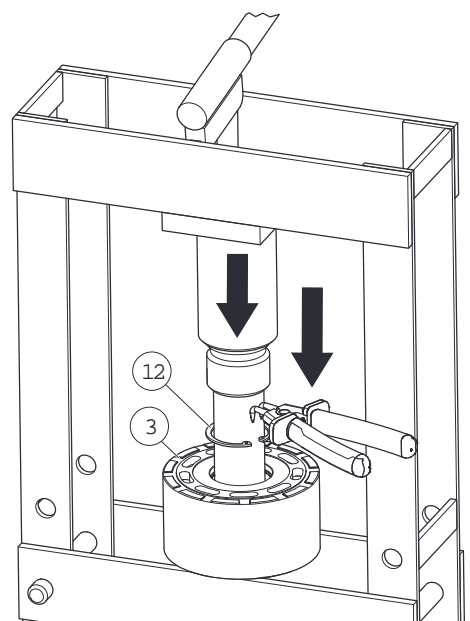


Figure 45

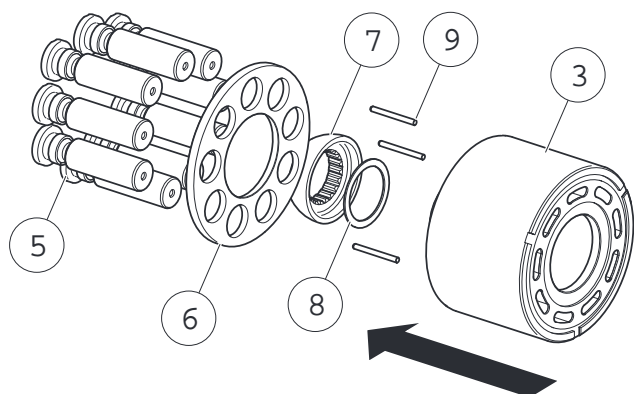


Figure 46

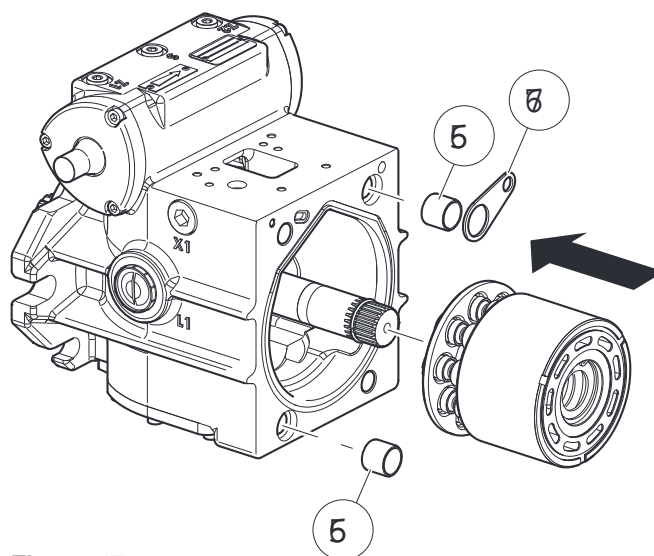


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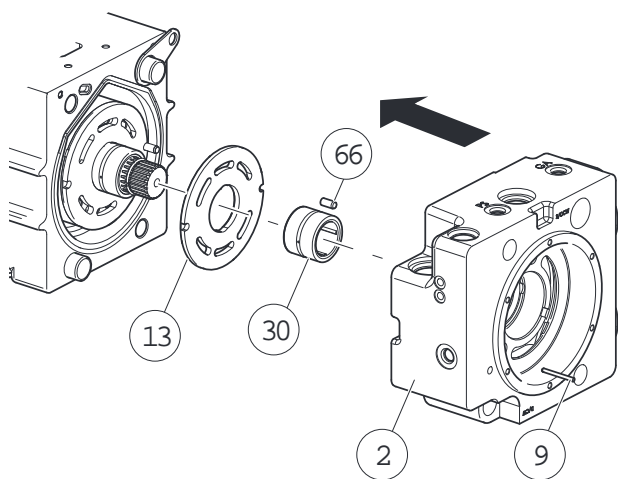


Figure 48

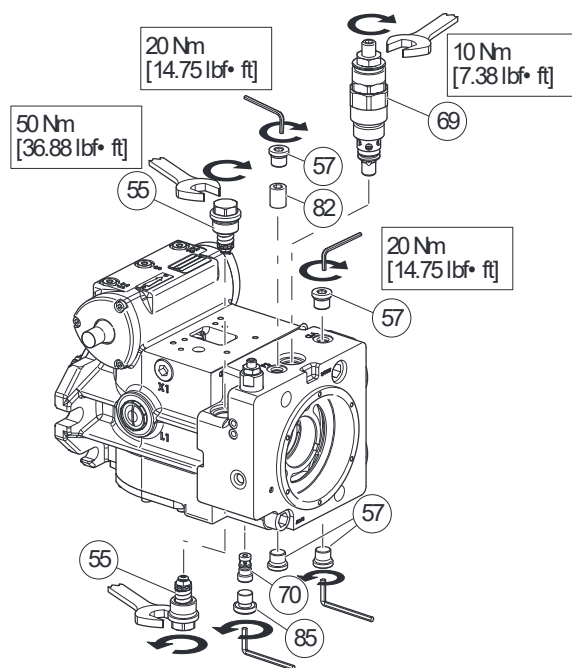


Figure 49

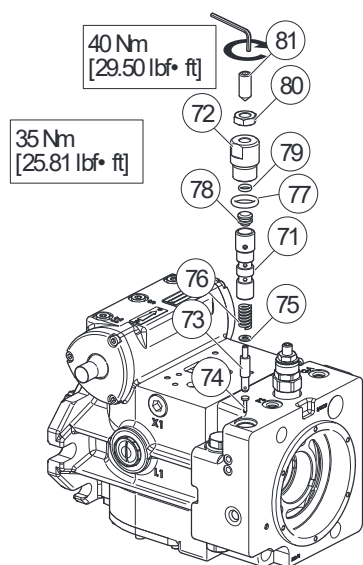


Figure 50

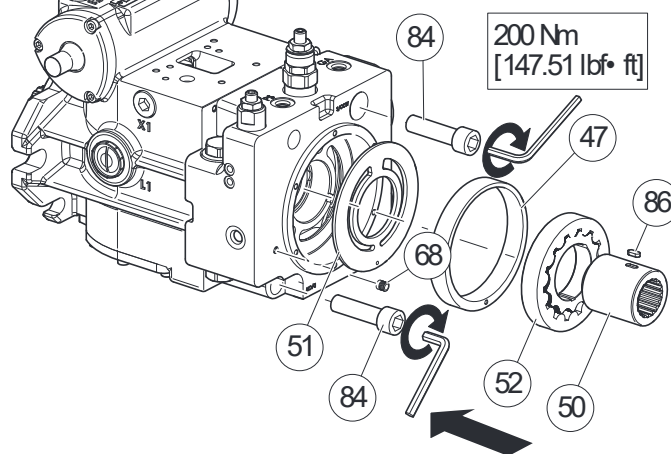


Figure 51

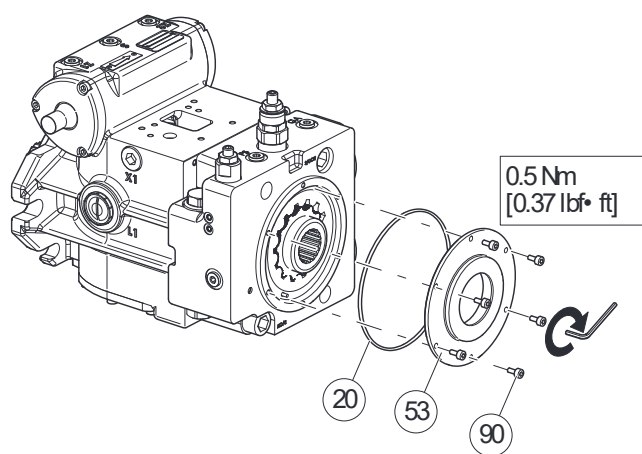


Figure 52

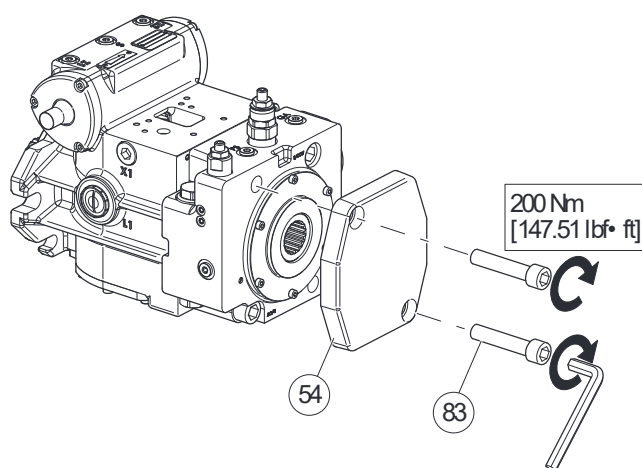


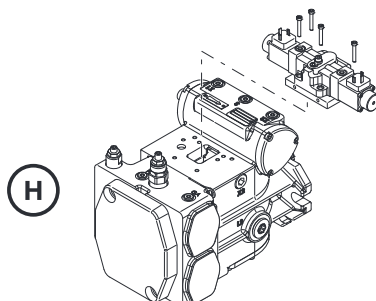
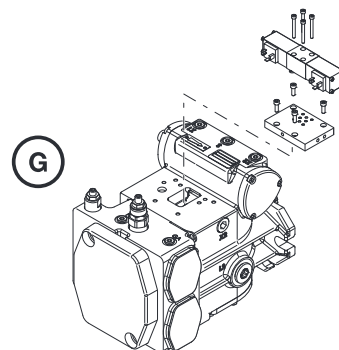
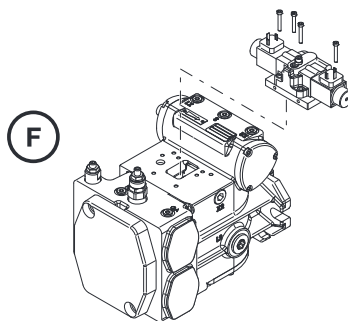
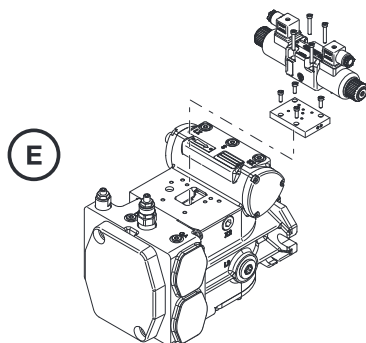
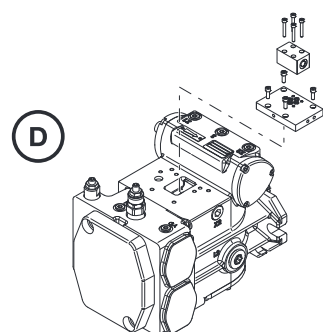
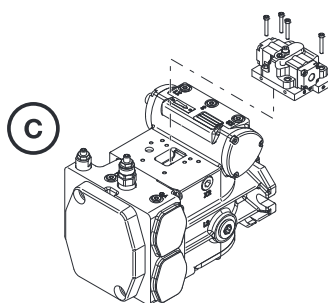
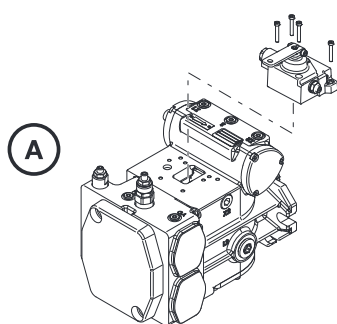
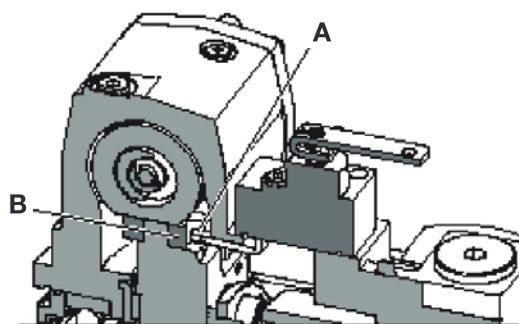
Figure 53

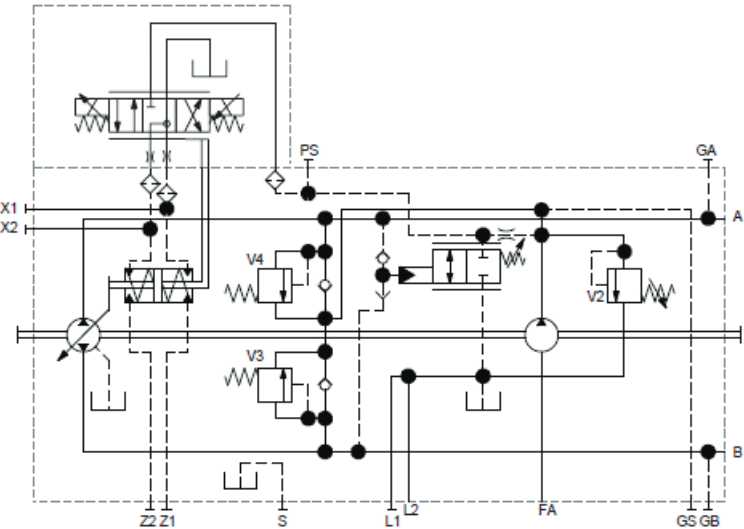
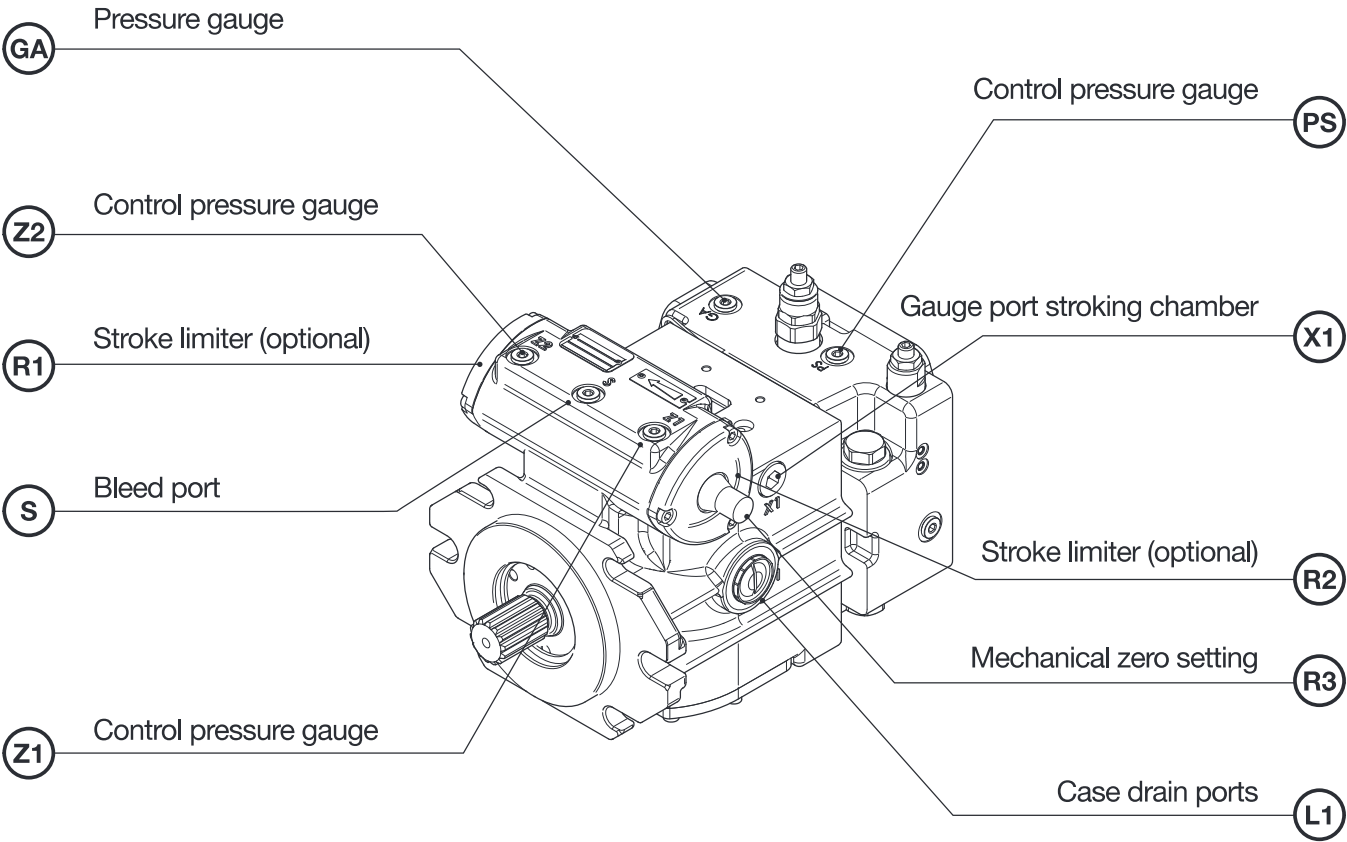
Controls Assembly



For mounting of controls with feedback (A-C-F-H)

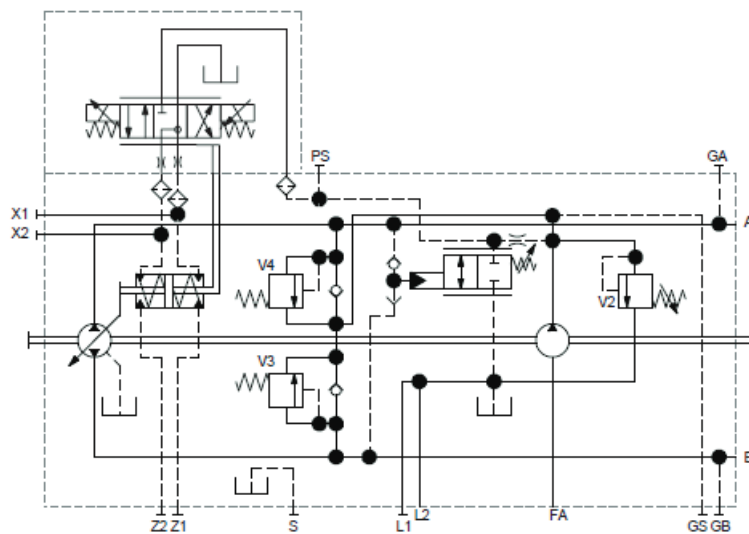
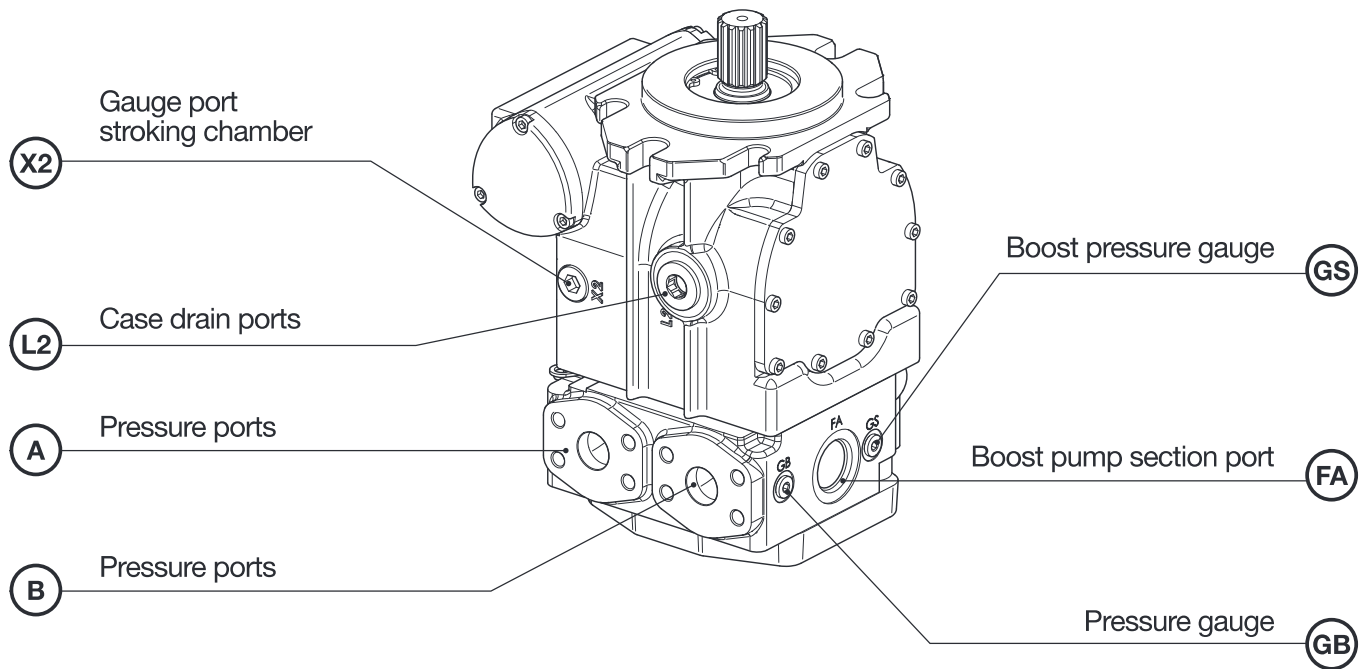
During assembly, pay attention that the lever (A) of the kit is correctly inserted into the slot of the shoe (B) of the control piston. In the body there is a groove that serves as a guide for easier insertion.





| C055 Port Sizes | | |
|-----------------|----------------|----------------|
| Port | Mount C | Mount G |
| A | 1" SAE Code 62 | 1" SAE Code 62 |
| B | 1" SAE Code 62 | 1" SAE Code 62 |
| L1 | -12 SAE ORB | 3/4" G |
| L2 | -12 SAE ORB | 3/4" G |
| FA | -16 SAE ORB | 1" G |
| GA | -4 SAE ORB | 1/4" G |
| GB | -4 SAE ORB | 1/4" G |
| GS | -4 SAE ORB | 1/4" G |
| PS | -4 SAE ORB | 1/4" G |
| S | -4 SAE ORB | 1/4" G |
| X1 | -6 SAE ORB | 3/8" G |
| X2 | -6 SAE ORB | 3/8" G |
| Z1 | -4 SAE ORB | 1/4" G |
| Z2 | -4 SAE ORB | 1/4" G |

Schematic shown is a C055 with "F" control and pressure override.



| C055 Port Sizes | | |
|-----------------|----------------|----------------|
| Port | Mount C | Mount G |
| A | 1" SAE Code 62 | 1" SAE Code 62 |
| B | 1" SAE Code 62 | 1" SAE Code 62 |
| L1 | -12 SAE ORB | 3/4" G |
| L2 | -12 SAE ORB | 3/4" G |
| FA | -16 SAE ORB | 1" G |
| GA | -4 SAE ORB | 1/4" G |
| GB | -4 SAE ORB | 1/4" G |
| GS | -4 SAE ORB | 1/4" G |
| PS | -4 SAE ORB | 1/4" G |
| S | -4 SAE ORB | 1/4" G |
| X1 | -6 SAE ORB | 3/8" G |
| X2 | -6 SAE ORB | 3/8" G |
| Z1 | -4 SAE ORB | 1/4" G |
| Z2 | -4 SAE ORB | 1/4" G |

Schematic shown is a C055 with "F" control and pressure override.

Suggested Gauges

Z1 & Z2 = 0-25 bar (0-365 PSI)
GS = 0-60 bar (0-870 PSI)
GA & GB = 0-600 bar (0-8700 PSI)

Setting Charge Pressure Relief Valve (V2)

Insert 60 bar (870 PSI) pressure gauge into port GS. Check to ensure test stand and pump input rotations are correct and bring prime mover up to 1000 RPM, run until oil temperatures are greater than 68°F (20°C). Loosen charge relief lock nut and adjust CW to increase pressure setting or counter clockwise to reduce pressure setting. Once completed tighten lock nut to 11 ft-lb (15 N-m).

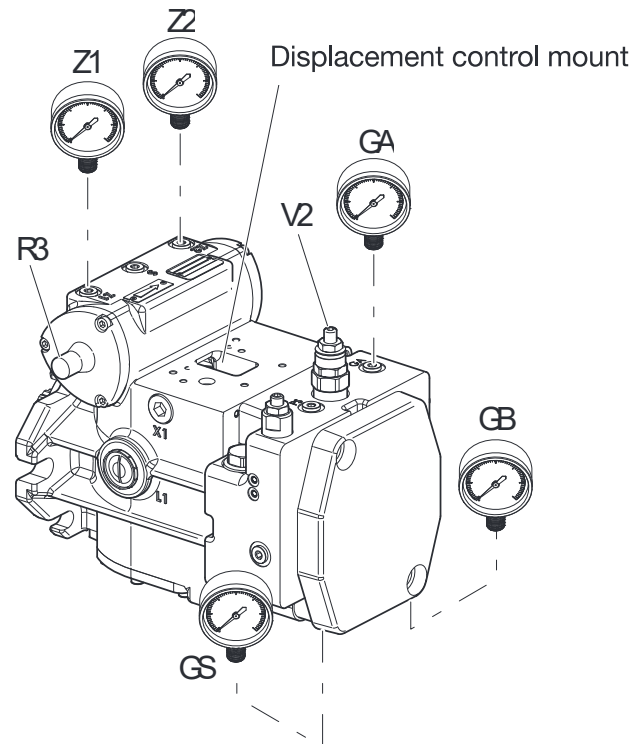
Centering of the Pump Servo Piston

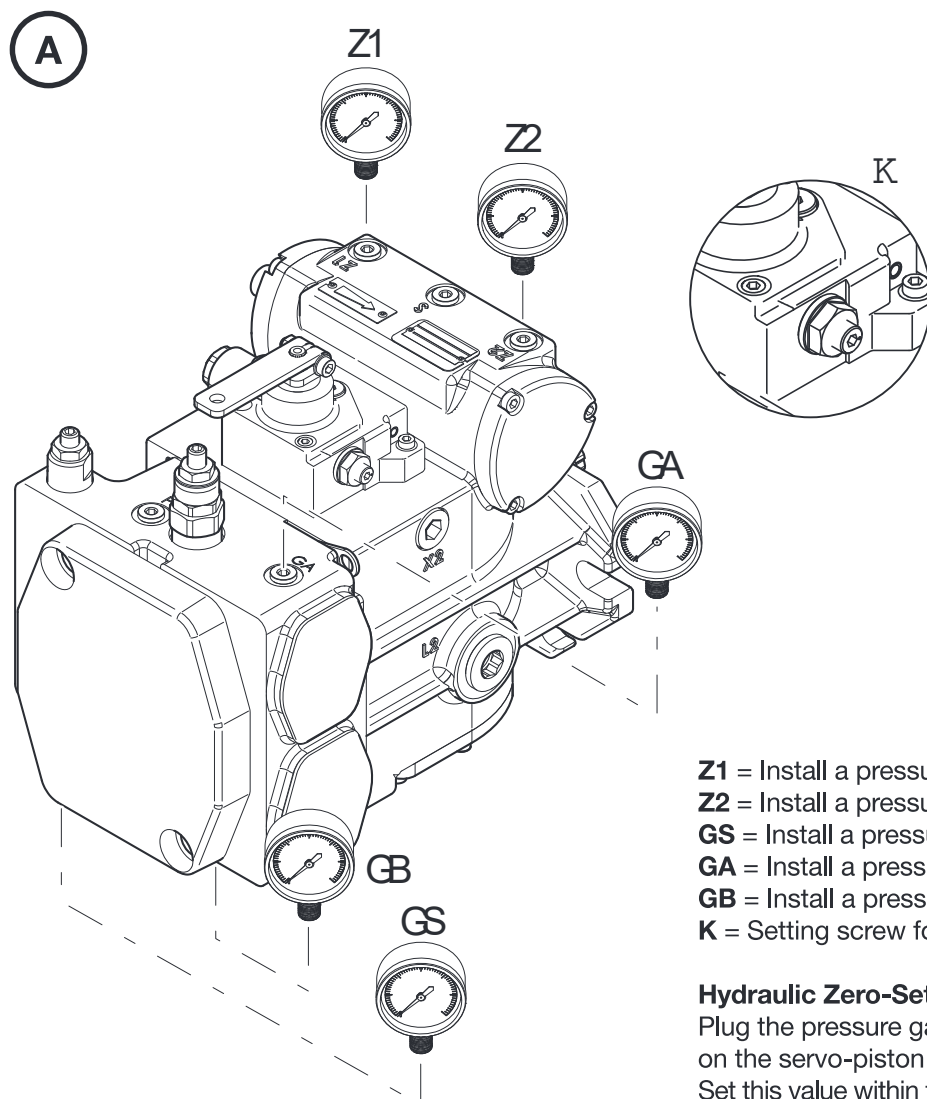
Insert gauges into ports GA and GB, ensure test stand rotation and pump rotation are the same and bring prime mover up to operating speed. Observing GA and GB you will notice one pressure being higher than the other. Rotate R3 until pressures on both gauges equalize and note the position of the wrench at this point. Continue rotating until pressure rises on the opposite gauge, reverse rotation on the adjustment until the pressure is equal on both ports and note the wrench position. Adjust the R3 adjustment to the midpoint between the two noted positions and tighten lock nut to 29 ft-lb (40 N-m).

Setting Mechanical Pressure Override (Override Option P)

Insert gauges into ports GA and GB. Ensure test stand and pump rotations are correct and bring unit up to operating speed.

Loosen POR valve lock nut and operate control to 30-40% of maximum flow. Slowly increase load until POR value activates. Adjust POR valve adjustment CW to increase setting and CCW to reduce setting. Tighten lock nut to 29 ft-lb (40 N-m). Reduce load to ensure pump flow is returned to the circuit and then increase load until POR activates and ensure setting has not changed. Run for 10-15 seconds to ensure no pressure oscillations are occurring when POR is active. Repeat test in opposite flow directions to ensure setting is unchanged.



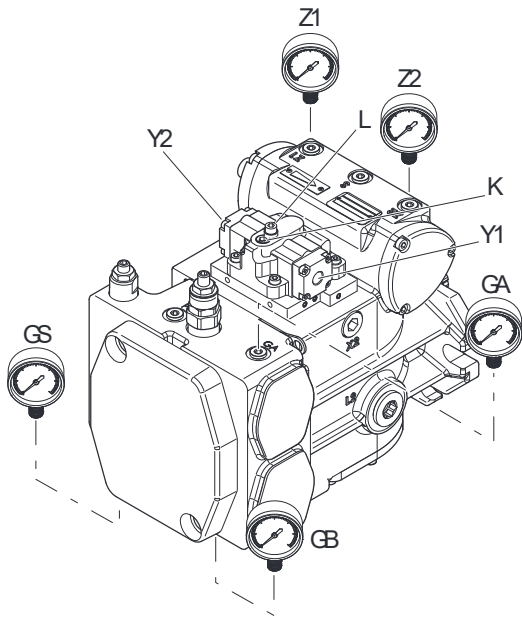


- Z1** = Install a pressure gauge 0 ÷ 25 bar
- Z2** = Install a pressure gauge 0 ÷ 25 bar
- GS** = Install a pressure gauge 0 ÷ 60 bar
- GA** = Install a pressure gauge 0 ÷ 600 bar
- GB** = Install a pressure gauge 0 ÷ 600 bar
- K** = Setting screw for zero setting

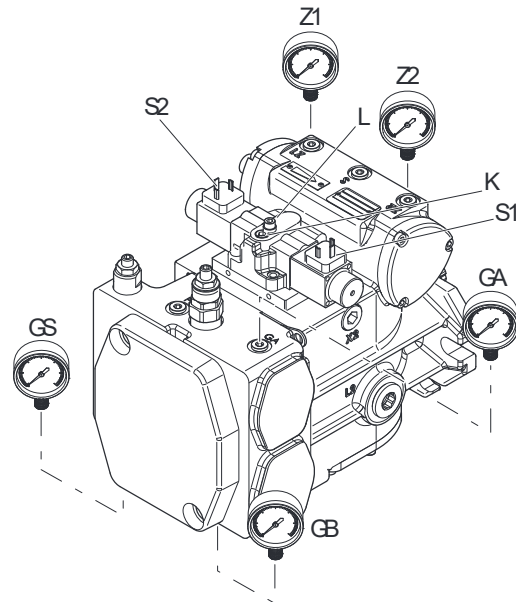
Hydraulic Zero-Setting of the A Control

Plug the pressure gauges Z1-Z2 and check the pressure on the servo-piston sides: max Δp accepted = 1 bar. Set this value within this range adjusting the screw (K). At the rotation speed of normal use, swivel the pump to maximum displacement, via the control lever, then suddenly release the said lever. The pump must swivel back to zero flow within two seconds. Repeat the procedure for both flow directions. There must be no significant difference between the two flow directions (equal pressure on GA and BG, max 2-3 bar differential). If this should occur, act on the control hydraulic zero-setting, until the proper control operation is achieved.

Check the control operation repeating procedure as described above in both the flow directions. The pump must always restore the zero flow position.



P1 = Install a pressure gauge 0 ÷ 25 bar
P2 = Install a pressure gauge 0 ÷ 25 bar
GS = Install a pressure gauge 0 ÷ 60 bar
GA = Install a pressure gauge 0 ÷ 600 bar
GB = Install a pressure gauge 0 ÷ 600 bar



S1/S2 = Input electrical signal
Y1/Y2 = Hydraulic input signal
K = Setting screw for zero setting
L = Locking screw of screw "K"

Hydraulic Zero-Setting of the Controls C-F-H

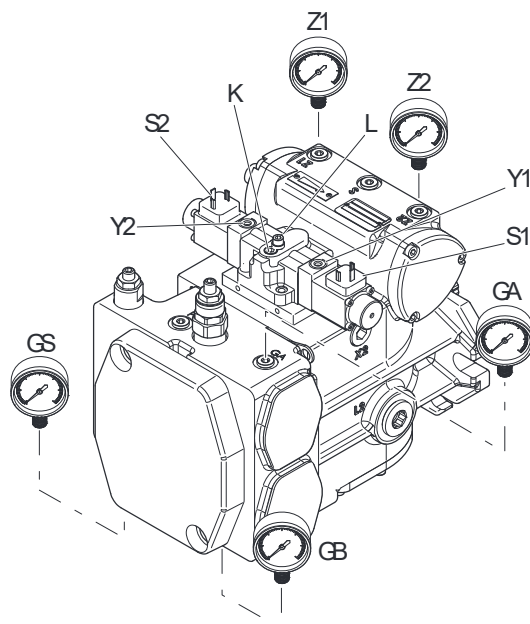
Plug the pressure gauges Z1-Z2 and check the pressure on the servo piston sides: max Δp accepted = 1 bar.

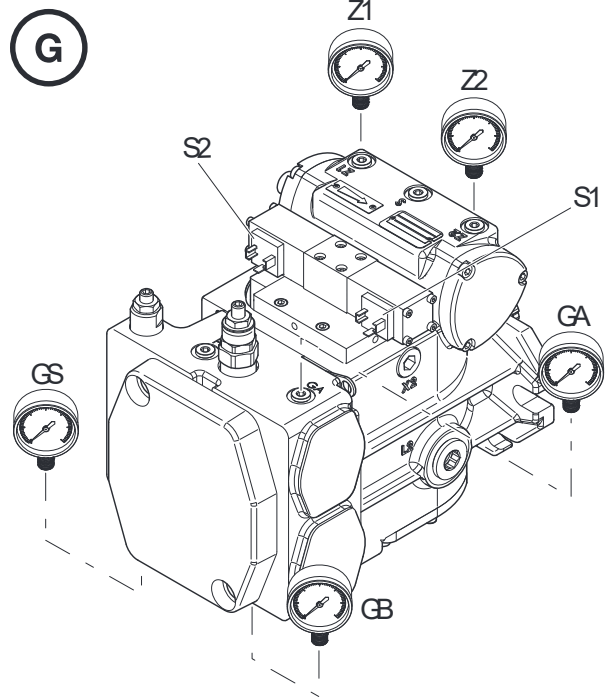
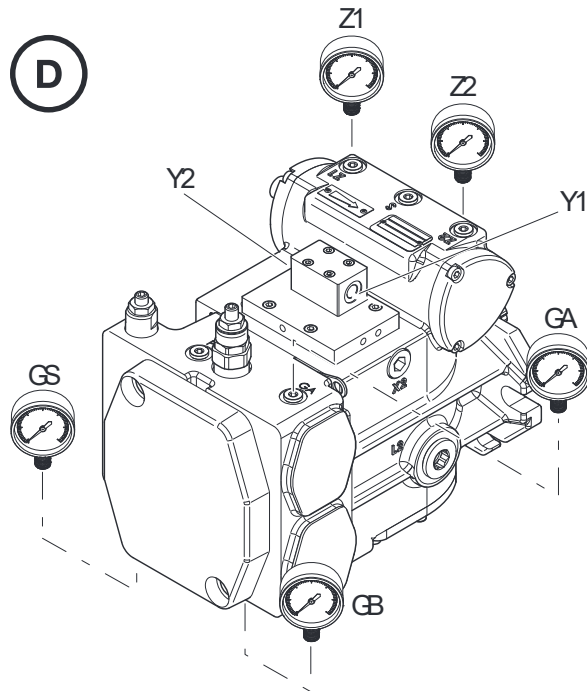
Set this value within this range adjusting the screw (K). At the rotation speed of normal use, swivel the pump to maximum displacement, via the hydraulic control (C) or electric control (F-H), then suddenly release the said lever. The pump must swivel back to zero flow within two seconds. Repeat the procedure for both flow directions. There must be no significant difference between the two flow directions (equal pressure on GA and BG, max 2-3 bar differential).

If this should occur, act on the control hydraulic zero-setting screw (K) unblocking the screw (L) for eccentric fixing, turning them in order to restore the control zero-setting, until the proper control operation is achieved.

Check the control operation repeating procedure as described above in both the flow directions. The pump must always restore the zero flow position.

Alternative supply current to the magnets S1-S2 (or pressure to the attacks Y1-Y2). Check the current (or pressure) of the control start and the max flow value with and without load. If the parameters do not fall within the expected values check the hydraulic zero.

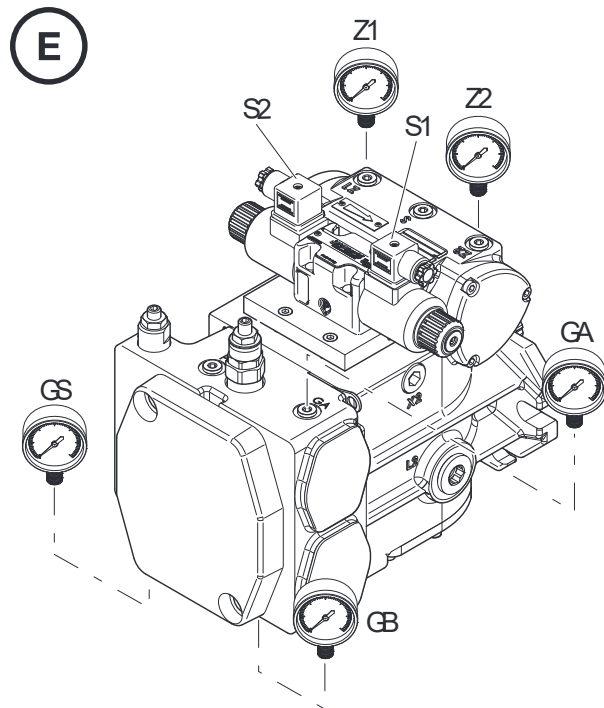




Check for Correct Operation Controls D-E-G

Feed voltage current to solenoids S1-S2 (or feed pressure to Y1-Y2) to check current (or pressure) of the control start and the max flow (see table on

page 40) with and without load. If the parameters do not fall within the expected values the control or the pump must be checked for damage or wear.



- P1** = Install a pressure gauge 0 ÷ 25 bar (0-365 PSI)
- P2** = Install a pressure gauge 0 ÷ 25 bar (0-365 PSI)
- GS** = Install a pressure gauge 0 ÷ 60 bar (0-870 PSI)
- GA** = Install a pressure gauge 0 ÷ 600 bar (0-8700 PSI)
- GB** = Install a pressure gauge 0 ÷ 600 bar (0-8700 PSI)
- S1/S2** = Input electrical signal
- Y1/Y2** = Hydraulic input signal
- K** = Setting screw for zero setting
- L** = Locking screw of screw "K"

Alternately activate solenoids S1-S2 to check proper functioning of the "ON-OFF" control

| Control Setting Values | | | | | | |
|---|--|----------|--|--|--|--|
| | | | Minimum Value of Piloting Pressure on Starting | Maximum Value of Piloting Pressure on Starting | Minimum Value of Piloting Pressure on Finish | Maximum Value of Piloting Pressure on Finish |
| A | Manual lever control with feedback | – | – | – | – | – |
| C | Hydraulic proportional with feedback | (*) | 5 bar | 7 bar | 16 bar | 19,5 bar |
| D | Hydraulic proportional without feedback | (*) | 5 bar | 7 bar | 12 bar | 15 bar |
| F | Electric proportional with feedback | 24V (*) | 180 mA | 240 mA | 540 mA | 660 mA |
| | | 12V (*) | 360 mA | 460 mA | 1080 mA | 1320 mA |
| G | Electric proportional without feedback | 24V (*) | 235 mA | 365 mA | 585 mA | 715 mA |
| | | 12V (*) | 470 mA | 730 mA | 1170 mA | 1430 mA |
| E | Electric on/off | | – | – | – | – |
| H | Electric proportional with feedback, with hydraulic emergency override | 24V (**) | 180 mA | 240 mA | 540 mA | 660 mA |
| | | 12V (**) | 360 mA | 460 mA | 1080 mA | 1320 mA |
| *Max case pressure: 1 bar | | | | | | |
| **Testing functionality hydraulic emergency | | | | | | |

| Troubleshooting Matrix | |
|--|---|
| Symptom | Possible Causes |
| Pump not operating in either direction | Low fluid level in reservoir |
| | Charge pump suction line plugged or disconnected |
| | Cross port relief damaged |
| | Wrong input rotation |
| | Command to pump control may be faulty |
| | Damaged actuator |
| Symptom | Possible Causes |
| Pump operates sluggishly or generates erratic movement | Low fluid level in reservoir |
| | Charge pump suction line restricted |
| | Improper charge pressure, check charge relief |
| | Command to pump control may be faulty |
| | Damaged actuator |
| Symptom | Possible Causes |
| Transmission operating hot | Heat exchanger improperly sized |
| | Heat exchanger damaged/plugged |
| | Excessive operation over cross port reliefs |
| | Cross port relief damaged |
| | Actuator damaged/bypassing fluid |
| | Low fluid level in reservoir |
| Symptom | Possible Causes |
| Excessive noise from system | Improper shaft alignment |
| | Charge pump suction line restricted/cavitation of charge pump |
| | Low fluid level in reservoir |
| | Aeration of hydraulic fluid in tank |
| Symptom | Possible Causes |
| Leakage from shaft seal | Case drain pressure too high |
| | Seal damaged |
| Symptom | Possible Causes |
| High case drain pressure | Drain hose improperly sized |
| | Drain hose restricted or blocked |
| Symptom | Possible Causes |
| Slow actuator speed | Prime mover RPM is slow |
| | Improper charge pressure, check charge relief |
| | Charge pump suction line restricted |
| | Oil temperature too high |
| Symptom | Possible Causes |
| Low actuator output force | Cross port relief damaged |
| | Cross port relief improperly set |
| | Actuator damaged |
| | Oil temperature too high |

When diagnosing, it is suggested that you have two 600 bar (8700 PSI) pressure gauges (system pressure), a 60 bar (870) PSI pressure gauge (charge pressure), a vacuum gauge (charge inlet), tachometer (engine RPM), amp meter (electric motor current draw), and temperature gun (to measure system temperatures).

Offer of Sale**Variable Displacement Pump Axial
Piston Pump C055 Service Information**

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

1. **Terms and Conditions.** Seller's willingness to offer Products, or accept an order for Products, to or from Buyer is subject to these Terms and Conditions or any newer version of the terms and conditions found on-line at www.parker.com/saleterms/. Seller objects to any contrary or additional terms or conditions of Buyer's order or any other document issued by Buyer.
2. **Price Adjustments; Payments.** Prices stated on Seller's quote or other documentation offered by Seller are valid for 30 days, and do not include any sales, use, or other taxes unless specifically stated. Unless otherwise specified by Seller, all prices are F.C.A. Seller's facility (INCOTERMS 2010). Payment is subject to credit approval and is due 30 days from the date of invoice or such other term as required by Seller's Credit Department, after which Buyer shall pay interest on any unpaid invoices at the rate of 1.5% per month or the maximum allowable rate under applicable law.
3. **Delivery Dates; Title and Risk; Shipment.** All delivery dates are approximate and Seller shall not be responsible for any damages resulting from any delay. Regardless of the manner of shipment, title to any products and risk of loss or damage shall pass to Buyer upon placement of the products with the shipment carrier at Seller's facility. Unless otherwise stated, Seller may exercise its judgment in choosing the carrier and means of delivery. No deferment of shipment at Buyers' request beyond the respective dates indicated will be made except on terms that will indemnify, defend and hold Seller harmless against all loss and additional expense. Buyer shall be responsible for any additional shipping charges incurred by Seller due to Buyer's acts or omissions.
4. **Warranty.** Seller warrants that the Products sold hereunder shall be free from defects in material or workmanship for a period of eighteen months from the date of shipment from the Company. The prices charged for Seller's products are based upon the exclusive limited warranty stated above, and upon the following disclaimer: **DISCLAIMER OF WARRANTY: THIS WARRANTY COMPRISES THE SOLE AND ENTIRE WARRANTY PERTAINING TO PRODUCTS PROVIDED HEREUNDER. SELLER DISCLAIMS ALL OTHER WARRANTIES, EXPRESS AND IMPLIED, INCLUDING DESIGN, MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE.**
5. **Claims; Commencement of Actions.** Buyer shall promptly inspect all Products upon delivery. No claims for shortages will be allowed unless reported to the Seller within 10 days of delivery. No other claims against Seller will be allowed unless asserted in writing within 30 days after delivery. Buyer shall notify Seller of any alleged breach of warranty within 30 days after the date the defect is or should have been discovered by Buyer. Any action based upon breach of this agreement or upon any other claim arising out of this sale (other than an action by Seller for an amount due on any invoice) must be commenced within 12 months from the date of the breach without regard to the date breach is discovered.
6. **LIMITATION OF LIABILITY. UPON NOTIFICATION, SELLER WILL, AT ITS OPTION, REPAIR OR REPLACE A DEFECTIVE PRODUCT, OR REFUND THE PURCHASE PRICE. IN NO EVENT SHALL SELLER BE LIABLE TO BUYER FOR ANY SPECIAL, INDIRECT, INCIDENTAL OR CONSEQUENTIAL DAMAGES ARISING OUT OF, OR AS THE RESULT OF, THE SALE, DELIVERY, NON-DELIVERY, SERVICING, USE OR LOSS OF USE OF THE PRODUCTS OR ANY PART THEREOF, OR FOR ANY CHARGES OR EXPENSES OF ANY NATURE INCURRED WITHOUT SELLER'S WRITTEN CONSENT, EVEN IF SELLER HAS BEEN NEGLIGENT, WHETHER IN CONTRACT, TORT OR OTHER LEGAL THEORY. IN NO EVENT SHALL SELLER'S LIABILITY UNDER ANY CLAIM MADE BY BUYER EXCEED THE PURCHASE PRICE OF THE PRODUCTS.**
7. **User Responsibility.** The user, through its own analysis and testing, is solely responsible for making the final selection of the system and Product and assuring that all performance, endurance, maintenance, safety and warning requirements of the application are met. The user must analyze all aspects of the application and follow applicable industry standards and Product information. If Seller provides Product or system options, the user is responsible for determining that such data and specifications are suitable and sufficient for all applications and reasonably foreseeable uses of the Products or systems.
8. **Loss to Buyer's Property.** Any designs, tools, patterns, materials, drawings, confidential information or equipment furnished by Buyer or any other items which become Buyer's property, will be considered obsolete and may be destroyed by Seller after two consecutive years have elapsed without Buyer ordering the items manufactured using such property. Seller shall not be responsible for any loss or damage to such property while it is in Seller's possession or control.
9. **Special Tooling.** A tooling charge may be imposed for any special tooling, including without limitation, dies, fixtures, molds and patterns, acquired to manufacture Products. Such special tooling shall be and remain Seller's property notwithstanding payment of any charges by Buyer. In no event will Buyer acquire any interest in apparatus belonging to Seller which is utilized in the manufacture of the Products, even if such apparatus has been specially converted or adapted for such manufacture and notwithstanding any charges paid by Buyer. Unless otherwise agreed, Seller shall have the right to alter, discard or otherwise dispose of any special tooling or other property in its sole discretion at any time.
10. **Buyer's Obligation; Rights of Seller.** To secure payment of all sums due or otherwise, Seller shall retain a security interest in the goods delivered and this agreement shall be deemed a Security Agreement under the Uniform Commercial Code. Buyer authorizes Seller as its attorney to execute and file on Buyer's behalf all documents Seller deems necessary to perfect its security interest.
11. **Improper use and Indemnity.** Buyer shall indemnify, defend, and hold Seller harmless from any claim, liability, damages, lawsuits, and costs (including

- attorney fees), whether for personal injury, property damage, patent, trademark or copyright infringement or any other claim, brought by or incurred by Buyer, Buyer's employees, or any other person, arising out of: (a) improper selection, improper application or other misuse of Products purchased by Buyer from Seller; (b) any act or omission, negligent or otherwise, of Buyer; (c) Seller's use of patterns, plans, drawings, or specifications furnished by Buyer to manufacture Product; or (d) Buyer's failure to comply with these terms and conditions. Seller shall not indemnify Buyer under any circumstance except as otherwise provided.
12. **Cancellations and Changes.** Orders shall not be subject to cancellation or change by Buyer for any reason, except with Seller's written consent and upon terms that will indemnify, defend and hold Seller harmless against all direct, incidental and consequential loss or damage. Seller may change product features, specifications, designs and availability with notice to Buyer.
13. **Limitation on Assignment.** Buyer may not assign its rights or obligations under this agreement without the prior written consent of Seller.
14. **Force Majeure.** Seller does not assume the risk and shall not be liable for delay or failure to perform any of Seller's obligations by reason of circumstances beyond the reasonable control of Seller (hereinafter "Events of Force Majeure"). Events of Force Majeure shall include without limitation: accidents, strikes or labor disputes, acts of any government or government agency, acts of nature, delays or failures in delivery from carriers or suppliers, shortages of materials, or any other cause beyond Seller's reasonable control.
15. **Waiver and Severability.** Failure to enforce any provision of this agreement will not waive that provision nor will any such failure prejudice Seller's right to enforce that provision in the future. Invalidity of any provision of this agreement by legislation or other rule of law shall not invalidate any other provision herein. The remaining provisions of this agreement will remain in full force and effect.
16. **Termination.** Seller may terminate this agreement for any reason and at any time by giving Buyer thirty (30) days written notice of termination. Seller may immediately terminate this agreement, in writing, if Buyer: (a) commits a breach of any provision of this agreement (b) appoints a trustee, receiver or custodian for all or any part of Buyer's property (c) files a petition for relief in bankruptcy on its own behalf, or by a third party (d) makes an assignment for the benefit of creditors, or (e) dissolves or liquidates all or a majority of its assets.
17. **Governing Law.** This agreement and the sale and delivery of all Products hereunder shall be deemed to have taken place in and shall be governed and construed in accordance with the laws of the State of Ohio, as applicable to contracts executed and wholly performed therein and without regard to conflicts of laws principles. Buyer irrevocably agrees and consents to the exclusive jurisdiction and venue of the courts of Cuyahoga County, Ohio with respect to any dispute, controversy or claim arising out of or relating to this agreement.
18. **Indemnity for Infringement of Intellectual Property Rights.** Seller shall have no liability for infringement of any patents, trademarks, copyrights, trade dress, trade secrets or similar rights except as provided in this Section. Seller will defend and indemnify Buyer against allegations of infringement of U.S. patents, U.S. trademarks, copyrights, trade dress and trade secrets ("Intellectual Property Rights"). Seller will defend at its expense and will pay the cost of any settlement or damages awarded in an action brought against Buyer based on an allegation that a Product sold pursuant to this Agreement infringes the Intellectual Property Rights of a third party. Seller's obligation to defend and indemnify Buyer is contingent on Buyer notifying Seller within ten (10) days after Buyer becomes aware of such allegations of infringement, and Seller having sole control over the defense of any allegations or actions including all negotiations for settlement or compromise. If a Product is subject to a claim that it infringes the Intellectual Property Rights of a third party, Seller may, at its sole expense and option, procure for Buyer the right to continue using the Product, replace or modify the Product so as to make it noninfringing, or offer to accept return of the Product and return the purchase price less a reasonable allowance for depreciation. Notwithstanding the foregoing, Seller shall have no liability for claims of infringement based on information provided by Buyer, or directed to Products delivered hereunder for which the designs are specified in whole or part by Buyer, or infringements resulting from the modification, combination or use in a system of any Product sold hereunder. The foregoing provisions of this Section shall constitute Seller's sole and exclusive liability and Buyer's sole and exclusive remedy for infringement of Intellectual Property Rights.
19. **Entire Agreement.** This agreement contains the entire agreement between the Buyer and Seller and constitutes the final, complete and exclusive expression of the terms of sale. All prior or contemporaneous written or oral agreements or negotiations with respect to the subject matter are herein merged.
20. **Compliance with Law, U.K. Bribery Act and U.S. Foreign Corrupt Practices Act.** Buyer agrees to comply with all applicable laws and regulations, including both those of the United Kingdom and the United States of America, and of the country or countries of the Territory in which Buyer may operate, including without limitation the U. K. Bribery Act, the U.S. Foreign Corrupt Practices Act ("FCPA") and the U.S. Anti-Kickback Act (the "Anti-Kickback Act"), and agrees to indemnify and hold harmless Seller from the consequences of any violation of such provisions by Buyer, its employees or agents. Buyer acknowledges that they are familiar with the provisions of the U. K. Bribery Act, the FCPA and the Anti-Kickback Act, and certifies that Buyer will adhere to the requirements thereof. In particular, Buyer represents and agrees that Buyer shall not make any payment or give anything of value, directly or indirectly to any governmental official, any foreign political party or official thereof, any candidate for foreign political office, or any commercial entity or person, for the purpose of influencing such person to purchase products or otherwise benefit the business of Seller. 04/2014



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