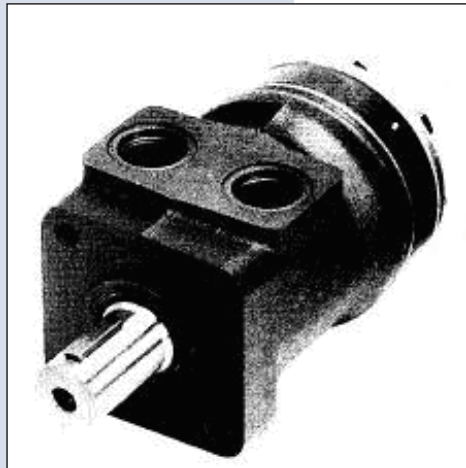




DH and DS Motors

Assembly and Test Procedures





History of Revisions

Table of Revisions

Date	Page	Changed	Rev.
October 2011	4	edits to General Instructions	AD
October 2010	last	new back page	AC
March 2010	last	Fix Osaka address	AB
April 2009	-	First edition	AA

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Overview

This manual includes information on assembly and testing of DH and DS Motors.

To provide timely motor delivery when a customer places an order, you need to have all the necessary modules and equipment on hand.

DH and DS motor assembly is based on a modular building concept. Each motor consists of two modules; the housing module and the gear wheel set module. When assembled, these two modules constitute a complete motor.

The variation in motor size (displacement) is determined by the gear wheel set module. One housing module is common for all motors of a given flange type.

General Instructions

Follow these general procedures when assembling DH and DS Motors.

Keep it clean

As with any precision equipment, keep all parts free of foreign materials and chemicals. Protect all exposed sealing surfaces and open cavities from damage and foreign material. If left unattended, cover the motor with a protective layer of plastic.

Lubricate O-rings

Lightly lubricate all O-rings with clean petroleum jelly prior to assembly.



Safety Precautions

Always consider safety precautions before beginning a service procedure. Protect yourself and others from injury. Take the following general precautions whenever servicing a hydraulic system.

Unintended Machine Movement

▲ Warning

Unintended movement of the machine or mechanism may cause injury to the technician or bystanders. To protect against unintended movement, secure the machine or disable/disconnect the mechanism while servicing.

Flammable Cleaning Solvents

▲ Warning

Some cleaning solvents are flammable. To avoid possible fire, do not use cleaning solvents in an area where a source of ignition may be present.

Fluid Under Pressure

▲ Warning

Escaping hydraulic fluid under pressure can have sufficient force to penetrate your skin causing serious injury and/or infection. This fluid may also be hot enough to cause burns. Use caution when dealing with hydraulic fluid under pressure. Relieve pressure in the system before removing hoses, fittings, gauges, or components. Never use your hand or any other body part to check for leaks in a pressurized line. Seek medical attention immediately if you are cut by hydraulic fluid.

Personal Safety

▲ Warning

Protect yourself from injury. Use proper safety equipment, including safety glasses, at all times.

Hazardous Material

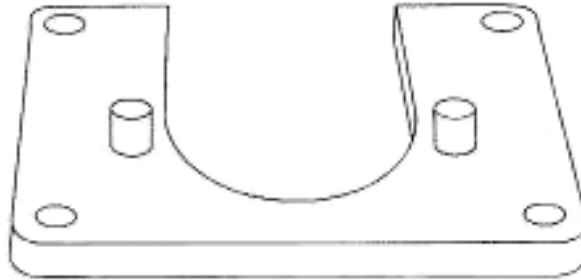
▲ Warning

Hydraulic fluid contains hazardous material. Avoid prolonged contact with hydraulic fluid. Always dispose of used hydraulic fluid according to state, and federal environmental regulations.

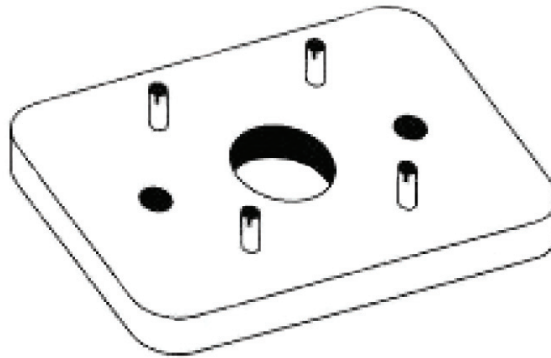
Tools

Proper assembly of DH/DS motors requires these tools. You may use the dimensions and information in the drawings on the next page to fabricate them.

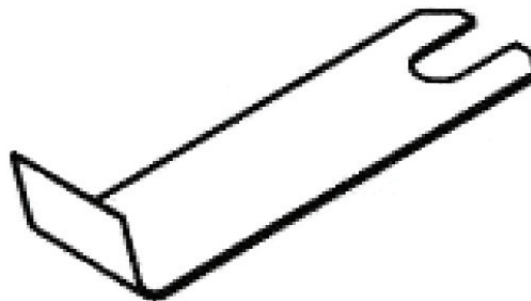
Holding tool for motors with A2 flange (horseshoe)



Holding tool for motors with C flange

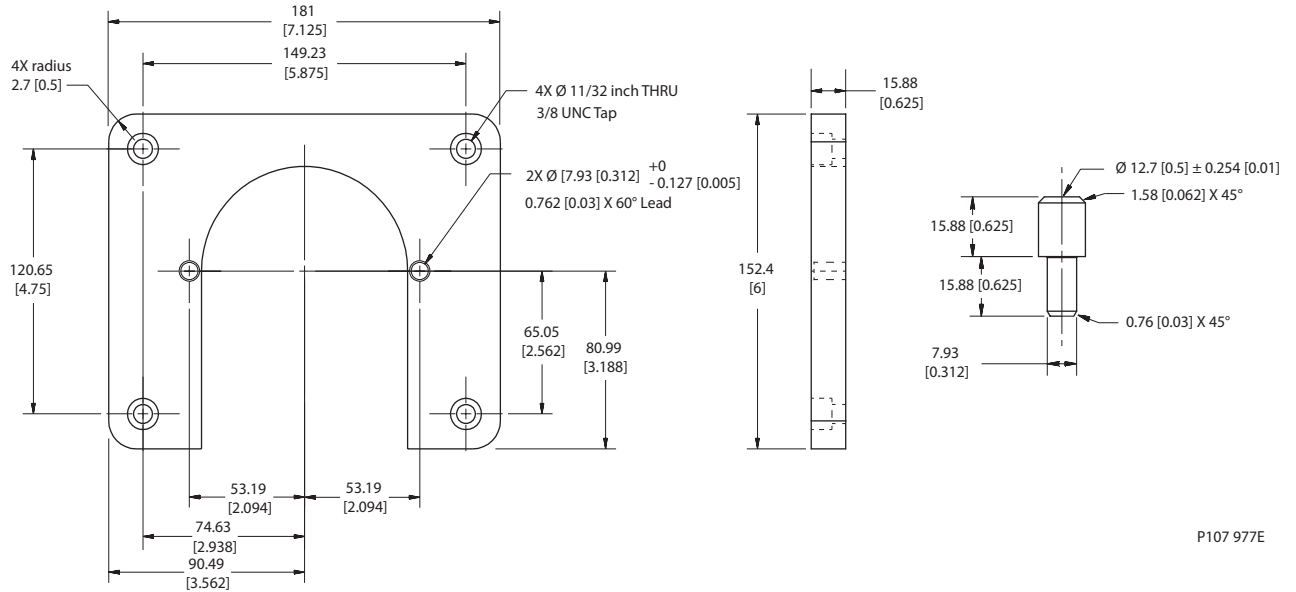


Fork tool



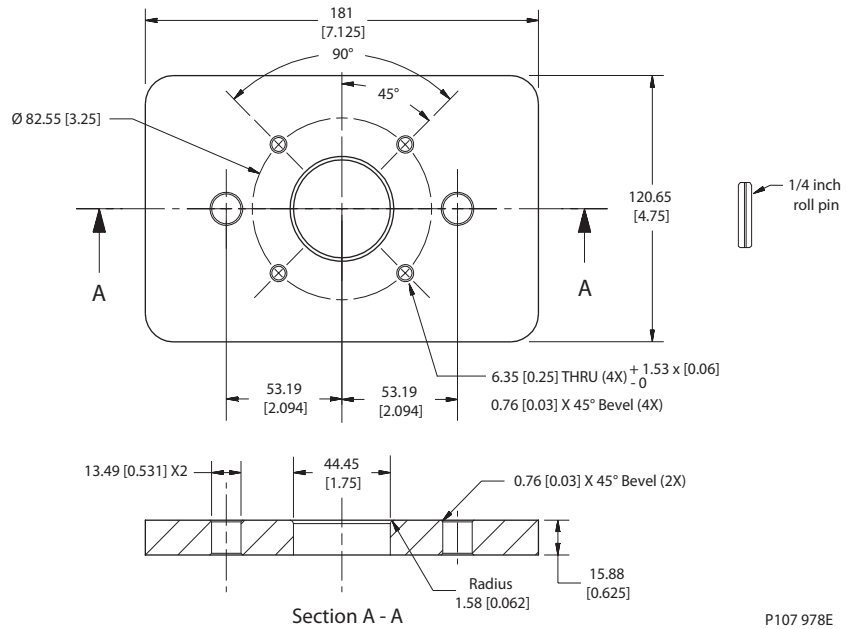
Tools (continued)

Holding tool for motors with A2 flange (horseshoe)



P107 977E

Holding tool for motors with C flange



P107 978E

Dimensions mm [in]

Module Components

The housing module and gear wheel set module ship in separate packages. Each module is packaged in a VCI plastic bag.

Housing module



Gear wheel set module



Housing module sealed in plastic



Gear wheel set module sealed in plastic



Housing Module Package Components	Quantity
Motor Housing	1
Spool Shaft	1
End Cover	1
Drain Plug and Washer	1
Shaft Seal	1
Dust Seal Ring	1
Bearing Set	1
Distributor Plate	1
Temporary bolts (do not use for assembly)	2



Gear Wheel Set Module Package Components	Quantity
O-rings	3
Gear Wheel Set	1
Bolts plus Belonging Washers (DS)	7
Bolts plus Belonging Washers (DH)	6
Cardan Shaft	1



Motor Assembly

Position motor with shaft pointing down. Use A2 flange tool or C flange tool depending on your housing configuration.

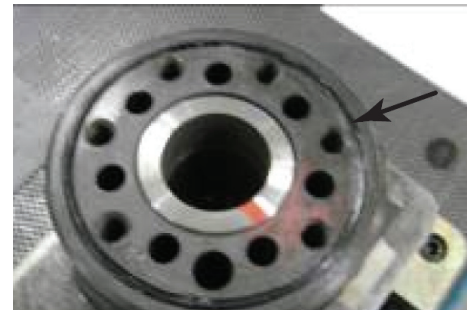
1. Remove and discard the two temporary bolts that fasten the end cover.



2. Remove end cover and distributor plate from the housing.



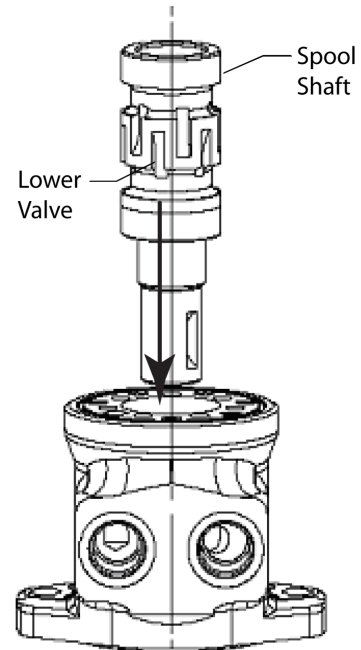
3. Grease an O-ring and position it in the O-ring groove. Ensure spool shaft timing is correct.



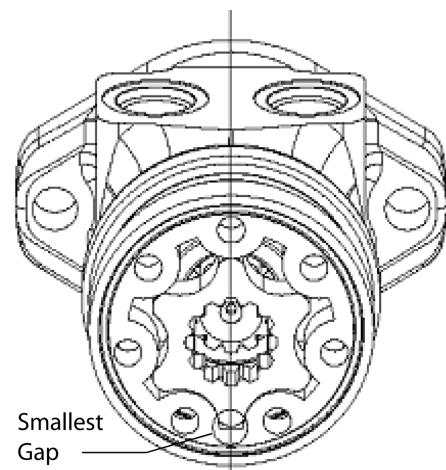
**Motor Assembly
(continued)***Ensure Proper Rotation*

You must install the internal gear wheel correctly in relation to the commutation of the spool valve to get proper rotation.

4. Install the spool shaft with a lower valve about 5 degrees clockwise from the center of the housing (as shown).



When mounting the gear set (step 7) ensure the smallest gap is facing directly away from the system ports of the housing.



**Motor Assembly
(continued)***Install Distributor Plate*

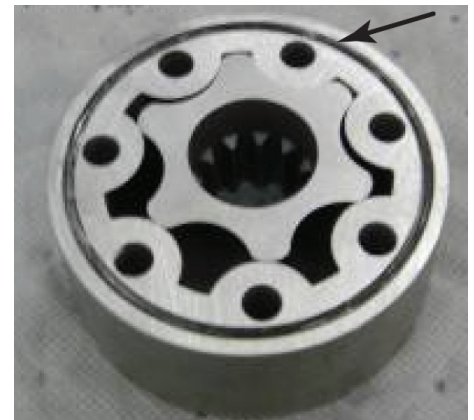
5. Mount the distributor plate on the housing and place the cardan shaft into the spool shaft

On smaller displacements, be sure to place the end of the cardan shaft with the longest splines into the spool shaft.

*Install Gear Set*

6. Grease an O-ring and place it in the O-ring groove on the bottom side of the gear set.

For larger displacement gear sets, the bottom side has recessed splines in the gear wheel.



7. Place the gear set onto the cardan shaft so that the smallest gap between the gear wheel and the gear rim face opposite the system ports and the internal splines of the gear wheel line up to those on the cardan shaft.

For smaller displacements, retain the cardan shaft using the fork tool.



**Motor Assembly
(continued)****Install End Cover**

8. Grease an O-ring and place it in the O-ring groove on the top of the gear set.



9. Place the end cover over the gear set (Note orientation of end cover for DH models).
10. Install washers and end cover bolts (DH=6, DS=7).



11. Tighten the bolts using a 13 mm socket. Torque to 30-35 N•m [22-25 lbf•ft].
12. If drain plug was removed during assembly or test. Torque to 32-44 N•m [24-33 lbf•in].

**Install Shipping Plugs**

13. Tighten the shipping plugs after testing. Torque to 2.5-5.0 N•m [22-44 lbf•in].

Testing Assembled Motor Hydraulic Fluid Specifications

General Testing Conditions	
Fluid type	Mineral hydraulic oil class HM, ISO 6743/4
Viscosity range	35 ± 3 cSt
Oil cleanliness	18/13 – contamination degree, ISO 4406

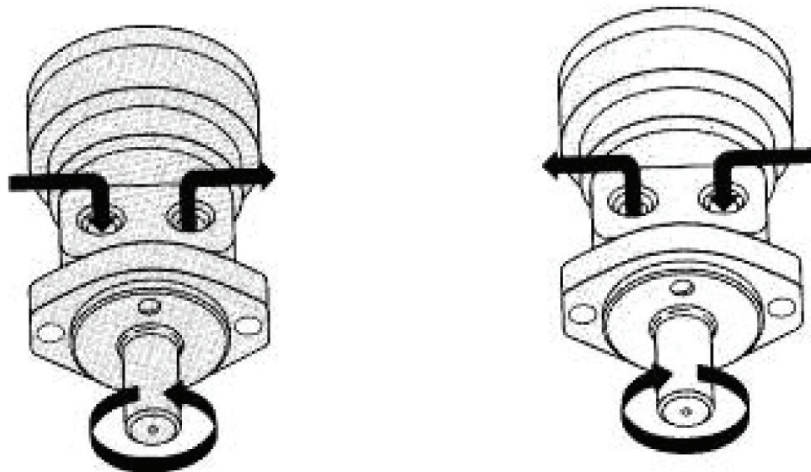
Rotation

With the shaft pointing toward you and the system ports facing up, the motor must turn to the right (clockwise) when supplying pressure to the right connection port.

Starting Pressure

With the motor disengaged and no outside load on the output shaft, slowly raise the oil supply pressure until the motor starts. Then lower the differential pressure to the limit shown in the table below (7 or 10 bar [102 or 145 psi]). Check that the motor is still turning at this limit. If so the motor is good.

If the motor begins to turn below the specified pressure, the motor check is OK.





Testing (continued)

Test Data on DH Motors

Maximum starting pressure (bar)		
Motor type	7 bar	10 bar
DH 25		x
DH 32		x
DH 36		x
DH 40		x
DH 50		x
DH 60		x
DH 80		x
DH 100		x
DH 125	x	
DH 160	x	
DH 200	x	
DH 250	x	
DH 275	x	
DH 315	x	
DH 400	x	
DH 630	x	

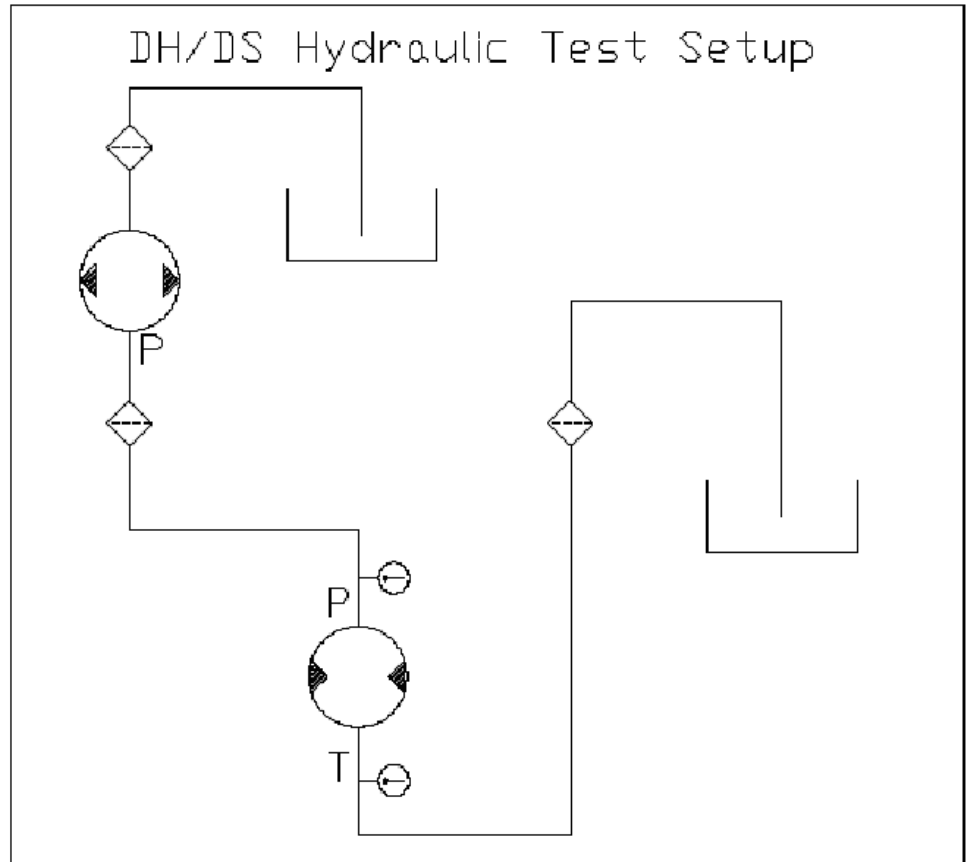
Test Data on DS Motors

Maximum starting pressure (bar)		
Motor type	7 bar	10 bar
DH 50		x
DH 80		x
DH 100		x
DH 125	x	
DH 160	x	
DH 200	x	
DH 250	x	
DH 275	x	
DH 315	x	
DH 390	x	

Hydraulic Schematic

The following schematic shows the proper connection of the motor to the hydraulic power unit for testing purposes.

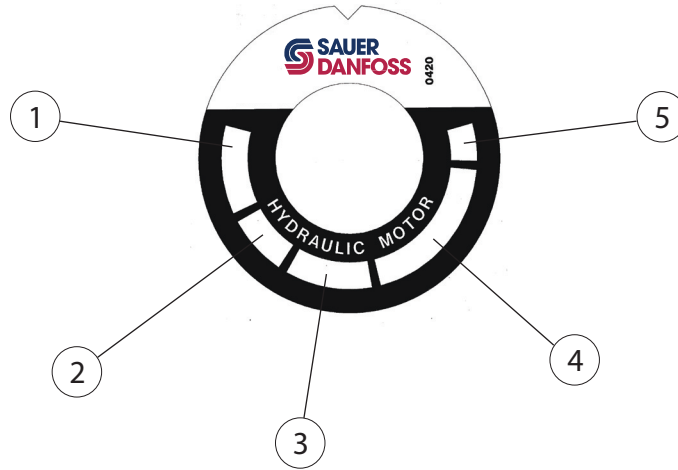
Note the position of the two pressure gauges. Position them as close as possible to the ports of the motor for the most accurate reading.



Motor Identification

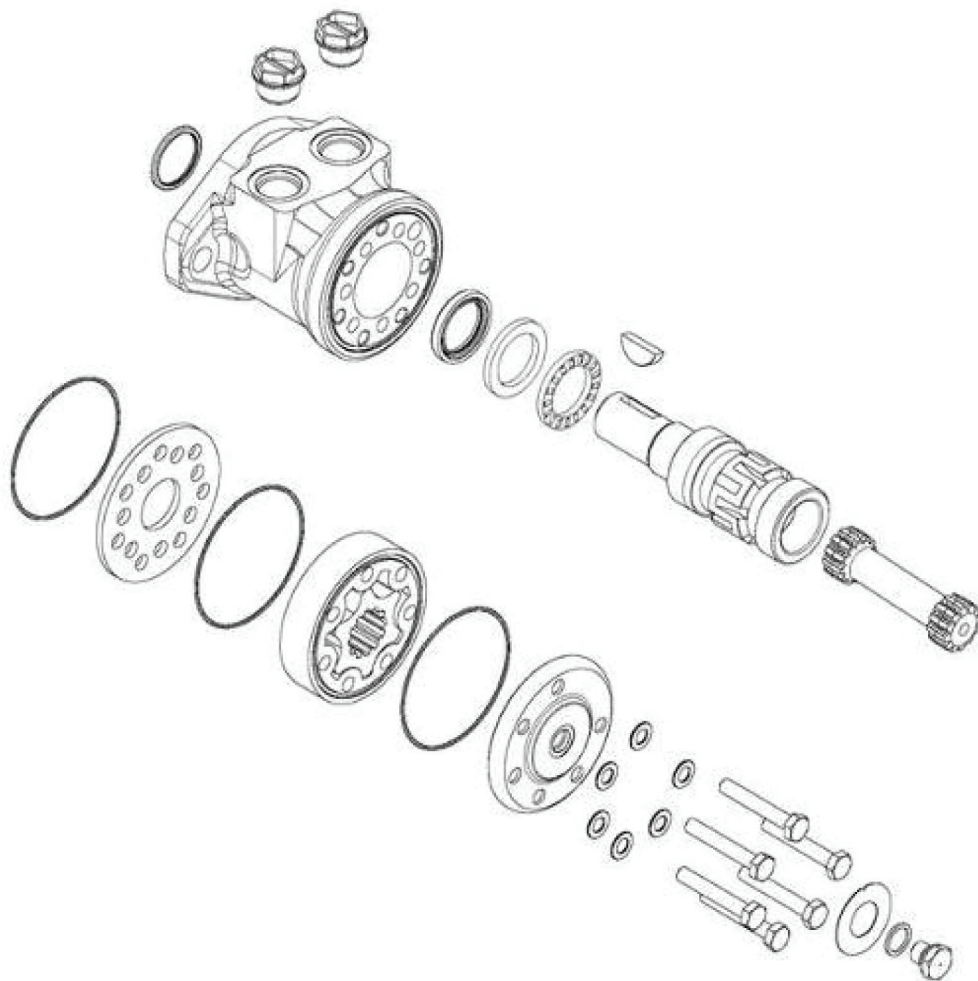
Fit a nameplate onto the end cover and stamp or etch the following data in the marked fields:

Order nameplates separately. They are not included in the motor modules.

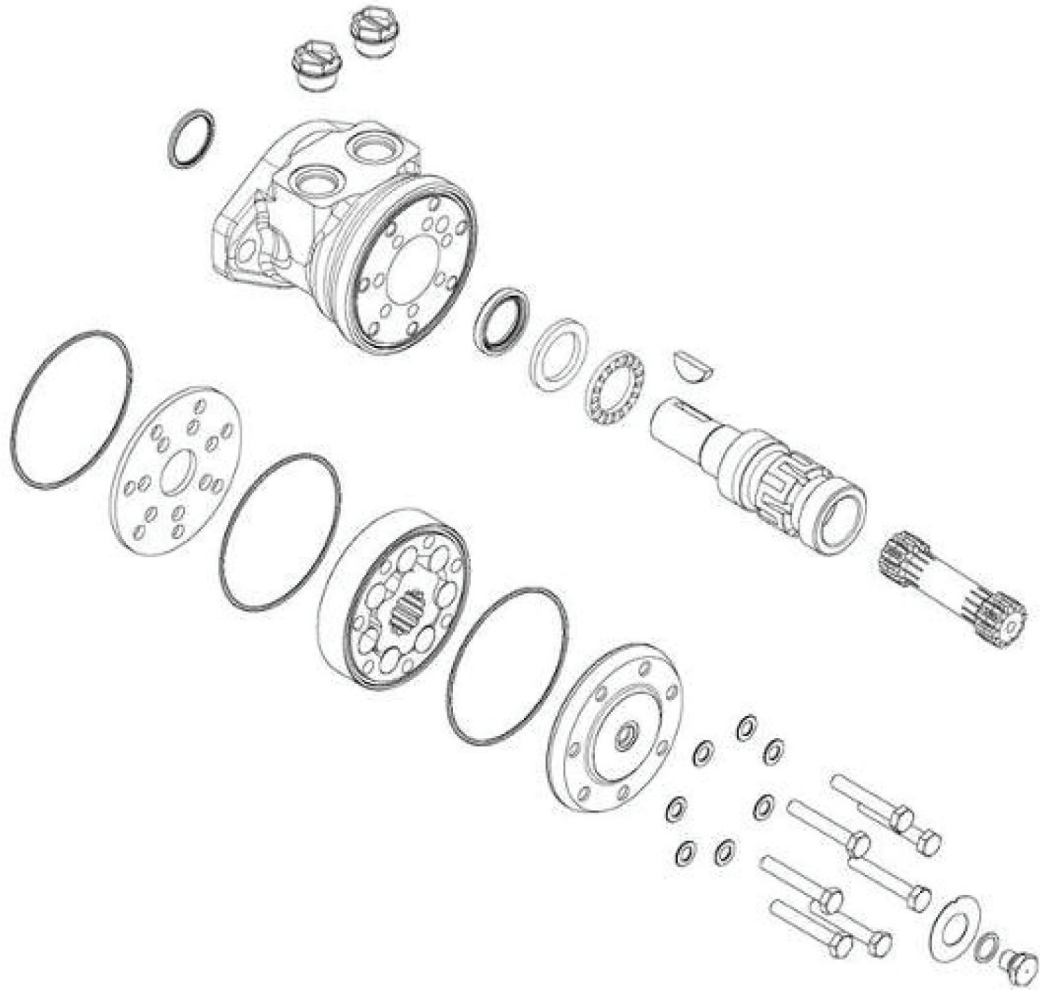


Item	Description	Example
1	Place and date of manufacture	43A105
2	Type of motor	DS or DH
3	Displacement	80 cm ³
4	Code number	151-3702
5	Series number	1

DH Exploded View



DS Exploded View





DH and DS Motors
Assembly and Test Procedures
Notes





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