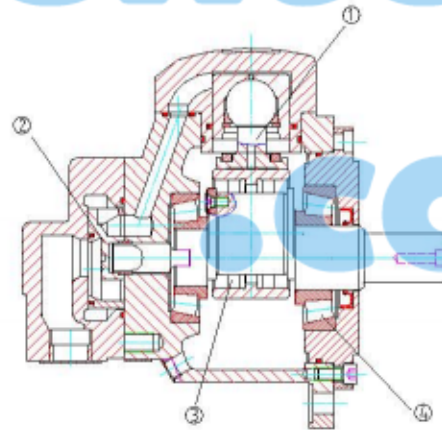


BRIEF INTRODUCTION .I

1.1 APPLICATION SCOPE

This series of motor, with its shell made of ductile cast iron of adequate intensity, can be applied to the screw drive of injection molding machine, the raising of capstan and winch, and the drive of various rotating mechanism.

1.2 MAIN CHARACTERISTICS (drawing attached)



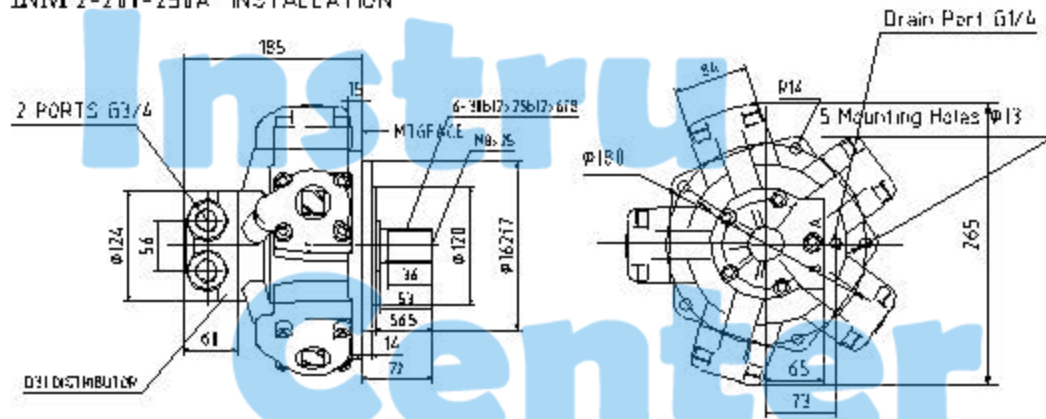
- 1) With the crankshaft and connecting rod mechanism, it has its noise reduced.
- 2) With the reliable compensation plain oil distribution structure, it has a high volumetric efficiency.
- 3) Roller supports the crankshaft and the outer ring, so it has a small friction and high mechanical efficiency.
- 4) The output shaft is supported by two taper roller bearings, so it can bear larger radial force and axial force.

1.3 MAIN SPECIFICATIONS AND BASIC PARAMETERS

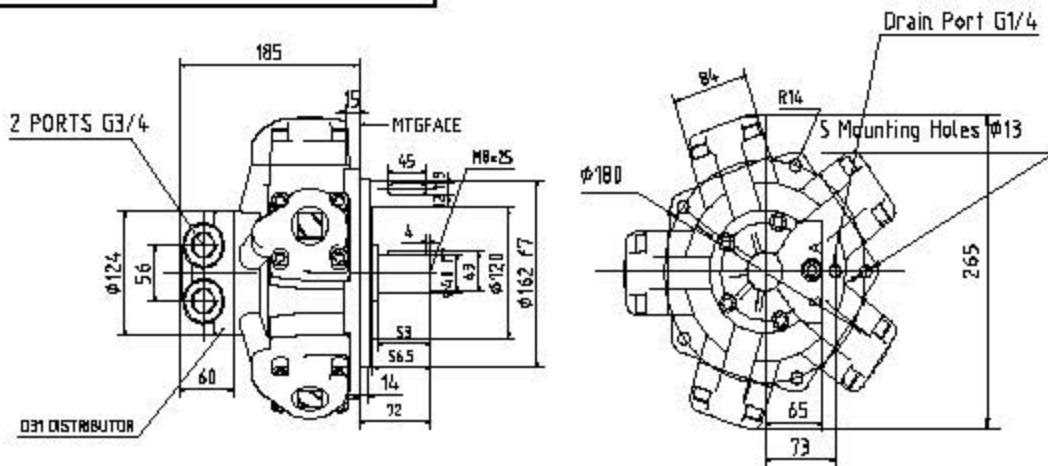
TYPE NHM	Displacement (cc/r)	Pressure (bar)		Torgue (N.m)		Speed Range (r/min)	Max.cont power (kw)	Shaft Diameter (mm)	Weight (kg)
		Rated PRESSURE	Max. Pressure	Rated Torgue	Theoris Spesific				
NHM 1-63	64	250	320	225	9.0	15~1500	16	32	20
NHM 1-80	78	250	320	300	12	15~1250	16		
NHM 1-100	96	250	320	350	14	15~1000	16		
NHM 1-125	126	200	250	380	19	15~1000	16		
NHM 1-160	159	200	250	472	23	15~1000	16		
NHM 2-100	113	250	320	420	18	15~1250	25	32	27
NHM 2-150	159	250	320	620	25	15~1000	25		
NHM 1-175	180	200	250	526	28	15~1000	25		
NHM 2-200	206	200	250	600	32	8~800	25		
NHM 2-250	235	160	200	607	40	8~630	25		
NHM 2-280	276	160	200	670	44	8~500	25	40	35
NHM 3-175	181	250	320	710	28	8~1000	37		
NHM 3-200	201	250	320	800	32	8~800	40		
NHM 3-250	254	250	320	949	40	8~630	40		
NHM 3-300	289	200	250	864	46	6~500	40		
NHM 3-350	340	200	250	1040	55	6~400	40	50	57.5
NHM 3-400	380	160	200	949	63	6~400	40		
NHM 3-450	437	160	200	1034	65	6~400	40		
NHM 6-400	397	250	320	1483	63	5~630	60		
NHM 6-450	452	250	320	1638	72	5~630	63		
NHM 6-500	491	200	250	1463	78	5~500	62	75	94
NHM 6-600	594	200	250	1775	94	4~500	65		
NHM 6-700	683	160	200	1633	103	4~400	65		
NHM 6-750	754	160	200	1760	110	4~320	65		
NHM 11-700	682	250	320	2667	114	4~400	80		
NHM 11-800	782	250	320	2959	120	4~400	80	100	170
NHM 11-900	894	250	320	3480	140	4~400	85		
NHM 11-1000	981	200	250	2974	158	3~320	85		
NHM 11-1100	1104	200	250	3336	177	3~320	85		
NHM 11-1200	1234	160	250	3512	187	3~320	85		
NHM 11-1300	1301	160	200	3080	197	3~250	80	100	170
NHM 16-1400	1413	250	320	5138	210	2~400	100		
NHM 16-1600	1648	200	320	6158	262	2~400	110		
NHM 16-1800	1814	200	250	5433	283	2~320	110		
NHM 16-2000	2034	160	250	6030	323	2~320	110		
NHM 16-2400	2267	160	200	5763	360	2~250	97	325	325
NHM 31-2500	2550	250	320	9523	405	1~200	150		
NHM 31-2800	2826	250	320	10559	443	1~200	150		
NHM 31-3000	3050	200	250	9135	485	1~200	140		
NHM 31-3500	3419	200	250	10220	544	1~200	140		
NHM 31-4000	4170	200	250	12481	665	1~160	130	325	325
NHM 31-5000	5190	160	200	12387	825	1~160	130		

INM INSTALLATION

INM 2-201-250A INSTALLATION



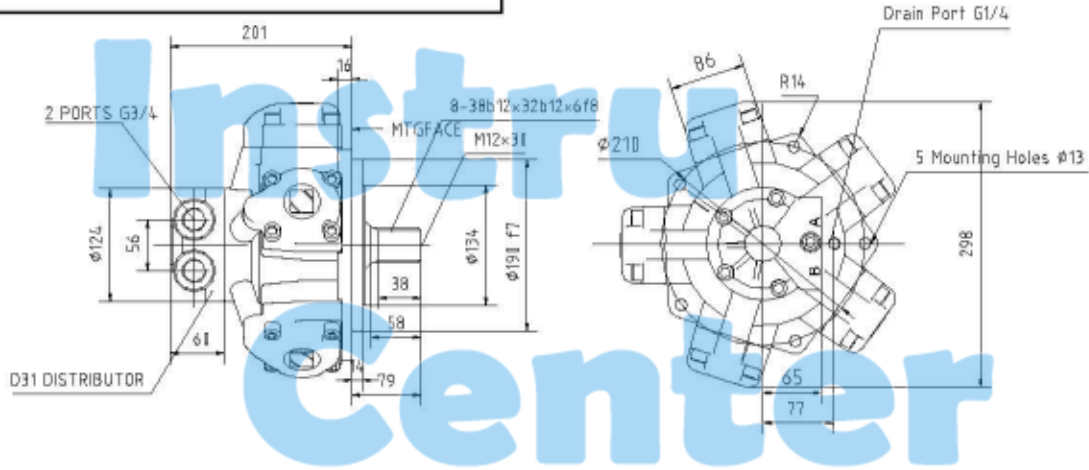
INM2-200~250 I NST ALLATION



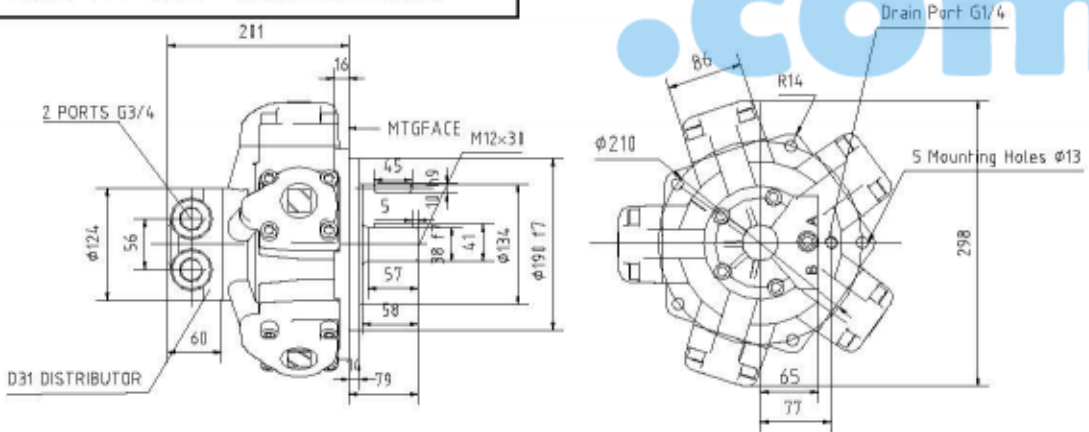
BHC Radial Piston Hydraulic motors

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INM3-300~400A INSTALLATION



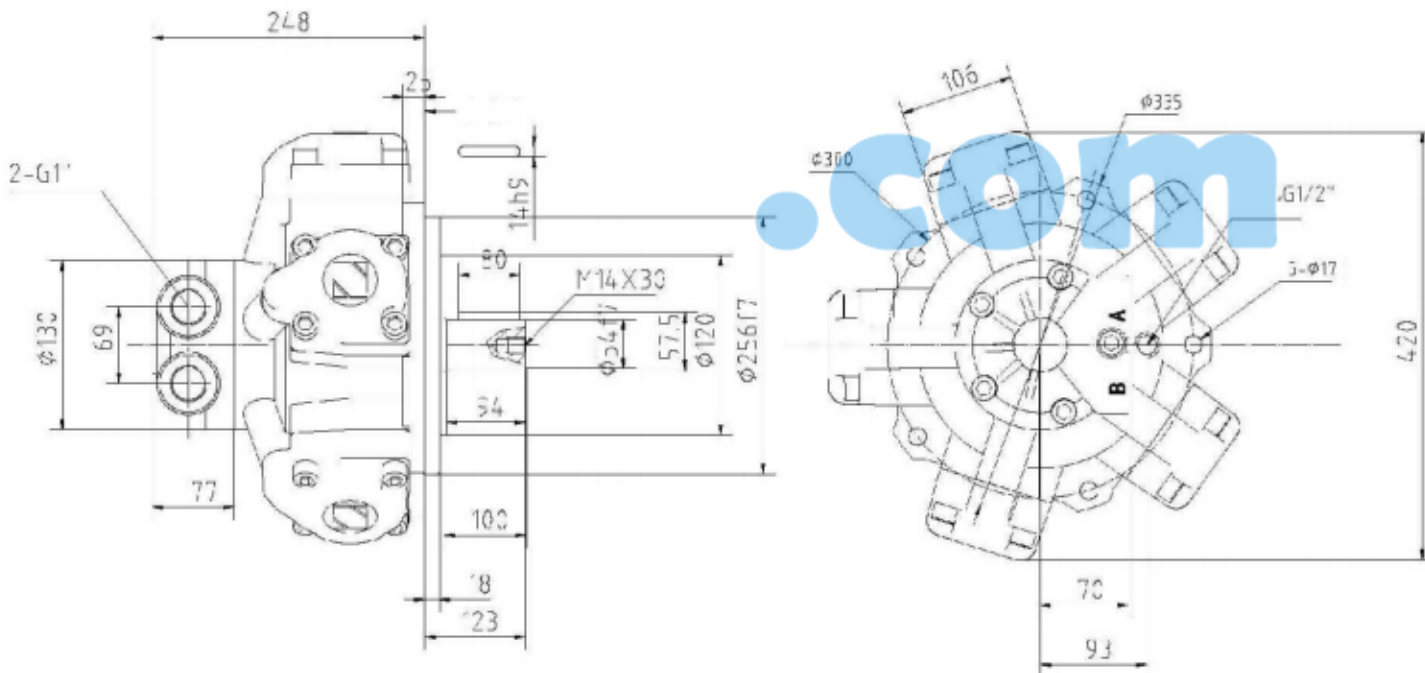
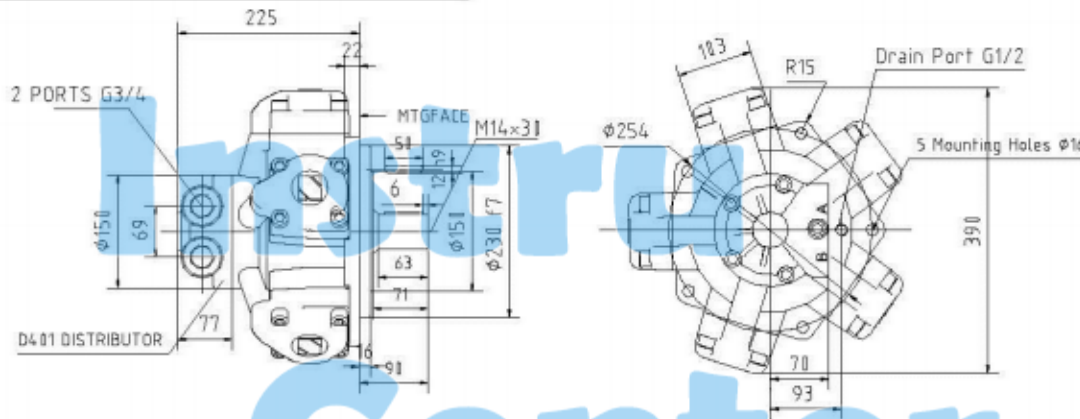
INM3-300~400B INSTALLATION



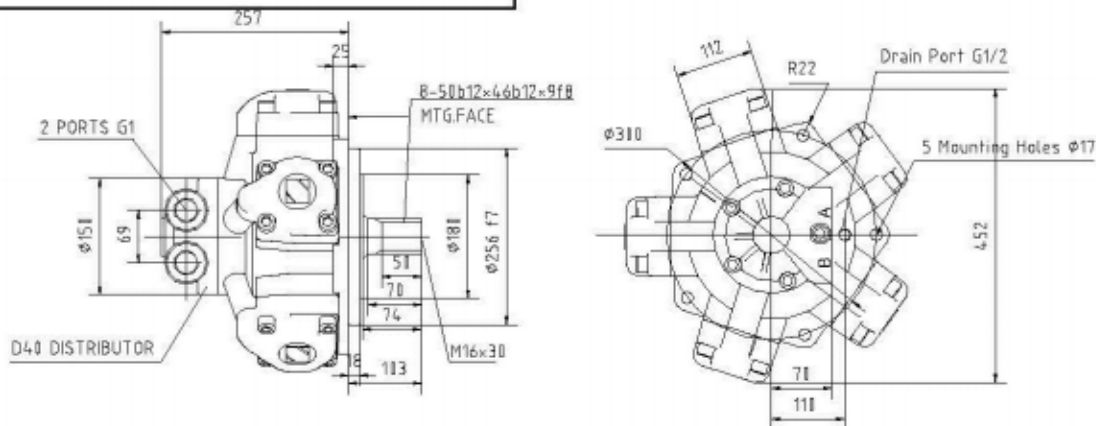
BHC Radial Piston Hydraulic motors

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INM6-400~700B I NSTALLATION



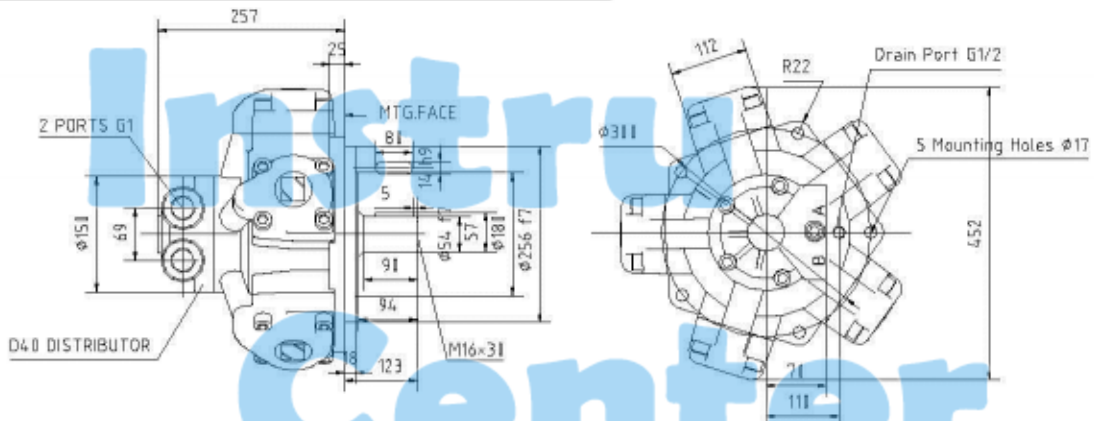
INM11-700~1300A I NSTALLATION



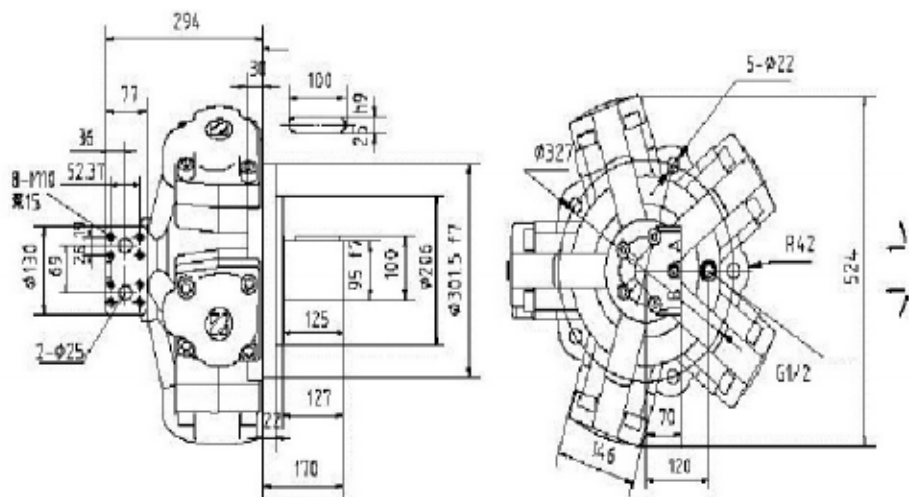
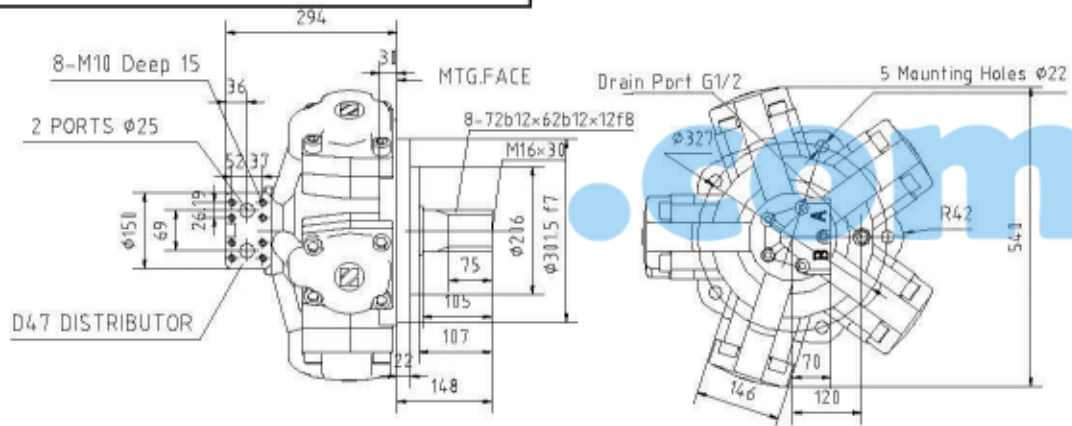
BHC Radial Piston Hydraulic motors

INM Series Manual

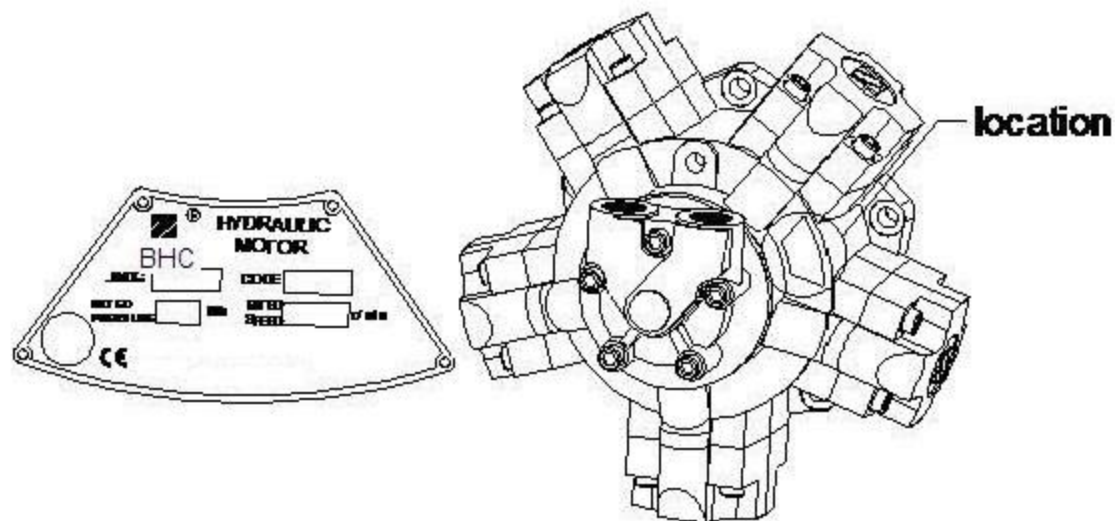
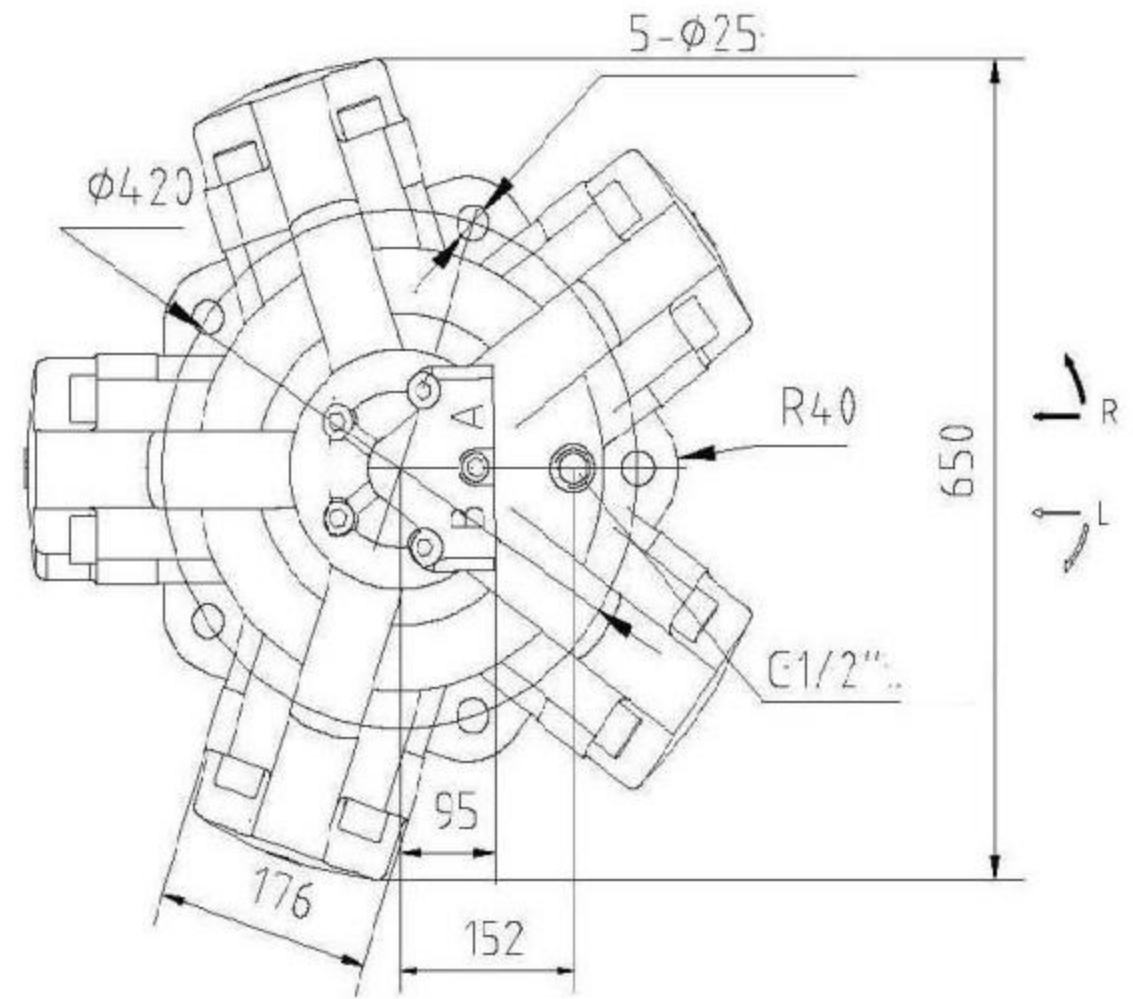
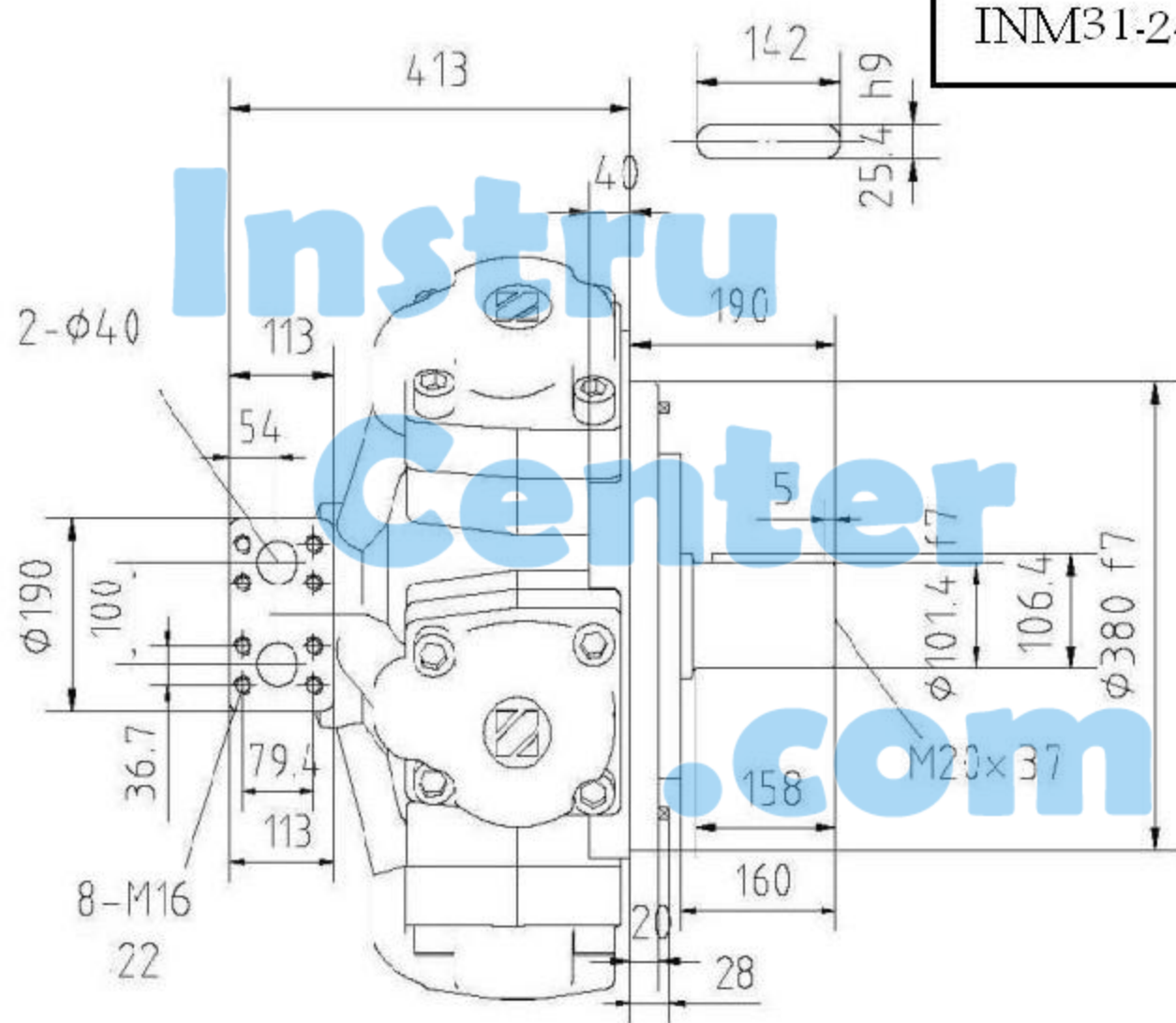
INM11-700~1300B I NSTALLATION



INM16-1400~2400A I NSTALLATION



INM31-2400~5000A INSTALLATION



Comment:

The "CODE" on the nameplate includes the information of its manufacture date.

For example,

CODE 507381 indicates it is the 381st motor of this series manufactured in July, 2005.

1.5 STRUCTURES AND OPERATION PRINCIPLE

The structure of the motor is indicated as in the following drawing.

Instru

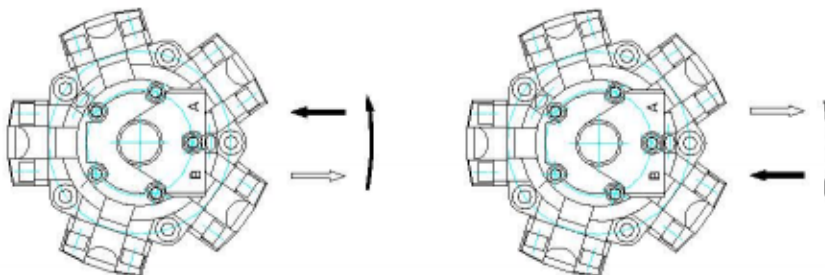
1.5.1 OPERATION PRINCIPLE

Thrust P from oil pressure on the piston is generated as soon as the oil cylinders of those pistons with hydraulic oil through is acted by hydraulic force, this thrust force is transmitted to the center of crank shaft by the connecting rods to make the shaft rotate, and at the same time the distributor rotates together with the general returned to oil port, meanwhile the pistons are pushed upward by the crankshaft, hydraulic oil which have worked is returned to oil tank by distributor. Every piston put through the high and low-pressure oil in proper order, the drive torque of the same direction created on the center of the output shaft adds up, so the output shaft acquires a continuous and steady rotating torque.

OUTPUT TURNING (drawing attached)

The rotating direction of a normal motor is the oil coming in from the A cavity. See from the output shaft direction for clockwise. (Attached figure)

The rotating direction of the motor varies with the direction of the oil output direction.



Instru

II. WORKING CONDITION

Whether the motor is used correctly will directly influence its working life, so the following basic requirements should be met.

Please read the following items carefully before the installation.

The motor type should be matched with the rotating speed and torque required by the client, and so should the oil pump.

2.1 SYSTEM REQUIREMENTS (drawing attached)

The system should be equipped with corresponding oil filters to ensure the cleanness of the oil used by the system.

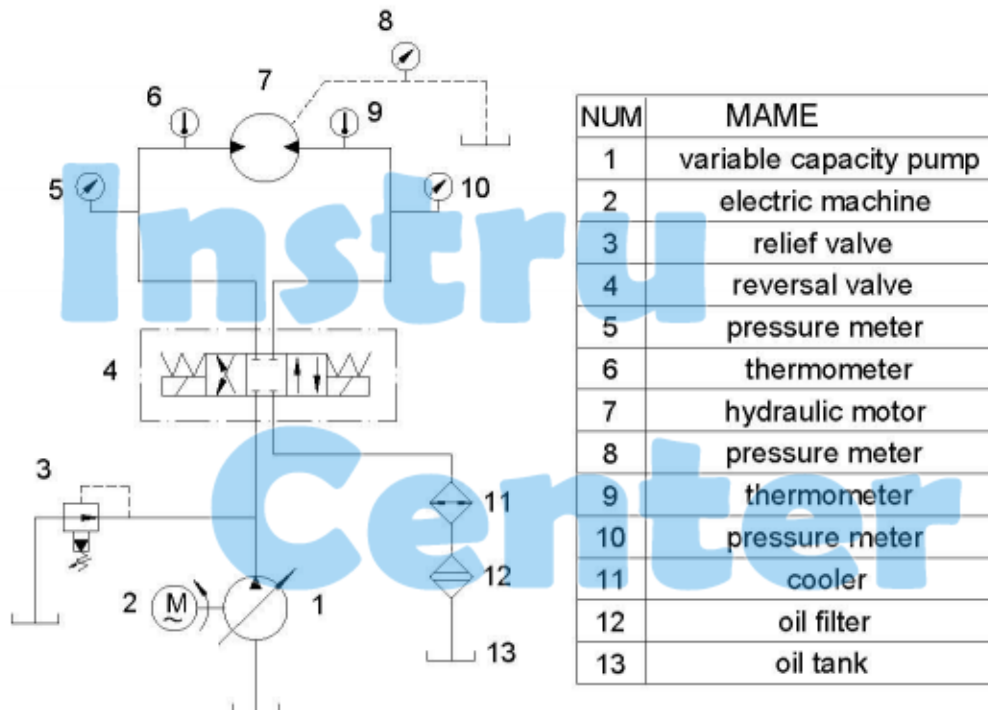
The hydraulic circuit must be equipped with a cooling system to prevent excessively high oil temperature.

The oil input pipe should be equipped with pressure meters and thermometers.

The oil circuit for the hydraulic pump should be equipped with pressure meters.

CAUTION

The hydraulic system must be equipped with all the elements indicated in the following chart.



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2.2 SYSTEM REQUIREMENTS ABOUT THE HYDRAULIC OIL

According to the environment temperature and different use, the hydraulic oil used should have outstanding viscosity-temperature and anti-foam properties, oxidation and rust resistance, and high flashpoint. During the operation of the motor, its viscosity should be $25 - 70) \times 10^{-6} \text{m}^2/\text{s}$, and the water, alkali and mechanical impurity should not exceed the allowed amount.

YB-N46 and YB-N68 anti-wear hydraulic oil is recommended.

The filter precision of the system should be better than $25\mu\text{m}$.

The normal working temperature is $25-55^\circ\text{C}$. The short-term working temperature should be no higher than 65°C .

2.3 REQUIREMENTS ABOUT THE OIL PIPE

1) No. 10 or No. 15 seamless steel pipe should be selected.

2) The size of the oil pipe: $d \geq \sqrt{5.3Q}$ (Q:flux unit: L/min)

3) Thickness (chart attached):

Pressure P (Mpa)	Thickness δ
$P \leq 8$	2
$8 < P \leq 16$	3
$16 < P \leq 25$	4.5

III. INSTALLATION

Before the installation, please check to see whether the motor is damaged. If the motor has been stored for too long, the inner oil should be exhausted and washed to avoid adhesion of the interior moving parts.

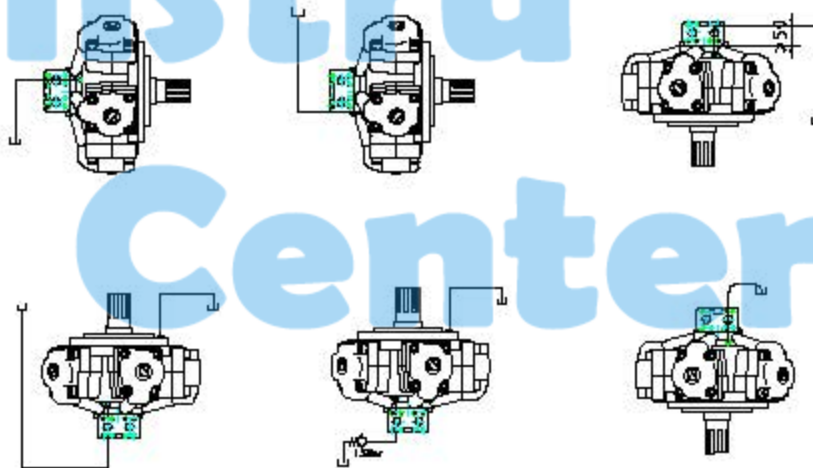
The installation bracket for the motor must be of adequate strength, so as to avoid vibration during the rotation.

The installation bolts must be evenly tightened.

Connection of the Oil Drain:

Generally, there are two screws for oil drainage on the motor. The user can select either one according to his need. No matter what installation location is selected, the maximal level of the oil drain should be higher than the maximal level of the motor to prevent the oil in the shell from being exhausted. The oil drain alone goes back to the oil tank, and it is prohibited

to connect it with the oil return pipe. And the pressure inside the leaking pipe should be no higher than 0.1 Mpa. (drawing attached)



If the motor appears unsteady during low-speed operation, adding the backpressure, which is no less than 0.2 Mpa, can solve it.

This type of motor can not operate in pump operating condition, less be used as a pump.

The installation surface should be smooth.

Ensure the correct dimension of the connecting flange, mounting and the connecting shaft during the installation.

Ensure the output shaft has a good concentricity with the equipment in connection and transmission with it. During the installation of the output shaft, be careful to prevent axial block between the output shaft and the connecting equipment.

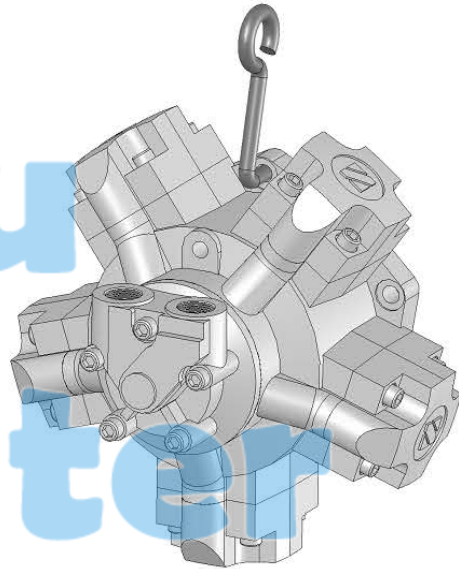
During the installation, protect the smoothness and parallelism of the connecting panel at the oil output port, and prevent the bad oil sealing because of bumps, which may lead to leakage.

The location of the hook is indicated as in the drawing.

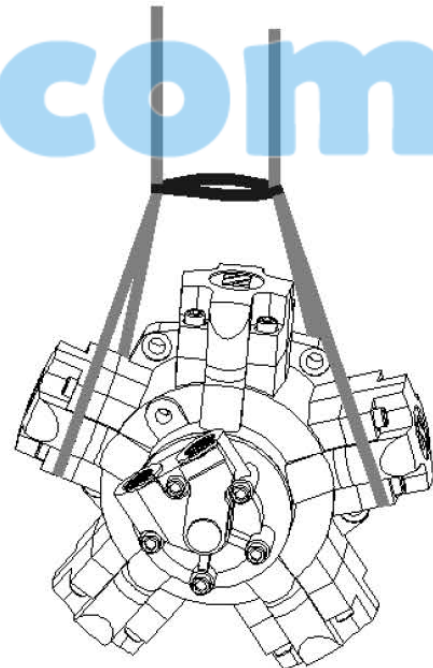
CAUTION

To ensure the safe craning, please use crane of adequate size and adequate hooks and ropes. For the corresponding motor weight, please refer to the basic parameter table.

Motors lower than the INM16 series can be craned directly at the installation hole with the hook as in the drawing on the right.



The INM16 series (including the 16 series) must be craned with the two angles fastened with two ropes to ensure safety and the balance of the motor.



The motor can not be installed with force or in distortion.

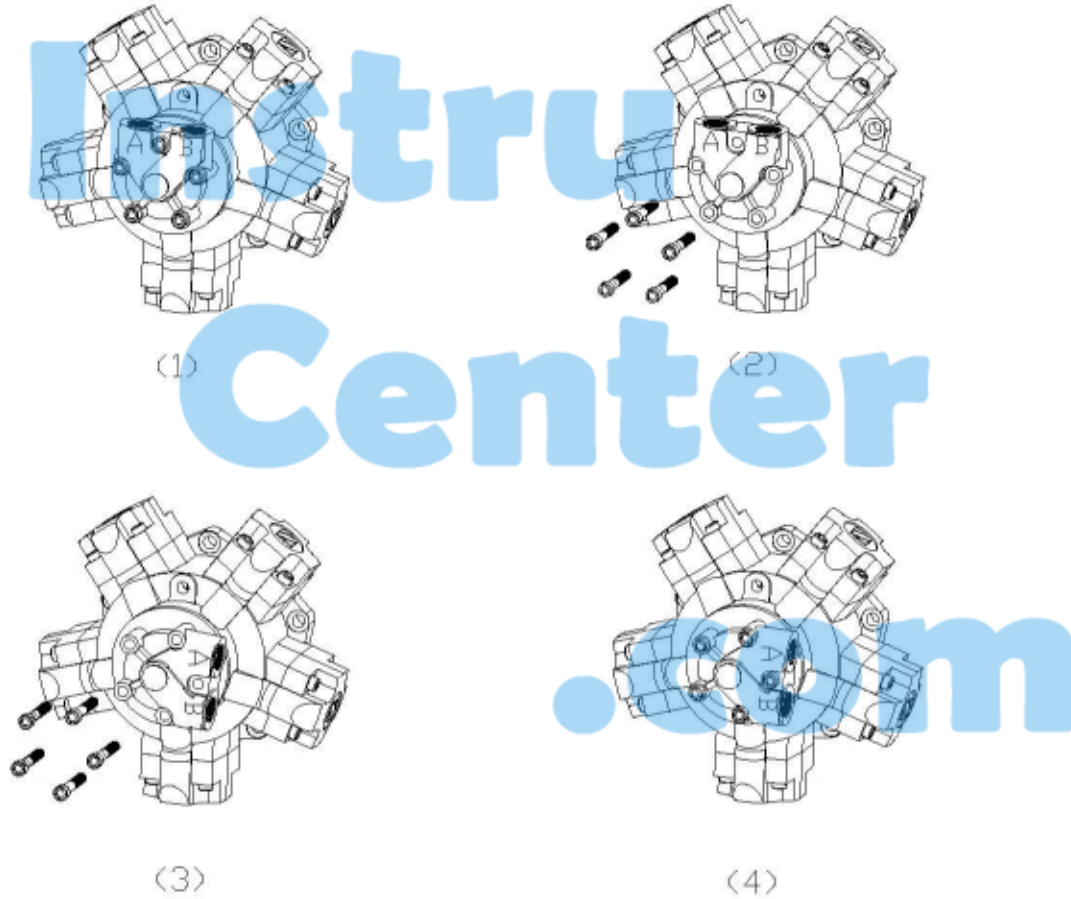
Do not take away the plastic stuff before the pipe circle and the oil pipe are installed.

The motor can be installed in any direction

During the installation of the motor, if the location of the input/output port is not good, it can be adjusted as follows (drawing attached):

- 1) Press the oil distributor (for the whole process),
- 2) Take out 5 installation bolts,
- 3) Turn it to the angle as you wish,

- 4) Find the corresponding boltholes, and evenly tighten the bolt.



For system coupling, please notice the relation between the installation location of the oil input/output ports of the motor and the rotation of the motor. During installation, if the oil input/output ports do not correspond with the rotation direction of the output shaft, exchange the oil input/output pipes connection to the A and B cavities, then the working rotation direction will be converse.

IV. USAGE OF THE MOTOR

4.1 USAGE OF THE MOTOR

The pressure, flux and output power of the motor should not exceed the prescribed value.

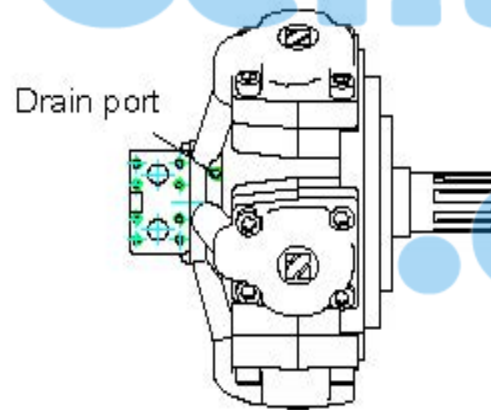
For long-term operation, the oil temperature should not exceed 65°C.

The maximal working temperature of the motor: $-30^{\circ}\text{C} - 70^{\circ}\text{C}$

4.2 TRIAL OPERATION

Before starting the motor, check to see whether the motor is correctly installed and connected, whether the connection is correct and fast, and whether the system has no error.

Before starting the motor, the working hydraulic oil must be filled into the highest spill port to full capacity.



Check to see whether the oil input/output direction and the rotation direction of the motor is in accordance with the operating condition requirements.

Adjust the pressure of the relief valve of the oil supply circuit to the lowest, and gradually turn it to the demanded pressure in operation.

Tighten the input/output pipe and oil drain.

When the motor has operated with no load for at least 20min, gradually increase the pressure to the working pressure, and notice at any moment whether the motor operates normally.

During the operation, frequently check the working situation of the motor and the system. In case of abnormal temperature rising, leakage, vibration and noise, or abnormal fluctuation of pressure, immediately stop the machine and find out the cause.

CAUTION

During the use of the motor, if the oil input port temperature

BHC Radial Piston Hydraulic motors*INM Series Manual*

65°C, please check to see whether the cooler is working normally, to ensure the normal working temperature of the motor surface.

Instru

V. MOVING AND STORAGE

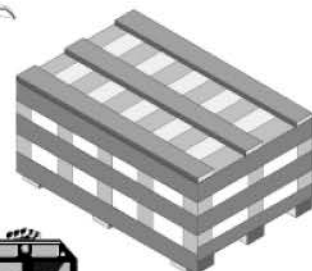
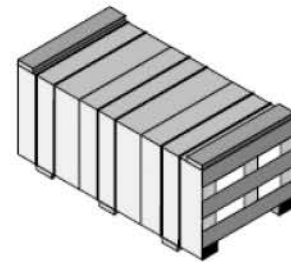
Center

Each motor should be packed individually.

Be careful and gentle during package and transportation, and prevent the motor from bumping with other rigid objects.



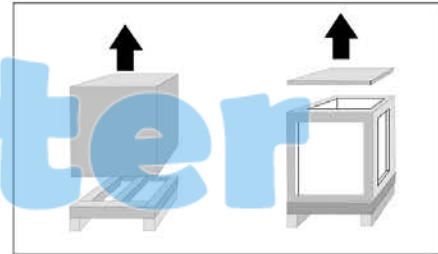
For the transportation, the motor must be equipped with appropriate wooden box and crate according to its size, and it should be wrapped with plastic paper to prevent motor failure because of rust caused by humidity.



Avoid laying the motor directly on the ground. If unused for a long time, it should be covered with anti-rust oil.

Instru

Open the package box and take out the motor as indicated in the drawing.



Storage environment: 10—90%RH, -20—65°C.

Avoid vapor, humidity and any corrosive gas during the transportation and storage of the motor.

WARNING

Please do not put the motor in abnormal environment, or the motor will be affected.

Instru

VI . SOLUTIONS TO MOTOR FAILURES

Center

The motor is a delicate element, and needs installing, trying and maintaining by professionals. Without the permission of our company, never dismantle and repair it by yourself. With the permission of our company and with the user unit able to dismantle and check it, do it by yourself after reading the instructions, and pay attention to the following three points:

- During the dismantling, do not burr or bump the parts, with special attention to the moving surface and sealing surface. Put the dismantled parts in a clean container and avoid collision between each other. Hammer knocking is prohibited in dismantling and assembling.
- Carefully check the dismantled parts. For the worn parts, basically change them instead of repairing them. In principle, the sealing parts should all be changed.
- Before assembling, wash and dry all the parts, and do not mop the parts with cotton yarn and rag. The assembling environment and the tools used should be clean. After the assembling, turn the output shaft and ensure it is flexible and not blocked.

Instru

SOLUTIONS TO FAILURES

NO.	Failure	Cause	Solution
1	The motor does not rotate.	The hydraulic pump not started	Start the hydraulic pump
		Inadequate oil in the oil tank	Fill in the oil
		The reversal valve in the middle	Open the reversal valve
		The system relief valve fully open	Adjust the system pressure to the prescribed value
		Inadequate motor torque	Change the motor
2	Abnormal noise during the operation	Air in the hydraulic system	Find out the cause of air inlet and exhaust the air in the oil
		Empty oil tank	Increase oil supply
		Motor failure	Change the motor
		Damaged support bearing	Change the bearing
3	Motor leakage	Damaged seal	Change the seal
		Air hole, sand hole or crack on the parts	Change the parts
4	Motor heating	Excessive temperature of the hydraulic oil	Increase the cooling capacity
		Low efficiency of the motor	Change the wear parts
		Abnormal wear	Change the motor
5	Increased leakage at the spill port	Abnormal wear of the oil distribution panel	Rub the oil distribution panel, rub the flow distribution plain of the shell and change the seal
		Seal damage at the plain or piston	

VII. MAINTENANCE AND LATER DISPOSAL

Maintenance:

Duly check the fittings of the hydraulic system, the accuracy of the pressure meter and the thermometer.

Duly check the hydraulic oil:

It is prohibited to use blend oil of different types of hydraulic oils. The period of changing the oil varies with different mines.

In general case: change the hydraulic oil every half a year.

Disposal of the waste oil after using the motor:

It should be carried to the waste oil disposal unit for central disposal.

If the motor is to be unused for a long time:

The cavity should be filled with oil and each oil hole should be sealed with oil. Cover the output shaft with lubrication, and wrap it with cloth or a cover.

WARNING: FOR THE CONSEQUENCES CAUSED BY THE USER BECAUSE HE DOES NOT OBEY THE ABOVE SUGGESTION OR USES THE MOTOR IN A WRONG WAY, THE COMPANY DOES NOT BEAR ANY RESPONSIBILITY.