Italgroup®

HYDRAULIC MOTORS

ITALY

IAM

Single displacement hydraulic motors

COMPANY WITH
QUALITY SYSTEM
CERTIFIED BY DNV GL
= ISO 9001 =

ITALGROUP MOTORS
IAM SERIES
TECHNICAL CATALOGUE
GENERAL INDEX

Italgroup®
HYDRAULIC MOTORS
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ITALGROUP MOTORS
IAM SERIES
TECHNICAL CATALOGUE
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FORMULAS

$$\text{Torque [Nm]} = \text{Specific torque [Nm/bar]} * \text{Pressure [bar]}$$

$$\text{Torque [Nm]} = \frac{\text{Displacement [cc/Rev]} * \text{Pressure [bar]}}{62.8}$$

$$\text{Power [kW]} = \frac{\text{Torque [Nm]} * \text{Speed [rpm]}}{9549}$$

$$\text{Power [CV]} = \frac{\text{Torque [Nm]} * \text{Speed [rpm]}}{7023}$$

$$\text{Speed [rpm]} = \frac{\text{Flow [l/min]} * 1000}{\text{Displacement [cc/Rev]}}$$

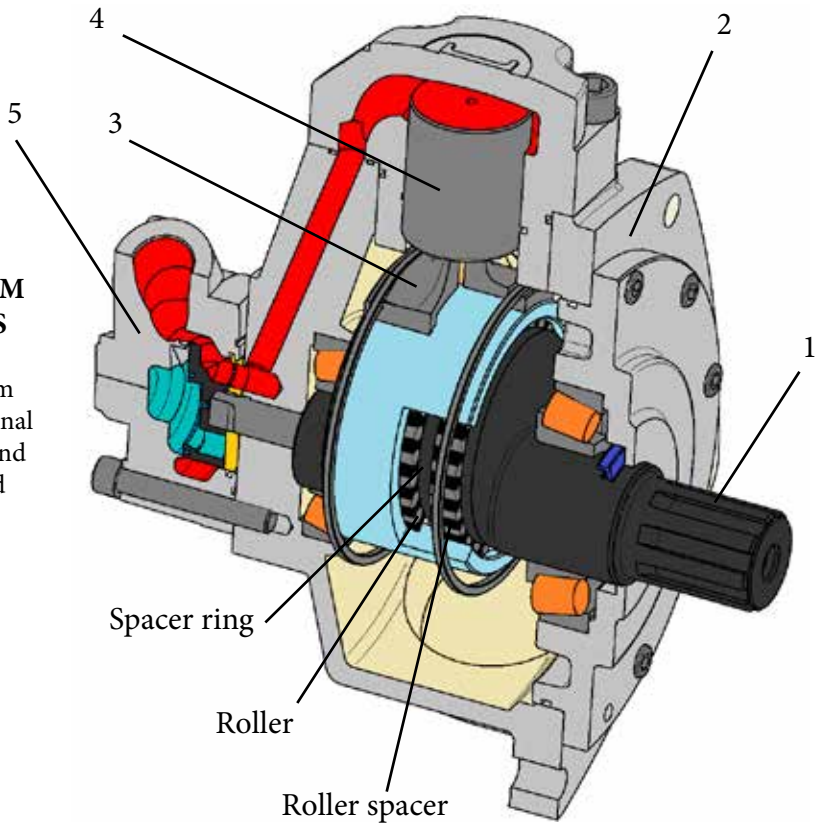
$$\text{Displacement [cc/Rev]} = \frac{\text{Torque [Nm]} * 62{,}8}{\text{Pressure [bar]}}$$

$$\text{Flow [l/min]} = \frac{\text{Displacement [cc/Rev]} * \text{Speed [rpm]}}{1000}$$

Carefully read the use and maintenance manual before start-up the motor. The use and maintenance manual must be placed near to motor installation location in order to guarantee operators easy access to the instruction manual. For further information please contact Italgroup.

Motor description

IAM series motors are radial piston hydraulic motors (generally indicated as LSHT motors, low speed high torque motors) with a rotating shaft (1) and a stationary housing (2). The pistons (4) are located radially and the working fluid provide the mechanical force that push the pistons against the eccentric shaft, providing the shaft ouput torque. The inlet and outlet flow to and from the pistons is regulated by a distributor (5), that provides the oil distribution correct timing. The pistons transfer the forces to the eccentric shaft through a connecting rod (3). Acting in the adequate way (increasing or reducing the oil flow coming from the pump) the motor rotational speed can be increased or reduced. The motor design guarantee extremely high starting torque and high mechanical working efficiency. Respecting the limitation of working parameters (indicated into the technical datasheets) and all recommendations (including fluid recommendations), high motor lifetimes are obtained and very low maintenance requirements are needed.



TECHNICAL INNOVATION ON IAM H45, H5, H55, H6 AND H7 SERIES

Special bearing construction to prevent from seizure of the connecting rod with the external bushing. This could happen in high speed and high pressure working conditions and could lead to motor breakdown.

The new bearing design consists of:
- roller spacers, with function of
  - keeping rollers axis parallel
  - creating space between rollers to hold more oil

- spacer rings, with function of
  - keeping rollers lined up
  - absorbing axial forces coming from connection rod

IAM SERIES

Hydraulic motors of the IAM series are single displacement crankshaft radial piston motors. Thanks to great variety of accessories IAM series can be used in a wide range of applications such as:

- Marine equipments
- Winches
- Offshore equipments
- Conveyors
- Injection moulding machines
- Steel bending machines
- Fork lifts trucks
- Skid steer loaders
- Dumpers
- Agricultural and forestry machines
- Municipal vehicles
- Airport machinery

Product Features:

- ✓ High volumetric and mechanical efficiencies
- ✓ Very smooth running at low speeds
- ✓ High starting torque / constant torque
- ✓ Wide speed range
- ✓ Compact Design
- ✓ Low maintenance and high reliability
- ✓ Bi-directional
- ✓ High radial and axial force allowed
- ✓ Speed sensor available
- ✓ Built-in valves available

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MOTOR TECHNICAL DATA

Motor	Size	Displacement	Theoretical torque	Max cont. pressure	Max cont. speed	Peak speed (**)	Max cont. power (*)	Max power	Dry weight
		[cc]	[Nm/bar]	[bar]	[rpm]	[rpm]	[kW]	[kW]	[kg]
IAM 80	H1	80	1.3	250	950	1050	20	40	26
IAM 100	H1	100	1.6	250	950	1050	27	40	26
IAM 150	H1	157	2.5	250	950	1050	27	40	26
IAM 175	H1	176	2.8	250	800	900	27	40	26
IAM 195	H1	195	3.1	250	800	900	27	40	26
IAM 200	H1	207	3.3	250	750	850	27	40	26
IAM 250	H1	257	4.1	250	750	850	27	40	26
IAM 300	H1	307	4.9	250	750	850	27	40	26
IAM 200	H2	198	3.2	250	800	900	33	49	42
IAM 250	H2	253	4.0	250	750	850	33	49	42
IAM 300	H2	314	5.0	250	750	850	33	49	42
IAM 350	H2	362	5.8	250	650	750	33	49	42
IAM 400	H2	424	6.7	250	600	700	33	49	42
IAM 500	H2	492	7.8	250	500	600	33	49	42
IAM 600	H2	584	9.3	250	500	600	33	49	42
IAM 350	H3	349	5.6	250	630	700	45	68	68
IAM 400	H3	397	6.3	250	600	680	45	68	68
IAM 450	H3	452	7.2	250	600	680	45	68	68
IAM 500	H3	491	7.8	250	600	680	45	68	68
IAM 600	H3	594	9.4	250	550	630	45	68	68
IAM 650	H3	660	10.5	250	500	580	45	68	68
IAM 700	H3	707	11.2	250	450	500	45	68	68
IAM 800	H3	791	12.6	250	400	450	45	68	68
IAM 700	H4	714	11.4	250	500	580	55	80	92
IAM 800	H4	792	12.6	250	450	530	55	80	92
IAM 850	H4	847	13.5	250	450	530	55	80	92
IAM 900	H4	904	14.4	250	450	530	55	80	92
IAM 1000	H4	992	15.8	250	330	400	55	80	92
IAM 1100	H4	1116	17.8	250	330	400	55	80	92
IAM 1200	H4	1192	19.0	250	300	350	55	80	92
IAM 1250	H4	1247	19.8	250	250	300	55	80	92
IAM 1400	H4	1332	21.2	250	230	280	55	80	92
IAM 1100	H45	1183	18.8	250	350	400	85	120	118
IAM 1400	H45	1376	21.9	250	300	350	85	120	118
IAM 1600	H45	1648	26.2	250	275	325	85	120	118
IAM 1800	H45	1815	28.9	250	250	300	85	120	118

MOTOR TECHNICAL DATA

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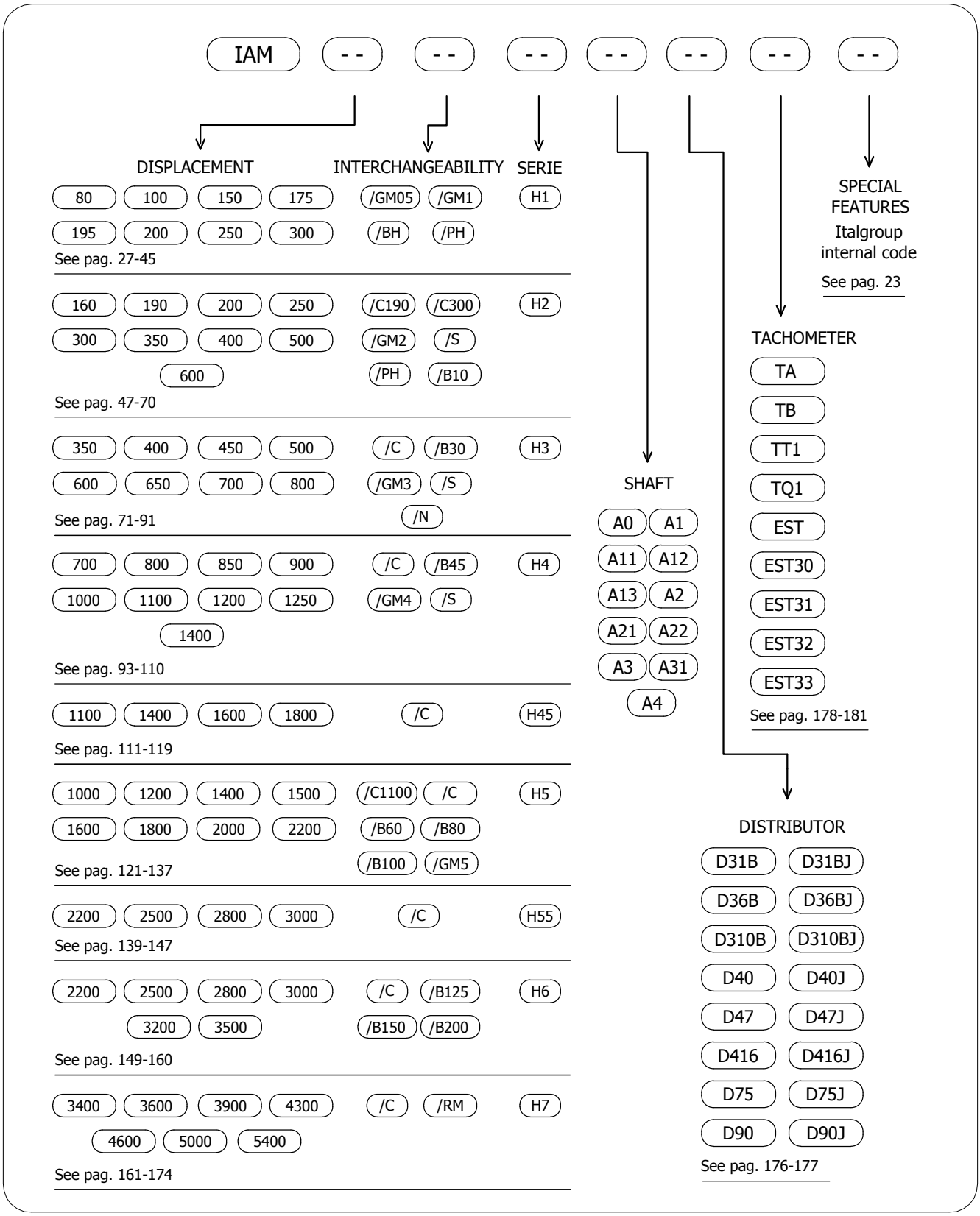
Motor	Size	Displacement	Theoretical torque	Max cont. pressure	Max cont. speed	Peak speed (**)	Max cont. power (*)	Max power	Dry weight
		[cc]	[Nm/bar]	[bar]	[rpm]	[rpm]	[kW]	[kW]	[kg]
IAM 1000	H5	1094	17.4	250	350	400	90	120	173
IAM 1200	H5	1231	19.6	250	300	350	90	120	173
IAM 1400	H5	1376	21.9	250	300	350	90	120	173
IAM 1500	H5	1528	24.3	250	300	350	90	120	173
IAM 1600	H5	1648	26.2	250	300	340	90	120	173
IAM 1800	H5	1815	28.9	250	250	300	90	120	173
IAM 2000	H5	2035	32.4	250	230	260	90	120	173
IAM 2200	H5	2220	35.3	250	220	240	90	120	173
IAM 2200	H55	2126	33.8	250	240	280	120	170	203
IAM 2500	H55	2525	40.2	250	240	280	120	170	203
IAM 2800	H55	2807	44.7	250	240	280	120	170	203
IAM 3000	H55	3028	48.2	250	230	270	120	170	203
IAM 2200	H6	2206	35.1	250	220	260	120	170	308
IAM 2500	H6	2525	40.2	250	220	260	120	170	308
IAM 2800	H6	2807	44.7	250	220	260	120	170	308
IAM 3000	H6	2983	47.5	250	210	250	120	170	308
IAM 3200	H6	3289	52.3	250	200	240	120	170	308
IAM 3500	H6	3479	55.4	250	200	240	120	170	308
IAM 3900	H7	3907	62.2	250	160	200	130	180	405
IAM 4300	H7	4343	69.1	250	150	190	130	180	405
IAM 4600	H7	4616	73.5	250	140	190	130	180	405
IAM 5000	H7	5088	81.0	250	140	180	130	180	405
IAM 5400	H7	5384	85.7	250	130	170	130	180	405
IAM 6000	H8								
IAM 6500	H8								
IAM 6800	H8			**For IAM H8, please refer to IAMD catalogue**					
IAM 7600	H8								
IAM 8000	H8								

For all motors:
- Hydrostatic test pressure: 420 bar
- Refer to motor performance diagrams for more information

- (*) For motor operation with a continuous duty cycle at maximum continuous power the flushing is usually required. For more information please contact our technical department.
- (**) Do not exceed maximum power.

Interchangeability chart

Italgroup motor code	Cross reference motor code
IAM 200/B10	HMB 10
IAM 450/B30	HMB 30
IAM 800/B45	HMB 45
IAM 1000 H5 - IAM 1000/B60 H5	HMB 60
IAM 1400 H5 - IAM 1400/B80 H5	HMB 80
IAM 1600 H5 - IAM 1600/B100 H5	HMB 100
IAM 2200 H55	HMB 125
IAM 2200 H6 - IAM 2200/B125 H6	HMB 125
IAM 2500 H6 - IAM 2500/B150 H6	HMB 150
IAM 3000 H6 - IAM 3000/B200 H6	HMB 200
IAM 4600 H7	HMB 270
IAM 5400 H7	HMB 325
IAM 160-190-250/C190 H2	MR 160 - MR 190
IAM 250-300-350-400/C300 H2	MR 250 - MR 300 - MRE 330 - MRA 400
IAM 450-500/C H3	MR 450 - MRE 500
IAM 700-800/C H4	MR 700 - MRE 800
IAM 1100-1400-1600/C H45 IAM 1000-1400-1600/C1100 H5	MR 1100 - MRE 1400 - MRA 1600
IAM 1600-1800-2000/C H5	MR 1600 - MR 1800 - MRE 2100
IAM 2500-2800-3000-3500/C H6	MR 2400 - MR 2800 - MRE 3100 MRA 3500
IAM 3600-4500-5400/C H7	MR 3600 - MR 4500 - MRE 5400
IAM 5000/RM H7	RM 5000
IAM H1/GM05	GM05
IAM H1/GM1	GM1
IAM H2/GM2	GM2
IAM H3/GM3	GM3
IAM H4/GM4	GM4
IAM H5/GM5	GM5
IAM H2/S	M2
IAM H3/S	M3
IAM H4/S	M4



Fluid selection

In general, we recommend the use of hydraulic oils with minimum viscosity index of 95, with anti-wear additives (ISO HM and HV). Once normal working temperature is reached, the drain oil viscosity must be at least 35-40 cSt, preferably in the range from 40 to 60 cSt.
HE oils (ecological fluids) are allowed, but must be used with particular attention, because them can influence the motor seals compatibility, and can reduce motor performances and life. Please contact us in case of HE oils usage.

Optimal viscosity selection

Referring the first approximated selection to the room temperature, we advice the following:

Room temperature	Oil
-20°C/0°C	BP ENERGOL HLP – HM 22
-15°C/+5°C	BP ENERGOL HLP – HM 32
-8°C/+15°C	BP ENERGOL HLP – HM 46
0°C/+22°C	BP ENERGOL HLP – HM 68
+8°C/+30°C	BP ENERGOL HLP – HM 100
-20°C/+5°C	BP BARTRAN HV 32
-15°C/+22°C	BP BARTRAN HV 46
0°C/+30°C	BP BARTRAN HV 68

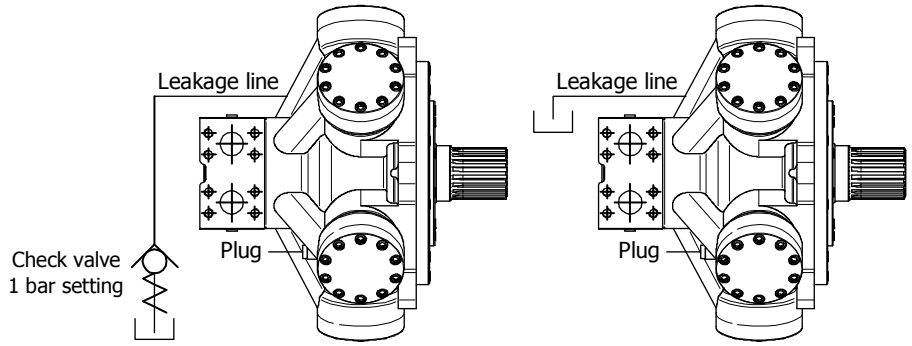
ATF (automatic transmission fluid) oils, SAE 10-20-30 W oils, multigrade motor oils (SAE 15 W 40, 10 W 40), universal oils, can also be used. Always fill the motor (please refer to the "DRAIN RECOMMENDATIONS" section) with the selected hydraulic fluid before motor start-up. During cold start-up avoid high-speed operation until the system reach the working temperature, in order to provide an adequate lubrication. Every 5-8 °C of increase respect to the optimal working temperature for the selected oil, the hydraulic fluid life decrease of about 40-50% (refer to "OXIDATION" section). Consequently, the motor lifetime will be affected by the working temperature increase respect to the optimal working temperature of the selected oil. The maximum continuous working temperature is 70 °C, the temperature must be measured from motor drain line. If the motor doesn't have a drain line, the temperature must be evaluated at the return line port.

Fire resistant oil limitations

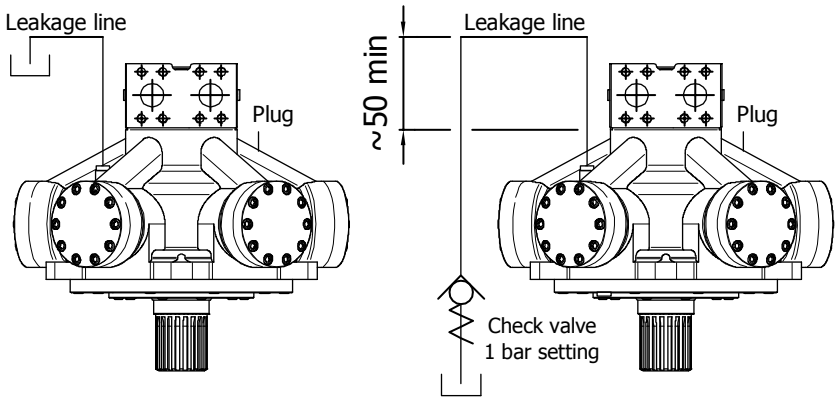
	Max cont. Pressure [bar]	Max int. Pressure [bar]	Max Speed [rpm]
HFA, 5-95% oil-water	103	138	50%
HFB, 60-40% oil-water	138	172	100%
HFC, water-glycol	103	138	50%
HFD, ester phosphate	250	293	100%

Filtration	Hydraulic systems oil must always be filtered. The choice of filtration grade derives from needs of service life and money spent. In order to obtain stated service life it is important to follow our recommendations concerning filtration grade. When choosing the filter it is important to consider the amount of dirt particles that filter can absorb and still operate satisfactorily. For that reason we recommend filters showing when you need to substitute filtering cartridge. · 25 µm filtration required in most applications · 10 µm filtration in closed circuit applications
Oxidation	Hydraulic oil oxidizes with time of use and temperature. Oxidation causes changes in colour and smell, acidity increase or sludge formation in the tank. Oxidation rate increases rapidly at surface temperatures above 60°C, in these situations oil should be checked more often. The oxidation process increases the acidity of the fluid; the acidity is stated in terms of the "neutralization number". Oxidation is usually slow at the beginning and then it increases rapidly. A sharp increase (by a factor of 2 to 3) in neutralization number between inspections shows that oil has oxidized too much and should be replaced immediately.
Water content	Oil contamination by water can be detected by sampling from the bottom of the tank. Most hydraulic oils repel the water, which then collects at the bottom of the tank. This water must be drained off at regular intervals. Certain types of transmission oils and engine oils emulsify the water; this can be detected by coatings on filter cartridges or a change in the colour of the oil. In such cases, obtain your oil supplier advice.
Degree of contamination	Heavy contamination of the oil causes wear rising in hydraulic system components. Contamination causes must be immediately investigated and remedied.
Analysis	It is recommended oil being analyzed every 6 months. The analysis should cover viscosity, oxidation, water content, additives and contamination. Most oil suppliers are equipped to analyze oil state and to recommend appropriate action. Oil must be immediately replaced if the analysis shows that it is exhausted.

Motor axis horizontal

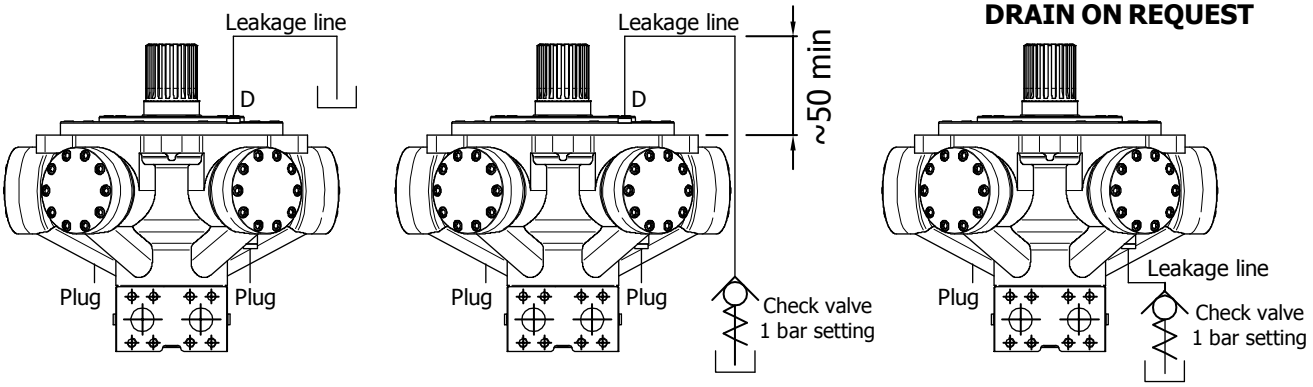


Motor axis vertical, shaft down



Motor axis vertical, shaft up

D = ADDITIONAL DRAIN ON REQUEST



Leakage line connection

Always fill the motor with hydraulic fluid before start-up. Arrange piping in a way that the motor cannot drain off and cannot generates air bubbles into the motor case. Under certain conditions may be is necessary to arrange a check valve in order to help avoiding the motor drain off. Always check carefully that the leakage line pressure doesn't overcome 10 bar pressure: therefore leakage lines must be shorter as possible and with a minimum flow resistance.

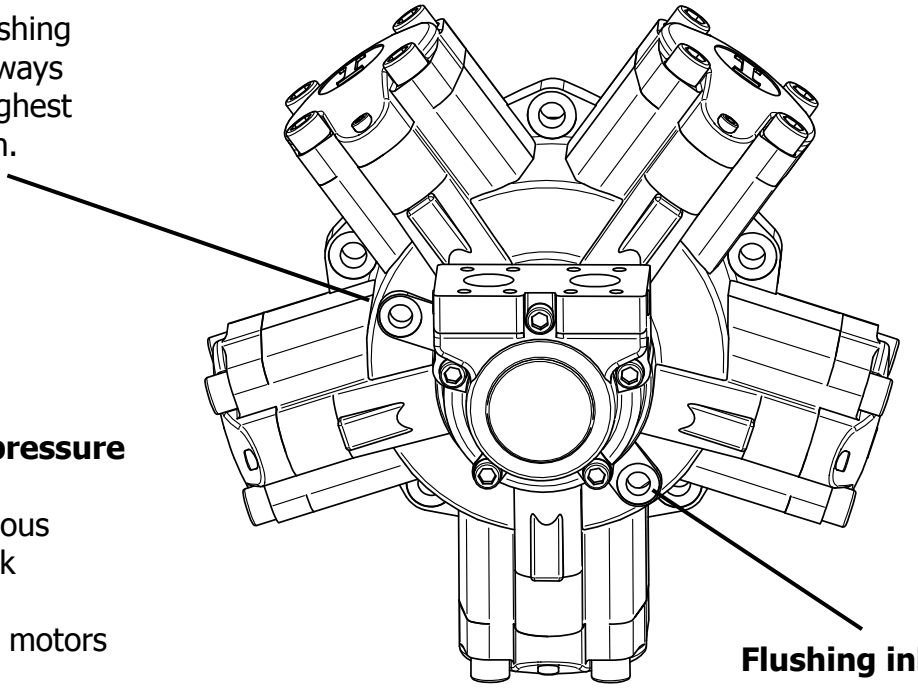
Motor	Flushing flow [l/min]
IAM H1 80,100	5
IAM H1 150, 175, 195, 200, 250, 300 IAM H2 200, 250, 300	6
IAM H2 350, 400, 500 IAM H3 350, 400, 450, 500	8
IAM H2 600 IAM H3 600, 650, 700, 800 IAM H4 700, 800, 850, 900, 1000, 1100, 1250, 1400 IAM H5 1000, 1200, 1400, 1500, 1600, 1800, 2000	10
IAM H5 2200 IAM H6 2500, 2800, 3000, 3200, 3500	15
IAM H7 3900, 4300, 4600, 5000, 5400 IAM H8 6000, 6500, 6800, 7600, 8000	20

Important note: the above value are approximated. The correct way to operate is the following: the flushing flow is adequate if during the motor operation the drain oil viscosity be at least 35-40 cSt, preferably in the range from 40 to 60 cSt.

Maximum continuous case pressure 6 bar (10 bar peak pressure). Special seals for 20-25 bar continuous case pressure are available upon request (ordering code: HPS).

Flushing outlet port

Please note: the flushing outlet port must always be located in the highest possible position.



Maximum case pressure

6 bar continuous
10 bar peak

For standard IAM motors

Flushing inlet port

Features	Type: BABSL Form: AS DIN 3760 Material: SIMRIT® 72 NBR 902 SIMRIT® 75 FKM 595
Material	SIMMERRING® radial shaft seal with rubber covered O.D., short, flexibility suspensed, spring loaded sealing lip and additional dust lip: see Part B/SIMMERRING®, sections 1.1 and 2.
Application	Sealing lip and O.D.: – Acrylonitrile-butadiene rubber with 72 Shore A hardness (designation: SIMRIT® 72 NBR 902) – Fluoro rubber with 75 Shore A hardness (designation: SIMRIT®75 FKM 595) Metal insert: – Plain steel DIN 1624 Spring: – Spring steel DIN 17223
Operating conditions	See Part B/ SIMMERRING®, sections 2. 4. Media: mineral oils, synthetic oils Temperature: -40°C to +100°C (SIMRIT® 72 NBR 902) -40°C to +160°C (SIMRIT® 75 FKM 595) Surface speed: up to 5 m/s Working pressure: see diagram on next page, pressure is function of surface speed (i.e. of rotating speed and shaft diameter)

Housing and machining criteria

See Part B/ SIMMERRING®, sections 2.

Shaft:
Tolerance: ISO h11
Concentricity: IT 8
Roughness: Ra=0.2-0.8 µm
Rz=1-4 µm
Rmax=6 µm
Hardness: 45-60 HRc
Roughness: non oriented;
preferably by plunge grinding

Housing:
Tolerance: ISO H8
Roughness: Rmax<25 µm

Pressure diagram

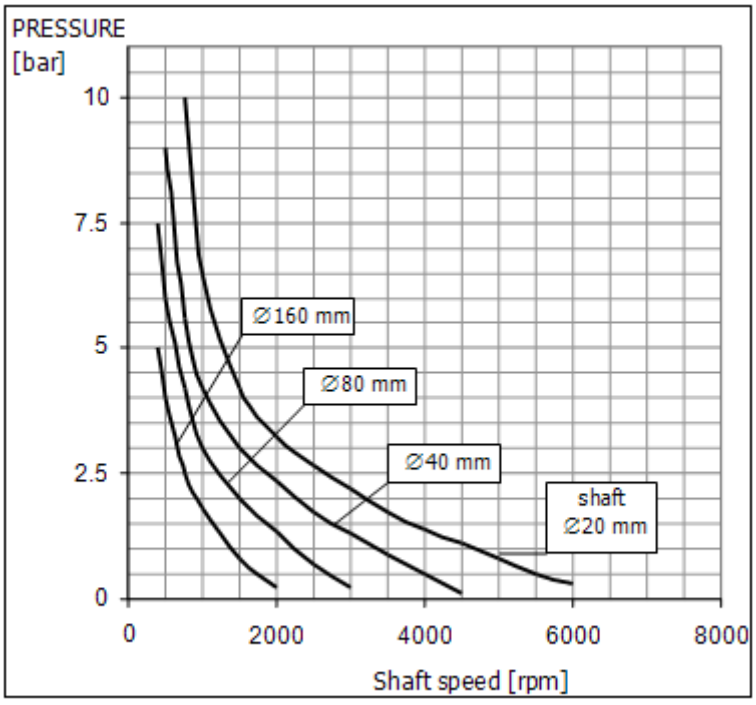


Diagram 1: Pressure Loading Limits

Special seals for 20-25 bar continuous case pressure are available upon request (ordering code: HPS). Refer to page 23 for more information.

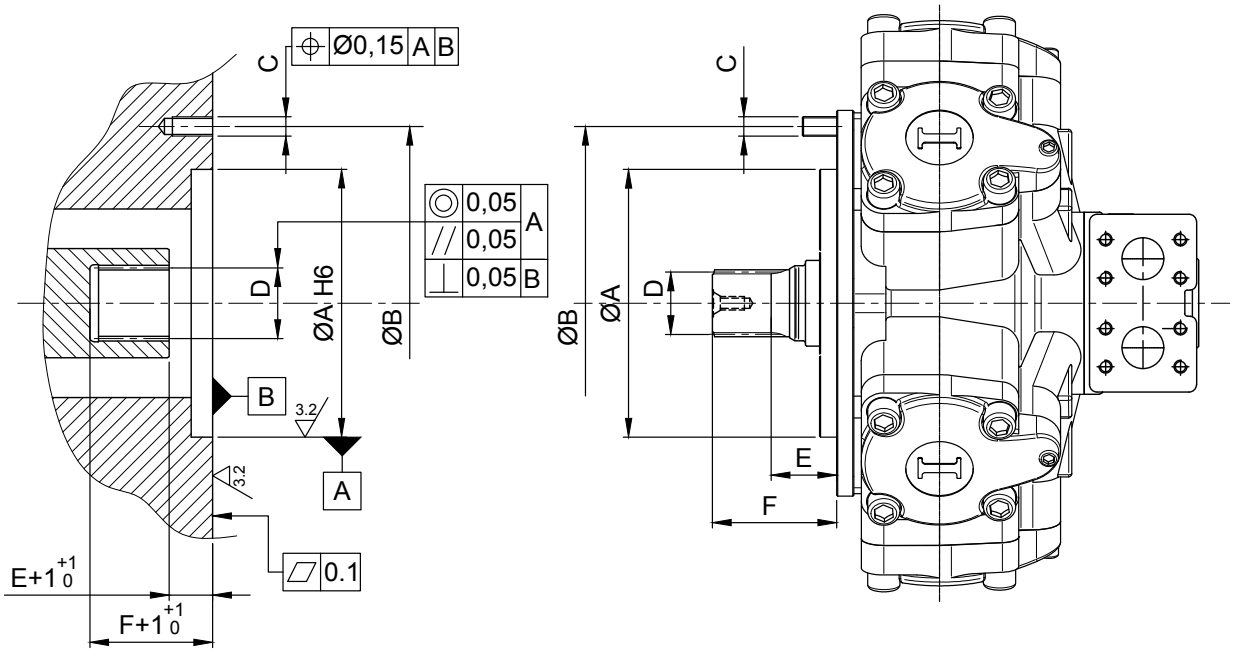
Motor installation and start-up

The motor, after testing, it's packed in different ways that depends by customer and/or logistic requirements. The motor must be carefully moved from his box or pallet, with the assistance of correctly sized movimentation tools, like eyebolts (all the motors has a thread hole in the shaft end, please refer to the IAM general catalogue, shafts section) or lifting slings.

When the motor is moved from one place to another always be very careful and act in a way that the motor is stable and under control during movimentation (refer to handling and storage section for more details).

Before mount the motor, check carefully the absence of damage happened for example during transportation and/or storing.

For mounting dimensions please refer to the IAM installation drawings. The motor must be installed using the correct screws size (we recommends the use of 10.9 and 12.9 class resistance fixing screws) and must be placed on a structure that is capable to correctly support the motor during functioning: for this reason the structure must not only be able to support the motor weight but must also assure the absence of vibration during operation and must win the reaction forces that are generated by the working torque. Regarding the motor fitting design, the concentricity between the centering diameter (spigot) and shaft (both splined or parallel) must be assured with a strict tolerance (please refer to the following general indication). If the concentricity between the shaft and the centering diameter and/or fixing holes is not respected, in the worst case the motor can have an unusual failure or can work only with low performances. Splined adaptors (splined billets) are available upon request.



Hoses and piping must be clean and free from contamination. Use proper hoses for oil connection, both for inlet and outlet main ports, and for drain line. Refer to hoses and fitting constructors in order to correctly size and select hoses and fittings. In order to keep control on the oil compressibility keep hoses to the minimum recommended size and select pipelines most rigid as possible.

The motor can be mounted in any position (refer also to drain recommendations section). In run-away conditions you must use counterbalance valves. When the motor is installed vertically with shaft pointing upwards, consult our technical department. If the motor is connected to high inertial loads, the hydraulic system must be designed to prevent peaks of pressure and cavitation.
Consider the use of relief valves, possibly directly mounted on motor distributor in case the application can generates pressure peaks at the motor ports: the relief valve should be able to discharge all the flow (or at least a good part of it) with a limited pressure increase. Italgroup can provide differents valve types that can be placed directly on the motor distributor (please refer to Italgroup valves technical catalogue).

Motor case and pistons must be completely filled with oil before starting. Do not load motor to maximum working pressure instantly. During cold start-up avoid high-speed operation until the system reach the working temperature. Connect the case drain directly to tank, and avoid excessive drain line pressure losses (the case drain pressure must not exceed 10 bar continuous pressure for IAM serie standard motors). The case drain port on the motor must be located on the highest point of the installation to ensure that the motor will always be full of oil. (See drain recommendations page for more details)

Maximum oil temperature must not exceed 70°C. Heath exchangers must be used with higher temperatures. The operating fluid viscosity must always be higher than a certain minimum value (see "fluid recommendation" section) in order to guarantee an optimal motor internal lubrication. When the working conditions cause the motor case overheating above a critical value, the motor flushing is required. Flushing consists in the introduction of fresh oil (taken from the hydraulic circuit) into the motor case. Oil must be taken from the return line to avoid internal motor damage (the continuous motor case pressure must be maximum 6 bar). Flushing is an important operation that can be very effective to improve motor lifetime with heavy duty working conditions and improve the motor mechanical efficiency.
The motor flushing, if the motor works in one direction only, can be easily performed connecting the motor return line to the lowest motor drain port. The highest motor drain port must be connected to the tank. For D75 and D90 flow distributors, the side 1/4" metallic plugs can be used for flushing circuit installation: infact the plug (corresponding to the return line port) can be removed and the connection between motor low pressure port and motor case can be correctly realized.

If the motor axis is not horizontal and/or the motor works in bidirectional operation, please contact Italgroup technical department, that can assist you to advice how to perform the desired operation in the best way. Just for your reference, Italgroup can provide you flushing valves in order to perform an effective flushing circuit.

Minimum speed is very low and can reach values near to 0.5-1 rpm (depending on motor displacement). In case of low speed vibration a reasonable back pressure can eliminate or minimize the vibration and noise level (a general guideline value can be defined by 5-8 bar back pressure). For more information please contact our technical department.

IAM series motors can works in an efficient way with high back pressures (back pressure occurs for example when hydraulic motors are installed in series circuit). A general guideline for back pressure can be set limitating the inlet and outlet pressure sum to 400 bar. High back pressure values are often responsible of motor overheating, so if drain temperature reach values that bring the oil viscosity under the recommended limit (refer to fluid recommendations section), perform appropriate motor flushing and/or reduce the back pressure.

During start-up and in the period immediately after it, any hydraulic installation must be regurarly and carefully checked at frequent intervals. The working pressure must be checked in order to understand that it agrees with the design values. The drain line pressure for standard motors must not overcome 10 bar continuous. If leakage occurs, check the reason, correct it and carry out new measurements. Check all lines, connections, screws, etc, and tighten if necessary. Replace contaminated fluid immediately.

The motor installation and start-up must be performed by instructed and experienced personnel only.

Please contact us freely to obtain further information.

Motor handling

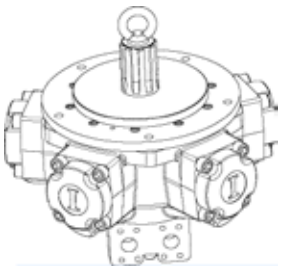
The motor must be correctly packed during transport and correctly stored into the warehouse in order to avoid eventual damages that can make the motor functioning not adequate.

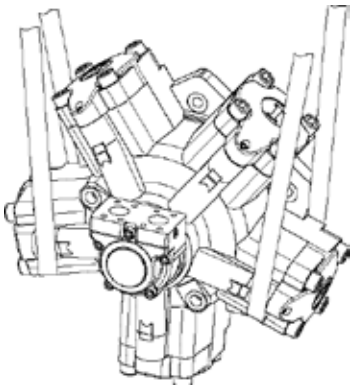
During handling operations, make sure that the motor shaft and tachometer shaft (if present) don't receive any hit, in order to avoid motor damage.

During all operations of lifting and handling, never movimentate motors by hand but use adequate tools. In order to avoid that motor can falls, creating danger for authorized working persons in the nearings, use one of following methods:

- use lifting slings of adequate capacity;
- use adequate eyebolt using the thread hole in the shaft end.

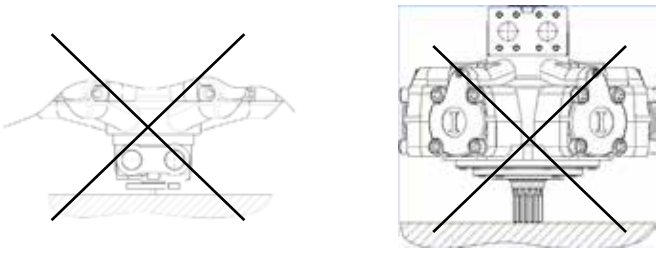
Refer to the following pictures.





Motor storing

Storing must be carefully made using adequate storing tools (for example boxes, pallets, etc...) that can guarantee that the motor is stable and cannot move without control, in order to avoid damage problems. Make sure that the weight of the motor doesn't be substained by the motor shaft or by the tachometer shaft (if present).



IAM series motors are supplied together with plastic plugs, that keep the hydraulic oil (that was used during final test in Italgroup testing workbench) inside the motor. A thin oil film is present on the internal motor parts, whereas the external parts are covered with antirust oil that prevents damage from oxidation and corrosion.

Therefore the motors can be safely stored into the customer warehouse without performance losses for long periods (up to 4-6 months).
The storing location must has some important characteristics:
- room temperature comprised between -15°C and +55°C without fast and/or excessives temperature excursions;
- low relative humidity;
- absence of aggressive and corrosive medias in the motor nearings.

In particular, if motor should be motionless for more than 4-6 months, it must be protected against internal rust. Proceed as follows:
- fill the motor case with hydraulic oil. After that the motor case is full of oil, close it with a screw plug;
- fill the motor also from inlet or outlet port. Turn the shaft by hand (the shaft must make about one revolution) and finally close the inlet and outlet ports.

Please note that the plastic plugs are necessary not only to keep the hydraulic oil inside the motor, but even to avoid that dirt and other fluids (like water for example) can enter into the motor and create damage during storing or during motor start-up. Therefore make sure all drain ports, supply ports and discharge ports are closed during motor handling and storing. If plugs are missing, use plastic plugs or adequate systems in order to guarantee that the motor is well protected by dirt and other fluids.

Maintenance operations

All the assembly and maintenance works must be performed when the motor is stopped and not connected to any power source, in order to avoid an accidental start-up. In addition the pressure inside the motor must be set to zero (the motor must be depressurized) before to perform maintenance operations.
The motor maintenance must be performed by instructed and experienced personnel only, following carefully Italgroup advices and procedures.

IAM series motors are internally lubricated by the operating fluid, if the motors are used according to the technical data reported into the IAM catalogue, they need very limited maintenance operations. In order to achieve good performances, long bearings lifetime and safe working, the working fluid must be carefully selected in function of the operating parameters (a fundamental parameter is the ambient temperature range). In case of fire resistence fluid usage , some limitation on pressure and speed can be required. Refer to hydraulic fluid recommendations section for more information. If required please contact Italgroup technical department for further information.

Motor parts	Material
Motor shaft, rollers, pins, screws, distributor bush, rotating distributor, distributor joint, pistons, ring for rod	Steel
Motor case, cylinders, connecting rod, motor flange, distributor body	Cast iron
Distributor disk	Bronze
Slippers	Charged PTFE, PTFE
O-Rings	Elastomer
Radial shaft seal rings	Elastomer

Bearings

The bearing life depends by different factors, like bearing type, motor speed, working pressure, external loads, duty cycle, fluid viscosity, oil cleanliness, type and temperature.

Lifetime is measured by L_{10} which is called "theoretic lifetime". It represents the number of cycles that 90% of identical bearings can effort at the same load without showing wear and tear.

Please refer to bearing lifetime diagrams reported in the following pages to obtain the theoretical bearing lifetime. **The lifetimes diagrams shown the L_{50}, median or average lifetime, that can be considered as 5 times L_{10}.**

Please note that the theoretical lifetime can be different from the real lifetime, especially in case of heavy duty applications with continuous work cycle. Please contact Italgroup S.r.l. for more information.

Motor creep speed

The hydraulic motor is able to hold the load acting as a brake (if proper valves or circuit are considered and installed), but a certain creep speed is always present: this is typical of all brands hydraulic motors.

The motor creep speed depends by many factors, like operating conditions (motor displacement and type, pressure load on the shaft, oil viscosity, type and temperature)

If creep speed is higher than desired value a negative brake can be considered: Italgroup can supply negative brakes that can be fitted to the hydraulic motor. Please contact Italgroup S.r.l. for more information.

Special features

Marine painting

If needed, special painting or primers are available in order to guarantee optimal protection against normal corrosion and marine environment corrosion. The ordering code is MP. Please contact Italgroup S.r.l. for more information.

Speedy-sleeve

A special inox sleeve is available upon request. In case the motor is used in aggressive medias or environments, this can be very useful in order to protect the motor shaft surface located in proximity of the motor shaft seal. This improves the shaft and seal endurance respect to wear and corrosion. The ordering code is SPSL. Please contact Italgroup S.r.l. for more information.

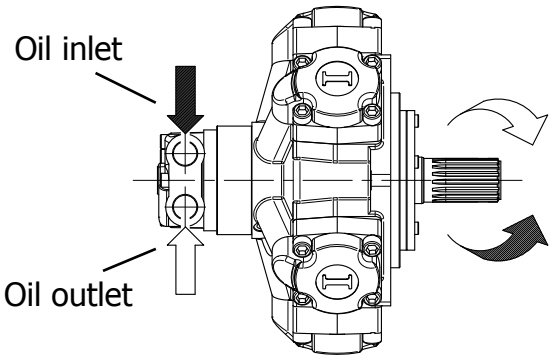
High pressure shaft seal

Standard IAM motors are supplied with high pressure shaft seals, the continuous drain pressure must be maximum 6 bar, whereas the peak drain pressure must be maximum 10 bar. In case the drain line can or must has a higher pressure, special shaft seals are available upon request. The ordering code is HPS. The drain pressure with HPS shaft seal can reach 20-25 bar continuous pressure and 30 bar peak pressure. The HPS shaft seal is bi-directional also, so it can be used for example in underwater applications. Please contact Italgroup S.r.l. for more information.

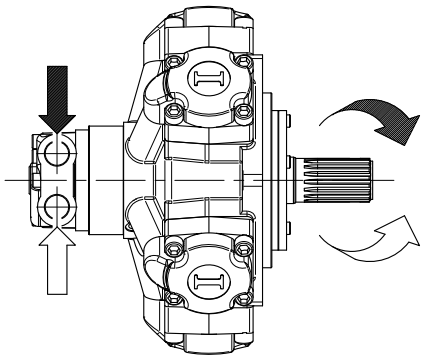
Counterclockwise rotation

Standard IAM motors are supplied with clockwise distributor timing. Please refer to the installation drawings of each section for more information. With ordering code CCW the motor is supplied with counterclockwise rotation timing. Contact Italgroup for more information.

Standard timing



CCW timing



Problem	Possible cause	Solution
Excessive noises	Cavitation	Adopt an anti-cavitation system
	Mechanical vibrations	Check and fix damaged components
	Irregular pressure or flow	Check other components (pump, valves, accumulators) and check drain flow
	Air bubbles in the circuit	Bleed circuit
Unit overheating	Overflow	Check max allowed flow
	Overpressure	Check relief valve pressure setting
	Oil viscosity too low	Choose the appropriate oil according to the temperature
	Undersized cooling system	Improve cooling system
	Working without oil in the case	Overhaul the unit, fill with oil before start-up
Anomalous drainage flow	Worn motor internal components	Overhaul the motor
	Motor internal seals worn	Overhaul the motor
	Excessive pressure in the motor case	Check drain port size, pressure and flow, check piping connections
Insufficient torque	Pressure relief valve set incorrectly	Check relief valve pressure setting
	Undersized motor displacement	Replace with bigger displ. motor
	Pump not able to reach the design pressure	Check pump integrity
Insufficient speed	Oversized motor displacement	Replace with smaller displ. motor
	Pump not able to reach the design flow	Check pump integrity
	Undersized pump	Improve pump output flow
	Excessive drain flow	Overhaul the motor
Output shaft cannot rotate	Seized motor flow distributor	Overhaul the flow distributor
	Motor internal seizure	Overhaul the motor
	Motor internal seals worn	Check drain flow, overhaul the motor
	Air in the circuit	Bleed the circuit

Problem	Possible cause	Solution
Oil leakage	Worn seals	Replace seals
	Excessive pressure in the motor case	Check drain port size, pressure and flow, check piping connections
	Burst motor shaft seal	Check drain port size, pressure and flow, check piping connections
Incorrecte sense of rotation	Pipes incorrectly connected	Check pipe connections
	Incorrect rotating distributor timing	Change rotating distributor timing

Italgroup®
HYDRAULIC MOTORS
ITALY

UNIT CONVERSIONS

LENGHT	1 m	= 39,3701 in
		= 3,2808 ft
		= 1,0936 yd
		= 1000 mm
	1 in	= 0,0833 ft
		= 25,4 mm
	1 ft	= 0,3048 m
		= 0,3333 yd
		= 12 in
	1 yd	= 0,9144 m
		= 3 ft
		= 36 in
	1 km	= 1000 m
		= 1093,6 yd
		= 0,6214 mile
	1 mile	= 1,609 km
		= 1760 yd
SPEED	1 m/s	= 3,6 km/h
		= 2,237 mph
		= 3,2808 ft/s
	1 km/h	= 0,2778 m/s
		= 0,6214 mph
		= 0,9113 ft/s
	1 mph	= 1,609 km/h
		= 0,447 m/s
		= 1,467 ft/s
	1 ft/s	= 0,3048 m/s
		= 1,0973 km/h
		= 0,6818 mph

MASS	1 kg	= 2,2046 lb
FORCE	1 N	= 0,102 kgf
		= 0,2248 lbf
	1 kgf	= 2,205 lbf
		= 9,806 N
	1 lbf	= 0,4536 kgf
		= 4,448 N
PRESSURE	1 bar	= 14,223 psi
		= 0,99 atm
		= 1,02 ata
		= 100000 Pa
		= 100 kPa
		= 0,1 MPa
	1 psi	= 0,0703 bar
FLOW	1 l/min	= 0,264 gpm
		= 1000 cc/Rev
	1 gpm	= 3,785 l/min
		= 3785 cc/min
	1 m^3/s	= 60000 l/min
		= 15852 gpm

POWER	1 kW	= 1,341 HP
		= 1,3596 CV
	1 HP	= 0,7457 kW
		= 1,0139 CV
VOLUME	1 m^3	= 1000 l
	1 l	= 61,023 in^3
		= 0,264 galUS
	1 in^3	= 0,01639 l
		= 16,39 cm^3
		= 0,004326 galUS
	1 galUS	= 3,7879 l
		=231,15 in^3
TORQUE	1 Nm	= 0,102 kgm
		= 0,7376 lbf ft
	1 kgm	= 9,806 Nm
		= 7,2325 lbf ft
	1 lbf ft	= 0,1383 kgm
		= 1,3558 Nm

Italgroup®
HYDRAULIC MOTORS
ITALY

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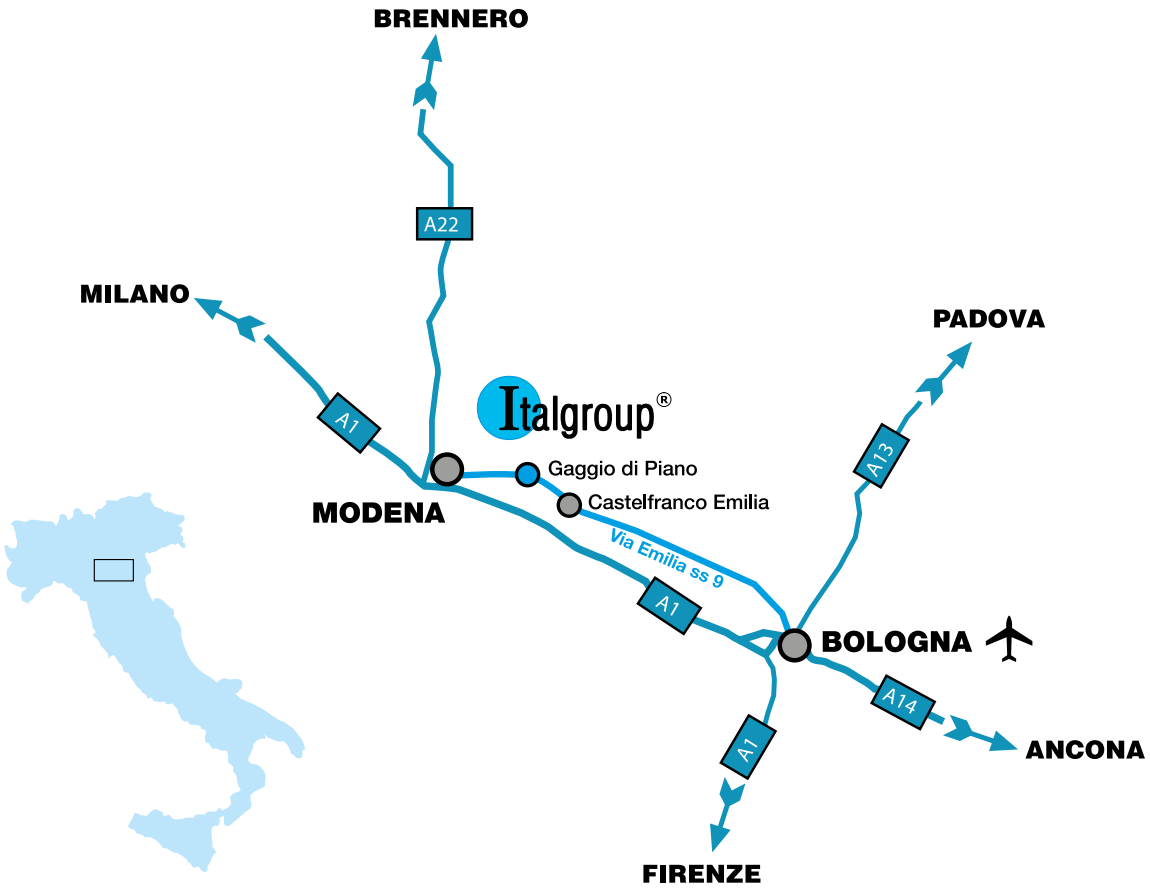

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HYDRAULIC MOTORS

ITALY

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