



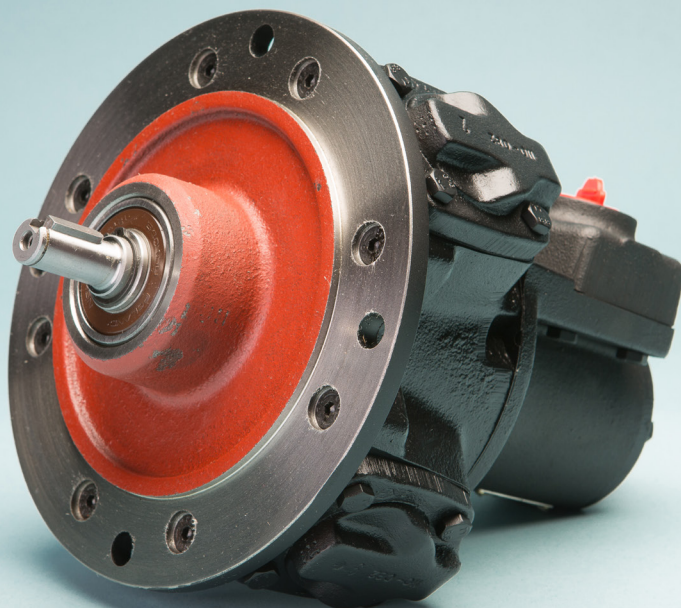
GLOBE AIRMOTORS B.V.

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Manual

GLOBE RM110 Piston Air Motor

With optional auxiliaries



globe-airmotors.com

APPROVALS

CERTIFICATION

The GLOBE piston air motors and pneumatic brakes are certified according to the following (harmonized) standards:

EN-ISO80079-36:2016

EN-ISO80079-37:2016

Machinery directive 2006/42/EC

Supply of Machinery (Safety) Regulations 2008

Safety of machines – basic terminology-
EN-ISO 12100:2010

Preparation for using the instructions – structure, content en presentation part 1:
General assumptions and detailed demands
EN-IEC 82079-1:2012

Pneumatics – general rules and safety regulations for systems and parts
EN-ISO 4414:2010

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Congratulations with your GLOBE air motor!

This product is made with quality materials to meet the highest standards. This manual contains safety instructions for the use of your GLOBE air motor. Please read and follow all recommended instructions for a trouble-free use.

Warranty

The GLOBE Piston Air Motor and the GLOBE Pneumatic Brakes are designed to operate without any problems. This is only guaranteed if the regulations with regards to installation, operation, maintenance and repair are observed. Problems occurring during the guarantee period are corrected in accordance to GLOBE Airmotors BV guarantee conditions. All results of unauthorised opening and repairs carried out during the guarantee period may invalidate the warranty.

You can order your service kit at orders@globe-benelux.nl. Please ensure that maintenance is carried out by certified staff.

Safety first

Safety is important for you and other people. For the protection of you and others, we have several warnings in this manual and on the product. Please always read carefully and follow the instructions.



Hazard

Possible consequences: dead or severe injuries



Wear hearing protection



Hazard Situation

Possible consequences: slight or mild injuries



Wear eye protection



Dangerous situation

Possible consequence: damage to the drive of the environment

Installation

Installation | Motor & Valve

In order to guarantee the maximum performance and service life of these motors it is essential that the following points are strictly observed and obeyed. All the information in this chapter is also valid in case a hand control valve (HCV) or remote control valve (RCV) is fitted to the motor or supplied loose.

WARNING - Injury hazard



Install proper guard around the output shaft if needed.



Wear eye protection: Airflow from product may contain solid or liquid materials that can result in eye or skin damage.



Failure to follow these instructions can result in serious injury or property damage.

Correct installation is your responsibility! Make sure you have the proper installation conditions.

Note! Damage by lack of lubrication will occur if motors are mounted shaft up or at an angle. Please consult GLOBE Airmotors BV for other mounting options.

Note! When first running the motor some light oil should be injected into the inlet connection to ensure adequate lubrication until the air line lubrication is established.

Mounting positions

The motor is normally mounted in a horizontal position with the filler / breather plug towards the top (Fig. 1). It may also be mounted with the shaft vertically downwards (Fig. 2). As supplied the motors have been run up and tested using protective oil and then drained for transit. It is vital that each motor is re-filled to the correct oil level as shown below. The RM 110 - 310 motors have a dipstick for vertical mounting (Fig. 2) and the lower mark on this dipstick provides the oil level. Oil levels are achieved on motors in the horizontal position by filling to the plugs marked 60 (RM 110-410 models) and plug 26 (fitted in housing 3 RM510-610 models). (numbers indicate parts on exploded view) The vertical oil level position for the RM410, RM510 and RM610 motors is a combined horizontal drain and vertical level plug (part number 26). To fill motors with oil remove the combined breather and oil filler plug part number 46. Ensure breather plug is in the vertical position. It may be necessary to fit an elbow between the breather plug and the motor (see Fig. 2).

Motor Mounting Positions

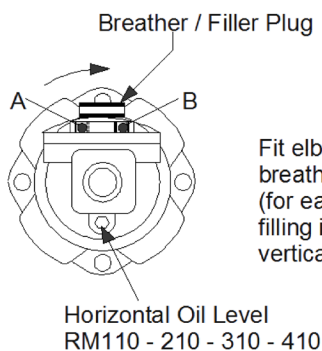


Fig. 1

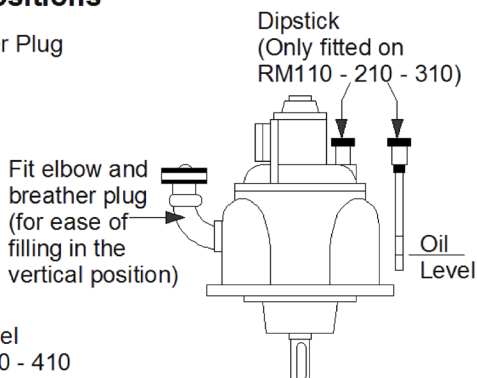


Fig. 2

Fitting

Mount motor in operating position. Check oil level, (as seen on Fig. 1). Before connecting to the air supply blow out the air lines to remove any loose scale, swarf or abrasive dust which may be present. Remove the red plastic dust-caps and the 'O' ring seal (45). For unidirectional operation check the required direction of rotation and connect the air supply line to the appropriate port on the inlet / exhaust adaptor plate (72) leaving the other port open or pipe downwards if exposed to the atmosphere. The motor should not be allowed to race. Always operate within the catalogue speed curves.



It's important that no dust or debris can accumulate at the output shaft. This may damage the shaft seal. The GLOBE Piston Motor is only allowed in horizontal position or shaft pointing vertical downwards. It is not allowed for the shaft to point in any angle upwards.

Mounting to construction

- » Mount the unit to the construction. Care should be taken, when fitting drive components to the shaft, that excessive force is not used. This will upset the shaft alignments which has been kept to a minimum in order to give high motor performance.
- » Use the proper sized fasteners.
- » Axial loads must be kept to a minimum.

Maximum Working Pressure 8 bar - 120 psi

The air supply must be clean and free from moisture. An air line filter and mist lubricator should be incorporated in the air supply line, located immediately before the motor. If the rated performance of the motor is to be obtained all valves and pipework must be of adequate size. Valves should be sited as close as possible to the motor. For short pipe runs e.g. up to 2 meters the supply line should be the same size as the motor ports and larger for longer runs.

Air Inlet

The motor is normally supplied with inlet / exhaust adaptor plate (72). All motors are reversible.



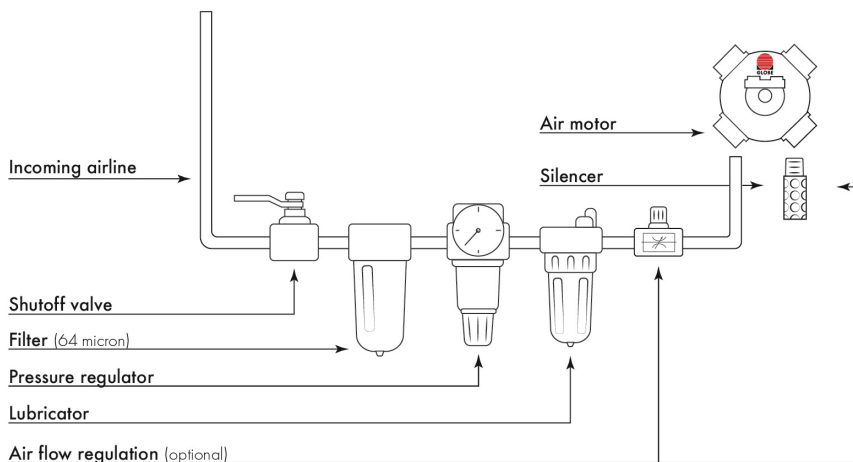
Do not exceed the maximum radial and axial forces on the shaft.
Use the proper size fasteners.
Use a puller to remove pulleys, pinions and couplings.



Use a puller to remove pulleys, pinions and couplings. Check if the tension on the belt pulley matches the specifications of the manufacture. Do not exceed the maximum radial and axial forces on the shaft. If the motor shaft is connected to the part to be driven without a coupling, check that the radial offset and axial force effect will not cause problems.

Air supply

- » Air supply to the motor should always be taken from non-hazardous area.
- » Remove the plastic shipping plugs from the ports. Save the plugs for the future, during shutdown.
- » Please make sure that the temperature of the air used for air supply to the air motor don't exceed the following temperatures, -20°C to +40°C.
- » Install a filter (64 micron) to make sure the air is clean and dry and install an air pressure regulator to control motor speed and flow control for speed regulation.
- » A lubricator must be placed inside the main air line near the motor. The lubricator unit should have a bowl with enough oil for operation and should allow the user to control the amount of oil drop per minute going to the motor. Check air line oil every time before starting. Air motor should be supplied with oil of a viscosity of 32. This type of oil is flammable at a temperature of 218°C.
- » Air quality should meet ISO 8573-1:2010 class 4 for solid particles and ISO 8473-1:2010 class 3 for water.
- » For the most efficient power and control of speed, all valves and the air lines should be the same size as the air connections of the motor. If the valves, air lines and other connections have a longer distance than 2m (6 feet) of the motor we advise one size bigger.
- » Before final connection to the motor, clean the compressed air connection with low pressure air to remove any dirt inside the line before connecting to the ports of the air motor.
- » When silencers are installed, ensure that condensation cannot run back into the motor port. Mount the air motor with silencer pointed down or make extra piping on the silencer.
- » If the motor unit is not used for a longer period it is advisable to store the unit indoors remove the silencer and plug the exhaust port. See also shut down and long storage at maintenance.
- » Make sure that on all ports of the motor and/or valve an air line or silencer is mounted, appropriate to the situation.



Air line filtration

- » Use a 64 micron air filter
- » The air line filter should be drained regularly and the element examined for signs of clogging.
- » Air quality should meet ISO 8573-1:2010 class 4 for solid particles and ISO 8473-1:2010 class 3 for water.

Air line lubrication

- » The air line lubricator should be replenished when needed and set to give the following required drop rate/min:

Drop rate/min		
Motor	Continuous Operation	Intermittent Operation
RM110	3-4	6-8
RM210	4-5	8-10
RM310	5-6	10-12
RM410	6-8	12-16
RM510	6-8	12-16
RM610	8-10	16-20

- » For normal ambient temperatures 0°C to 32°C. Use oil with viscosity VG32.
- » For extremes of ambient temperature consult the manufactures.

Recommended Lubricants

For normal ambient temperature (0-32 deg. C.)

Brand	Crankcase	Air line
Shell	TELLUS S2 VX100	TELLUS S2 A32
B.P.	ENERGOLHLP-HM100	ENERGOL HLP-HM32
Esso	NUTO H.100	-
Regent	REGAL PE.RO	-
Castrol	HYSPIN AWH-M100	HYSPIN AWS 32
Mobil	-	ALMO 524
Texaco	-	RANDO 32

For extremes of ambient temperatures consult GLOBE

Installation | Brake

In order to guarantee the maximum performance and service life of these motors it is essential that the following points are strictly observed and obeyed.

WARNING - Injury hazard



Install proper guard around the output shaft if needed.



Wear eye protection: Airflow from product may contain solid or liquid materials that can result in eye or skin damage.



Failure to follow these instructions can result in serious injury or property damage.



It's important that no dust or debris can accumulate at the output shaft. This may damage the shaft seal. The GLOBE Piston Motor is only allowed in horizontal position or shaft pointing vertical downwards. It is not allowed for the shaft to point in any angle upwards.

Correct installation is your responsibility! Make sure you have the proper installation conditions.

Mounting to construction

- » Mount the brake to the construction. Care should be taken, when fitting drive components to the shaft, that excessive force is not used. This will upset the shaft alignments which has been kept to a minimum in order to give high motor performance.
- » The brake is pre-set to the maximum holding torque needed at the operating pressure of the customer. The brake will not be released when the motor is running at a lower pressure than the operating pressure given by the customer prior to delivery.
- » Make sure that the air is dry and filtered with an air filter of 64 micron or better.
- » The brake must be mounted to a GLOBE Piston Airmotor of equivalent size (for instance: RM110 Brake on RM110 Motor) including the correct piping and control valves supplied by GLOBE.



Do not exceed the maximum radial and axial forces on the shaft.

Use the proper size fasteners.

Use a puller to remove pulleys, pinions and couplings.

Operation

Operation | Motor & Valve

Correct operation is your responsibility! Make sure you have the proper operation conditions.

WARNING - Injury hazard



Wear eye protection: Air stream from product may contain solid or liquid materials that can result in eye or skin damage.



Wear hearing protection: The noise level from the air motor may exceed 85 db (A)



Do not use combustible gases to drive this air motor



Failure to follow these instructions can result in serious injury or property damage.

- » Check all connections before starting the air motor. It is your responsibility to operate this product at recommended speeds, loads and ambient temperatures (-20°C to +60°C).
- » Check if the air line filtration and air line lubrication is OK. The air line filter should be drained and/or cleaned regularly and the filter element examined for signs of clogging.
- » The maximum working pressure is 8 bar (120 PSI).
- » Clean surface of air motor unit thoroughly of all dustproofing products, contaminants and other impurities. Clean only with damp cloth.
- » Do not run the air motor at high speeds with no load. This will result in excessive internal heat that may cause motor damage.
- » The starting torque is less than the running torque. The starting torque will vary depending on the position of the pistons in relation to the air intake port when the motor is being started.
- » During operation be aware if unfamiliar sounds or vibrations occur. Stop the unit immediately and investigate the source.
- » In case that the motor is exposed to high vibrations, during operation and when not in operation, please contact GLOBE. High vibrations might lead to increased inspection interval of the bearings.
- » The motor may run continuously at speeds up to the rated running conditions shown in our performance data sheets. In these sheets the output power/torque is based on running conditions with the actual pressure measured at the motor port. Check the allowable speeds below.
- » Advisable is to use an air dryer with set point of 20 degrees Celsius below lowest ambient temperature.

Allowable speeds for motors (RPM)

	RM110	RM210	RM310	RM410	RM510	RM610
Continuous	1950	1200	1800	1350	900	1100
Intermittent	0-2400	0-2400	0-2400	0-2000	0-2000	0-2000



Do not run the air motor at high speeds with no load.
This will result in excessive internal heat that may cause motor damage.

- » Axial loads must be kept to a minimum.
- » Max. radial load midway along shaft as shown in graph below:
- » Check intake filter and silencer after the first 100 hours of operation.
- » Clean filters and determine how frequently filters should be checked during future operation.

Allowable Radial Loads

	RM110	RM210	RM310	RM410	RM510	RM610
N	445	890	1330	1330	6500	6500
LBF	100	200	300	300	1461	1461

Air line filtration

- » Use a 64 micron air filter
- » The air line filter should be drained regularly and the element examined for signs of clogging.
- » Air quality should meet ISO 8573-1:2010 class 4 for solid particles and ISO 8473-1:2010 class 3 for water.

Air line lubrication

- » The air line lubricator should be replenished when needed and set to give the following required drop rate/min:

Drop rate/min

Motor	Continuous Operation	Intermittent Operation
RM110	3-4	6-8
RM210	4-5	8-10
RM310	5-6	10-12
RM410	6-8	12-16
RM510	6-8	12-16
RM610	8-10	16-20

- » For normal ambient temperatures 0°C to 32°C. Use oil with viscosity VG32.
- » For extremes of ambient temperature consult the manufactures.



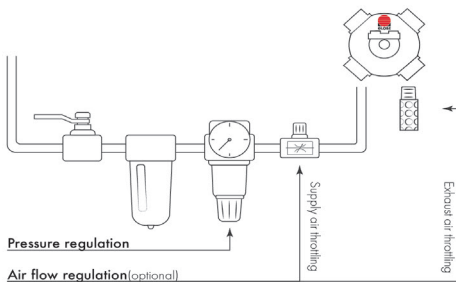
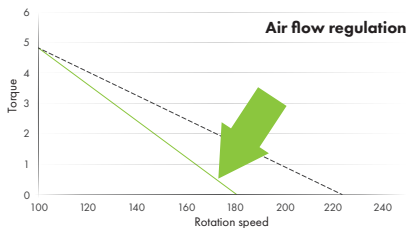
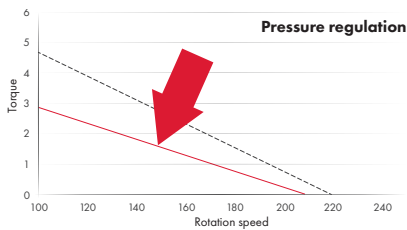
The oil level in the motor casing must be maintained. The frequency of replenishment will depend on the application and usage. The motor case should be drained and refilled after 25 hours of initial running and every 200 hours thereafter or sooner if found necessary e.g. (contamination of oil by water from the air line.)

Performance regulation

With the regulation of the inlet pressure and the flow rate, the performance can be adapted to the individual application. This is done by pressure or air flow regulation or a combination of both. The compressibility of the air generates a dampening effect in all ranges. This allows that the motor also can be started, while it is loaded. With a load reduction, the motor reacts immediately with an increase in speed.

1. Pressure regulation

With pressure regulation the output power can be adjusted. When the supply pressure is decreased, the torque and power is reduced proportionally and the torque curve becomes flatter. The forces inside the motor are also reduced, which increases its durability.



2. Air flow regulation

Air flow regulation is the best way to reduce the output speed without the loss of torque. The air flow can be regulated with a throttling device. By throttling, the starting torque remains essentially the same but the torque curve is steeper. This means that under the same load fluctuation, the speed fluctuation is smaller in comparison with the pressure regulation. There is a distinction made between the following installation positions:

Exhaust air throttling

The exhaust air throttling is the less optimal way of throttling relating to the durability and the air consumption. The advantage of this method is that the rotational speed can be regulated constantly in the lower rotation range. In the border area of the rotation range, a combination of supply- and exhaust air throttling should be used. The exhaust throttling should be used for controlling low speed of rotation.

Supply air throttling

The supply air throttling generates better results in relation to the durability, the running smoothness and the air consumption.

For optimal power and speed control, we advise to use the combination of pressure and air flow regulation.

Operational principle RM 110 Hand Control Valve

This range of bolt on valves offers very sensitive speed and directional control. One frictional matched spool and sleeve assembly is offered with two alternative means of actuation.

Configuration

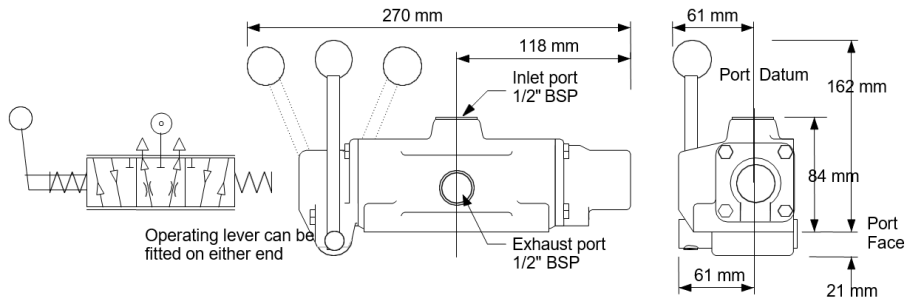
As standard these valves can be supplied with either **EQUAL POWER OR BIASED POWER** spools, the latter is suitable for hoisting applications (normal power for lifting - reduced power for lowering).

The direction of reduced power must be stated when ordering **CW** or **CCW**, when viewed on the output shaft of the motor.

Hand Controlled (HCV) - The control valve spool is operated directly by a lever mechanism. Speed increase is obtained as the lever is moved in either direction from the centre (neutral) position.

Pressure Drop - Minimal pressure drop will be experienced through the valves, having the effect of maintaining the output torque whilst reducing the motor output speed by approximately 10-15% at 6 bar (90 psi) at maximum power. The starting torque remains unaffected.

HAND CONTROL VALVE



Operational principle RM110 Remote Control Valve

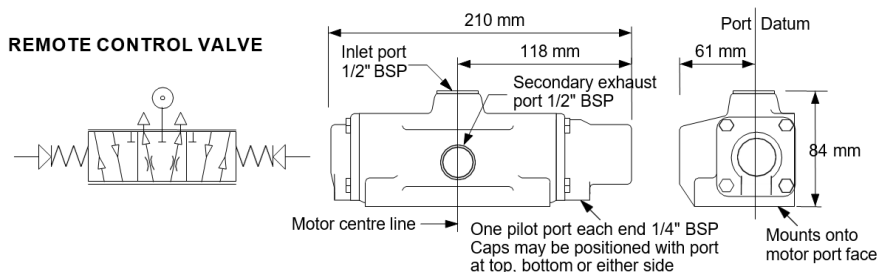
This range of bolt on valves offers very sensitive speed and directional control. One frictional matched spool and sleeve assembly is offered with two alternative means of actuation.

Configuration

As standard these valves can be supplied with either **EQUAL POWER OR BIASED POWER** spools, the latter is suitable for hoisting applications (normal power for lifting - reduced power for lowering). The direction of reduced power must be stated when ordering **CW** or **CCW**, when viewed on the output shaft of the motor.

Remotely Controlled (RCV) - This option is usually controlled from a remote position by one of the PC series or LC2 remote controllers. A variable air pilot signal is applied to either end of the valve spool, depending on the required direction of motor rotation. The pilot pressure range is between 1.4 bar (20 psi) and 4.8 bar (70 psi), increased pilot pressure gives increased speed. The valve is spring centred to neutral.

Pressure Drop - Minimal pressure drop will be experienced through the valves, having the effect of maintaining the output torque whilst reducing the motor output speed by approximately 10-15% at 6 bar (90 psi) at maximum power. The starting torque remains unaffected.



Operation | Brake

Correct operation is your responsibility! Make sure you have the proper operation conditions.

WARNING - Injury hazard



Wear eye protection: Air stream from product may contain solid or liquid materials that can result in eye or skin damage.



Wear hearing protection: The noise level from the air motor may exceed 85 db (A)



Do not use combustible gases to drive this brake



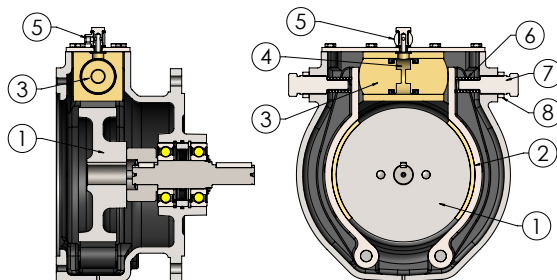
Failure to follow these instructions can result in serious (eye) injury or property damage.

Operating Principle Brake

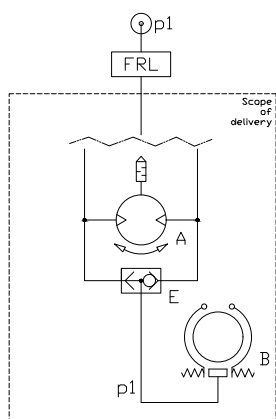
The brake has a corresponding mounting interface, thus can be directly mounted on the motor. This brake consists of two spring applied brake shoes (2) pressed against a central hub (1), which is mounted on the output shaft of the motor. These shoes are released by applying air pressure to the cylinder / piston assembly (3/4). The brake torque can be varied by means of two spring adjusters (7).

The brake has a wide range of adjustment to match the requirements of each application (i.e. torque and air pressure) but it is normally set to hold the motor torque plus 20%. Care must be taken because it is possible to adjust the brake so tightly that it will not release, and conversely it can be adjusted to the other extreme and not hold the load. Both adjusters must be screwed equally to the required setting. If the brake is used within the "running torque plus 20%" range then it is working within its safety limits and will give exceptional service over a long period of time when correctly utilized as a parking brake. These conditions of "running torque plus 20%" are broadly similar to the minimum starting torque of the RM motors at around 4 bar (60 psi) and adjustment to give full lift off of the brake at around 4 bar (60 psi) will enable the load to be held initially on the brake with the motor progressively engaging to hold the load as the pressure increases and gradually release the brake.

Under no circumstances should these parking brakes be offered or used for dynamic braking applications; they have not been designed to meet the different criteria that apply in these cases.



- | | | | |
|---|---|---|---|
| 1 | Brake wheel | 5 | Pilot pressure connection |
| 2 | Brake shoe (2x) | 6 | Brake shoe spring (2x);
brake force actuator |
| 3 | Brake release piston (2x);
brake force release | 7 | Brake force adjuster (2x) |
| 4 | Brake release cylinder; pressure chamber | 8 | Brake force adjuster locknut (2x) |

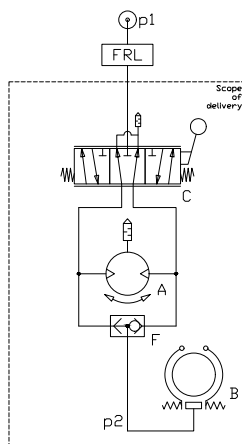


Circuit A

Applies to braked motors supplied without control valving. The unit will be fitted with a shuttle valve to allow brake operation for dual rotation.

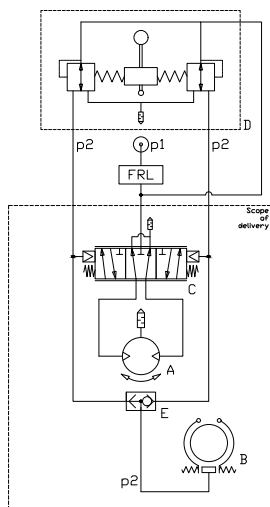
Circuit B

Units supplied with hand (HCV) proportional control reversible valve (C). When the HCV (C) is operated a pneumatic signal will be passed onto the shuttle valve (F) and the brake (B) is released.



Circuit C

Units supplied with remote (RCV) proportional control reversible valve (C). When the RCV is actuated by one of the pilot lines (p2) a pneumatic signal will be passed onto the shuttle valve (E) and the brake (B) is released.



The following figure can be used as a guide to using the brake, they are all based around an air line supply pressure of 5.5 bar (80 psi). In each case the motor running torque has been taken at the peak power condition of the motor, the rotational speed of the motor varying in each case, this speed is specified against a particular motor. The maximum brake torque of the brakes is achieved by applying the procedure described under **Load Adjustment** in this chapter.

Range brake Torque

Type	Running torque		Max. Brake Holding Torque	
	Nm	lbf/Ft.	Nm	lbf/Ft.
RM 110 at 2000 rpm	4,5 Nm	3	5,4 Nm	4
RM210 at 2000 rpm	12 Nm	9	14,4 Nm	10,5
RM310 at 1800 rpm	28 Nm	20	33,6 Nm	25
RM410 at 1600 rpm	55 Nm	40	66 Nm	48,5
RM510 at 1100 rpm	125 Nm	92	150 Nm	110,5
RM610 at 1500 rpm	125 Nm	92	150 Nm	110,5

Operation

- » Before use always remove any sediments on the surface of the brake before starting-up.
- » During operation be aware if unfamiliar sounds or vibrations occur. Stop the unit immediately and investigate the source.
- » Air quality should meet ISO 8573-1:2010 class 4 for solid particles and ISO 8473-1:2010 class 3 for water.
- » Bear in mind the maximum allowable torque of the brake. Do not exceed as this may result slipping and damage of the brake.

Wear check

Check every 200 operating hours the thickness of the brake shoe liners. If the rivet heads which are holding the shoes on the brake shoe assembly – item 26 – are within 0.5 mm of the surface new brake shoe assemblies need to be fitted.

Allowable Radial Loads

	RM110	RM210	RM310	RM410	RM510	RM610
N	445	890	1330	1330	6500	6500
LBF	100	200	300	300	1461	1461

Allowable speeds for brakes (RPM)

	RM110	RM210	RM310	RM410	RM510	RM610
Continuous	1950	1200	1800	1350	900	1100
Intermittent	0-2400	0-2400	0-2400	0-2000	0-2000	0-2000



The brake is NOT equipped with a locking device. The braking force is based on friction and is caused by a friction material which is pushed against the braking wheel and brake housing. When the load is higher than the rated holding torque the brake.

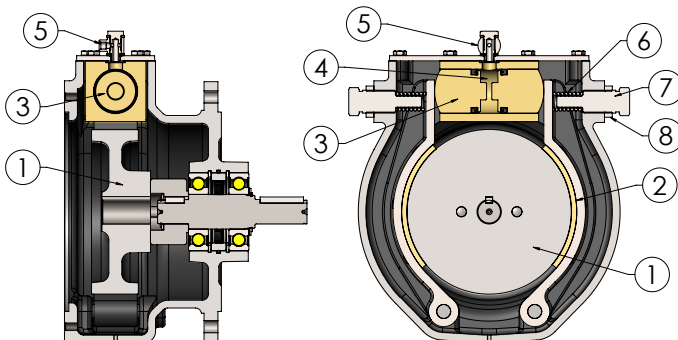
During operation the brake shoe liner will wear which results in a reduction of the holding torque. To compensate this loss of holding torque the next procedure must be followed:

Load adjustment

Because of standard wear of the liner on the brake shoe there is a possibility to adjust the holding torque to its maximum. The next steps should be done to adjust the holding torque. When a new brake unit is put into operation it may be necessary to reset the Adjustment until the brake shoes become fully bedded in.

- » With both locknuts – item 8 – loose, screw in each Adjuster – item 7 – until contact with spring is felt.
- » From this position, with the motor running, without load, screw first one Adjuster until the motor starts to labour indicating the brake shoe is in contact with the brake wheel. From this position unscrew the Adjuster with $1/4$ turn or more until the motor is running at a constant speed indicating the brake shoe is not in contact with the brake wheel. After this screw the opposite Adjuster until the motor starts to labour indicating the brake shoe is in contact with the brake wheel. From this position unscrew the Adjuster with $1/4$ turn or more until the motor is running at a constant speed indicating the brake shoe is not in contact with the brake wheel.
- » With this procedure both brake shoe's are just free of the brake wheel.
- » From this position screw in each Adjuster at a time with $1/8$ turn, repeat this until the motor starts to labour. (A marker pen marking on a flat of the Adjuster will assist in this operation).
- » From this position unscrew each Adjuster $1/6$ turn at a time until the motor runs freely. This gives the maximum load setting for the brake, because in operation the brake shoes must release when air is applied to the pistons.
- » After setting the brake lock the Adjusters with locknut item 8.

Remember each Adjuster must be altered the same amount to give equal operation to the brake shoes.



Maintenance

Maintenance | Motor & Valve

Correct maintenance is your responsibility! Make sure you have the proper maintenance conditions.

WARNING - Injury hazard



Disconnect air supply and vent all air lines.



Wear eye protection: Air stream from product may contain solid or liquid materials that can result in eye or skin damage.



Flush this product in a well ventilated area.



Do not use kerosene or other combustible solvents to flush this product.



Failure to follow these instructions can result in serious injury or property damage.

Note! Lack of maintenance will shorten the life of the motor and could cause failure.

Cleaning silencer

If the silencer becomes dirty this will effect the performance of the motor. To clean the silencer follow the next procedure:

- » Disconnect air line
- » Remove the silencer
- » Clean the silencer
- » Lubricate the motor with 3-4 drops of oil
- » Connect the air line
- » Listen for changes in the sound of the motor. If the motor runs fine, operation can continue
- » If it is not running fine, you should install a service kit.

Shutdown and long storage

- » You need to take care of the following procedures for a proper shutdown.
- » Wear eye protection. Keep out of the air stream.
- » Turn off the air supply.
- » Disconnect all air supply and vent all air lines.
- » Disconnect air lines.
- » Disassemble the air motor from its connection.
- » Remove the silencer.
- » Make sure you use clean and dry air to remove condensation from the inlet port.
- » Use a small amount of oil to lubricate the motor.
- » Rotate the shaft by hand several times to distribute the oil.
- » Cap or plug each port of the air motor.
- » Coat output shaft with oil or grease.
- » Store the air motor in a dry environment.

Inspection and replacement interval of critical components

Description	Quantity	Expected/Rare malfunction	Measures applied to prevent excessive wear on critical components
Cylinder pot	4/5	Overheating	Check air line oil before starting
Piston	4/5	No oil in engine case	Check oil in engine case every 50 hours*
Compression ring	4/5	Extra wear	Check every 2500 hours*
Oil control ring	4/5	Extra wear	Check every 2500 hours*
Queen rod	3/4	Overheating	Check oil in engine case every 50 hours*
Queen rod pivot	3/4	Overheating	Check oil in engine case every 50 hours*
Oil thrower	1	Bended	Check every 2500 hours*
All bearings	-	No grease	Replace every 7500 hours*
Valve	-	Leakage	Replace O-Rings every 5000 hours*

* Operating/running hours

- » Please ensure that maintenance is carried out by certified staff. You can order your service kit at orders@globe-benelux.nl.
- » Check intake filter and silencer after the first 100 hours of operation.
- » Clean filters and lubricators and determine how frequently filters and lubricators should be checked during future operation. This will help the motor performances and it' service life.
- » When performing maintenance on the air motor please use the rebuild instructions which are also enclosed in this manual. Please make sure the motor runs smooth after maintenance and check the clearances in the motor to prevent problems when operating the motor.



The oil level in the motor casing must be maintained. The frequency of replenishment will depend on the application and usage. The motor case should be drained and refilled after 25 hours of initial running and every 200 hours thereafter or sooner if found necessary e.g. (contamination of oil by water from the air line.)

Servicing Motor

A: Disassembly motor

Note! For the clarification of the part numbers please refer to the Spare Parts Lists in the appendix.

Preparation for disassembly

Remove the motor from its operating position to a clean working surface ready for stripping, externally clean the motor ready for opening. Drain the oil from the motor casing by removing the drain plug (26). Stripping and re-assembly will be simplified if the crankshaft (20/A/B) or output shaft (67) RM510 and RM610 is vertically in a soft-jawed vice or supported on a suitable packing to raise the shaft clear of the working surface.

Removal of Rotary Valve Housing

- » Remove inlet / exhaust adaptor plate (72) or control valve fitted).
- » Remove valve cover
- » Release bolts (38) and valve bush housing (3) can be eased upward.
- » On RM110 to 410 motors remove grub screw (49) together with the valve side balance weight (number 35).
- » All motors - carefully remove rotary valve (2) from housing (3). This can generally done from the inside outwards and inspect both the rotary valve and the housing for wear. The normal clearance at manufacture between these two components is 0.002 - 0.003" (0.05 - 0.075 mm). Excessive wear will cause air leakages and loss of efficiency of the unit.

All Motors

Inspect the clearance of the pivot pins (29) in queen rod (30) and king rod(12). Inspect the gudgeon pin in both the piston and all rods. Check for wear on the main crankshaft (20A, 20B) and on the main big end bearing (no. 48). The wear in the cylinder bores can be checked by removing each compression ring (10) and pushing it into the cylinder bore (8). The ring gap should be in the region of 0.003 to 0.004" (0.075 - 0.010 mm). Bore wear cause loss of power and inject high pressure air into the case & oil could be ejected from the breather plug (part no. 46). All other parts should thoroughly cleaned and inspected for wear. Spare parts can be found from the spare listings. The motor number and its code should be incorporated in any spares order. This is always stamped on the main flange plate (24) located near the breather plug hole 46, i.e. 230 Hx. GLOBE provides a seal kit for each motor and it is strongly recommended that new oil seals, seals and gaskets are used throughout.

RM110 Motors

Lift the spacing washers (31/34) out. Slightly rotate the shaft backwards and forwards and inspect the amount of wear which is present on the big end assembly. Remove the top retaining ring (part no. 74). All the connecting rods can then be lifted upwards and pushed outwards towards the cylinders. Remove cylinder bolts (37) and the entire piston assembly can be withdrawn from the motor unit.

RM210/310/410 Motors

These units are of the king rod variety and again it is wise to slightly rotate the crankshaft (part no. 20 A/B) in direction to test any excessive wear on either the king rod bearing or the pivot pins (part no. 29). Having first removed the outer spacing washer (31/34) withdraw pivot pins (part no. 29). This procedure is usually done with a bent rod withdrawing the pins from the inside outwards. Remove all cylinder cap bolts (part 37) and by pushing the queen rods (part 30) outwards the entire piston and rod assembly can be removed from the motor. Turn the motor unit over to extract the crank bearing bearings (part no. 48). The main king rod (part no. 12) can then be lifted upwards and tilted over the top of the crankshaft. Remove the main king rod, piston and cylinder from the motor. Remove the output shaft circlip (14), spacer (15) and shims (16). Remove the counter sunk bolts (52) holding the output flange (24 /A B) on to the engine case (part no. 27). The engine case (27) can be Drift the crankshaft inwards from the flange plate (24A). To remove the outer shaft bearings (55 and 56) drift to their respective sides as they are located inwardly on the two circlips (part no. 18).

RM510 and 610 Motors

Remove bolts (58) holding the output shaft assembly. Remove bolts (57) and the output flange (24 A/B). This will then expose the inside of the motor. Turn the crankshaft so that one rod is at T.D.C. Remove that cylinder, the circlip and gudgeon pin. Push out from the piston and the entire assembly can be removed. Repeat this procedure in turn until all the pistons have been removed. On this motor the balance weight and crank assembly is built as one item and this can now be removed. Remove locking nut (22) and the tapered pin (21). Both balance weights (part no. 20A and 20B) can now be disengaged. This will expose the king rod and queen rod assembly. To remove the queen rod remove the pivot pin (29).

B: Assembly Procedure

Warning: When first running the motor, some light oil should be injected into the inlet connection to ensure adequate lubrication until the air line lubrication is established. All parts should be clean and liberally coated with oil.

Note! For the clarification of the part numbers please refer to the Spare Parts Lists in the appendix.

RM110 Motor only

Fit crank spacer (13) bearing (48) and the inner retaining ring (74) (internal bevel uppermost). Assemble con rods on pistons. Assemble all pistons into their cylinder pots (8) using ring clamp. Fit all pistons / cylinder on to engine case. Carefully lift the connecting rods (53). Lift upwards and locate the shoe on the connecting rod between the bearing (48) and the retaining ring (74). Repeat for all cylinders. Locate the outer retaining ring (74) (internal bevel downwards) over all shoe on the connecting rods (53). Fit the packing spacer (31 / 34). Refer to motor spacing assembly. Paragraph No. 10.

RM110 to 410 Motors

Output shaft assembly. Ensure both circlips and bearings are fully home. Oil seal (19) lip must face inwards and be lubricated. RM 410 motor has also a spacer fitted between bearings. Push crankshaft fully home and locate spacer washer (15) and circlip (14). Check gap, shim up (16) for minimum end float. Fit new seal (25) and output flange (24) to the engine case (27). Turn motor vertical (shaft downwards).

RM410 Motor big end

Fit all connecting rods (30) & (12) on to gudgeon pins and pistons using ring clamp assemble into cylinders. Ensure gudgeon pin circlips are seated correctly. Rotate motor until crank is nearest to breather plug (46). Fit the crank spacer (13) push the piston to bottom dead centre within the cylinder (8). Insert the king rod into the engine case (27) lifting and rotating the king rod (12) over the top of the crankshaft (20 A / B). Bolt cylinder in position, fit the 2 crank bearings (48). Fit remaining cylinders / pistons and attach to king rod (12) with the pivot pin (29). Rotate 360 degrees to ensure parts are correctly fitted. Locate the spacing washer (31 - 34) and spacing as paragraph No. 10.

After assembly, install the motor according to the Installation chapter in this manual

RM510 to 610 Motors

Assemble the spacing washer (13) on to the crankshaft outer section locating the dowel pin (23). Assemble bearing (48) and the king rod (12). Assemble all four queen rods (part no. 30) into the king rod (12) locating with pivot pins (no.29). Fit final location washer (13) to close the assembly. Ensure that the drive peg (23) is fitted on to the inner balance weight (20 A / B). Closed together and finally to 'ldcale correctly by passing a 12 mm dia. bar between the holes marked X and Y on the drawings. Once this assembly is located the locking dowel (21) and its nut can be assembled, remove the 12 mm bar and ensure that the mechanism is free. Locate assembly into open engine case. Ensure each rod projects into its correct cylinder. Rotate the unit so that the main king rod comes to top dead centre, fit the piston and gudgeon pin, ensure gudgeon pin circlip is correctly located. Fit gasket (7) to cylinder Fit pistons into cylinder bore using a piston ring clamp. Bolt cylinder (8) on to engine case (27). Rotate the crank to the next top dead centre position and repeat the procedure. Turn crank 360 degrees to check correct functioning .Fit gasket (28) and the output flange (24 A / B). Turn the 180 degrees to allow valve to be fitted. Lubricate valve (2) and Inside Bore of Housing (3). Rebuild the valve assembly in the reverse order. Check it rotates freely. Fit valve assembly on to the motor ensuring the different size drive dowels (61) and (62) are located in the crankshaft. The remaining build procedure is the reverse to initially dismantling

Crank assembly instructions for RM210 and RM310 motors

Fit the 3 queen rods (30) on to piston assembly (9) and assemble into the cylinder pot (98) complete with gasket (7). Fit piston assembly (9) on to the king rod (10) ensuring gudgeon pin clips are correctly positioned. (RM 310 motor). Assemble a ring clamp (dimensions shown on sketch) on to the king rod piston. Fit the crank spacer (13) to the crankshaft (20 A / B). Rotate the crankshaft until the crank pin is in the vertical position (nearest the breather plug 46). Feed king rod (12) complete with its piston assembly through the aperture marked 'Z' on drawing. Twist and lift the rod over the end of the crank pin. Fit crank pin bearing or bearings. Feed the cylinder pot (8) complete with its gasket (7) on to the piston. The ring clamp is ejected inwards from the piston. Work clamp off sideways from the king rod. Bolt the cylinder pot into position and feed the remaining cylinders completely assembled through the various holes and locate the inner end of the connecting rods with the king rod fixing with pin (29). Rotate the motor 360 degrees to ensure correct fitting. Fit spacing washer (30 /34) and refer to paragraph 10 for spacing the motor unit.

Assembly of valve housing

This is the reverse procedure to dismantling. Smear oil to external surface of valve (2) and to the bore of valve housing (3).

Servicing Control Valve

A: Disassembly Control Valve

Preparation for disassembly

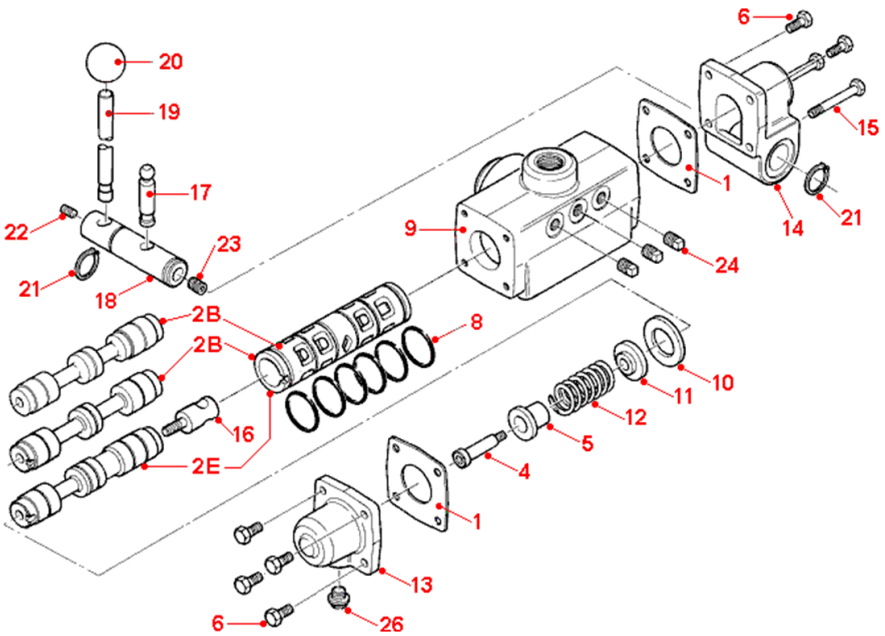
Remove the valve from its operating position to a clean working surface ready for stripping, externally. Clean the valve ready for opening.

Note! The spool and sleeve are during fabrication matched to each other. It is not possible to replace only the spool or sleeve. They always have to be replaced as a set.

Disassembly HCV

- » Dismount Lever Cap 7 by unscrewing bolts 6
- » Dismount End Cap Spring End 13 by unscrewing bolts 6
- » Pull out carefully spool 2 (remember or mark so that spool is mounted back in the sleeve in from the same side) You should not “mirror” the spool in the sleeve when reassembled.
- » Do not damage in any way the surface of the spool 2B
- » Push out sleeve 2
- » Inspect the O-rings 8 and replace if necessary.
- » Apply grease on the O-rings 8 and sleeve 2 and the internal surface in the valve body 9
- » Clean the sleeve 2
- » Gently push the sleeve 2 in the valve body 9. Make sure that the O-rings are not sheared of during assembly.
- » Make sure that the spool and valve are clean. Oil the surface of the spool 2. Replace with hand carefully spool 2 into the sleeve. When replacing hardly no force should be used. If the spool does not go in lightly then take out the spool and try again.
- » Replace End Cap 13
- » Add grease on Toggle pin 17 and replace Lever Cap 7
- » Test whether the O-rings 8 are not damaged during assembly by applying 1 bar air pressure on the inlet. Listen if there is air leaking from the bottom of the valve. If there is clearly a hissing sound it means that one or more of the O-rings are damaged during re-assembly. Start procedure again.

Spare Parts List Hand Control Valve

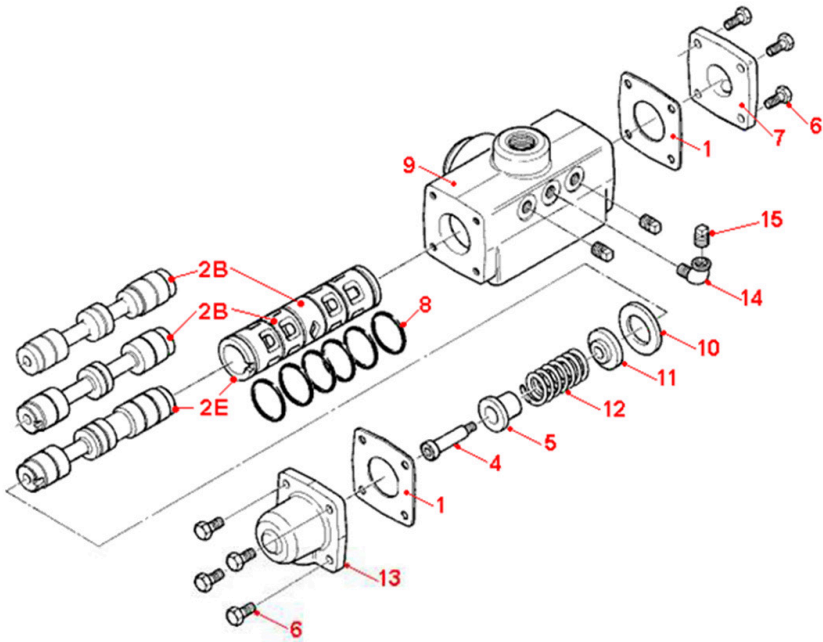


Item	Part No.	Description	Qty
01	111-066	End Cap Gasket	2 (Equipower)
02E	111-913	Matched Spool and Sleeve	1 (Biased)
02B	111-914	Matched Spool and Sleeve	1
4	817-003	Shoulder Screw 8 mm	1
5	111-071	Centering Shaft Guide	1
6	802-016	Hex Head Screw M6 x 16	8
8	808-027	O Ring 27.5 x 30	6
9	111-060	Valve Body	1
10	111-068	Valve Sleeve Spacer	1
11	111-072	Washer, Spring Centering	1
12	814-016	Spring 323714	1
13	111-064	End Cap - Spring End	1
14	113-041	Hand Lever Cap	1
15	802-024	Hex Head Bolt M6 x 50	2
16	113-024	Toggle Shaft	1
17	113-026	Toggle Pin	1
18	113-008	Hand Lever Pivot	1
19	113-002	Hand Lever	1
20	818-002	Black Plastic Knob 31 mm	1
21	804-013	Circlip 20mm External	2
22	815-010	Grub Screw M8 x 10	1
23	815-022	Grub Screw M8 x 16	1
24	816-063	Plug 1/8" BSPT Sq. Head	3
26	113-050	Vent Plug	1

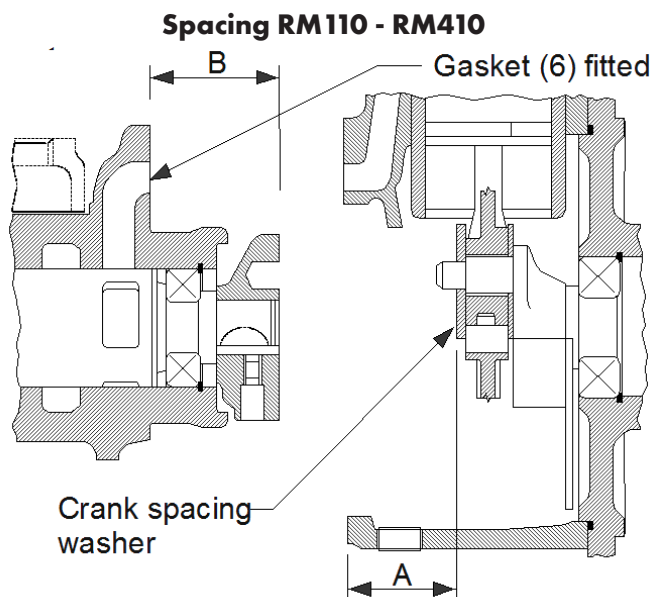
Disassembly RCV

- » Dismount End Cap 7 by unscrewing bolts 6
- » Dismount End Cap Spring End 13 by unscrewing bolts 6
- » Pull out carefully spool 2 (remember or mark so that spool is mounted back in the sleeve in from the same side) You should not "mirror" the spool in the sleeve when reassembled.
- » Do not damage in any way the surface of the spool 2B
- » Push out sleeve 2
- » Inspect the O-rings 8 and replace if necessary.
- » Apply grease on the O-rings 8 and sleeve 2 and the internal surface in the valve body 9
- » Clean the sleeve 2
- » Gently push the sleeve 2 in the valve body 9. Make sure that the O-rings are not sheared of during assembly.
- » Make sure that the spool and valve are clean. Oil the surface of the spool 2. Replace with hand carefully spool 2 into the sleeve. When replacing hardly no force should be used. If the spool does not go in lightly then take out the spool and try again.
- » Replace End Cap 13
- » Replace End Lever Cap 7
- » Test whether the O-rings 8 are not damaged during assembly by applying 1 bar air pressure on the inlet. Listen if there is air leaking from the bottom of the valve. If there is clearly a hissing sound it means that one or more of the O-rings are damaged during re-assembly. Start procedure again.

Spare Parts List Remote Control Valve



Item	Part No.	Description	Qty
01	111-066	End Cap Gasket	2
02E	111-913	Matched Spool and Sleeve	1 (Equipower)
02B	111-914	Matched Spool and Sleeve	1 (Biased)
4	817-003	Shoulder Screw 8 mm	1
5	111-071	Centering Shaft Guide	1
6	802-016	Hex Head Screw M6 x 16	8
7	111-065	End Cap - Plain End	1
8	808-027	O Ring 27.5 x 30	6
9	111-060	Valve Body	1
10	111-068	Valve Sleeve Spacer	1
11	111-072	Washer, Spring Centering	1
12	814-017	Spring D13040	1
13	111-064	End Cap - Spring End	1
14	816-049	Elbow M/F 1/8" BSPT	1
15	816-063	Plug 1/8" BSPT Sq. Head	3



Clearance Crank spacing Washers

RM110	RM210	RM310	RM410
1.85 mm / 0.073 "	2.64 mm / 0.104"	3.24 mm / 0.128"	2.50 mm / 0.099"
2.03 mm / 0.080"	3.25 mm / 0.128"	3.66 mm / 0.144"	3.00 mm / 0.120"
2.34 mm / 0.092"	3.66 mm / 0.144"	4.06 mm / 0.160"	4.00 mm / 0.157"
2.64 mm / 0.104"			

Measure dimension (A) from the crank washer face to the engine case and also dimension (B) from the rotary valve face to the inside of the gasket. Select the correct shim washer from the list (31 - 34) to obtain clearance. Rotate the crankshaft until the balance weight is at the bottom dead centre position, rotate the rotary valve until the balance weight is at the bottom position. Assemble the valve housing (3) on to the engine case (27). Rotate the output shaft in both directions and viewing the rotary valve (2) through the exhaust cover (51) ensure that the valve is correctly following the output shaft direction, this checks that both crank and valve slot are correctly engaged. Replace all drain plugs and refill with oil. Spray some light oil into the inlet and exhaust ports and connect the unit to a low pressure supply and allow the unit to run on the bench for a short period of time prior to refitting the unit into full service.

Maintenance | Brake

Correct maintenance is your responsibility! Make sure you have the proper maintenance conditions.

WARNING - Injury hazard



Disconnect air supply and vent all air lines.



Wear eye protection: Air stream from product may contain solid or liquid materials that can result in eye or skin damage.



Flush this product in a well ventilated area.



Do not use kerosene or other combustible solvents to flush this product.



Failure to follow these instructions can result in serious injury or property damage.

Inspection and replacement interval of critical components

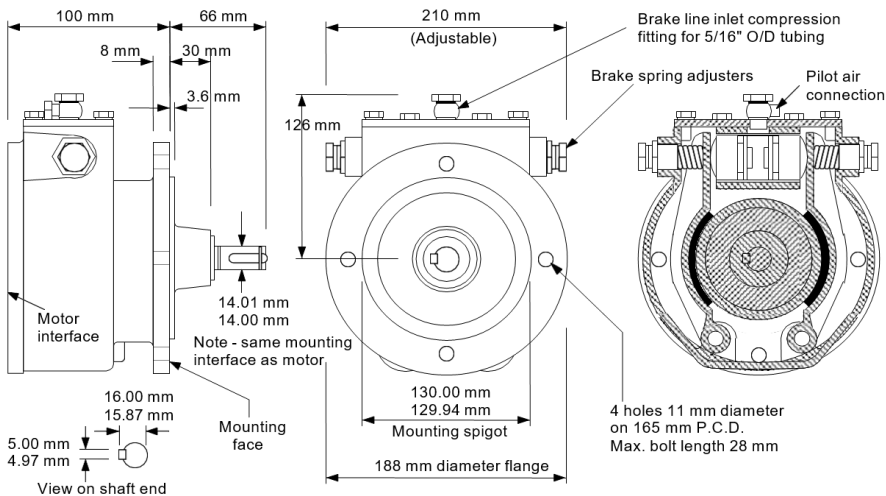
Brake

Description	Quantity	Expected/Rare malfunction	Measures applied to prevent excessive wear on critical components
Brake shoe assy	2	Wear of brake shoe	Check thickness brake liners every 200 hours*
Output shaft	1	No grease	Check every 2500 hours*
All bearings	-	Worn/No grease	Replace every 7500 hours*

* Operating/running hours

Maintenance brake

Check every 200 operating hours the thickness of the brake liner on the brake shoe (item 26). Disconnect the brake and inspect the thickness of the liner. If the rivet heads which are holding the shoes on the brake shoe assembly – item 26 – are within 0.5 mm of the surface new brake shoe assemblies need to be fitted. Always replace both brakes shoes even if only one is worn. After fitting the new brake shoe assemblies use the LOAD ADJUSTMENT procedure as mentioned in the chapter OPERATION.



Trouble shooting

Fault Finding

1. The RM series motors are designed to perform at their rated capacities for the long periods of time. Faults can develop for the following reasons:

(A) Lack of lubrication. This will result into rapid wear, internal seizure, loss of power or excessive air leakage.

(B) Faults in the air supply system:

1. failure to remove the plastic protective dust caps

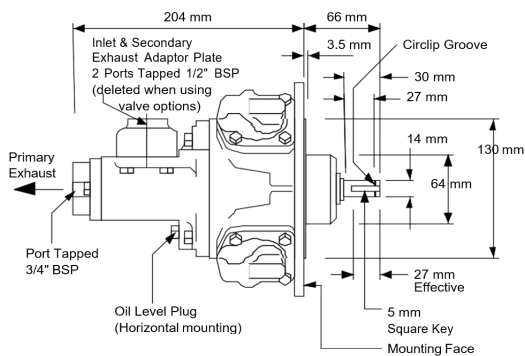
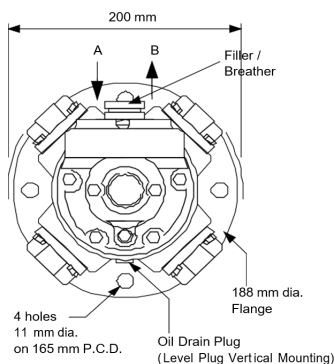
2. insufficient air pressure at the motor caused by (a) supply pipe line or valve too small (b) if the exhaust is piped away excessive back pressure due to small bore pipes (c) compressor of insufficient capacity (d) clogged air line filter (e) the air pressure should remain at the required pressure when the motor is operating at full potential. If the air pressure reduces considerably from the stationary to the rotating conditions then the supply line or the compressed air available is inadequate for the service operation of the motor.

The motor should always be supplied with clean moisture free and lubricated air. The better the quality of the air the less attention will be required to the motor unit. Air quality should meet ISO 8573-1:2010 class 4 for solid particles and ISO 8473- 1:2010 class 3 for water.

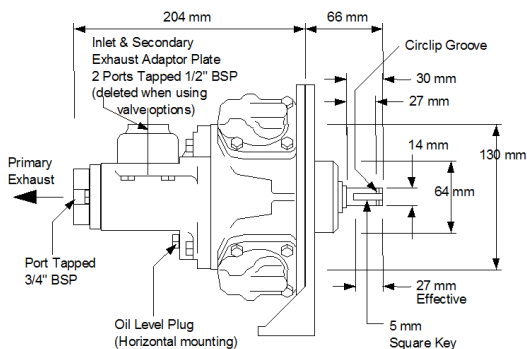
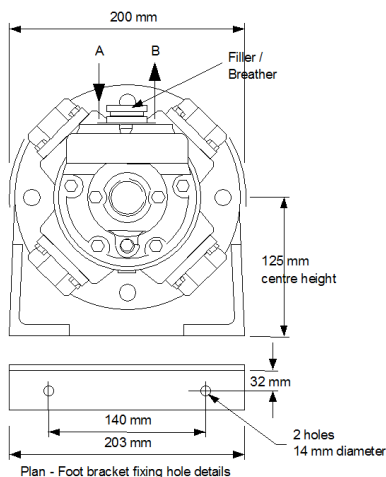
Problem				Conclusion
Low speed	Low Torque	Won't run	Runs well then slows down	
x	x	x		There may be dirt or foreign material in the motor. Inspect and flush the motor.
x	x	x		There may be internal rust in the motor. Inspect and flush the motor.
x	x			The air pressure may be too low. Increase the air pressure.
x	x			Incoming air line too narrow. Replace with a bigger one.
	x		x	Limited exhaust. Inspect and repair.
x	x	x	x	Motor is running hot. Perform a service maintenance.
	x		x	Inadequate air flow from air source. Inspect and repair.
	x		x	Air source is too far from the motor. Put the air source closer.

Dimensions, Performances & Spare Parts

Dimensions RM110 & RM110 + Foot Bracket



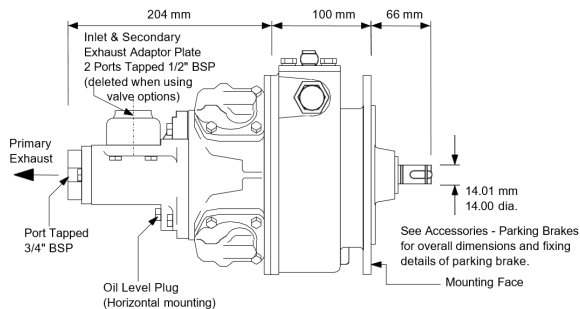
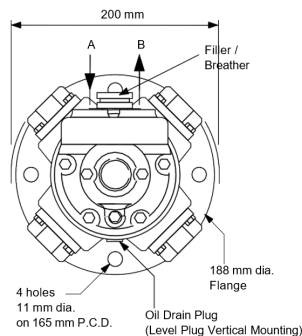
Arrows show direction of rotation with airflow direction as shown (Reverse port connections A & B for opposite rotation)



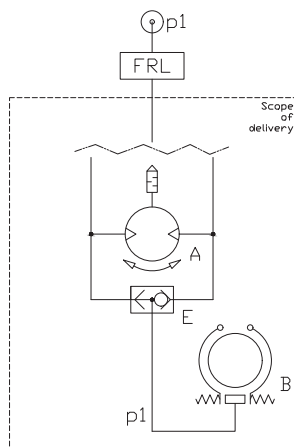
Arrows show direction of rotation with airflow direction as shown (Reverse port connections A & B for opposite rotation)



Dimensions & Performance RM110 + Brake



Arrows show direction of rotation with airflow direction as shown (Reverse port connections A & B for opposite rotation)

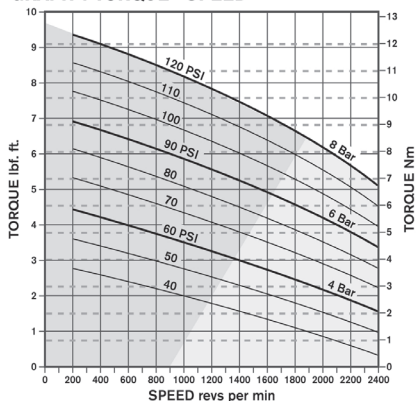


Gearbox ratio: None

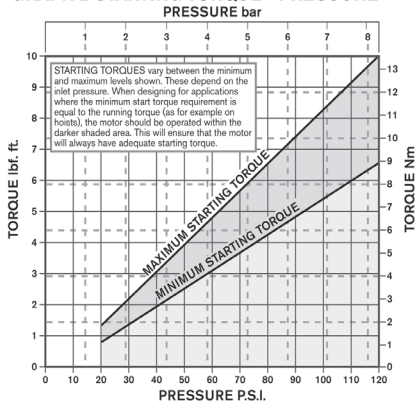
Maximum speed: 2400 RPM
No Control Valve fitted

Reading Graphs - Scales have been adjusted to enable bar and psi to be read from a common curve. Therefore only read psi with the left hand axis and bar with the right hand axis.

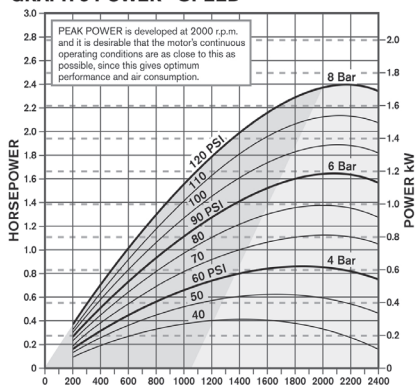
GRAPH 1 TORQUE - SPEED



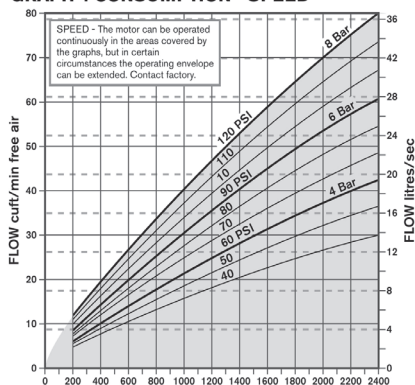
GRAPH 2 STARTING TORQUE - PRESSURE



GRAPH 3 POWER - SPEED



GRAPH 4 CONSUMPTION - SPEED



LUBRICATING OIL CAPACITIES

Horizontal 75ml Vertical 150ml

Use a good quality hydraulic oil with a viscosity of around 100cSt (460SSU) at 40°C (104°F)

AIRLINE FILTRATION AND LUBRICATION

Use 64 micron filtration or better. Choose a lubricator suitable for the flow required. Prior to initial start-up, inject oil into the inlet port.

GENERAL DATA

MASS (motor only) 13 kgs (28.7 lbs)

MOMENT OF INERTIA of rotating parts 0.01 gm² (motor only)

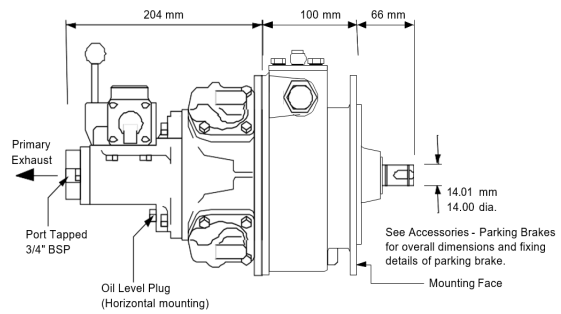
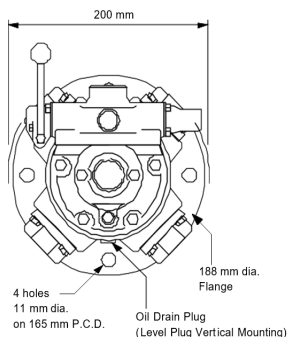
MAX OVERHUNG FORCE on motor shaft 445 N (100 lbf)

TEMPERATURE RANGE -20°C to +60°C (-4°F to +140°F) / -10°C to +60°C (-14°F to +140°F) with brake

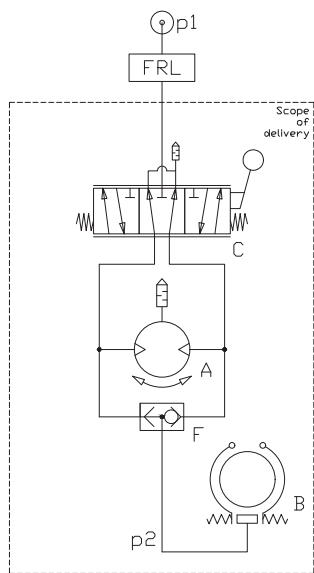
Lubricator drop rate 3-4 drops/minute continuous operation

Lubricator drop rate 6-8 drops/minute intermittent operation

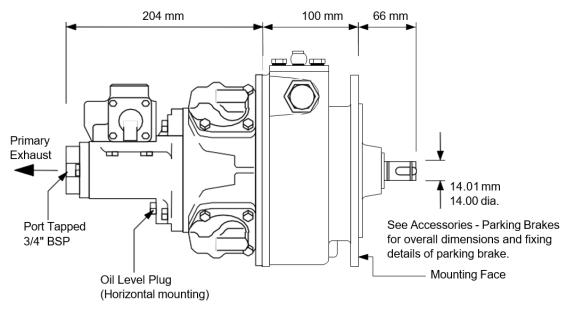
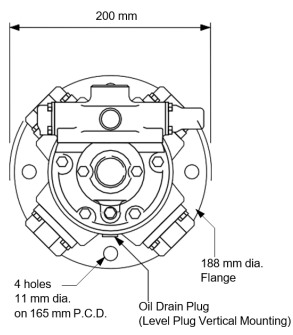
Dimensions & Performance RM110 + Brake + HCV



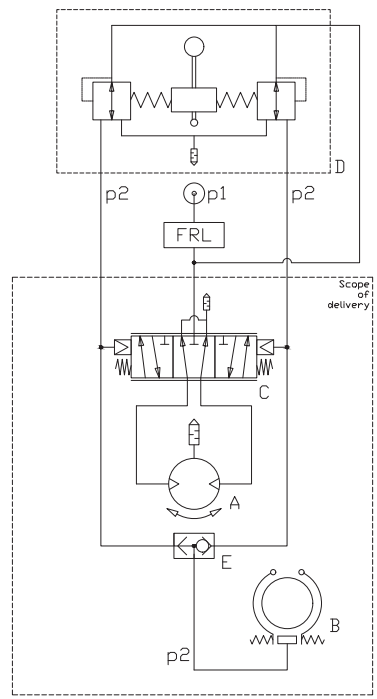
Arrows show direction of rotation with airflow direction as shown (Reverse port connections A & B for opposite rotation)



Dimensions & Performance RM110 + Brake + RCV

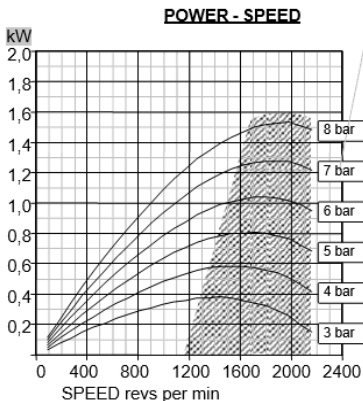
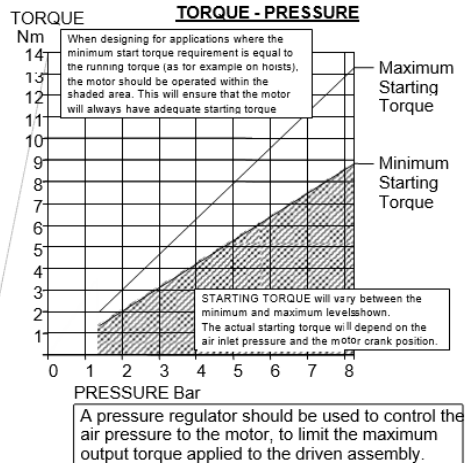
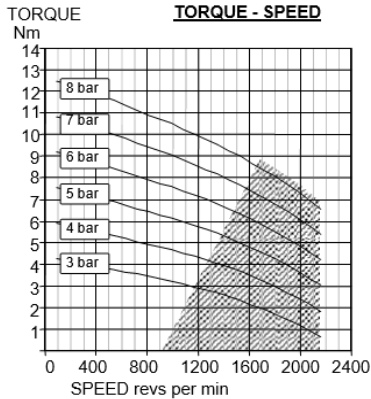


Arrows show direction of rotation with airflow direction as shown (Reverse port connections A & B for opposite rotation)

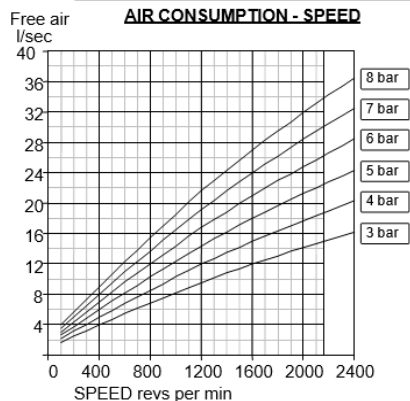


Gearbox ratio: None

Maximum speed: 2160 RPM
Control Valve Fitted



It is desirable that the motor's continuous operating speed is close as possible to the speed at which PEAK POWER is since this gives optimum performance and air



LUBRICATING OIL CAPACITIES

Horizontal 75ml Vertical 150ml

Use a good quality hydraulic oil with a viscosity of around 100cSt (460SSU) at 40°C (104°F)

AIRLINE FILTRATION AND LUBRICATION

Use 64 micron filtration or better. Choose a lubricator suitable for the flow required. Prior to initial start-up, inject oil into the inlet port.

Lubricator drop rate 3-4 drops/minute continuous operation

Lubricator drop rate 6-8 drops/minute intermittent operation

GENERAL DATA

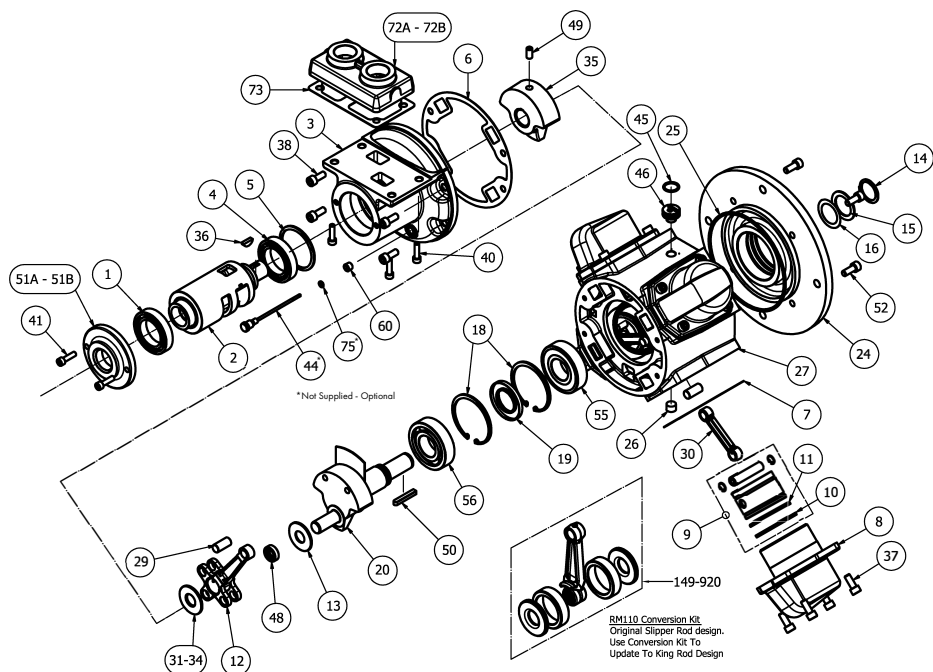
MASS (motor only) 13 kgs (28.7 lbs)

MOMENT OF INERTIA of rotating parts 0.01 gm² (motor only)

MAX OVERHUNG FORCE on motor shaft 445 N (100 lbf)

TEMPERATURE RANGE -20°C to +60°C (-4°F to +140°F) / -10°C to +60°C (-14°F to +140°F) with brake

Spare Parts List RM110

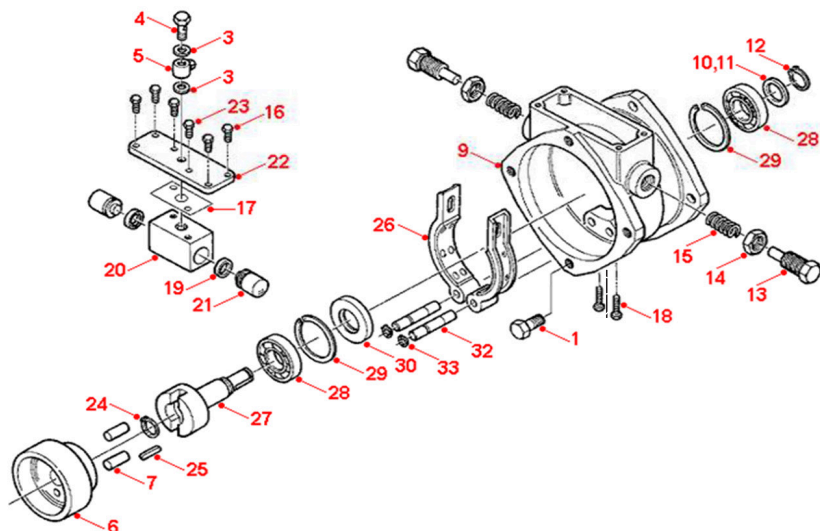


Item	Part No.	Description	Qty	Kit No.	Item	Part No.	Description	Qty	Kit No.
01	807-020	Rotary Valve Bearing (Outer)	1		36	811-016	Woodruff Key	1	
02	130-006	Rotary Valve	1		37	802-020	Cylinder Bolts	16	
03	130-011	Rotary Valve Housing	1		38	802-020	Valve Housing Bolts	4	
04	807-021	Rotary Valve Bearing (Inner)	1		40	802-020	Adaptor Plate Bolt	4	
05	804-051	Rotary Valve Bearing Circlip	1		41	802-016	Exhaust Cover Bolts	2	
06	100-001	Rotary Valve Housing Gasket	1*	139-911	44	100-040	Dipstick (vertical mounting)	1	
07	110-030	Cylinder Gasket	4*	139-911	45	808-004	Seal (transit only)	1	
08	110-082	Cylinder	4		46	130-066	Breather Plug	1	
09	130-902	Piston Assembly	4		48	807-042	Needle Bearing	1	
10	100-024	Compression Ring	4*	139-911	49	815-012	Grub Screw	1	
11	100-022	Oil Control Ring	4*	139-911	50	811-002	Key	1	
12	140-077	King Rod	1		51A	130-005	Rotary Valve Exhaust Cover BSP	1	
13	140-013	Crankshaft Spacer	1		51B	130-105	Rotary Valve Exhaust Cover NPT	1	
14	804-006	Crankshaft Circlip	1		52	810-003	Flange Bolt	8	
15	100-035	Crankshaft Spacer	1		55	807-007	Output Shaft Bearing (Outer)	1	
16	100-049	Crankshaft Spacer Shim	5		56	807-007	Output Shaft Bearing (Inner)	1	
18	804-051	Crankshaft Bearing Circlip	2		60	816-063	Oil Level Plug	1	
19	808-043	Crankshaft Oilseal	1*	139-911	72A	130-003	Inlet Adaptor Plate BSP	1	
20	110-901	Std. Crankshaft Assembly	1		72B	130-103	Inlet Adaptor Plate NPT	1	
24	130-076	Std. Flange Plate	1		73	130-004	Inlet Adaptor Plate Gasket	1*	139-911
25	808-033	Flange Plate Seal	1*	139-911	75	808-008	Dipstick Seal	1*	139-911
26	816-074	Plug	1		139-911		RM110 Seal Kit	1	
27	130-012	Engine Case	1		149-920		Conversion Kit	1	
29	140-081	Queen Rod Pivot	3						
30	140-078	Queen Rod	3						
31	140-052	Crank Spacer SELECT	1	149-920					
32	140-053	Crank Spacer ON	1	149-920					
33	140-054/055	Crank Spacer * ASSEMBLY	1	149-920					
34	140-056	Crank Spacer	1	149-920					
35	130-010	Balance Weight	1						

149-920 Conversion Kit:

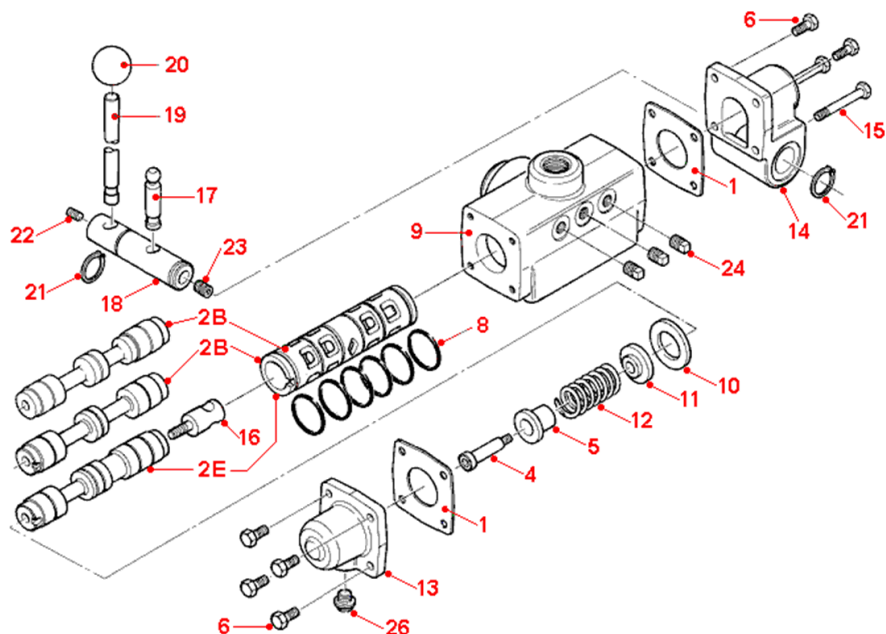
Comprises of items 12, 13, 29, 30, 31-34 and 48. These items may be used to convert a motor from the original design to the king rod design. If unit is pre 1990 supplied, consult manufacturer to confirm design.

Spare Parts List Parking Brake



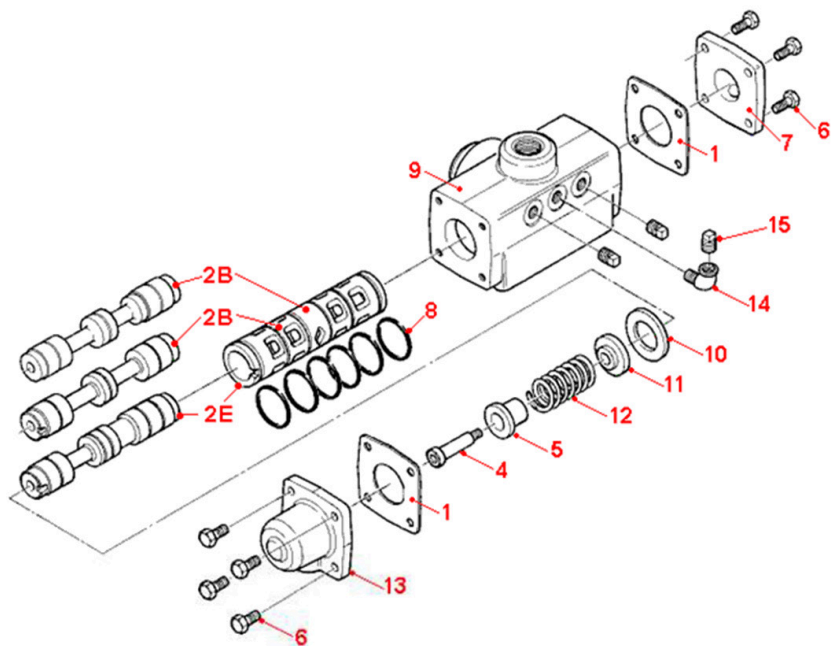
Item	Part No.	Description	Qty
01	802-052	Set Screw M10 x 20	4
03	808-090	Bonded Seal 1/4" BSP Dowty	2
04	816-004	Banjo Bolt Only 1/8" BSP	1
05	816-005	Banjo Bolt C/W/ Nut&Pin 5/16"	1
06	112-001	Brake Wheel	1
07	806-001	Dowel Dia 10 x 30 Lg	2
09	112-008	Brake Housing	1
10	100-049	Shim - Output	5
11	100-035	RM100 Output Shaft Spacer	1
12	804-006	Circlip 19mm External	1
13	102-009	Brake Spring Adjuster	2
14	102-024	1/2" BSP Hex Nut	2
15	814-002	Spring 223612	2
16	802-016	Hex Head Screw M6 x 16	4
17	112-030	Piston Block O-Ring Gasket	1
18	802-020	Hex Head Screw M6 x 20	2
19	808-072	U Packing U110	2
20	112-014	Piston Block	1
21	102-011	Brake Piston	2
22	112-013	Block Support Plate	1
23	802-012	Hex Head Screw M6 x 12	2
24	804-003	Circlip 14mm External	1
25	811-022	Key K123 5Sq	1
26	112-901	Brake Shoe Assembly	2
27	112-005	Output Shaft	1
28	807-007	Ball Bearing	2
29	804-051	Circlip 47mm Internal	2
30	808-043	Oilseal 20x47x10/R4	1
32	112-003	Brake Shoe Pivot	2
33	804-121	Circlip 3/8" External Ander	2

Spare Parts List Hand Control Valve



Item	Part No.	Description	Qty
01	111-066	End Cap Gasket	2 (Equipower)
02E	111-913	Matched Spool and Sleeve	1 (Biased)
02B	111-914	Matched Spool and Sleeve	1
4	817-003	Shoulder Screw 8 mm	1
5	111-071	Centering Shaft Guide	1
6	802-016	Hex Head Screw M6 x 16	8
8	808-027	O Ring 27.5 x 30	6
9	111-060	Valve Body	1
10	111-068	Valve Sleeve Spacer	1
11	111-072	Washer, Spring Centering	1
12	814-016	Spring 323714	1
13	111-064	End Cap - Spring End	1
14	113-041	Hand Lever Cap	1
15	802-024	Hex Head Bolt M6 x 50	2
16	113-024	Toggle Shaft	1
17	113-026	Toggle Pin	1
18	113-008	Hand Lever Pivot	1
19	113-002	Hand Lever	1
20	818-002	Black Plastic Knob 31 mm	1
21	804-013	Circlip 20mm External	2
22	815-010	Grub Screw M8 x 10	1
23	815-022	Grub Screw M8 x 16	1
24	816-063	Plug 1/8" BSPT Sq. Head	3
26	113-050	Vent Plug	1

Spare Parts List Remote Control Valve

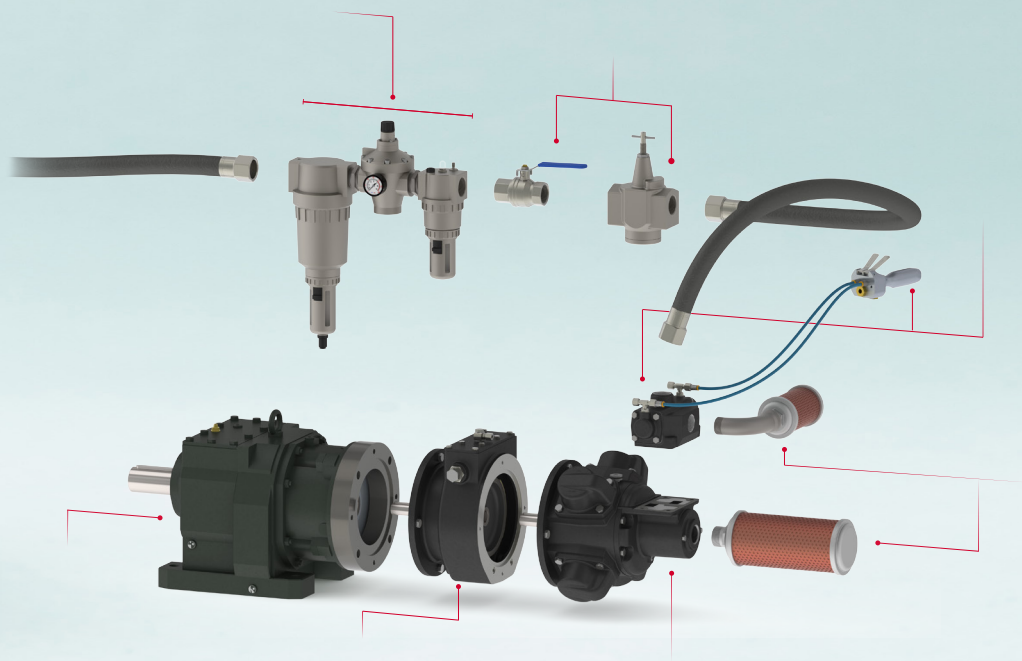


Item	Part No.	Description	Qty
01	111-066	End Cap Gasket	2
02E	111-913	Matched Spool and Sleeve	1 (Equipower)
02B	111-914	Matched Spool and Sleeve	1 (Biased)
4	817-003	Shoulder Screw 8 mm	1
5	111-071	Centering Shaft Guide	1
6	802-016	Hex Head Screw M6 x 16	8
7	111-065	End Cap - Plain End	1
8	808-027	O Ring 27.5 x 30	6
9	111-060	Valve Body	1
10	111-068	Valve Sleeve Spacer	1
11	111-072	Washer, Spring Centering	1
12	814-017	Spring D 13040	1
13	111-064	End Cap - Spring End	1
14	816-049	Elbow M/F 1/8" BSPT	1
15	816-063	Plug 1/8" BSPT Sq. Head	3

Options for the GLOBE Air Motors

Complete your air motor with many different accessories. Order your GLOBE air motor with the desired options, and have it delivered to you completely assembled. In addition, you are assured of GLOBE quality for your air motor and assembly.

Many of our accessories, including the brakes for the piston engines, are ATEX certified. With the GLOBE air motors & accessories you can always work safely in explosion-prone areas. See below which options we offer for your air motor.

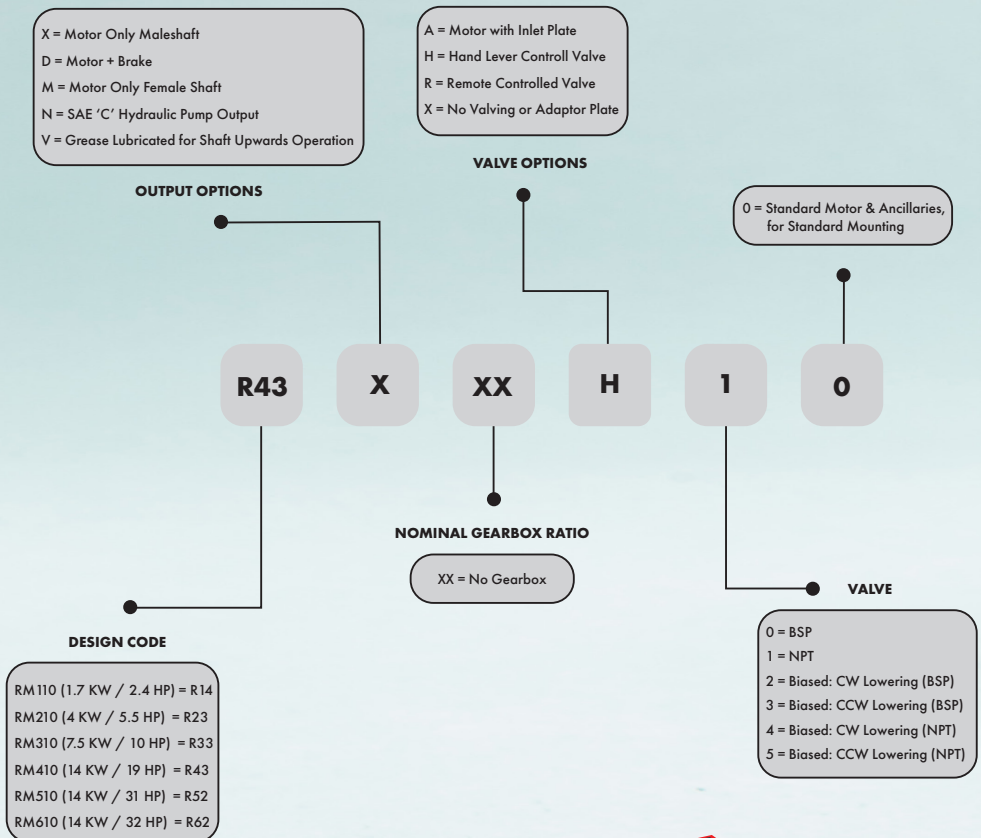


Benefits of a complete GLOBE air motor with accessories:

- | | |
|--|---|
| » Complete assembly in our workshop. | » Assured of proper assembly and operation |
| » No more building yourself. | of your air motor. |
| » Assured of the GLOBE assembling quality. | » Our high-pressure specialists provide you |
| » Complete unburdening with the delivery of
your air motor. | with the best advice. |

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Order your
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EU CE Certification



GLOBE AIRMOTORS B.V.

Boerhaaveweg 9-11
2408 AD Alphen aan den Rijn
The Netherlands
Tel: +31-172-6608
e-mail: info@globe-benelux.nl
www.globe-benelux.nl

EC - DECLARATION OF CONFORMITY

According to annex II.1.A of the Machinery directive 2006/42/EC

Complies with the provisions of the following EG-directive* and standards*

air driven GLOBE Piston Motor models:

RM110, RM210, RM310, RM410, RM510, RM610

Incl. Ancillary Components (Brakes, Valves, Gearboxes)

Complies with the provisions of the following EG-directive* and standards*

- | | |
|---|---------------------|
| • Machinery directive 2006/42/EC | |
| ▪ Safety of machines – basic terminology | EN-ISO 12100:2010 |
| ▪ Preparation for using the instructions – structure, content en presentation part 1: | EN-IEC 82079-1:2012 |
| General assumptions and detailed demands | |
| ▪ Pneumatics – general rules and safety regulations for systems and parts | EN-ISO 4414:2010 |

* incl. possible changes in the directive and standards during the signing of this declaration.

The technical file is present inside the EER and can be drawn from name and the address of the manufacturer by the undersigned of this declaration.

Netherlands, Alphen aan den Rijn

Date: 19-02-2022

Signature assignee of

GLOBE Airmotors B.V.

Boerhaaveweg 9-11
2408 AD Alphen a/d Rijn
The Netherlands

Name: J.G.G. Wannet

Director

UKCA Certification



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www.globe-benelux.nl

UKCA - DECLARATION OF CONFORMITY

According to Supply of Machinery (Safety) Regulations 2008

Complies with the provisions of the following EG-directive* and standards*

air driven GLOBE Piston Motor models:

RM110, RM210, RM310, RM410, RM510, RM610

Incl. Ancillary Components (Brakes, Valves, Gearboxes)

Complies with the provisions of the following EG-directive* and standards*

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- Safety of machines – basic terminology EN-ISO 12100:2010
- Preparation for using the instructions – structure, content en presentation part 1: EN-IEC 82079-1:2012
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Name: J.G.G. Wannet

Director



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Compact Piston Air Motors



Pneumatic Brakes



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Specials: Custom Build

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