ROXAR®

INNOVATIVE ROCK-DRILLS
& ROCK-BREAKERS
MANUFACTURER

Made in Europe

ROXAR FD15 HYDRAULIC DRIFTER

OPERATION AND MAINTENANCE MANUAL

THANK YOU FOR CHOOSING OUR PRODUCT

All information, recommendation and instructions that our technicians have considered relevant for the correct use of the Roxar Hydraulic drifter have been included in this manual.

It also includes the maintenance plan which will enables you to keep the Roxar hydraulic drifter perfectly efficient.

We recommend you to read this manual before attempting the use of the drifter for the first time.

For any technical question about Roxar products, please contact us:

info@roxar.fr

GENERAL INFORMATION

RECOMMENDATION FOR OPERATION AND MAINTENANCE:

In this manual, you will find recommendation for operations following the general practises. Please keep this manual in good conditions and always available together with the drifter. We don't recommend to execute any processing, repair or intervention not mentioned in this manual. Please note that any hydraulic drifter is intended to be operated as component of a machine and not alone as a machine itself, please follow the safety recommendations of the machine which integrates the drifter.

DRIFTER IDENTIFICATION:

The hydraulic drifter is identified by its ID plate placed on its rear part. In case of parts order, or any request or advice related on the operation or maintenance, always refer to the type of drifter and serial number indicated on the plate. It is absolutely forbidden to remove to or to modify the features contained therein.

SAFETY INSTRUCTIONS

A close and careful following of all the instructions contained in this manual will allow a safe and correct use of the drifter.
The drifter shall be used only by adequately trained professionals, older than 18 years.
It is mandatory that the responsible for corporate security makes sure that the staff designed to use the drifter has read and understood this manual in all of its parts. Adjustment ans maintenance servicing must also be performed by authorised, trained professional and over the age of 18 years.
It is recommended that who uses this manual for maintenance and repair may have a basic knowledge of the principles of mechanics & hydraulics as well as the technique of repair of a hydraulic drifter.
Connect the hydraulic drifter only to an appropriate machine.
Make sure that the machine relief valve is set at 40bars higher than the drifter operating pressure.

WARNING:
A drifter generates a rotation movement, make sure to take appropriate care that anybody cannot approach the drifter while operating, including application of any method or precaution on the machine which carries the drifter in order to automatically stop the operation in case of danger.
In any case, never operate the drifter with any person at the immediate proximity.
Keep hands away from the drifter while operating.
Every manipulation or removal of any drifter component can lead to serious accidents.
Always wear appropriate protections while operating.
Please note that the operation of an hydraulic drifter has to be made only by trained operators with adequate professional skills and training.

PROTECTION DEVICES FOR SAFETY

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Always wear safety goggles during the operation as well as during any maintenance or disassembly

Wear protective gloves before any maintenance operation

Use a headset for hearing protection if the noise levels exceed 90db

Beware of burning parts as the drifter can reach high temperature when operating

Always stay away from rotating parts while operating.
Protect yourself from possible rock fragments.
Stay protected behind a windshield during operation.
Ensure that any person is distant from at least 20m from the drifter operation area.

TECHNICAL SPECIFICATIONS

	unit	**FD15**
Type		Independant Rotation
Shank Adapter		T38 / R38 / R32
Recommended max Hole Ø	mm	102
Impact Power (max)	kW	16
Impact Energy (max)	Joule	180
Impact Frequency (max)	Hz	72
Percussion Flow Rate	l/min	50 ÷ 70
Percussion Pressure	bar	120 - 140
Return line maximum admissible pressure	bar	12
Rotation Flow Rate / Motor 400cc	l/min	30 - 60
Rotation Torque Max / Motor 400cc	Nm	1000 at 140 bar **1300 at 175 bar** (peak)
Rotation Speed Max / Motor 400cc	rpm	100 at 60 l/min
Rotation Flow Rate / Motor 250cc	l/min	30 - 60
Rotation Torque Max / Motor 250cc	Nm	900 at 200 bar **1050 at 225 bar** (peak)
Rotation Speed Max / Motor 250cc	rpm	160 at 60 l/min
Rotation Flow Rate / Motor 125cc	l/min	20 - 40
Rotation Torque Max / Motor 125cc	Nm	500 at 200 bar **550 at 225 bar** (peak)
Rotation Speed Max / Motor 125cc	rpm	220 at 40 l/min
Flushing Water Consumption	l/min	25
Flushing Water Pressure	bar	8 - 15
Flushing Air Consumption	m^3/min	4 ÷ 6
Lubricating Air Consumption	l/min	200 (7 bar)
Oil viscosity	cSt	ISO VG 32 (ISO VG 46)
Oil temperature	°C	20 - 80
Air and water flushing temperature	°C	5 - 60
Accumulator Nitrogen pressure	bar	35

TECHNICAL SPECIFICATIONS

ROTATION MOTOR

ROXAR FD15 ROTATION		
REDUCTION	1,48	

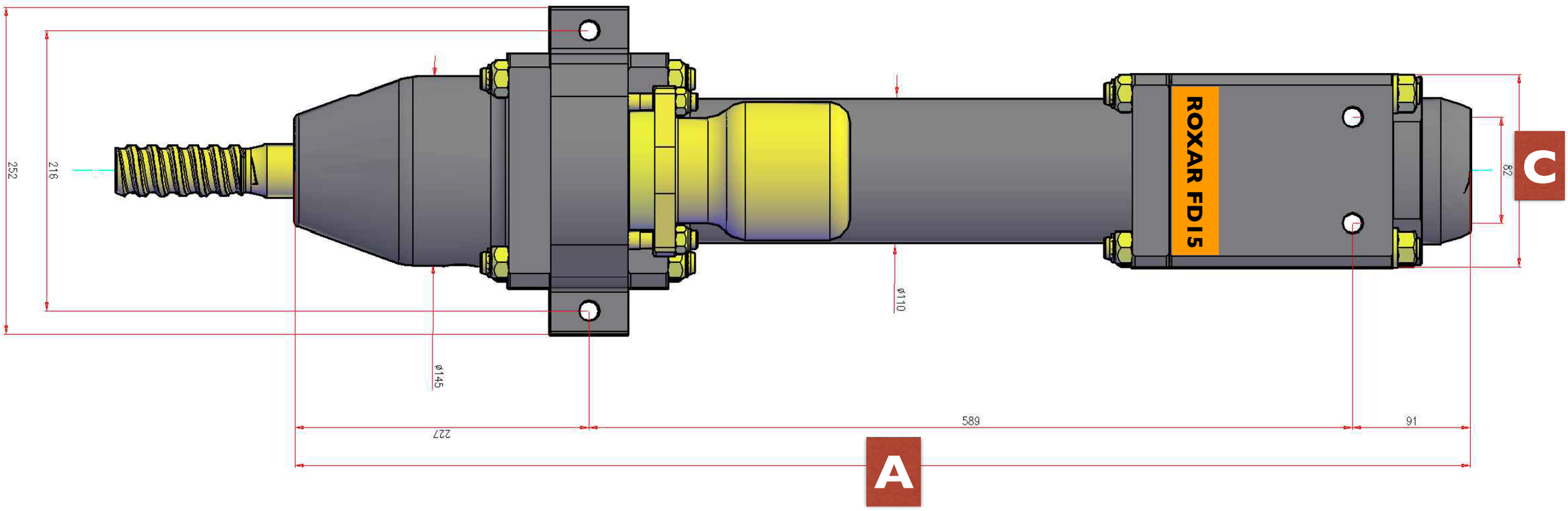
400cc		
PEAK (175bar)	129	daNm
INT (140bar)	102	daNm
CONT (110bar)	90	daNm
Rotation speed (60lpm)	101	rpm
Rotation speed (40lpm)	68	rpm

250cc		
PEAK (225bar)	105	daNm
INT (200bar)	90	daNm
CONT (175bar)	80	daNm
Rotation speed (60lpm)	162	rpm
Rotation speed (40lpm)	108	rpm

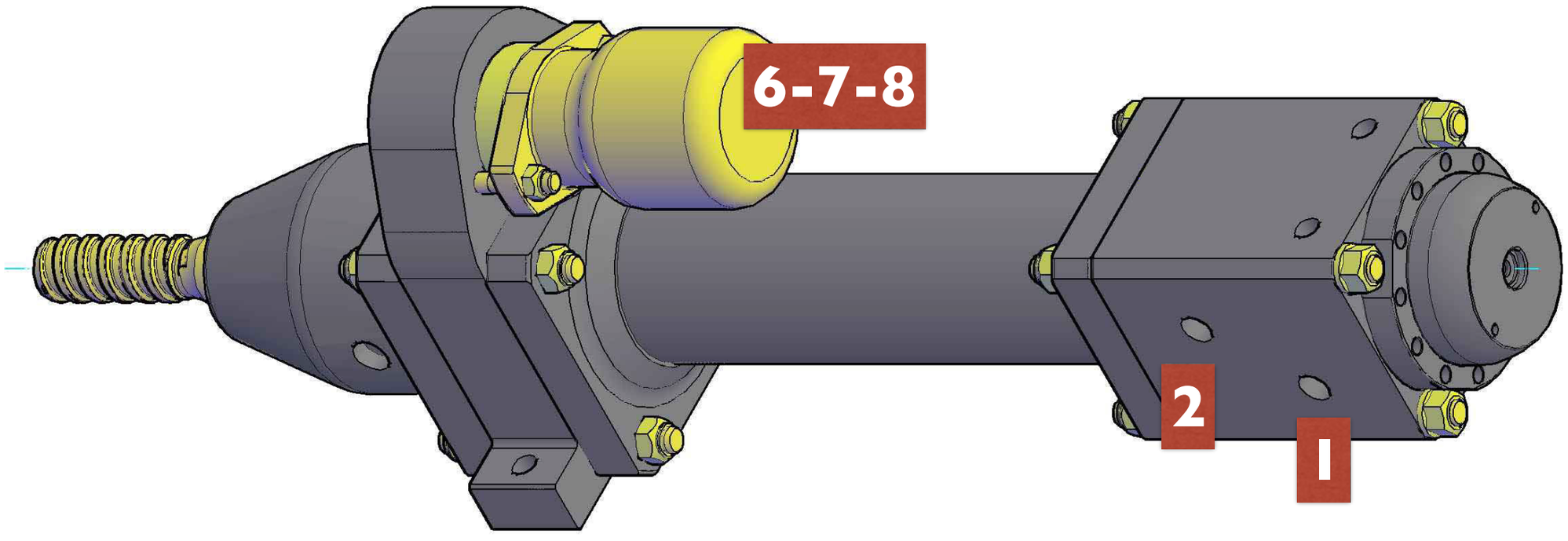
160cc		
PEAK (225bar)	68	daNm
INT (200bar)	64	daNm
CONT (175bar)	58	daNm
Rotation speed (60lpm)	253	rpm
Rotation speed (40lpm)	169	rpm

125cc		
PEAK (225bar)	55	daNm
INT (200bar)	50	daNm
CONT (175bar)	44	daNm
Rotation speed (60lpm)	321	rpm
Rotation speed (40lpm)	214	rpm

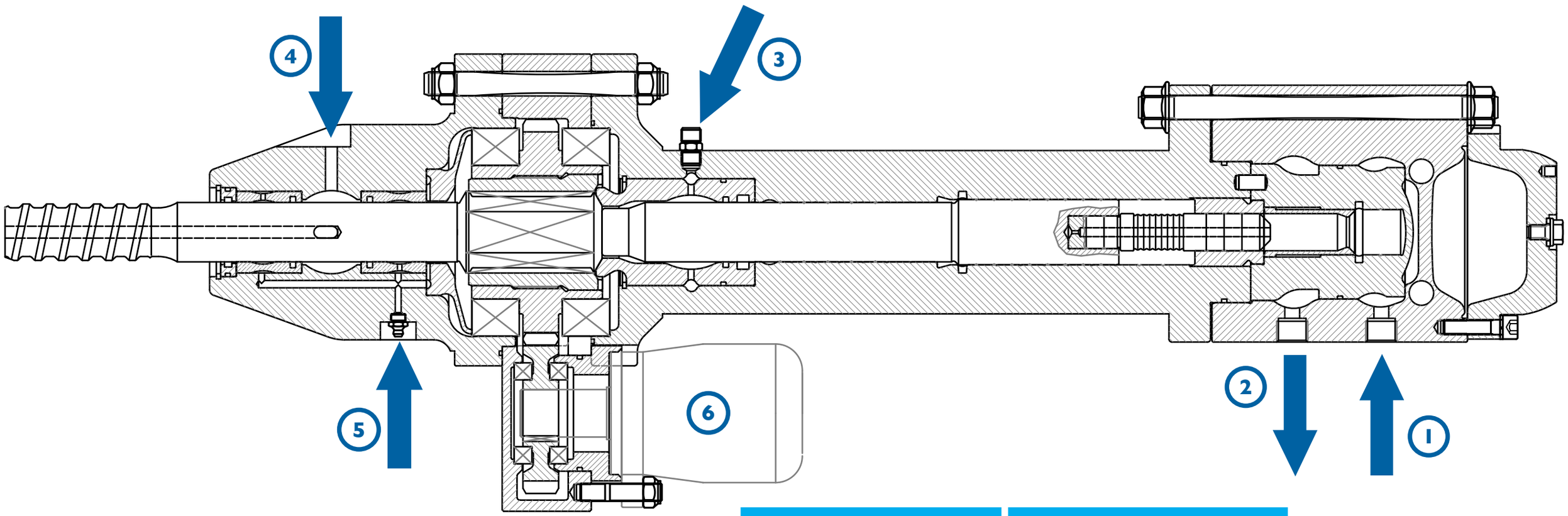
TECHNICAL SPECIFICATIONS DIMENSIONS



Length w/o Shank Adapter - A	mm	907
Height Over Drill Center - B	mm	90
Overall Height/Width - C	mm	148x148
Overall Height/Width - D	mm	180x180
Width with Motor - E	mm	188
Strike inlet thread connection ❶	inch	G 1/2" (BSP, GAS)
Strike out thread connection ❷	inch	G 1/2" (BSP, GAS)
Flushing thread connection ❸	inch	G 1/2" (BSP, GAS)
Pressurisation (lubrication circuit) connection ❹	inch	G 1/4" (BSP, GAS)
Greasing ❺	inch	G 1/4" (BSP, GAS) GREASER
Rotation inlet thread connection ❻	inch	G 1/2" (BSP, GAS)
Rotation outlet thread connection ❼	inch	G 1/2" (BSP, GAS)
Rotation drain thread connection ❽	inch	G 1/4" (BSP, GAS)



INSTALLATION CHECK LIST



FD15 INSTRUCTIONS FOR INSTALLATION

	FD 15
❶ Percussion flow inlet	Percussion Flow Rate 50 ÷ 90 l/min
	Connection G1/2”
❷ Percussion flow outlet	Connection G1/2”
❸ Lubricating Air+Oil inlet	Continuous flow: Air + Sprayed Oil Consumption 200 l/min - 7 bar
	Connection G1/4”
❹ Flushing flow inlet (Air or Water)	Water continuous flow Consumption 25 l/min - 8 to 15 bar
	Air continuous flow Consumption 4-8 m^3/min - 7/10 bar
	Connection G1/2”
❺ Greasing for rotation bearings	Every 100 working hours Lithium grease / 100g
	G1/4” Greaser
❻ Rotation Motor	Rotation Flow Rate 30-60 l/min
	Inlet & Outlet connection G1/2” Drain connection G1/4”

Percussion Flow:

- Use a flowmeter to check the inlet flow at working pressure (100 to 140 bars)
- Set the relief valve at 180 bars
- Use a manometer to check the pressure on the return line. Maximum admissible back pressure is 20 bars.

Rotation Flow:

- Use a flowmeter to check the inlet flow
- Set the relief valve at 170 bars for motors over 200cc, 200 bars for smaller motors.

ALWAYS KEEP PERCUSSION AND ROTATION CIRCUIT INDEPENDANT

Use a flowmeter to check:
- Inlet Flow at working pressure

Use a manometer to check:
- pressure on the return line

MAXIMUM 20 BARS

INSTALLATION CHECK LIST

Ensure a clean hydraulic installation, hydraulic drifters work with tight clearances and oil pollution may damage it. Damages due to oil pollution are not covered under warranty:

KEEP CONNECTIONS CLEAN

CHECK OIL SPECIFICATION QUALITY AND CLEANNESS

CHECK HYDRAULIC FILTERS BEFORE INSTALLATION

Always ensure a good alignment of the drifter / rig and the drill string:

INCORRECT ALIGNMENT MAY CAUSE DAMAGES TO THE DRIFTER AND / OR THE DRILL STRING

Always ensure a good greasing, hydraulic drifters work with high rotation speed and percussion frequency. Damages due to lack or improper greasing are not covered under warranty:

GREASE BEFORE FIRST USE

USE AIR+OIL MIST TO CONSTANTLY LUBRICATE THE FRONT PART.

GREASE BEARINGS EVERY 50 WORKING HOURS

HYDRAULIC OIL SPECIFICATION

The hydraulic drifter is powered by the oil flow / pressure, the respect of the hydraulic oil specification is important for a correct drifter operation:

- An incorrect hydraulic oil would not present the required viscosity at operation temperature causing drifter disfunction or lack of performance.
- An incorrect hydraulic oil may damage the seals,
- Always ensure a clean hydraulic installation, hydraulic drifters work with tight clearances and oil pollution may damage it,
- Always ensure a good oil cooling, hydraulic drifters working at high frequency generate heat which must be properly controlled.
- Always use the recommended oil as it presents particular characteristics of resilience in temperature / lubrication capabilities / resilience at high pressure.

Recommended hydraulic oil:
ROXAR DRILLOIL

Or compatible oil respecting the following standards:

- ISO CETOP HYDRAULIC HV
- AFNOR 48-690 Dry filtrabIlity
- AFNOR 48-691 Wet filtrability
- FZG 12 Pass DIN 51354 Part 2
- DIN 51524 Part 3
- ASTM D-2882
- Wichers I-286-S
- Wichers M-2950-S

For any question about the compatibility of third party hydraulic oil, please contact us.

INSTRUCTIONS FOR FLUSHING

AIR OR WATER FLUSHING:

External source of compressed air is needed for the flushing:

- Air flushing flow and pressure has to be adapted to the hole diameter and depth.
- Water flushing is possible, in this case the drilling speed is slightly reduced.

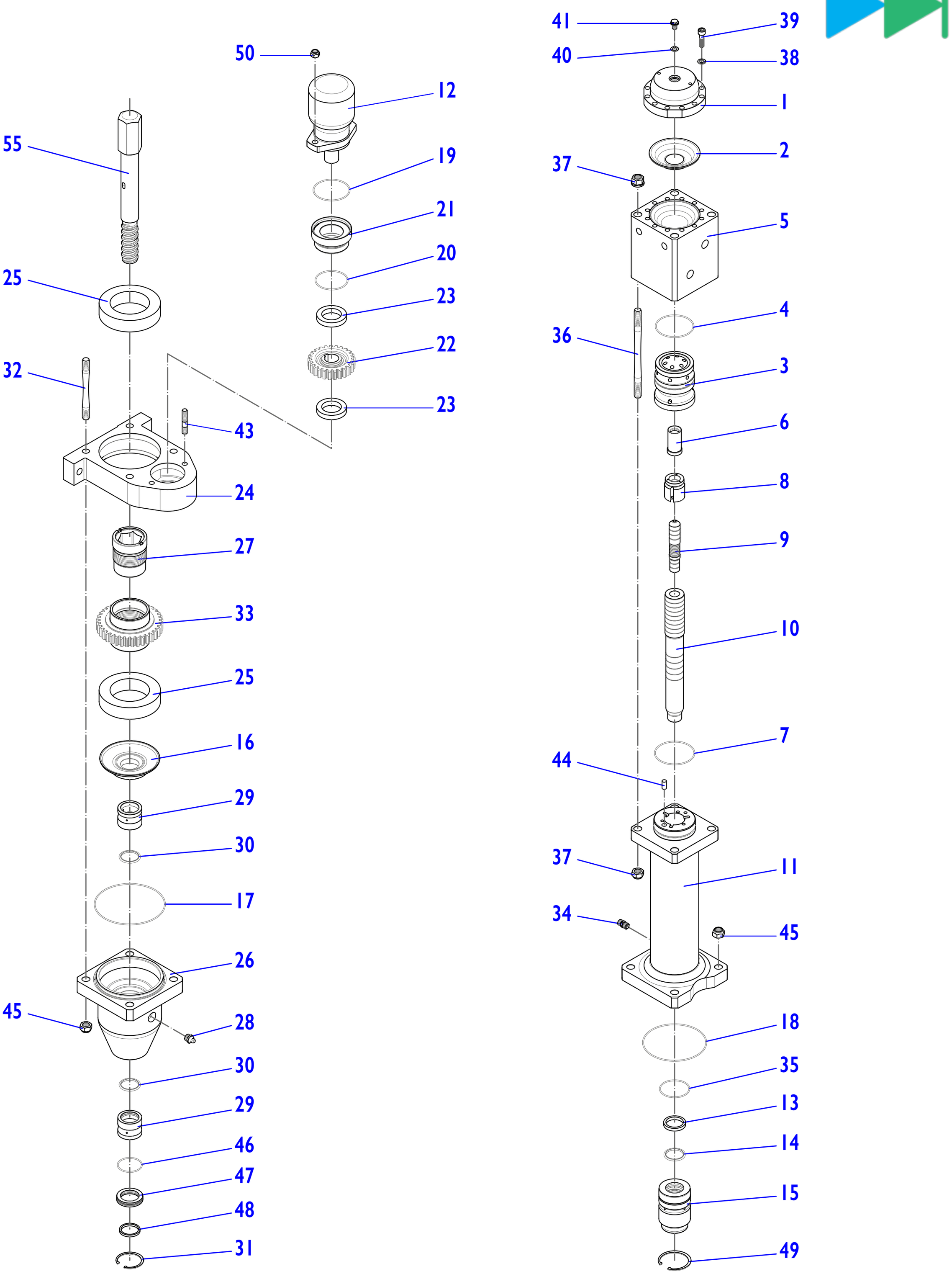
Typical air flushing flows:

Rod 32 / Diameter 2” / 51mm:	Optimum 2,2m^3/min Minimum 1,1m^3/min Pressure 7bars
Rod 38 / Diameter 3” / 76mm:	Optimum 6m^3/min Minimum 3m^3/min Pressure 7bars
Rod 38 / Diameter 4” / 101mm:	Optimum 12m^3/min Minimum 6m^3/min Pressure 7bars

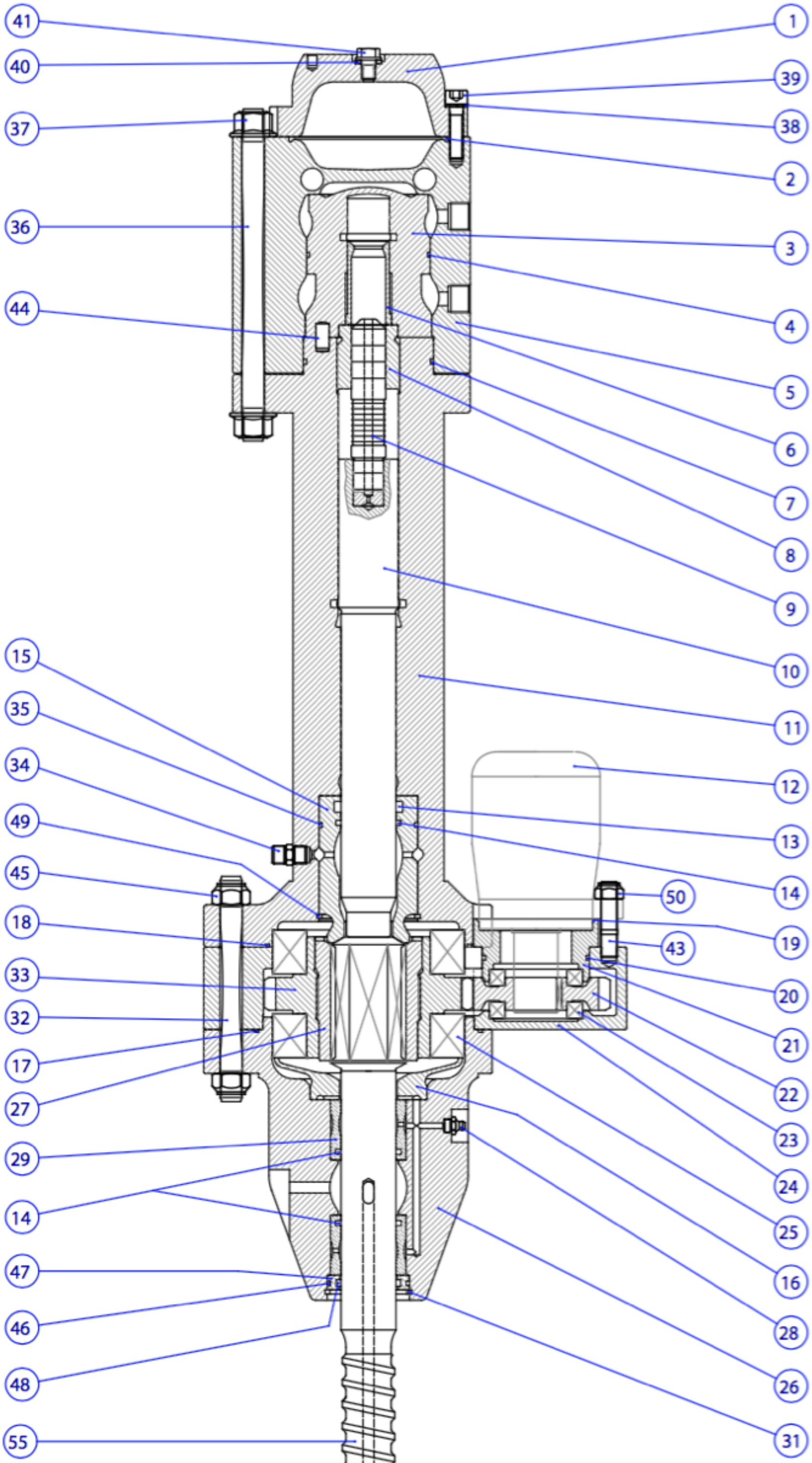
NEVER USE THE FLUSHING PORT FOR DIRECT CONCRETE OR POLYMER INJECTION

This could damage the internal parts. May you need to inject concrete / polymers in the hole, use an external injection box fitted outside of the drifter (please consult us for this application).

ROXAR FD15 PARTS LIST



ROXAR FD15 PARTS LIST



ROXAR FD15 PARTS LIST

ITEM	ROXAR CODE	KIT	QTY	DESCRIPTION EN	DESCRIPTION FR	MAINTENANCE PROGRAM
1	21840010		1	ACCUMULATOR	ACCUMULATEUR	
2	21840020	K4	1	DIAPHRAGM	MEMBRANE	M3
3	21840030		1	DISTRIBUTION BOX	BOITE DE DISTRIBUTION	
4	31 010 108	K2	1	O RING	O RING	M2
5	21 840 050		1	BACKHEAD	TETE ARRIERE	
6	21840060		1	VALVE	DISTRIBUTEUR	
7	31 010 109	K2	1	O RING	O RING	M2
8	21840080		1	CYLINDER FLANGE	FLASQUE DE CYLINDRE	
9	21840090		1	PILOT VALVE	PILOTE	
10	21 840 100		1	STRIKE PISTON	PISTON	M2
11	21 840 110		1	CYLINDER	CYLINDRE	
12	38 032 160		1	HYDRAULIC MOTOR	MOTEUR HYDRAULIQUE	
13	33 040 507	K2	1	LIP SEAL	JOINT A LEVRES	
14	32 002 040	K1 (x2) K2 (x1)	3	ROD SEAL	JOINT DE TIGE	M1 / M2
15	21840150		1	SHANK THRUST	BUTEE EMMANCHEMENT	M3
16	21 840 160		1	SPRING	RESSORT	M4
17	31 010 120	K1	1	O RING	O RING	M1
18	31 010 118	K1	1	O RING	O RING	M1
19	31 010 107	K1	1	O RING	O RING	M1
20	31 010 106	K1	1	O RING	O RING	M1
21	21 840 210		1	HOUSING FLANGE	BRIDE DE CARTER	
22	21 840 220		1	SIDE GEAR	PIGNON LATERAL	M4
23	39 061 909		2	BALL BEARING	ROULEMENT A BILLES	M4
24	21 840 240		1	ROTATION HOUSING	CARTER DE ROTATION	
25	39 032 018		2	TAPERED ROLLER BEARING	ROULEMENT A ROULEAUX	M4
26	21 840 260		1	HUB	MOYEU	
27	21 840 270		1	GEAR BUSHING	DOUILLE ENGRENAGE	M2
28	27 000 101		1	GREASER	GRAISSEUR	
29	21 840 290		2	BUSHING	DOUILLE	M2
31	26 006 000	K1	1	SNAP RING	ANNEAU ELASTIQUE	M1
32	21 830 320		4	HOUSING TIE ROD	TIRANT DE CARTER	
33	21 840 330		1	CENTRAL GEAR	ENGRENAGE CENTRAL	M4
34	27 000 140		1	NIPPLE 1/4”	RACCORD 1/4”	
35	31 010 103	K2	1	O RING	O RING	M2
36	21 840 360		4	BACKHEAD TIE ROD	TIRANT TETE ARRIERE	
37	22 161 500		8	SELF LOCKING NUT	ECROU AUTOBLOQUANT	
38	23 110 000		12	WASHER	RONDELLE ELASTIQUE	
39	21 100 100		12	ACCUMULATOR SCREW	VIS ACCUMULATEUR	
40	35 140 200	K4	1	SEAL	BAGUE ETANCHEITE	M3
41	21 140 000	K4	1	INFLATING SCREW	VIS AZOTE	M3
43	21 012 155		2	STUD	GOUJON	
44	24 010 200		1	CYLINDER PIN	GOUPILLE CYLINDRE	
45	22 161 501		8	DADO	ECROU	
46	31 010 095	K1	1	O RING	O RING	M1
47	21 840 470		1	SEAL RING	PORTE JOINT	
48	32 000 040	K1	1	WIPER SEAL	JOINT RACLEUR	M1
49	26 007 200		1	SNAP RING	ANNEAU ELASTIQUE	M3
50	22 130 100		2	SELF LOCKING NUT	ECROU AUTOBLOQUANT	
55	21 844 030		x	SHANK ADAPTOR R32	EMMANCHEMENT R32	M1
55	21 844 040		x	SHANK ADAPTOR R38	EMMANCHEMENT R38	M1
55	21844045		x	SHANK ADAPTOR T38	EMMANCHEMENT T38	M1
K1	36 184 010	K1	-	SEALS KIT K1	POCHETTE JOINTS K1	M1
K2	36 184 020	K2	-	SEALS KIT K2	POCHETTE JOINTS K2	M2
K4	36 184 040	K4	-	DIAPHRAGM KIT K4	KIT MEMBRANE K4	M3

MAINTENANCE PROGRAM

Ordinary Maintenance Program - FD15

Ordinary Maintenance Program	Qty	every 30.000meters or 500hours M1	every 60.000meters M2	every 120.000meters M3	every 300.000meters M4
Shank Adapter	1	o			
Front part seals kit *Kit K1*	1	o			
Front bushings	2	x (check)	o		
Gear Bushing	1	x (check)	o		
Percussion part seals kit *Kit K2*	1	x (check)	o		
Strike Piston	1		o		
Diaphragm *Kit K4*	1			o	
Shank Thrust	1			o	
Cylindrical bearings	2			x (check)	o
Conical bearings	2			x (check)	o
Central rotation gear	1			x (check)	o
Motor side rotation gear	1			x (check)	o
Spring	1			x (check)	o

INSPECTIONS

Grease every 2 working hours the front bushings.

Careful greasing of the bearing port with a Lithium grease every 50 hours of operation. Please note that in case of excessive quantity of grease, the excellent may be flushed away, this has no consequence on the drifter.

Check the specification of the hydraulic oil: Incorrect hydraulic oil may reduce drifter performance and/or damage sealing elements. In case of doubt replace the hydraulic oil with recommended oil before the first operation of the drifter.

Monitoring of screw connections between drifter and machine as a drifter generates high frequency shock waves.

Monitoring of the correct alignment of the drifter and drill string / machine feed is essential for correct operation and reliability.

Hoses checking: take care of the correct conditions of hoses and eliminate possible interferences.

Inspect the shank adapter, always ensure that the rod end is flat and not cracked or damaged. Use the proper rod dimensions in order to match the bushing dimension.

Inspect the bushing wear every 50 hours. In case of excessive wear the bushing must be replaced as the operation with a worn out bushing may generate damages to the piston and shank thrust.

Always operate according the technical specification values: lack of oil flow, overflow, lack of flushing, lack of greasing, excessive return pressure may create incorrect operation or damage to the drifter. In case of first installation on a machine, always use a flowmeter in order to ensure the correct parameters.

WARRANTY CERTIFICATE

The drifter is built in our factory according the best technological, quality and safety criteria and tested before shipping.

Roxar guarantees the drifter functioning and quality according to law provisions for a 12 months period. An improper use and a wrong maintenance which not comply with the rules provided in this manual as well as regulation or adjustments or modifications not approved by the manufacturer void the warranty.

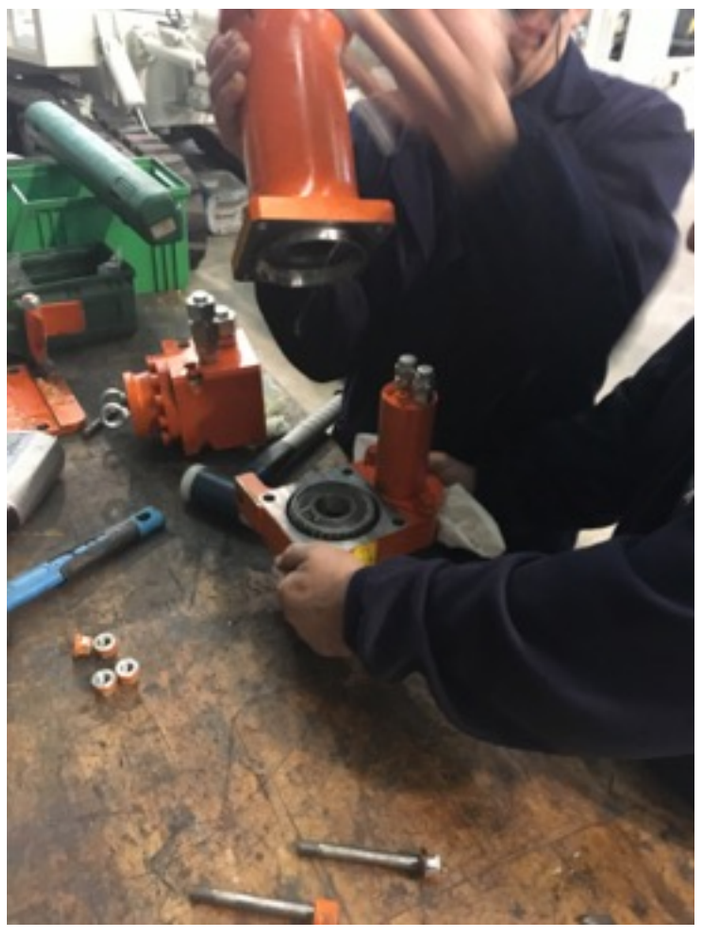
Any repair or service on the drifter may be done by official dealer or trained technician.

Warranty conditions about proper machine operation are related to compliance with all information provided in this manual.

The replacement of parts which will be proved to be defective will be done only after checking the proper use of the drifter. The recognition of the warranty is restricted only to the replacement of those parts recognised to be defective.
Under no circumstances shipping or manpower expenses will be approved for the replacement of defective parts accept for agreements with our management who would approve repair in our factory only by charging the transportation cost of the drifter.
Complaints and request for warranty service will be accepted only by submitting the drifter serial number engraved on the identification plate. At the moment you receive the drifter, check the packing containing it is perfectly intact and has no damage.

Unless otherwise agreed, the manufacturer is not responsible for damages caused during transportation. In the event that there is an evident damage on the packaging, you should immediately contact the transporter. Our company will be available to provide the necessary support.

FRONT PART DISMANTLING



Remove the 4 nuts (45) and housing tie rods (32), lift the cylinder.

Remove the spring (16) and the bearing cover (25).

BUSHINGS / FRONT SEALS MAINTENANCE

Use a soft hammer in order to remove the Hub (26) from the rotation housing (24)

Carefully remove the bearing (25) and the hexagonal bushing (27) and gear (33). The Hexagonal bushing and gear can be disassembled using a press.

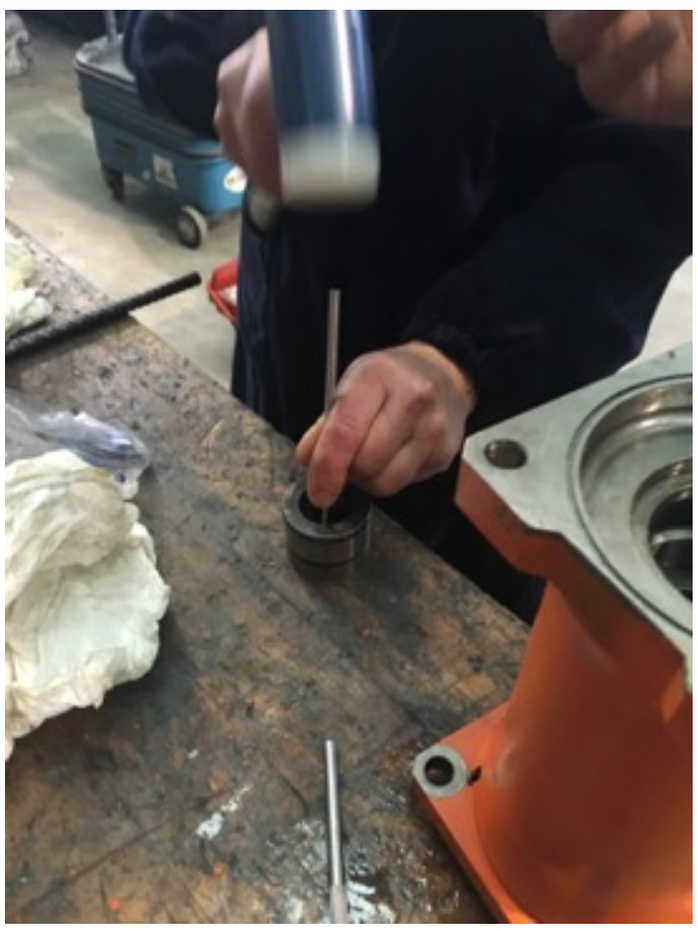
The rotation motor (12) can be disassembled removing the 2 screws (43)

Remove the snap-ring (31), the seal ring (46) and the Bushings (29)

PERCUSSION SEALS AND SHANK THRUST MAINTENANCE

Percussion seals are easily accessible from the front part.

Remove the snap-ring (49) and extract the shank thrust (15)



If necessary, remove and replace the seals (13) and (14).

PERCUSSION DISMANTLING



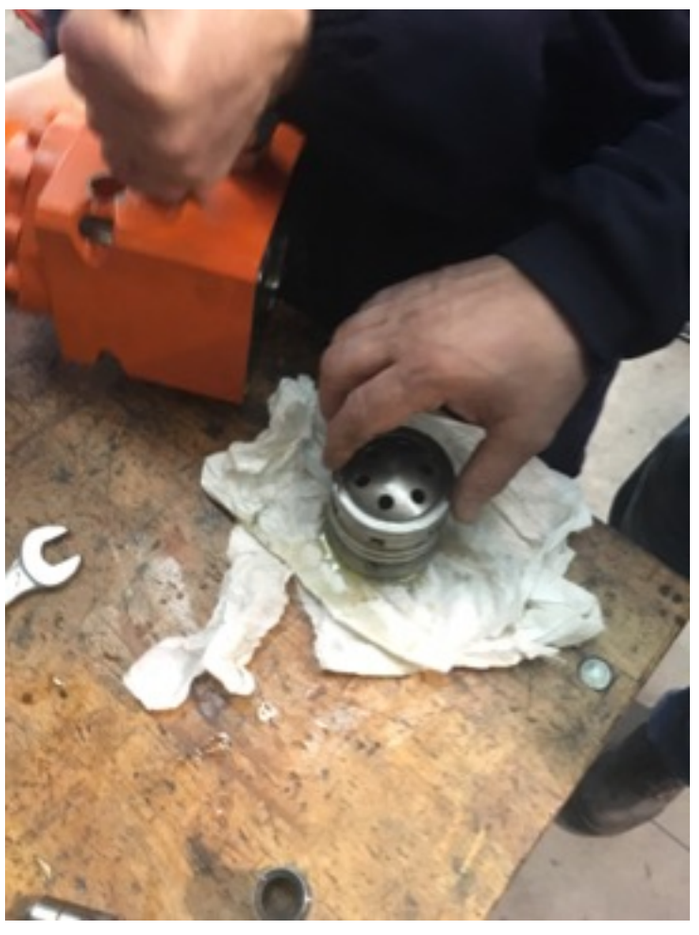
Place the drifter vertically placing eventually a support under the rotation motor in order to keep it stable.

Remove the 4 bolts (36) / nuts (37)



Use 2 lifting hooks and a bar, lift the back module (5)

PERCUSSION DISMANTLING



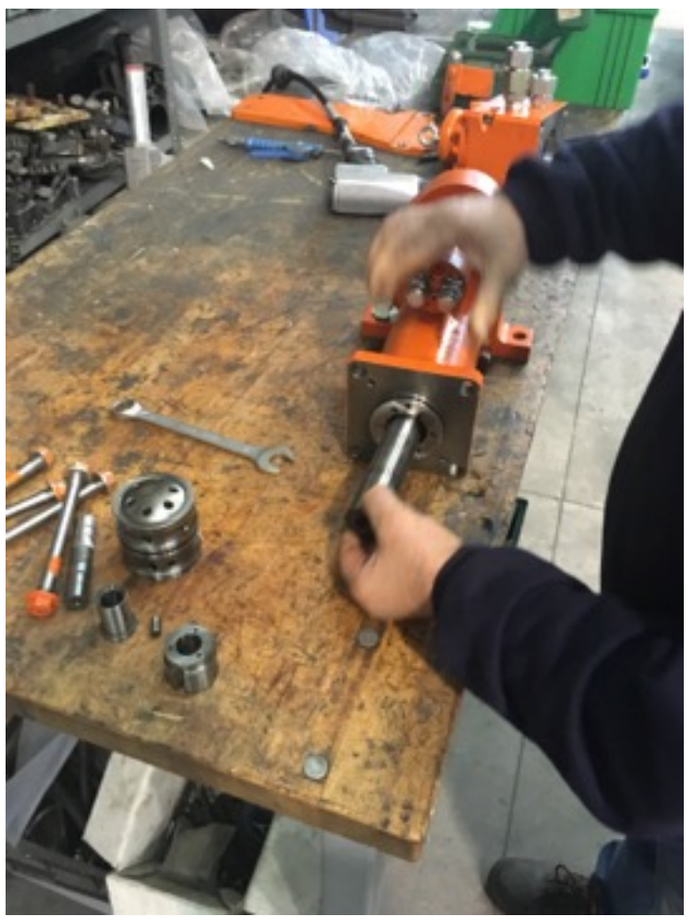
Remove the distribution box (3), eventually carefully using a soft hammer.

Remove the valve (6), the pilot valve (9), the cylinder pin (44)

PERCUSSION DISMANTLING

Remove the oil from the cylinder module.

Use a hammer and bar (diameter 20mm) and push the strike piston (10)



Remove the cylinder flange (8)

Remove the strike piston (10). Inspect carefully the strike piston.

PERCUSSION ASSEMBLY

ROXAR

Carefully clean all parts

Insert the strike piston (10) in the cylinder (11)

Place the drifter in vertical position and orientate properly and insert the cylinder flange (8)

Use a soft hammer in order to push the cylinder flange until it reaches the bottom of its lodgement.

Place the Pilot Valve (9)

Insert the cylinder pin (35)

Add the Valve (6).

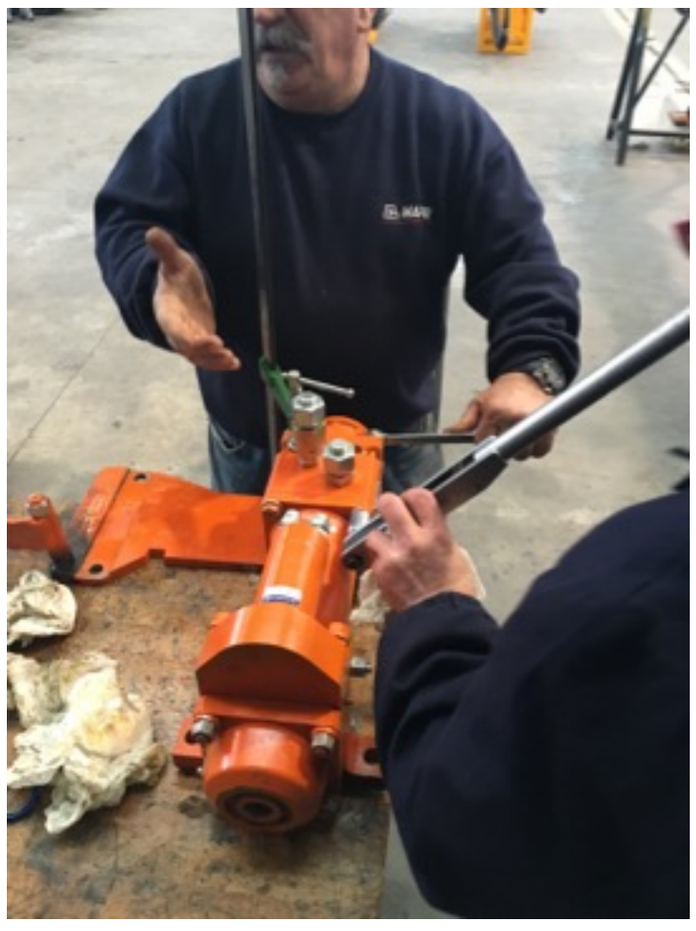
PERCUSSION ASSEMBLY



Insert the distribution box (3), use carefully a soft hammer to facilitate the insertion.

Place the back module on the top.





Use a soft hammer to fully assemble the back module.

Place the bolts (36) and nuts (37), slightly tighten the 4 bolts.

Maintain the drifter and pre-tighten with a torque wrench at 120Nm.

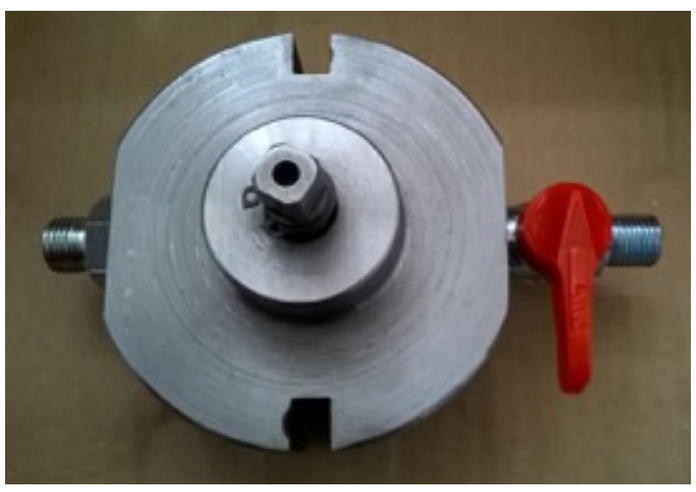
Tighten using the torque wrench at 180Nm.

TOOLING

Only basic tools are needed for the ROXAR drifters maintenance:

2 WRENCHES M16
1 TORQUE WRENCH / 180Nm / M16
1 WRENCH M12
1 SOFT HAMMER
1 METAL BAR (diameter 20 - length 400mm)

The Nitrogen filling tool is needed for diaphragm replacement.
This special tool is supplied by ROXAR is not needed for ordinary maintenance as the diaphragm replacement is not frequent on ROXAR's drifters.



	unit	**FD15**
Weight	kg	105
Reverse Percussion		YES
Length w/o Shank Adapter - A	mm	907
Height Over Drill Center - B	mm	90
Overall Height/Width - C	mm	148x148
Overall Height/Width - D	mm	180x180
Width with Motor - E	mm	188
Strike inlet thread connection ❶	inch	G 1/2" (BSP, GAS)
Strike out thread connection ❷	inch	G 1/2" (BSP, GAS)
Flushing thread connection ❸	inch	G 1/2" (BSP, GAS)
Pressurisation (lubrication circuit) connection ❹	inch	G 1/4" (BSP, GAS)
Greasing ❺	inch	G 1/4" (BSP, GAS) GREASER
Rotation inlet thread connection ❻	inch	G 1/2" (BSP, GAS)
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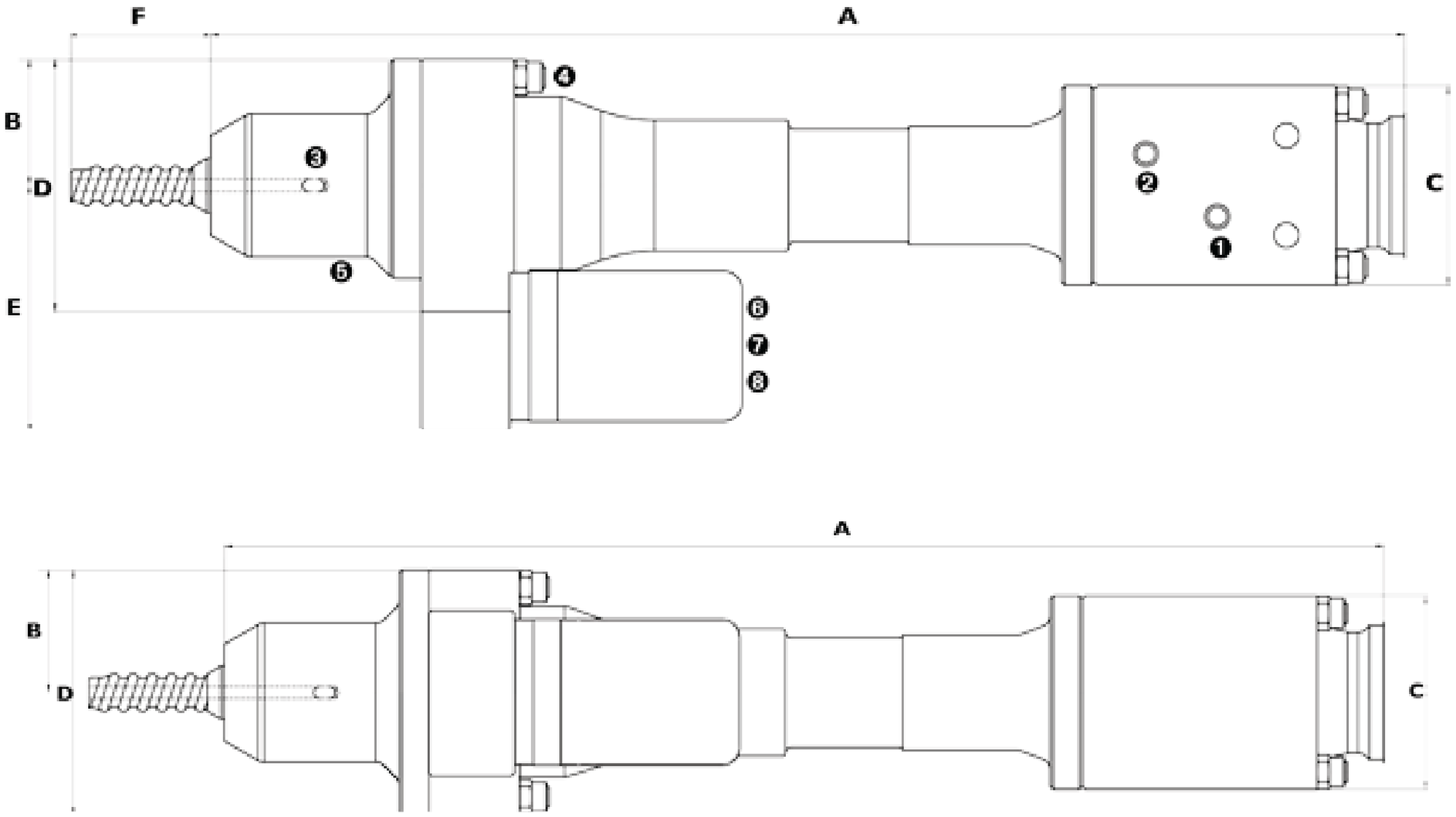

Roxar designs and manufactures modern and innovative products in the drilling and rock-breaking field. Roxar has developed an unique expertise of hydraulic systems in order to offer superior performance and value to its customers. Roxar operates worldwide while all Roxar products are manufactured in Europe.

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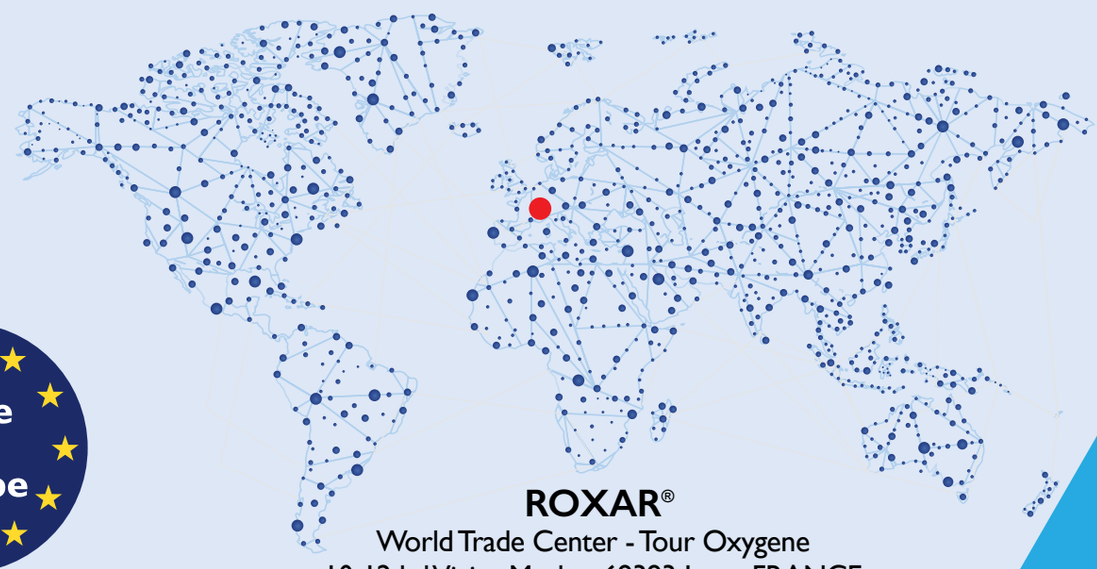
www.roxar.fr



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SAS capital variable 100000€ - RCS Lyon 808 785 000