

Secoroc Rock Drilling Tools

Secoroc YSP Series Rock Drill

Secoroc YSP 45 Stoper

Operator's instructions / Spare parts list

Foreword

Thank you for selecting the Secoroc stoper YSP45.

These instructions were developed to help you get the best performance and productivity from the use of your new stoper.

Please refer to them also for correct maintenance of the stoper.

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Scope of application

Model YSP45 is a high frequency stoper. The blast hole angle range is from 60°–90°. YSP45 is mainly used for production drilling, raise driving and bolting. It is equipped with FY500 lubricator.

Specification

Stoper YSP45		
Weight	44	kg
Dimension (L x W x H)	1420x390x160	mm
Cylinder diameter	95	mm
Piston stroke	47	mm
Pusher leg stroke	750	mm
Pusher leg inner diameter	74	mm
Working pressure	4–6.3	bar(e)
Impact energy (at 6.3 bar(e))	≥73.5	J
Impact energy (at 5 bar(e))	≥70	J
Impact energy (at 4 bar(e))	≥57	J
Air consumption (at 6.3 bar(e))	≤113.3	l/s
Air consumption (at 5 bar(e))	≤83	l/s
Air consumption (at 4 bar(e))	≤80	l/s
Drilling frequency (at 6.3 bar(e))	≥46	Hz
Drilling frequency (at 5 bar(e))	≥45	Hz
Drilling frequency (at 4 bar(e))	≥42	Hz
Torque (at 6.3 bar(e))	≥21	
Torque (at 5 bar(e))	≥18	
Torque (at 4 bar(e))	≥15	
Water pressure	working pressure -1	bar(e)
Air hose inner diameter	25	mm
Water hose inner diameter	13	mm
Drilling diameter	34–42	mm
Max drilling depth	6	m
Working temperature	-30 to +50	°C
Shank size	H22x108±1	mm
Lubricator FY500		
Weight	2.5	kg
Capacity	0.52	litre

Safety instructions

To reduce the risk of serious injury or death to yourself or others, carefully read through this instruction booklet before putting the stoper to use. Always follow the instructions given in this manual.

- Always wear a safety helmet, impact resistant eye protection with side protection and ear protectors during drilling. Any local regulations that exist must also be observed.
- When drilling in certain minerals, there is a risk of spark generation. Before starting work, check that the machine is approved (in accordance with local regulations) for work under such conditions.
- Always take great care when using the machine. The drill steel is subjected to heavy loading and can break, with a risk of injury to personnel.
- Check that the hoses used are of the right quality, and that all hose connections are in good condition and properly tightened.
- Before starting work on any of the systems, make sure that the air and water systems are without pressure.
- Make sure that there are no concealed wires or other sources of electricity. Never drill near any electric wires or other sources of electricity.
- Exposure to crystalline silica (sometimes called 'silica dust') as a result of drilling in rock may cause silicosis, cancer or death. Never operate the stoper without water flushing.
- A compressed air hose that comes loose can lash around and cause personal injury or death. Check that the compressed air connections are not damaged and that they are properly attached.

Operation

Using the stoper for the first time

When the stoper arrives from the factory, the inside of the machine is coated with heavy oil to prevent corrosion.

After unpacking and installing the machine, pour a small amount of lubrication oil into the air connection and operate the machine on partial throttle to clean the interior. Follow this immediately with a liberal amount of air tool oil.

The stoper is lubricated with oil mixed with compressed air, which is taken to the parts that need continuous lubrication. Oil is metered into the compressed air using the FY500 lubricator connected to the air line.

Preparations before starting

1. Check the drilling equipment

- Check that all of the drilling equipment is in good working order.
- Check that the impact surface of the drill steel shank is flat with no signs of wear.
- Make sure that the air inlet and exhaust ports are free from obstructions.
- Check that the flushing holes in the drill steel and drill bit are not blocked and that the flushing air/water flows through without obstruction.
- Ensure that the fittings are tight and leak-proof.

WARNING

A compressed air hose that comes loose can lash around and cause personal injury or death. Check that the compressed air connections are not damaged and that they are properly attached.

2. Blow out the air hose

Every day before using the drill, blow out the air hose to clear it from accumulated dirt and moisture.

3. Check the lubrication oil level

- Fill the lubricator with oil if necessary.
- Always use a recommended lubricant.

Lubricant recommendation	
Use a mineral-based air tool oil	
Ambient temperature °C	Viscosity grade (ISO 3448)
-30 to 0	ISO VG 32-68
-10 to +20	ISO VG 68-100
+10 to +50	ISO VG 100-150

4. Air/water pressure and hose dimensions

Air pressure

Ensure that the compressor can deliver the required air pressure of 5 bar at the machine.

- High pressure (>6.3 bar) causes rough operation and damage.
- Low pressure (<4 bar) results in a slow drilling speed.

Water pressure

Set the water pressure to around 3 bar. Maximum water pressure is 1 bar less than the working pressure. For example if the air pressure is 5 bar, the water pressure must be below 4 bar to prevent water entering the impact mechanism.

Air hose dimensions

The air hose diameter must be no less than 25 mm. The inner diameter of connection nipples and hoses must be no less than 20 mm. The ideal overall air hose length is less than 15m.

Water hose dimensions

The water hose inner diameter must be no less than 1/2".

5. Prevent freezing

In low ambient temperatures, ice can form in the machine. This can be avoided if the water in the compressed air is removed. This can be done by equipping the air lines with water separators and drainage points for water condensate.

If the stopper ices up, it must not be heated to melt the ice. Let the ice thaw at room temperature.

Do not pour methylated spirits or similar substances into the stopper, as they will interfere with the lubrication and lead to increased wear.

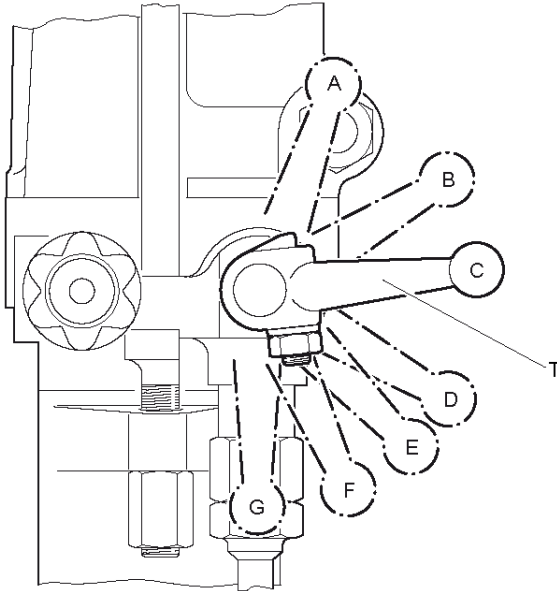
Before fitting the drill steel

- Check that the drill steel shank is of the correct size and length for the chuck used.
- The shank must be clean and the drill steel must be in good condition.
- The suitable quenching hardness of the shank is HRC48-53. A harder end face will cause piston damage and breakage of the end face of the piston. If the shank face is too soft it will be easily deformed by the piston which will result in difficulty in removing the drill steel.
- The shank end face shall be flat and perpendicular to the axis.
- Remove sharp edges from the shank's end face. A rough shank surface will cause premature piston failure.
- Inspect the drill steel: A dull drill steel will slow down the drilling speed and overstrain the drill mechanism. When changing drill steel make sure that the new one is the correct size to follow your previous bore.
- Before drilling check that the flushing hole in the drill steel is not blocked.

Controls

Throttle lever

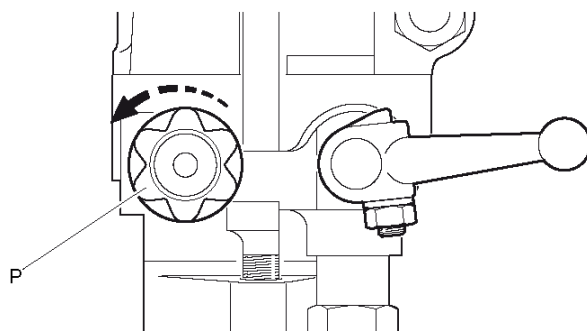
The stoper is equipped with a throttle lever (T) for regulating both the compressed air to the percussion mechanism, the blowing and the water flushing. The seven positions (A to G) of the throttle lever are explained in detail in the table below.



Position	Rotation and percussion	Water flushing	Blowing	Air to pusher leg
A	off	off	on (extra strong)	off
B	off	off	on	on (low)
C	off	off	on	on
D	on (slight)	off	on	on
E	on (low)	on (low)	on	on
F	on (medium)	on (full)	on	on
G	on (full)	on (full)	on	on

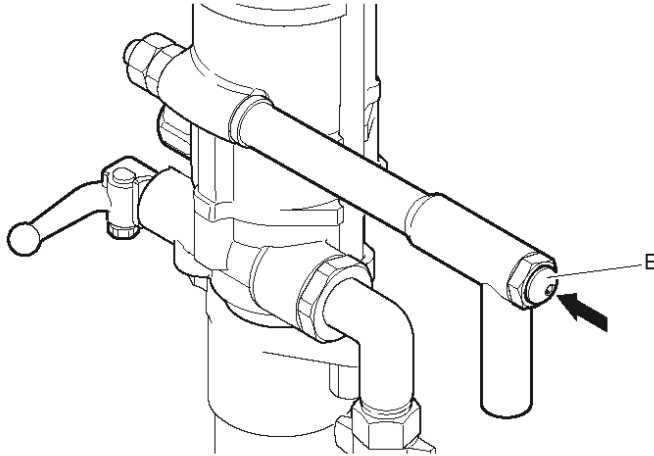
Feed control knob

The pressure regulating valve is located in the back head. It regulates the feed force of the pusher leg. Increase the feed force by turning the feed control knob (P) in the direction of the arrow, i.e. counter clockwise.



Exhaust valve button

The exhaust valve button (E) controls the exhaust valve which is located in the cylinder handle. When the exhaust valve button is pushed, the feed force ceases abruptly, thus overriding the setting on the feed control. The facility is used e.g. to adjust the height of the stoper, setting up the stoper or to help releasing a jammed drill steel.



Oil regulating valve

Oil dosing is controlled using a screwdriver. Tighten the nut after regulation.

Check that sufficient lubrication is obtained by putting your hand in front of the exhaust port while adjusting the regulating valve. If the hand is covered by a thin film of oil after a few seconds, the lubricator has been correctly adjusted. Too much oil will have negative effects on the operation whilst too little will result in damage to parts as the temperature rises during operation.

The amount of oil going into the stoper increases when turning the valve counter clockwise, and it decreases when turning the valve clockwise. Oil consumption is 2.5–6 ml/minute.

Drilling

Starting the stoper

1. Open the main valve for compressed air.
2. Open the cock for the flushing water.
3. Adjust the feed control knob to give a suitable feed force for collaring the hole.
4. Align the stoper so that the drill steel touches the desired collaring point.
5. Move the throttle lever downward a little, which will start water flushing, percussion and rotation.
6. Collar the hole with reduced feed force.
7. Move the throttle lever fully downward once the drill steel has gained a secure footing in the rock.
8. Adjust the feed force by means of the feed control knob so that the maximum penetration rate is obtained.

Note! Do not bend the drill steel as this will increase wear of the shank bushing and piston. It can also affect drilling efficiency and increase the risk of drill steel breakage.

Stopping the stoper

Pull the throttle lever upwards, which will stop percussion, rotation and flushing water.

Blow-cleaning the drill hole

CAUTION

When blow-cleaning, particles and dirty flushing water can emerge at speed from the drill hole.

- Move to the side and cover your eyes before starting to blow-clean the drill hole.
- Always wear impact resistant eye protection with side protection to avoid injury.
- Make sure that no co-workers are in range when blow-cleaning.

If powerful blow-cleaning of the drill hole is required, turn the throttle lever fully upwards whereupon the stoper stops. This can be done during drilling. When the drill hole is clean, turn the throttle lever downwards again to re-start the stoper.

When you have finished drilling

Run the stoper at medium speed when retracting the drill steel from the drilled hole.

Lay down the stoper on a stone, wooden plank or similar object, so as to prevent drill cuttings and other foreign matter from entering the chuck.

Turn off the water pressure before the air pressure. Run the stoper for a few seconds to clean out water and moisture after the water has been shut off.

Maintenance

Regular maintenance is a prerequisite for machine safety. Replace damaged and worn components in good time.

Check the machine and drill steel for wear and damage at regular intervals. Do not use a very worn or damaged drill steel.

When cleaning mechanical parts with a solvent, make sure that you comply with current health and safety regulations and ensure that there is sufficient ventilation.

Daily maintenance, regular checking of wearing parts and carrying out repairs in good time prevents breakdowns and increases the service life of the machine.

- Make sure that no foreign matter enters the machine.
- Always hose down and wipe clean the stoper after use.

Once a shift (after 8 hours of operation)

- Check the wear in the chuck bushing. If the wear limit has been exceeded, the drill steel shank will wear more quickly, or become deformed. This will lead to stoppages and increased drill steel consumption.
- Check the hoses, couplings and controls for leakage and damage.
- Check that the stoper is receiving enough lubrication. Fill the lubricator if necessary.

- Every day before using the drill, blow out the air hose to clear it from accumulated dirt and moisture.
- Drain the water separator.
- Check the air and water pressure. Make sure that the water pressure is at least 1 bar lower than the air pressure.

Once a week (after 40 hours of operation)

Carry out a basic check of all functions of the drilling equipment.

Once a month (after 200 hours of operation)

- Send the stoper to a workshop for inspection. The local operating conditions will determine whether or not this is a suitable interval for overhauling the drill.
- Dismantle and clean the lubricator.
- Clean out the water separator.

Selection of spare parts

Use only genuine parts for replacement, to ensure stable performance. Do not use pattern parts, which not only have a short working life but also cause consequential damage to other parts, due to differing measurements and methods of manufacturing.

Storage

- Always oil the stoper well before you put it into storage.
- Store the stoper in a clean and dry place.
- In the case of long-term storage, pour a quantity of oil directly into the stoper's air intake and then turn on the air briefly. This will protect the machine from corrosion.
- Protect the chuck using a wooden plug or a clean piece of cotton waste.

Scrapping and waste disposal

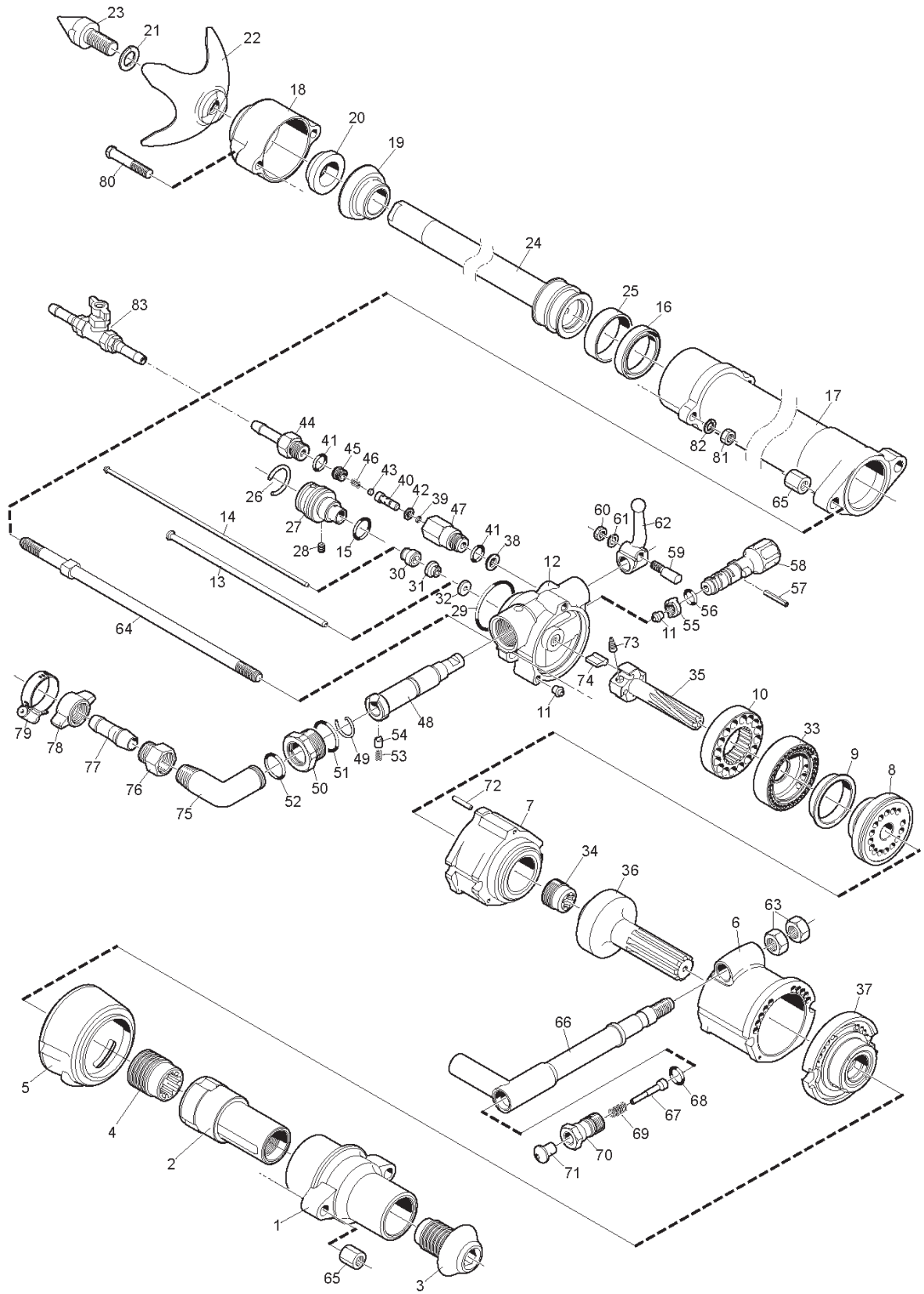
Used and worn-out machines must be disposed of in such a way that as much of the material as possible can be recycled and the impact on the environment is kept to a minimum.

Trouble shooting

Problem	Cause	Solution
Decreased penetration rate	Air leakage in hoses, couplings	Change packings, and where required, change parts in the throttle valve
	Shank sleeve	Check the shank sleeve for excessive wear. Replace if necessary.
	Air leakage due to worn piston/cylinder	Replace the piston and/or cylinder
	Air leakage due to worn guide sleeve/pilot guide	Change the worn part
Insufficient feed force	Piston rod seal (in pusher leg) worn or deformed	Change the seal
	O-rings on pusher leg coupling worn or deformed	Change the o-rings
Poor rotation	Splines of the rifle nut worn	Replace the rifle nut if the splines are worn
	Splines of the rifle bar worn down	Replace the rifle bar when needed
	Splines on the piston worn down	Replace the piston when needed
	The tothing in the ratchet housing is worn out	Replace the ratchet housing if the tooth housing is so worn that the pawls have difficulty catching
	The tothing in the ratchet wheel is worn out	Replace the ratchet wheel if the tothing is so worn that the pawls have difficulty catching
	Chuck nut worn out	Replace the chuck nut if the splines have been worn to 1/2 of the spline width
	Pawls worn	Replace all pawls, all pawl springs and all pawl pins
Uneven running	Piston has seized in the guide sleeve or the piston guide	Replace the guide sleeve/piston guide. If required, polish the piston. Check the piston for heat damage such as blue colouring and/or fissures. If it is damaged in this way, replace the piston as well
	Dirty or damaged main valve. Caused by impurities or foreign matter entering the drill with the compressed air	Clean and polish the valve so that it seals against the corresponding cylindrical and plane sealing surfaces. If this is not possible because the defects are too serious, the valve must be replaced
	Freezing. Caused by leakage in the flushing system or by excess water in the compressed air or by excessive water pressure	Check the flushing tubes and seals and the water pressure. Drain water from the compressed air system. If the problem continues, fit a water separator in the airline system.

Problem	Cause	Solution
Uneven running (continued)	The side bolts are unevenly or insufficiently tightened. Can cause the various parts to lose their alignment, resulting in the seizure of the movable parts. Abnormal strains on the side bolt may result in fracture at the threads.	Check and repair any damage to the contact points and tighten the bolts with the correct tightening torque
The drill gets hot	Lack of oil	Add oil and check that it runs through. It is not sufficient that there is oil in the exhaust air. There must also be an oil coating on the shank of the drill steel.
Freezing	High level of humidity in the compressed air	Use water traps
	Water pressure higher than the air pressure	Lower the water pressure
Water pipe breakage	Misalignment of the shank	Change drill steel or shank sleeve or both
	Damaged flushing hole in the shank	Change drill steel
Chipping of the piston tip	Misalignment of the shank	Change the drill steel or shank sleeve or both
	Excessive wear of the piston tip	Change piston
Spline breakage	Lack of lubrication	Lower the water pressure if it is the same as or greater than the air pressure
		Increase lubrication or change oil
	Dirt intrusion (specially when drilling upwards)	Increase service intervals
Piston breakage	Lack of lubrication	Lower the water pressure if it is the same as or greater than the air pressure
		Increase lubrication or change oil
	Uneven tension in the side bolts	Tighten the bolts correctly
	Worn guide sleeve/piston guide (can be confirmed by the cushion test)	Change the worn part
Side bolt breakage	Uneven tension on the bolts	Tighten the bolts correctly

Spare parts list and exploded drawing



No.	Description	Quantity	Ordering No.	Product code
1	Front head	1	96000288	962A-1-3312310293
2	Rotation sleeve	1	96000289	962A-1-3312310294
3	Shank bush	1	96000291	962A-1-3312310296
4	Rotation nut	1	96000290	962A-1-3312310295
5	Silencer	1	96000282	962A-1-3312310287
6	Cylinder	1	96000285	962A-1-3312310290
7	Air cylinder	1	96000287	962A-1-3312310292
8	Valve sleeve	1	96000280	962A-1-3312310285
9	Valve	1	96000279	962A-1-3312310284
10	Ratchet	1	96000277	962A-1-3312310282
11	Small seal	3	96000543	9605-1-3312310726
12	Back head	1	96000292	962A-1-3312310298
13	Air tube	1	96000296	962A-1-3312310302
14	Water tube	1	96000297	962A-1-3312310303
15	O-ring	1	96000485	9605-1-3312310632
16	Yx seal ring	1	96000320	962A-1-3312310329
17	Outer pipe	1	96000314	962A-1-3312310320
18	Lower pipe seat	1	96000315	962A-1-3312310324
19	Guide sleeve	1	96000316	962A-1-3312310325
20	Dust sleeve	1	96000317	962A-1-3312310326
21	Spring pad	1	96000535	9616-1-3312310718
22	Foot	1	96000355	9616-1-3312310385
23	center	1	96000326	9605-1-3312310337
24	Piston rod	1	96000318	962A-1-3312310327
25	Ring	1	96000319	962A-1-3312310328
26	Elastic ring	1	96000333	9616-1-3312310344
27	Water tube nut	1	96000300	962A-1-3312310306
28	Fixing screw	1	96000525	9605-1-3312310705
29	O-ring	1	96000196	962A-1-3312310191
30	Water tube sleeve	1	96000301	962A-1-3312310307
31	Air tube seat	1	96000302	962A-1-3312310308
32	Air tube pad	1	96000176	9605-1-3312310166
33	Valve chest	1	96000278	962A-1-3312310283
34	Rifle nut	1	96000814	9600-1-3312310009
35	Rifle bar	1	96000283	962A-1-3312310288
36	Piston	1	96000284	962A-1-3312310289
37	Guide sleeve assembly	1	96000286	962A-1-3312310291
38	Large rubber pad	1	96000308	962A-1-3312310314
39	O-ring	1	96000481	9605-1-3312310623
40	Water valve	1	96000309	962A-1-3312310315
41	O-ring	2	96000483	9605-1-3312310628
42	Rubber pad	1	96000310	962A-1-3312310316
43	Aluminum plug	1	96000313	962A-1-3312310319

No.	Description	Quantity	Ordering No.	Product code
44	Water hose swivel	1	96000311	962A-1-3312310317
45	Nut	1	96000312	962A-1-3312310318
46	Water valve spring	1	96000305	962A-1-3312310311
47	Water valve body	1	96000298	962A-1-3312310304
48	Control valve	1	96000293	962A-1-3312310299
49	Lock ring	1	96000294	962A-1-3312310300
50	Air hose nut	1	96000295	962A-1-3312310301
51	O-ring	1	96000488	9605-1-3312310640
52	O-ring	1	96000487	9605-1-3312310635
53	Spring	1	96000179	9605-1-3312310169
54	Lock pin	1	96000180	9605-1-3312310170
55	Expansion ring	1	96000830	9600-1-3312310027
56	O-ring	1	96000482	9605-1-3312310627
57	Dowel pin	1	96000560	9605-1-3312311043
58	Pressure regulating valve	1	96000306	962A-1-3312310312
59	Fixing pin	1	96000177	9605-1-3312310167
60	Hexagon thin nut	1	96000524	9605-1-3312310704
61	Spring pad	1	96000534	9605-1-3312310716
62	Control handle	1	96000307	962A-1-3312310313
63	Hexagon nut	2	96000517	9605-1-3312310695
64	Side bolt	2	96000299	962A-1-3312310305
65	Hexagon thick nut	4	96000518	9605-1-3312310697
66	Handle	1	96000869	962A-1-3312311027
67	Exhaust valve	1	96000325	9605-1-3312310336
68	O-ring	1	96000484	9605-1-3312310629
69	Exhaust valve spring	1	96000324	9605-1-3312310335
70	Exhaust valve body	1	96000322	9605-1-3312310333
71	Exhaust valve button	1	96000323	9605-1-3312310334
72	Fixing pin	1	96000281	962A-1-3312310286
73	Conical spring	4	96000167	9605-1-3312310156
74	Ratchet pawl	4	96000166	9605-1-3312310155
75	Air hose swivel	1	96000303	962A-1-3312310309
76	Connector nut	3	96000304	962A-1-3312310310
77	Rubber tube connector	3	96000186	9605-1-3312310176
78	Wing nut	3	96000185	9605-1-3312310175
79	Hoop	3	96000540	9605-1-3312310723
80	Bolt	2	96000321	962A-1-3312310331
81	Hexagon nut	2	96000523	962A-1-3312310703
82	Spring pad	2	96000536	962A-1-3312310719
83	Water valve	1	96000555	962A-1-3312311026
84	Retainer bolt	2	96000634	9600-1-3312311820
85	Retainer spring	2	96000818	9600-1-3312310013
86	Retainer	1	96000635	9600-1-3312311821
87	Locking nut	2	96000531	9605-1-3312310713
88	Dust ring	1	96000870	962A-1-3312312013



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