



Glacier Energy

OPERATOR'S MANUAL

AIRBEAST 45 - ATEX DRILLING MACHINE WITH MAGNETIC BASE



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1. GENERAL INFORMATION

1.1. Application

The AIRBEAST 45 - ATEX is an air drilling machine designed to drill holes with diameters of 12–45 mm (1/2–1-3/4") by using annular cutters or holes with diameters of 3.5–20 mm (1/8–13/16") by using twist drill bits.

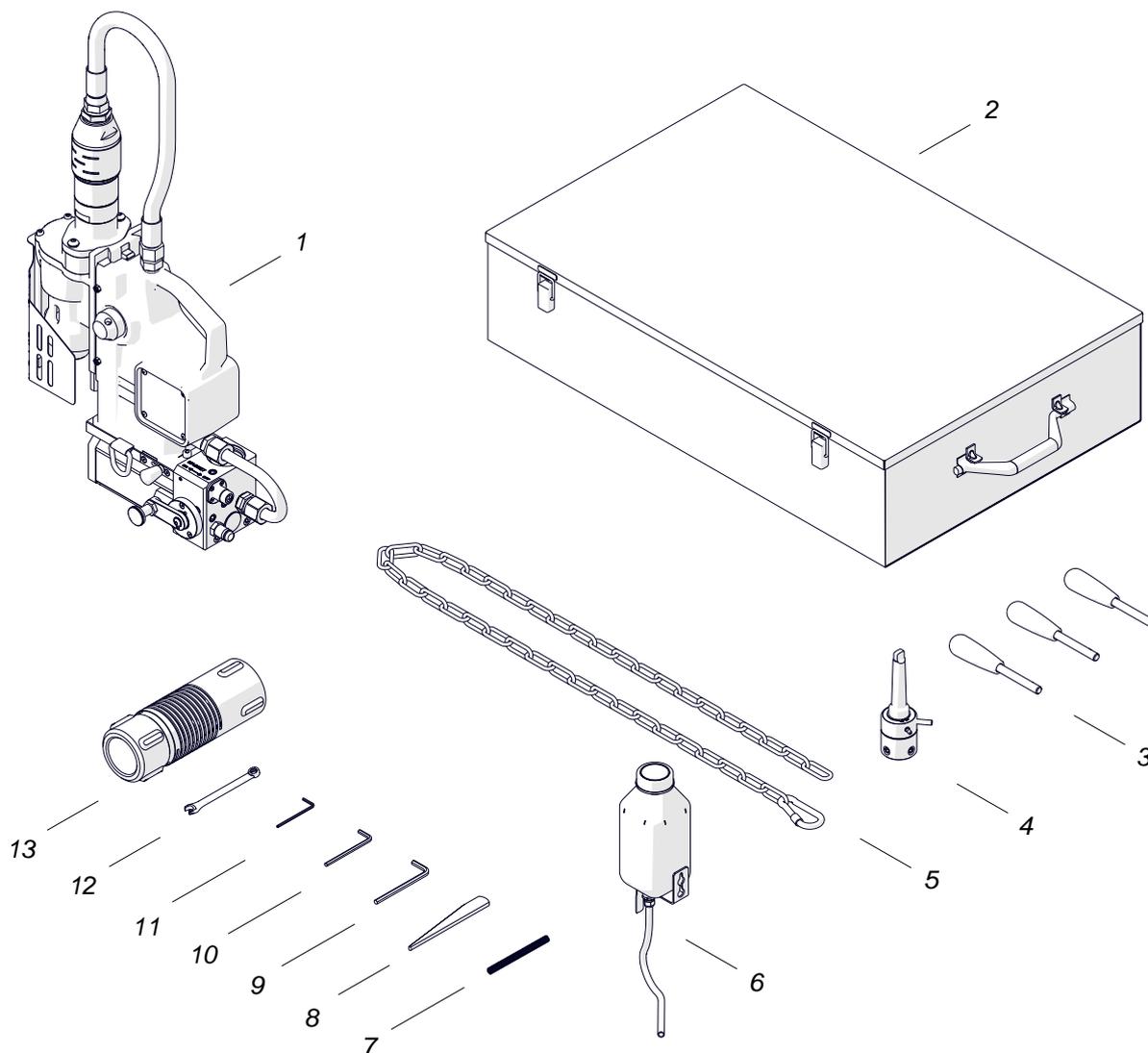
The machine is ATEX II 2 G/D c IIC T6/T4 certified to allow working in explosive environments.

The magnetic base allows the machine to be fixed to ferromagnetic surfaces with a force that ensures operator safety and proper machine operation. A safety chain protects the machine from falling in case of a pressure loss.

1.2. Technical data

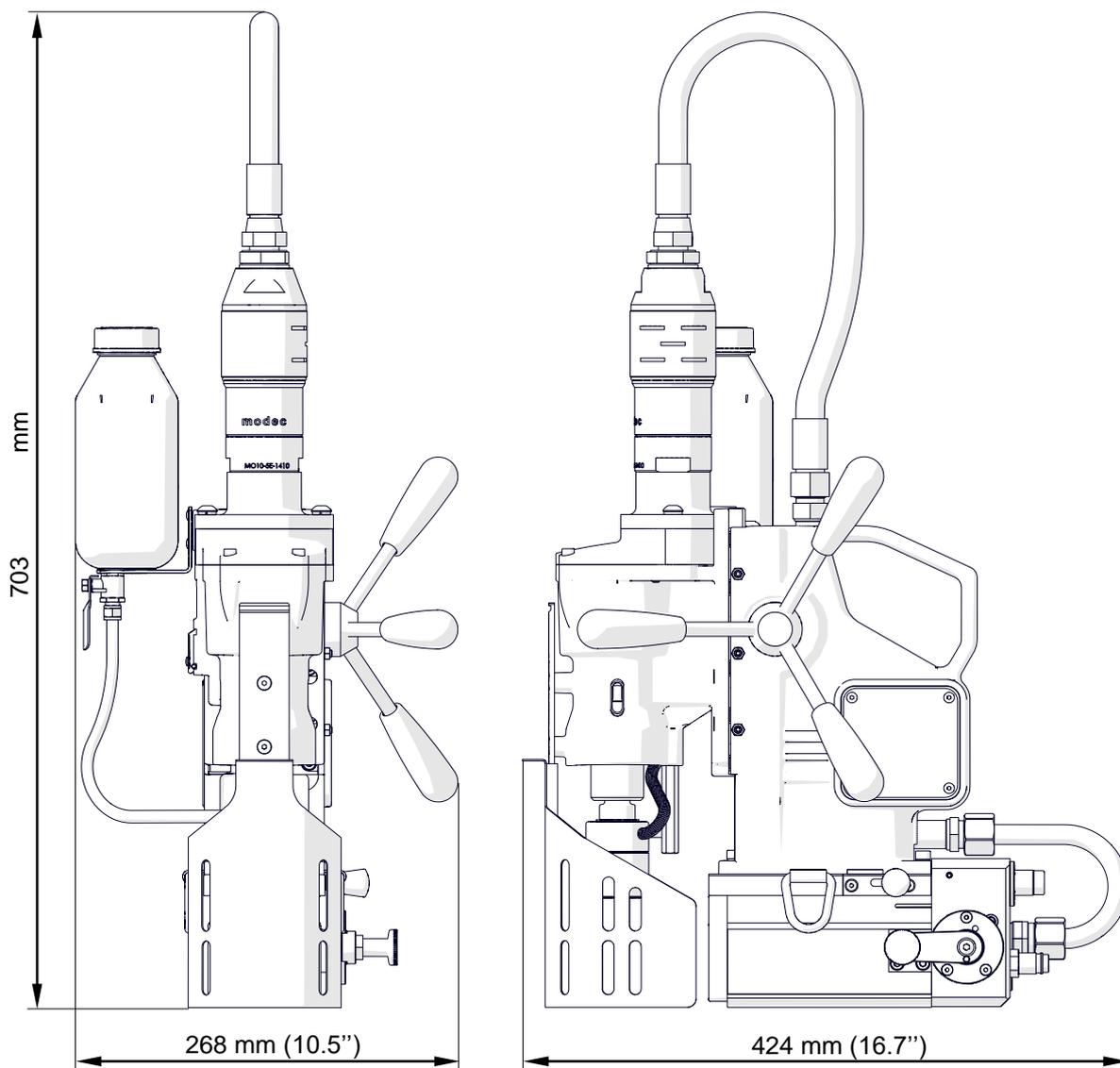
Pressure	6 bar (87 psi)
Connection	CEJN 410 DN 10.4 R 3/8" BSPT fitting for quick-coupling
Power	800 W
Air consumption	1400 l/min (50 CFM)
Spindle shank	MT2
Tool holder	19 mm (3/4") Weldon
Drilling diameter with annular cutter	12–45 mm (1/2–1-3/4")
Drilling diameter with twist drill bit	3.5–20 mm (1/8–13/16")
Maximum drilling depth	51 mm (2")
Magnetic base dimensions	80 mm × 80 mm × 143 mm 3-1/8" × 3-1/8" × 5-5/8"
Holding force of magnetic base (surface with the thickness of 25 mm and roughness $R_a = 1.25$)	7 500 N
Stroke	150 mm (6")
Rotational speed with load	190 rpm (gear I) 290 rpm (gear II)
Rotational speed without load	330 rpm (gear I) 500 rpm (gear II)
Minimum workpiece thickness	10 mm (3/8")
Noise level	More than 70 dB
Required ambient temperature	0–40°C (32–104°F)
Weight	26.5 kg (58.5 lbs)

1.3. Equipment included

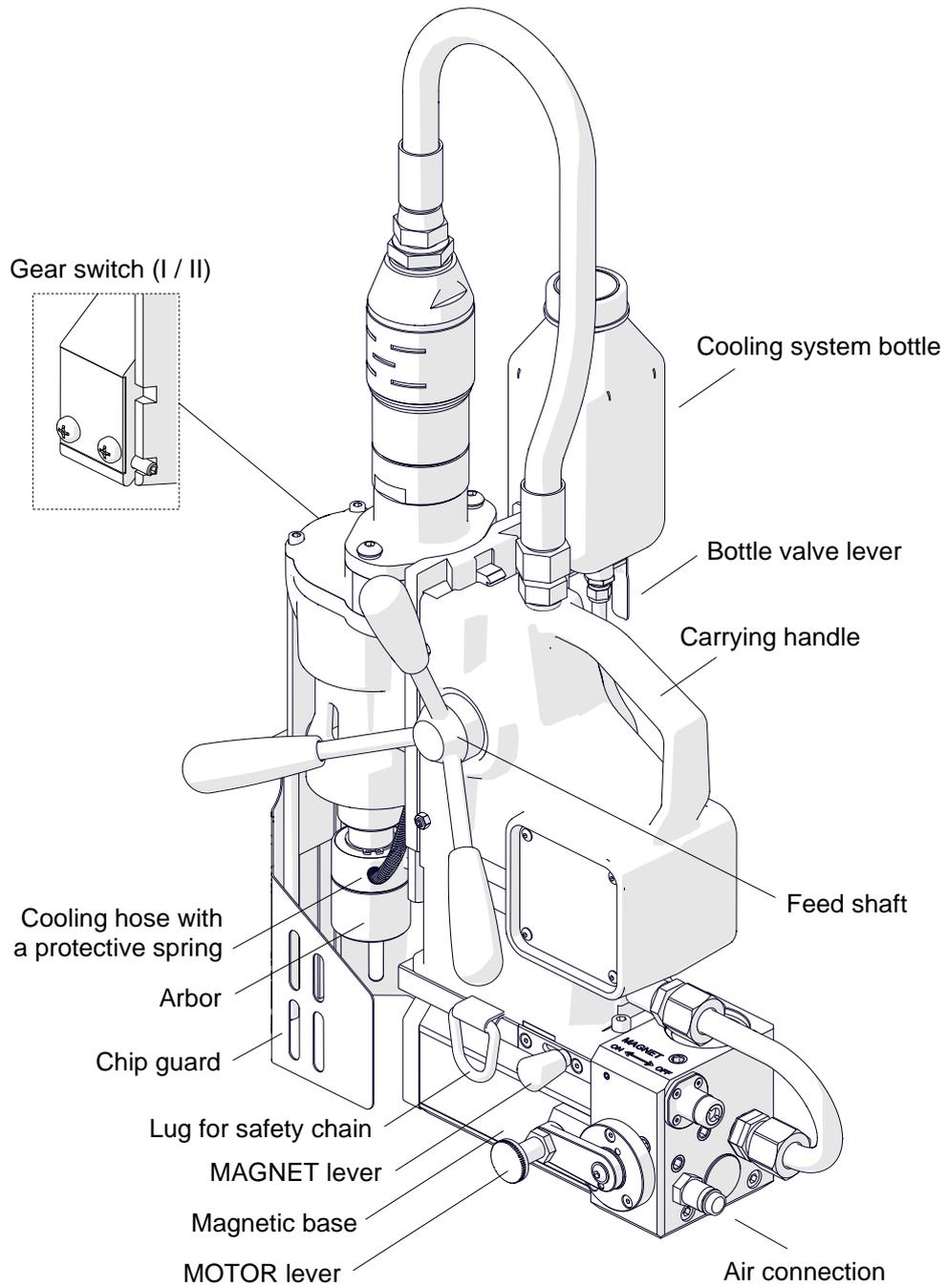


1	Drilling machine	1 unit
2	Metal box	1 unit
3	Handle	3 units
4	MT2 arbor	1 unit
5	1.5 m (5 ft) chain with snap hook	1 unit
6	Cooling system	1 unit
7	Protective spring for cooling hose	1 unit
8	MT2 drift	1 unit
9	5 mm hex wrench	1 unit
10	4 mm hex wrench	1 unit
11	2.5 mm hex wrench	1 unit
12	8 mm combination wrench	1 unit
13	Tool can	1 unit
–	Operator's Manual	1 unit

1.4. Dimensions



1.5. Design



2. SAFETY PRECAUTIONS

1. Before starting, read this Operator's Manual and complete proper occupational safety and health training.
 2. Use the machine only in applications specified in this Operator's Manual.
 3. The machine must be complete and all parts must be genuine and fully functional.
 4. The specifications of the air source must conform to those specified on the rating plate.
 5. Supply the machine only with clean and lubricated air by using a supply hose with a quick-coupling. The air source must be equipped with an air preparation unit that contains a filter, regulator, and lubricator. Never supply the air by using a hose without a quick-coupling.
 6. Never carry the machine by the hoses and never pull them because this may damage them and result in serious injury.
 7. Transport and position the machine by using the carrying handle and only when the MAGNET switch is set to OFF.
 8. Untrained bystanders must not be present near the machine.
 9. Before starting, ensure the correct condition of the machine, air source, supply hose, air connection, and milling tools.
 10. Keep the machine dry and never expose it to rain, snow, or frost. Protect the supply hose from direct sunlight.
 11. Never stay below the machine placed at heights. Prevent anyone from being hit with the slug core expelled from the cutter.
 12. Keep the work area well lit, clean, and free of obstacles.
 13. Install the tools securely. Tighten the annular cutter with the set screws. Remove wrenches from the work area before connecting the machine to the air source.
 14. Never use tools that are dull or damaged.
 15. Install and remove tools by using protective gloves and only when the machine is unplugged from the air source.
 16. Never use annular cutters without a pilot pin except when drilling incomplete through holes. Never use arbors without a spring.
 17. Do not make holes which diameter or depth differ from those specified in the technical data.
 18. Never use the machine on surfaces that are rusty, covered with paint, uneven, or not rigid.
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19. Use the safety chain in all work positions. Attach the machine to a fixed structure by fastening the chain to the lugs or carrying handle. The chain must not be loose. Wrap the chain around the workpiece if possible.
 20. Do not start work if the gib clearance is improper.
 21. Before every use, inspect the machine to ensure it is not damaged. Check whether any part is cracked or improperly fitted. Make sure to maintain proper conditions that may affect the operation of the machine.
 22. Always use eye and hearing protection, protective footwear, and protective clothing during work. Do not wear loose clothing.
 23. Drilling in plates with a thickness less than 10 mm (3/8") is not advised because the holding force depends on material thickness and is much lower for thin plates.
 24. The whole bottom of the magnetic base must be in full contact with the workpiece. Before every positioning, wipe the workpiece with coarse-grained sandpaper.
 25. Do not touch chips or moving parts. Prevent anything from being caught in moving parts.
 26. After every use, remove chips and excess coolant from the machine and tool. Never remove chips with bare hands.
 27. Cover steel parts with a thin anti-corrosion coating to protect the machine from rust when not in use for any extended period.
 28. Maintain the machine and install/remove parts and tools only when the machine is unplugged from the air source.
 29. Repair only in a service center appointed by the seller.
 30. If the machine falls from any height, is wet, or has any other damage that could affect the technical state of the machine, stop the work and promptly send the machine to the service center for inspection and repair.
 31. Never leave the machine unattended during work.
 32. Remove from the worksite and store in a secure and dry place when not in use, previously removing the tool from the holder.
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3. STARTUP AND OPERATION

3.1. Installing and removing the arbor or MT2 twist drill bit

Unplug the machine from the air source, raise the chip guard (1, Fig. 1), and then rotate the handles to the right (2) to raise the motor. Use a clean and dry cloth to wipe the spindle and arbor (twist drill bit). Next, wear protective gloves and insert the arbor (drill bit) into the spindle (3) so that the vertical rod is placed between the horizontal rod and hose fitting (4). Finally, rotate the arbor (drill bit) to the right (5) until it snaps into place.

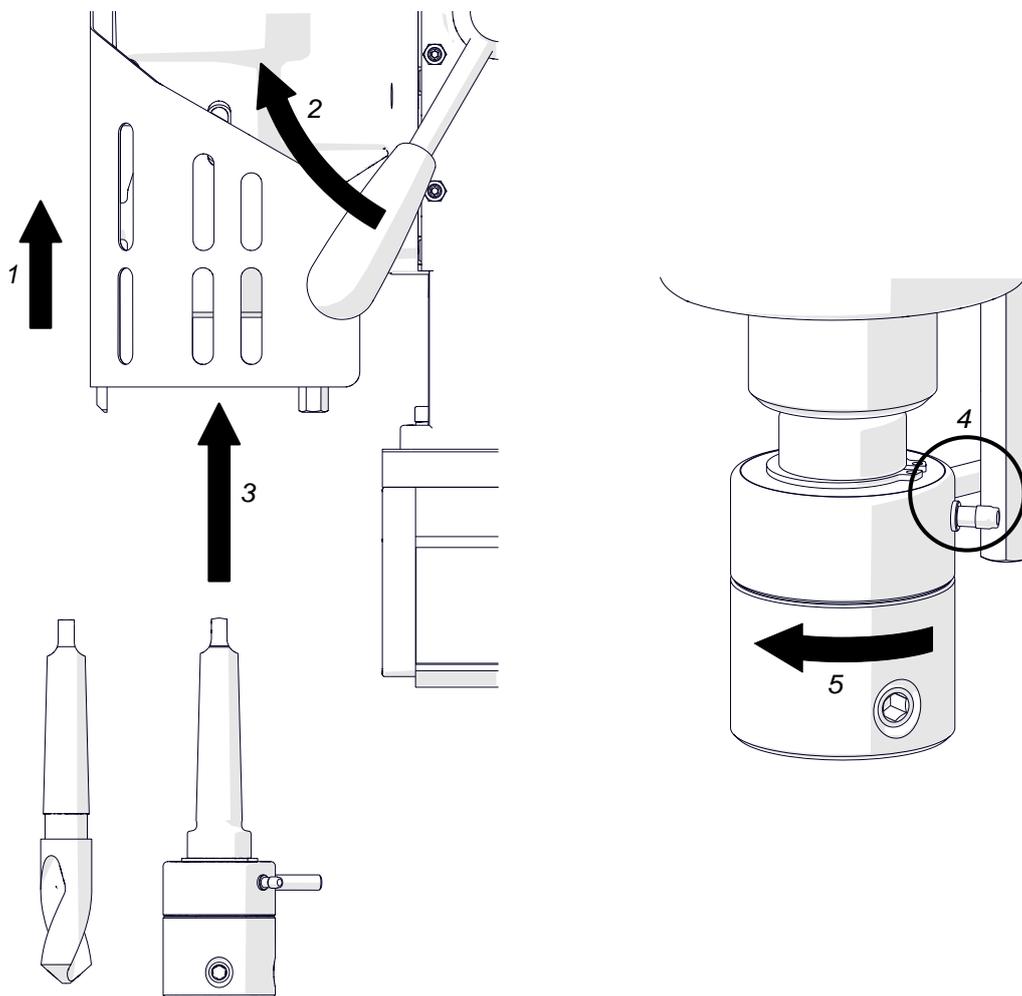


Fig. 1. Installing the arbor or twist drill bit

To remove the arbor (drill bit), raise the motor, and then rotate the spindle (1, Fig. 2) so that the holes in the spindle and gearbox body are aligned (2). Next, insert the MT2 drift into the hole (3), and tap the drift with a mallet (4).

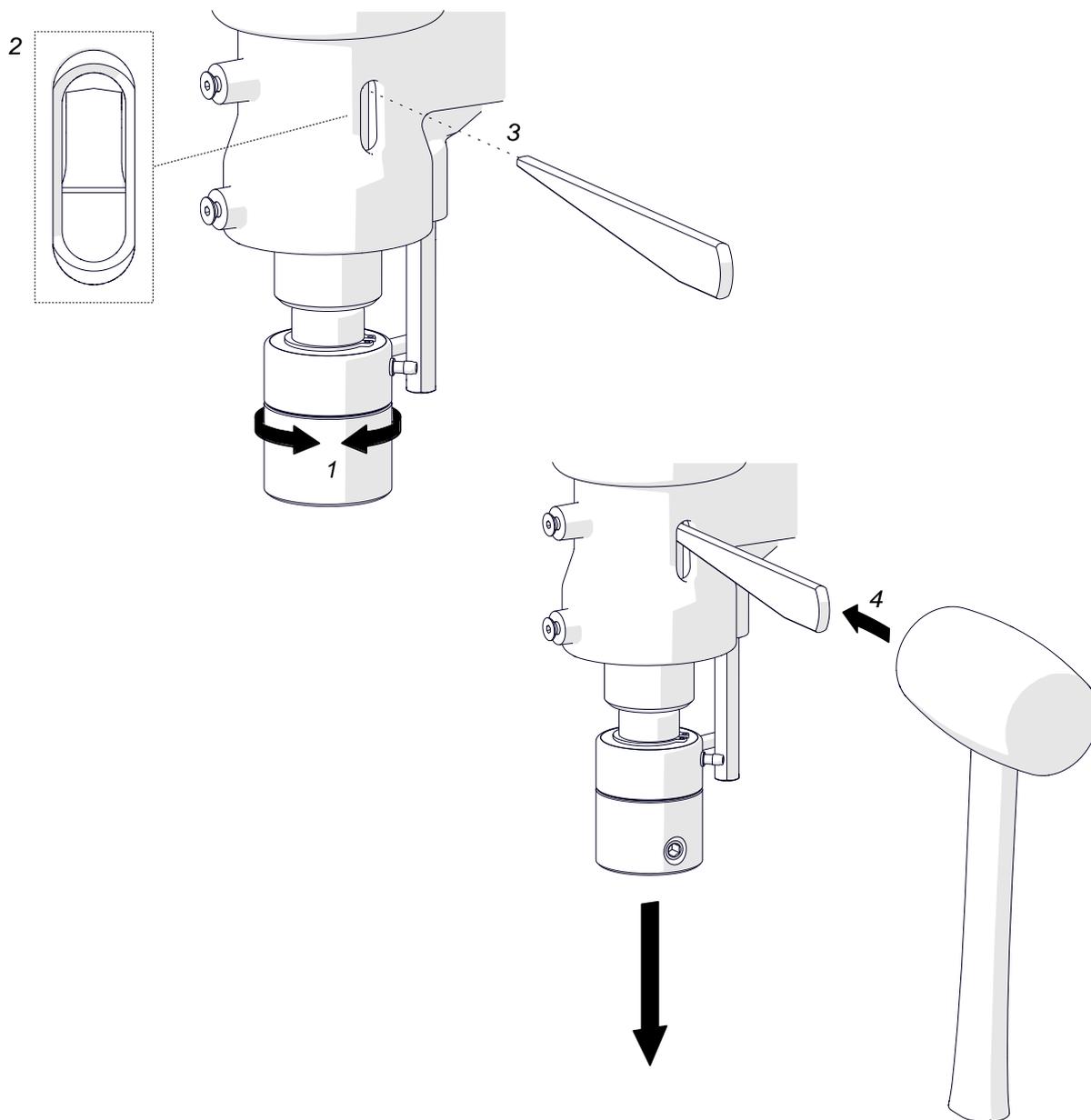


Fig. 2. Removing the arbor or twist drill bit

3.2. Installing, removing, and operating the annular cutter

Install the arbor as described before, wear protective gloves, and then insert the proper pilot pin into the annular cutter (1, Fig. 3). Use a clean and dry cloth to wipe the cutter. Next, place the cutter into the arbor (2) so that the flats 3 are aligned with set screws 4, and then use the 5 mm hex wrench to tighten both screws.

To remove the cutter, loosen the screws 4 with the 5 mm hex wrench.

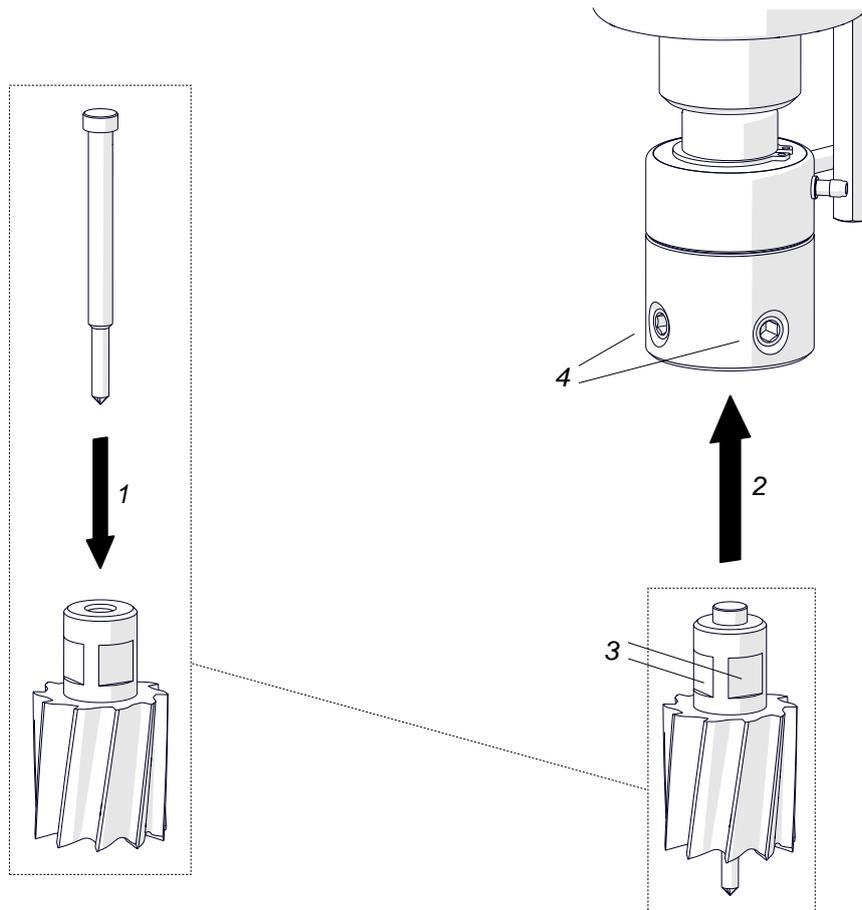


Fig. 3. Installing the annular cutter

Fig. 4 shows how annular cutters work. As the cutter drills into the workpiece, the pilot pin retracts and tightens the spring. As a result, after the cutter drills through the material, the slug core is expelled from the cutter. Also, when pressed, the pilot pin allows application of coolant to the inside of the cutter.

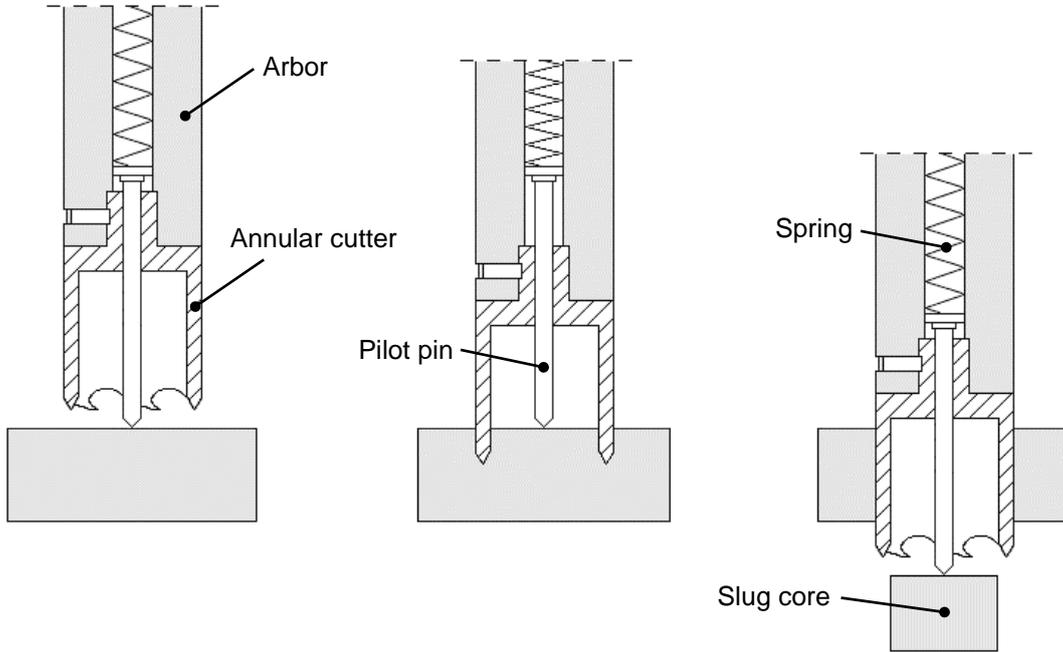


Fig. 4. Annular cutters work

Annular cutters are designed to make only through holes shown in Fig. 5. When drilling incomplete through holes the pilot pin must not be used.

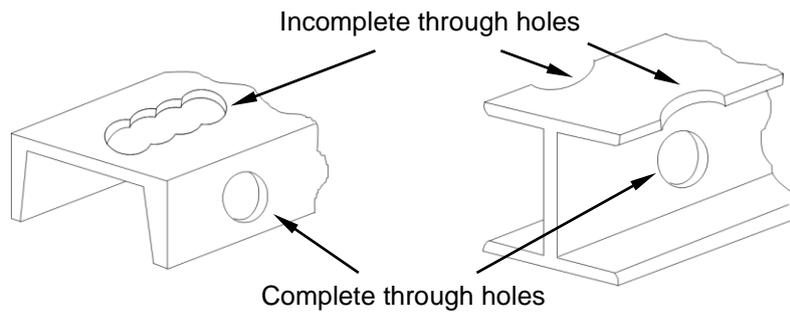


Fig. 5. Types of holes to make with annular cutters

3.3. Installing and removing the cooling system

Hang the cooling system bottle on the screws (1, Fig. 6) and place the protective spring onto the bottle hose (2). Insert the hose between the vertical rod and arbor (3), and attach the hose to the fitting (4). Slide the spring to the hose end (5) so that the spring rests on the arbor (6).

Before removing the bottle, detach the hose from the fitting.

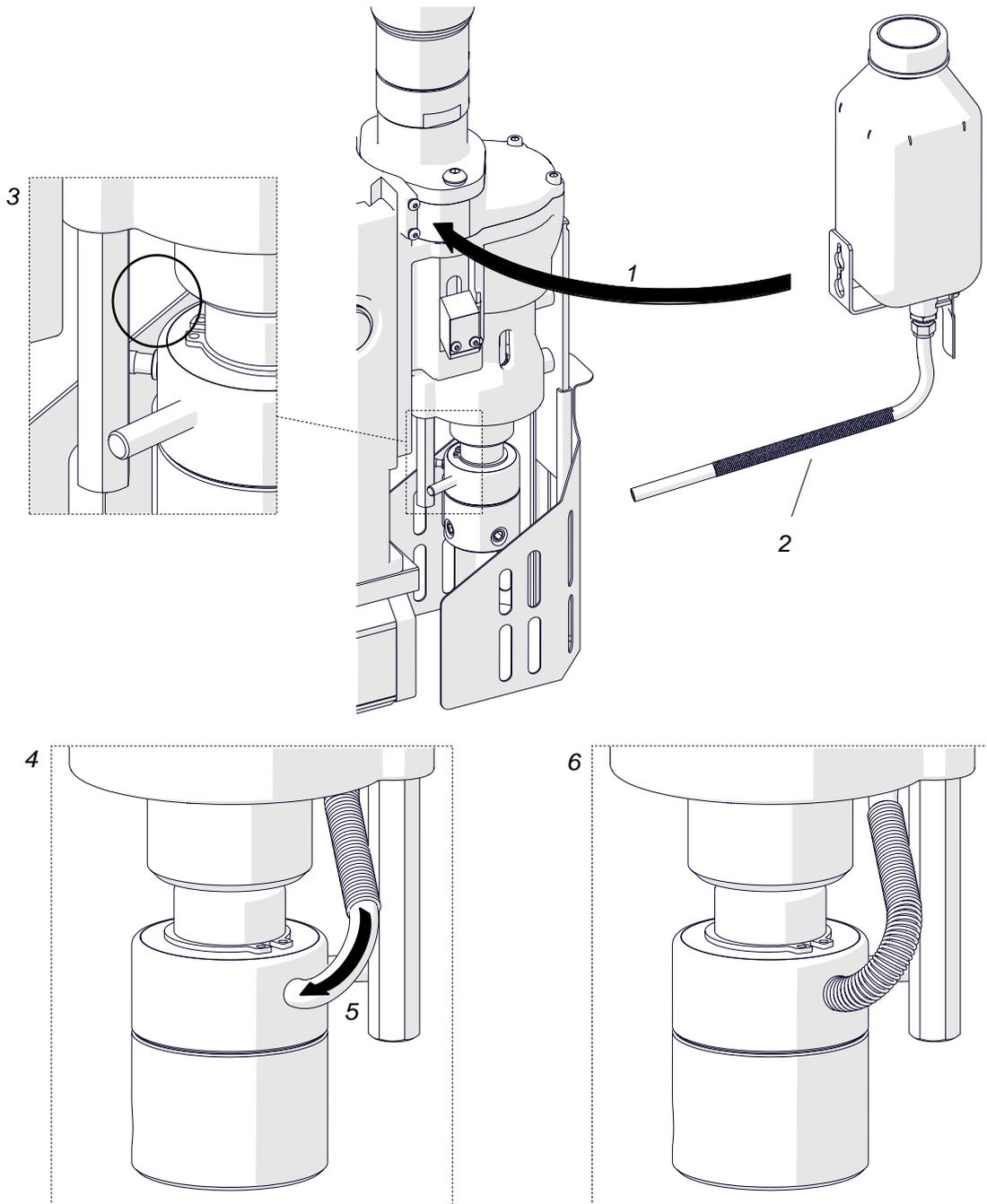


Fig. 6. Installing the cooling system

3.4. Preparing

Before starting, clean steel parts, including the MT2 shank, from anticorrosion coating used to preserve the machine for storage and transport.

Screw the handles into the feed shaft. To allow working in places hard to reach or using the machine by a left-handed person, the feed shaft can be installed so that the handles are on the opposite side of the machine.

Select the proper annular cutter based on the hole size desired. When drilling holes with diameters of 15–20 mm (9/16–13/16”) by using twist drill bits, select two bits. The first bit must be with 70% diameter and the second bit with 100% diameter of the hole size desired.

Use a clean and dry cloth to wipe the spindle, arbor (drill bit), and annular cutter. Then, as described before, install the arbor (and then the cutter) or twist drill bit with the lower diameter.

Connect the machine to a correctly prepared air source of sufficient purity. All inner diameters of the air source (including the supply hose and fittings) must be at least 10 mm (3/8”). The air source must be equipped with an air preparation unit that contains a filter, regulator, and lubricator.

Place the machine on a flat ferromagnetic workpiece with the thickness of at least 10 mm (3/8”). The workpiece must be clean, without rust, paint, or chips that decrease the holding force. Some types of steel are non-ferromagnetic (do not conduct magnetic flux) and the machine is not able to clamp onto them.

With the MOTOR lever set to OFF (Fig. 7), set the MAGNET switch to ON to turn on the clamping of the magnetic base.

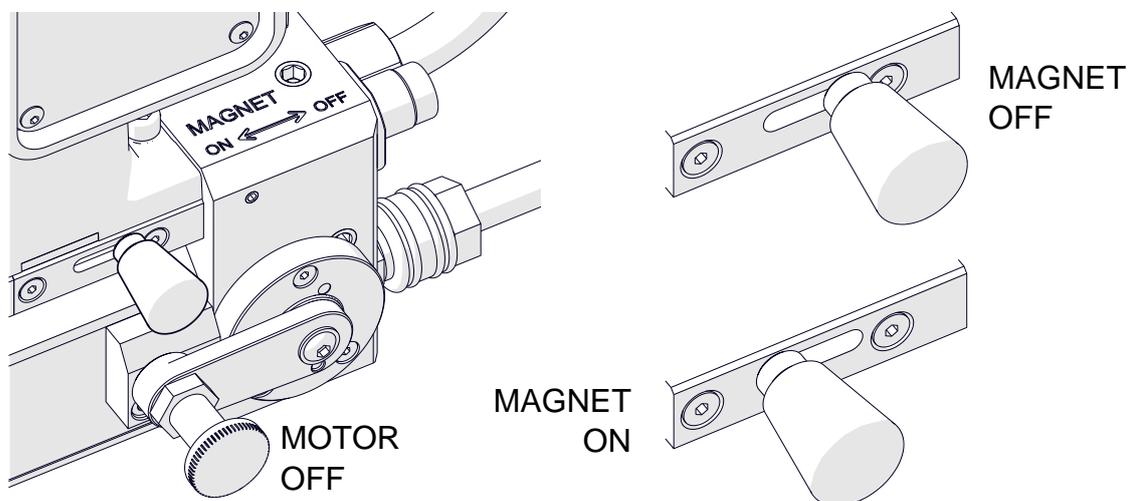


Fig. 7. Turning on the magnetic base

Use the safety chain to prevent the machine from falling and avoid possible injury to the operator if the machine loses magnetic clamping. To protect the machine, attach it to a fixed structure by fastening the chain to the lugs or carrying handle (Fig. 8). The chain must not be loose. Wrap the chain around the workpiece if possible.

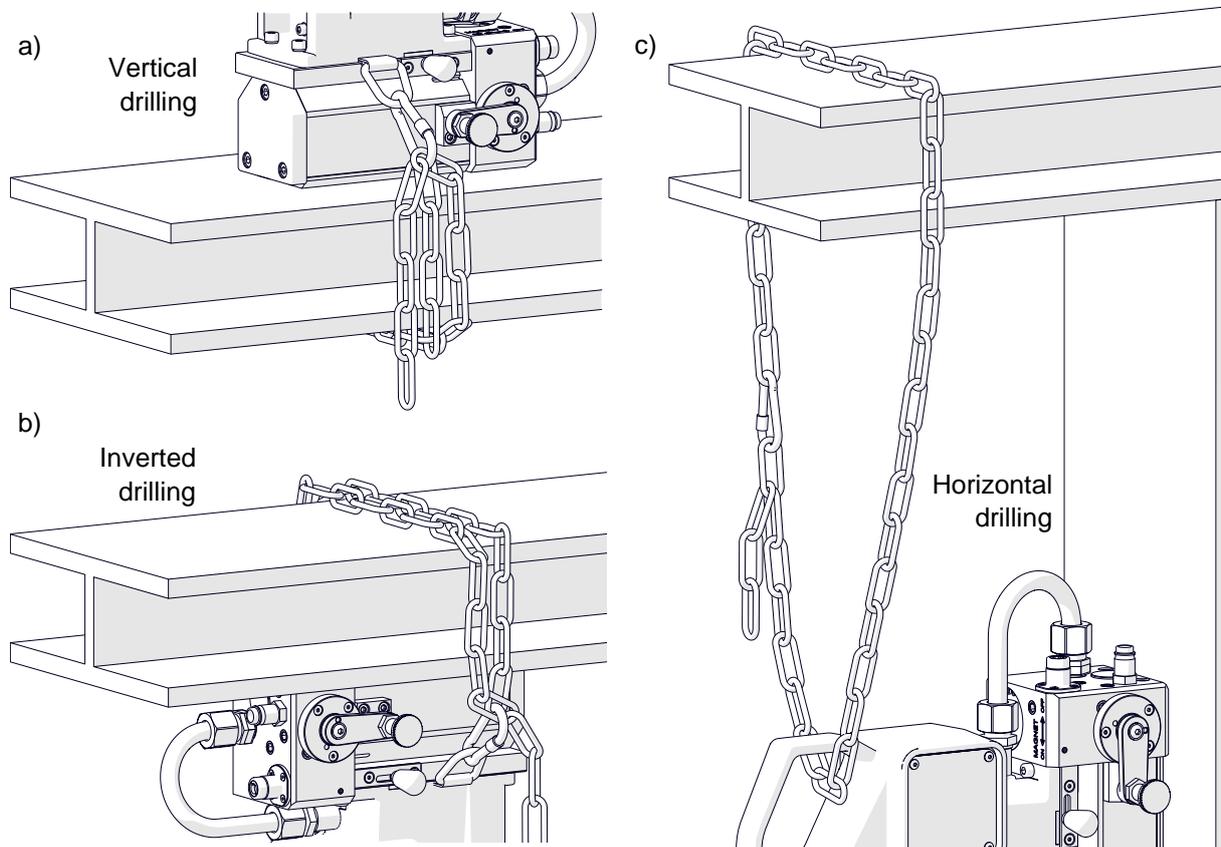


Fig. 8. Using the safety chain to protect the machine

Rotate the handles to the left to place the tool above the workpiece.

When using an annular cutter and working in the position from Fig. 8a, install the cooling system as described before and fill it with coolant. Do not use only water as the coolant. However, using emulsions from water and drilling oil is adequate. To check the operation of the cooling system, slightly loosen the bottle cap, use the lever to open the valve, and then rotate the handles to the left to initially apply pressure on the pilot pin. The coolant should fill the system and start flowing from the inside of the cutter.

Because the cooling system works by gravity, when working in inverted or horizontal positions (Fig. 8b, 8c) use coolants under pressure or in the form of spray or paste.

3.5. Drilling

Use the gear switch to set the gear based on the following table.

Tool	Hole diameter		Rotational speed* [rpm]
	[mm]	[in]	
Annular cutter	12–30	1/2–1-3/16	290 (gear II)
	31–45	1-3/16–1-3/4	190 (gear I)
Twist drill bit	3.5–13	1/8–1/2	290 (gear II)
	14–20	1/2–13/16	190 (gear I)

* for sharp tool and mild steel with a shear strength $R_m < 500 \text{ N/mm}^2$ (70,000 psi), such as for instance St0 (S185), St3S (S235JR), or St4W (S275JO)

Steel with a shear strength $R_m = 500\text{--}700 \text{ N/mm}^2$ (70,000–100,000 psi), such as for instance St5 (E295), 18G2A (S355N), or 45 (C45), requires lower rotational speed. If the speed is selected too high or low for the shear strength and type/diameter of the tool, the tool will wear faster or be unable to drill the hole.

Pull the MOTOR lever and rotate it to ON to start the motor. Next, slowly rotate the handles to the left to lower the tool to the workpiece, and start drilling.

When using annular cutters, drill holes in one pass.



When the annular cutter goes through the workpiece, the slug core is expelled from the cutter with a substantial force.

When using drill bits, drill holes with diameters of 15–20 mm (9/16–13/16") in two passes. First, drill a hole by using the drill bit with the 70% diameter of the hole size desired. Next, drill in the same spot by using the drill bit with diameter equal to the hole size desired.

After the drilling depth exceeds 40 mm (1-9/16"), apply the coolant manually (from the bottle) into the drilling area.

After the hole is made, retract the tool from the workpiece and rotate the MOTOR lever to OFF to turn off the motor. Before moving the machine to another drilling spot, set the MAGNET switch to OFF to turn off the magnetic base.

After the work is finished and the motor stopped, set the opposite gear (for instance from gear I to II), and then run the machine for a while without load, which will improve lubricity. Next, turn off the motor and magnetic base, unplug the machine from the air source, clean chips and excess coolant from the machine and tool, and then remove the machine from the worksite.

Tighten the bottle cap, close the valve, and then press the pilot pin to expel the coolant remaining within the cooling system. Before inserting the machine into the tool box, remove the bottle, and then wear gloves to remove the tool from the holder.

3.6. Maintaining the air preparation unit

Maintain the air preparation unit as required to keep the water trap drained, filter cleaned, and the lubricator oil reservoir filled so that there is a drop of oil every 2–5 seconds. Use only oil which ignition temperature is more than 260°C (500°F). If the machine is to be left idle for at least 24 hours after the work is finished, increase the delivery of oil and run the motor for 2–3 seconds, which will prevent rusting and degrading of the rotor vanes.

3.7. Adjusting the gib clearance

Every 50 work hours, or more often, check the gib clearance because it greatly affects the quality of drilled holes. The clearance is proper if the motor slides smoothly and not drops under its own weight.

To remove the excessive clearance, use the 8 mm combination wrench to loosen the nuts (1, Fig. 9), and then use the 2.5 mm hex wrench to loosen the set screws (2). Next, rotate the handles to set the motor on levels that allow access to the gib screws through the holes. Then, use the 4 mm hex wrench to loosen (3) and tighten (4) each screw with a force enough to prevent the gib from being pushed out by the springs placed inside.

Use the 2.5 mm hex wrench to tighten the set screws (5) to such an extent that the motor moves smoothly through the entire stroke and not drops under its own weight. Next, use the 4 mm hex wrench to tighten the gib screws: central screw (6), adjacent screws, and then top and bottom screws. Finally, use the 8 mm combination wrench to tighten the nuts (7), while countering the set screws with the 2.5 mm hex wrench (8).

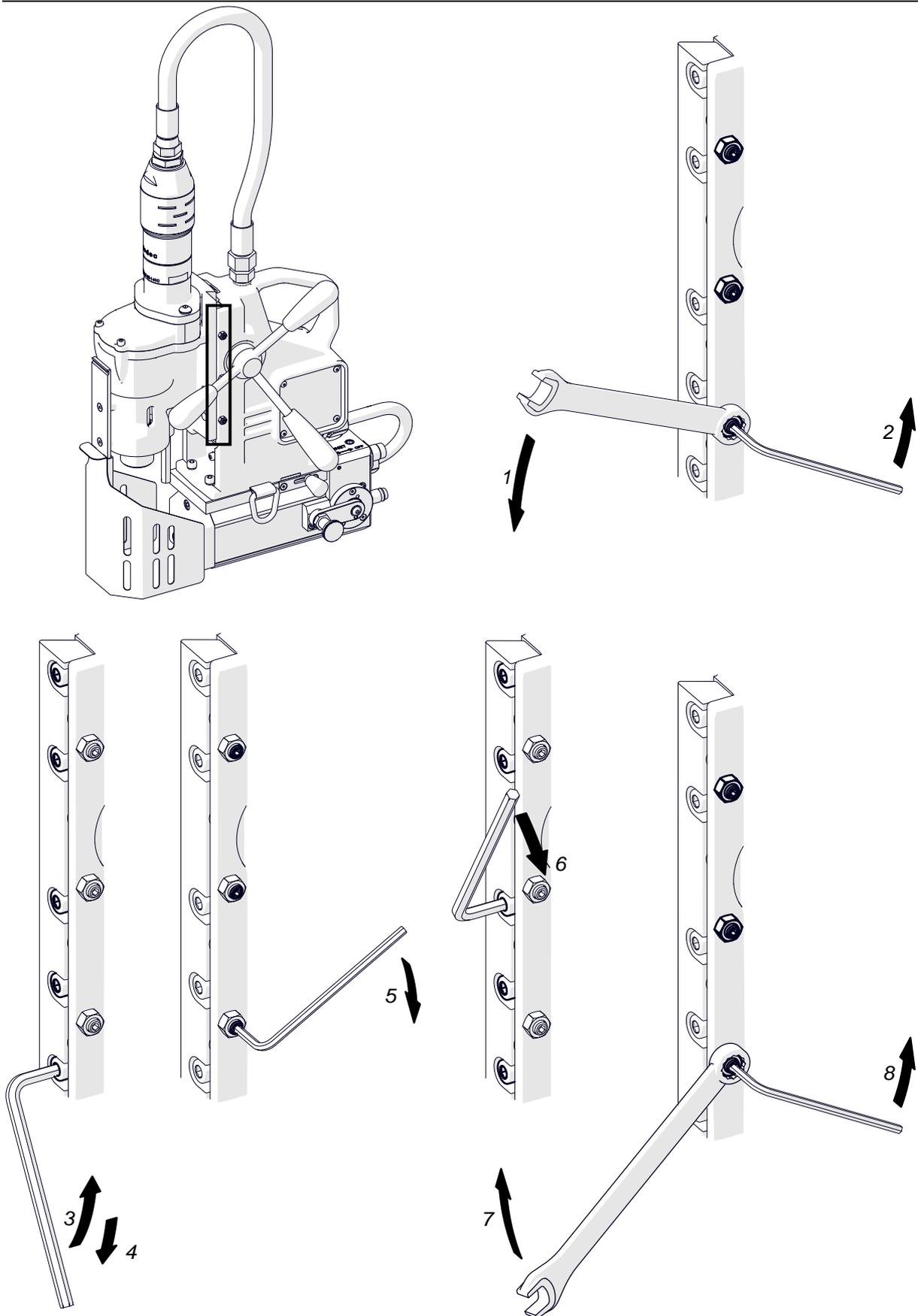
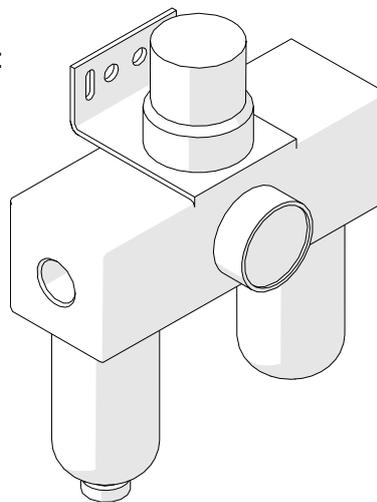


Fig. 9. Adjusting the gib clearance

4. ACCESSORIES

4.1. Air preparation unit

Part number (filter, regulator, lubricator):
ZST-000021



4.2. Pressure cooling system

Capacity of 2 liters.

Part number:
UKL-0440-16-00-00-0

