



HOLEMAKER HMSPECIAL110

Holemaker Portable Magnetic Drilling Machine

OPERATOR'S MANUAL

WARNING!

BEFORE USE, ENSURE EVERYONE USING THIS MACHINE READS AND UNDERSTANDS ALL SAFETY AND OPERATING INSTRUCTIONS IN THIS MANUAL .



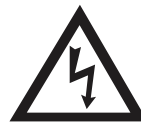
EYE PROTECTION
REQUIRED



HEARING PROTECTION
REQUIRED



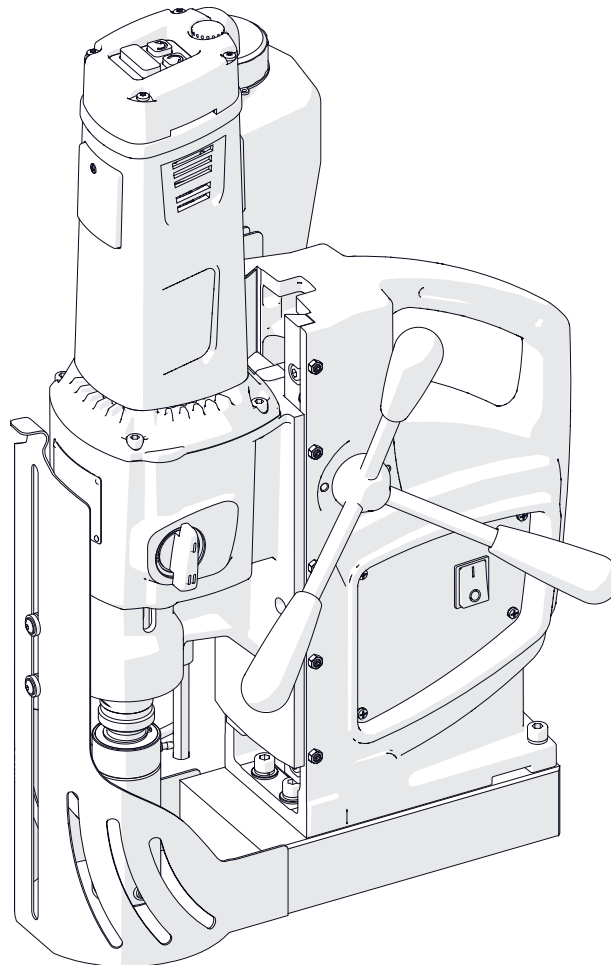
NEVER PLACE
FINGERS NEAR
CUTTING AREA OR
MACHINE ARBOR



LINE VOLTAGE
PRESENT



BEWARE OF
ROTATING
MACHINE PARTS



Serial # _____

Date of Purchase _____

Ver: 1.03 15/10/2021

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1. GENERAL INFORMATION

1.1. Application

The HMSPECIAL110 is a drilling machine designed to drill holes with diameters of up to 120 mm by using annular cutters. The machine can also drill holes with diameters of up to 31.75 mm by using twist drill bits.

The machine can change the direction of rotation. This allows thread cutting by using a tap chuck.

The electromagnetic base clamps the machine to ferromagnetic surfaces. This makes sure that the operator is safe and the machine works correctly. A safety strap protects the machine from falling in case of a clamping loss.

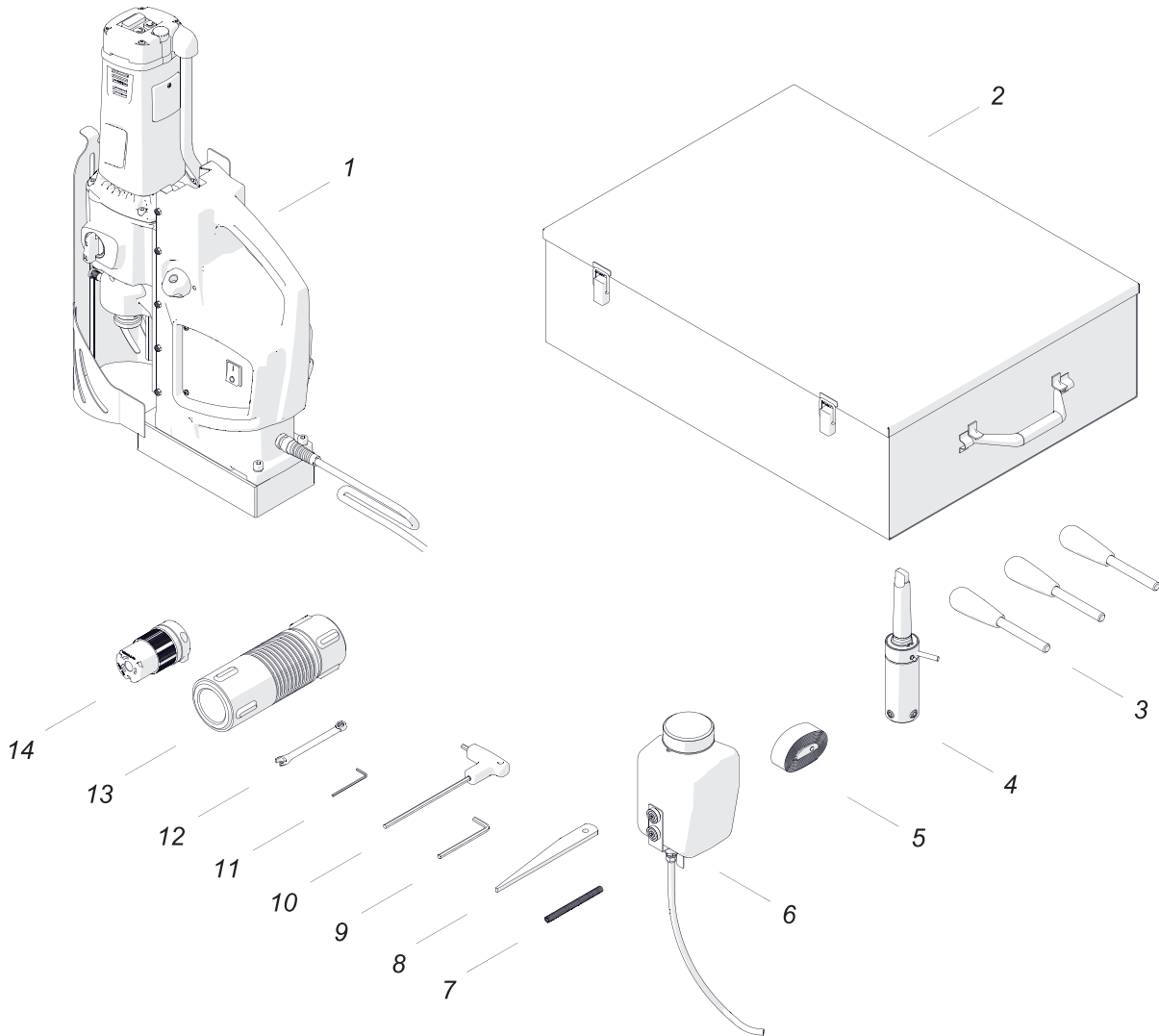
Accessories allow you to drill in pipes and cut threads.

1.2. Technical data

Voltage	1~ 220–240 V, 50–60 Hz 1~ 110–120 V, 50–60 Hz
Power	2300 W
Spindle shank	MT3
Tool holder	19 mm (3/4") Weldon
Maximum drilling diameter with an annular cutter	120 mm*
Maximum drilling diameter with a twist drill bit	31.75 mm
Maximum drilling depth with an annular cutter	110 mm
Maximum tap size	M30 (1-1/4")
Clamping force (surface with the thickness of 25 mm and roughness $R_a = 1.25$)	18,000 N
Electromagnetic base dimensions	110 mm × 220 mm × 50 mm 4.3" × 8.7" × 2"
Stroke	225 mm (8.9")
Rotational speed under load	75–110 rpm 135–200 rpm 220–320 rpm 390–570 rpm
Minimum workpiece thickness	10 mm (0.4")
Protection class	I
Noise level	More than 85 dB
Required ambient temperature	0–40°C (32–104°F)
Weight	25 kg (55 lbs)

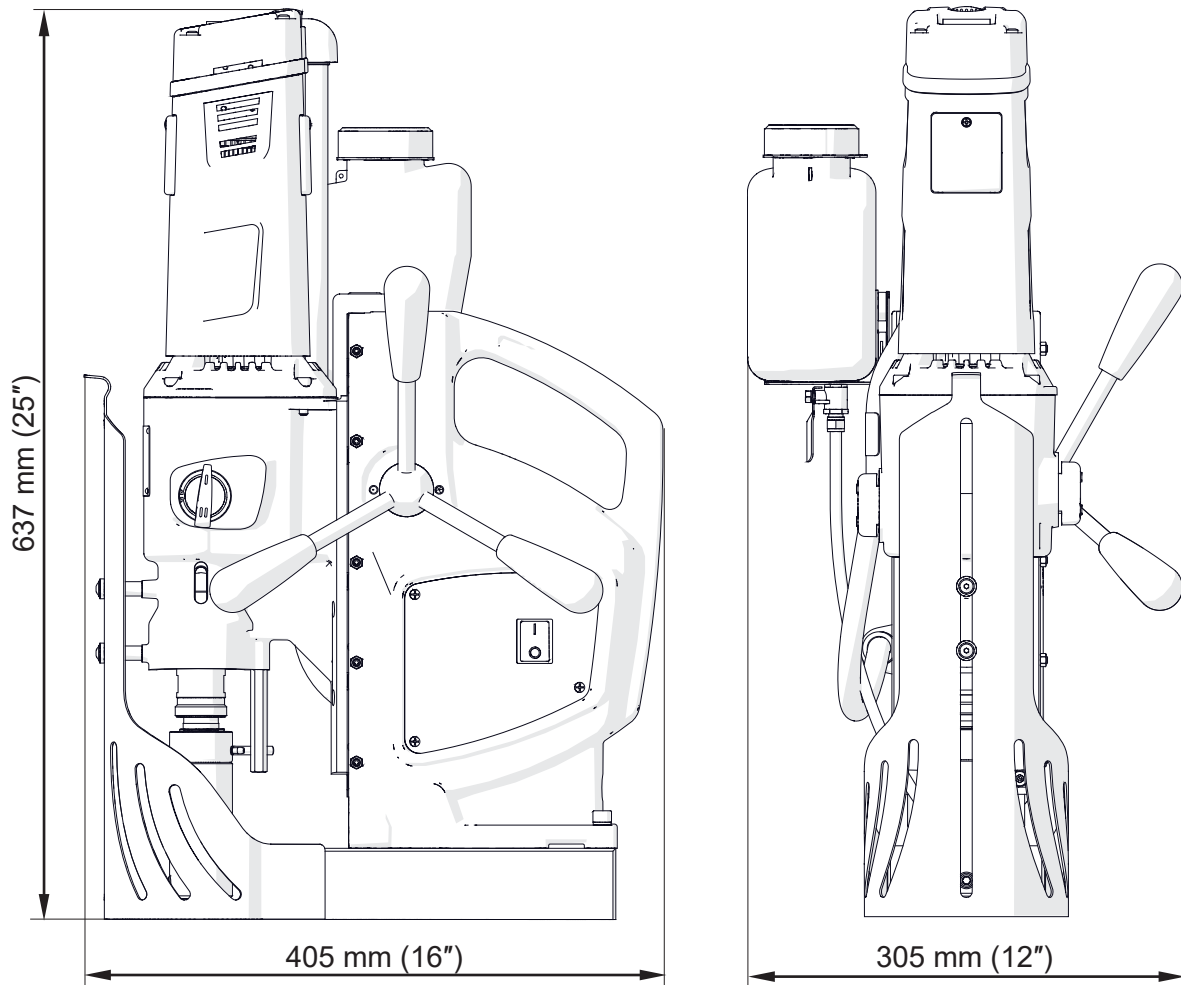
* If more than 60 mm (2.36"), use an MT3 arbor with 32 mm Weldon tool holder (UCW-0563-22-00-00-0).

1.3. Equipment included

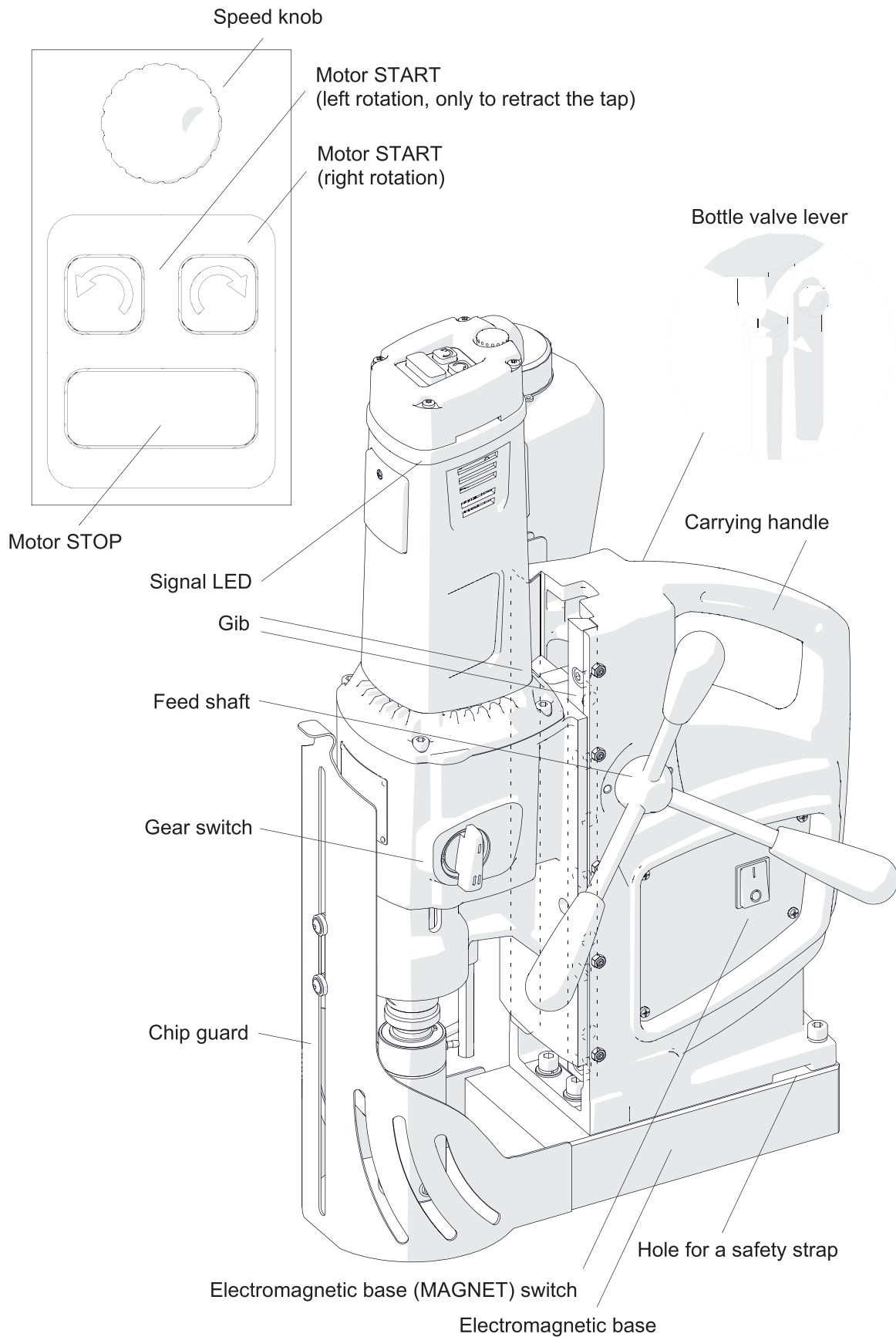


1	Drilling machine	1 unit
2	Metal box	1 unit
3	Handle	3 units
4	MT3 arbor with 19 mm (3/4") Weldon tool holder	1 unit
5	Safety strap	1 unit
6	Cooling system	1 unit
7	Protective spring for cooling hose	1 unit
8	MT3 drift	1 unit
9	5 mm hex wrench	1 unit
10	5 mm hex wrench with a handle	1 unit
11	2.5 mm hex wrench	1 unit
12	8 mm combination wrench	1 unit
13	Tool can	1 unit
14	Locking connector (only in 115 V version)	1 unit
–	Operator's Manual	1 unit

1.4. Dimensions



1.5. Design



2. SAFETY PRECAUTIONS

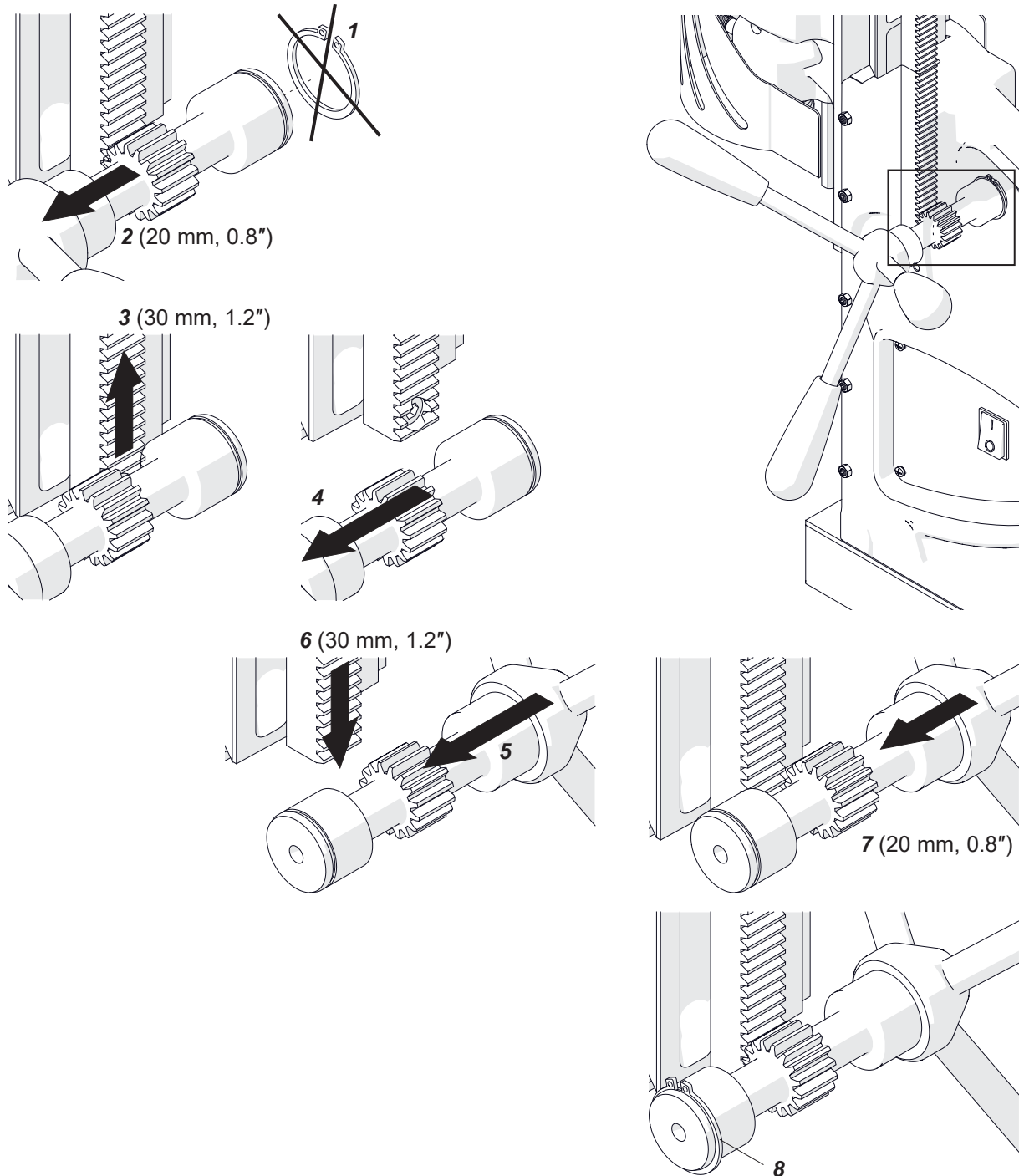
1. Before use, read this Operator's Manual and complete a training in occupational safety and health.
2. Use only in applications specified in this Operator's Manual.
3. Make sure that the machine has all parts and they are genuine and not damaged.
4. Make sure that the specifications of the power source are the same as those specified on the rating plate.
5. Connect the machine to a correctly grounded power source. Protect the power source with a 16 A fuse for 230 V or a 32 A fuse for 115 V. If you are going to work on building sites, supply the machine through an isolation transformer with class II protection only.
6. Let only qualified electrician do the connection to the 115 V power source.
7. Set the MAGNET switch to 'O' before you move the machine. Use carrying handle to move the machine.
8. Do not carry the machine by the power cord and do not pull the cord. This can cause damage and electric shock.
9. Keep untrained bystanders away from the machine.
10. Before each use, ensure the correct condition of the machine, power source, power cord, plug, control panel, and tools.
11. Before each use, make sure that no part is cracked or loose. Make sure to maintain correct conditions that can have an effect on the operation of the machine.
12. Keep the machine dry. Do not expose the machine to rain, snow, or frost.
13. Do not stay below the machine that is put at heights.
14. Keep the work area well lit, clean, and free of obstacles.
15. Make sure that the tool is correctly attached. Remove wrenches from the work area before you connect the machine to the power source.
16. Do not use tools that are dull or damaged.
17. Unplug the power cord before you install and remove tools. Use protective gloves to install and remove tools.
18. Unplug the power cord before you manually turn the spindle.
19. Use annular cutters without the pilot pin only when you drill incomplete through holes. Do not use arbors without a spring.
20. Do not make holes/threads whose diameter or depth differ from those specified in the technical data.

21. Do not use near flammable materials or in explosive environments.
22. Do not use on surfaces that are rough, not flat, not rigid, or have rust, paint, chips, or dirt.
23. Do not use if the gibs are adjusted incorrectly.
24. Do not use if there is no grease on the gibs.
25. Do not use the gear switches if the motor is on.
26. Use the safety strap to attach the machine to a stable structure. Put the strap through the hole in the machine body. In the horizontal position, attach the strap to the carrying handle. Do not put the strap into the buckle from the front.
27. Use eye and ear protection and protective clothing. Do not use loose clothing.
28. We do not recommend work on workpieces thinner than 10 mm (0.4"). The clamping force depends on the workpiece thickness and is much lower for thin plates.
29. Each time before you put the machine on the workpiece, rub the workpiece with coarse-grained sandpaper. Make sure that the bottom of the base is in full contact with the workpiece.
30. Do not touch chips or moving parts. Do not let anything catch in moving parts.
31. After each use, remove chips and coolant from the machine and the tool. Do not remove chips with bare hands.
32. Unplug the power cord before you do maintenance or install/remove parts.
33. Repair only in a service center appointed by the seller.
34. If the machine falls, is wet, or has any damage, stop the work and immediately send the machine to the service center for check and repair.
35. Do not leave the machine when it operates.
36. If you are not going to use the machine, remove the tool from the holder. Then, remove the machine from the work area and keep it in a safe and dry place.
37. If you are not going to use the machine for an extended period, put anti-corrosion material on the steel parts.

3. STARTUP AND OPERATION

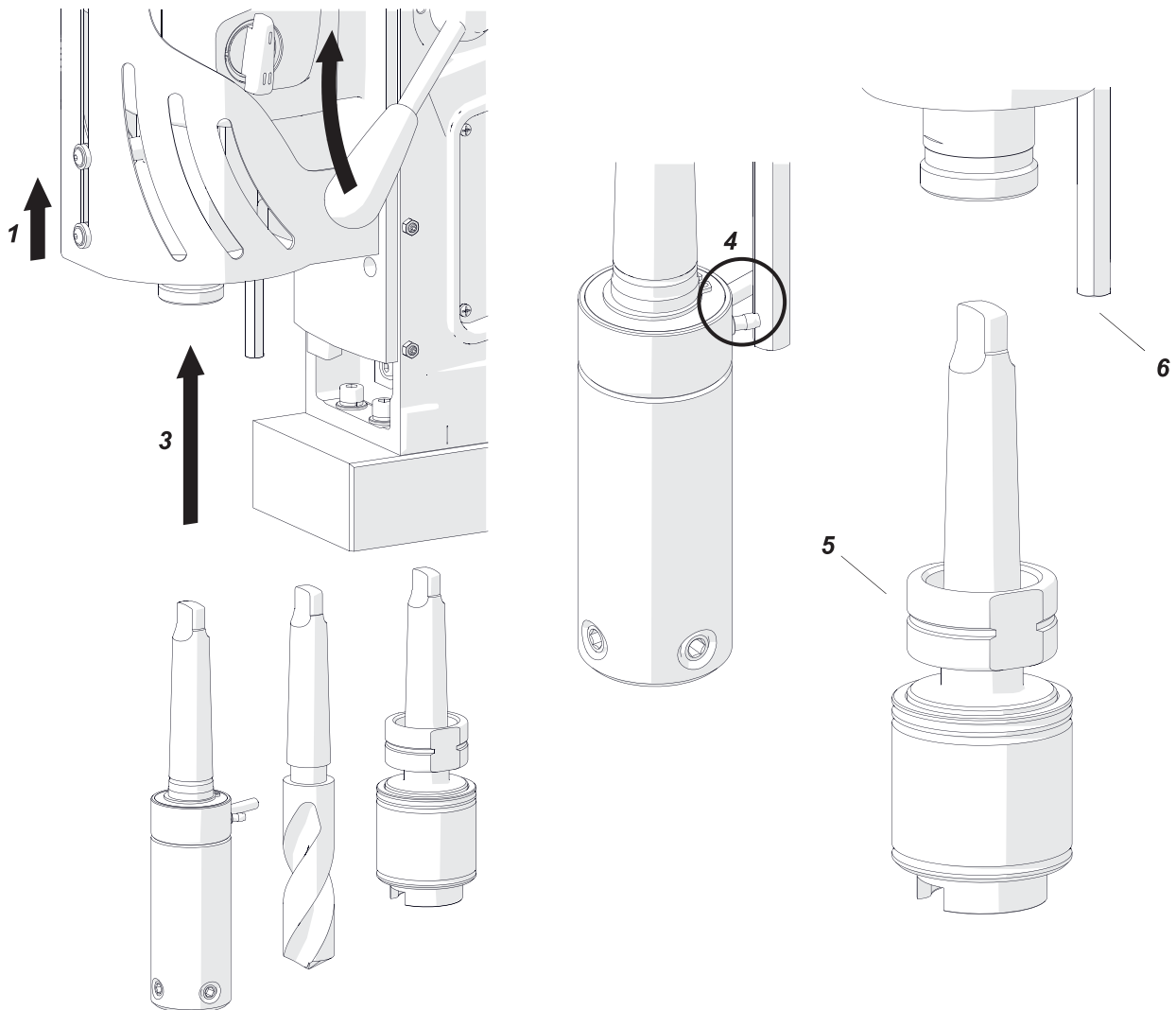
3.1. Installing the handles

Attach the handles to the feed shaft. You can install the shaft so that the handles are on the opposite side of the machine. To do this, lift the motor to the maximum and continue in the sequence that follows.

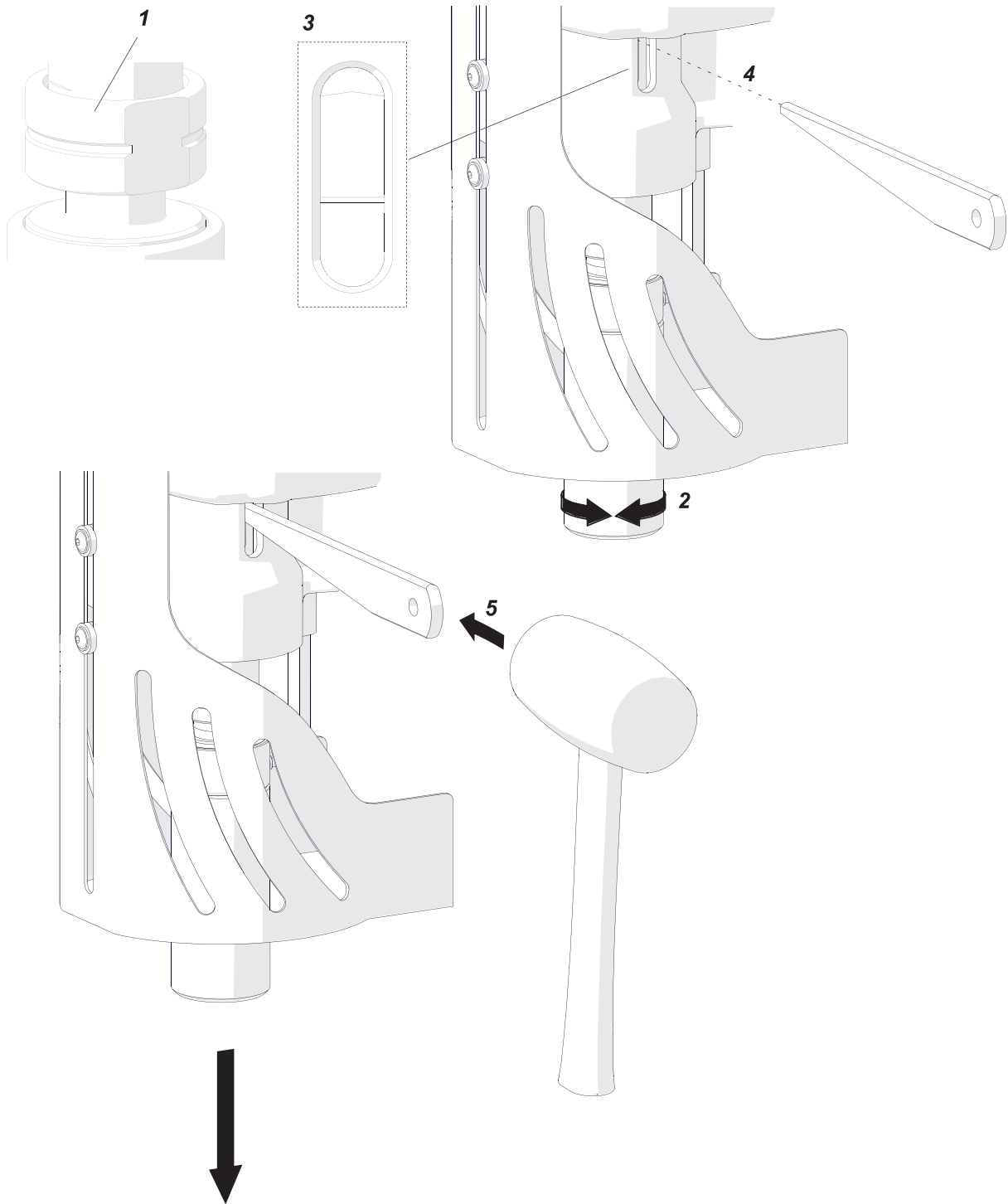


3.2. Installing and removing the arbor, MT3 twist drill bit, or tap chuck

Unplug the power cord and lift the chip guard (1). Turn the handles to the right (2) to lift the motor. Use a dry cloth to clean the spindle and the arbor (drill bit, tap chuck). Use gloves to put the arbor (drill bit, tap chuck) into the spindle (3). Make sure that the stop rod is between the pin and the fitting (4). If the arbor (tap chuck) has a nut (5), tighten the nut to the spindle. Before you install an MT3×48 mm tap chuck, remove the stop rod (6).



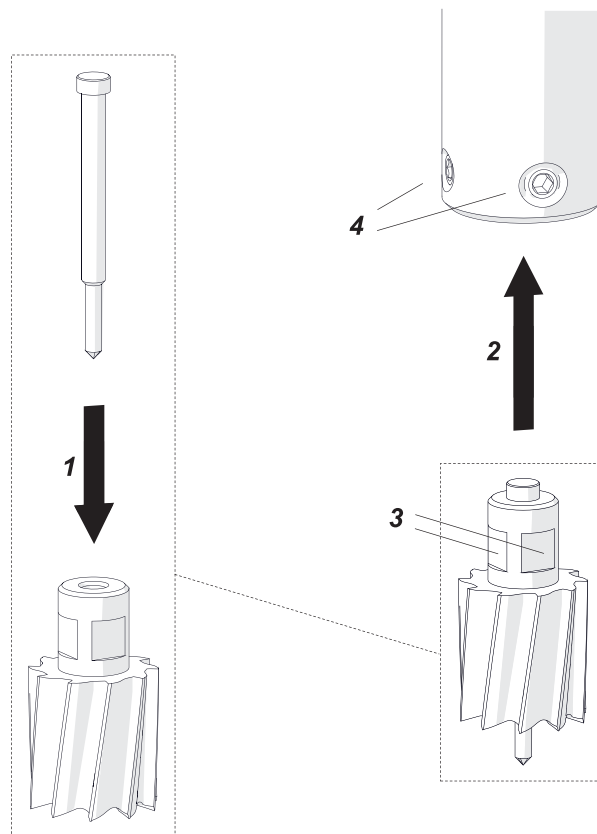
To remove the arbor (drill bit, tap chuck), continue as follows. If the arbor (tap chuck) has a nut (1), remove the nut. Next, lift the motor and turn the spindle (2) to align the holes in the spindle and gearbox (3). Put the drift into the hole (4). Next, hold the carrying handle with one hand and hit the drift with a mallet (5).



3.3. Installing and removing the annular cutter

Install the arbor as described before. Use gloves to put the correct pilot pin into the annular cutter (1). Use a dry cloth to clean the cutter. Put the cutter into the arbor (2) to align the flat surfaces (3) with the screws (4). Use the 5 mm hex wrench to tighten the screws.

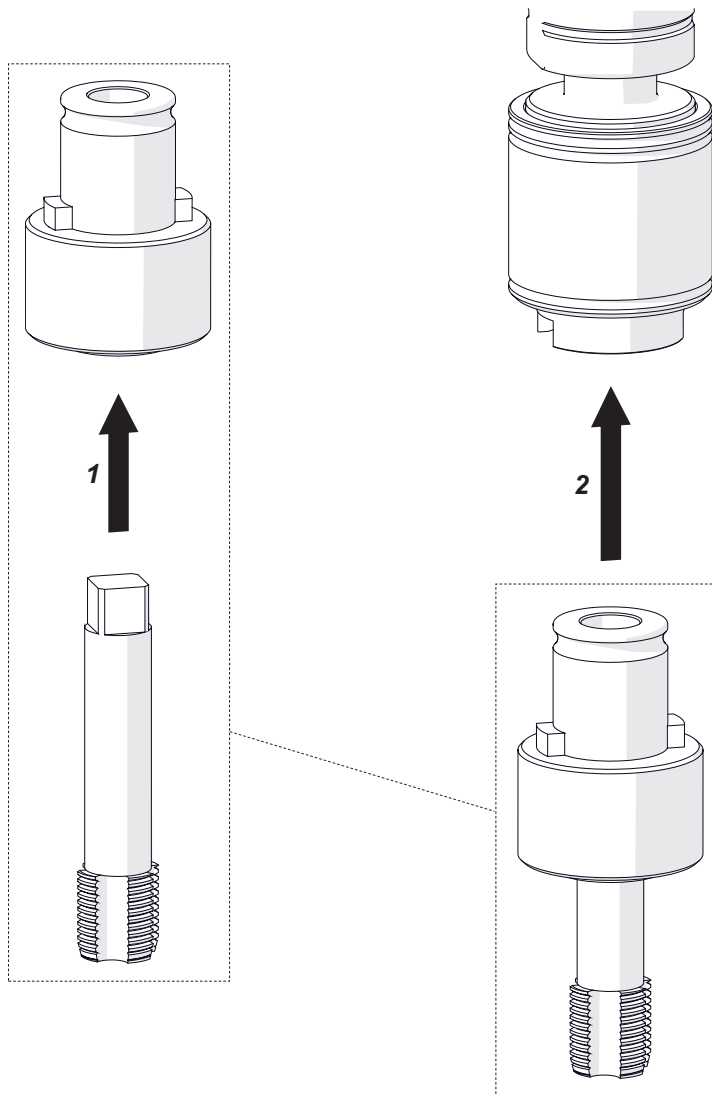
To remove the cutter, loosen the screws (4) with the 5 mm hex wrench.



3.4. Installing and removing the screw tap

Install the tap chuck as described before. Next, put the screw tap into the correct adapter (1). Install the adapter into the tap chuck (2).

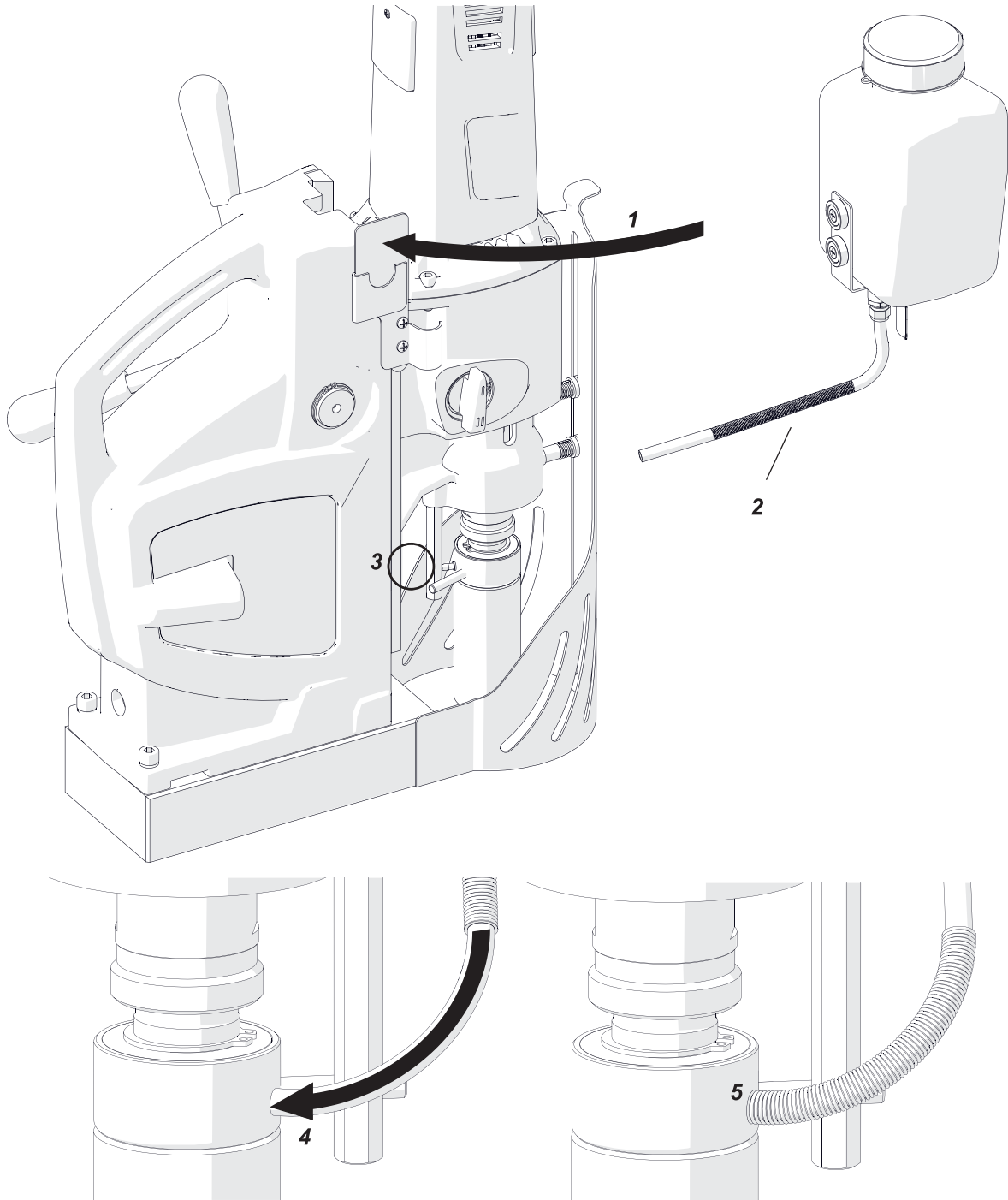
To remove the screw tap, unlock it and remove from the adapter.



3.5. Installing and removing the cooling system

Attach the bottle to the bracket (1). Put the hose with the spring (2) between the stop rod and the body (3). Then, attach the hose to the fitting and move the spring to the arbor (4, 5).

To remove the bottle, continue in reverse sequence.



3.6. Preparing

Before use, clean steel parts, including the MT3 socket, from anti-corrosion material used to preserve the machine for storage and transport.

Attach the handles to the feed shaft. You can install the shaft so that the handles are on the opposite side of the machine.

Apply a thin layer of grease to the gibs.

Select the annular cutter, drill bit, or screw tap that matches the required hole diameter. When you drill holes with diameters of 20–31.75 mm (0.8–1.25") by using twist drill bits, select two bits: with 70% and 100% of the required diameter.

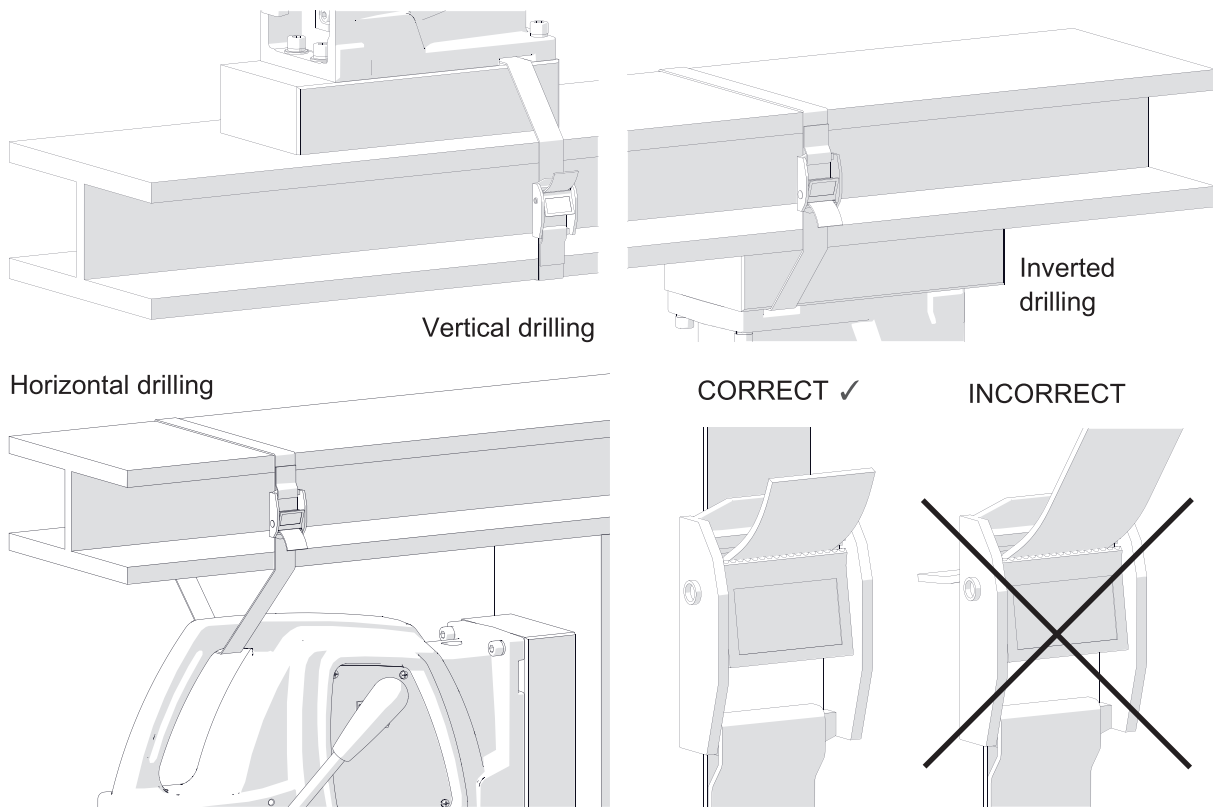
Use a dry cloth to clean the spindle, arbor (drill bit, tap chuck), and cutter. Then, as described before, install the arbor (and then the cutter), drill bit with the smaller diameter, or tap chuck (and then the screw tap with adapter).

Put the machine on a flat ferromagnetic workpiece with the thickness of at least 10 mm (0.4"). Make sure that there is no rust, paint, chips, or dirt. They decrease the clamping force. The force will be lower also if the surface is thin, rough, not flat, not rigid, the voltage is lower than required, or the bottom of the base is worn.

Connect the machine to the power source. To connect the machine to a 115 V power source, use the locking connector. Refer to the instructions included with the connector.

Set the MAGNET switch to 'I' to turn on the clamping. Some types of steel (non-ferromagnetic) do not conduct magnetic flux so the machine cannot clamp onto them.

Use the safety strap to prevent fall and injury if the machine loses the clamping. Attach the machine to a stable structure by putting the strap through the hole in the machine body. In the horizontal position, attach the strap to the carrying handle. Make sure that the strap is tight and not twisted. If the machine comes loose from the workpiece and hangs on the strap, replace the strap. Do not put the strap into the buckle from the front.



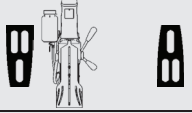
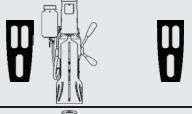
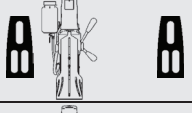
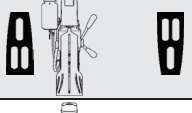
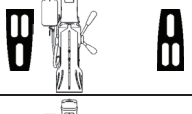
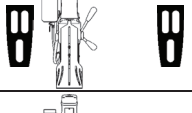
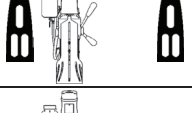
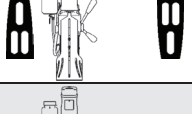
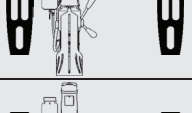
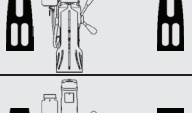

Turn the handles to the left to put the tool above the workpiece.

When you use an annular cutter, install the cooling system and fill it with coolant. Do not use only water as the coolant. But you can mix water and drilling oil. Then, make sure that the cooling system works correctly. To do this, lightly loosen the bottle cap and use the lever to open the valve. Then, turn the handles to the left to apply a light pressure on the pilot pin. The coolant should fill the system and start flowing from the cutter.

The cooling system works by gravity. Thus, in the horizontal position, turn the bottle. In the inverted position, use coolants under pressure or in the form of spray or paste.

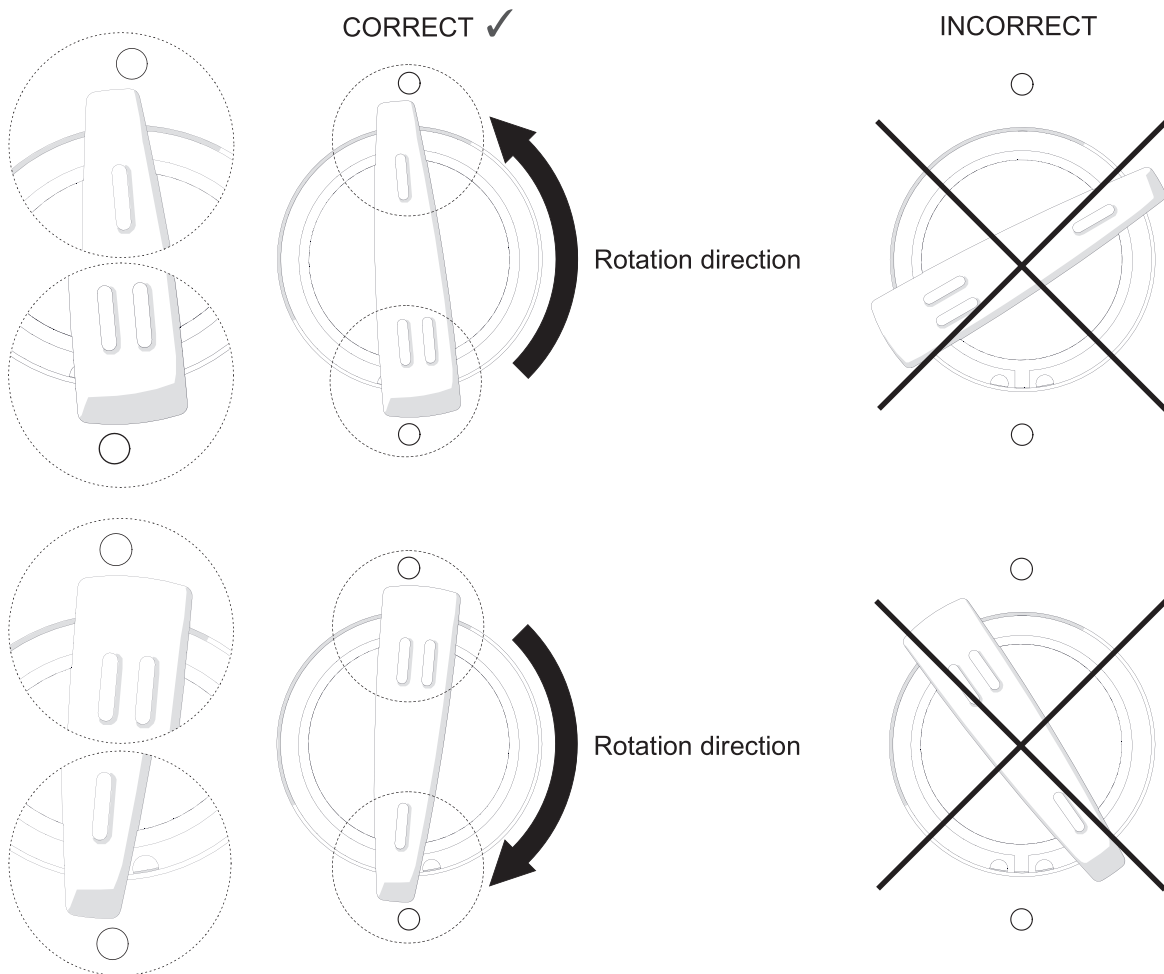
3.7. Drilling

Set the speed based on the table that follows.


Tool	Hole diameter		Rotational speed* [rpm]	Gear switches setting
	[mm]	[in]		
HSS annular cutter	12–20	0.47–0.79	390–570	
	21–35	0.83–1.38	220–320	
	36–57	1.42–2.24	135–200	
	58–100	2.28–3.94	75–110	
TCT annular cutter	12–24	0.47–0.94	390–570	
	25–44	0.98–1.73	220–320	
	45–69	1.77–2.72	135–200	
	70–100	2.76–3.94	75–110	
Twist drill bit	15–18	0.59–0.71	220–320	
	18–26	0.71–1.02	135–200	
	26–31.75	1.02–1.25	75–110	

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

Turn the gear switch as shown in the figure until you feel resistance. Incorrect setting can damage the gearbox.



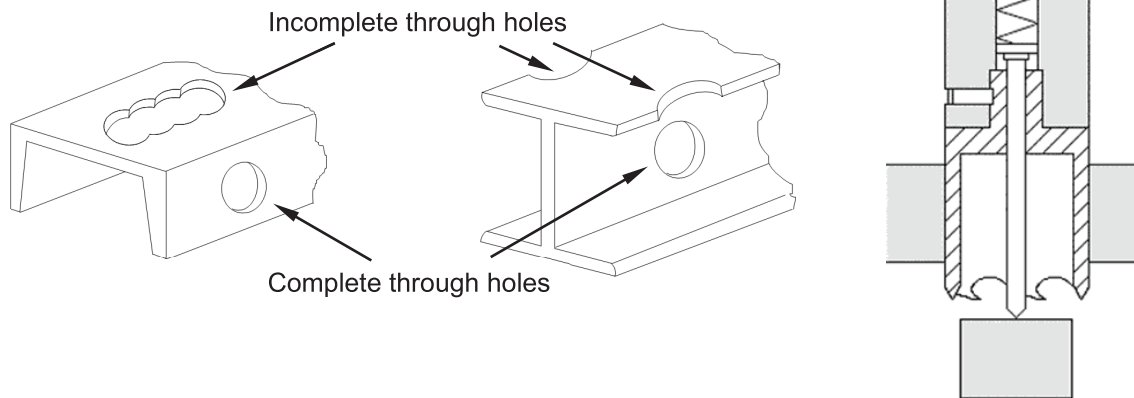
Steel with a strength $R_m \geq 500 \text{ N/mm}^2$ (70,000 psi), such as St5 (E295), 18G2A (S355N), or 45 (C45), requires lower speeds. If the speed is too high or too low for the workpiece strength and the type/diameter of the tool, the tool will wear faster or be unable to drill the hole.

Press  to start the motor. Turn the handles to the left to put the tool into the workpiece. Use the speed knob to set a speed sufficient for the actual process conditions. Set the speed knob near the maximum.



When the annular cutter goes through the workpiece, the slug core is pushed out with a large force.

When you use an annular cutter, drill only through holes. For incomplete through holes do not use the pilot pin.






Keep the machine in the same position until the hole is made.

When you use a drill bit, drill holes with diameters of 20–31.75 mm (0.79–1.25") in two steps. First, use the drill bit with the 70% diameter of the required diameter to drill a hole. Then, keep the machine in the same position, and drill again with the drill bit that matches the required diameter.

If you are going to drill holes deeper than 50 mm (2"), retract the tool above the workpiece as often as possible. This allows chips to be removed from the hole. If the grooves of the tool are clogged, turn off the motor and use a brush to clean them.


After you get to the depth of 40 mm (1.6"), retract the tool above the workpiece as often as possible. Then, manually apply the coolant from the bottle into the drilling area.

The table that follows shows the meaning of the LED colours.

Colour	Meaning	Description
Green is on	Strong surface.	Ready to work.
Green flashes	Weak surface.	We do not recommend work.
White is on	Normal work.	–
Blue flashes	Near overload.	Do not increase the feed speed. This can cause emergency stop.
 Red is on	 Overheat.	 Immediately retract the tool from the workpiece! Operate with no load for 2–4 minutes to let the temperature of the motor decrease.
Blue is on	Emergency stop. Overload.	Make sure that the tool is sharp. Make sure that the motor speed and the feed are correct. Use coolant. Retract the tool from the workpiece, press STOP, and then start again.
Violet is on	Emergency stop. Machine tilt/vibrations or the surface not stable.	Make sure that the surface is stable and its thickness is at least 10 mm (0.4"). Press STOP and then start again. If the motor does not operate, contact the service center.
Red changes to blue	Emergency stop. Voltage drop.	Make sure that the power source is correct. Press STOP and then start again.
Red changes to green	Emergency stop. Worn brushes.	Replace the brushes. Let the motor operate with no load for 20 minutes. If the motor does not operate, contact the service center.



The green colour is indicative only. It does not make sure that the machine will always be in contact with the surface. Thus, in each position protect the machine with the safety strap.

If an overload occurs, the machine stops. The overload can be caused by not enough cooling, dull tool, too fast feed, or too slow speed. Then, to start the machine again, retract the tool from the workpiece, press STOP and then .

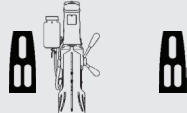
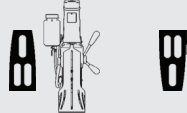
After the hole is made, retract the tool from the workpiece, and press STOP to turn off the motor. Before you move the machine, set the MAGNET switch to 'O' to turn off the base.

After the work is finished and the motor turned off, set the gear switches to the opposite position. Then, turn on the motor and let it operate for a while with no load to improve lubrication. Next, turn off the motor and the base, and then unplug the power cord. Clean the machine and the tool, and then remove the machine from the work area.

Tighten the bottle cap, close the valve, and then press the pilot pin to remove the coolant that remains in the cooling system. Before you put the machine into the box, remove the bottle, and use gloves to remove the tool from the holder.



3.8. Thread cutting

Install the screw tap and set the speed based on the table that follows.

Screw tap size	Rotational speed* [rpm]	Gear switches setting
M8 – M20	135–200	
5/16" – 3/4"		
M22 – M30	75–110	
13/16" – 1-1/4"		

Turn the handles to the left to put the tap above the hole for the thread. If the diameter of the hole is too small, cutting may not be possible because of too much milling resistance.

Apply oil on the cutting part of the tap to prevent seizure and increase durability.

Press  to start the motor. Set the speed knob near the minimum. Then, turn the handles to the left to put the tap into the hole. Use the handle to guide the tap down until the thread is cut. After the cutting with the tap is finished, press STOP to turn off the motor. Then, press and hold  and use the handle to guide the tap up to prevent damage to the thread.

After the work is finished and the motor turned off, set the gear switches to the opposite position. Start the motor and let it operate for a while with no load to improve lubrication. Next, turn off the motor and the base, and then unplug the power cord.

3.9. Adjusting the gibs

Every 50 work hours, make sure that the gibs are correctly adjusted. To do this, move the motor up and down and make sure that it moves smoothly.

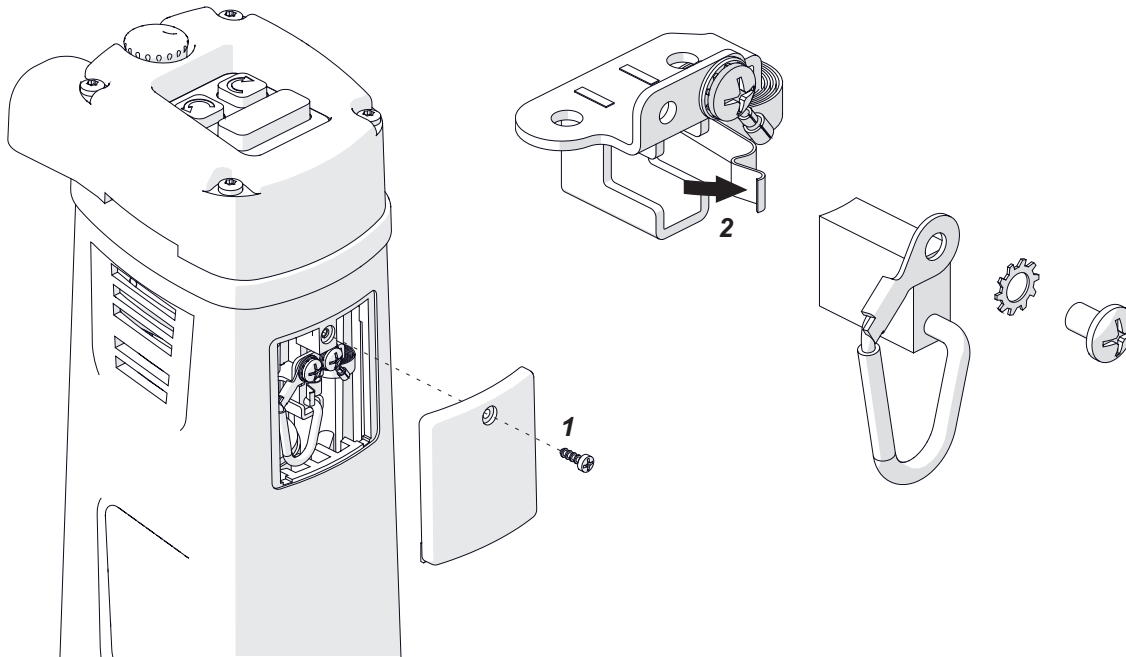
To adjust the gibs, apply a thin layer of grease on them. Then, use the 8 mm combination wrench, the 2.5 mm hex wrench, and the 5 mm hex wrench to loosen the nuts and screws (1). Put the motor so that the slider is in the center of the gibs (2). Then, lightly tighten the screws (3) so that they touch the gib. Move the motor up and down and adjust the screws (3) so that the travel is smooth. Next, tighten the screws (4) and then tighten the nuts (5).



3.10. Replacing the motor brushes

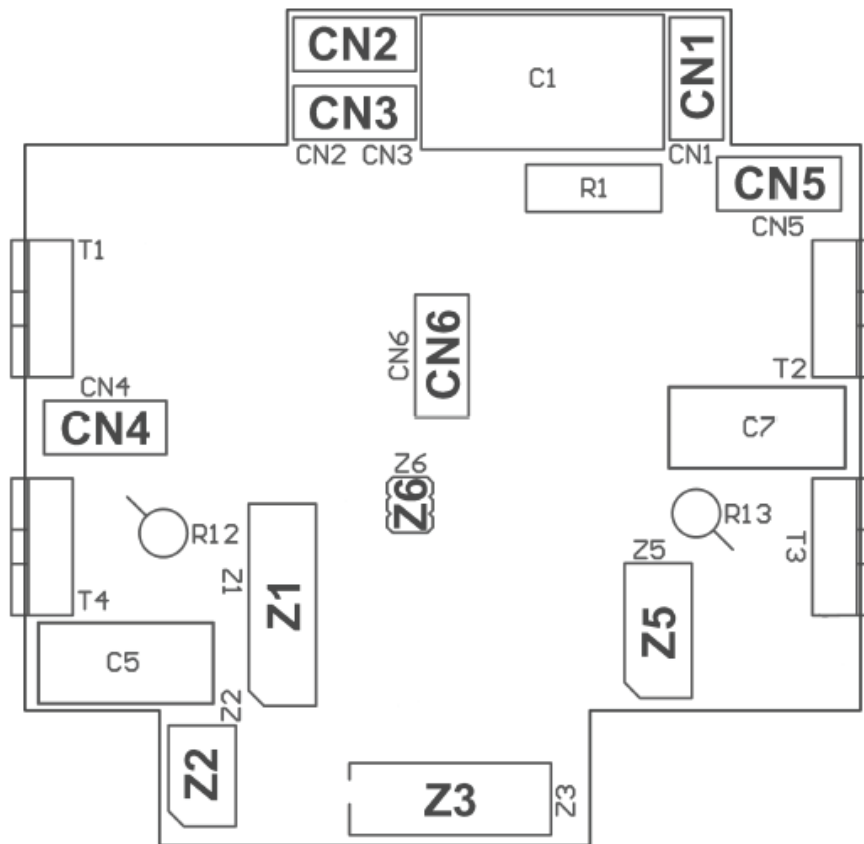
Every 100 work hours, check the condition of the brushes. To do this, unplug the power cord and remove the cover (1). Lift the spring (2) and remove the brush. If the brush is shorter than 5 mm (0.2"), replace the two brushes with new ones.

Install in reverse sequence. Then, let the motor operate with no load for 20 minutes.

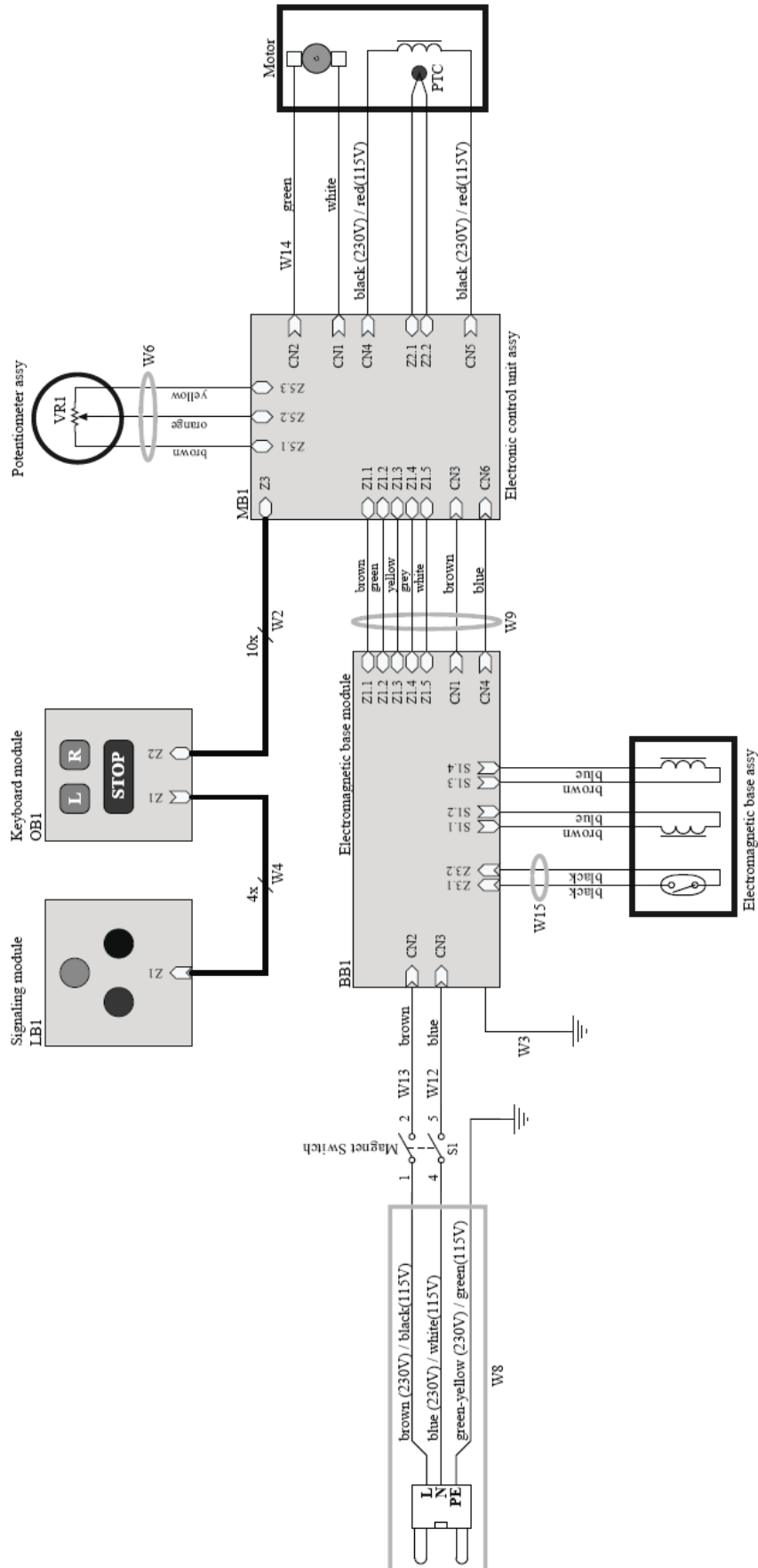


4. WIRING DIAGRAMS

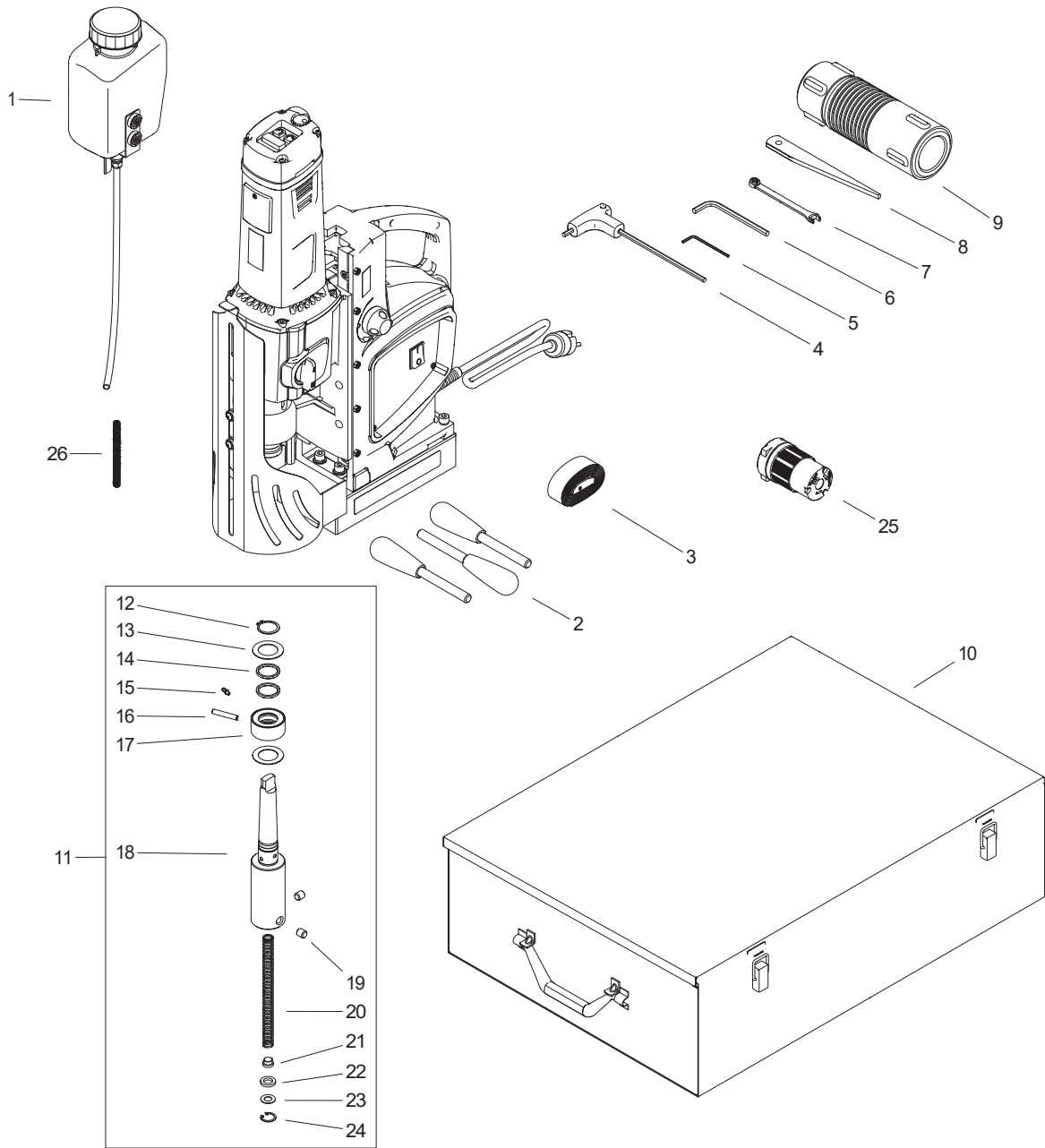
4.1. Electronic control unit ass



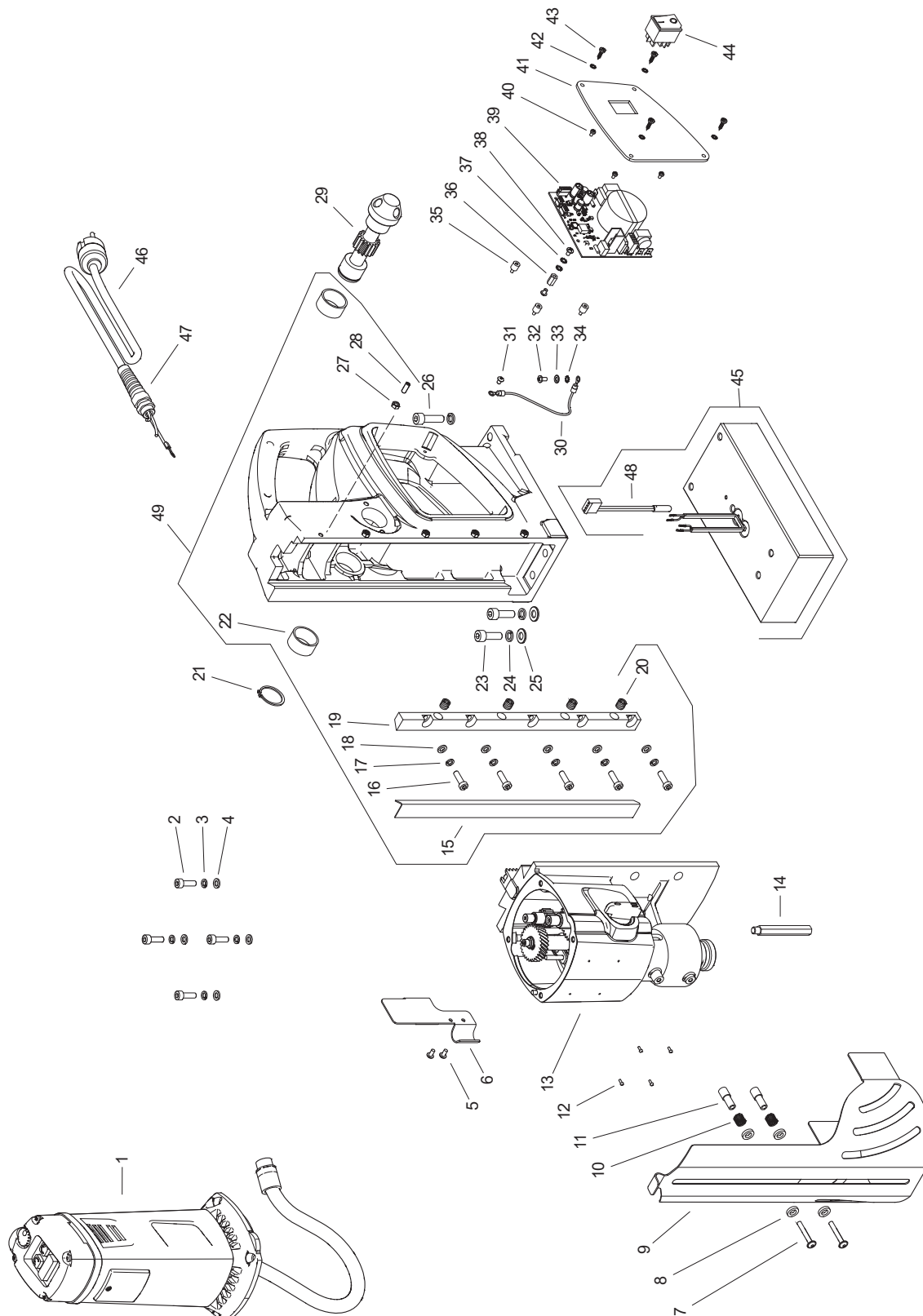
4.2. Wiring diagram



5. PARTS LIST

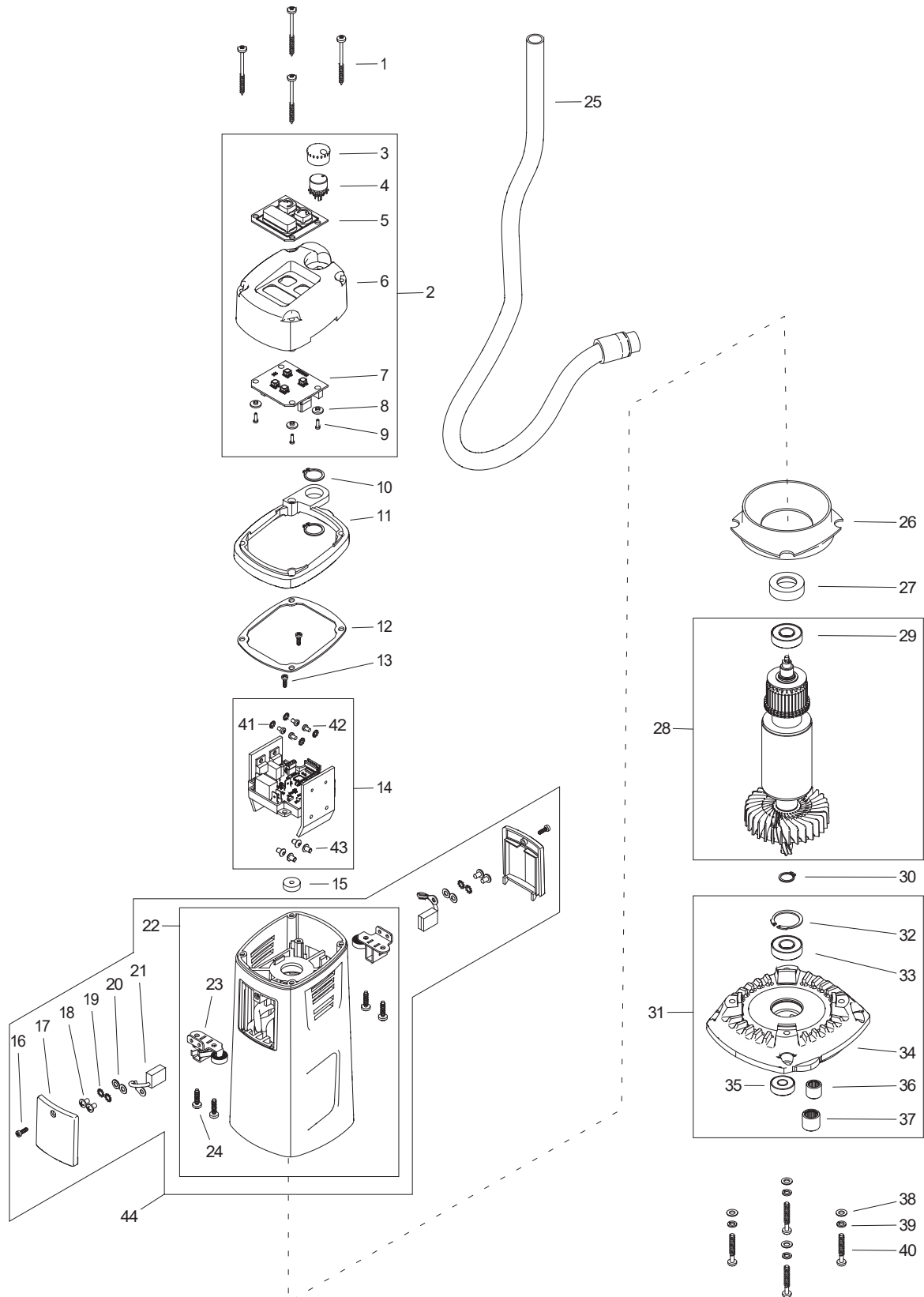


ITEM	PART NUMBER	DESCRIPTION	Q-TY
1	UKL-0563-07-00-00-0	COOLANT SYSTEM ASSY	1
2	DZW-0178-09-00-00-0	SPOKE HANDLE ASSY	3
3	PAS-000008	SAFETY STRAP 500	1
4	KLC-000037	5 MM HEX WRENCH WITH HANDLE	1
5	KLC-000005	2.5 MM HEX WRENCH	1
6	KLC-000008	5 MM HEX WRENCH	1
7	KLC-000003	8 MM COMBINATION WRENCH	1
8	KLN-0103-00-00-00-0	WEDGE MT3	1
9	OPK-000001	TOOL CAN	1
10	SKR-0563-12-00-00-0	METAL BOX ASSY	1
11	UCW-0563-20-00-00-0	ARBOR ASSY AMT3-C-19-4	1
12	PRS-000017	EXTERNAL RETAINING RING 25z	1
13	PDK-0234-00-09-00-0	WASHER II	2
14	PRS-000105	SEAL O-RING 25.2x3	2
15	KNC-0234-00-10-00-0	CONNECTOR 4x11.5	1
16	PRT-0151-06-13-00-2	ROD L=35	1
17	TLJ-0284-00-07-00-1	COOLING SLEEVE	1
18	KRP-0563-20-01-00-0	ARBOR BODY AMT3-C-19-4	1
19	WKR-000032	HEX SOCKET SET SCREW WITH FLAT POINT M10x10	2
20	SPR-0563-20-02-00-0	SPRING	1
21	WYP-0563-20-03-00-0	PLUNGER	1
22	USZ-0220-00-04-00-0	SEAL	1
23	PDK-0139-00-04-00-0	WASHER 18.8x10x1	1
24	PRS-000009	INTERNAL RETAINING RING 19w	1
25	ZLC-000299	LOCKING CONNECTOR (115V ONLY)	1
26	OSL-0399-17-00-00-0	SAFETY SPRING	1



ITEM	PART NUMBER	DESCRIPTION	Q-TY
1	SLN-0563-01-00-00-0	MOTOR - 115V	1
1	SLN-0563-01-00-00-1	MOTOR - 230V	1
2	SRB-000114	HEX SOCKET HEAD CAP SCREW M6x20	4
3	PDK-000046	SPRING WASHER 6.1	4

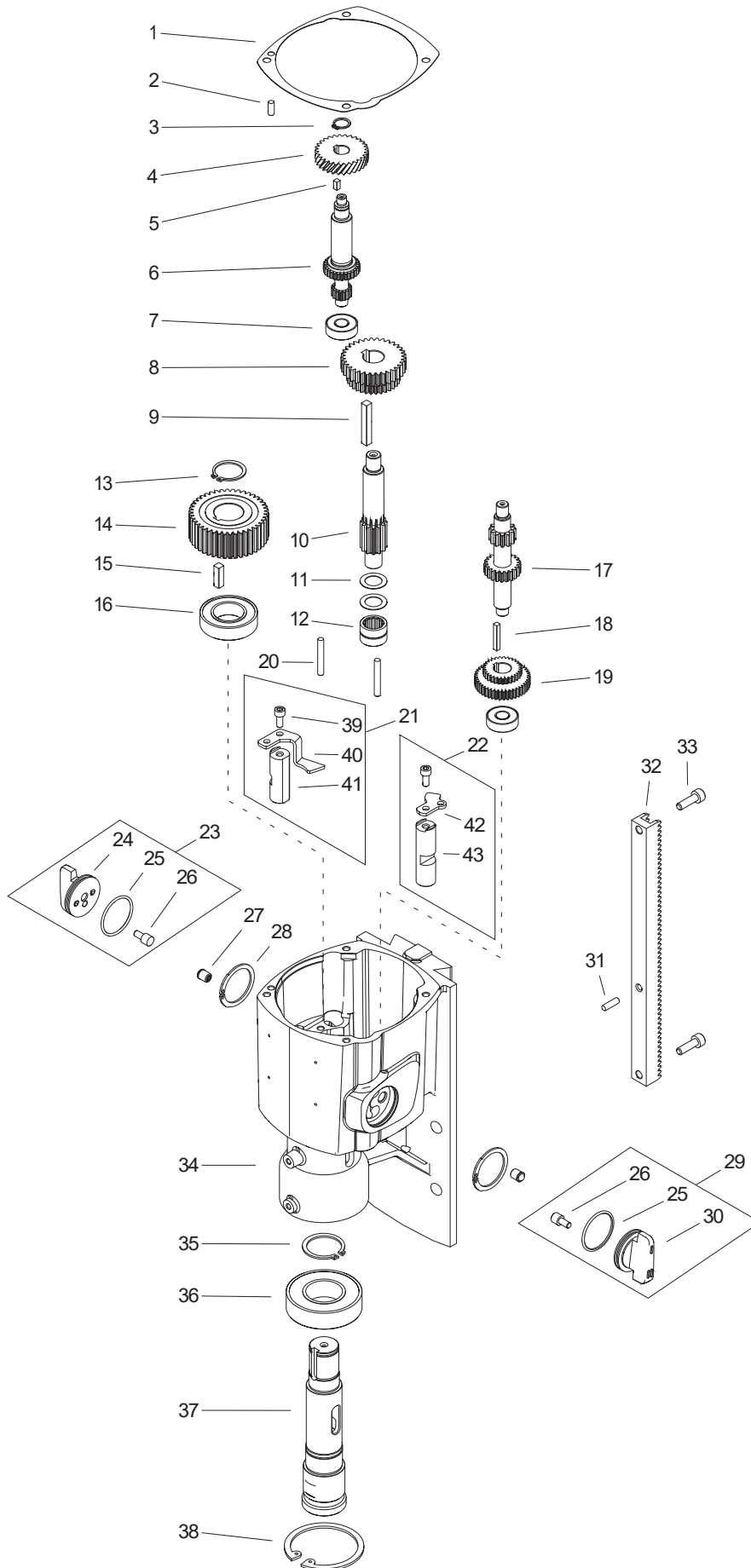
ITEM	PART NUMBER	DESCRIPTION	Q-TY
4	PDK-000136	SMALL ROUND WASHER 6.4	4
5	WKR-000193	CROSS RECESSED PAN HEAD SCREW M4x8	2
6	NKD-0563-06-00-00-0	COOLANT BOOTLE BRACKET	1
7	WKR-000531	HEX SOCKET ROUND HEAD SCREW WITH FLANGE M5x35	2
8	PDK-000151	NYLON WASHER 8.1x14x3	4
9	OSL-0563-05-00-00-0	GUARD	1
10	SPR-000030	PUSH SPRING	2
11	TLJ-0563-04-00-00-0	SLEEVE	2
12	KRP-0563-03-01-00-0	BODY ASSY	1
13	ZSP-0563-02-00-00-0	GEARBOX ASSY	1
14	PLC-0143-03-06-00-3	STOP ROD	1
15	LST-0563-03-01-03-0	GIB	1
16	SRB-000304	LOW HEAD SOCKET CAP SCREW M6x20	5
17	PDK-000048	SPRING WASHER 6.1	5
18	PDK-000136	SMALL ROUND WASHER 6.4	5
19	LST-0563-03-01-02-0	ADJUSTABLE GIB	1
20	SPR-000043	SPRING 1.6x8x14.5	4
21	PRS-000019	EXTERNAL RETAINING RING 28z	1
22	TLJ-000010	SELF-LUBRICATING SLEEVE 28.05x32x16	2
23	SRB-000153	HEX SOCKET HEAD CAP SCREW M8x25	2
24	PDK-000051	SPRING WASHER 8.2	4
25	PDK-000022	ROUND WASHER 8.4	2
26	SRB-000155	HEX SOCKET HEAD CAP SCREW M8x30	2
27	NKR-000015	HEX NUT M5	5
28	WKR-000410	HEX SOCKET SET SCREW WITH FLAT POINT M5x14	5
29	WLK-0563-14-00-00-0	PINION SHAFT	1
30	WZK-0563-03-10-00-0	SAFETY WIRE SET (W3)	1
31	WKR-000292	HEX SOCKET BUTTON HEAD SCREW M4x6	2
32	WKR-000193	CROSS RECESSED PAN HEAD SCREW M4x8	1
33	PDK-000016	ROUND WASHER 4.3	1
34	PDK-000060	EXTERNAL TOOTH LOCK WASHER 4.3	1
35	WBR-000004	DAMPER	3
36	TLJ-000142	SLEEVE 4x12	1
37	PDK-000166	EXTERNAL TOOTH LOCK WASHER 4.3	2
38	WKR-000192	CROSS RECESSED PAN HEAD SCREW M4x6	1
39	MDL-0563-80-03-00-1	ELECTROMAGNETIC BASE MODULE (BB1) – 115V	1
39	MDL-0563-80-03-00-0	ELECTROMAGNETIC BASE MODULE (BB1) – 230V	1
40	WKR-000180	CROSS RECESSED PAN HEAD SCREW M3x5	3
41	MSK-0563-09-01-00-0	PANEL PLATE	1
42	PDK-000161	EXTERNAL TOOTH LOCK WASHER 3.7	4
43	WKR-000415	CROSS RECESSED PAN HEAD SELF-TAPPING SCREW 3.5x13	4
44	PNK-000013	MAGNET SWITCH	1
45	PDS-0563-03-02-00-0	ELECTROMAGNETIC BASE ASSY	1
46	PWD-0563-16-01-00-0	POWER CORD 120V WITH STRAIN RELIEF ASSY (US) (W8)	1
46	PWD-0563-16-02-00-0	POWER CORD 230V WITH STRAIN RELIEF ASSY (EU) (W8)	1
46	PWD-0563-16-03-00-0	POWER CORD 230V WITH STRAIN RELIEF ASSY (AU) (W8)	1
46	PWD-0563-16-04-00-0	POWER CORD 230V WITH STRAIN RELIEF ASSY (INDIA) (W8)	1
46	PWD-0563-16-05-00-0	POWER CORD 230V WITH STRAIN RELIEF ASSY (UK) (W8)	1
47	DLW-000008	CABLE GLAND WITH STRAIN RELIEF PG13,5	1
48	WZK-0242-03-00-00-0	REED WIRES SET (W15)	1



ITEM	PART NUMBER	DESCRIPTION	Q-TY
1	WKR-000529	TORX PAN HEAD SCREW 4x50	4
2	PKR-0563-01-06-00-0	STATOR COVER ASSY	1
3	PKT-0563-01-06-04-0	POTENTIOMETER KNOB	1
4	PTN-000039	POTENTIOMETER ASSY	1
5	OSL-0563-01-06-02-0	BUTTON COVER	1

ITEM	PART NUMBER	DESCRIPTION	Q-TY
6	PKR-0563-01-06-01-0	STATOR COVER	1
7	MDL-0563-80-05-00-0	KEYBOARD MODULE (OB1)	1
8	TLJ-000151	INSULATION SLEEVE 2.6x3.9	4
9	WKR-000458	SCREW FOR PLASTIC 2.2x8	4
10	PRS-000238	EXTERNAL RETAINING RING 16z	2
11	SYG-0563-01-05-01-0	SIGNALLER	1
12	MDL-0563-80-04-00-0	SIGNALING MODULE (LB1)	1
13	WKR-000506	SCREW FOR PLASTIC 3x10	2
14	ZSP-0563-23-00-00-0	ELECTRONIC CONTROL UNIT ASSY (MB1) - 115V	1
14	ZSP-0563-23-00-00-1	ELECTRONIC CONTROL UNIT ASSY (MB1)- 230V	1
15	IMP-000002	PULSE GENERATOR	1
16	WKR-000506	SCREW FOR PLASTIC 3x10	2
17	PKR-0563-01-09-00-0	BRUSH COVER	2
18	WKR-000192	CROSS RECESSED PAN HEAD SCREW M4x6	4
19	PDK-000060	EXTERNAL TOOTH LOCK WASHER 4.3	4
20	PDK-000016	ROUND WASHER 4.3	4
21	SCZ-000035	BRUSH – 115V	2
21	SCZ-000036	BRUSH – 230V	2
22	OBD-0563-99-01-00-0	STATOR HOUSING ASSY – 115V	1
22	OBD-0563-99-01-00-1	STATOR HOUSING ASSY – 230V	1
23	SCT-000013	BRUSH HOLDER	2
24	WKR-000300	SCREW FOR PLASTIC 4x16	4
25	WZK-0563-01-08-00-0	MOTOR WIRE SET (W9)	1
26	OBD-0563-01-07-00-0	FAN COVER	1
27	WKL-000046	BEARING INSERT	1
28	WRN-0563-99-00-00-0	ROTOR ASSY - 115V	1
28	WRN-0563-99-00-00-1	ROTOR ASSY - 230V	1
29	LOZ-000158	BALL BEARING 12x28x8	1
30	PRS-000003	EXTERNAL RETAINING RING 12z	1
31	PKR-0563-01-02-00-0	GEARBOX COVER ASSY	1
32	PRS-000356	INTERNAL RETAINING RING 28w	1
33	LOZ-000158	BALL BEARING 12x28x8	1
34	PKR-0563-01-02-01-1	GEARBOX COVER	1
35	LOZ-000053	BALL BEARING 8x22x7	1
36	LOZ-000162	NEEDLE BEARING 10x14x12	1
37	LOZ-000176	NEEDLE BEARING 12x16x14	1
38	PDK-000017	ROUND WASHER 5.3	4
39	PDK-000044	SPRING WASHER 5.1	4
40	WKR-000525	TORX PAN HEAD TAPPING SCREW 5x30	4
41	PDK-000058	EXTERNAL TOOTH LOCK WASHER 3.2	4
42	WKR-000180	CROSS RECESSED PAN HEAD SCREW M3x5	4
43	WKR-000292	HEX SOCKET BUTTON HEAD SCREW M4x6	4
44	OBD-0563-99-02-00-0	MOTOR COVER WITH STATOR ASSY – 115V	1
44	OBD-0563-99-02-00-1	MOTOR COVER WITH STATOR ASSY – 230V	1
45*	WZK-0563-01-06-07-0	POTENTIOMETER WIRE SET (W6)	1
46*	WZK-0563-01-11-00-0	LED WIRE SET (W4)	1
47*	WZK-0563-01-12-00-0	CONTROLLER WIRE SET (W2)	1
48*	PWD-0563-01-13-00-0	BRUSH HOLDER WIRE (W14)	1
49*	PWD-0563-09-02-00-0	CONTROLLER WIRE SET (W12)	1
50*	PWD-0563-09-03-00-0	CONTROLLER WIRE SET (W13)	1

*not shown in the drawing



ITEM	PART NUMBER	DESCRIPTION	Q-TY
1	USZ-0563-02-17-00-0	BODY SEAL	1
2	KLK-000045	DOWEL PIN 5n6x12	1
3	PRS-000003	EXTERNAL RETAINING RING 12z	1
4	KOL-0563-02-03-02-0	GEAR z29	1
5	WPS-000082	PARALLEL KEY 4x4x8	1
6	WLK-0563-02-02-00-0	CLUTCH SHAFT ASSY	1
7	LOZ-000161	BALL BEARING 10x26x8	2
8	KOL-0563-02-07-00-0	GEAR z32, z32	1
9	WPS-0563-02-19-00-1	PARALLEL KEY 6x6x40	1
10	WLK-0563-02-06-00-0	PINION SHAFT z12	1
11	PDK-0563-02-22-00-0	WASHER 14x22x0.5	2
12	LOZ-000175	NEEDLE ROLLER BEARING 14x22x16	1
13	PRS-000322	EXTERNAL RETAINING RING 24z	1
14	KOL-0563-02-08-00-0	GEAR z42	1
15	WPS-0563-02-18-00-1	PARALLEL KEY 6x6x20	1
16	LOZ-000028	BALL BEARING 25x47x12	1
17	WLK-0563-02-04-00-0	PINION SHAFT z12, z21	1
18	WPS-0563-02-20-00-1	PARALLEL KEY 4x4x25	1
19	KOL-0563-02-05-00-0	GEAR z29, z43	1
20	KLK-000052	DOWEL PIN 5n6x40	2
21	WDZ-0563-02-10-00-0	SHORT SLIPPER ASSY	1
22	WDZ-0563-02-11-00-0	LONG SLIPPER ASSY	1
23	PKT-0563-02-12-00-0	SHORT SHIFT KNOB ASSY	1
24	KRP-0563-02-12-01-1	SHORT SHIFT KNOB	1
25	PRS-000327	OS-RING 32x2	2
26	KLK-0599-02-09-02-0	KNOB PIN	2
27	ZTR-000001	BALL LOCK 8	2
28	PRS-000346	INTERNAL RETAINING RING 36w	2
29	PKT-0563-02-13-00-0	LONG SHIFT KNOB ASSY	1
30	KRP-0563-02-13-01-1	LONG SHIFT KNOB	1
31	KLK-000047	DOWEL PIN 5n6x16	1
32	LST-0563-02-15-00-0	GEAR RACK	1
33	SRB-000114	HEX SOCKET HEAD CAP SCREW M6x20	2
34	KRP-0563-02-01-01-1	GEARBOX BODY	1
35	PRS-000021	EXTERNAL RETAINING RING 30z	1
36	LOZ-000075	BALL BEARING 30x62x16	1
37	WRZ-0563-02-09-00-0	SPINDLE	1
38	PRS-000035	INTERNAL RETAINING RING 62w	1
39	SRB-000078	HEX SOCKET HEAD CAP SCREW M5x12	2
40	ZCZ-0563-02-10-02-0	SHORT SLIPPER BRACKET	1
41	WLK-0563-02-10-01-0	SHORT SLIPPER SHAFT	1
42	ZCZ-0563-02-11-02-0	LONG SLIPPER BRACKET	1
43	WLK-0563-02-11-01-0	LONG SLIPPER SHAFT	1
44*	SMR-000001	GREASE	1

*not shown in the drawing