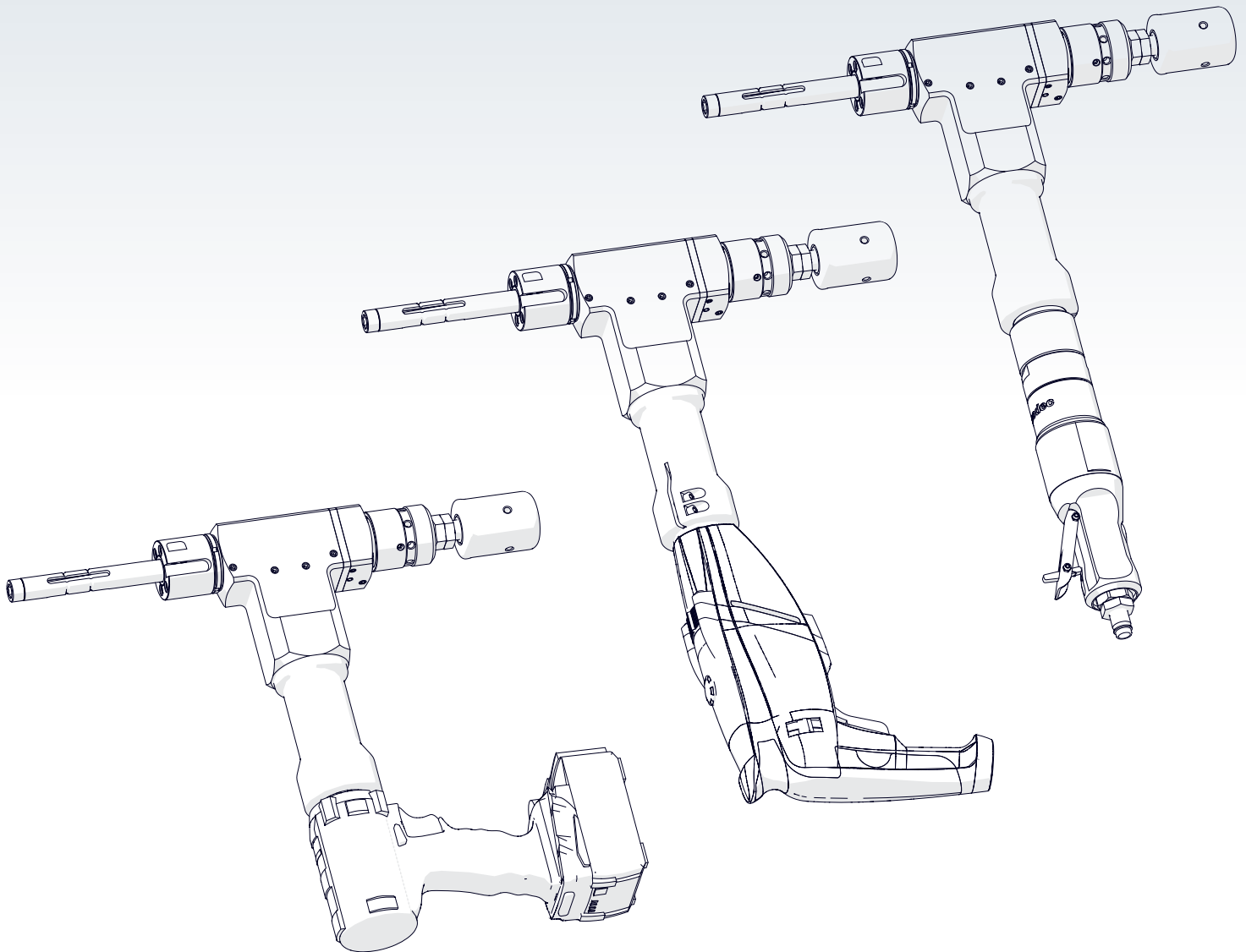




# PRO 2 PB PIPE BEVELLER

OPERATOR'S MANUAL



**WA-PRO2PB**

**Ver: 1.0**

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This warranty is void if the item has been damaged by accident, neglect, improper service or other causes not arising out of defects in materials or workmanship. This warranty does not apply to machines and/or components which have been altered, changed, or modified in any way, or subjected to overloading or use beyond recommended capacities and specifications. Worn componentry due to normal wear and tear is not a warranty claim. Goods returned defective shall be returned prepaid freight to ITMS or agreed repair agent, which shall be the buyer's sole and exclusive remedy for defective goods. ITMS accepts no additional liability pursuant to this guarantee for the costs of travelling or transportation of the product or parts to and from ITMS or the service agent or dealer, such costs are not included in this warranty.

Our goods come with guarantees which cannot be excluded under the Australian Consumer Law. You are entitled to replacement or refund for a major failure and to compensation for other reasonably foreseeable loss or damage. You are also entitled to have the goods repaired or replaced if the goods fail to be of acceptable quality and the failure does not amount to a major failure.

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## 1. GENERAL INFORMATION

### 1.1. Application

The PRO 2 PB is a pipe bevelling machine designed to mill pipes made of mild and stainless steel, aluminum alloys, and copper-nickels. The machine can face and bevel pipes from inner diameters (ID) of 22 mm (0.86") to outer diameters (OD) of 48 mm (1.89").

An optional small mandrel set allows you to bevel pipes from inner diameters of 15.5 mm (0.61") to outer diameters of 29 mm (1.14"). An optional extension set allows you to bevel pipes from inner diameters of 42 mm (1.65") to outer diameters of 60.3 mm (2.37").

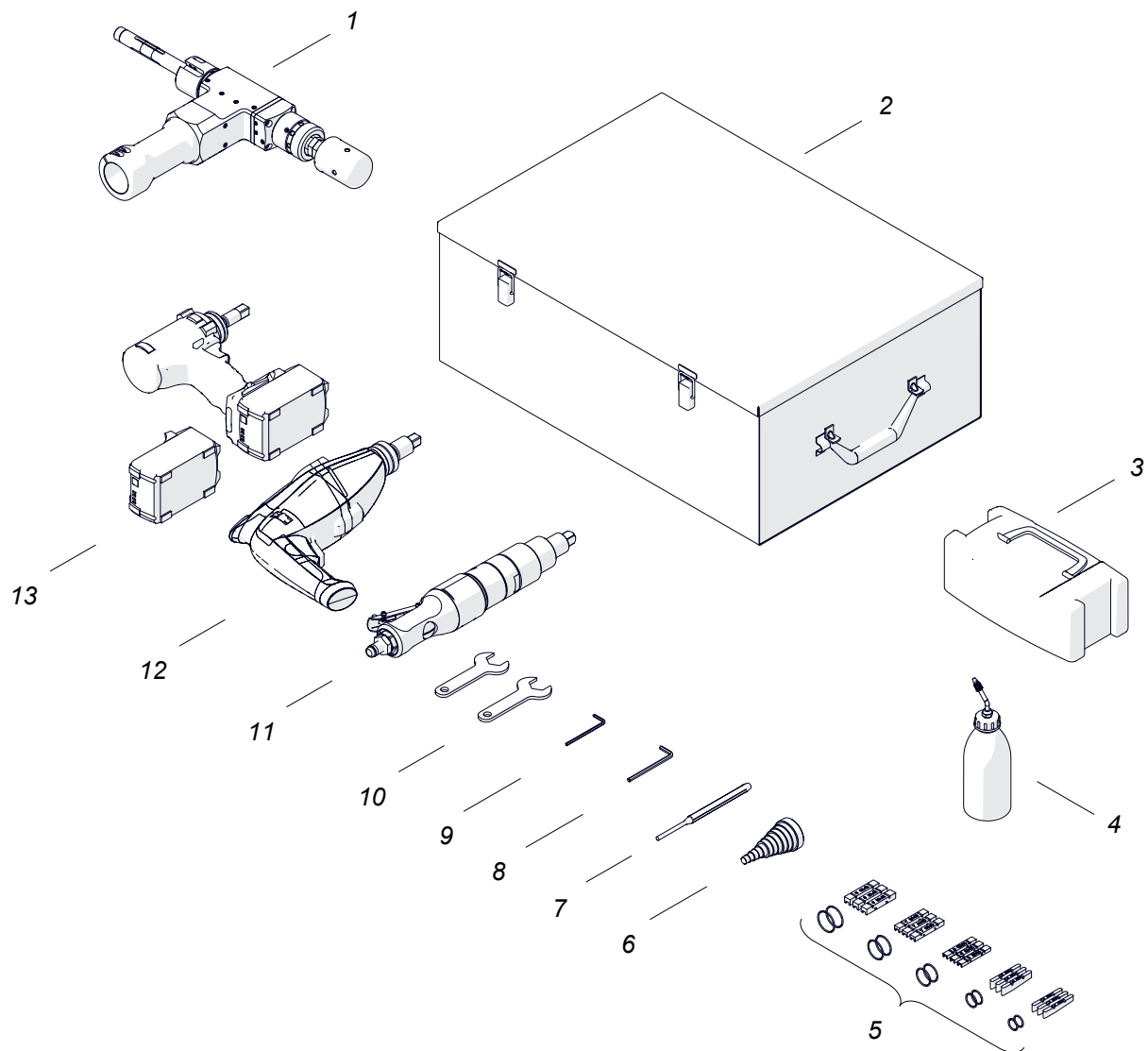
### 1.2. Technical data

	PRO 2 PB with air motor	PRO 2 PB with electric motor	PRO 2 PB with battery motor
Motor	Pneumatic Motor Air Requirement: 0.6 MPa (87 psi) Air Consumption: 1400 l/min (50 CFM) Power: 800 W Part# <b>WAP-B05/100</b>	Electric Motor Voltage: 1~ 220-240V, 50-60Hz Power: 1100 W Part# <b>WAP-B02/105</b>	Battery Powered Motor Voltage: 18V DC 5.2Ah Part# <b>WAP-B02/108</b>
Connection	CEJN 410 DN 10.4 R 1/2" BSPT fitting for quick-coupling	Electrical plug	Battery socket
Pipe diameter	22 mm ID–48 mm OD 15.5 mm ID–29 mm OD* 42 mm ID–60.3 mm OD**	22 mm ID–48 mm OD 15.5 mm ID–29 mm OD* 42 mm ID–60.3 mm OD**	22 mm ID–48 mm OD 15.5 mm ID–29 mm OD* 42 mm ID–60.3 mm OD**
Maximum pipe wall thickness	8 mm 3.5 mm*	8 mm 3.5 mm*	8 mm 3.5 mm*
Rotational speed without load	210 rpm	10–134 rpm (gear 1) 30–377 rpm (gear 2)	10–60 rpm (gear 1) 30–205 rpm (gear 2)
Nominal rotational speed	105 rpm	10–134 rpm (gear 1) 30–377 rpm (gear 2)	10–60 rpm (gear 1) 30–205 rpm (gear 2)
Protection class	–	II	–
Required ambient temperature	0–40°C (34–104°F)	0–40°C (34–104°F)	0–40°C (34–104°F)
Weight with motor	7.6 kg (17 lbs)	7.4 kg (16.5 lbs)	6.5 kg (14.5 lbs), includes battery

\* With an optional small mandrel set (WAP-B02/150).

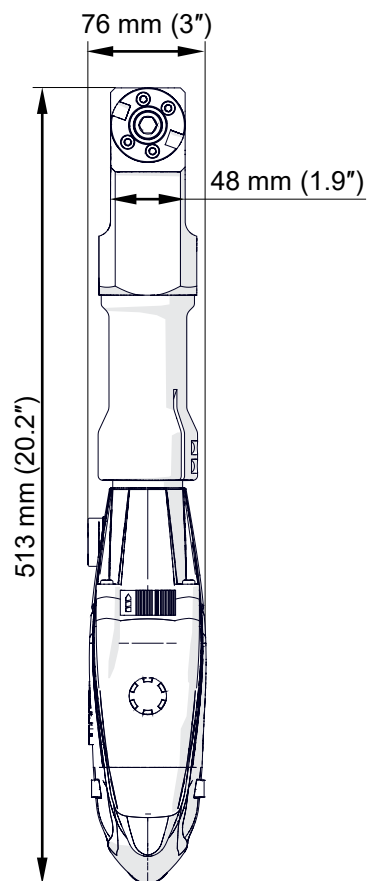
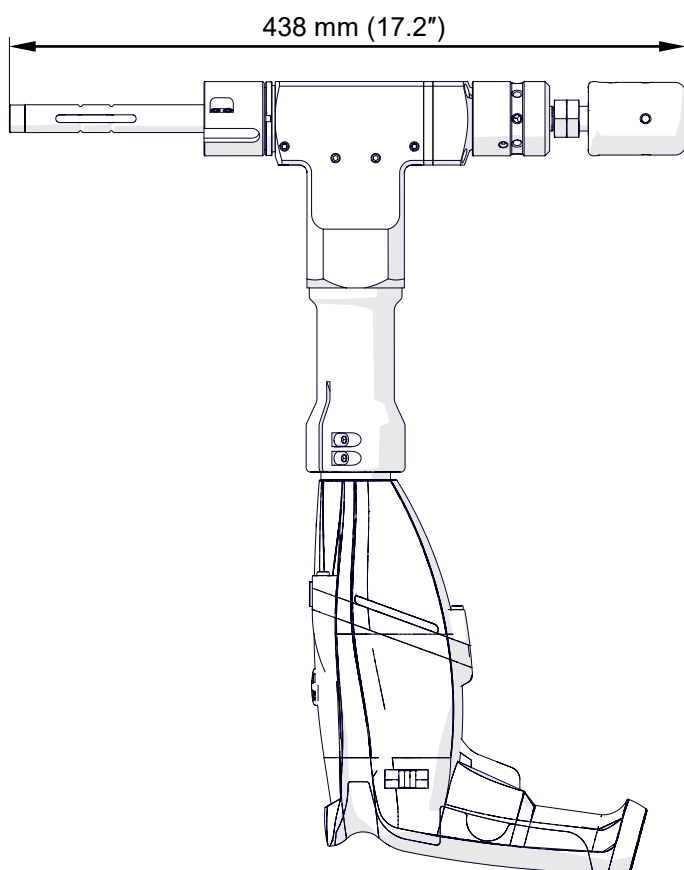
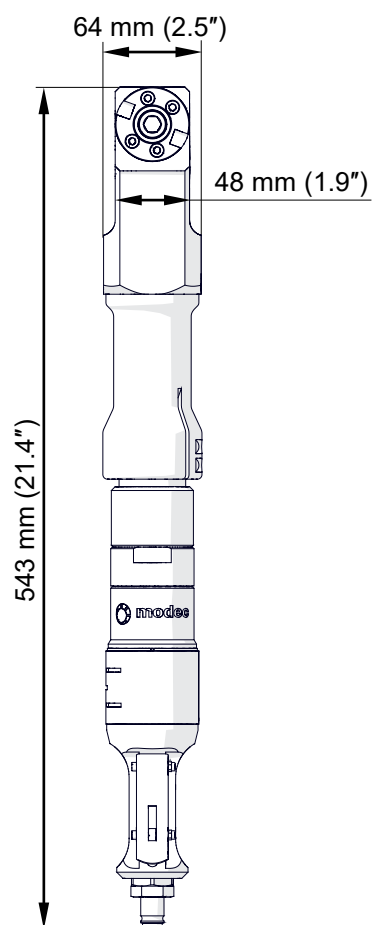
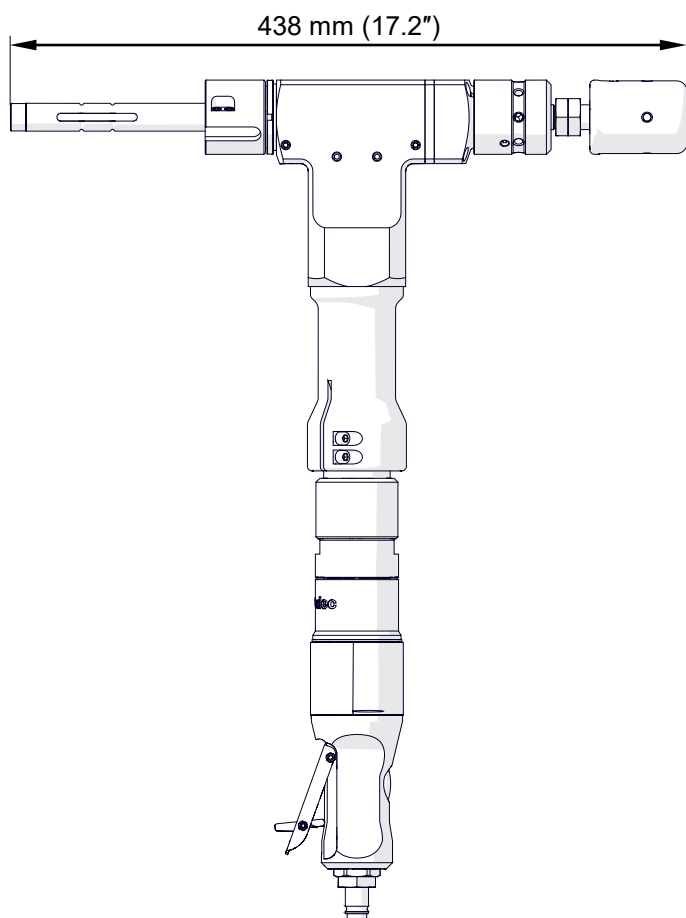
\*\* With an optional extension set (WAP-B02/130).

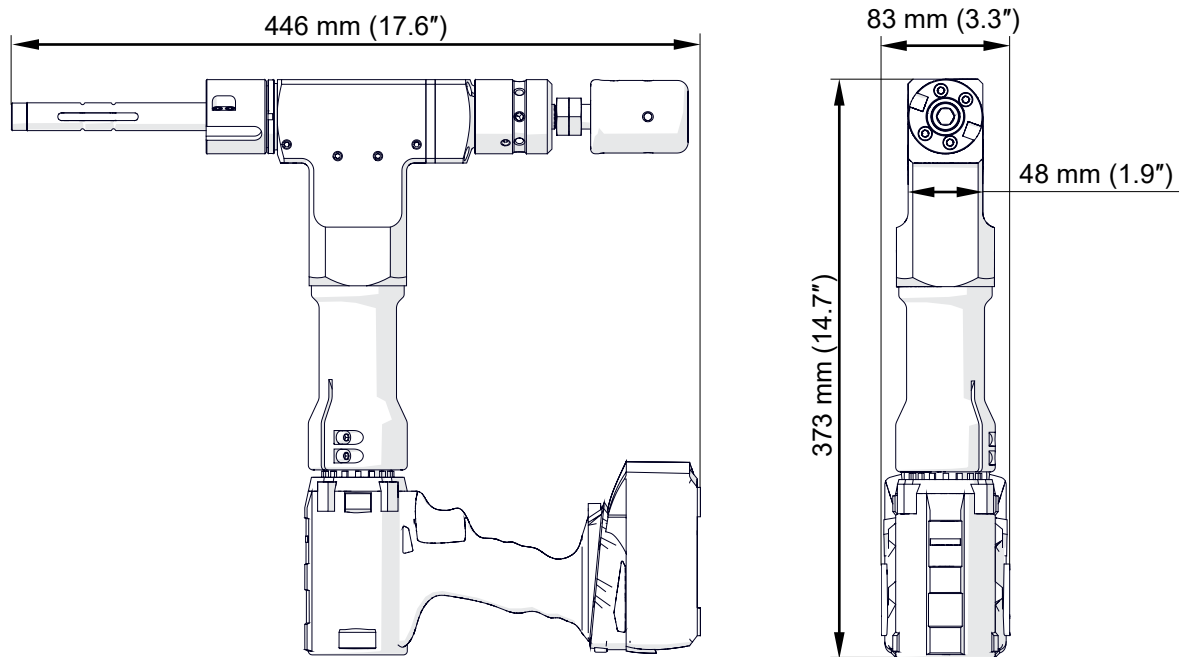
### 1.3. Equipment included



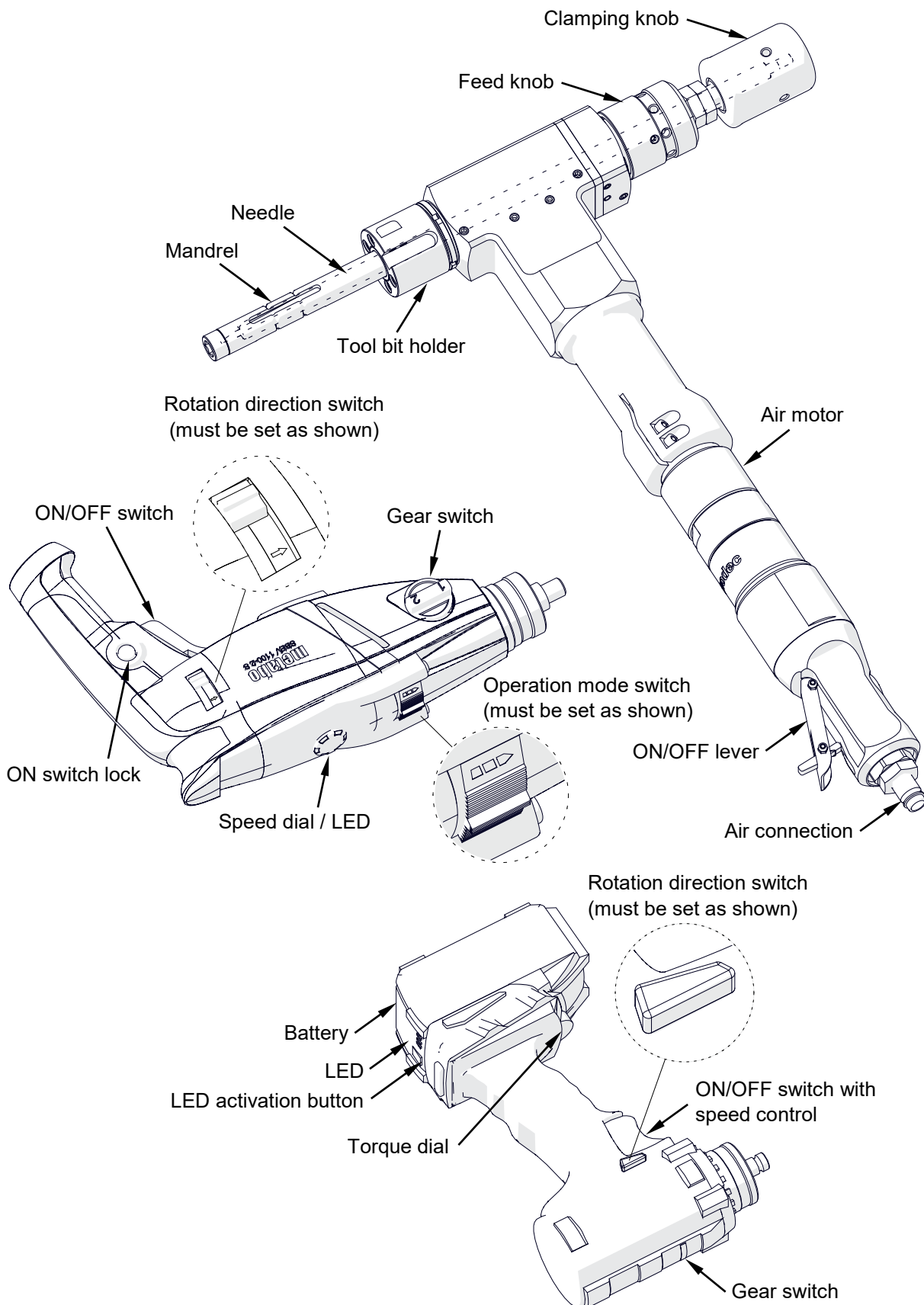
1	Beveling machine (without tool bits)	1 unit
2	Metal box	1 unit
3	Tool container	1 unit
4	Coolant container with nozzle	1 unit
5	2 sets of jaws (no. 4, 5), 3 sets of jaw blocks (no. 6, 7, 8), and 5 sets of springs (no. 4, 5, 6, 7, 8) for standard mandrel	1 set
6	Spring gauge	1 unit
7	Handle	1 unit
8	4 mm hex wrench	1 unit
9	3 mm hex wrench	1 unit
10	24 mm flat wrench	2 units
11	Air motor	<i>option</i>
12	Electric motor	<i>option</i>
13	Battery motor	<i>option</i>
–	Operator's Manual	1 unit

## 1.4. Dimensions





## 1.5. Design



**Fig. 1.** View of the machine with air motor and of the electric and battery motor

## **2. SAFETY PRECAUTIONS**

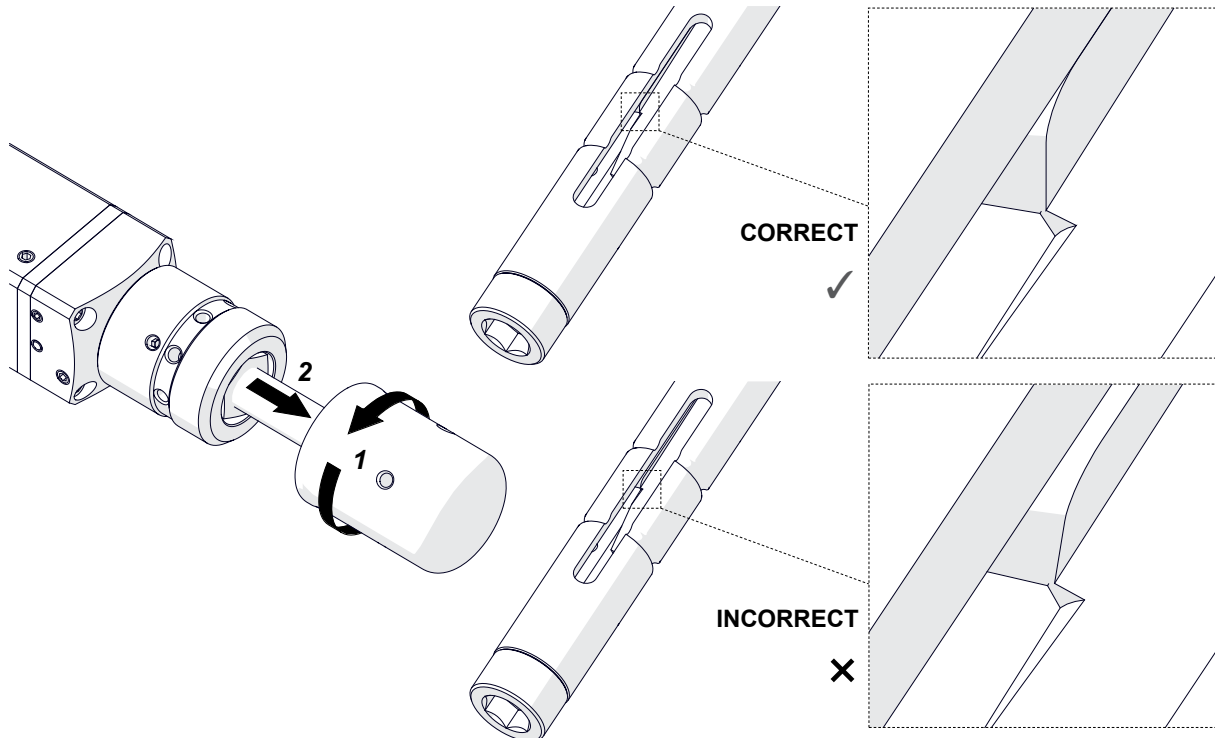
1. Before use, read this Operator's Manual and complete a training in occupational safety and health.
2. Use only motors specified in the technical data.
3. Use only in applications specified in this Operator's Manual.
4. Make sure that the machine has all parts and they are genuine and not damaged.
5. Make sure that the specifications of the air (power) source are the same as those specified on the rating plate.
6. Supply the machine with air motor only with clean and lubricated air. Make sure that the air source has an air preparation unit that contains a filter, regulator, and lubricator.
7. Do not pull the hose (cord). This can cause damage and serious injury.
8. Keep untrained bystanders away from the machine.
9. Before each use, ensure the correct condition of the machine, air (power) source, supply hose (power cord, battery), coupling (plug), control parts, and tool bits.
10. 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.
11. Avoid accidental starts. Do not put the machine so that the motor will start. Do not carry the machine with air motor by holding the ON/OFF lever.
12. Keep the machine dry. Do not expose the machine to rain, snow, or frost.
13. Keep the work area well-lit, clean, and free of obstacles.
14. Do not use machine near flammable materials, or in explosive environments.
15. Attach the pipe so that it will not fall or roll.
16. Use only tool bits specified in this Operator's Manual.
17. Do not use tool bits that are dull or damaged.
18. Attach the tool bits with two set screws. Remove wrenches from the work area before you connect the machine to the air (power) source.
19. Use eye and ear protection, protective footwear, and protective clothing. Do not use loose clothing.
20. Use an electric/battery motor only after you set the rotation direction switch and operation mode switch as shown in Fig. 1. Using left rotation or impulse mode (switches set to the opposite positions) can damage the machine.

21. Do not touch chips or moving parts. Do not let anything catch in moving parts.
22. After each use, remove chips and coolant from the machine. Do not remove chips with bare hands. Clean the machine with a cotton cloth and no chemical agents.
23. Maintain the machine and install/remove parts and tool bits only after you unplug the machine from the air (power) source or remove the battery.
24. Repair only in a service center appointed by the seller.
25. If the machine falls, is wet, or has any damage, stop the work and promptly send the machine to the service center for check and repair.
26. Do not leave the machine when it operates.
27. If you are not going to use the machine, remove the tool bits from the sockets. Then, remove the machine from the worksite and keep it in a safe and dry place.
28. 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 jaws and the jaw blocks

Retract the needle (1, 2, Fig. 2) and use a small wrench to align the needle socket with the mandrel hole.



**Fig. 2.** Aligning the needle socket

Use a dry cloth to clean all needle sockets and mandrel holes. Lubricate them each time before you install jaws and after each 50 work hours.

Use the table that follows to select the correct jaws, jaw blocks, and springs for the diameter of the pipe. To see what the spring number is, put the spring on the spring gauge.

Pipe inner diameter		Jaw number	Jaw block number	Spring number
[mm]	[in]			
15.5–19 *	0.61–0.75	1	–	1
19–22 *	0.75–0.86	2	–	2/4
22–26	0.86–1.02	4	–	2/4
26–30	1.02–1.18	5	–	5
30–34	1.18–1.34	5	6	6
34–38	1.34–1.49	5	7	7
38–42	1.49–1.65	5	8	8
42–46 **	1.65–1.81	5	9	9
46–50 **	1.81–1.97	5	10	10
50–54 **	1.97–2.12	5	11	11
54–58 **	2.12–2.28	5	12	12

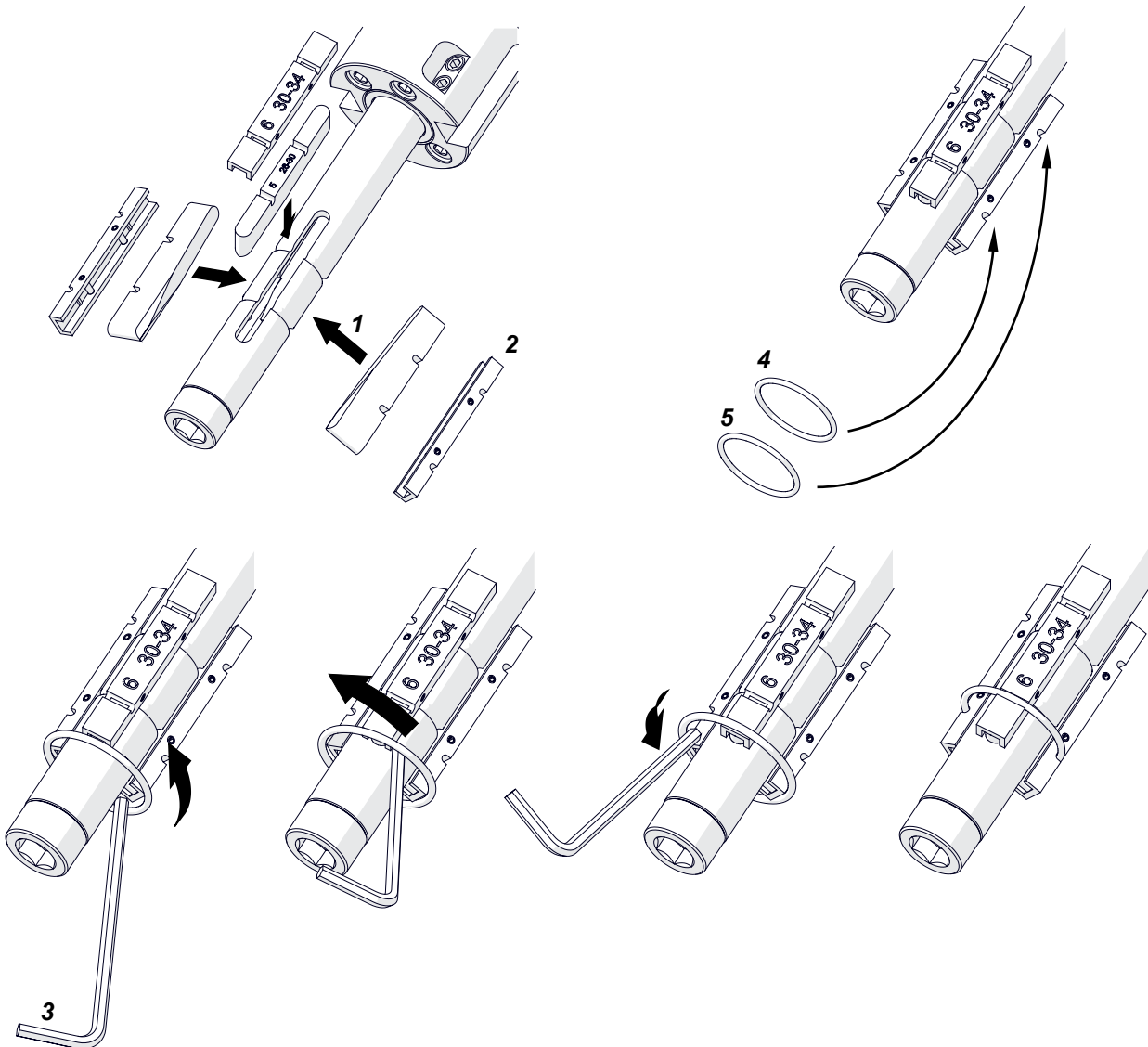
\* With an optional small mandrel set (WAP-B02/150)

\*\* With an optional extension set (WAP-B02/130)

Put the jaws into the mandrel holes (1, Fig. 3). Make sure that the jaws are in the holes. Put the jaw blocks (2) on the jaws. Hold the jaws/blocks and move the smallest wrench (3) spirally to put the springs (4, 5) on the jaws/blocks. Do not stretch the spring more than it is needed to install the jaws/blocks.



**Too much stretch will cause damage to the spring.**



**Fig. 3.** Installing the jaws and the jaw blocks

### 3.2. Installing the tool bits

Put the facing tool bit and the bevelling tool bit into the sockets of the tool bit holder (1, Fig. 4). Point the blades in the rotation direction (2). Next, use the 3 mm hex wrench and the screws (3, 4) to attach the tool bits. Make sure that the pressing surfaces of the screws are in full contact with the tool bits. Make sure that the screws are tight. Adjust the facing tool bit as shown (5). To remove the tool bit, loosen the screw (3) first.

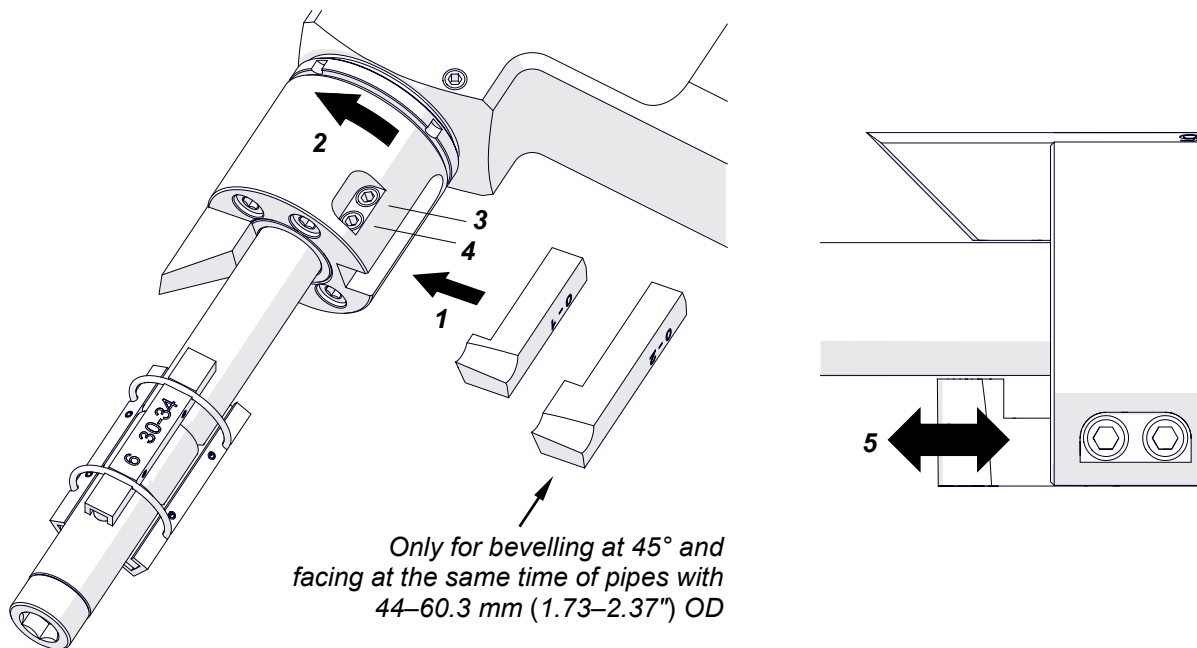
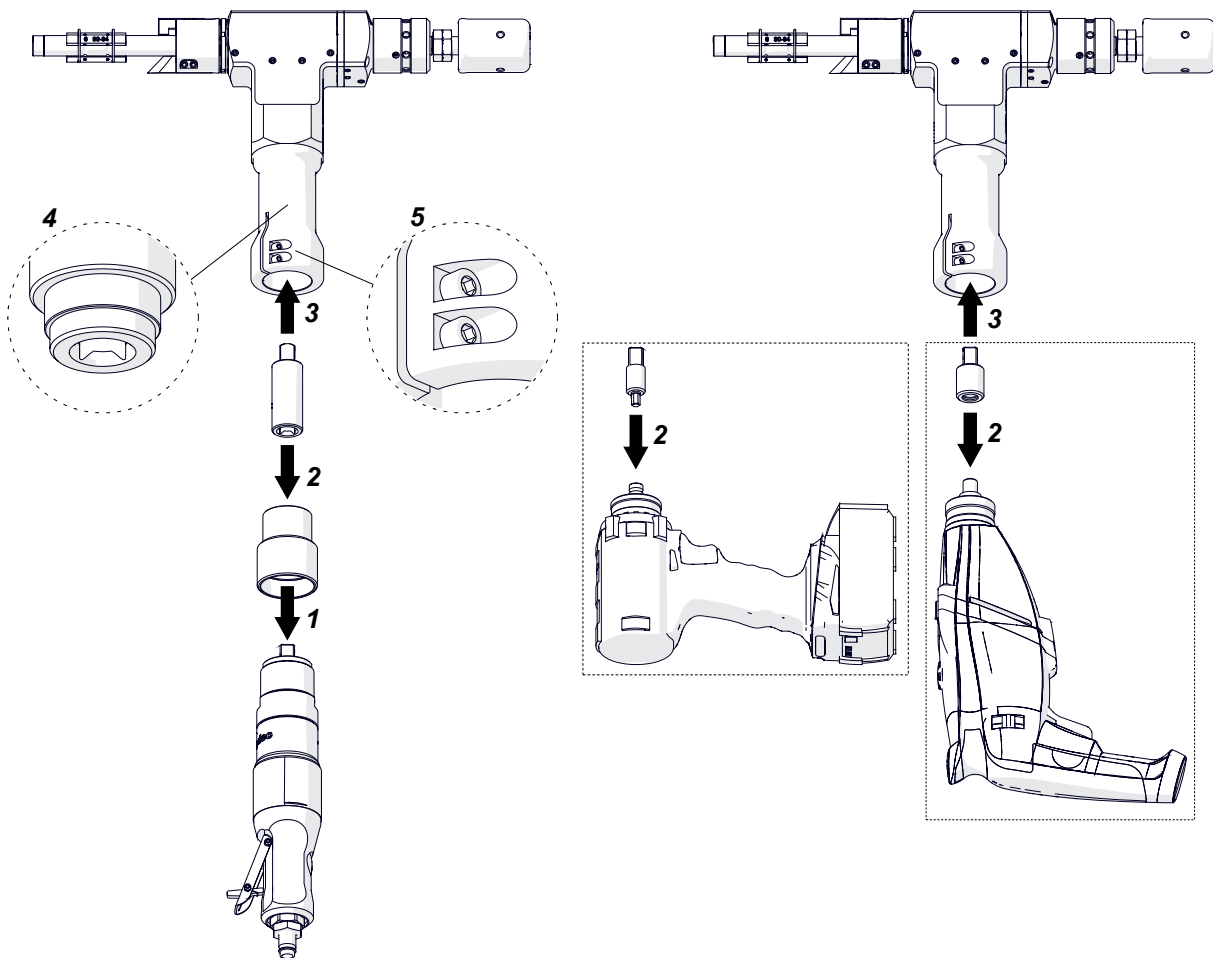


Fig. 4. Installing the tool bits

### 3.3. Installing the motor

When using the air motor, attach the adapter (1, Fig. 5). Attach the correct driver to the motor (2). Put the motor into the machine (3) so that the driver is in the socket (4). Then, use the 4 mm hex wrench to tighten the screws (5).

In the electric/battery motor, set the rotation direction switch as shown in Fig. 1. In the battery motor, set the rotation direction switch and the operation mode switch as shown in Fig. 1.



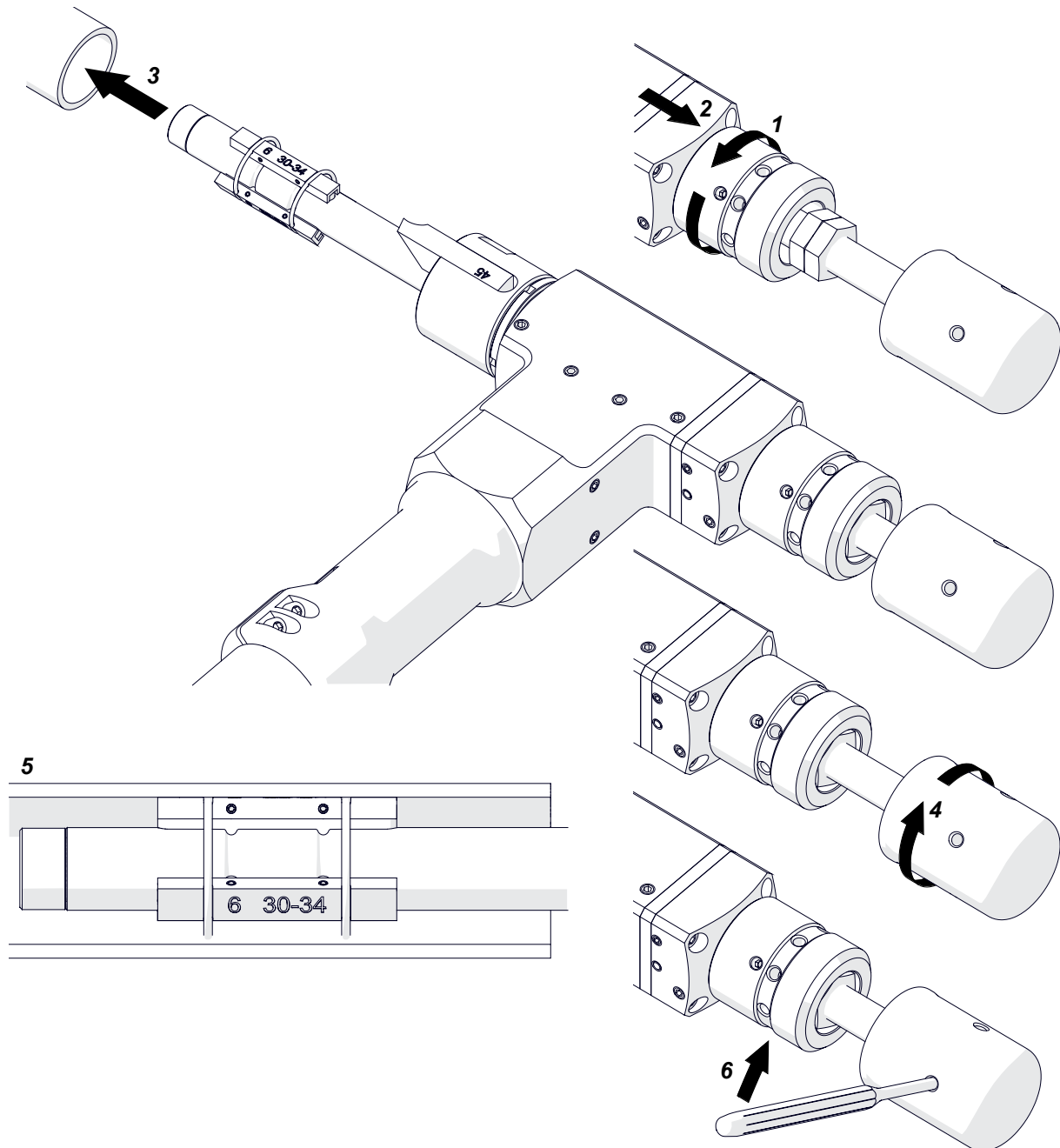
**Fig. 5.** Installing the air, electric, and battery motor

### 3.4. Clamping the machine into the pipe

Rotate the feed knob (1, Fig. 6) to retract the machine to the required start point of the feed (2). Put the machine into the pipe (3) to set the tool bits at least 3 mm (0.12") from the pipe end. Next, rotate the clamping knob (4) to expand the jaw blocks and clamp the machine into the pipe (5).



**Use the handle (6) to tighten the clamping knob.**



**Fig. 6.** Clamping the machine into the pipe

### **3.5. Preparing the air (for machine with air motor)**

Connect the machine to a correctly prepared air source of sufficient purity. Make sure that all inner diameters of the air source (including the supply hose and fittings) are of at least 10 mm (0.4"). Make sure that the air source has an air preparation unit that contains a filter, regulator, and lubricator (FRL).

Maintain the FRL unit as required. 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 oil whose ignition temperature is more than 260°C (500°F). If you are not going to use the machine for at least 24 hours, increase the supply of oil and let the motor operate for 2–3 seconds. This will prevent rusting and degrading of the rotor vanes.

### 3.6. Operating

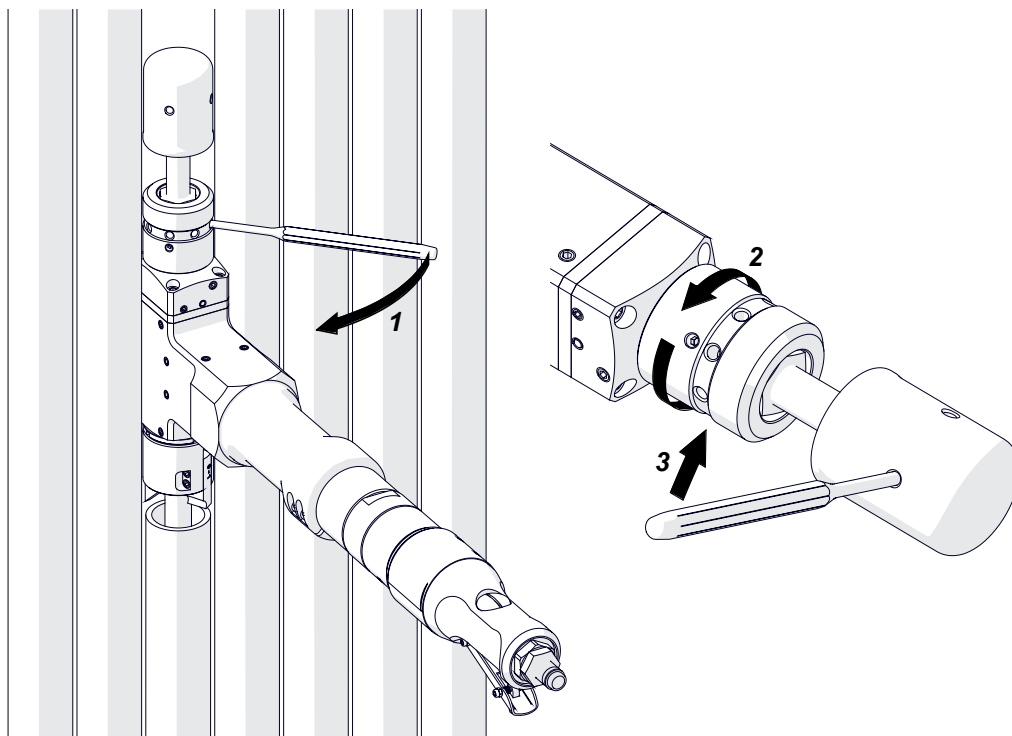
After you connect the machine to the correct supply, press the ON/OFF lever to start.

In the electric/battery motor, set the gear 1. In the battery motor, set the gear 1 and the maximum torque, and then press and hold the ON/OFF switch. To lock the switch in the position ON (not available in the battery motor), press the ON switch lock before you release the ON/OFF switch. To adjust the speed, use the dial or, in the battery motor, change the force you apply on the ON/OFF switch.

Apply the coolant on the working edge. Then, rotate the feed knob to the right to bring the tool bits close to the pipe. If needed, put the handle into the knob hole and rotate the handle to start the feed (1, Fig. 7).



**After some rotations, retract the tool bits from the workpiece (2). Then, use the handle to tighten the knob and remove the clearance (3).**



**Fig. 7. Using the handle**

If the pipe end is not perpendicular to the pipe axis, the tool bit will cut only a small part of the pipe during initial rotations. Thus, use a low feed rate until the tool bit is in continuous contact with the pipe during at least one rotation. The feed rate is 1.5 mm (0.06") per one full turn of the feed knob.

Rotate the feed knob to the right to continue machining. Use such a feed rate so that the chip is continuous. If the feed rate is too low, only small chips are removed. If the feed rate is too high, machining is difficult and the chips are rough or torn.

Do not allow the tool bit to burnish the surface. If chatter problems occur, decrease the feed rate and the speed. Then, make sure that the tool bits are sharp and that you use the tool bits of correct type for the material. Stainless steel can harden during work. Thus, cut stainless steel with a high enough feed, 0.08–0.15 mm (0.003–0.006") per rotation, to cut under the hardened surface.



**If an overload occurs and the rotation stops, promptly turn off the motor. The motor turned off too late can cause damage to the machine.**

To start the work again, rotate the feed knob to the left to retract the tool bits from the pipe. Then, start the motor and cut the material with a lower feed rate. Do not let the motor overload. If possible, cut hard materials with a low feed rate and speed.

After the pipe end is machined fully, stop rotating the feed knob and allow several more turns of the spindle to improve the finish of the surface. Then, use the ON/OFF lever/switch to turn off the motor, and wait until the rotation stops. Next, rotate the feed knob to the left to move the tool bits away from the pipe end to at least 3 mm (0.12"). Then, rotate the clamping knob to the left to release the clamping, and remove the machine from the pipe.

Use petroleum ether to clean the pipe from excess coolant. Clean the machine with a cotton cloth and no chemical agents.

### **3.7. Troubleshooting the electric motor**

If the LED is on, the motor power has been decreased. This prevents overheating of the motor as a result of frequent overload. To decrease the temperature of the motor, let the motor operate with no load at the maximum speed.

If the LED flashes fast, the automatic restart has been prevented after a power failure. Then, to start the motor, switch it off and on.

If the LED flashes slow, the carbon brushes are almost worn and the motor has been shut off. Replace the brushes with new ones specified by the manufacturer of the motor.

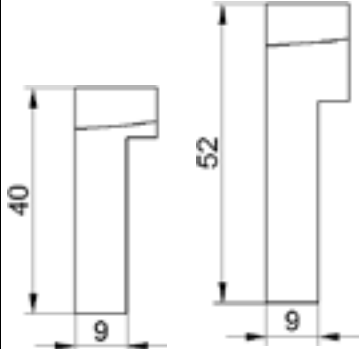
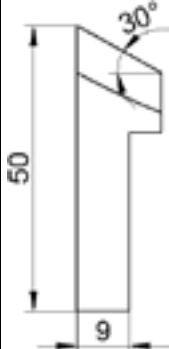
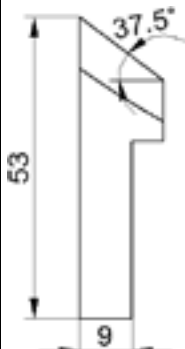
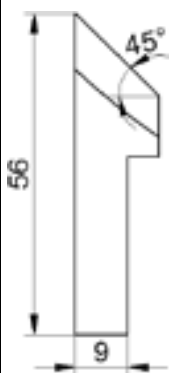
### **3.8. Troubleshooting the battery motor**

If the motor is frequently overloaded for extended periods, it will be shut off. To stop the beeping signal, release the ON/OFF switch. If you feel that the motor or the battery is warm, before use wait until its temperature decreases. To decrease the temperature more quickly, let the motor operate with no load at the maximum speed.

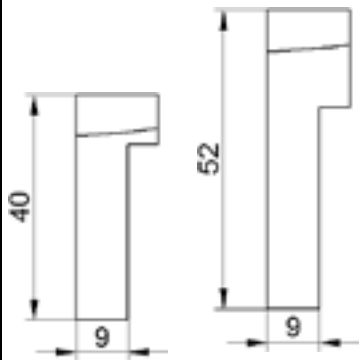
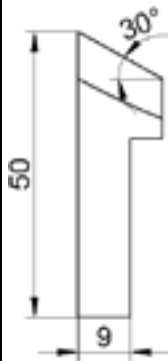
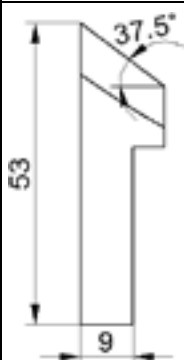
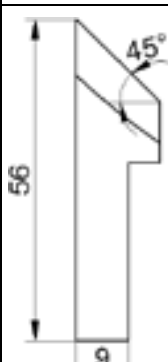
If the LED flashes, the battery is almost discharged. To check the charge level, press the LED activation button. If the battery is discharged fully, charge the battery or replace to a fully charged.

## 4. ACCESSORIES

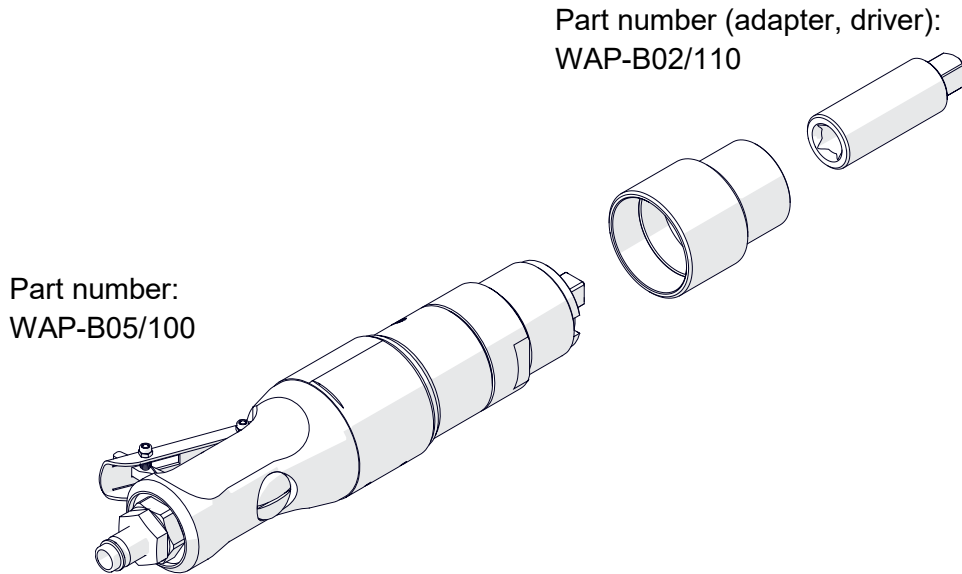
### 4.1. Tool bits for carbon steel

WAP-B02/F040	0-1 short 0° facing tool bit	
WAP-B02/F052	0-2 long 0° facing tool bit	
WAP-B02/B3050	30° bevelling tool bit	
WAP-B02/B37553	37.5° bevelling tool bit	
WAP-B02/B4556	45° bevelling tool bit	

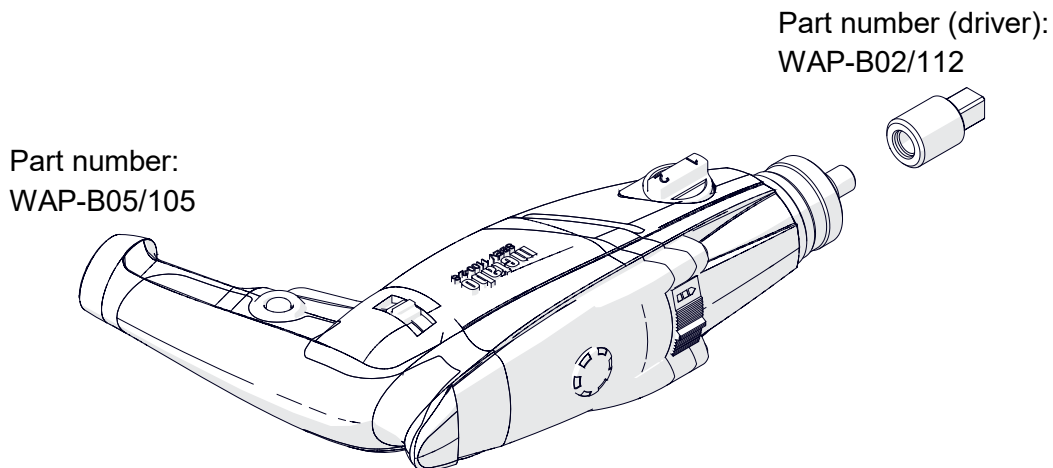
## 4.2. Tool bits for stainless steel

WAP-B02/F040T	0–1 short 0° facing tool bit (TiAlN coated)	
WAP-B02/F052T	0–2 long 0° facing tool bit (TiAlN coated)	
WAP-B02/B3050T	30° bevelling tool bit (TiAlN coated)	
WAP-B02/B37553T	37.5° bevelling tool bit (TiAlN coated)	
WAP-B02/B4556T	45° bevelling tool bit (TiAlN coated)	

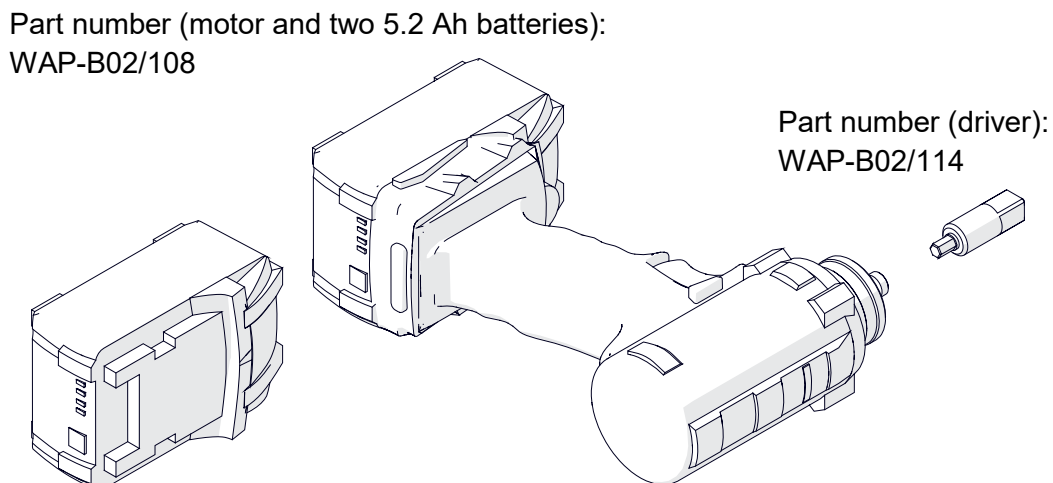
### 4.3. Air motor



### 4.4. Electric motor

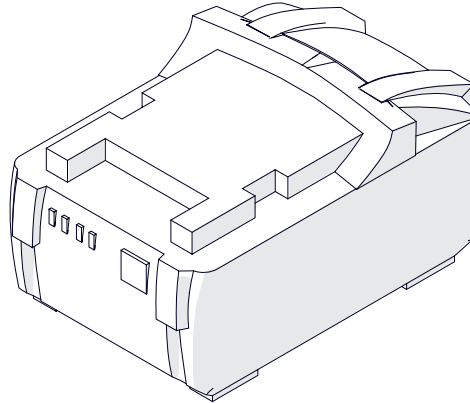


### 4.5. Battery motor



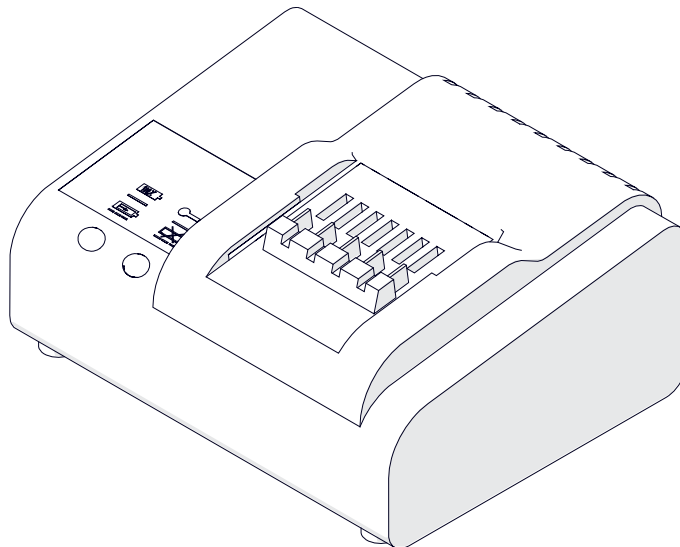
#### 4.6. 5.2 Ah battery

Part number:  
AKM-000088



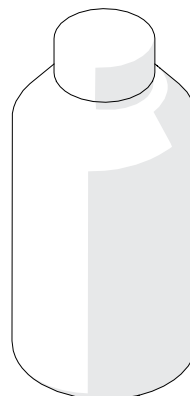
#### 4.7. Battery charger

Part number:  
LDW-000011 (230 V AU)



#### 4.8. Coolant

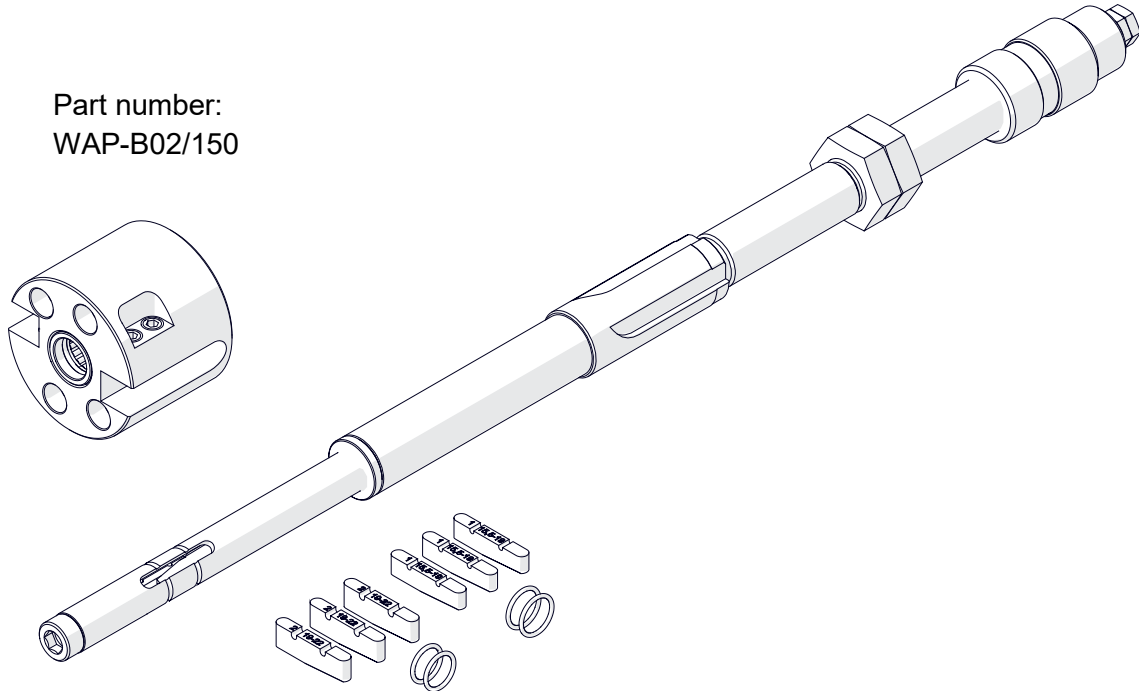
Part number:  
SPFLUID (0.5 kg, 1.1 lbs)  
SPFLUID1 (1 kg, 2.2 lbs)  
SPFLUID5 (5 kg, 11 lbs)



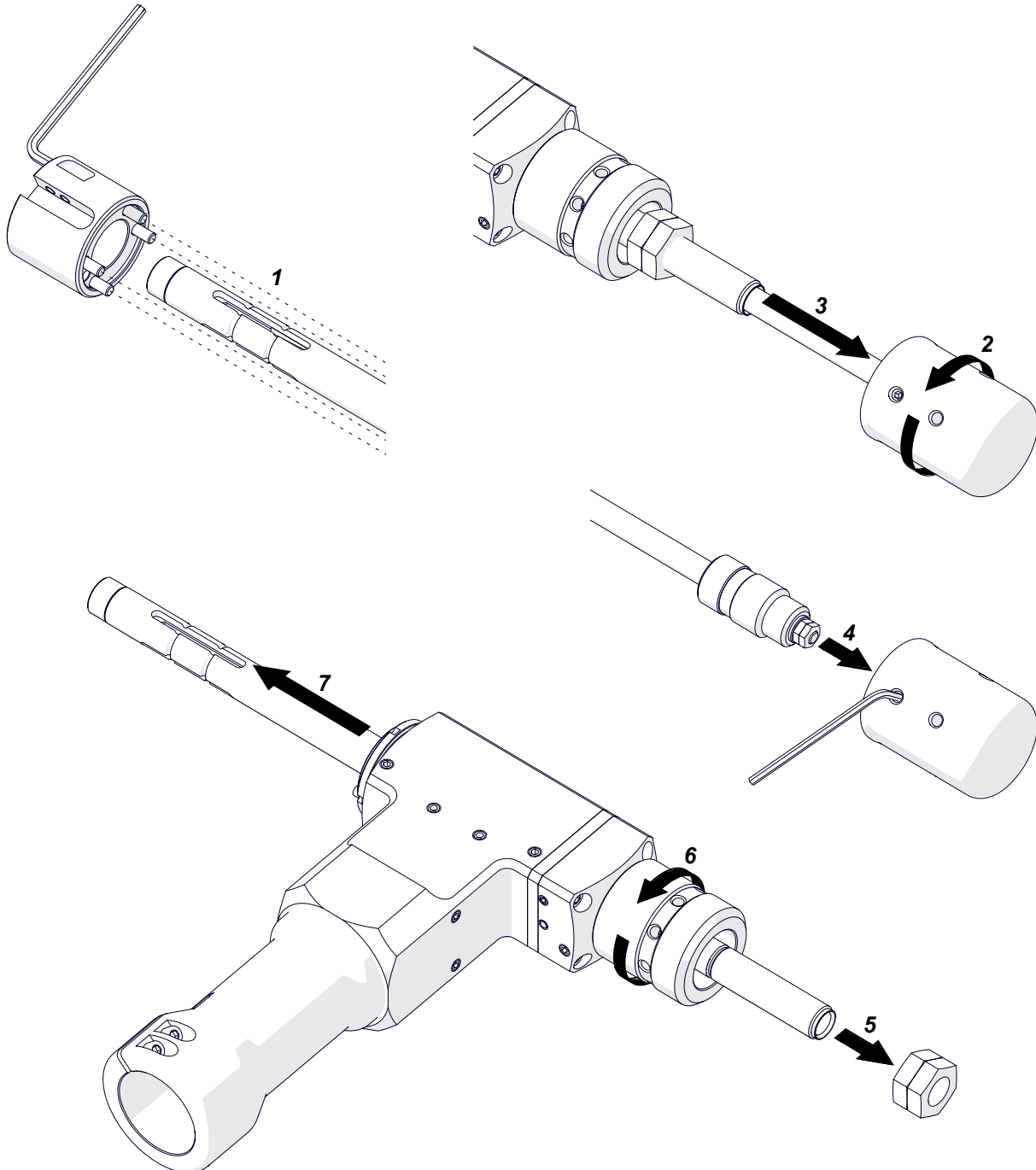
## 4.9. Small mandrel set

Allows you to machine pipes from inner diameters of 15.5 mm (0.61") to outer diameters of 29 mm (1.14").

Part number:  
WAP-B02/150

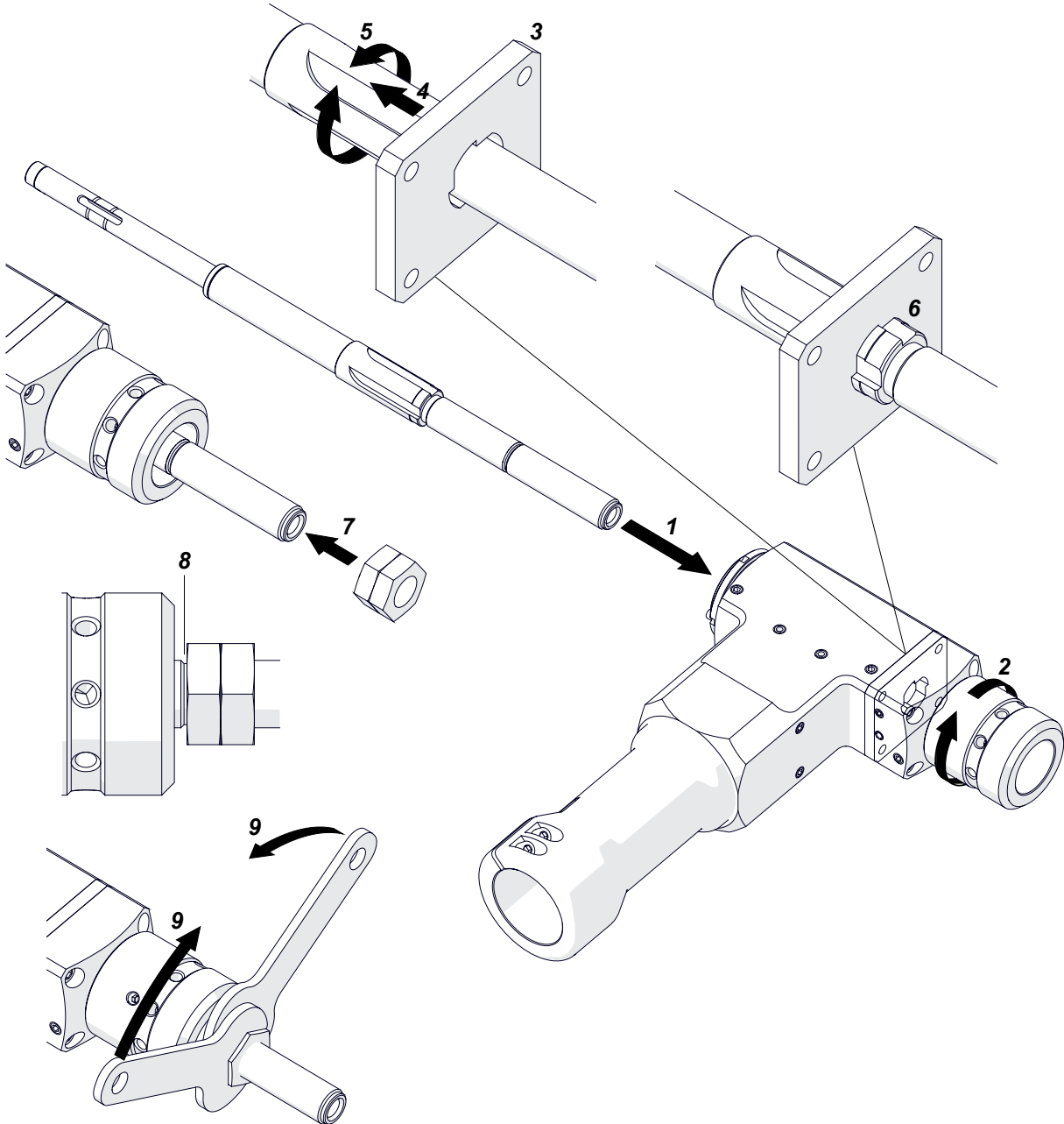


To install, use the 4 mm hex wrench and unscrew the tool bit holder (1, Fig. 8). Then, remove the clamping knob (2) with the needle (3). Use the 3 mm hex wrench to loosen the screw and remove the knob from the needle (4). Remove the nuts from the mandrel (5), and then rotate the knob (6) to remove the mandrel (7).



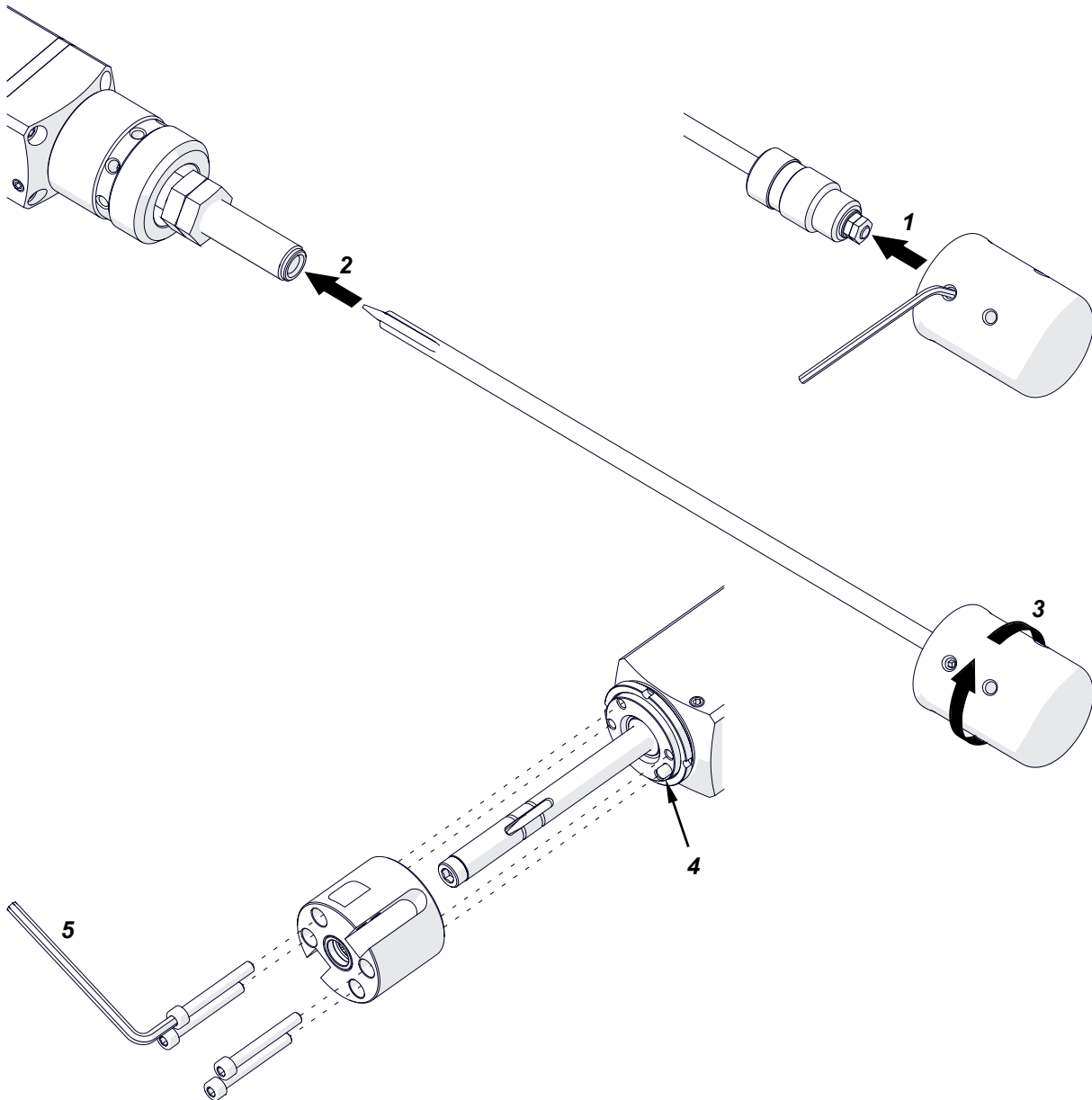
**Fig. 8.** Removing the mandrel

Put the small mandrel in (1, Fig. 9) and tighten it with the feed knob (2) until you feel resistance of the plate (3). Then, slightly loosen the mandrel (4) and rotate it by hand (5) to align the grooves with the bulges (6). Next, rotate the feed knob (2) to tighten the mandrel as much as possible. Then, put the nuts on the mandrel (7), set them at the groove (8), and then tighten with the 24 mm flat wrenches (9).



**Fig. 9.** Installing the mandrel

Put the clamping knob onto the needle of the small mandrel (1, Fig. 10) and tighten with the 3 mm hex wrench. Next, put the needle into the mandrel (2) and tighten with the knob (3). Put the small tool bit holder onto the pin (4) and use the 4 mm hex wrench to attach the holder with screws (5).

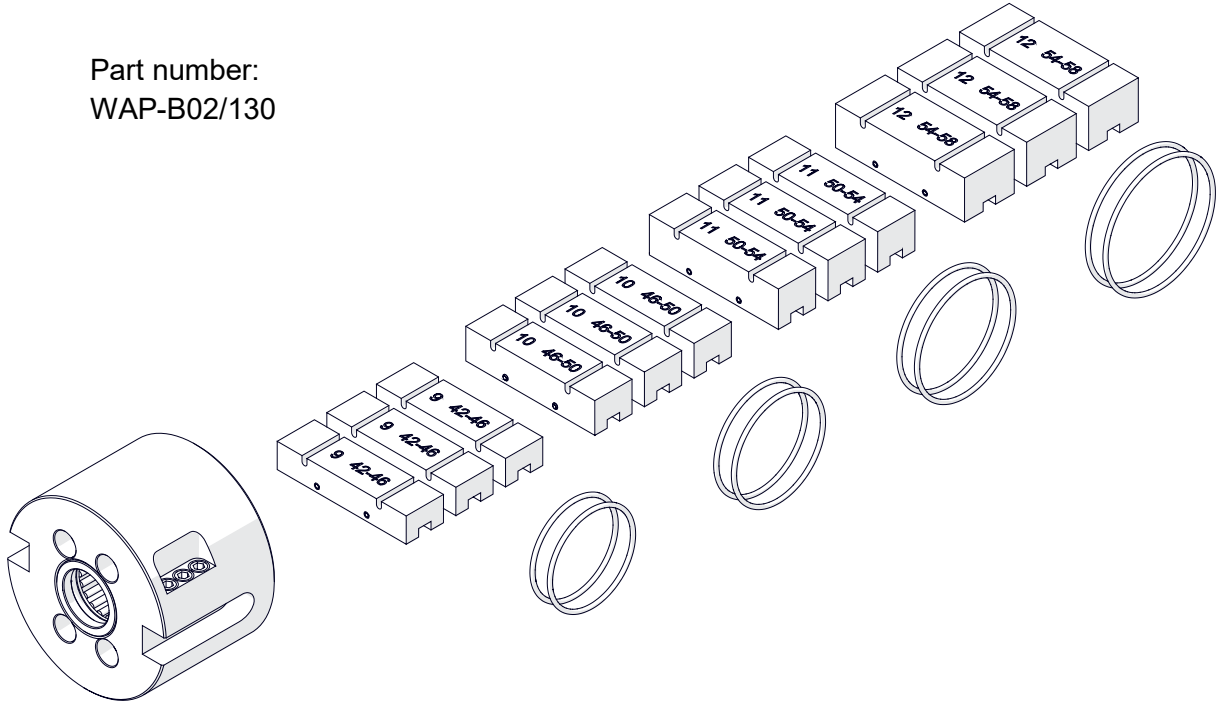


**Fig. 10.** Installing the mandrel (continued)

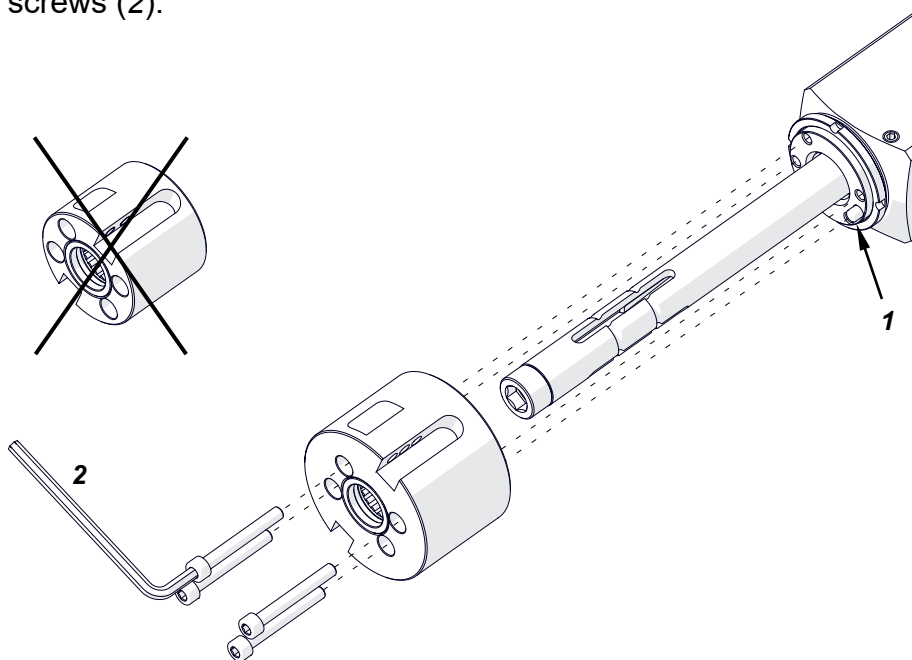
## 4.10. Extension set

Allows you to machine pipes from inner diameters of 42 mm (1.65") to outer diameters of 60.3 mm (2.37").

Part number:  
WAP-B02/130



Use the 4 mm hex wrench to remove the standard tool bit holder. Next, put the large holder onto the pin (1, Fig. 11) and use the 4 mm hex wrench to attach the holder with the screws (2).

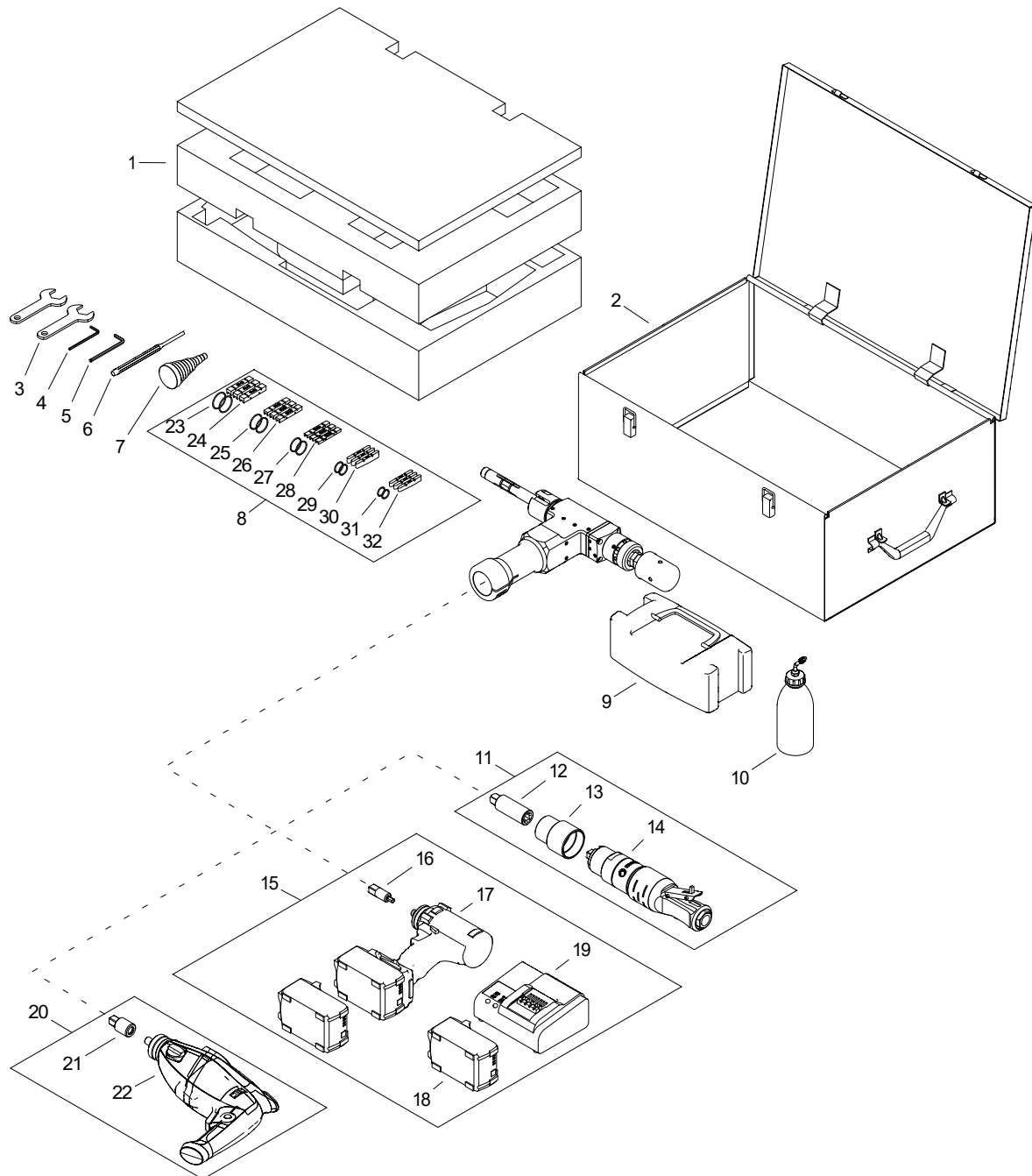


**Fig. 11.** Installing the large tool bit holder

THE MANUFACTURER RESERVES THE RIGHT TO MAKE CHANGES IN THIS MANUAL WITHOUT NOTICE

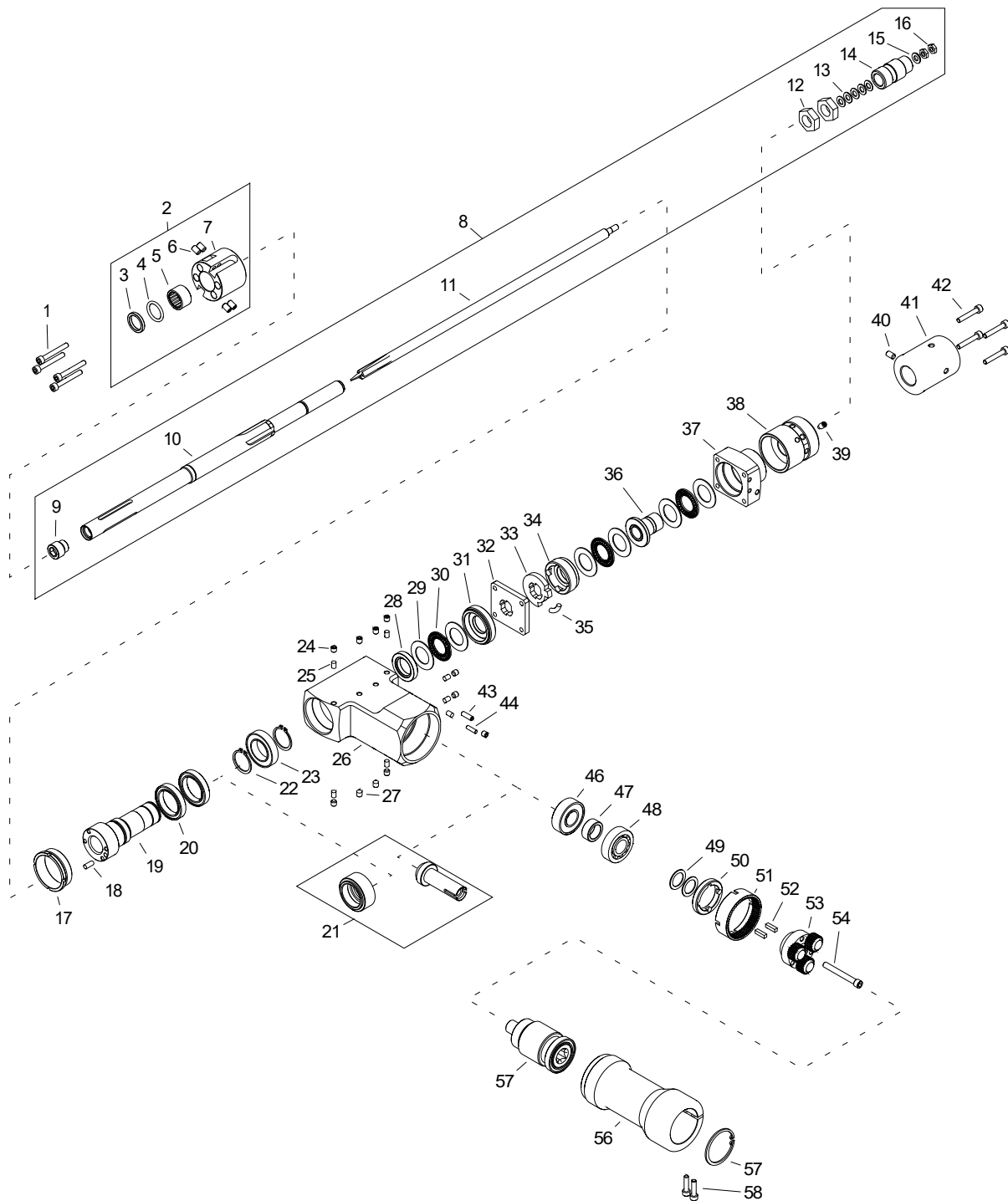
## 5. PARTS LIST

### 5.1. Package Breakdown



ITEM	PART NUMBER	DESCRIPTION	Q-TY
1		FOAM INSERT ASSY	1
2		METAL BOX	1
3		24 MM FLAT WRENCH	2
4		3 MM HEX WRENCH	1
5		4 MM HEX WRENCH	1
6		DRIFT	1
7		SPRING GAUGE	1
8		JAW BLOCKS SET	1
9		TOOL CONTAINER	1
10		COOLANT CONTAINER	1
11		PNEUMATIC MOTOR ASSY	1
12	WAP-B02/110	DRIVER SUIT PNEUMATIC MOTOR	1
13		ADAPTER SUIT PNEUMATIC MOTOR	1
14	WAP-B05/100	PNEUMATIC MOTOR	1
15		CORDLESS ELECTRIC MOTOR ASSY	1
16	WAP-B02/114	DRIVER SUIT BATTERY MOTOR	1
17	WAP-B02/108	CORDLESS ELECTRIC MOTOR	1
18		5.2Ah BATTERY	1
19		BATTERY CHARGER – 230V (AU)	1
20		ELECTRIC MOTOR ASSY – 230V	1
21	WAP-B02/112	DRIVER TO SUIT ELECTRIC MOTOR	1
22	WAP-B05/105	ELECTRIC MOTOR - 230V	1
23		SPRING fi 27.5 (38-42)	2
24		38-42 JAW ASSY	3
25		SPRING fi 25 (34-38)	2
26		34-38 JAW ASSY	3
27		SPRING fi 22.5 (30-34)	2
28		30-34 JAW ASSY	3
29		SPRING fi 17 (26-30)	2
30		26-30 JAW	3
31		SPRING fi 14 (22-26)	2
32		22-26 JAW	3

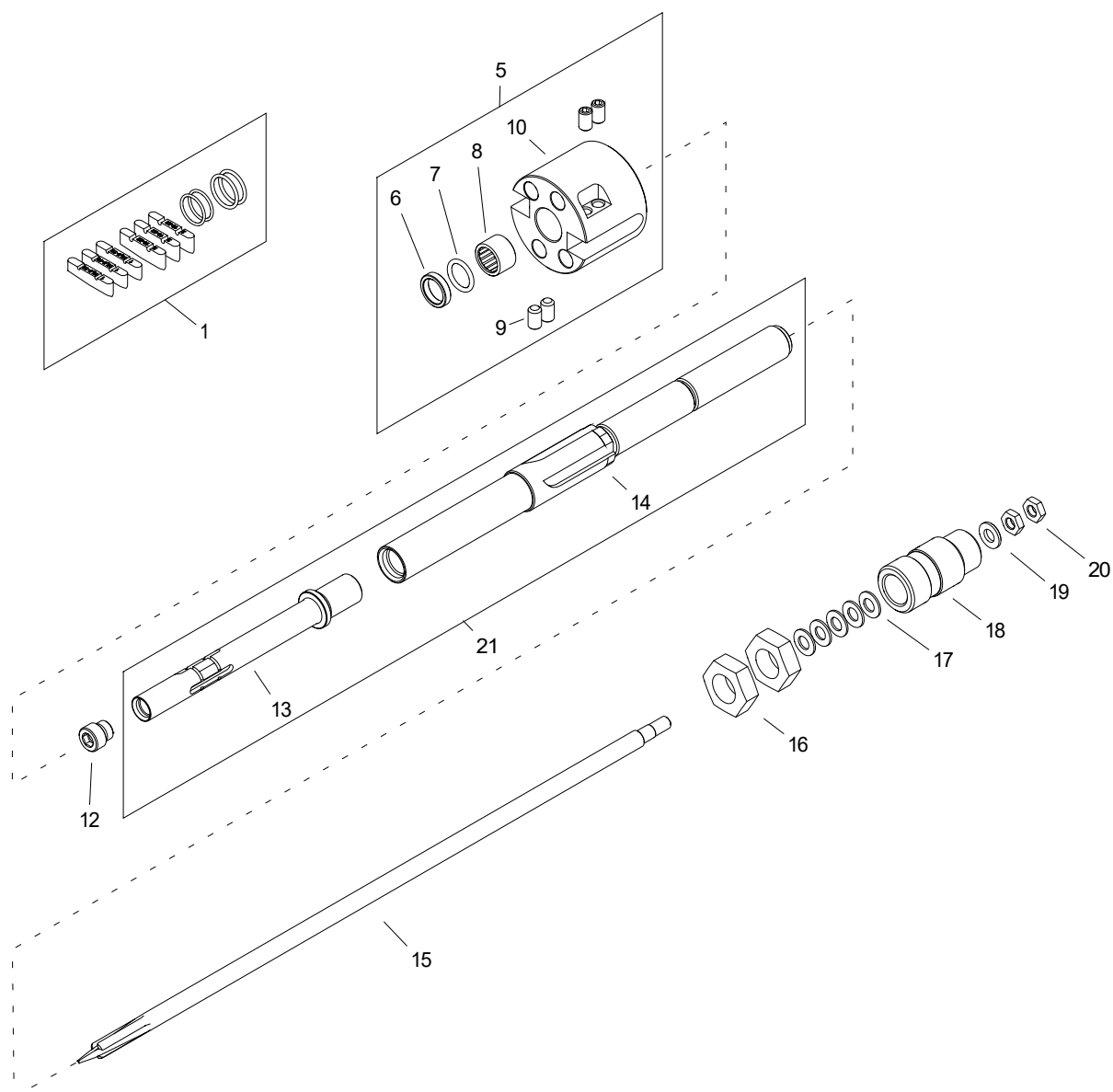
## 5.2. Tool Breakdown



ITEM	PART NUMBER	DESCRIPTION	Q-TY
1		HEX SOCKET HEAD CAP SCREW M5x40	4
2		TOOL BIT HOLDER ASSY	1
3		COVER RING 18	1
4		O-RING 19x3	1
5		NEEDLE BEARING 18x24x14	1
6		HEX SOCKET SET SCREW WITH FLAT POINT M6x10	4
7		TOOL BIT HOLDER	1
8		EXPANDING MANDREL 18 ASSY	1
9		PLUG 18	1
10		MANDREL BODY 18 ASSY	1
11		MANDREL NEEDLE	1
12		LOW HEX NUT M16x1.5	2
13		DISC SPRING 6.48x12.7x0.97	5
14		MANDREL NUT	1
15		ROUND WASHER 6.4	1
16		LOW HEX NUT M6	2
17		SPINDLE LOCK 1	1
18		DOWEL PIN 5n6x12	1
19		SPINDLE	1
20		BALL BEARING 30x42x7	2
21		BEVEL GEAR SET	1
22		EXTERNAL RETAINING RING 25z	2
23		BALL BEARING 25x42x9	1
24		HEX SOCKET SET SCREW WITH FLAT POINT M6x6	7
25		LOCK INSERT	7
26		BODY	1
27		HEX SOCKET SET SCREW WITH CONE POINT M6x8	4
28		SPINDLE SUPPORT	1
29		BEARING RING 21x35x1	6
30		THRUST BEARING 20x35x2	3
31		SPINDLE LOCK 2	1
32		EXPANDING MANDREL LOCK 1	1
33		EXPANDING MANDREL LOCK 2	1
34		FEED SPACER	1
35		SPRING	1
36		FEED SCREW	1
37		LOCK COVER	1

ITEM	PART NUMBER	DESCRIPTION	Q-TY
38		FEED KNOB	1
39		HEX SOCKET SET SCREW WITH DOG POINT M6x12	1
40		HEX SOCKET SET SCREW WITH FLAT POINT M6x10	1
41		MOUNTING KNOB	1
42		HEX SOCKET HEAD CAP SCREW M5x30	4
43		HEX SOCKET SET SCREW WITH FLAT POINT M5x16	1
44		SPRING PIN 4x14	1
45		PINION SHAFT ASSY	1
46		BALL BEARING 17x40x12	1
47		BEARING SPACER	1
48		CONE BEARING 17x40x13.25	1
49		WASHER 17x24x1	2
50		PINION SHAFT LOCK	1
51		RING GEAR	1
52		KEY 4x4x14.5	2
53		PLANETARY GEARBOX ASSY	1
54		HEX SOCKET HEAD CAP SCREW 6x50	1
55		CLUTCH ASSY	1
56		CLUTCH BODY	1
57		INTERNAL RETAINING RING 42w	1
58		HEX SOCKET HEAD CAP SCREW M5x20	2

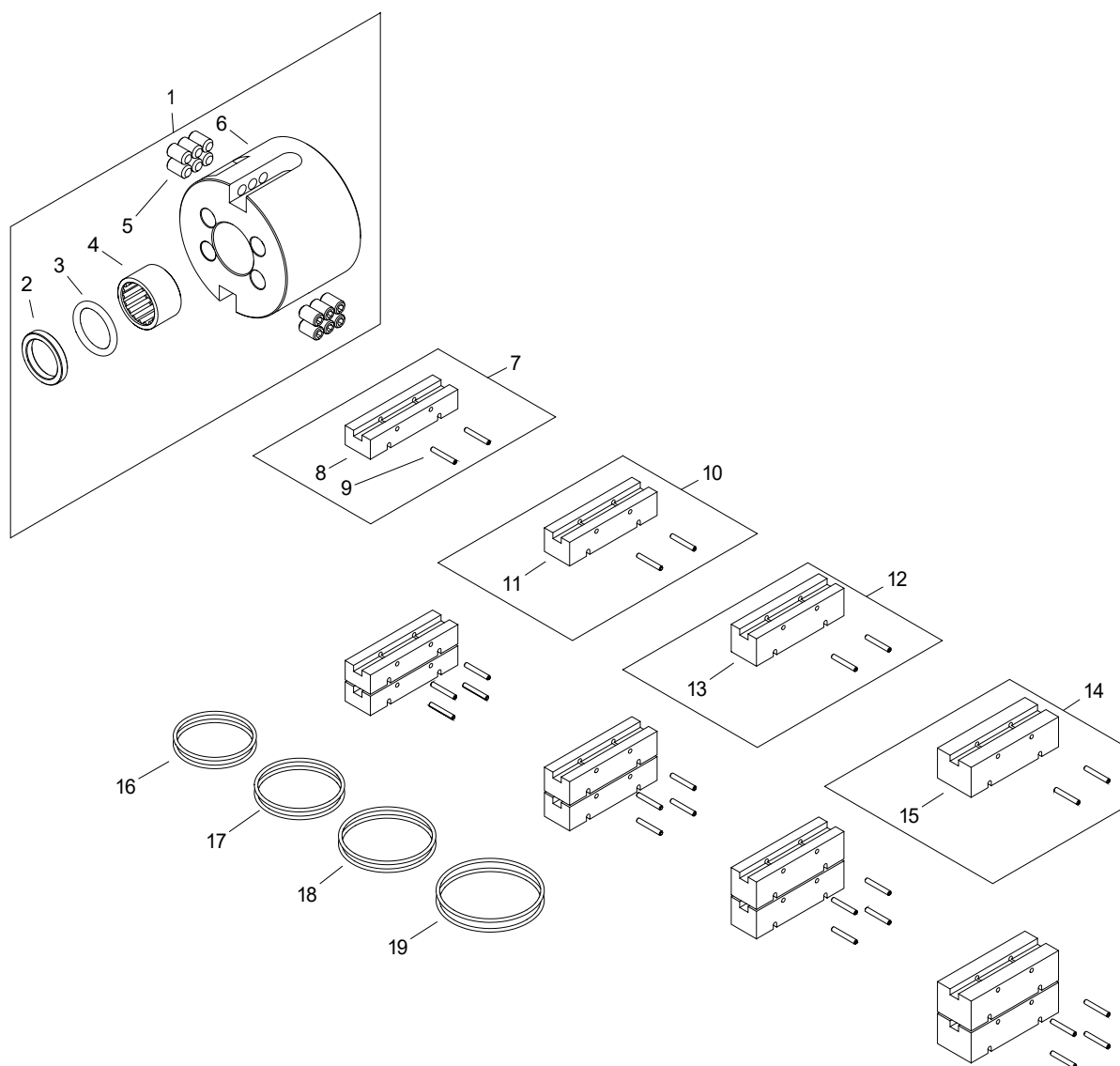
### 5.3. Small Expanding Mandrel Set (WAP-B02/150) Breakdown



ITEM	PART NUMBER	DESCRIPTION	Q-TY
1		JAW AND SPRING SET	1
5		TOOL BIT HOLDER ASSY	1
6		RING	1
7		WASHER 12x2	1
8		NEEDLE BEARING 12x16x10	1
9		HEX SOCKET SET SCREW WITH FLAT POINT M6x10	4
10		TOOL BIT HOLDER	1
11		EXPANDING MANDREL ASSY	1
12		CAP	1

ITEM	PART NUMBER	DESCRIPTION	Q-TY
13		EXPANDING MANDREL HEAD	1
14		EXPANDING MANDREL BODY	1
15		MANDREL PIN	1
16		LOW HEX NUT M16x1.5	2
17		PLATE SPRING	5
18		NUT	1
19		ROUND WASHER 6.4	1
20		LOW HEX NUT M6	2
21		EXPANDING MANDREL BODY ASSY	1

## 5.4. Extension Set (WAP-B02/130) Breakdown



ITEM	PART NUMBER	DESCRIPTION	Q-TY
1		TOOL BIT HOLDER ASSY	1
2		COVER RING 18	1
3		O-RING 19x3	1
4		NEEDLE BEARING 18x24x14	1
5		HEX SOCKET SET SCREW WITH FLAT POINT M6x10	12
6		TOOL BIT HOLDER	1
7		42-46 JAW ASSY	3
8		42-46 JAW	3
9		SPRING PIN 2x14	24
10		46-50 JAW ASSY	3

ITEM	PART NUMBER	DESCRIPTION	Q-TY
11		46-50 JAW	3
12		50-54 JAW ASSY	3
13		50-54 JAW	3
14		54-58 JAW ASSY	3
15		54-58 JAW	3
16		SPRING fi 32 (42-46)	2
17		SPRING fi 35 (46-50)	2
18		SPRING fi 38 (50-54)	2
19		SPRING fi 42.5 (54-58)	2