Volume

1.2

OPERATIONAL MANUAL

MODEL: **20”Z1TS CORE DRILLING MACHINE WITH TILTING STAND / LARGE ROLLING BASE**

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by BLUEROCK ® Tools

UNPACKING THE ITEM

CAUTION: This machine is packed together with items that may be sharp, oily and overly heavy objects. Remove the machine from the packaging in a safe manner. Check to ensure all accessories are included with the item while unpacking. If any parts are found to be missing, contact the retailer as soon as possible. Do not throw away the packaging until the item is out of the guarantee period. Dispose of the packaging in an environmentally responsible manner. Recycle if possible. Keep all plastic bags away from children due to risk of suffocation.

	WEEE - Waste Electrical & Electronic Equipment. Note this machine should be disposed of as electrical & electronic waste.

SLURRY DISPOSAL

NOTE: It is recommended to dispose of the drilling slurry (the muddy/dusty water material) in an environmentally responsible manner. The disposal of slurry directly into sewage systems, sewers, lakes, rivers, or direct earth without treatment can be environmentally harmful and possibly illegal. Ask your local public authorities about current regulations in your area.

1033 Andover Park East, Tukwila WA 98188 USA
Phone 206.604.8363 • Fax 425.572.5167
www.bluerocktools.com

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Chapter

1

Safety

DO NOT USE THIS MACHINE UNLESS YOU HAVE READ THE OPERATING INSTRUCTIONS!

Safety glasses must be worn at all times in work areas.

Appropriate footwear must be worn.

Safety gloves should be worn at all times and jewelry must not be worn.

Hard-hat must be worn while using machine.

Read operational manual prior to use.

Long and loose hair must be contained.

Close fitting/protective clothing must be worn.

Hearing protection should be worn when using this machine.

Dust mask must be worn while using this machine.

PRE-OPERATIONAL SAFETY CHECKS

- Examine the power cord and plug for damage. This tool is supplied with a ground plug and must always be used with a properly grounded circuit.
- Examine the body of the machine and inspect for damage or defects.

OPERATIONAL SAFETY CHECKS

- ONLY to be operated by qualified personal who have read instructions.
  - NOTE: Failure to read and follow instructions could result in electrical shock, fire, property damage and/or serious injury!
- DO ensure all non-essential people are clear of the immediate work area.
- DO be attentive at all times. Keep your eye on the work piece. Always be in a sensible state of mind and do not use the machine if you cannot fully concentrate.
- DO keep body parts, clothing & power cords clear of turning/cutting pieces. Stay alert and use common since when using this tool.
- DO allow machine to reach operating speed before starting a hole.

- **DO unplug machine while changing or adjusting cutting bits so as not to accidentally turn machine on.**
- **DO remove adjusting wrenches prior to turning the machine on.**
- **DO guard against electric shock by only operating this tool on a properly functioning GFCI (Ground Fault Circuit Interrupt) circuit.**
- **DO be mindful that power tools can expose an operator to vibrations transmitted trough contact with the machine. Prolonged exposure can lead to medical issues which should be discussed with a medical professional.**
- **DO tie in a drip loop in the power cord to prevent water from running into the power receptacle.**
- **DO use a dust extraction system for cutting materials that create dust. The operator should also wear a protective respiratory device.**
- **DO NOT make adjustments to machine while the machine is running.**
- **DO NOT switch off the machine when it is under load, except in an emergency.**
- **DO NOT remove or modify grounding plug. Only to be used on a properly grounded GFCI circuit.**
- **DO NOT leave the machine running when not in use.**
- **DO NOT hold the work piece by hand or using body. Always mechanically clamp or secure work piece.**
- **DO NOT allow operator to make contact with grounded surfaces such as metal objects.**
- **DO NOT allow liquids to enter the machine’s ventilation system.**
- **DO NOT operate machine outside of machine specifications.**
- **DO NOT touch moving parts while the machine is running as death or dismemberment could occur.**
- **DO NOT operate machine overhead (Inverted) when drilling “wet” type cores.**
- **DO NOT remove machines electrical components while connected to a power source. Only to be removed for service by qualified personal and put back on the machine after service is complete.**
- **DO NOT allow children or untrained personal to operate machine.**
- **DO NOT use this machine in the rain or a wet environment.**
- **DO NOT operate in the presence of explosive materials as power tools create sparks which may ignite dust or fumes.**
- **DO NOT drill into an area that may contain a live electrical wire/circuit.**
- **DO NOT use this machine without safely securing to the work piece being drilled.**
- **DO NOT use full water pressure when drilling with “wet” type bits! You only need minimal water to drill with these machines. Extreme water pressure can cause water to enter the gearbox!**
- **DO NOT operate this machine on a lower voltage as it may result in reduced power level and the machine could become unstable while cutting. This could also limit the motor life.**
  - **NOTE: Use of long small gauge power extension cords can result in decreased voltage. As local voltages can vary, it may be a good idea to test the voltage at the end of the extension cord to ensure proper voltage requirements are met. You might also consult an electrician to make sure the length of cord matches up with the proper wire gauge for this size motor. Make sure to use outdoor cords when operating outdoors.**

HEALTH WARNINGS

- **Certain dust created by drilling contains chemicals known to cause cancer, birth defects or other reproductive harm. The examples of these chemicals are below:**
  - **Lead from lead based paint.**

- **Crystalline silica from bricks, cement and assorted masonry products.**

  - **TO REDUCE RISK OF EXPOSURE TO THESE CHEMICALS, WORK IN A WELL VENTILATED AREA WITH VACUUM SYSTEMS, RESPIRATORS AND WITH ALL SUITABLE SAFETY EQUIPMENT.**

Chapter 2

Specifications

ELECTRICAL DATA	
Voltage	**230V, 60Hz, Single Phase**
Motor Size	**3500W**
Power Connection	**NEMA L6-30P 250V 3 Prong Twist Lock Plug**

MECHANICAL DATA	
Cutter Range	**1” to 20” Max Diameter (508mm)**
Cutting Speed	**350/750/1000 RPM Three Speed Gearbox Gear 3 (1000 rpm) for 1”-4” Holes Gear 2 (750 rpm) for 4”-8” Holes Gear 1 (350 rpm) for 8”-20” Holes**
Tool Holder	**Direct Arbor 1-1/4” 7 UNC Spindle**
Safety Clutch	**Yes**
Water hose and Valve	**Yes**
Rolling/Tilting Base	**Yes**
Travel	**21”**

SHIPPING DATA	
Shipping Weight	**100 Lbs**
Shipping Carton	**40” x 20” x 17”**

Included Accessories

DESCRIPTION	*QTY*
Instruction Manual	**1**
Wrenches	**2**
Feed Handle	**1**
Water Hose and Valve	**1**
Top Bolt for Binding in Ceilings	**1**
Hex Wrench	**3**
Spare Brushes (set)	**1**

Note

UPON RECEIPT, CHECK CAREFULLY TO ENSURE THAT THE MACHINE IS IN GOOD CONDITION AND HAS ALL ACCESSORIES LISTED ABOVE.

Additional Available Accessories

Additional accessories for this machine can be found in BLUEROCK ® Tools online shop at www.bluerocktools.com or from your local retailer.

DESCRIPTION
1” Wet Coring Bit
1.25” Wet Coring Bit
1.5” Wet Coring Bit
1.75” Wet Coring Bit
2” Wet Coring Bit
2.5” Wet Coring Bit
3” Wet Coring Bit
3.5” Wet Coring Bit
4” Wet Coring Bit
4.5” Wet Coring Bit
5” Wet Coring Bit
6” Wet Coring Bit
7” Wet Coring Bit
8” Wet Coring Bit
9” Wet Coring Bit
10” Wet Coring Bit
11” Wet Coring Bit
12” Wet Coring Bit
14” Wet Coring Bit
16” Wet Coring Bit
18” Wet Coring Bit
20” Wet Coring Bit
1” Dry Coring Bit
1.25” Dry Coring Bit
1.5” Dry Coring Bit
1.75” Dry Coring Bit
2” Dry Coring Bit
2.5” Dry Coring Bit
2.75” Dry Coring Bit
3” Dry Coring Bit
3.5” Dry Coring Bit
4” Dry Coring Bit
5” Dry Coring Bit

Chapter

3

Operations

Note

THOROUGHLY READ THROUGH THE ENTIRE MANUAL BEFORE OPERATING THIS MACHINE!

PURPOSE

- **The purpose of the 20”Z1TS Core Drill is to drill through masonry, concrete or other mineral rock types using annular coring bits.**
- **These drills are designed to be bolted to the drilling surface through their base.**
  - **NOTE: Make sure the base fits completely on the surface and the base is securely fastened using wedge anchors to bolt to the surface.**
- **These machines can be used vertically, horizontally or overhead (inverted) provided an acceptable work environment. NOTE: For safety, when drilling horizontally or overhead a safety chain/strap should always be used.**
  - **CAUTION: If drilling overhead you are only permitted to use dry type core bits with a dust collection system. “Wet” type holes overhead would allow water into the motor and create an extremely dangerous situation.**

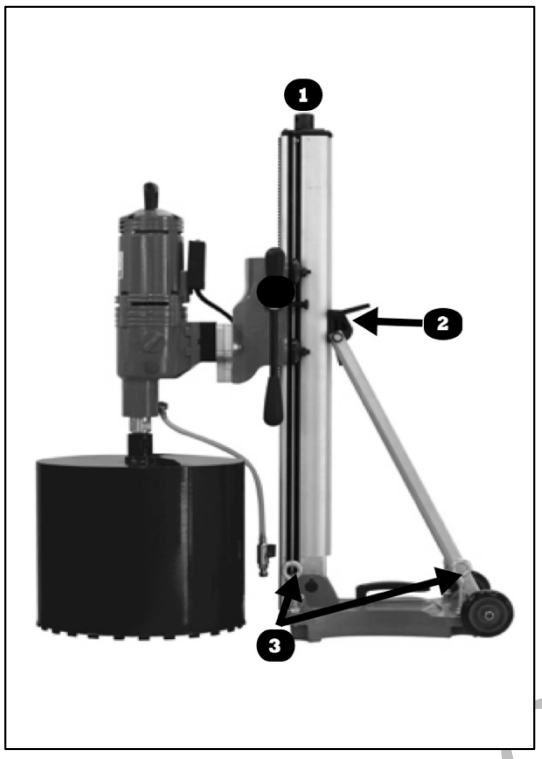
OPERATIONAL PRINCIPLES

- **The main drilling shaft rotates in a forward clockwise direction. The main drilling motor connects to the tool spindle to make contact with a surface and slowly bore a hole. Using the feed handles on the side of the drill, the user can raise or lower the drilling motor.**
- **These drills are ONLY to be used with diamond impregnated coring bits.**
  - **When drilling with “wet” type bits, the bit ends pulverizes the material and the water brings the material out of the cut.**
  - **When drilling with “dry” type bits, the bit end pulverizes the material and dust brings the material out of the cut.**

MACHINE COMPONENTS

- **The main components of the 20”Z1TS are the spindle, gearbox, motor, carriage, drill stand and wheeled base. The spindle is driven by the transfer case and the motor.**
  - **These components must be not be removed except by a qualified technician. Power must be disconnected prior to any service.**

- **This machine has one primary adjusting point for the angle between the drill stand and the drill motor. The Angle Adjusting bolt (2 below) can be loosened to adjust the angle and retightened when desired angle is achieved.**



1) Top Bolt for Binding in Ceilings
2) Angle Adjusting Bolt
3) Leveling Bolts

TRANSPORTING THE MACHINE

- **When transporting the machine, always lock the carriage bolt.**
- **Always carry the machine with both hands.**
- **DO NOT transport the machine with bits in the spindle.**
- **When using the wheels, tilt the machine back towards the operator and once the wheels are engaged with the ground pull or push the machine on the ground.**
- **If transporting inside a vehicle, it is recommended to transport it on its side so as to avoid the item falling over.**
- **DO NOT carry/pull the machine by the cord.**
- **DO NOT allow the cord or plug to drag along the floor when transporting.**

RUNNING THE MACHINE

- **Do all pre-operational and operational safety checks from Chapter 1.**
- **Consider your security and stability as well as the orientation of the machine in the work area.**
  - **Consider the work surface material, condition, strength, density and rigidity. These factors directly affect the tools efficiency.**

- Secure the machine base to the work surface by using a wedge anchor, vacuum system or other method to ensure the base does not move.
- Use the four leveling bolts on the corners of the base to level the machine if needed.
- After placing the machine in work area, connect a safety chain or strap if necessary.
  - A safety chain should attach to the machine (preferably through the carrying handle or O bolt) as well as attached to the work area in such a manner that prevents the machine from detaching or falling from the work area.
- If necessary, adjust drilling angle.
  - Loosen the lower side bottom bolt on the base as necessary.
  - Adjust the angle and tighten the side bolt
- Ensure the feed handles are securely attached to the feed spindle.
- Ensure the work surface is free of debris, oil, etc.
- Select and set up fluid delivery method or dust system.
- Select the gear you will be using.
  - Do not force the gear shifter when changing between gears. There is a neutral position between gears.
  - Change gears when the machine is stopped or almost stopped. It may help to slightly turn the drill spindle while applying slight pressure to gear selector knob.
- If using the machine horizontally with the water system, connect hose to the side of the machine using the connector.
  - This connector takes standard ¾” US garden hose hookup.
  - Make sure the water valve is in the off position.
    - This is generally at a 90 degree angle from the valve hose.
  - Partially turn the water spigot on (usually half a turn).
    - CAUTION: DO NOT turn the hose on fully! You need sufficient water when using wet type bits. Using too much water pressure can cause the bits to not cut properly as well as water entering the gearbox.
- Select appropriate size cutting bit. See section below for details on securing bit.
- Check that the machine is firmly attached to the work area.
- Plug the machine into power source.
  - Form a loose knot in the power cord close to the plug connection to prevent fluid from running down the cord and into the power receptacle.
- Turn feed handle raising the cutter until the bit is above the work surface.
- Open the water valve to allow water to come out to the work surface.
- ATTENTION: BE AWARE THESE MACHINES ARE EXTREMELY POWERFUL. THEY HAVE A TREMENDOUS AMOUNT OF TORQUE, WHICH MIGHT NOT BE SUITABLE FOR ALL POTENTIAL USERS. ESPECIALLY IN LOW GEAR AND WITH LARGER BITS. DESPITE THE SAFETY CLUTCH, THESE DRILLS CAN STILL INJURE THE USER. IF IN DOUBT, CONTACT A PROFESSIONAL FOR ADVICE.
- Turn the machine on by flipping the breaker switch to the “on” position.
- Very slowly engage the cutting bit with the material surface by lightly engaging the hand crank down towards the material.

- NOTE: During the initial stages of contact the bit may wander.

- After about 1/8” of cutting has been achieved in the work surface, slightly more force can be applied. This will be the normal amount of force the rest of the hole.
  - NOTE: Do not force the hole. Let the machine do most of the work. Excessive physical effort should be avoided as it can cause damage to the machine or the user.
  - If the unit jams in a hole, stop the drill immediately to prevent injury. Disconnect the drill from the power supply and loosen the cutter by turning drill spindle counterclockwise. Never attempt to free bit by starting motor!
    - After an interruption in drilling, make sure the drill bit is free and turns before restarting the hole. Be very careful at this point to make certain the drill does not bind when restarting.
- Make sure to keep the cutting material lubricated.
- Ease up on feed pressure as the cutter starts breaking through the backside of the material.
  - Be certain all is clear on the output side of this core to prevent injury to persons or property.
- Finish drilling the hole.
- Turn the motor off and disconnect power once the drill is safely back up in the non-drilling position.
- Turn water valve off.
- Unbolt the wedge anchor.
- Disconnect safety chain/strap and move the drill to a new drilling location.

INSTALLING CORING BITS

- WARNING: Core bits can be sharp and should only be handled with gloves so as not to cut the user during installation or removal.
- Check that the bits are not damaged.
  - Coring bits that are damaged should not be used.
- Make certain the machine is unplugged from power.
- Raise the drill motor to ensure ample room to install the bit.
  - Apply grease to the spindle thread to prevent corrosion and allow easier core bit removal.
- Insert the coring bit and screw it onto the drill spindle.
- Tighten the bit until fully tightened.
  - Use wrenches that fit the spindle and coring bit to fully tighten.

Chapter 4

Troubleshooting

Note

SERVICING SHOULD ONLY BE DONE BY A QUALIFIED TECHNICIAN.

DON’T FORGET TO UNPLUG POWER TO UNIT PRIOR TO SERVICE!

PROBLEM	*SOLUTION*
Motor does not turn on.	1) Check external power source (extension cord, breaker, etc). 2) Loose internal wire. Check and secure if necessary. 3) Motor brushes defective. Replace if necessary. 4) Check to ensure the motor on/off switch is operable. Replace if necessary.
Excessive sparking when motor is running.	1) This may indicate the presence of debris in the motor or worn out carbon brushes. Check the brushes for unusual wear and replace if necessary. Clean out the internal motor armature if necessary. 2) Armature has a rough edge. Inspect and replace if necessary.
Hole is not cutting.	1) Cutting bit is dull. Replace bit. 2) Work area material is not appropriate for bit type.
Bit is jammed while coring.	1) Debris is lodged between core hole and bit. Rotate bit in both directions to and inspect bit for debris. 2) Make sure stand is secured to work surface.
Coring speed has reduced.	1) Bit has hit rebar. Adjust feed control to prevent motor overload while cutting through rebar. 2) Diamonds on bit have glazed over. Deglaze bit or dress diamond rim on bit and check water flow rate. 3) Diamonds on bit have worn away. Replace core bit. 4) New core bit. Core at slow rate with new bits for 2-3 coring cycles. 5) The safety clutch is slipping. Tighten clutch. 6) Drilling progress is prevented by an accumulation of dust. Use suitable vacuum cleaner. 7) Water flow rate is too low. Increase water flow. 8) Core is stuck in the core bit. Remove core.
Core bit appears to wobble.	1) Spindle is damaged. Replace spindle and check bearings. 2) Bit is bent or damaged. Replace bit. 3) The core bit is not screwed securely onto the spindle. 4) Coring material is attaching to the bit. Inspect bit and increase water flow rate.
Water escapes at the water swivel or gear housing.	1) The water pressure is too high. Turn down water flow. 2) The shaft seal is defective. Replace seal 3) The water hose is damaged. Replace hose.

Chapter 5

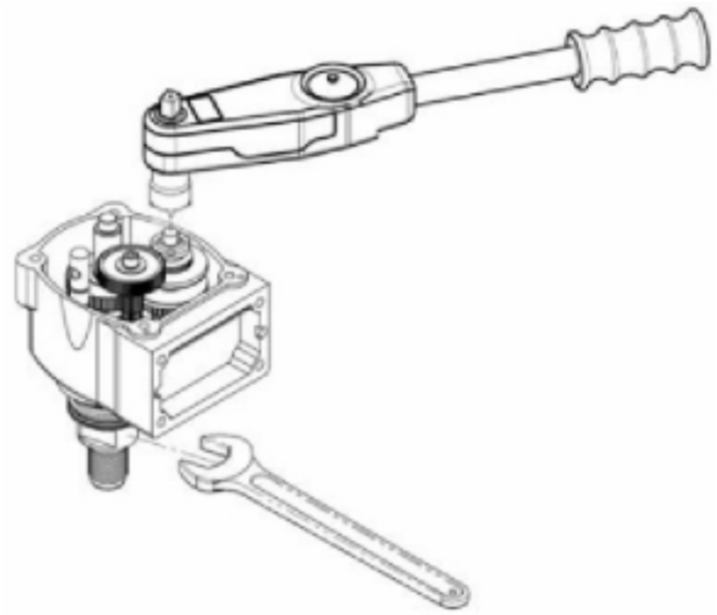
General Maintenance

- Inspect electrical cords and electrical connections.
- Keep machine clean and free of debris.
- Check for misalignment, binding and breakage of all moving parts. If damaged, repair tool before use.
- Keep cutting tools sharp and clean. Sharp bits are less likely to bind and are easier to control.

Occasional Maintenance

- Have the power tool serviced by a qualified service technician using identical replacement parts.
  - Adjusting Carriage:
    1) Periodically check and adjust slides as necessary.
    2) Use hex wrench to loosen the hex bolts on the carriage. There are four hex bolts on each adjusting slide. Backing out the bolts will loosen feed tension, while tightening the bolts will increase feed tension.
    3) Adjust the bolts evenly while moving the handle up and down so that there’s no free play yet not binding anywhere through its range of travel.
  - Change Gear Oil:
    1) Change if necessary using NLGL-2 grade grease. This service is generally done around the 50 hour service mark.
  - Adjust Safety Clutch:
    1) Adjust clutch as necessary.
      - NOTE: A torque wrench is necessary for this service.
      - Make certain the spindle is facing the ground so as not to get oil/grease everywhere. Locate the hex screws holding the gear housing together and remove them.
      - Gently pull the gear housing apart. You may use a couple flat screwdrivers to gently apply pressure to separate the housings.
      - Take the main clutch nut off of the clutch. Apply some Loctite type of thread glue on the clutch threads.
      - Reapply the nut to the thread.
      - Hold the spindle in place using the box wrench. See diagram below.
      - Use the torque wrench to tighten the clutch nut.

○ **Torque the tensioning nut to 40 NM (354 inch/lbs, 29.5 ft/lbs).**
○ **With the clutch nut tightened, reassemble the housings. Make sure the orientation of the internal gears is correct and the housings mate correctly.**
○ **Reattach the bolts that hold the housing together.**



Chapter 6

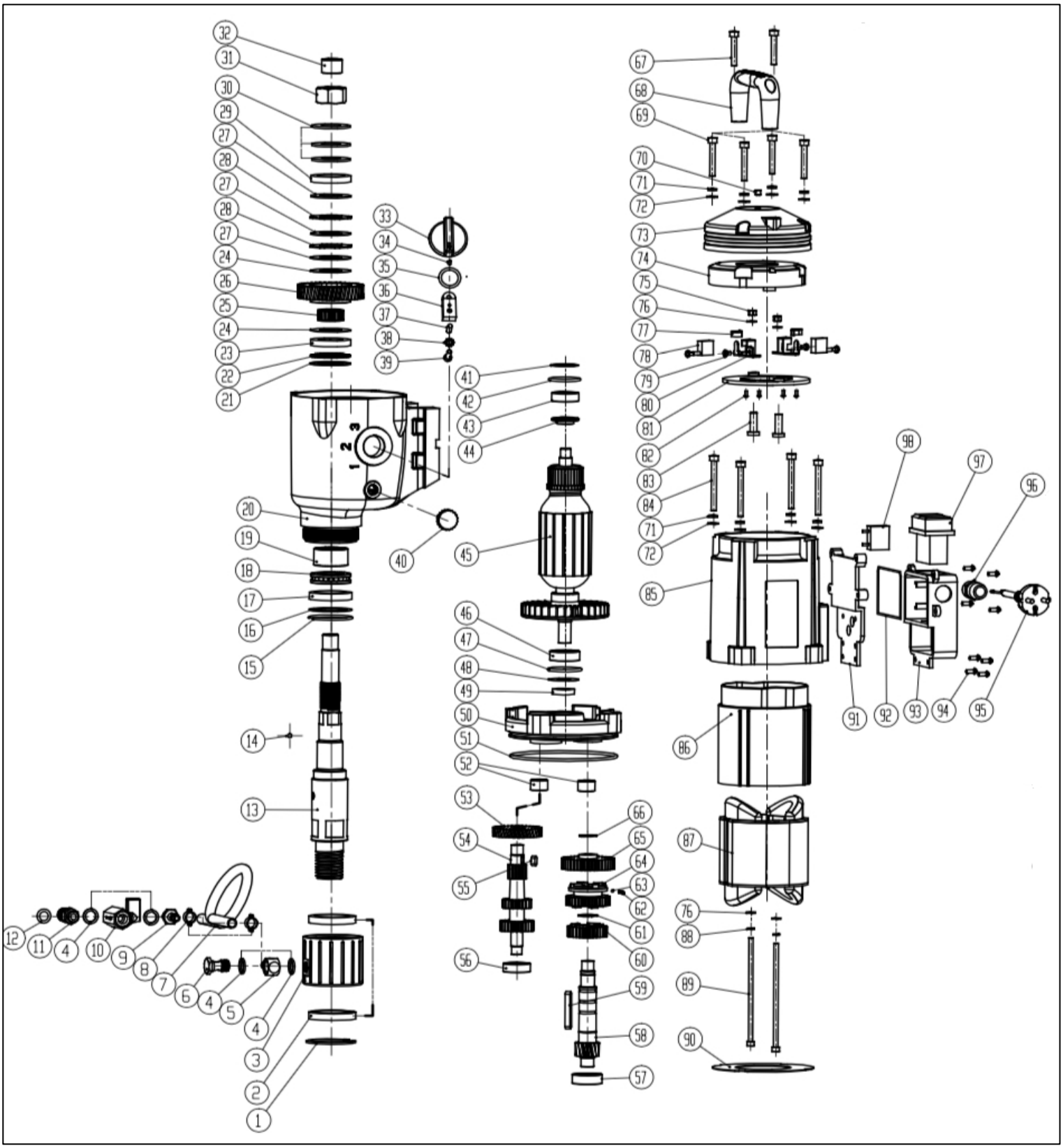
Parts List – Motor and Gearbox

No.	Description	Qty	No.	Description	Qty
1	Shield ring for holes Φ55	1	51	O-ring 121X3X127	1
2	Bracket seal ring FB42*55*8	2	52	Needle bearing HK1412	2
3	Water seal jacket	1	53	2# gear	1
4	Washer 18*13.3*1.5	4	54	Triple gear	1
5	Connector of water faucet	1	55	Flat key A5X10	1
6	Tightening screw	1	56	Bearing 6201-2RZ	1
7	Mesh tube(inner Φ8*350)	1	57	Bearing 6202-ZZ	1
8	Tightening ring	2	58	9# gear	1
9	Connector of water faucet	1	59	Flat key A6X45	1
10	1/4" mini ball valve	1	60	4# gear	1
11	Connector of water switch	1	61	Non-Standard Open shaft ring 18.5*22*1	1
12	O shape sealing ring	1	62	Small spring	1
13	Output shaft	1	63	Steel ball 4	1
14	Steel ball Φ5	1	64	6# gear	1
15	Wire-steel snap rings for hole Φ50	1	65	8# gear	1
16	Sealing washer	1	66	Shaft shield ring 16	1
17	Bracket seal ring TC38*50*8	1	67	Inner hexagon bolt M6*35	2
18	Trust cylindrical roller bearing 81106	1	68	Handle	1
19	Single row needle bearing NK30/20	1	69	Inner hexagon bolt M6*40	4
20	Gear box	1	70	Inner hexagon set screw with flat point M6*6	1
21	Trust washer AS3047	1	71	Spring washer Φ6	8
22	Trust needle roller bearing AXK3047	1	72	Flat washer Φ6	8
23	Grooved shim	1	73	Rear cover	1
24	Friction plate	2	74	Jacket for rear cover	1
25	Needle bearing K26*30*13	1	75	Nut M5	4
26	10# gear	1	76	Flat washer Φ5	4
27	Square hole shim	3	77	Coil srping	2
28	Outer tooth shim	2	78	Brush assembly	2
29	Butterfly spring shim	1	79	Slotted round head bolt M4*8	2
30	Butterfly spring	3	80	Brush holder	2
31	Hexagon nut M22x1.5	1	81	Brush holder base plate	1
32	Needle bearing HK1816	1	82	Brazier-head rivet 3*8	4

33	Speed knob	1	83	Insulating cover	2
34	Round pin Φ3*12	1	84	Inner hexagon bolt M6*40	4
35	O-ring Φ20*3*26	1	85	Housing	1
36	Speed block	1	86	Stator insulating cover	1
37	Round pin Φ5*20	1	87	Stator assembly	1
38	External teeth lock washer Φ5	1	88	Spring washer Φ5	2
39	Inner hexagon bolt M5*16	1	89	Inner hexagon bolt M5*125	2
40	Plug screw for gear box	1	90	Shield board	1
41	Wave srping washer Φ31	1	91	Cover of switch box	1
42	O-ring 32*3*38	1	92	Sealing ring for switch box	1
43	Bearing 6201-2RZ/Z1	1	93	Switch box	1
44	Armature rear insulating cover	1	94	Pan head screws with cross recess M4*12	8
45	Armature assembly	1	95	Cord & plug	1
46	Bearing 6202-2RZ/Z1	1	96	Jacket N20	1
47	O-ring 35x3x41	1	97	Switch	1
48	Oil sealing base shim	1	98	Capacitance	1
49	Bracket seal ring TC15*26*6	1	99	Inner hexagon bolt M8*100	1
50	Mid cover	1	100	Square pipe	1
101	Tracking bar	4	141	Snap rings for shaft Φ17	2
102	Gear bar	1	142	Reducing gear	1
103	Inner hexagonbolt M5*10	32	143	Bearing 6003	1
104	Ruler(inch)	1	144	Flat washer Φ12	8
105	Ruler(metric)	1	145	Bearing 6001	8
106	Nut for square pipe	1	146	Wheel	4
107	Inner hexagon bolt M6*60	6	147	Washer for wheel	4
108	Plastic pipe	6	148	Adjustable bolt for wheel	2
109	Plug screw	6	149	Flange nut M12	6
110	Bakelite handle	2	150	Bolt for wheel	2
111	Brazier-head rivet 6*12	1	151	Index pin	1
112	Spring	1	152	Locking handle M8	2
113	Operating stick	1	153	Washer	1
114	Lengthen sleeve	1	154	Inner hexagon bolt M8*65	1
115	Steel ball Φ5	1	155	Washer Φ8	1
116	Spring	1	156	Plastic washer Φ13	2
117	Wire-steel snap rings for shaft Φ22×2×Φ24	1	157	Slip block	1
118	Sliding sleeve	1	158	Slotted shim for supporting bar	1
119	Bearing 6003	1	159	Inner hexagon bolt M8*110	1
120	Flange nut M12(thicker)	2	160	Supporting bar	2
121	Adapter board B	1	161	Plastic washer Φ10	4
122	Adapter board A	1	162	Sleeve	1

123	Stud bolt M12*45	2	163	Shaft for caster wheel	1
124	Inner hexagon bolt M8*25	8	164	Caster wheel assembly 4"	2
125	Flat key A10*90	2	165	Flat washer Φ10	3
126	Lifter body	1	166	Nut M10	2
127	Gear shaft	1	167	Nut M12	1
128	Handle	1	168	Bushing	1
129	Hexagon nut M6	2	169	Eye bolt M12*90	4
130	Plug for square pipe	1	170	Inner hexagon set screw with flat point M8*8	2
131	Screw	1	171	Hexagon bolt M10*30	1
132	Inner hexagon bolt M6*90	2	172	Holder for water connection device	1
133	Flat key A5*12	1	173	Connection stick	2
134	Snap rings for shaft Φ15	1	174	Inner hexagon bolt M8*30	2
135	Non-Standard bearingφ15*12*φ32mm	1	175	Inner hexagon bolt M5*40	2
136	Snap rings for hole Φ32	1	176	Flat key A8x18	1
137	Shaft	1	177	Bolt for square pipe	1
138	Rubber sealing 15*25*5	2	178	Handle	1
139	Brazier-head screw M4*12	3	179	Base	1
140	Cover of gear box	1			

Breakdown View – Motor and Gearbox



Breakdown View – Drilling Stand