

OWNERS MANUAL



DR520, DR620 & DR620C CORE DRILLS DS5 & DS6 CORE DRILL STAND

FORM <<DR520-620 rev 4-08



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I PREPARATION

A. Safety Precautions

IMPORTANT! THE FOLLOWING SAFETY PRECAUTIONS MUST BE OBSERVED.

1. **Know your core drilling machine!** Read the Operator's manual carefully. Learn the operation, application and limitations, as well as the specific potential hazards peculiar to this equipment.
2. **Ground the machine!** The core drill must be grounded while in use to protect the operator from electric shock. The motor is equipped with a three prong grounding type plug to fit the proper type receptacle. The green [or green & yellow] conductor in the cord is grounding wire.
3. **NEVER** connect the green [or green & yellow] wire to a live terminal.
4. Use only three-wire grounded extension cords suitable for use outdoors and of sufficient gage to accommodate power requirements.
5. Replace frayed or damaged extension cords.
6. Keep the work area clean avoiding cluttered work areas.
7. Consider the work area environment!
 - Do not expose power tools to rain.
 - Wear rubber boots to further insulate yourself from the drill.
 - Mop up all excessive water around the work area before and after drilling.
 - Keep the work area well lit.
8. Use extreme caution when drilling through floors. Provide for protection of all personnel and material below the area. Cores generally drop from the drill bit at the completion of the hole.
9. Keep visitors away. Do not let visitors contact tool or extension cord. All visitors should be kept at a safe distance from the work area.
10. Do not force the bit into the drilling surface.
 - Use an anchor bolt , ceiling jack or vacuum hold-down attachment when drilling vertically (↓↑) into floors.
 - Only use an anchor bolt or ceiling jack when drilling horizontally (↔) into a wall or any other vertical surface.
11. Dress properly for the work being performed.
 - Do not wear loose clothing or jewelry which can get caught in moving or rotating parts.
 - Rubber gloves and non-skid footwear is recommended when working outside.
 - Wear protective covering to contain long hair.
12. Don't abuse the cord. Never carry the tool by the cord or yank the cord to disconnect the plug from the receptacle.
13. Secure the drill stand to the work surface. Use an anchor bolt, ceiling jack or vacuum attachment to secure the drill stand to the work surface.
14. NEVER stand on the drill stand base as a method of securing the drill stand!
15. Don't overreach! Keep proper footing and balance at all times. The slippery surface created during the drilling operation results in unstable footing.
16. **ALWAYS** disconnect the power before servicing or changing accessories or bits.
17. **ALWAYS** check, then make sure wrenches are removed from the motor spindle and bit adapter before connecting power or starting the drill motor.
18. **ALWAYS** make sure power switch is in "off" position before connecting drill to power.
19. **NEVER** Stand on the base at any time!
20. **Anchor** mounting is the most secure and is always recommend for both horizontal or vertical drilling over vacuum base mounting.

Caution: It is very important that the drilling machine is properly secured to the work surface. Movement during drilling will cause bit chatter against work surface, fracturing diamonds or binding bit in the hole.

I PREPARATION

B. General Information

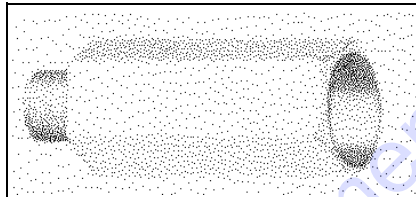
The DR520 & DR620 core drills are available with different power units.

MANUFACTURER	AMPS	VOLTS	PHASE	HERTZ
MILWAUKEE	15	115	SINGLE	60
Cardi	20	115	SINGLE	60
MILWAUKEE	20	115	SINGLE	60

All motors are **single phase** with two-speed selector switches. The **115 volt** motors will operate within a power range of 110 to 120 volts.

C. Bit Installation

The threads on the output spindle of the core drill motors have dimensions of 1-1/4"-7. Core bits are available in a variety of diameters. The spindle thread on the adapter nut of the core bit is 5/8"-11 on smaller diameter bits. The use of an adapter coupling part number 400148 is required in order to run smaller diameter bits. The adapter provides a coupling which has a female 1-1/4"-7 thread on one side and a 5/8"-11 spindle on the other end.

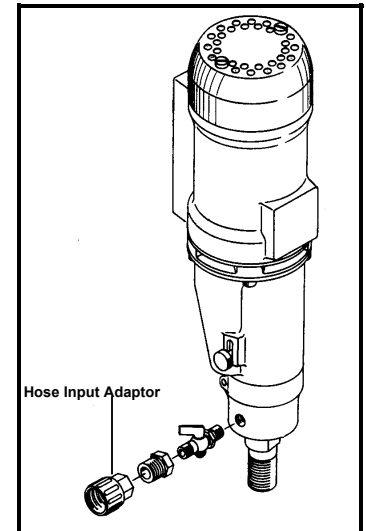


**Core Bit Adapter
Part Number 400148**

1. Using a wrench to firmly hold the output shaft , screw the core bit onto the spindle until snug.
2. Placing one wrench on the machined flats of the output shaft and one wrench on the end adapter of the core bit tighten the bit on the spindle. **Note:** Attempting to turn the bit by the barrel rather than by the adapter nut may break the weld between the adapter nut plate and the barrel.

D. Water Supply

It is important when wet cutting to maintain an adequate supply of clean water to the diamond drill bits. The hose input adapter on the water swivel at the base of the core drill motor is used to connect the water supply hose to the core drilling unit. Special precautions should be taken to insure that the water supply will not be interrupted during the drilling operation.



I PREPARATION

E. Electrical Supply

The DR520 & DM620 core drills are furnished with 115 volt, single phase motors. These motors operate within a power range of 110 to 120 volts. Serious damage can result if the supply line voltage does not fall within this range.

The following wire sizes are recommended when using an extension cord:

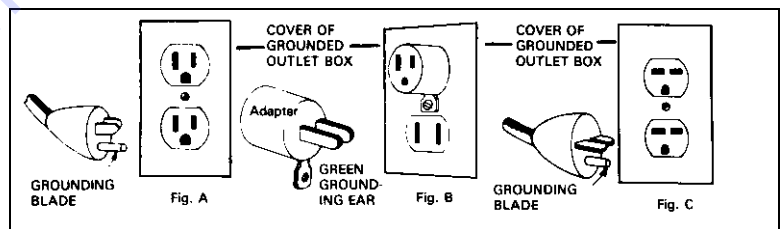
DISTANCE FROM SOURCE	115 volt 25 FEET	115 volt 50 FEET	115 volt 75 FEET	115 volt 100 FEET
Wire Gauge	# 14	# 12	# 10	# 08

The DR520 & DR620 core drills are manufactured with a three conductor connector cord which attaches the motor to the electrical supply. The green wire provided is used to connect to a permanent ground.

- a. Before connecting the drill to the power source, make sure that the voltage and cycles shown on the name plate of the motor are the same as the available electrical power supplied.
- b. Always properly ground the core drill before attempting to start the motor. The presence of water during the drilling operation requires that the drill always be properly grounded.
- c. **NEVER connect the green wire to a live terminal !**

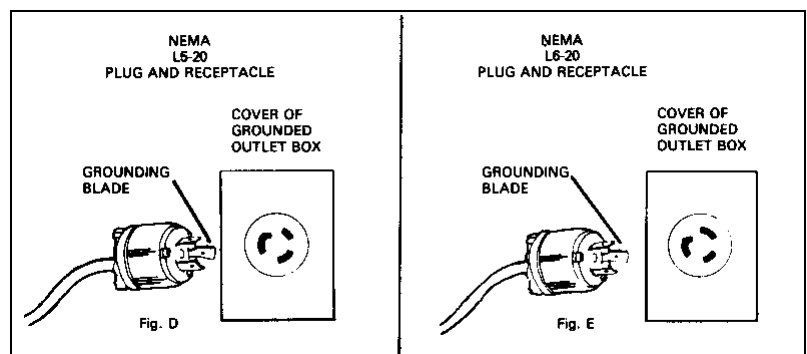
The use of 3-prong adapter is prohibited in Canada by the Canadian Electrical Code.

An adapter, Fig. "B" is available for connecting Fig. A plugs to two prong receptacles. The green grounding ear extending from adapter must be connected to a permanent ground such as to properly grounded outlet box. No adapter is available for fig "C" plugs.



NOTE: RECEPTACLE MUST BE GROUNDED FOR SAFE USE OF ADAPTER:
IF IN DOUBT CALL A QUALIFIED ELECTRICIAN AND HAVE THE RECEPTACLE CHECKED FOR GROUND.

To connect twist lock plugs like those shown in figures D and E, insert the plug into a matching outlet. When the plug is fully inserted, turn it clockwise until it locks. This prevents the plug from being pulled out accidentally. To remove the plug, twist it counterclockwise to unlock it and remove it from the outlet.



II OPERATION

A. Core Drill Positions

To position the core drill:

1. Roll the drill so that the spindle is positioned over the desired drilling location.
2. Using the leveling screws located on the four corners of the base, level the core drill to insure that the bit will drill a straight, vertical hole.

⇒ **CEILING BRACING** - can be used when the ceiling above the work area is strong enough to provide solid bracing. A length of pipe may be used with the adjustable brace on the top of the drill column to firmly secure the drill against the work piece.

⇒ **ANCHOR BOLTING** - is a method used quite often in both horizontal and vertical drilling. The anchor is secured in the work surface and the core drill is placed over the anchor bolt so that the bolt goes through the hole in the center of the drill base. A nut and washer is used to pull the base down as the nut is screwed onto the anchor bolt.

⇒ **VACUUM HOLD DOWN** - requires that the surface of the intended drilling area be smooth or of an even texture in order to achieve an effective bond to the drilling surface. A large hold down base and vacuum pump are used to fasten the drill to the work surface. Both the pump and large base are available as optional accessories for the drills.

B. Drilling Technique

The performance of any diamond core bit depends heavily on the use of proper drilling technique. Although drilling conditions and materials may vary, following specific guide lines insures faster drilling speeds and longer bit life.

1. Secure the core drill to the work surface so that there is no movement in the drill that would cause the core bit to bind in the hole.
2. Insure that the hole is constantly flushed of abrasive fines by supplying a sufficient flow of water.
3. Slowly lower the bit into the hole so that there is no skidding or lateral movement of the drill. The entire circumference of the core bit should penetrate the drilling surface before additional pressure is applied to the handle.
4. Exert steady downward pressure while drilling. NEVER force the bit into the material!
5. Do not stop the flow of water or rotation of the bit while the core bit is drilling.
6. Check the core bit if the drilling rate decreases noticeably. The slowing penetration rate generally indicates that the bit is in need of reconditioning.



II OPERATION

C. Vacuum Hold Down Operation

The vacuum hold down base and pump work together to seal the drill to the work surface. The vacuum pump requires 115 volt electrical supply. A 115 volt accessory outlet located on the switch box is used to supply power to the vacuum pump. One outlet is consistently supplied with power so that turning the motor off does not turn off the vacuum pump and release the drill from the work surface.

1. Mount the column and carriage in the large vacuum hold down base.
2. Connect the vacuum pump to the vacuum base.
3. Wet the work area in order to achieve an effective seal.
4. Connect the vacuum pump cord into the top outlet of the receptacle in the switch box above the motor. This will start the pump and create a seal between the base and the work surface.
5. Adjust the leveling screws so that the core drill is level and resting lightly on the vacuum seal.
6. Plug the vacuum pump cord into the live outlet of the receptacle in the switch box. This will start the pump and create a seal between the base and the work surface.
7. Adjust the leveling screws so that the base is snug against the work surface. NOTE: (Excessive tightening of the leveling screws will break the seal between the base and the work surface).
8. To turn the vacuum pump off, unplug the power cord.

D. Water Collector Operation

The water collector unit (Part Number 402034) is designed to work with any core drill. It can be used with any diameter core bit up to and including ten inch. The unit consists of a tear dropped shaped ring with a rubber seal, a 115 volt electric water pump and a drainage hose.

1. Place the pump in the small end of the tear-drop ring. Center the large area of the ring over the area to be drilled.
2. Run the drainage hose from the pump to a drainage barrel and secure the hose to the barrel with the hose hook.
3. PROPERLY GROUND THE PUMP, then plug it into the top outlet of the core drill switch box.
4. Turn the pump off by unplugging the pump power cord at the cord drill switch box.

III. MAINTENANCE AND COMPONENT DESCRIPTION

A. Motor Specifications Cardi

Specifications

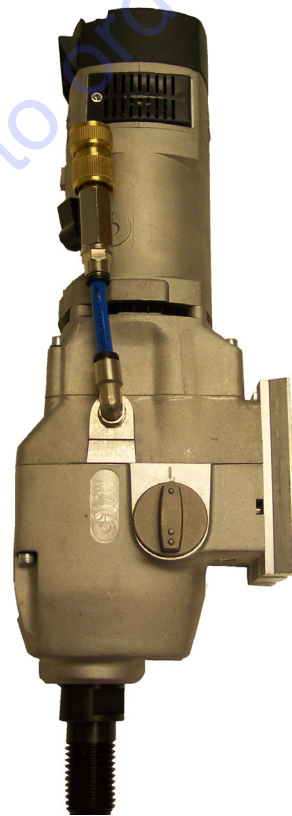
MFR	MODEL	VOLT	AMP	MOTOR RPM		BIT CAPACITY IN	
				LOW GEAR	HIGH GEAR	LOW GEAR	HIGH GEAR
Cardi	D3-250	120	20	420	860	8"-10"	4"-7"

*Refer to motor owners manual supplied with drill for required motor maintenance.

The Cardi motor is designed to operate at two speeds. Changing speeds is accomplished by using the speed shift knob built into the gear case of the unit.

Changing the rpm of the motor is accomplished as follows:

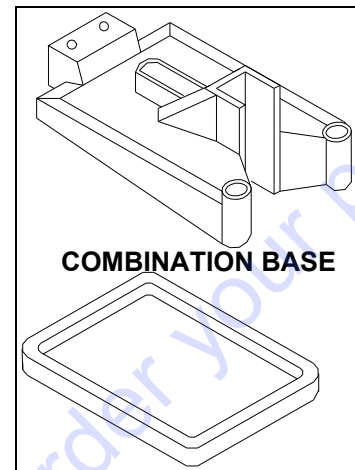
1. Turn off switch, wait for spindle to stop then rotate the shift knob to go from the HIGH(••) to LOW(•) speed.
2. Move the shift knob until the clutch teeth are fully engaged. Moving the knob toward the single dot engages the LOW rpm while moving the knob toward the two dots engages the HIGH rpm.
3. Attempting to shift with the motor off may require turning the spindle by hand to engage the clutch.



Changing the rpm while the motor is running will damage gears and void warranty.

III. MAINTENANCE AND COMPONENT DESCRIPTION

The vacuum pump is used with the large vacuum hold down base to secure the core drill on smooth evenly textured surfaces. The pump is powered by a 115 volt, 4.2 amp, 60 hertz electric motor. The power cord of the pump is plugged into the **live** outlet of the receptacle in the switch box of the core drill. The switch box on the drill allows the motor on the drilling unit to be turned on and off without shutting down the vacuum pump and breaking the seal between the drill base and the work surface.



The required maintenance procedure for the vacuum pump is listed in the "**Parts List and Operating and Maintenance Instructions**" pamphlet. Parts for the vacuum pump are available from local distributors of Gast products. A listing of Gast distributors is available in this drill manual and in the vacuum pump pamphlet.

B. Leveling Screws

The four leveling screws on the base should be cleaned with a mild solvent and lubricated with a lightweight machine oil each time the machine is used. Allowing the slurry to accumulate on the threads may cause damage to the threads in the base.

C. Carriage

The carriage or head assembly should be cleaned and lubed with a lightweight machine oil each time the machine is put away. Allowing slurry to build on the column and inside the carriage will prematurely wear the pinion gear and gibs.

III. MAINTENANCE AND COMPONENT DESCRIPTION

D. Gibs

The gibs are brass wear shims used on the inside of the carriage which allow the carriage to slide freely and rigidly on the column. The gibs require periodic replacement. Replacing the gibs is necessary when the carriage is no longer rigid on the column. Keeping the column free of excess debris and burrs will maximize the service life of the gibs.

E. Motor Spindle

The motor spindle on all core drill motors is equipped with 1-1/4"-7 thread dimensions. The end adapter of the core bit is also threaded 1-1/4"-7 on core bits of 2 inches and larger diameter. Core bits with a diameter less than 1-5/8 inches have 5/8"-11 threads and require the use of an adapter. The motor spindle maintenance should be performed each time the machine is stored for the day. Leaving the core bit on the motor spindle may cause the threads on the spindle to rust making removal of the core bit very difficult. After removing the core bit check the threads for any nicks or burrs. The spindle should then be cleaned with a mild solvent and lubricated with a lightweight machine oil.

Removing the core bit from the motor spindle by turning the core bit barrel is not recommended. The core bit barrel may break the weld between the adapter plate and barrel if excessive side pressure is applied. The best results are achieved using two wrenches. One of the wrenches placed on the machined flats on the motor spindle and the other wrench on the core bit end adapter.

F. Vacuum Seal

The vacuum seal is the sponge rubber gasket which lines the bottom of the large vacuum base. The material prevents air from entering the area under the base. Thus allowing the vacuum to pull against the work surface. In order for the seal to work properly the seal material must remain pliable and in one piece with no gaps or inconsistencies on the surface. The vacuum seal should be rinsed at the completion of each operation. Allowing the slurry to accumulate on the gasket will cause the material to deteriorate prematurely. The vacuum seal should be checked on a regular basis and replaced if it has been damaged or started to deteriorate.

III. MAINTENANCE AND COMPONENT DESCRIPTION

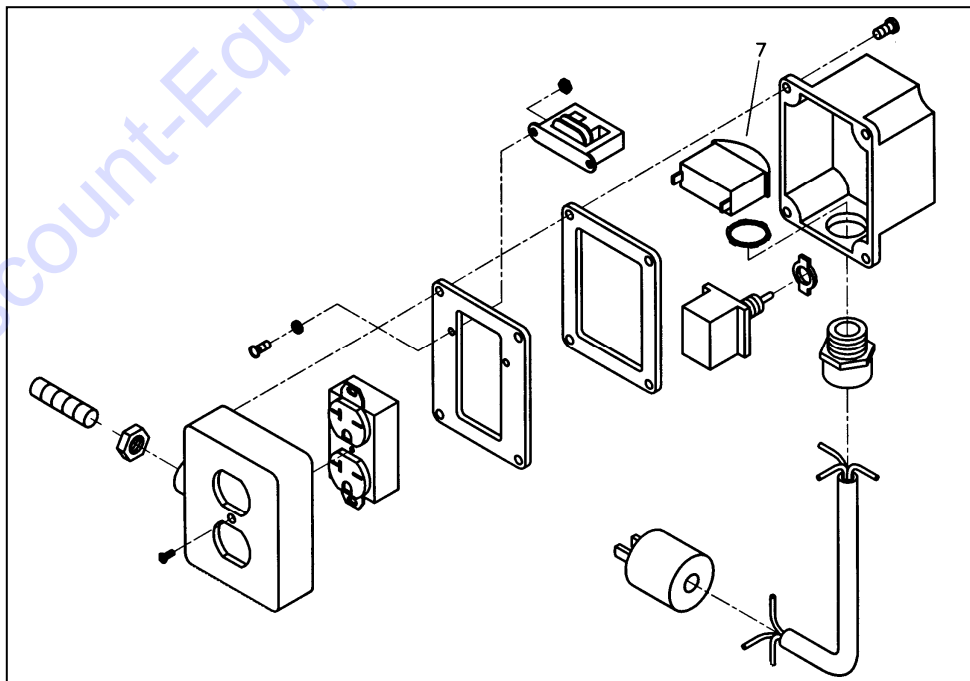
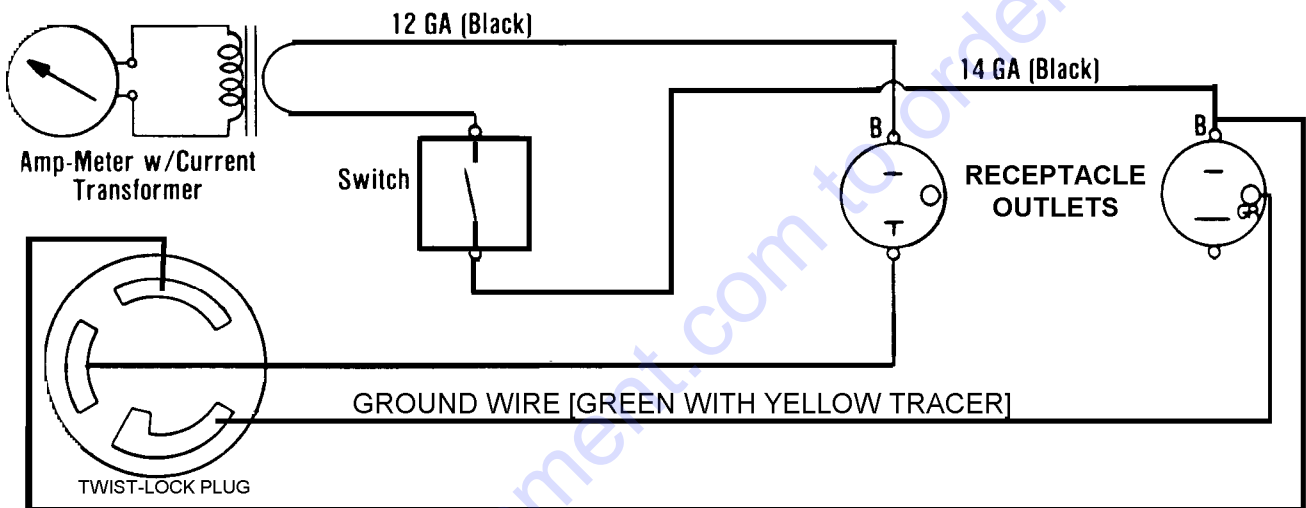
G Electrical Wiring Diagram

BEFORE CONNECTING DRILL TO THE POWER SOURCE, MAKE SURE THE VOLTAGE AND CYCLES SHOWN ON THE NAME PLATE AGREE WITH THE AVAILABLE ELECTRICAL SUPPLY!

ALWAYS PROPERLY GROUND THE CORE DRILL!

NEVER CONNECT THE GREEN WIRE TO A LIVE TERMINAL!

INTERNAL WIRING DIAGRAM



See Page 19 For Switch Box Parts Breakdown

IV. PARTS LIST SECTION

A. Ordering Information

1. List model number of machine.
2. List part number and description of part (not item number).
3. Wherever alternate parts are shown due to product improvement, inspect the part you have and provide additional description as necessary.
4. Specify mode of shipping desired, such as, parcel post, truck, air freight, U.P.S., best way, etc.

B. Optional Accessories

1. **Vacuum Hold Down: Part Number 407000** Provides a means of securing the core drill on smooth evenly textured surfaces without using anchors.
2. **Water Collector Kit: Part Number 402034** recovers the excess water used during the drilling operation and pumps it into a drum. The ring is used to limit the amount of area that is exposed to water. The ring is best used in areas where the surface texture is smooth and even.
3. **Shaft Couplings:** The couplings are used as adapters which decrease or increase the spindle diameter and thread dimension.

Part Number	Spindle Thread	Adapter Thread
400145	1/2"--20	5/8"--11
400146	5/8"--11	1/2"--20
400147	5/8"--11	1-1/4"--7
400148	1-1/4"--7	5/8"--11



4. **Shaft Extensions:** Extend the depth to which a core bit will drill when the carriage has reached the maximum travel distance of the column.

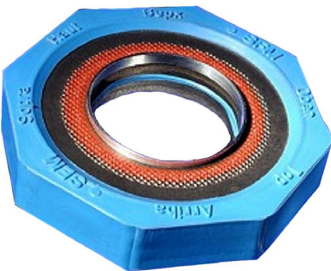

Part Number	Spindle Thread	Length
402754	1-1/4"--7	9"
402755	1-1/4"--7	3.5"
402756	1-1/4"--7	12"
402757	5/8"--11	12"
402758	5/8"--11	6"
402759	5/8"--11	3"



5. **Motor Spacer Plate Kit: Part Number: 408002** Moves the motor away from the column so that the drill will accept up to a fourteen inch bit.



B. Optional Accessories

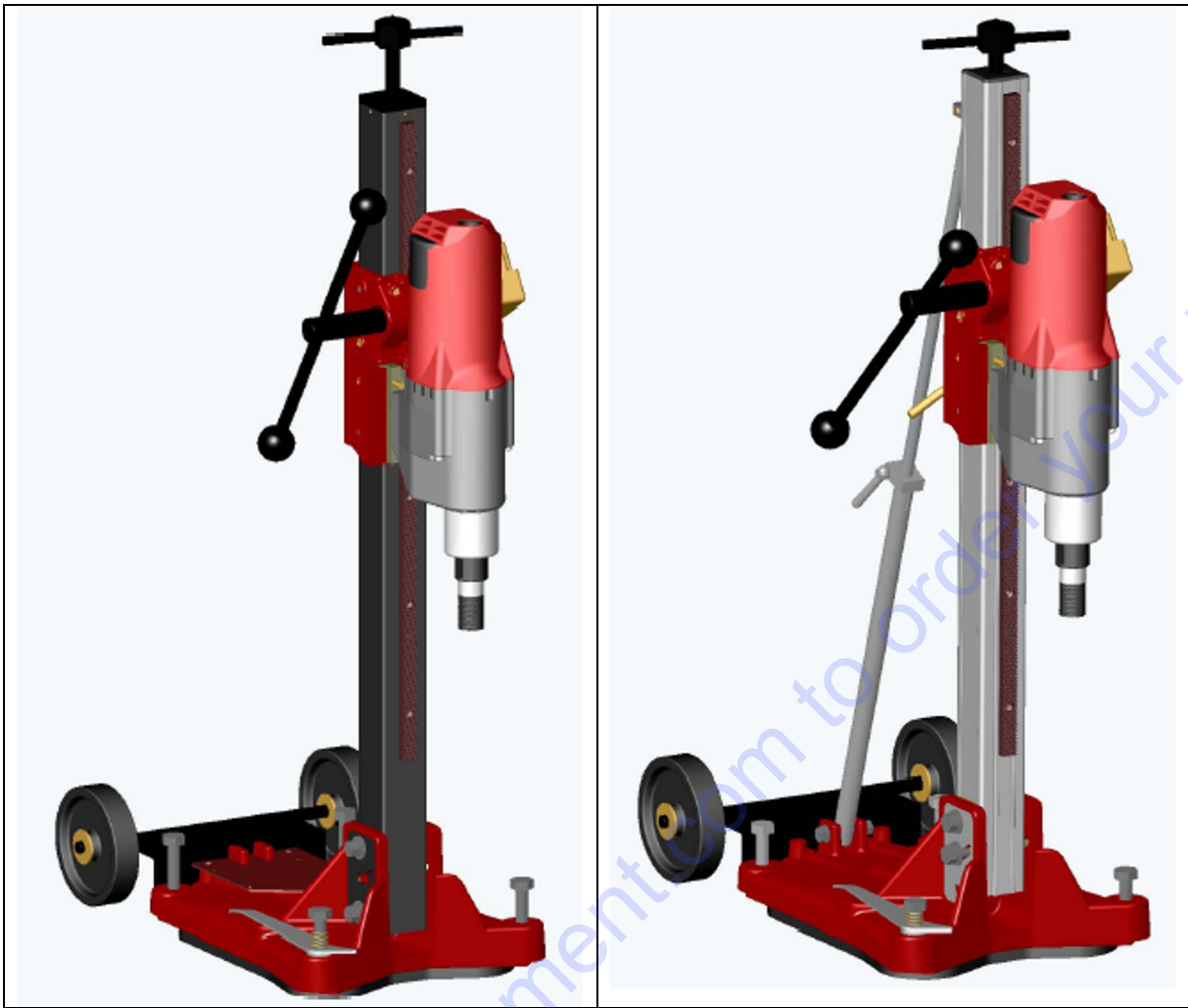
	<p>Part Number 408003</p>	<p>UPC: 70184600938</p> <p>The Bit Slider Helps prevent the core bit from "sticking" on threads of spindle. No more need for wrench and hammer to remove core bits.</p>
	<p>Part Number 403126</p>	<p>UPC: 70184675539</p> <p>Water Pressure Tank 4 Gallon capacity Metal Construction Fittings included</p>

ASSEMBLY DRAWINGS

DR520, DR620 & DR620C CORE DRILLS

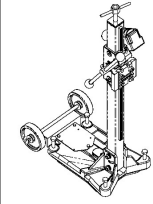

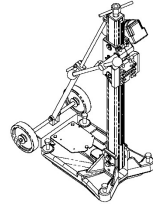
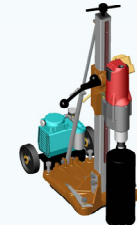
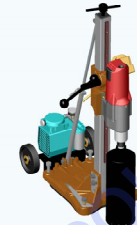
DS5 & DS6 CORE DRILL STAND

[Go to Discount-Equipment.com](http://Discount-Equipment.com) to order your parts



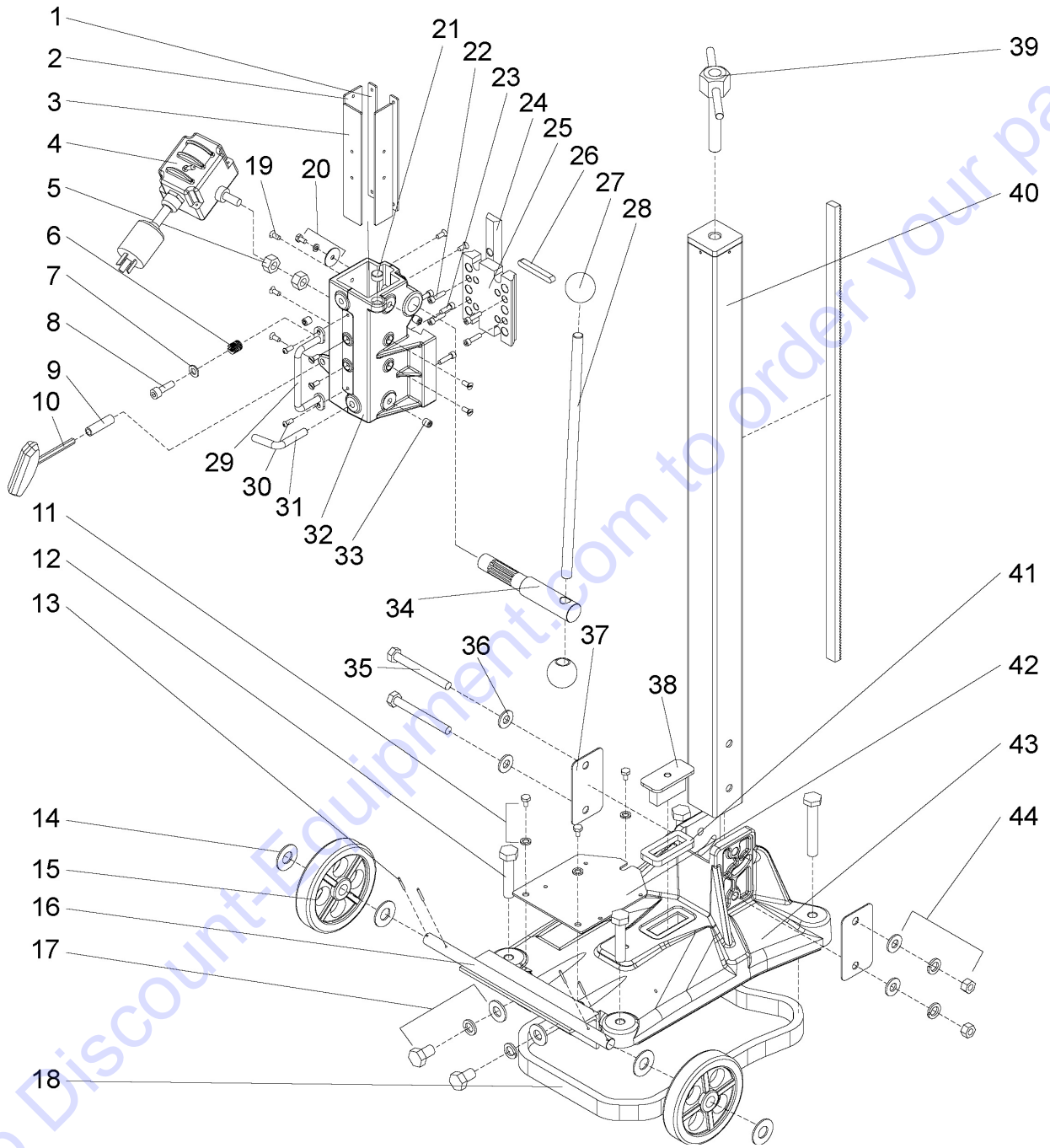
IV. PARTS LIST SECTION

Product Breakdown:

	Model	UPC	Description
	DS5	70184600922	Rental Drill Stand Only
	DR520	70184600924	DS5, Milwaukee 20A Drill Motor, Vacuum Pump
	DS6	70184600923	Professional Drill Stand Only
	DR620	70184600925	DS6, Milwaukee 20A Drill Motor, Vacuum Pump
	DR620C	70184600926	DS6, Cardi 20A Drill Motor, Vacuum Pump

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DS5 & DR520



DS5 & DR520

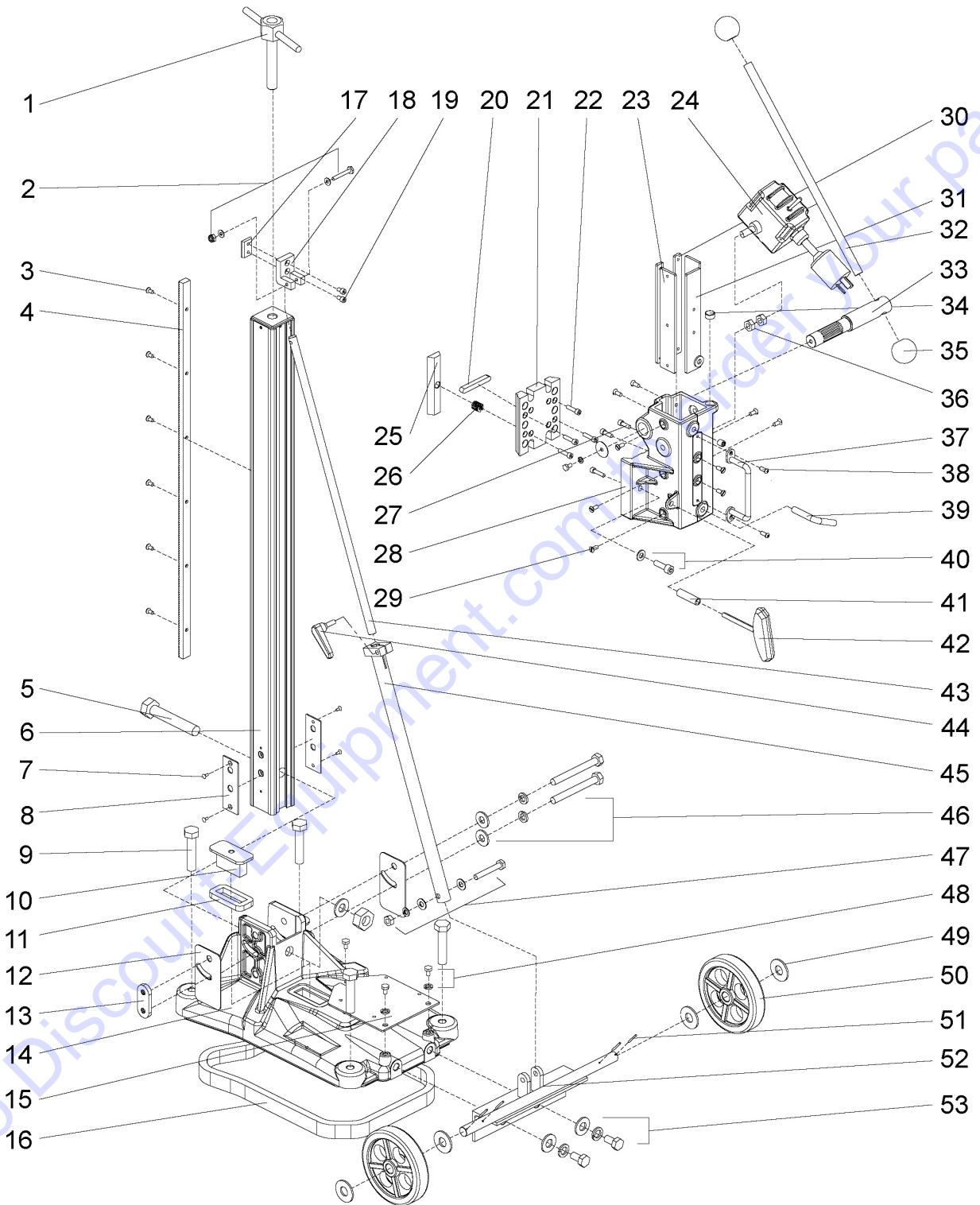
Item No.	Part#	UPC#	Description	Qty
-NA-	407000	70184679912	PUMP VAC ASSY W/FITTINGS	Opt
-NA-	403064	70184657985	MOT 20A 115V MILW ASSY	Opt
-NA-	403061	70184657976	MOT 15A 115V MILW ASSY	Opt
-NA-	408001	70184600916	MOT 20A 115V CARDI D3-250	Opt
-NA-	408002	70184600927	SPACER BLOCK DS5-DS6	Opt
-NA-	408003	70184600938	QUICK DISCONNECT BIT SLIDER	Opt
1	408004	70184600985	GIBB BRASS 3X16X215MM	2
2	408005	70184600986	GIBB BRASS 3X38X215MM LS	1
3	408006	70184600987	GIBB BRASS 3X38X215MM	2
4	407062	70184679998	SWITCH BOX	1
5	27006	70184681615	NUT M10 1.5 DIN934	2
6	408007	70184600988	BUSHING THREADED 3/8X5/8	1
7	8177012	70184650149	WASHER 3/8 SPRING LOCK ZN	1
8	9048126	70184600989	SCR 3/8-16 X 1 SOC HD CP	1
9	408008	70184600990	TUBE 3/8ID X 1/2OD X 1L	1
10	408009	70184600991	WRENCH ALLEN 8MM T HANDLE	1
11	8041048	70184649898	SCR 3/8-16 X 3/4 HEXHDCAP	3
12	8041146	70184649936	SCR 5/8-11 X 3 HEXHDCAP	4
13	227146	70184674553	PIN COTTER 1/8 X 1-1/2	4
14	27505	70184681623	WASHER M20 DIN125	4
15	408010	70184600992	WHEEL 6 X 1-3/8 X 3/4 (2)	2
16	408011	70184600993	WHEEL DOLLY BRACKET DS5	1
17	8042136	70184600994	SCR 5/8-11 X 1 HEXHDCAP	2
	8177016	70184650156	WASHER 5/8 SPRING LOCK	2
	8172013	70184650127	WASHER 5/8 SAE	2
18	408012	70184600983	GASKET VACUUM BASE DS5- DS6	1
19	408013	70184600995	SCR 1/4-20 X 1/2 FHCP BRASS	9
20	8041008	70184649881	SCR 1/4-20X1 1/2 HEXHDC	1
21	408014	70184600996	BUBBLE LEVELING	1
22	9048092	70184650195	SCR 1/4-20X1 SOC HD CAP	6
23	9048090	70184600997	SCR 1/4-20X3/4 SOC HD CAP	4
24	408015	70184600998	DOVETAIL MOUNT 30 X 125MM MOTOR MOUNT PLATE DS5- DS6	1
25	408016	70184600999	MOTOR MOUNT PLATE DS5- DS6	1
26	P110294	70184680687	KEY 3/8 X 3/8 X 2	1
27	408017	70184601000	KNOB HANDLE DS5-DS6	2
28	408018	70184601001	HANDLE BAR DS5-DS6	1
29	408019	70184601002	HANDLE CARRYING DS5-DS6	1
30	8041002	70184649875	SCR 1/4-20X1/2 HEXHDCAP	2
31	408020	70184601003	CARRIAGE LOCK 7/16-14 DS5- DS6	1

DS5 & DR520

Item No.	Part#	UPC#	Description	Qty
32	408021	70184601004	CARRIAGE DS5-DS6	1
33	9083143	70184601005	SCR 7/16-14 X 1/2 SOC SET SCR	3
34	408022	70184601006	PINION GEAR DS5-DS6	1
35	8041095	70184649919	SCR 1/2-13 X4 1/2 FULL TH	2
36	8172011	70184650124	WASHER 1/2 SAE	4
37	408023	70184601007	COLUMN SUPPORT BRACKET DS5-DS6	2
38	408024	70184601008	SLOT PLUG ONLY DS5-DS6	1
39	408025	70184601009	CEILING JACK DS5-DS6	1
40	408026	70184601010	COLUMN DS5-DS6	1
41	408027	70184600984	GASKET SLOT PLUG DS5-DS6	1
42	408028	70184601011	VACUUM MOUNT DS5-DS6	1
43	408029	70184601012	BASE DR5-DR6	1
44	8041107	70184649929	SCR 1/2-13X4 1/2 HEXHDCAP	2
	8172011	70184650124	WASHER 1/2 SAE	4
	8177014	70184650154	WASHER 1/2 SPRING LOCK	2
	8143005	70184650358	NUT 1/2-13 HEX JAM	2

Go to Discount-Equipment.com for your parts

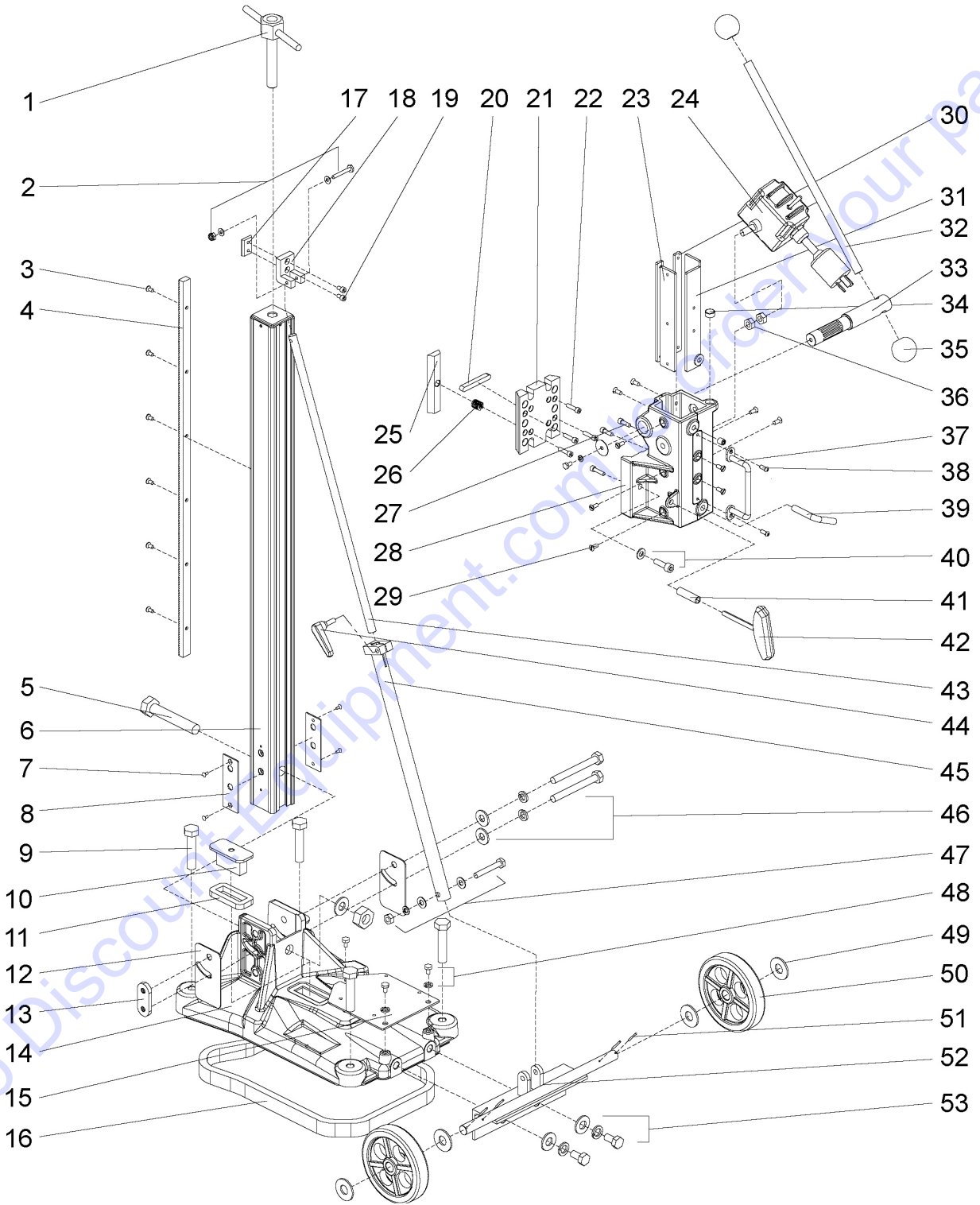
DS6, DR620, DR620C



DS6, DR620, DR620C

Item No.	Part#	UPC#	Description	Qty
-NA-	407000	70184679912	PUMP VAC ASSY W/FITTINGS	Opt
-NA-	403064	70184657985	MOT 20A 115V MILW ASSY	Opt
-NA-	403061	70184657976	MOT 15A 115V MILW ASSY	Opt
-NA-	408001	70184600916	MOT 20A 115V CARDI D3-250	Opt
-NA-	408002	70184600927	SPACER BLOCK DS5-DS6	Opt
-NA-	408003	70184600938	QUICK DISCONNECT BIT SLIDER	Opt
1	408025	70184601009	CEILING JACK DS5-DS6	1
2	408030	70184601013	SCR M6 X 45 1.0 DIN933	1
	27539	70184600585	WASHER M6 DIN125	2
	27003	70184600850	NUT M6 DIN985 LOCK	1
3	408031	70184601014	SCR M6 X 12 1.0 DIN965 FHP	6
4	408032	70184601015	GEAR RACK DS6	1
5	8041095	70184649919	SCR 1/2-13 X4 1/2 FULL TH	2
6	408033	70184601016	COLUMN DS6 W/TOP PLATE	1
7	408034	70184601017	SCR M4 X 6 0.7 DIN965 FHP	4
8	408035	70184601018	PLATE REINFORCEMENT DS6	2
9	8041146	70184649936	SCR 5/8-11 X 3 HEXHDCAP	4
10	408024	70184601008	SLOT PLUG ONLY DS5-DS6	1
11	408027	70184600984	GASKET SLOT PLUG DS5-DS6	1
12	408036	70184601019	PLATE ANGLE GUIDE DS6	2
13	408037	70184601020	PLATE ANGLE ADJUST DS6	1
14	408029	70184601012	BASE DR5-DR6	1
15	408028	70184601011	VACUUM MOUNT DS5-DS6	1
16	408012	70184600983	GASKET VACUUM BASE DS5- DS6	1
17	408038	70184601021	PLATE ANGLE ADJ BAR DS6	1
18	408039	70184601022	BRACKET ANGLE ADJUSTMENT DS6	1
19	9042088	70184601023	SCR 1/4-20 X 1/2 SHCP	2
20	P110294	70184680687	KEY 3/8 X 3/8 X 2	1
21	408016	70184600999	MOTOR MOUNT PLATE DS5- DS6	1
22	9048092	70184650195	SCR 1/4-20X1 SOC HD CAP	4
23	408040	70184601024	GIBB TEFLON 5X38X215MM 3HOLE	1
24	27006	70184681615	NUT M10 1.5 DIN934	1
25	408015	70184600998	DOVETAIL MOUNT 30 X 125MM	1
26	408007	70184600988	BUSHING THREADED 3/8X5/8	1
27	9048090	70184600997	SCR 1/4-20X3/4 SOC HD CAP	6
28	408021	70184601004	CARRIAGE DS5-DS6	1
29	408013	70184600995	SCR 1/4-20 X 1/2 FHCP BRASS	6

DS6, DR620, DR620C

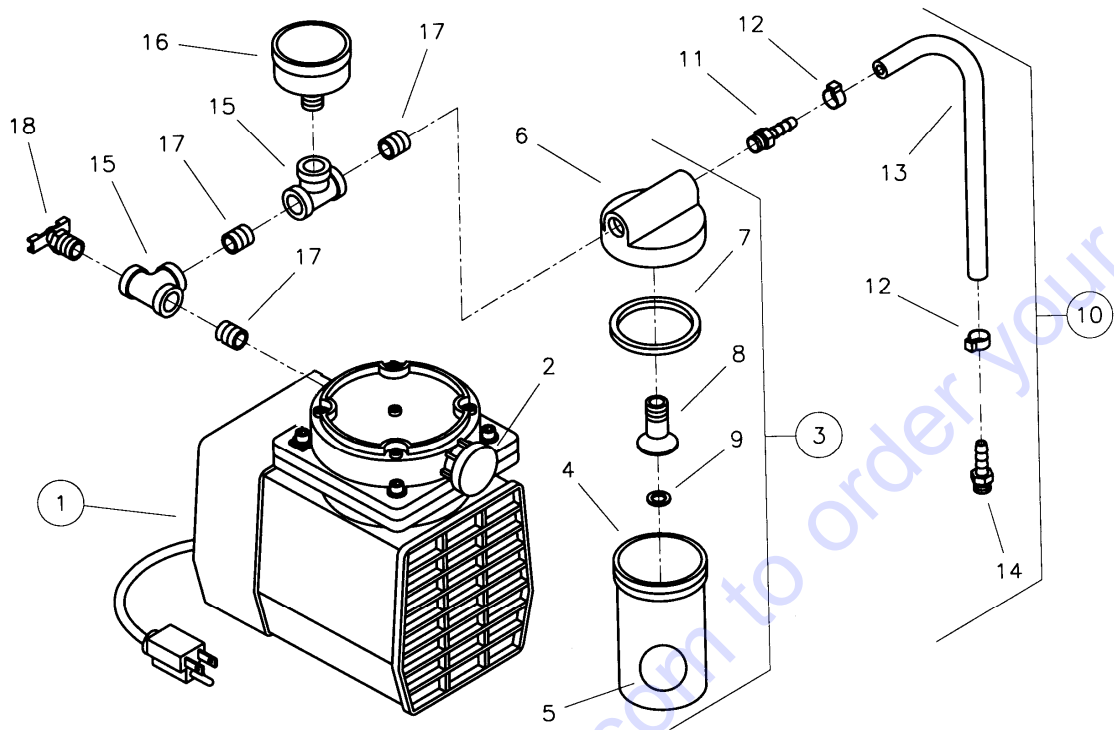


DS6, DR620, DR620C

Item No.	Part#	UPC#	Description	Qty
30	408041	70184601025	GIBB TEFLON 5X16X215MM FRONT	2
31	408042	70184601026	GIBB TEFLON 5X38X215MM 2HOLE	2
32	408018	70184601001	HANDLE CARRYING DS5-DS6	1
33	408022	70184601006	PINION GEAR DS5-DS6	1
34	408014	70184600996	BUBBLE LEVELING	1
35	408017	70184601000	KNOB HANDLE DS5-DS6	2
37	408019	70184601002	HANDLE CARRYING DS5-DS6	1
38	8041002	70184649875	SCR 1/4-20X1/2 HEXHDCAP	1
39	408020	70184601003	CARRIAGE LOCK DS5-DS6	1
40	9048126	70184600989	SCR 3/8-16 X 1 SOC HD CP	1
41	408008	70184600990	TUBE 3/8ID X 1/2OD X 1L	1
42	408009	70184600991	WRENCH ALLEN 8MM T HANDLE	1
43	408043	70184601027	BAR ANGLE ADJUSTMENT DS6	1
44	408044	70184601028	KNOB ANGLE ADJUSTMENT DS6	1
45	408045	70184601029	TUBE ANGLE ADJUSTMENT DS6	1
46	8041107	70184649929	SCR 1/2-13X4 1/2 HEXHDCAP	2
	8177014	70184650154	WASHER 1/2 SPRING LOCK	
	8172011	70184650124	WASHER 1/2 SAE	
47	8041056	70184649906	SCR 3/8-16 X 2-1/2 HEXHDCAP	1
	8172009	70184650123	WASHER 3/8 SAE	
	8177012	70184650149	WASHER 3/8 SPRING LOCK	
	8142003	70184650349	NUT 3/8-16 HEX	
48	8041048	70184649898	SCR 3/8-16 X 3/4 HEXHDCAP	3
49	27505	70184681623	WASHER M20 DIN125	4
50	408010	70184600992	WHEEL 6 X 1-3/8 X 3/4 (2)	2
51	227146	70184674553	PIN COTTER 1/8 X 1-1/2	4
52	408046	70184601030	WHEEL DOLLY BRACKET DS6	1
53	8042136	70184600994	SCR 5/8-11 X 1 HEXHDCAP	2

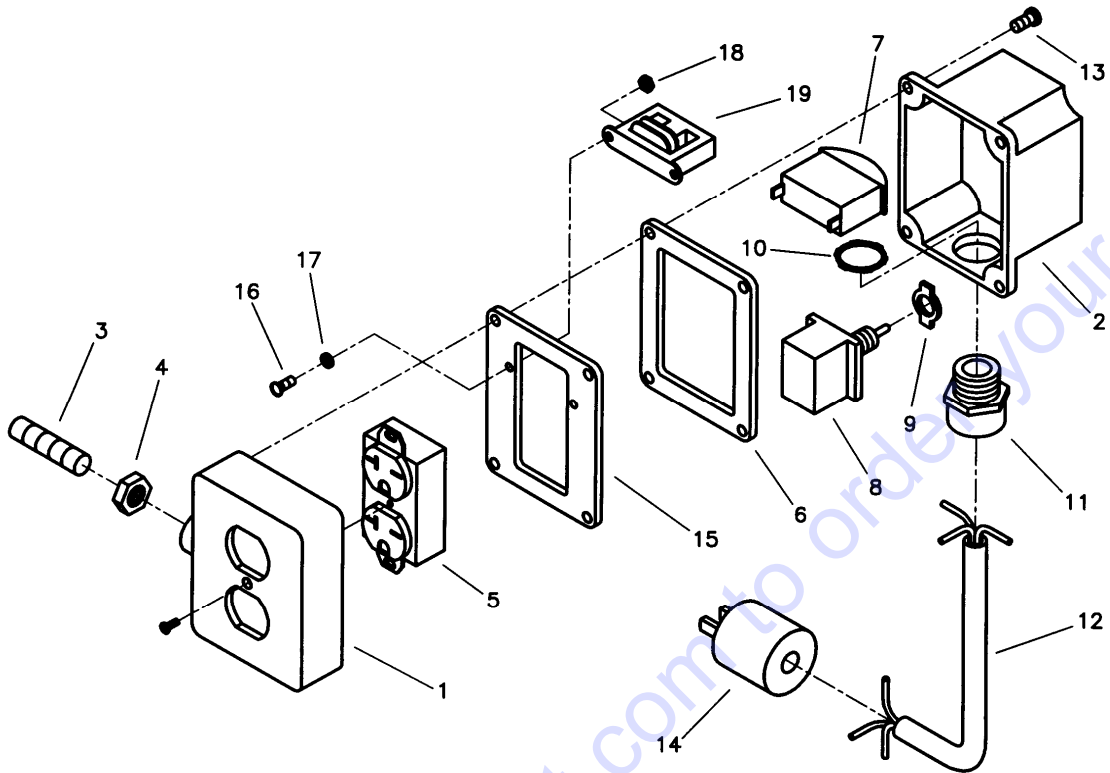
Go to Disc... Parts

Vacuum Base Assembly: DR520, DR620, and DR620C



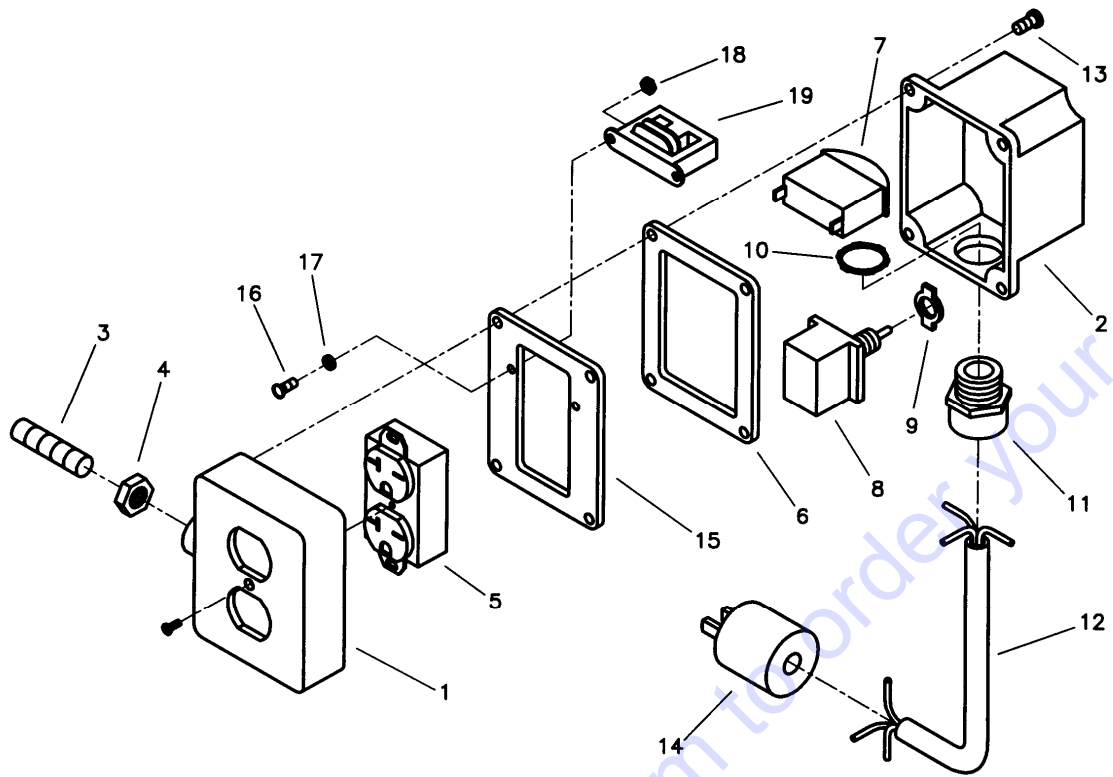
Item	Part #		Description	Qty
-NA-	407000	70184679912	VACUUM PUMP ASSY 110-VOLT (INCLUDES 1-18)	1
1	-NA-	-NA-	USE 407000	1
2	407045	70184680257	MUFFLER	1
3	-NA-	-NA-	USE YD2700014, YD2700017, 407051, 407052, 407047, AND 407048	1
4	407047	70184680099	WATER TRAP JAR	1
5	407048	70184680184	FLOAT BALL	1
6	YD2700014	70184670831	WATER TRAP TOP	1
7	YD2700017	70184669874	WATER JAR GASKET	1
8	407051	70184681740	BRASS FUNNEL FITTING	1
9	407052	70184681741	O-RING	1
10	407053	70184681142	HOSE ASSY 9-1/4" LONG (INCLUDES 11-14)	1
11	407054	70184680456	1/4" HOSE BARB TO 1/4" MALE PIPE	1
12	407055	70184681205	HOSE CLAMP 1/2" PINCH ON	2
13	407056	70184681739	HOSE 1/4" ID X 9-1/4" LONG	1
14	9600004	70184650460	FITTING 1/4" HOSE BARB TO 1/8" MALE PIPE	1
15	8428001	70184650412	PIPE TEE 1/4" NPT	2
16	407059	70184680050	VACUUM GAUGE	1
17	8404001	70184650676	CLOSE NIPPLE 1/4" NPT	3
18	407061	70184681100	AIR PETCOCK	1

Electrical Box Assembly: DS5, DS6, DR520, DR620, and DR620



Item	Part #	UPC#	Description	Qty
-NA-	407062	70184679998	ELECTRICAL BOX ASSEMBLY 110-VOLT (INCLUDES 1-19)	1
1	407063	70184680763	SWITCH BOX	1
2	407064	70184681204	SWITCH BASE	1
3	407065	70184681768	STUD 1/2"-13 X 2"	1
4	8143005	70184650358	NUT 1/2-13 HEX JAM	1
5	407067	70184680712	RECEPTACLE 110-VOLT	1
6	407068	70184683549	SPACER GASKET	1
7	407069	70184680070	AMP METER 110-VOLT	1
8	407070	70184680327	TOGGLE SWITCH 20-AMP	1
9	407071	-NA-	ON-OFF PLATE	1
10	407072	70184683337	SEALING LOCK NUT 3/4"	1
11	407073	70184683434	CORD CONNECTOR 3/4"	1

Electrical Box Assembly: DS5, DS6, DR520, DR620, and DR620



12	407074	70184683550	LINE CORD 110-VOLT	1
13	407075	-NA-	SCR #10-24 X 7/8" MACHINE ROUND HEAD	4
14	407076	70184683550	PLUG 30 AMP	1
15	407077	70184683551	MOUNT PLATE	1
16	407078	-NA-	SCR #6-32 X 1/2" MACHINE ROUND HEAD	2
17	407079	-NA-	WASHER #6 LOCK	2
18	407080	-NA-	NUT #6-32 HEX	2
19	407081	70184682234	TRANSFORMER 110-VOLT	1

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I. OPERATING AND MAINTENANCE INSTRUCTIONS (GAST MODEL DOA-V185A-AA)

Do not at any time lubricate any of the parts with oil, grease, or petroleum products nor clean with acids, caustics or chlorinated solvents. Be very careful to keep the diaphragm from contracting any petroleum product or hydrocarbons. It can affect the service life of the pump.

Danger: To prevent explosive hazard, Do NOT pump combustible liquids or vapors with these units. Personal Injury and/or Property Damage would result.

To replace the diaphragm, remove the socket cap screws from the head of the pump. The diaphragm is held in place by two Phillips head screws. Remove screws, retainer plate, and the diaphragm. The diaphragm will fit in any position on the connecting rod. Replace the plate and the two Phillips head screws. Torque to 30 inch-pounds on DOA and DAA. torque to 12 inch-pounds on MOA and MAA.

Caution: Do not raise any burrs or nicks on the heads of these screws. These burrs could cause damage to the inlet valve.

For replacing the inlet and outlet valve, remove the slotted machine screw that holds each valve in place. The stainless steel inlet and outlet valves are interchangeable.* Clean them with water. When replacing the outlet valve, place the new valve in location and note there is a retaining bar near the machine screw hole. This retaining bar holds the valve in position. When replacing the inlet valve, note that the valve holder is marked with an X in one corner. This X should be in the lower right hand corner toward the inlet of the air chamber. Replace the head and tighten the socket head screws to 90-100 inch-pounds of torque on DOA and DAA Torque to 30 Inch-pounds on MOA and MAA. *DOA and DAA models only.

WARNING-The motor may be thermally protected and can automatically restart when the overload resets. Always disconnect power source before servicing. Personal Injury and/or Property Damage could result.

Do not attempt to replace the connecting rod or motor bearings. If after cleaning the unit and/or installing a new Service Kit, the unit still does not operate properly, contact your representative, the factory, or return the pump to one of the GAST authorized Service Centers.

IF YOUR PUMP IS EQUIPPED WITH PLASTIC PLUGS IN THE EXHAUST AND/OR INTAKE PORTS, REMOVE BEFORE STARTING UNIT.

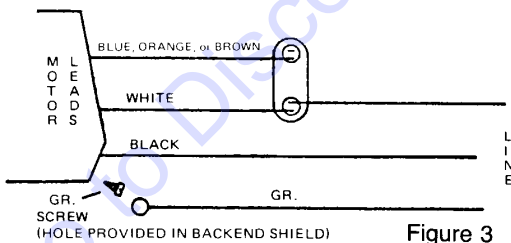
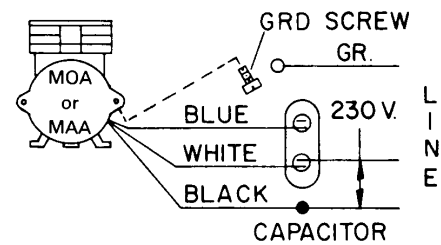
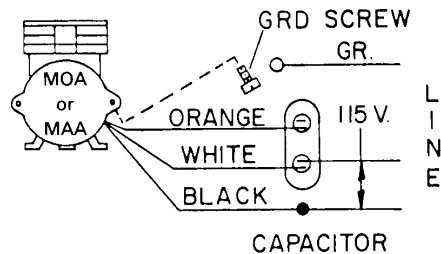
WIRING INFORMATION

For any D.C. unit-red lead goes to positive side of power source.

For any permanent split capacitor motor which has four leads(4) leads is as follows:
Brown leads to capacitor.

Black leads to Power Source.

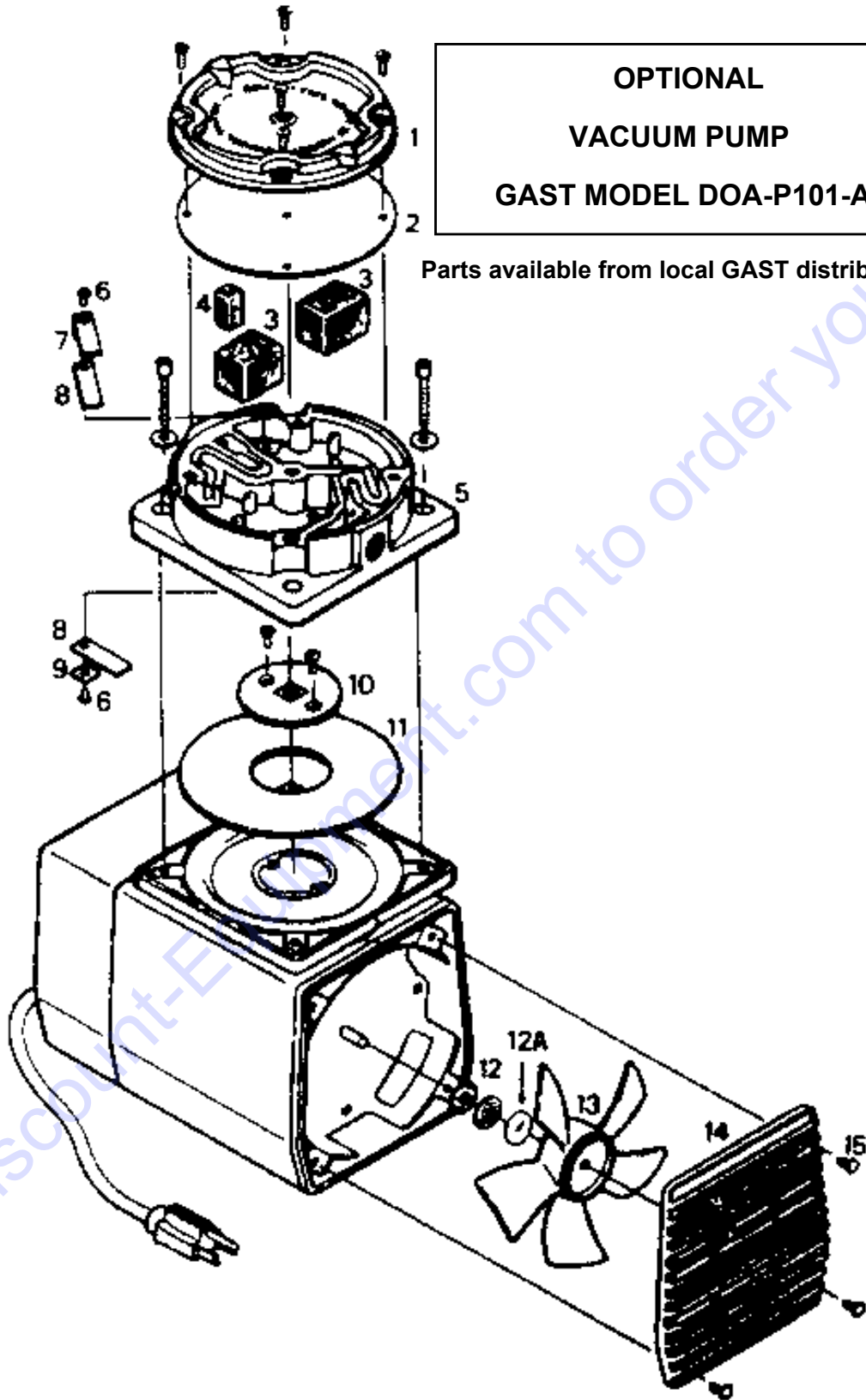
For any permanent split capacitor for DOA & DAA motor which has (3) leads is as follows: Figure 3



DO NOT ATTEMPT AT ANY TIME TO REMOVE THE CONNECTING ROD OR COMPLETELY DISASSEMBLE THE PUMP. IF IT DOES NOT GIVE YOU THE PROPER SERVICE EVEN AFTER INSTALLING A NEW SERVICE KIT, PLEASE RETURN IT TO ONE OF THE AUTHORIZED GAST SERVICE CENTERS LISTED IN THE SERVICE CENTER PAGES.

**OPTIONAL
VACUUM PUMP
GAST MODEL DOA-P101-AA**

Parts available from local GAST distributors



GAST PUMP MODEL DOA-P101-AA

Parts for vacuum pump available through local GAST PUMP distributors

REF NO.	DESCRIPTION	PART QTY.	GAST PART NO.
1	COVER	1	AF808
2	HEAD GASKET	2	AF820
3	FILTER/MUFFLER ELEMENT	2	AG998A
4	FILTER ELEMENT	1	AF857A
5	HEAD	1	AF804
6	VALVE SCREW	2	BB317
7	VALVE RETAINER	1	AF856
8	LEAF VALVE	2	AF817
9	VALVE RETAINER	1	AF819A
10	RETAINER PLATE	1	AF809
11	DIAPHRAGM	1	AF818A
12	FELT SPACER	3	AA929
12A	SPACER	1	AG970
13	FAN	1	AF533
14	GRILLE	1	AF807
15	RIVET	4	AE946
16	TANK	1	AC189
17	ADAPTOR PLATE	2	AF969
18	DRAIN VALVE	1	AE248
19	CHECK VALVE	1	AE761A
20	PRESSURE GAUGE	1	AA806
21	GLOBE VALVE	1	AE251
22	PRESSURE SWITCH	1	AF564
23	PLASTIC TUBE	1	AD159G
24	ELBOW	1	AE261B
25	TEE	1	BA418
28	TUBE CONNECTORS	1	AG247
29	PLASTIC TUBE	1	AE814C
30	ELBOW	1	AE261A
	SERVICE KIT	1	K294A
	MUFFLER	1	AH190A



SERVICE PARTS LIST

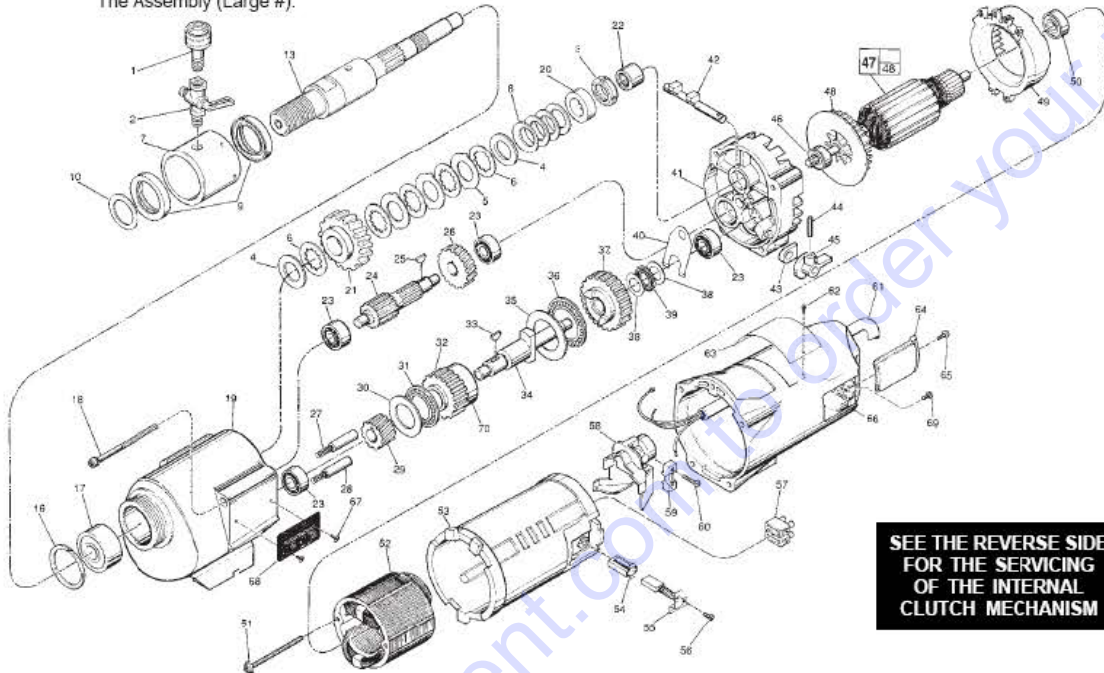
BULLETIN NO.
54-16-4093

SPECIFY CATALOG NO. AND SERIAL NO. WHEN ORDERING PARTS		REVISED BULLETIN	DATE
DYMODRILL with INTERNAL CLUTCH		54-16-4092	April 2003
CATALOG NO.	4096	STARTING SERIAL NO.	798C
		WIRING INSTRUCTION 58-01-0930	

EXAMPLE:

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 Component Parts (Small #)
 Are Included When Ordering
 The Assembly (Large #).



**SEE THE REVERSE SIDE
FOR THE SERVICING
OF THE INTERNAL
CLUTCH MECHANISM**

FIG.	PART NO.	DESCRIPTION OF PART	NO. REQ.
1	42-04-0600	Water Hose Adapter	(1)
2	45-80-0060	Shut Off Valve	(1)
3	06-57-1050	Retaining Nut	(1)
4	45-88-1140	Thrust Washer	(2)
5	43-06-0160	Clutch Disc-Outer	(3)
6	43-06-0150	Clutch Disc-Inner	(5)
7	43-76-0051	Water Swivel Hsg Incl 06-83-2430 Scr	(1)
8	40-50-2150	Disc Spring	(4)
9	45-06-0635	Seal	(2)
10	45-88-8565	Washer (Bag of 2)	(1)
13	38-50-6020	Spindle	(1)
16	34-80-3800	Retaining Ring	(1)
17	02-20-2515	Ball Bearing	(1)
18	06-82-9202	1/4-20 x 4-1/4" Taprite T-30	(4)
19	28-14-1870	Gear Case Assy Incl 06-65-1535 Pin	(1)
20	45-36-1520	Spindle Spacer	(1)
21	32-75-3420	Spindle Gear	(1)
22	02-50-4830	Needle Bearing	(1)
23	02-04-1205	Ball Bearing	(4)
24	36-66-3751	Pinion Shaft Assy.	(1)
25	06-42-1600	Woodruff Key	(1)
26	32-40-1581	Intermediate Gear	(1)
27	40-50-6300	Shifting Spring	(2)
28	44-70-0100	Shifting Plunger	(2)
29	32-60-1041	Pinion Gear	(1)
30	45-88-0520	Thrust Bearing Washer	(1)
31	02-80-1800	Thrust Bearing	(1)
★32	32-10-0060	Clutch Gear Assembly	(1)
33	06-42-2000	Woodruff Key	(1)
34	36-14-0061	Clutch Shaft	(1)
35	45-88-0530	Thrust Bearing Washer	(1)
36	02-80-5000	Thrust Bearing	(1)
37	32-10-0051	Clutch Gear Assembly	(1)
38	45-88-0510	Thrust Bearing Washer	(1)
39	02-80-1200	Thrust Bearing	(2)
40	45-98-0090	Shifting Yoke	(1)
41	14-13-0210	Diaphragm Assy.(Inc. 06-65-1155 Pin)	(1)
42	30-15-0272	Shift Cam	(1)
★43	43-44-0580	Foam Gasket	(2)
44	06-65-0840	1/8 x 3/4" Groove Pin	(1)
45	25-60-0056	Shifting Knob	(1)

FIG.	PART NO.	DESCRIPTION OF PART	NO. REQ.
46	02-04-1229	Ball Bearing	(1)
47	16-70-0320	120 V Armature	(1)
48	22-84-0790	Fan	(1)
49	42-14-0291	Baffle	(1)
50	02-04-1041	Ball Bearing	(1)
51	06-82-9152	10-24 x 5/16" Pan Hd. Sem. T-25	(2)
52	18-70-0290	120 V. Field	(1)
53	23-16-1410	Motor Insulator	(1)
54	22-20-0680	Brush Tube	(2)
55	22-18-0702	Carbon Brush Assembly	(2)
56	06-82-8835	8-32 x 5/16" Pan Hd. Sem.T-20	(2)
57	22-56-0470	Terminal Block	(1)
58	22-38-0140	Wire Trap	(1)
59	31-17-0200	Cord Clamp	(1)
60	06-82-7326	8-16 x 1" Pan Hd. Plastite T-20	(2)
★61	22-64-0300	Cord Set	(1)
62	06-72-1720	Service Rivet	(2)
63	12-99-1875	Service Nameplate	(1)
64	22-32-0350	Brush Cover	(2)
65	06-82-5316	8-32 x 1/2" Pan Hd. Slit. Taprite I-2U	(2)
66	28-50-6363	Motor Housing	(1)
67	06-82-5266	4-40 x 1/4" Pan Hd. Taprite T-10	(2)
68	12-98-2100	Instruction Plate	(1)
69	06-95-5200	8-32 x 5/16" Slotted Hex Hd. Screw	(1)
★70	45-36-0225	Gear Spacer	(1)
	49-96-4700	1-3/8" Open End Wrench	(1)
	45-88-0800	Water Hose Washer(For Fig. No. 1)	(1)
	61-10-0660	Retaining Nut Spanner Tool	(1)

FOR MOUNTING DRILL MOTOR USE:

06-75-3090	1/4-20 x 7/8" Socket Hd. Screw	(4)
06-97-4050	1/4" Split Ring Lock Washer	(4)

FIG. LUBRICATION

19	18 Oz. Type "J" Grease, No. 49-08-4220.
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MILWAUKEE ELECTRIC TOOL CORPORATION
13135 W. LISBON RD., BROOKFIELD, WI 53005

Drwg. 2

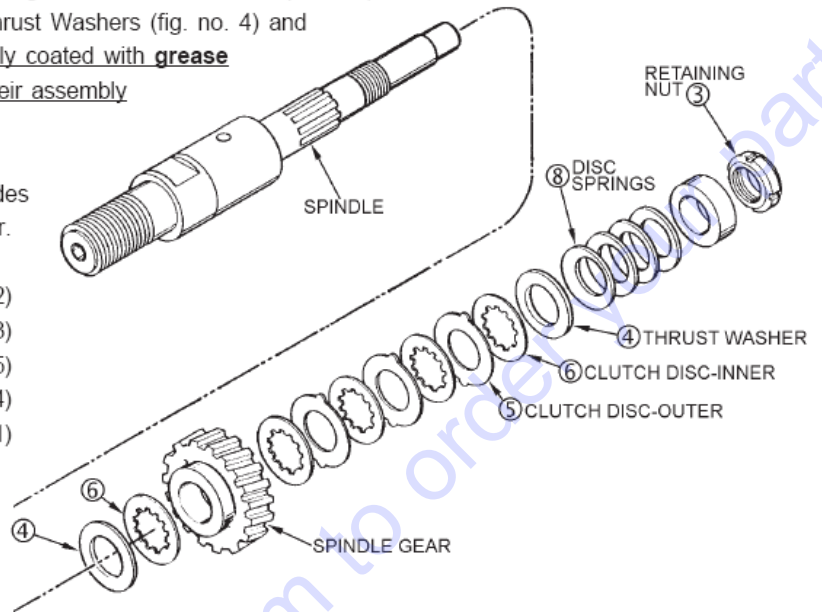
Servicing the Clutch Mechanism-

Torque Value for the Clutch Mechanism Retaining Nut (fig. no. 3).

Grease / Lubrication — when assembling the internal clutch component parts: the Clutch Discs (fig. nos. 5 and 6), Thrust Washers (fig. no. 4) and Disc Springs (fig. no. 8) are to be lightly coated with grease (Cat. No. 49-08-4220 type 'J') during their assembly into the spindle gear.

Grease / Lubrication specification includes coating internal bore of the spindle gear.

4	45-88-1140	Thrust Washers	(2)
5	43-06-0160	Clutch Discs-Outer	(3)
6	43-06-0150	Clutch Discs-Inner	(5)
8	40-50-2150	Spring Discs	(4)
	32-75-3430	Spindle Gear	(1)



Service note: the assembly torque for the Clutch Mechanism Retaining Nut, No. 06-57-1050 (fig. no. 3), which insures the static torque required to slip the clutch mechanism, as lubricated, should be **40-45 ft-lbs.**

With the gear case separated from the diaphragm & motor housing of the Clutch Dymo-Drill motor —

- insert & engage a **61-10-0660** retaining nut spanner with the notches in the **06-57-1050** clutch adjustment retaining nut.
- with a **1/2" hex socket bit driver** attached to a torque wrench, interlock the male hex with the female hex found in the threaded end of the dymo-drill spindle.
- turn the torque wrench clockwise ⤵, observing the torque reading and tighten the clutch adjustment retaining nut on the rear of the spindle shaft until a value of **40-45 ft-lbs** is obtained.



Retaining Nut Spanner
Service Tool
No. 61-10-0660




1/2" Hex Bit Socket Driver,
Snap-On #psa16,
Pronto#5441½
or equivalent

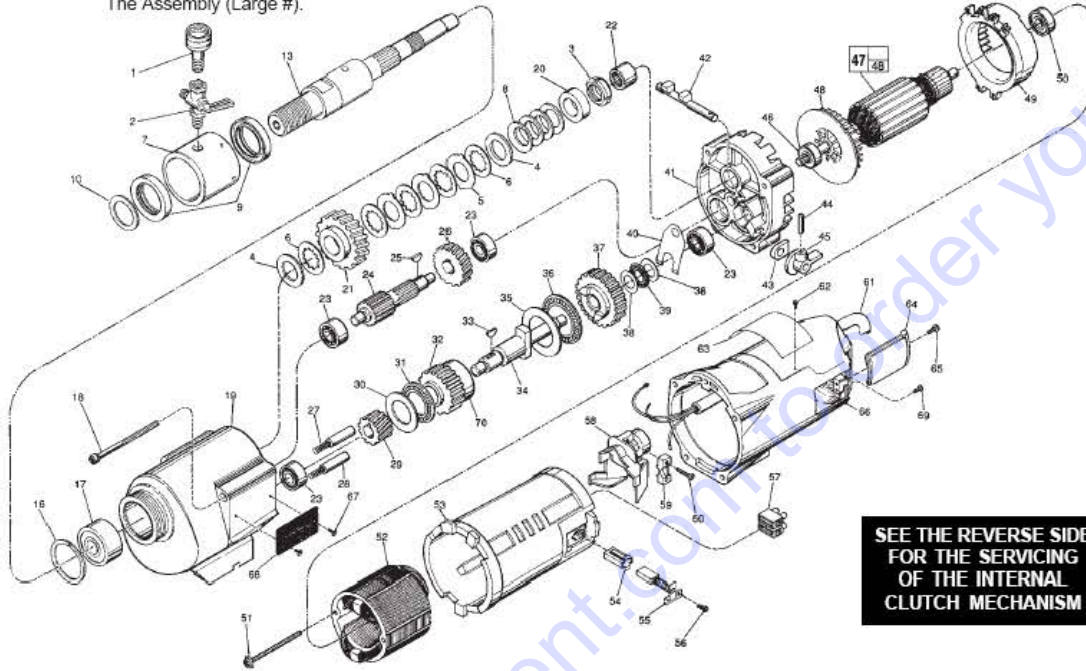


SERVICE PARTS LIST

BULLETIN NO.
54-16-4150

SPECIFY CATALOG NO. AND SERIAL NO. WHEN ORDERING PARTS		REVISED BULLETIN	DATE
DYMODRILL with INTERNAL CLUTCH			April 2003
CATALOG NO.	4097-20	STARTING SERIAL NO.	947A
		WIRING INSTRUCTION	58-01-0930

EXAMPLE:
 Component Parts (Small #)
 Are Included When Ordering
 The Assembly (Large #).



**SEE THE REVERSE SIDE
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OF THE INTERNAL
CLUTCH MECHANISM**

FIG.	PART NO.	DESCRIPTION OF PART	NO. REQ.	FIG.	PART NO.	DESCRIPTION OF PART	NO. REQ.
1	42-04-0600	Water Hose Adapter	(1)	46	02-04-1229	Ball Bearing	(1)
2	45-80-0060	Shut Off Valve	(1)	47	16-70-0330	120 V Armature	(1)
3	06-57-1050	Retaining Nut	(1)	48	22-84-0790	Fan	(1)
4	45-88-1140	Thrust Washer	(2)	49	42-14-0291	Baffle	(1)
5	43-06-0160	Clutch Disc-Outer	(3)	50	02-04-1041	Ball Bearing	(1)
6	43-06-0150	Clutch Disc-Inner	(5)	51	06-82-9152	10-24 x 2-3/4" Pan Hd. Sem. T-25	(2)
7	43-76-0051	Water Swivel Hsg Incl 06-83-2430 Scr	(1)	52	18-70-0300	120 V. Field	(1)
8	40-50-2150	Disc Spring	(4)	53	23-16-1410	Motor Insulator	(1)
9	45-06-0635	Seal	(2)	54	22-20-0680	Brush Tube	(2)
10	45-88-8565	Washer (Bag of 2)	(1)	55	22-18-0702	Carbon Brush Assembly	(2)
13	38-50-6020	Spindle	(1)	56	06-82-8835	8-32 x 5/16" Pan Hd. Sem. T-20	(2)
16	34-80-3800	Retaining Ring	(1)	57	22-56-0470	Terminal Block	(1)
17	02-20-2515	Ball Bearing	(1)	58	22-38-0140	Wire Trap	(1)
18	06-82-9202	1/4-20 x 4-1/4" Taprite T-30	(4)	59	31-17-0200	Cord Clamp	(1)
19	28-14-1870	Gear Case Assy Incl 06-65-1535 Pin	(1)	60	06-82-7326	8-16 x 1" Pan Hd. Plastite T-20	(2)
20	45-36-1520	Spindle Spacer	(1)	★ 61	22-64-0300	Cord Set	(1)
21	32-75-3440	Spindle Gear	(1)	62	06-72-1720	Service Rivet	(2)
22	02-50-4830	Needle Bearing	(1)	63	12-99-1875	Service Nameplate	(1)
23	02-04-1205	Ball Bearing	(4)	64	22-32-0350	Brush Cover	(2)
24	36-66-3751	Pinion Shaft Assy.	(1)	65	06-82-5316	8-32 x 1/2" Pan Hd. Slit. Taprite T-20	(2)
25	06-42-1600	Woodruff Key	(1)	66	28-50-6363	Motor Housing	(1)
26	32-40-1581	Intermediate Gear	(1)	67	06-82-5266	4-40 x 1/4" Pan Hd. Taprite T-10	(2)
27	40-50-6300	Shifting Spring	(2)	68	12-98-2100	Instruction Plate	(1)
28	44-70-0100	Shifting Plunger	(2)	69	06-95-5200	8-32 x 5/16" Slot Hex Hd. Screw	(1)
29	32-60-2011	Pinion Gear	(1)	★ 70	45-36-0225	Gear Spacer	(1)
30	45-88-0520	Thrust Bearing Washer	(1)		49-96-4700	1-3/8" Open End Wrench	(1)
31	02-80-1800	Thrust Bearing	(1)		45-88-0800	Water Hose Washer (For Fig. No. 1)	(1)
★ 32	32-10-0060	Clutch Gear Assembly	(1)				
33	06-42-2000	Woodruff Key	(1)				
34	36-14-0061	Clutch Shaft	(1)				
35	45-88-0530	Thrust Bearing Washer	(1)				
36	02-80-5000	Thrust Bearing	(1)				
37	32-10-0051	Clutch Gear Assembly	(1)				
38	45-88-0510	Thrust Bearing Washer	(2)				
39	02-80-1200	Thrust Bearing	(1)				
40	45-98-0090	Shifting Yoke	(1)				
41	14-13-0210	Diaphragm Assy.(Inc. 06-65-1155 Pin)	(1)				
42	30-15-0272	Shift Cam	(1)				
43	43-44-0580	Foam Gasket	(2)				
44	06-65-0840	1/8 x 3/4" Groove Pin	(1)				
45	25-60-0056	Shifting Knob	(1)				

FOR MOUNTING DRILL MOTOR USE:
 06-75-3090 1/4-20 x 7/8" Socket Hd. Screw (4)
 06-97-4050 1/4" Split Ring Lock Washer (4)

FIG. LUBRICATION
 19 20 Oz. Type "J" Grease, No. 49-08-4220.

MILWAUKEE ELECTRIC TOOL CORPORATION
 13135 W. LISBON RD., BROOKFIELD, WI 53005
 Drwg. 3

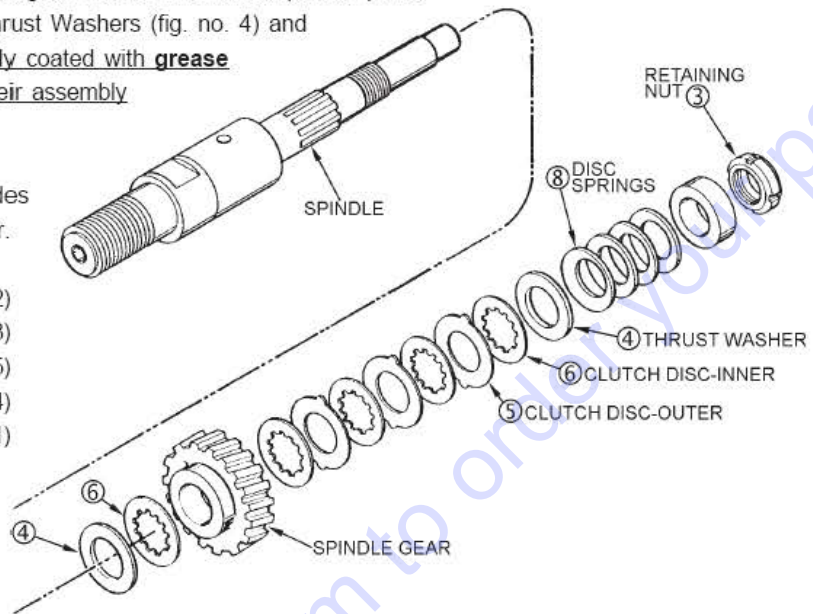
Servicing the Clutch Mechanism-

Torque Value for the Clutch Mechanism Retaining Nut (fig. no. 3).

Grease / Lubrication — when assembling the internal clutch component parts: the Clutch Discs (fig. nos. 5 and 6), Thrust Washers (fig. no. 4) and Disc Springs (fig. no. 8) are to be lightly coated with grease (Cat. No. 49-08-4220 type 'J') during their assembly into the spindle gear.


Grease / Lubrication specification includes coating internal bore of the spindle gear.

4	45-88-1140	Thrust Washers	(2)
5	43-06-0160	Clutch Discs-Outer	(3)
6	43-06-0150	Clutch Discs-Inner	(5)
8	40-50-2150	Spring Discs	(4)
	32-75-3430	Spindle Gear	(1)



Service note: the assembly torque for the Clutch Mechanism Retaining Nut, No. 06-57-1050 (fig. no. 3), which insures the static torque required to slip the clutch mechanism, as lubricated, should be **13-18 ft-lbs.**

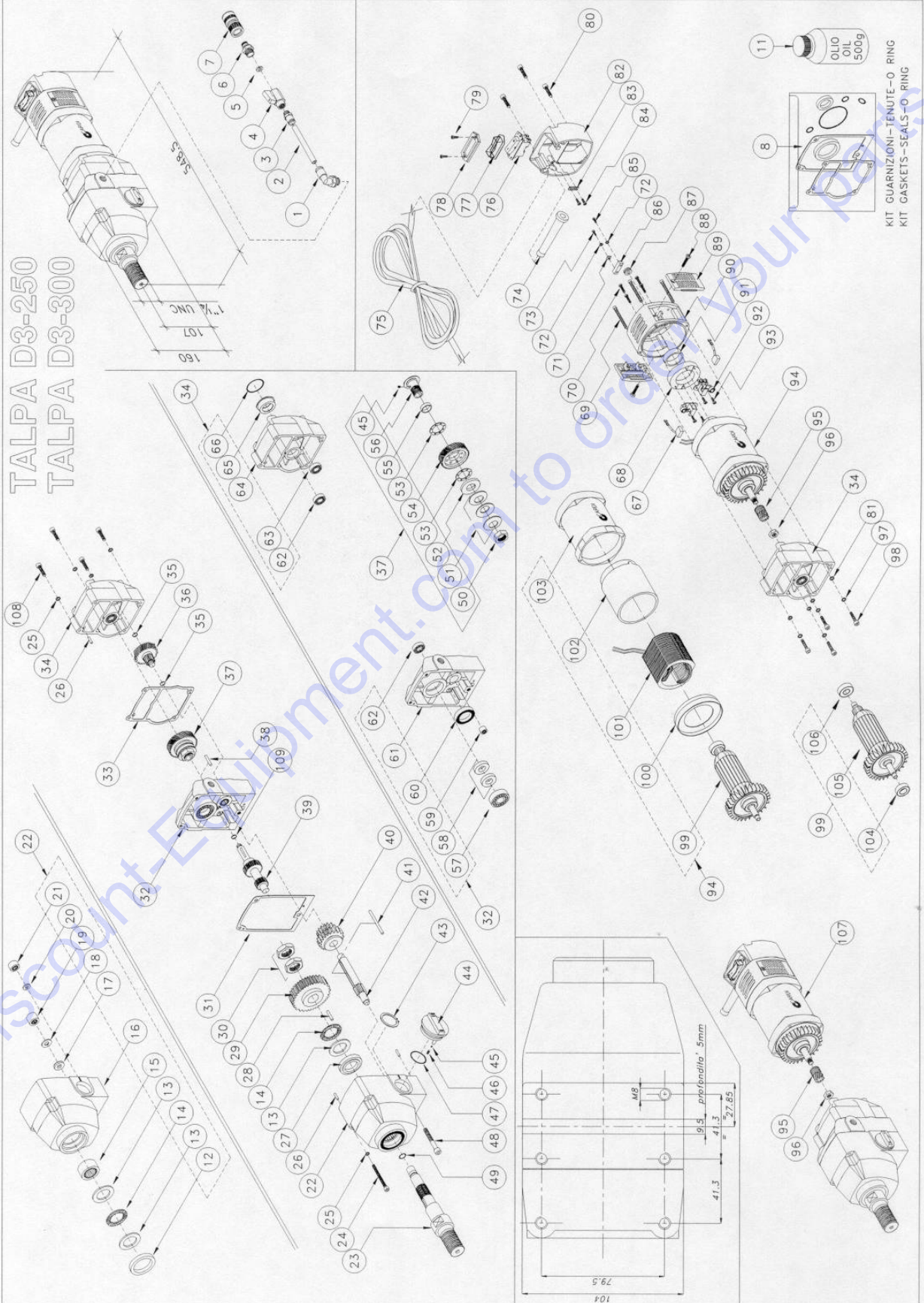
With the gear case separated from the diaphragm & motor housing of the Clutch Dymo-Drill motor —

- insert & engage a **61-10-0660** retaining nut spanner with the notches in the **06-57-1050** clutch adjustment retaining nut.
- with a **1/2" hex socket bit driver** attached to a torque wrench, interlock the male hex with the female hex found in the threaded end of the dymo-drill spindle.
- turn the torque wrench **clockwise** , observing the torque reading and tighten the clutch adjustment retaining nut on the rear of the spindle shaft until a value of **13-18 ft-lbs** is obtained.



CARDI Core Drill Motor Model D3-250

TALPA D3-250
TALPA D3-300



CARDI Core Drill Motor Model D3-250

TALPA D3-250

TALPA D3-300

ITEM	CODICE	Q.TY		ITEM	CODICE	Q.TY		ITEM	CODICE	Q.TY	
		D3-250	D3-300			D3-250	D3-300			D3-250	D3-300
1	503203	1	1	41	500311	1	1	81	502172	4	4
2	503204	1	1	42	500273	-	1	82	503167	1	1
3	503202	1	1		500272	1	-	83	501156	1	1
4	503223	1	1	43	500142	1	1	84	501155	2	2
5	500509	1	1	44	500195	1	1	85	501860	1	1
6	500511	1	1	45	500119	2	2	86	501859	1	1
7	502979	1	1	46	500120	1	1	87	501863	1	1
8	503333	1	1	47	500141	1	1	88	501090	2	2
9	-	-	-	48	500229	1	1	89	501427	2	2
10	-	-	-	49	500034	1	1	90	503327	1	1
11	503293	-	-	50	502214	1	1	91	501869	1	1
12	500031	1	1	51	502213	3	3	92	500940	2	2
13	500134	3	3	52	502042	1	1	93	501833	4	4
14	500133	2	2	53	502203	2	2	94	502632	1	1
15	500135	1	1	54	503303	1	1	95	502625	1	1
16	503306	1	1	55	502220	1	1	96	502073	1	1
17	500024	1	1	56	502100	1	1	97	502088	4	4
18	500025	1	1	57	500021	1	1	98	500903	4	4
19	500136	1	1	58	500032	2	2	99	502630	1	1
20	500080	1	1	59	500026	1	1	100	502554	1	1
21	500028	1	1	60	500096	1	1	101	501922	1	1
22	503328	1	1	61	503298	1	1	102	501754	1	1
23	500276	1	1	62	500323	2	2	103	502616	1	1
24	500309	2	2	63	500030	1	1	104	502759	1	1
25	500047	6	6	64	503297	1	1	105	502628	1	1
26	500046	4	4	65	501821	1	1	106	501750	1	1
27	500130	1	1	66	500245	1	1	107	503398	1	1
28	500106	1	1	67	502761	2	2	108	502760	4	4
29	500125	-	1	68	501331	1	1	109	500035	1	1
	503305	1	-	69	501835	4	4				
30	501883	2	2	70	502018	4	4				
31	500294	1	1	71	501720	1	1				
32	503329	1	1	72	500292	2	2				
33	503307	1	1	73	501332	1	1				
34	503330	1	1	74	502917	1	1				
35	500335	2	2	75	501255	1	1				
36	503332	1	1	76	500162	1	1				
37	503331	1	1	77	500070	1	1				
38	502238	1	1	78	501152	1	1				
39	503302	1	1	79	503334	2	2				
40	500269	1	1	80	503349	3	3				

*

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