

INSTRUCTIONS AND PARTS MANUAL

CWP-18 PROGRAMMABLE CIRCLE WELDER

Please record your equipment identification information below for future reference. This information can be found on your machine nameplate.

Model Number _____

Serial Number _____

Date of Purchase _____

Whenever you request replacement parts or information on this equipment, always supply the information you have recorded above.

LIT-CWP18-IPM-0914

Bug-O Systems is guided by honesty, integrity and ethics in service to our customers and in all we do.



BUG-O SYSTEMS

A DIVISION OF WELD TOOLING CORPORATION



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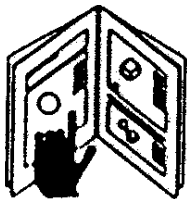
SAFETY

PROTECT YOURSELF AND OTHERS FROM SERIOUS INJURY OR DEATH. KEEP CHILDREN AWAY. BE SURE THAT ALL INSTALLATION, OPERATION, MAINTENANCE AND REPAIR PROCEDURES ARE PERFORMED ONLY BY QUALIFIED INDIVIDUALS.



ELECTRIC SHOCK can kill.

- 1) The equipment is not waterproof. Using the unit in a wet environment may result in serious injury. Do not touch equipment when wet or standing in a wet location.
- 2) The unused connectors have power on them. Always keep the unused connectors covered with the supplied protective panels. Operation of the machine without the protective panels may result in injury.
- 3) Never open the equipment without first unplugging the power cord or serious injury may result.
- 4) Verify the customer-supplied power connections are made in accordance with all applicable local and national electrical safety codes. If none exist, use International Electric Code (IEC) 950.
- 5) Never remove or bypass the equipment power cord ground. Verify the equipment is grounded in accordance with all applicable local and national electrical safety codes. If none exist, use International Electric Code (IEC) 950.



READ INSTRUCTIONS.

Read the instruction manual before installing and using the equipment.



EQUIPMENT DAMAGE POSSIBLE.

- 1) Do not plug in the power cord without first verifying the equipment is OFF and the cord input voltage is the same as required by the machine or serious damage may result.
- 2) Always verify both the pinion and wheels are fully engaged before applying power or equipment damage may occur.
- 3) Do not leave the equipment unattended.
- 4) Remove from the work site and store in a safe location when not in use.



FALLING EQUIPMENT can cause serious personal injury and equipment damage.

Faulty or careless user installation is possible. As a result, never stand or walk underneath equipment.



MOVING PARTS can cause serious injury.

- 1) Never try to stop the pinion from moving except by removing power or by using the STOP control.
- 2) Do not remove any protective panels, covers or guards and operate equipment.

HIGH FREQUENCY WARNINGS

SPECIAL PRECAUTIONS ARE REQUIRED WHEN USING PLASMA, TIG OR ANY WELDING PROCESS THAT USES HIGH FREQUENCY TO STRIKE AN ARC.

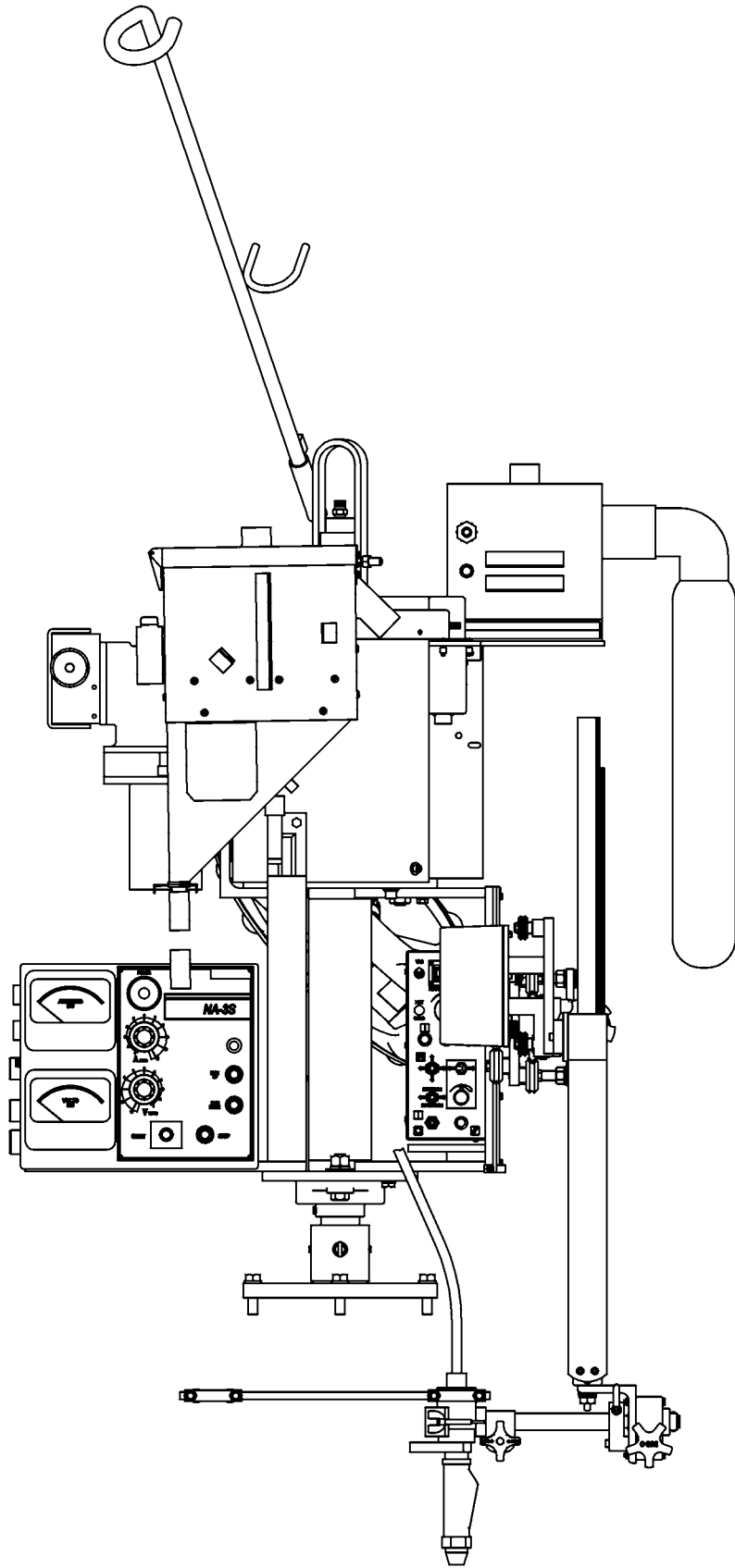


WARNING: HIGH FREQUENCY CAN EFFECT MACHINE OPERATION AND THEREFORE, WELD QUALITY.

Read the precautions below before installing and using the equipment.

PRECAUTIONS:

- 1) Some plasma or welding cables are strong sources of high frequency interference. NEVER lay a plasma or welding cable across the controls of the machine.
- 2) Always physically separate the plasma or welding cable leads from the machine cables. For example, the plasma or welding cable leads should NEVER be bundled with a pendant cable or the machine power cord. Maximize the separation between any machine cables and the plasma or welding cables.
- 3) Strictly follow the grounding procedures specified for the plasma or welding unit. NOTE: Some plasma and welding units produce exceptionally large amounts of high frequency noise. They may require a grounding rod be driven into the earth within six feet (2 meters) of the plasma or welding unit to become compatible with an automatic cutting or welding process.
- 4) If the high frequency is produced using a spark gap, adjust the points so the gap is as small as possible. The larger the gap, the higher the voltage and the higher the interference.
- 5) Some plasma or welding units will inject high frequency interference into the AC power line. Use separate power line branches whenever possible to power the plasma or welding source and the machine. Do not plug them into the same outlet box.
- 6) High frequency noise may enter the machine through the plasma or welding supply remote contactor leads. Some plasma and welding sources can produce noise spikes of up to several thousand volts. These sources are not compatible with automated cutting and welding equipment. It is recommended that the remote contactor leads on these plasma or welding sources not be connected to the machine. An alternate solution is to purchase a separate remote contactor isolation box.



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INTRODUCTION

The CWP-18 (CWP-1800) Programmable Circle Welder is designed for contour welding of nozzles into vessels or domed heads utilizing SUB-ARC, MIG or FLUX CORED PROCESS, with gas shielding. The CWP-18 mounts on a 3-Jaw Chuck welding diameter 6" to 50" O.D.

FEATURES

- Wire feeder with one set of drive rolls
- 1/12 HP P.M. motor and rotational speed control
- 600 AMP gun & cable assembly
- 50 ft. (15 m) power cable
- 50 ft. (15 m) gas shielding hose
- 50 ft. (15 m) weld cable
- Quick disconnects for all cables
- Pre and post flow controls
- Wire reel adaptor for 60 lb. (27 kg) spools
- Motorized vertical and horizontal torch positioning system
- Microprocessor controlled rise and fall with 7" (175 mm) of travel
- Brushes and collector rings for welding current, rated at 600 AMPS 100% duty cycle
- Brushes and collector rings for all controls, eliminates cable and hose wrap

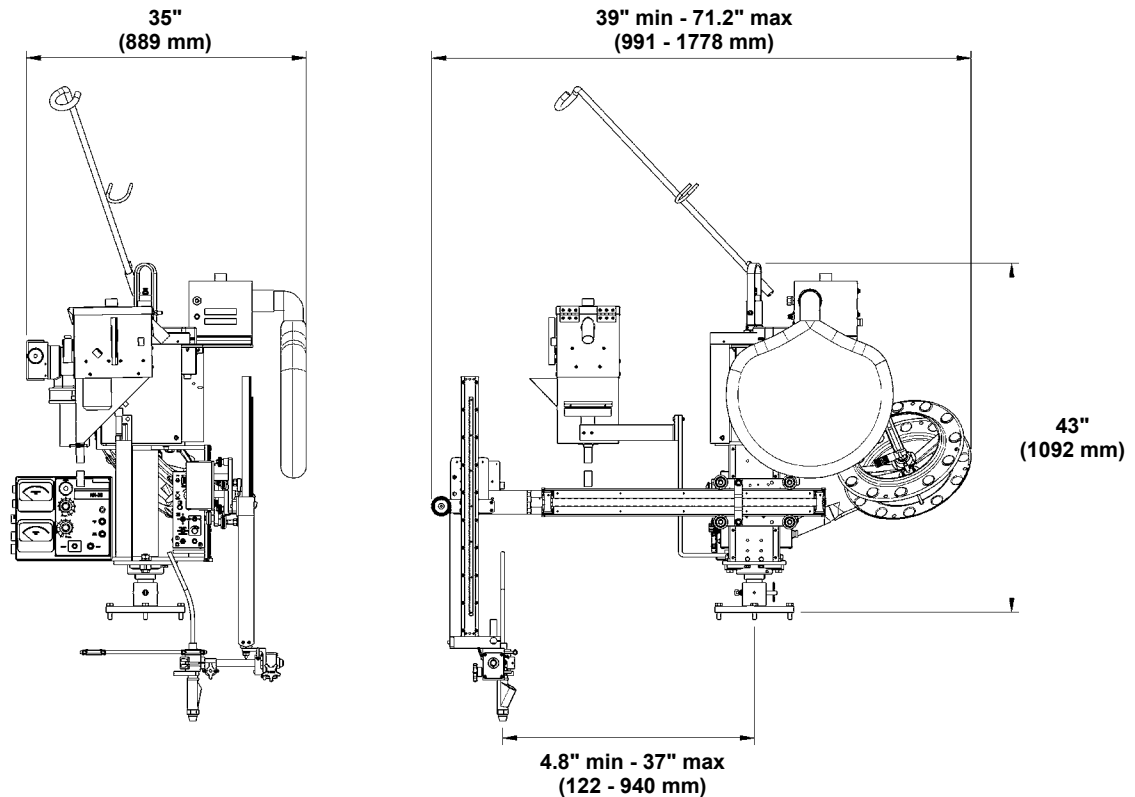
NA 3 CONTROL PROVIDES

- Wire Speed (amperage) control
- Voltage Control
- Wire burn back
- Weld contact
- Cold wire inch switch
- Weld start parameter adjustment
- Weld Crater parameter adjustment

TECHNICAL DATA

Control Voltage:	115 VAC
Amperage:	0-600 amps
Voltage:	0-50
Wire Sizes:	1/16"-7/32" (1.6-5.6 mm)
Rotation Speed:	.06-0.72 rpm
Vertical Travel:	0"-7" (0-175 mm)
Welding Diameter:	10"-50" (254-1270 mm)
Shielding Gas:	Solenoid Control
Height:	43" (1092 mm)
Net Weight:	360 lbs. (163.6 kg)
Shipping Weight:	490 lbs. (222.3 kg)

DIMENSIONS



SETUP

POWER SOURCE

Please refer to the included Lincoln NA3 User's Manual for welding power source requirements and system setup.

GUNS AND CABLES

All circle welders come equipped with a gun and cable assembly. It is our recommendation that at least once a week the liner be taken out of the cable and soaked overnight in solvent solution. To keep the wire moving, it is also recommended that a felt clip be saturated with a product like Ferro Slick and fed through the incoming tube of the wire feeder at least once a day.

ADDITIONAL CABLES

The circle welders are supplied with the following cables:

1. CWO-3971 50' (15 m) control cables that connects the power source to the cable connector on the top gear of the machine.
2. CWO-3040 50' (15 m) weld cable that connects the lead coming out of the top of the machine using the quick connect connector to your power supply.
3. CWO-9406 50' (15 m) gas shielding hose that connects the gas fitting on the top of the shaft to your shielding gas supply. (MIG models only)

SETUP, CONT'D.

WIRE SPEED AND VOLTAGE ADJUSTMENT

The wire speed control on the front of the CWP-1810 Wire Feed Control Box has a dial that is calibrated directly in inches per minute. Voltage can be controlled on the power source or with the NA-3 controller. To use the NA-3 controls, set the power source voltage control to REMOTE.

MACHINE CONTROLS

Operational parameters can be set using the two control boxes. Please refer to the section in this manual entitled CBP-1550 Rotational Control (page 10) for descriptions of the various speed and directional capabilities. For the NA-3 Wire Feeder Control, refer to the supplied NA-3 Semiautomatic Wire Feeder Manual from Lincoln Electric.

INSTALLATION

Use a 3-Jaw Chuck to mount and center the CWP-18 on nozzles with or without flanges, as seen in Figure 1. See page 34 for a listing of available 3-Jaw Chucks.

WHEEL ADJUSTMENT

The CWP-18 Motorized Racking System CBP-1840 and the Horizontal Racker CWO-1690-MH are equipped with adjustable wheels. Always check these components for proper wheel adjustment before using the machine. The wheels need adjustment if you can cock or wiggle the components out of alignment. The wheels should be snug, but not prohibit movement along the path of travel. The wheels with the hex stand offs are adjustable. To adjust the wheels, loosen the hex bolt (A) until the adjustable bushing (B) can be rotated. Correct the wheel alignment by rotating the adjustable bushing (B). Once adjusted, hold the adjustable bushing (B) while tightening the hex bolt (A). Recheck alignment.

WELD STARTING POSITION

Proper positioning of the electrode is crucial to a successful weld. The CWP-18 rotates in a clockwise direction. Depending on the job, whether on-center or hillside, or the process, the optimum starting point of the weld may vary. The desired starting position should be entered at setup as an angle to the pipe axis direction, as shown in Figure 3.

The default start position (start angle = 0.00°) is shown as A and B in Figure 3. For an on-center joint, this would be the topmost point. For a hillside joint, -90.00° is the topmost point (C in Figure 3) and 90.00° is the lowest point.

During setup, enter the Start Angle in hundredths of degrees: 4500 is 45.00° . The machine makes one revolution from the start point for each pass. Overlap is only added to the last pass.

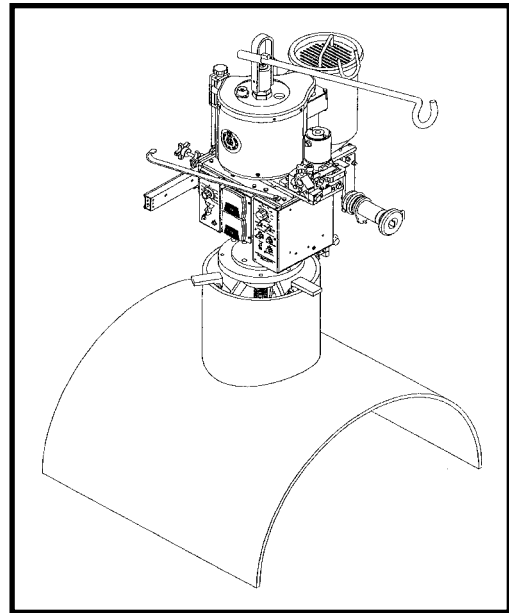


Figure 1: Installation with 3-Jaw Chuck

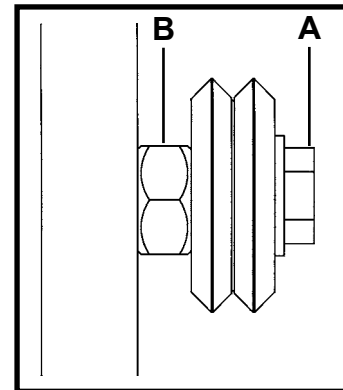


Figure 2: Adjustable Wheel

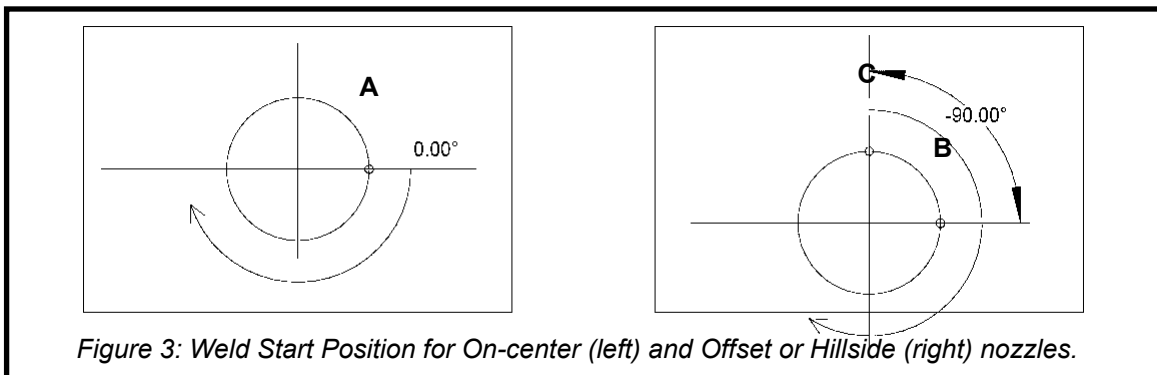


Figure 3: Weld Start Position for On-center (left) and Offset or Hillside (right) nozzles.

CWP-1810 NA-3 WIRE FEEDER CONTROL PANEL

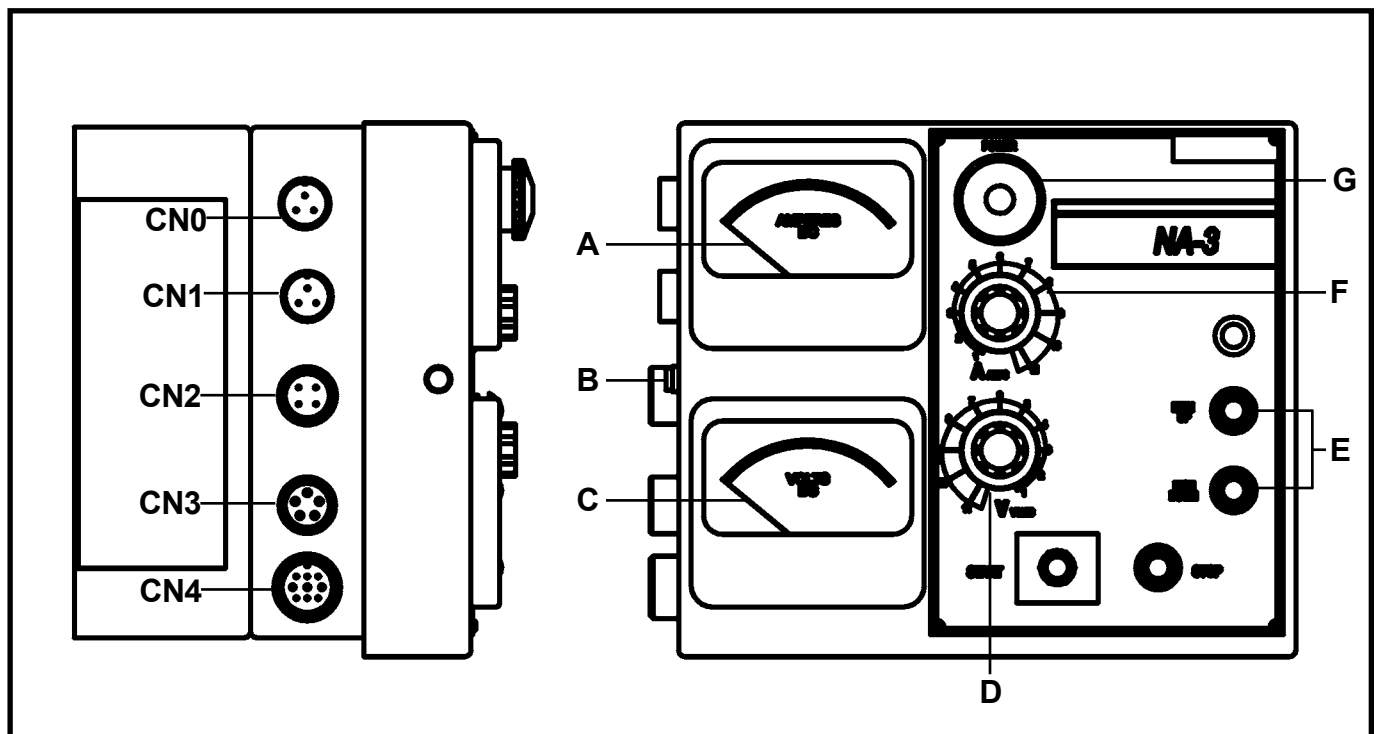


Figure 4: Side and Front views of Lincoln NA-3 Control Box. (Not to Scale.)

CONTROLS (A-G)

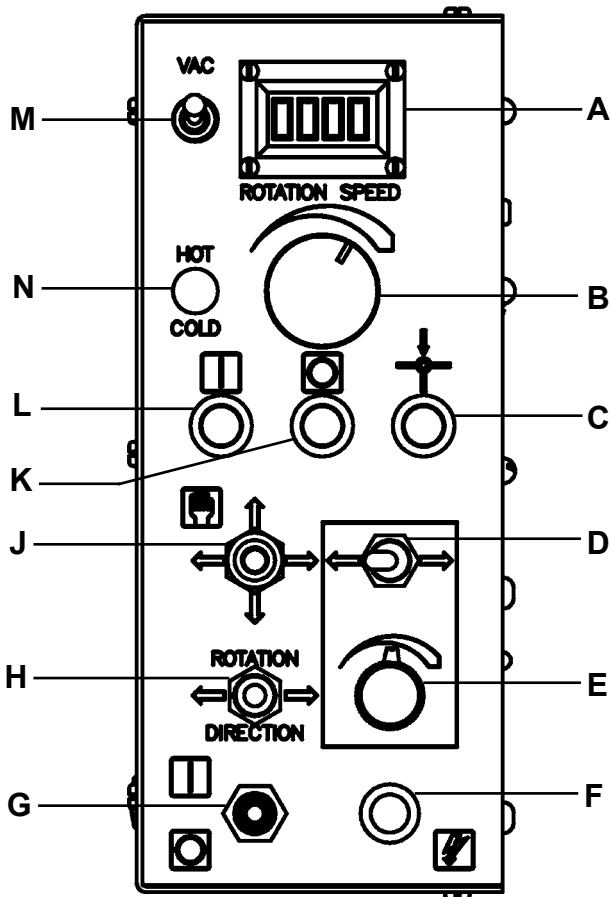
- A. Ammeter** - Indicates current only while welding.
- B. Circuit Breaker** - Protects the circuit from severe wire feed motor overload and short circuits. Press to reset. Locate and correct the cause for overload.
- C. Voltmeter (Standard)** - Indicated welding voltage only while welding. Also indicates OCV below 60 volts.
- D. Current Control** - Adjusts wire feed speed to control welding current.
- E. Inch Up & Inch Down** - Press to inch electrode at the speed set by "Inch Speed" control on inner panel.
- F. Voltage Control** - Adjust arc volts by controlling power source output voltage.
- G. Control Power Switch** - Turns input control power "On" and "Off". Also used as an emergency "Off" in case of malfunction.

CABLE CONNECTIONS (CN0 - CN4)

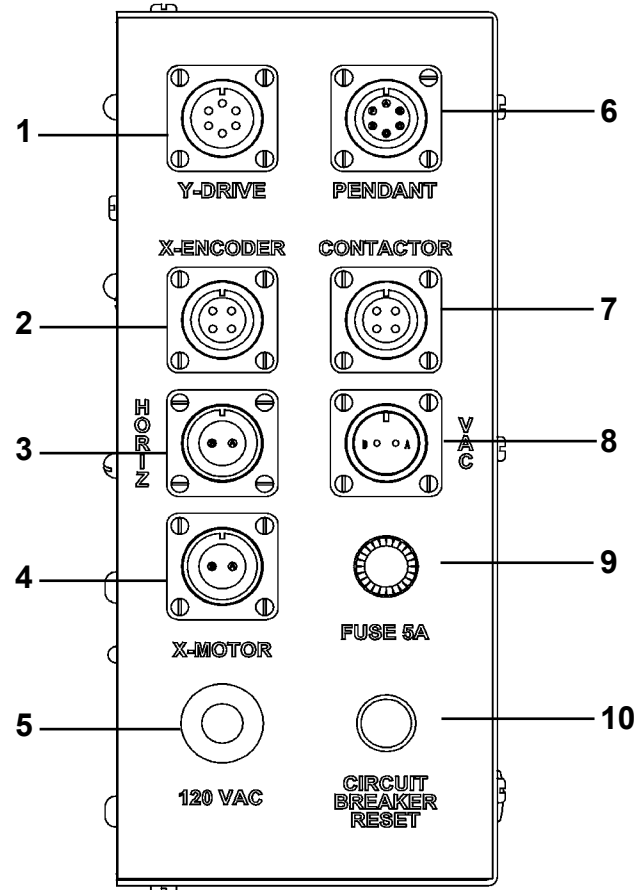
- CN0** Connects to Contactor Box via CWP-1816
- CN1** (Unused)
- CN2** Connects to Rotation Control Box via Power Cable
- CN3** Connects to Wire Feeder Motor (Cable is integral to Wire Feeder Motor)
- CN4** Connects to Terminal Block Ass'y (internal to machine) via CWO-2978

NOTE: For further information refer to Lincoln Electric NA-3 Operator's Manual.

CBP-1550 ROTATION CONTROLS



(FRONT VIEW)



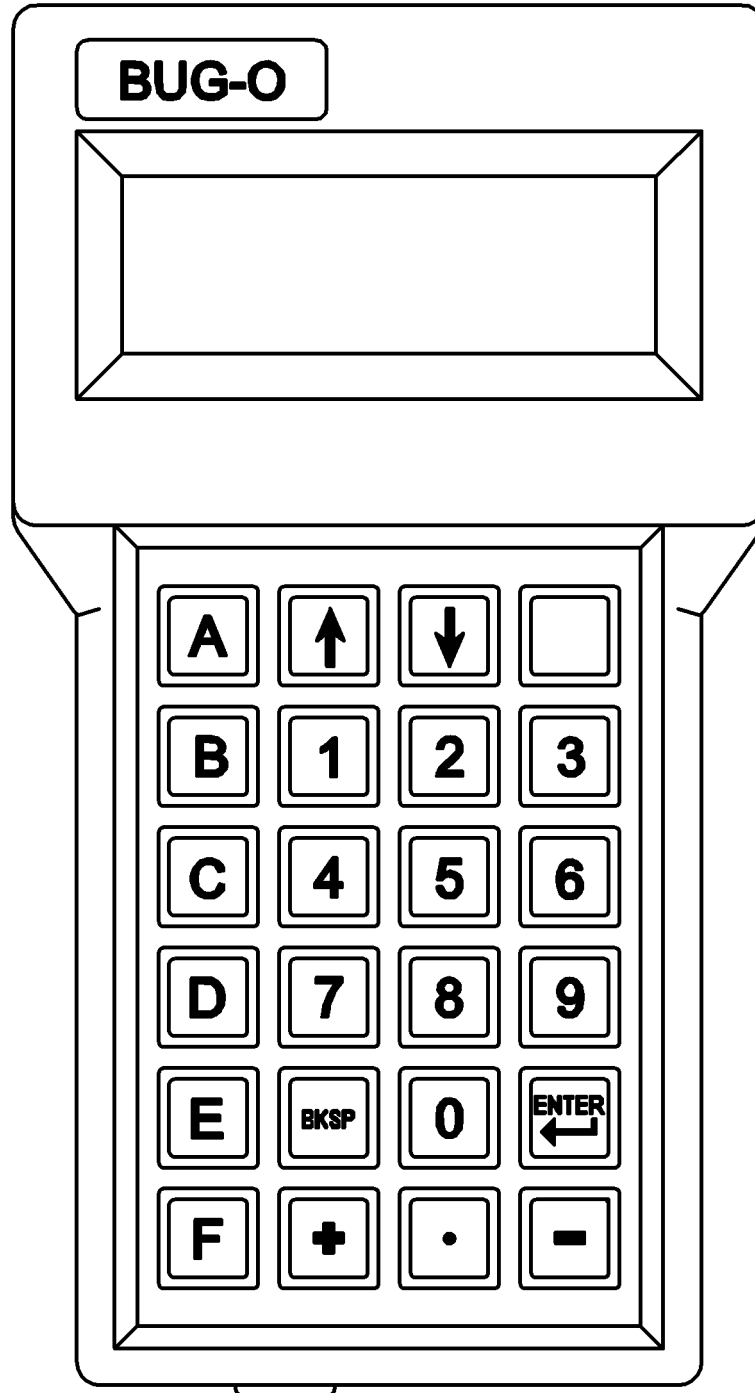
(REAR VIEW)

- A. **DIGITAL READOUT** - Displays rotation speed as a reference value.
- B. **SPEED CONTROL** - Increases or decreases the rotation speed.
- C. **RESET** - Resets Home or weld start position.
- D. **HORIZONTAL JOG** - Drives the horizontal racker left and right.
- E. **HORIZONTAL SPEED CONTROL** - Increases or decreases speed of horizontal racker.
- F. **PILOT LIGHT** - Illuminated when power is ON to rotation control box.
- G. **ON/OFF SWITCH** - Enables / disables power to the rotation control box.
- H. **ROTATION DIRECTION SWITCH** - Changes rotation direction.
- J. **MANUAL JOG** - Manually drives the welding tip while machine is stopped or paused.
- K. **STOP/PAUSE** - Stops weld program and rotation.
- L. **START/RESUME** - Starts weld program and rotation.
- M. **VAC** - On/Off switch for flux recovery vacuum.
- N. **HOT/COLD SWITCH** - Changes whether the rotation control uses the wire feeder.

- 1. **Y-DRIVE** - Connects to Vertical Racking Motor (CBP-1840).
- 2. **X-ENCODER** - Connects to Encoder (CBP-1535-18).
- 3. **HORIZ** - Connects to Horizontal Racker Motor (CWO-1690-MH).
- 4. **X-MOTOR** - Connects to Terminal Block Assembly (CWO-3969).
- 5. **120 VAC** - Input power, connects to CN2 on the LN3 wire feeder controller.
- 6. **PENDANT** - Connects to Pendant (BUG-6050).
- 7. **CONTACTOR** - Connects to welding power source.
- 8. **VAC** - Connects to vacuum pump for flux recovery.
- 9. **FUSE** - Access to 5 Amp fuse.
- 10. **CIRCUIT BREAKER RESET** - Press to reset circuit breaker after overload.

BUG-6050 PENDANT CONTROL

The handheld terminal with keypad and text display or pendant control is used for entering the dimension and weld parameter data. It plugs into the Pendant connection on the CBP-1500 rotation control box.



ALPHA KEYS: Press keys A, B, C, D, E, or F for the desired program function.

DIGIT KEYS: Use the digit keys to enter pipe diameters or dimensions.

ENTER: Push the enter button to store the numeric value keyed.

BACKSPACE: The backspace key removes the last digit keyed in before pushing the enter button, if a correction is required.

SHIFT: The blank key at the top right corner of the keypad is the SHIFT key. Use this key to access additional programming options.

ARROW KEYS: Used to jog vertical axis during auto-run program to set new torch position.

PROGRAMMING

ALPHA KEYS

Dimensions and weld parameter data is entered on the handheld terminal with keypad and text display. The alpha keys used are listed below, with their functions:

- A:** To enter dimensions
- B:** To enter the time delay for puddle build-up
- C:** To change Program Number in memory (0 – 99)
- D:** To display all programmed parameters for the current program
- E:** To enter the number of passes (1 – 99)
- F:** To enter the start angle so weld can start at the preferred point around the joint (see pg. 8)

Three other useful key functions are:

- Shift 9:** Set units, English (inch) or metric (meters)
- Shift 8:** Test drives & encoders
- Shift E:** Version number (have this information ready when calling for service)

DATA REQUIRED

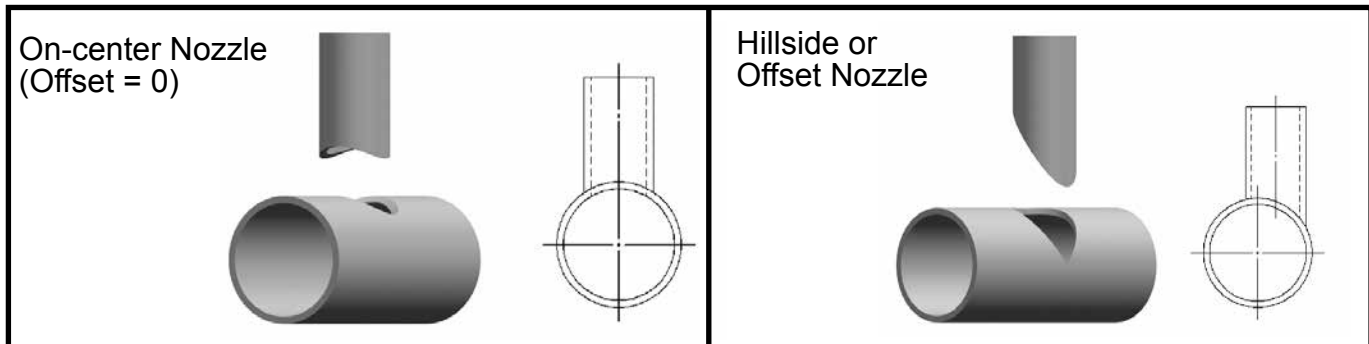
The following five (5) parameters are entered for each program:

1. Small diameter (diameter of weld) - inches x 100 or mm x 10
2. Large diameter (pipe OD) - inches x 100 or mm x 10
3. Offset - inches x 100 or mm x 10. Enter "0" if nozzle is on centerline of vessel
4. Overlap (additional rotation on final pass) - degrees X 100
5. Start Angle - degrees x 100. Enter "0" for top dead center

In addition, background parameters that are retained for all programs, and are individually set are:

1. Time Delay (from arc start to gun moving)
2. Number of Passes (when multiple passes required. Default setting is 1)

NOTE: If the STOP / RESUME button is pressed, the machine will be in pause mode, and cannot be programmed. Press the RESET button to get back to the ready mode for programming.



DATA ENTRY

When entering data with the pendant keypad, multiply inches, degrees, or seconds by 100 and enter the number without a decimal point. For metric dimensions, multiply mm x 10 or cm x 100.

Example: 350 for 3.5 inches,
800 for 80 mm, on metric machines

Press "ENTER" on the keypad after the number is entered.

SAVING PROGRAMS

The machine has 100 storage areas or welds, numbered 0 to 99 in memory. Push the "C" button on the pendant keypad to change (or set) the program number and enter the desired number. Program data is retained until reprogrammed. At any time, one of these numbers is selected, it will stay selected even when power is shut off and turned back on, it will not change until the program number is changed by the operator. Settings for time delay and number of passes are not saved as part of a program.

OPERATION

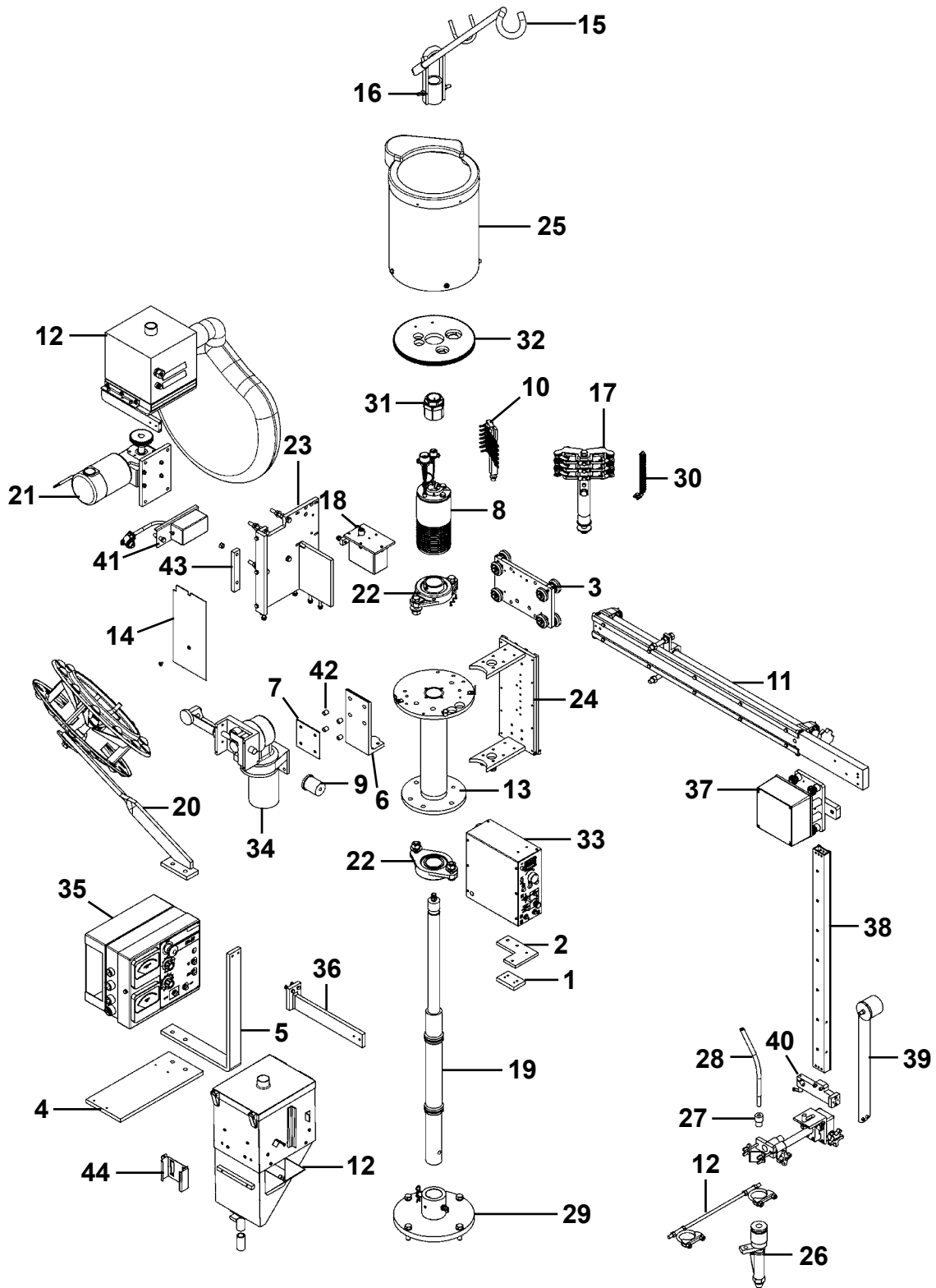
MAKING A WELD

1. Turn on control power to NA-3 Wire Feeder Controls, to Rotation Controls and to the welding power source.
2. Connect the ground cable to the workpiece. The ground cable must make good electrical contact with the work.
3. Press the red “STOP” button on the Rotation Controls to allow for manual positioning. Use the four-way jog switch to manually position the torch at the desired weld start point.
4. With Hot/Cold Switch in the “COLD” position, set rotation speed.
5. Press the Wire Down button on the NA-3 control box until the wire touches the work piece and stops.
6. Using the keypad on the Pendant Control, press “A” and follow the prompts to input a new weld program or press “C” to select an existing weld program.
7. At the “READY” prompt, press “B” to change “ROTATION START DELAY or “E” to enter “NUMBER OF WELD PASSES.”
8. Open the flux hopper valve. (For Sub-Arc models only)
9. Throw Hot/Cold Switch to the “HOT” position.
10. Weld process and rotation are both started by pressing the green Start Button on the Rotation Controls.
11. Weld process and rotation are stopped by pressing the red Stop Button on the Rotation Controls.
12. For multi-pass welds, use the arrow keys on the Pendant Control to raise the torch for each pass.
13. To stop welding immediately, without burnback or purge, turn off control power to the NA-3 Wire Feeder Controls.

WARNING:

When using an open arc process, it is necessary to use correct eye, head and body protection.

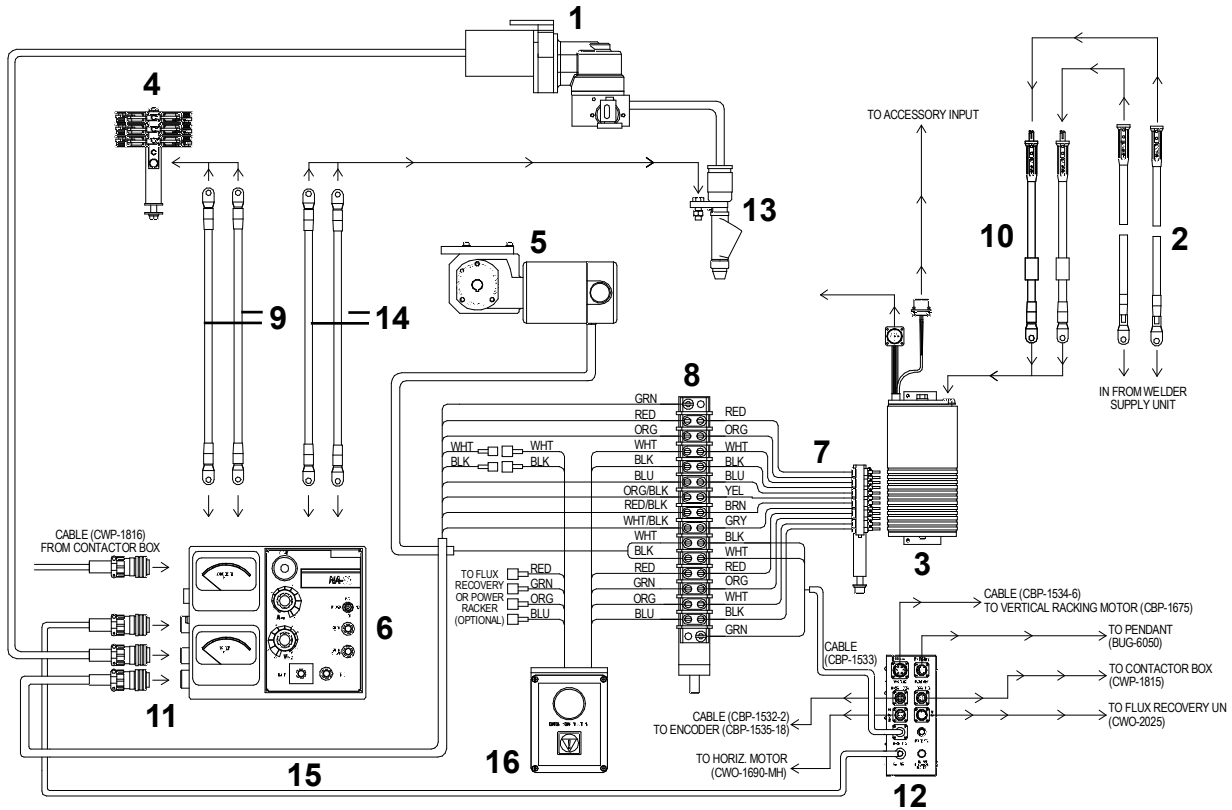
CWP-1800 CWP-18 CIRCLE WELDER / EXPLODED VIEW



CWP-1800 CWP-18 CIRCLE WELDER / PARTS LIST

<u>ITEM</u>	<u>QTY</u>	<u>PART NO.</u>	<u>DESCRIPTION</u>
1	1	CWO-1123	Control Mt. Spacer Block
2	1	CWO-1124	CW-18 Control Mt. Plate
3	1	CWP-3363	Horiz. Racker for Hvy Duty Screw Racking
4	1	CWO-1811	NA-3S Mount Plate
5	1	CWO-1812	Flux Hopper Support Bracket
6	1	CWO-1813	Wire Feeder Bracket
7	1	CWO-1814	Insulator Plate
8	1	CWO-3133	Collector
9	1	CWO-1816	Wire Feeder Adaptor
10	1	CWO-3931	Brush Retainer Assembly
11	1	CWP-3345	Manual Horiz. Hvy Duty Rack Assembly
12	1	CWO-2025	Flux Recovery System
13	1	CWO-3165	CW-18 Housing Assembly
14	1	CWP-1803	Adaptor Plate
15	1	CWO-3218	Cable Support Bar
16	1	CWO-3312	Lifting Lug Weldment
17	1	CWO-3315	Brush Holder & Support
18	1	CBP-1545-18	Encoder Assembly
19	1	CWO-3432	CW-18 Shaft Assembly
20	1	CWO-3498-11	Wire Reel Assembly CW-18
21	1	CWO-3506	4066 Motor Assembly
22	2	CWO-3528	2" Flange Bearing W/ Fasteners
23	1	CWO-3531	Motor & Transmission Plt. Assembly
24	1	CWO-3534	Slide Bar Mounting Assembly
25	1	CWO-3537	Guard Assembly CW-18
26	1	CWO-3690-5/32	SUB-ARC Nozzle
27	1	CWO-3695-1/2	Adaptor K231 1/2"
28	1	CWO-3697	QCC 72" Liner
29	1	CWO-3968	CW-18 Base Plate
30	1	CWO-3969	Terminal Block Assembly
31	1	CWO-5074	1-1/2" ID Trantorque
32	1	CWO-5793	Gear Aluminum
33	1	CBP-1550	Rotation Control, 120 VAC
34	1	LDC-0010	Automatic Head
35	1	LDC-NA3S	NA-3S
36	1	CWO-1820	Flux Hopper Support Arm Assembly
37	1	CBP-1675	Motorized Vehicle Racker
38	1	ABR-1060	V-Guide Ways 33"
39	1	CWO-3460	33# Load Spring Assembly
40	1	CWO-1695	Attachment Block
41	1	CWP-1815	CWP Contactor Box
42	4	CWO-3876	Micarta Bushing 1/2OD x 3/8"ID x 9/16"
43	1	CWP-1817	Contactor Box Mounting Bar
44	1	SEO-4165	Terminal Holster Assembly

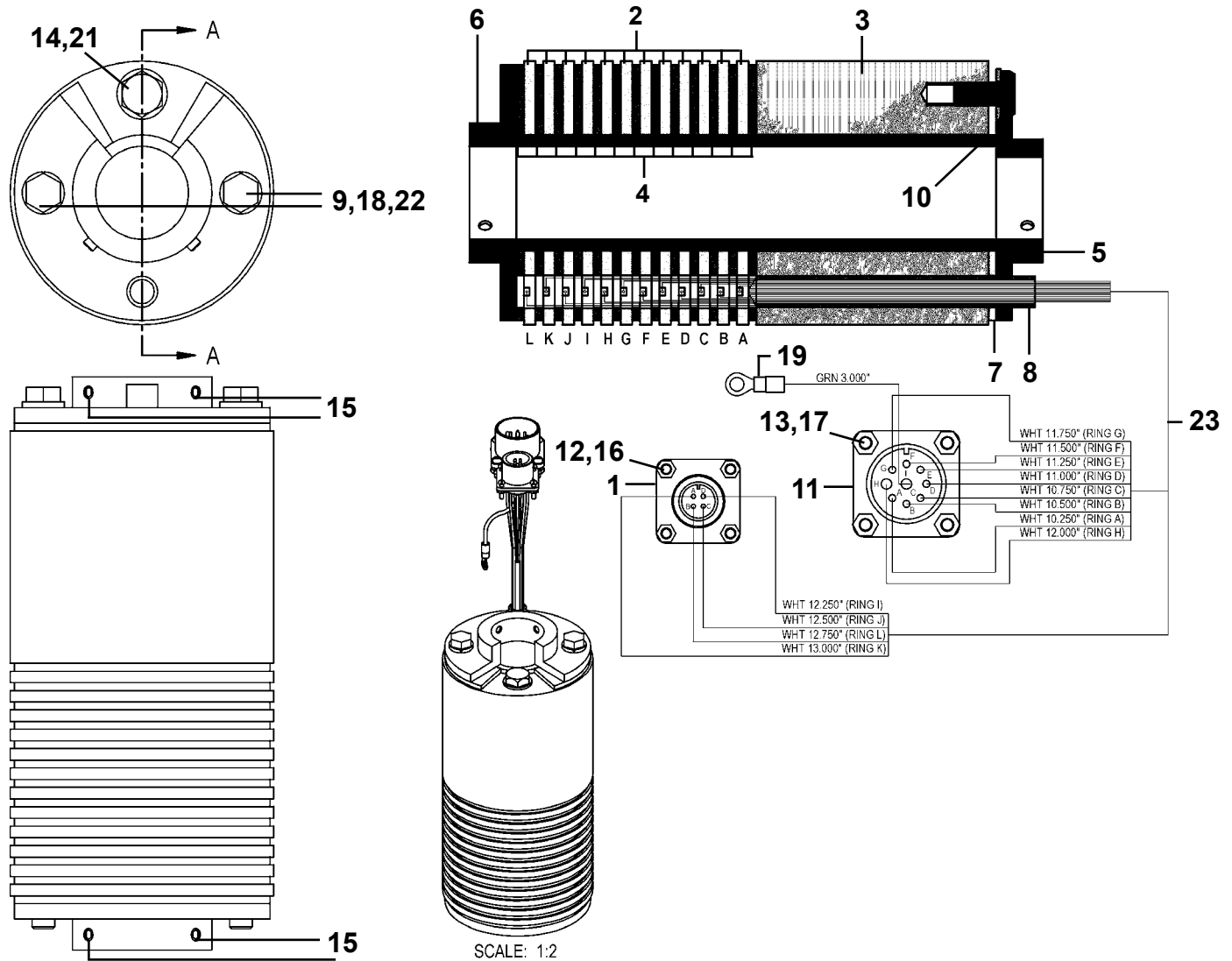
CWP-1800 CWP-18 CIRCLE WELDER / WIRING DIAGRAM / ELECTRICAL COMPONENT CHART



ELECTRICAL COMPONENT CHART

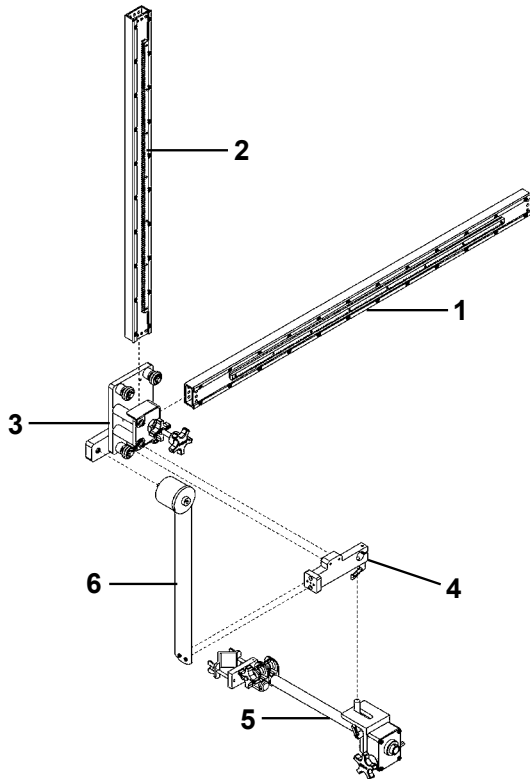
ITEM	DESCRIPTION	PART NO.
1	NA-3 Wire Feeder	LDC-0040
2	Weld Cable 4/0 50'	CWO-3040
3	CW-18 Collector Ring	CWO-3133
4	Brush Holder Support	CWO-3313
5	4066 Motor Assy.	CWO-3506
6	NA-3 Wire Feeder Control	CWP-1805
7	Small Retainer Brush	CWO-3931
8	Terminal Block Assy.	CWO-3969
9	Weld Cable 4/0	CWO-3970
10	Weld Cable Inlet	CWO-3972
11	Feeder Control Box Cable	CWO-2978-ES
12	Rotational Control	CBP-1550
13	K231 Sub Arc Gun	CWO-3710-__
14	Weld Cable 4/0 6'	CWO-3970-72
15	Power Input to NA3	MUG-1621-1.5
16	E-STOP Assy.	CWO-1105

CWO-3133 COLLECTOR WITH POWER RACKER



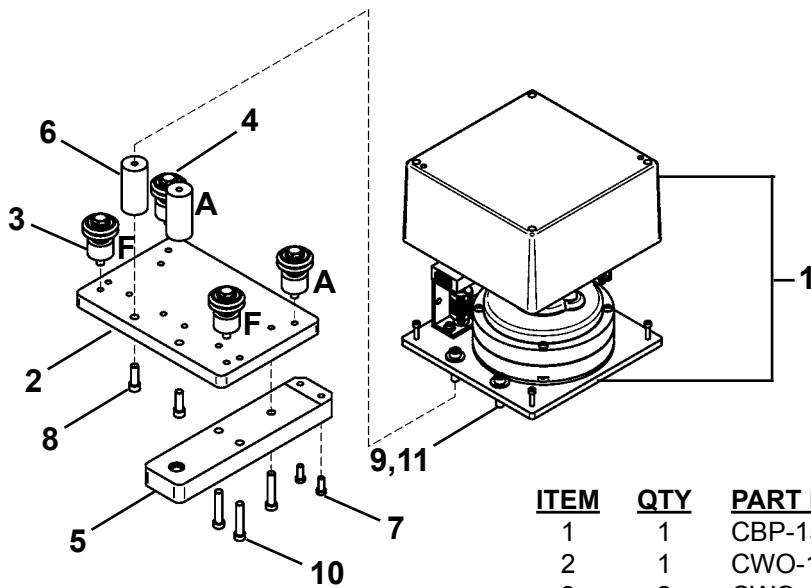
ITEM	QTY	PART NO.	DESCRIPTION
1	1	BUG-1034	Panel Connector 4-T, M
2	12	CWO-3127	Brass Ring 4.250" Dia x .188" Thk
3	1	CWO-5739	Brass Ring 4.250" Dia x 3.750 Thk
4	13	CWO-5744	Micarta Spacer
5	1	CWO-5745	Top Collector Plate CW-7, CW-11
6	1	CWO-5746	Cb-2 Bottom Collector Plate
7	1	CWO-5747	Micarta Spacer W/Notch
8	1	CWO-5758	Micarta Sleeve .495" O.D. x .391" I.D. x 4.500" Lg
9	2	CWO-5760	Micarta Sleeve .495" O.D. x .391" I.D. x 8.000" Lg
10	1	CWO-5770	Micarta Sleeve 1.875" O.D. x 1.5000" I.D. x 7.750" Lg
11	1	CWO-6068	Panel Connector 9-T, M
12	4	FAS-0205	Rnd Hd Scr 4-40 x 1/2"
13	4	FAS-0215	Rnd Hd Scr 6-32 x 1/2"
14	1	FAS-0397	Hex Hd Cap Scr 3/8-16 x 3/4"
15	4	FAS-0455	Set Scr 1/4-20 x 1/2" Cup Point
16	4	FAS-1305	Hex Nut 4-40
17	4	FAS-1310	Hex Nut 6-32
18	2	FAS-3397	Hex Hd Cap Scr 3/8-16 x 8-1/2"
19	1	TERM-5494	#8 Ring, Red
20	1	W05-2025	Green Wire 20 Ga 2-1/2"
21	1	WAS-0260	3/8" Washer
22	2	WAS-0262	3/8" Split Lockwasher
23	140"	WRE-1601	16 Awg. White Teflon

CBP-1840 MOTORIZED RACKING SYSTEM / EXPLODED VIEW / PARTS LIST



<u>ITEM</u>	<u>QTY</u>	<u>PART NO.</u>	<u>DESCRIPTION</u>
1	1	ABR-1050	V-Guide Ways 40"
2	1	ABR-1060	V-Guide Ways 33"
3	1	CWO-1675	Vertical Racker
4	1	CWO-1695	Attachment Block
5	1	CWO-3023-S	Torch Angle Adjuster
6	1	CWO-3460	33# Load Spring Assembly

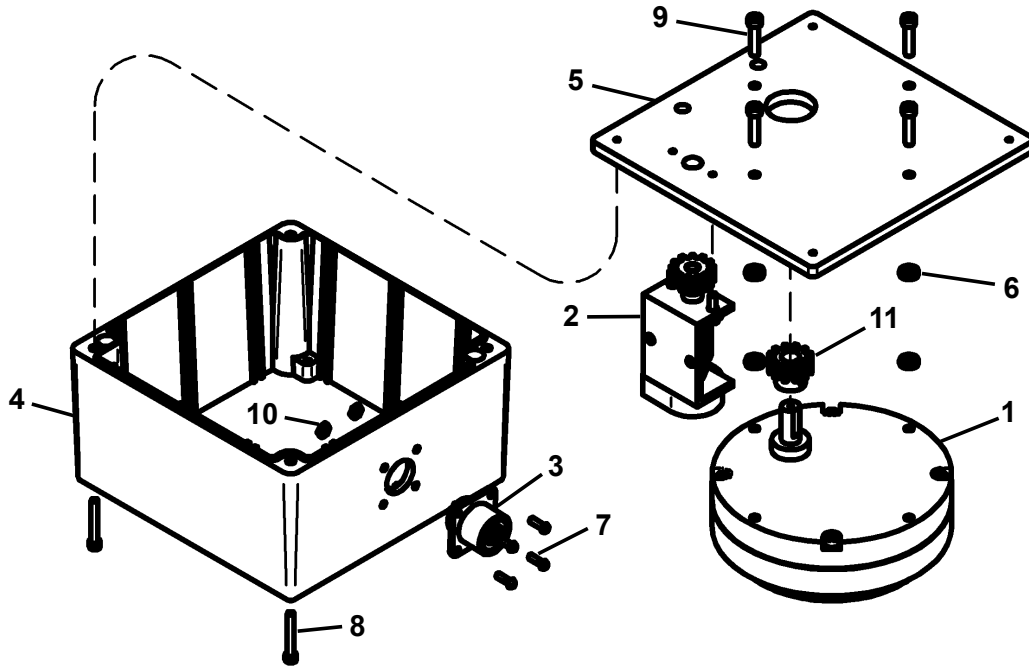
CBP-1675 MOTORIZED RACKER / EXPLODED VIEW / PARTS LIST



A = Adjustable Wheel Placement
F = Fixed Wheel Placement

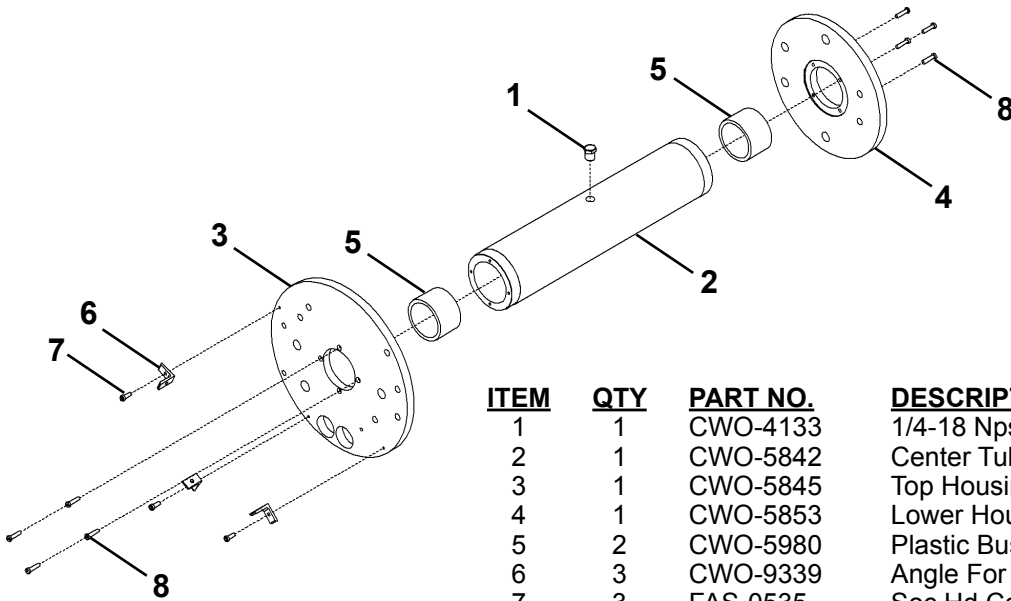
<u>ITEM</u>	<u>QTY</u>	<u>PART NO.</u>	<u>DESCRIPTION</u>
1	1	CBP-1590	Drive Box
2	1	CWO-1677	Mount Plate
3	2	CWO-1680	W2 Fixed Leg & Wheel Assembly
4	2	CWO-1681	W2 Adj Leg & Wheel Assembly
5	1	CWO-1682	Racker Mount Base
6	2	CWO-1694	Stand-Off
7	2	FAS-0555	Soc Hd Cap Scr 1/4-20 x 1/2
8	2	FAS-0557	Soc Hd Cap Scr 1/4-20 x 3/4
9	2	FAS-0559	Soc Hd Cap Scr 1/4-20 x 1
10	3	FAS-2551	Soc Hd Cap Scr 1/4-20 x 1 1/4
11	2	WAS-0240	1/4" SAE Washer

CBP-1590 DRIVE BOX / EXPLODED VIEW / PARTS LIST



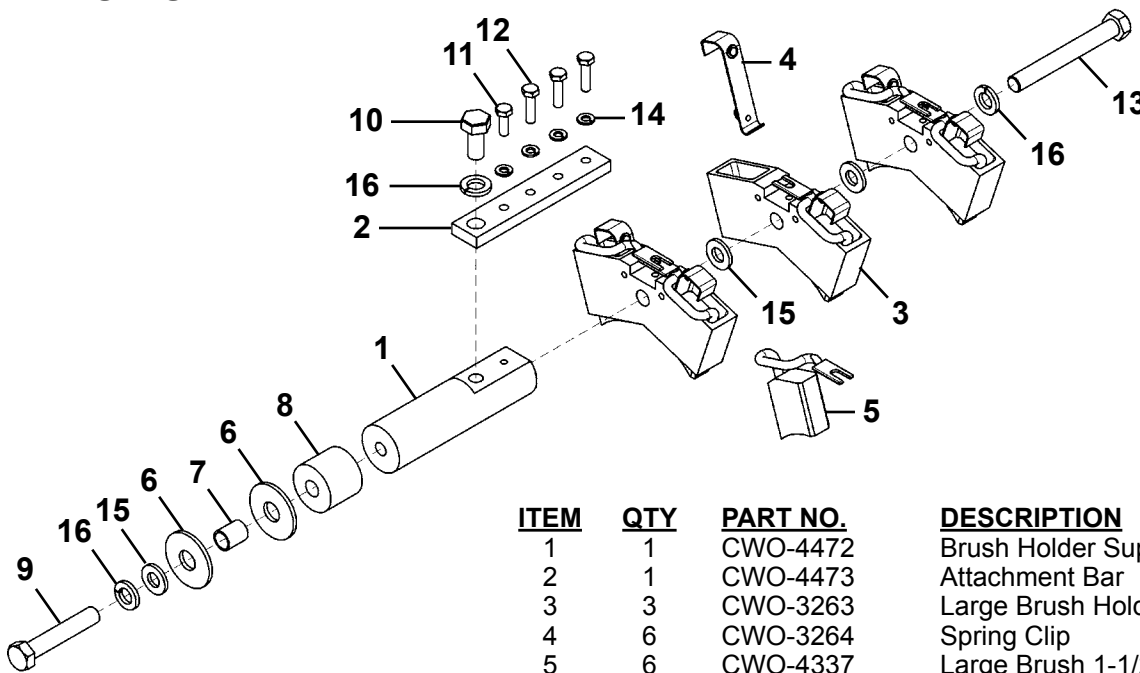
<u>ITEM</u>	<u>QTY</u>	<u>PART NO.</u>	<u>DESCRIPTION</u>
1	1	BUG-1550	Gear Motor (150:1)
2	1	BUG-6040	Gear / Encoder Assembly
3	1	BUG-9909	Panel Connector, 6-T, M
4	1	CBP-1585	Drive Box Enclosure
5	1	CBP-1586	Drive Plate
6	4	AFR-1015	Spacer Washer
7	4	FAS-0204	Screw, Rnd Hd Slit 4-40 x 3/8
8	4	FAS-0519	Screw, Soc Hd Cap 6-32 x 1
9	4	FAS-0527	Screw, Soc Hd Cap 8-32 x 3/4
10	4	FAS-1305	Hex Nut 4-40
11	1	GOF-3014	Drive Pinion

CWO-3165 HOUSING ASSEMBLY / EXPLODED VIEW / PARTS LIST



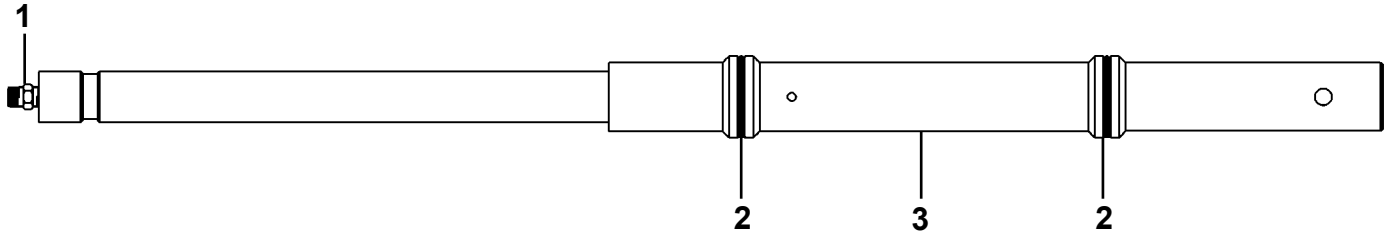
<u>ITEM</u>	<u>QTY</u>	<u>PART NO.</u>	<u>DESCRIPTION</u>
1	1	CWO-4133	1/4-18 Npsm Hex Plug, Brass
2	1	CWO-5842	Center Tube Housing, CW-18
3	1	CWO-5845	Top Housing Plate, CW-18
4	1	CWO-5853	Lower Housing Plate, CW-18
5	2	CWO-5980	Plastic Bushing
6	3	CWO-9339	Angle For Guard
7	3	FAS-0535	Soc Hd Cap Scr 10-24 x 1/2"
8	8	FAS-0548	Soc Hd Cap Scr 10-32 x 3/4" Low Head

CWO-3315 BRUSH HOLDER & SUPPORT ASSEMBLY / EXPLODED VIEW / PARTS LIST



<u>ITEM</u>	<u>QTY</u>	<u>PART NO.</u>	<u>DESCRIPTION</u>
1	1	CWO-4472	Brush Holder Support
2	1	CWO-4473	Attachment Bar
3	3	CWO-3263	Large Brush Holder
4	6	CWO-3264	Spring Clip
5	6	CWO-4337	Large Brush 1-1/2" x 3/4" x 3"
6	2	CWO-5548	Micarta Spacer
7	1	CWO-5549	Micarta Bushing
8	1	CWO-4470	Support Brush Holder Extension
9	1	FAS-3308	Hex Hd Cap Scr 1/2-13 x 3"
10	1	FAS-0309	Hex Hd Cap Scr 1/2-13 x 1"
11	1	FAS-0357	Hex Hd Cap Scr 1/4-20 x 3/4"
12	3	FAS-0359	Hex Hd Cap Scr 1/4-20 x 1"
13	1	FAS-3304	Hex Hd Cap Scr 1/2-13 x 4"
14	4	WAS-0243	1/4" Split Lock Washer
15	3	WAS-0280	1/2" SAE Flat Washer
16	3	WAS-0281	1/2" Split Lock Washer

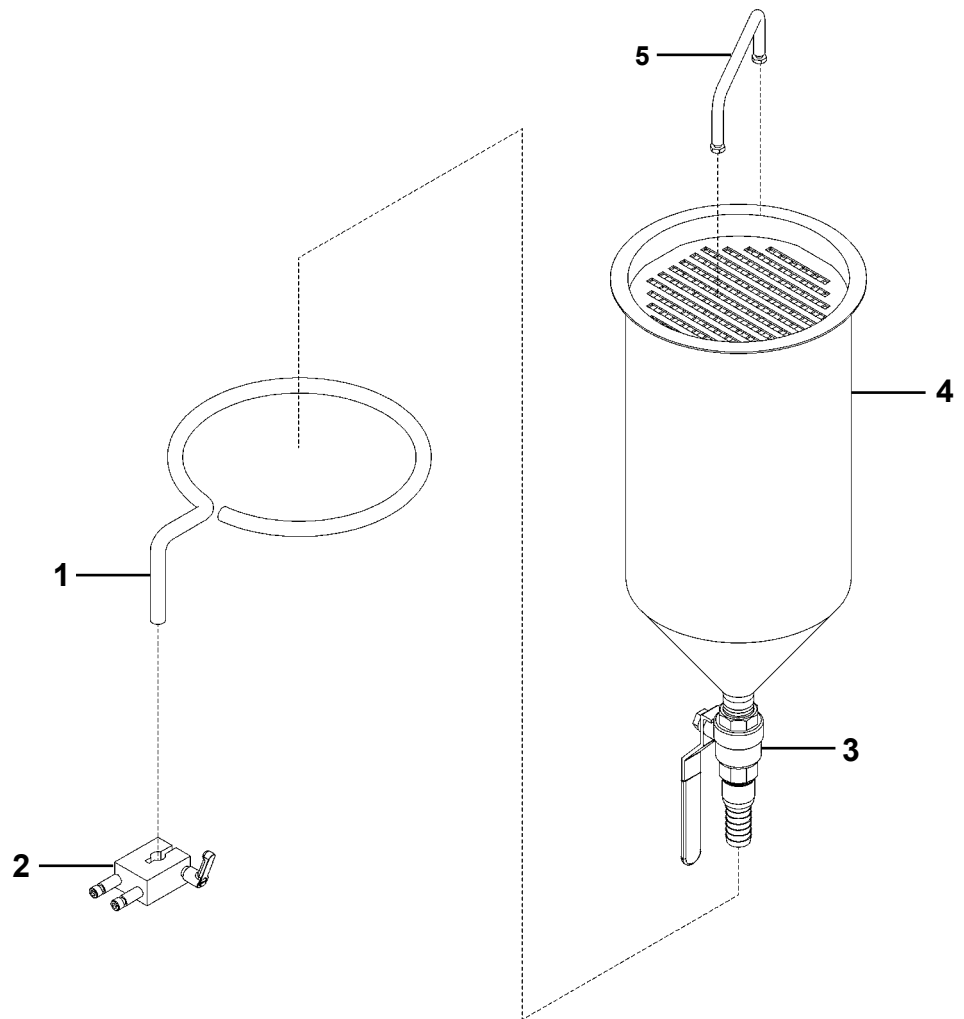
CWO-3432 SHAFT ASSEMBLY / EXPLODED VIEW / PARTS LIST



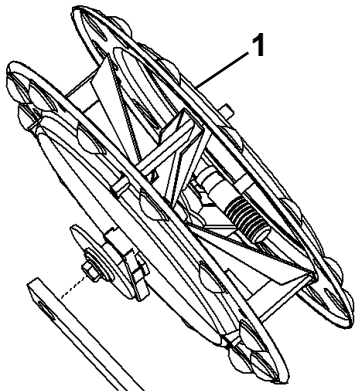
<u>ITEM</u>	<u>QTY</u>	<u>PART NO.</u>	<u>DESCRIPTION</u>
1	1	BUG-9096	Outlet Bushing, Oxygen
2	2	CWO-4507	O-Ring, Oxygen, Gas
3	1	CWO-5779	Shaft CW-18

CWO-3490 FLUX HOPPER ASSEMBLY / EXPLODED VIEW / PARTS LIST

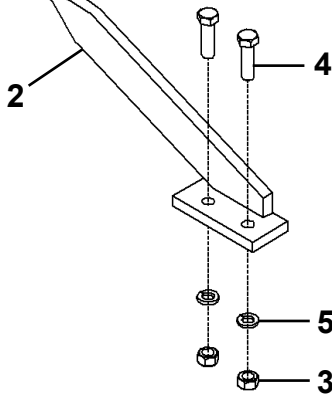
<u>ITEM</u>	<u>QTY</u>	<u>PART NO.</u>	<u>DESCRIPTION</u>
1	1	CWO-3757	Hopper Support Rod
2	1	CWO-3760	Clamp Block 1/2"
3	1	CWO-3478	1-3/4" Hose Barb
4	1	CWO-3769	Flux Hopper Steel 12"
5	1	GOF-3019	Handle W/ Bolts
N/S	1	CWO-3491-48	Flux Hose 3/4" ID x 1" OD x 48" Lg



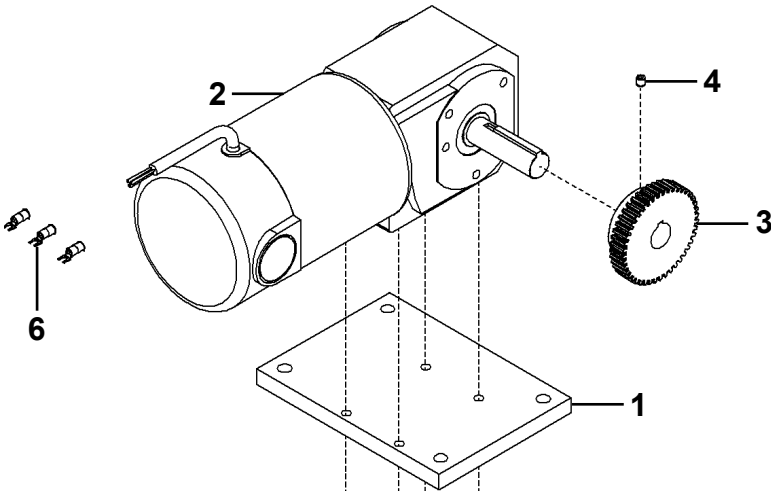
CWO-3498-11 WIRE REEL ASSEMBLY / EXPLODED VIEW / PARTS LIST



<u>ITEM</u>	<u>QTY</u>	<u>PART NO.</u>	<u>DESCRIPTION</u>
1	1	BUG-3293	Reel, 60 Lbs.
2	1	CWO-3217-11	Wire Reel Support Assembly CW-18
3	2	FAS-1301	Hex Nut 1/2-13
4	2	FAS-2305	Hex Hd Cap Scr 1/2-13 x 1-3/4"
5	2	WAS-0281	1/2" Lock Washer

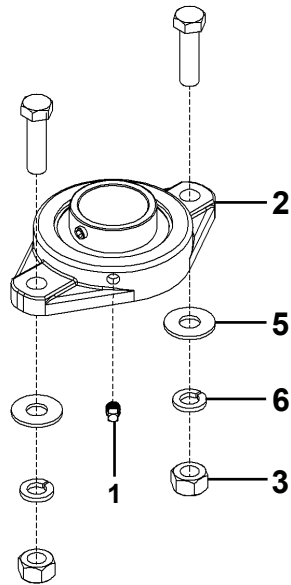


CWO-3506 4066 MOTOR ASSEMBLY / EXPLODED VIEW / PARTS LIST



<u>ITEM</u>	<u>QTY</u>	<u>PART NO.</u>	<u>DESCRIPTION</u>
1	1	CWO-3620	Motor Mount Bracket
2	1	CWO-4846	Right Angle DC Motor 4066
3	1	CWO-5767	Gear Pm Motor 147
4	1	FAS-0453	Set Scr 1/4-20 x 1/4"
5	4	FAS-0559	Soc Hd Cap Scr 1/4-20 x 1"
6	3	TERM WTE 1508	#8 Fork, Blue
7	4	WAS-0243	1/4" Split Lock Washer

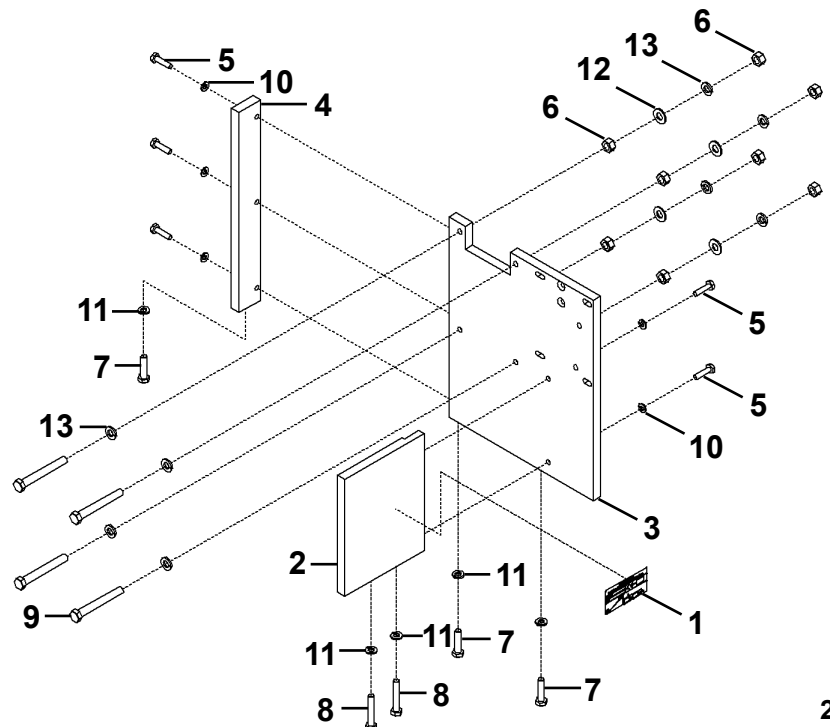
CWO-3528 2" FLANGE BEARING w/FASTENERS / EXPLODED VIEW / PARTS LIST



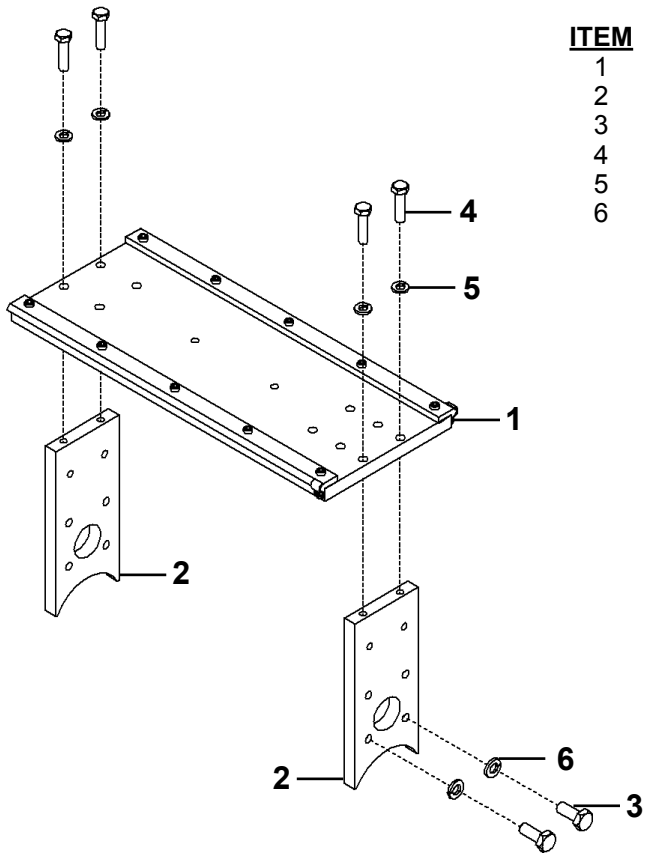
<u>ITEM</u>	<u>QTY</u>	<u>PART NO.</u>	<u>DESCRIPTION</u>
1	1	CWO-1511	1/8" Pipe Plug Black Iron
2	1	CWO-4482	Flange Bearing 2" Bore
3	2	FAS-1398	9/16-12 Hex Nut
4	2	FAS-3305	Hex Hd Cap Scr 9/16-12 x 2"
5	2	WAS-0290	9/16" Sae Washer
6	2	WAS-0291	9/16" Split Lock Washer

CWO-3531 MOTOR & TRANSMISSION PLATE ASSEMBLY / EXPLODED VIEW / PARTS LIST

<u>ITEM</u>	<u>QTY</u>	<u>PART NO.</u>	<u>DESCRIPTION</u>
1	1	BUG-1338	I.D. Plate
2	1	CWO-5788	Cover Plate
3	1	CWO-5887	Motor & Transmission Plate
4	1	CWO-5888	End Plate
5	5	FAS-0359	Hex Hd Cap Scr 1/4-20 x 1"
6	8	FAS-1390	Hex Nut 3/8-16
7	3	FAS-2372	Hex Hd Cap Scr 5/16-18 x 1-1/4"
8	2	FAS-2374	Hex Hd Cap Scr 5/16-18 x 1-3/4"
9	4	FAS-2398	Hex Hd Cap Scr 3/8-16 x 3"
10	5	WAS-0243	1/4" Split Lock Washer
11	5	WAS-0251	5/16" Split Lock Washer
12	4	WAS-0260	3/8" Washer
13	8	WAS-0262	3/8" Split Lock Washer

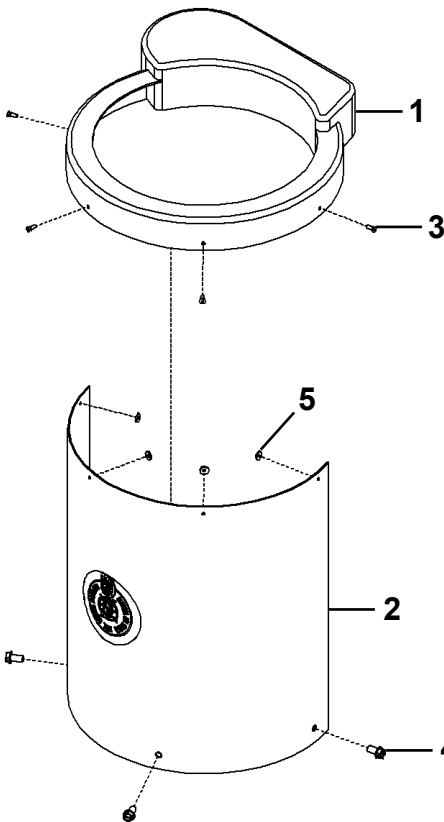


CWO-3534 SLIDE BAR ASSEMBLY / EXPLODED VIEW / PARTS LIST



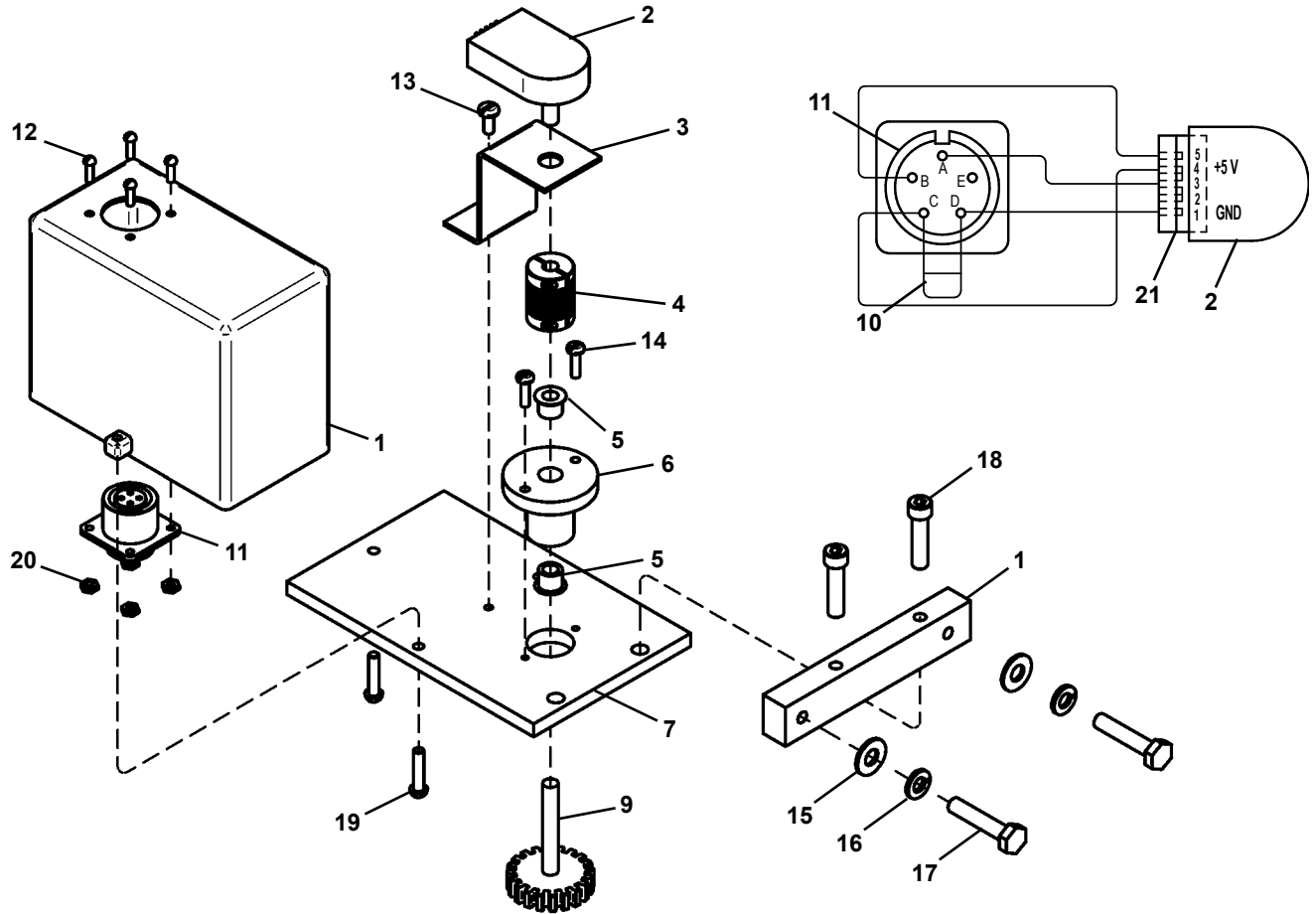
<u>ITEM</u>	<u>QTY</u>	<u>PART NO.</u>	<u>DESCRIPTION</u>
1	1	CWO-3912	Slide Bar Assembly
2	2	CWO-9033	Top / Bottom Vertical Slide Plate
3	2	FAS-0399	Hex Hd Cap Scr 3/8-16 x 1"
4	4	FAS-2372	Hex Hd Cap Scr 5/16-18 x 1-1/4"
5	4	WAS-0251	5/16" Split Lockwasher
6	2	WAS-0262	3/8" Split Lockwasher

CWO-3537 GUARD ASSEMBLY / EXPLODED VIEW / PARTS LIST



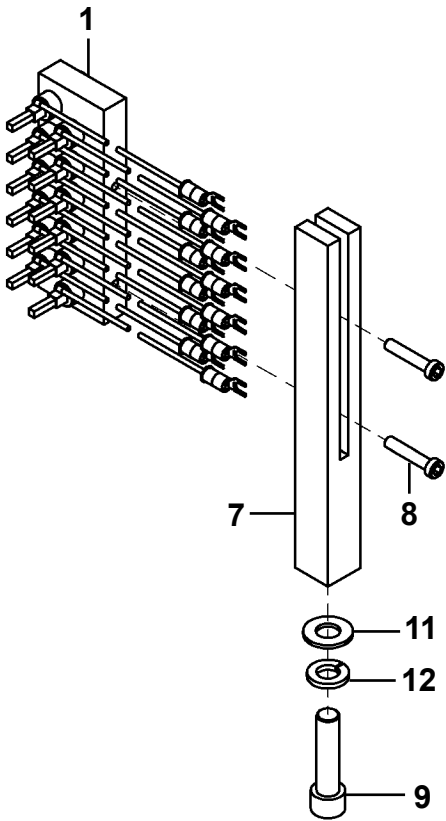
<u>ITEM</u>	<u>QTY</u>	<u>PART NO.</u>	<u>DESCRIPTION</u>
1	1	CWO-5094	Upper Guard CB-2, CB-3, CW-7, CW-18
2	1	CWO-9142	Lower Guard CW-18
3	4	FAS-1376	Rivet 1/8" Dia x 3/8"
4	3	FAS-1455	T.C. Slit Hex 1/4-20 x 1/4" W/Washer
5	4	FAS-0261	3/8" Washer, 0.056 Thk

CBP-1545-18 ENCODER ASSEMBLY / EXPLODED VIEW / PARTS LIST / WIRING DIAGRAM



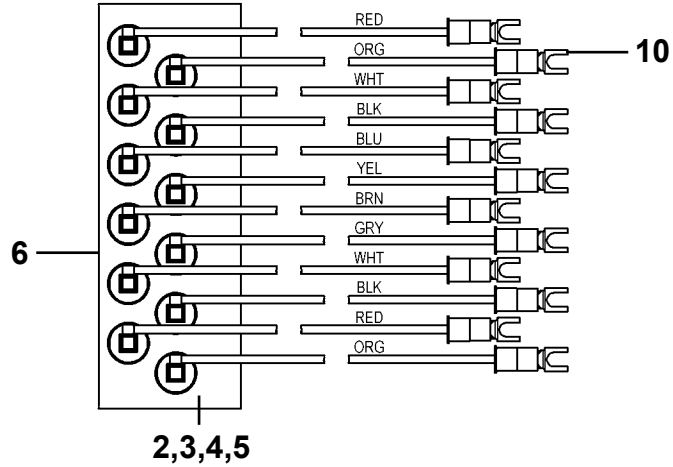
<u>ITEM</u>	<u>QTY</u>	<u>PART NO.</u>	<u>DESCRIPTION</u>
1	1	CBP-1603	Encoder Enclosure For CWP-18
2	1	CBP-1599	Encoder, 512 CPR
3	1	MUG-1592	Bracket
4	1	BUG-6044	Flexible Coupling
5	2	SFX-1218	Bearing-Flg 1/4 ID x 3/8 OD x 5/16 Lg
6	1	MUG-1593	Pod
7	1	CBP-1601	Encoder Mount Plate For CWP-18
8	1	CBP-1602	Encoder Mounting Bar For CWP-18
9	1	CBP-1593	Gear Shaft Assembly
10	1	CAP-1105M	1Uf 50V 10% Radial
11	1	CON-1305P	Panel Connector, 5-T, M
12	4	FAS-0204	Rnd Hd Slit Scr 4-40 x 3/8 Zinc
13	1	FAS-0124	8/32 x 3/8 Pan Hd, Di-Chrome
14	2	FAS-0115	6-32 x 1/2 Pan Head, Zinc
15	2	WAS-0240	1/4 SAE Flat Washer
16	2	WAS-0243	1/4" Split Lock Washer
17	2	FAS-2351	Hex Hd Cap Scr 1/4-20 x 1-1/4
18	2	FAS-0559	Soc Hd Cap 1/4-20 x 1
19	3	FAS-0227	Rnd Hd Scr 8-32 x 3/4
20	4	FAS-1305	Hex Nut 4-40
21	1	CBP-1598	Connector Cable

CWO-3931 SMALL BRUSH ASSEMBLY / EXPLODED VIEW / PARTS LIST

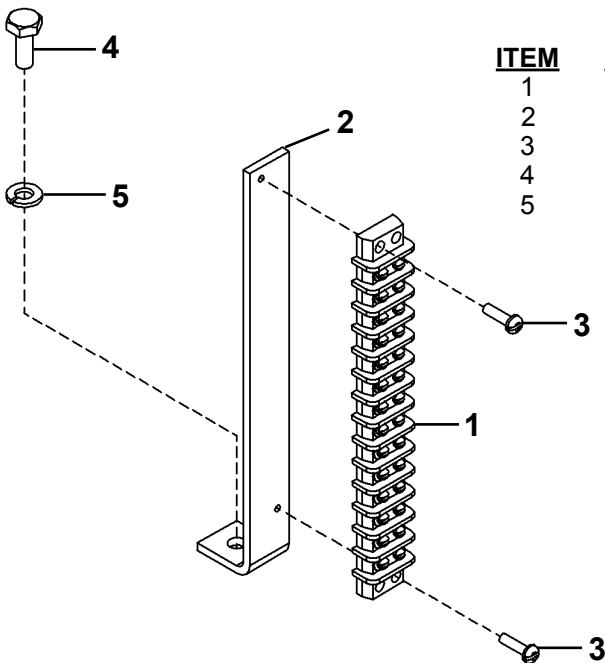


ITEM	QTY	PART NO.	DESCRIPTION
1	1	CWO-3947	12 Position Small Brush Assembly
2	12	CWO-5831	1/8" x 1/8" Z 1/8" Brush
3	12	CWO-5874	1/8" Brush Holder
4	12	CWO-5875	Cap
5	12	CWO-5876	Clip
6	1	CWO-9067	Small Brush Retainer Block, CW-18
7	1	CWO-9082	Retainer Support
8	2	FAS-0359	Soc Hd Cap Scr 10-24 x 1"
9	1	FAS-0593	Soc Hd Cap Scr 3/8-16 x 1-1/2"
10	12	TERM-WTE-1508	#8 Fork, Blue
11	1	WAS-0260	3/8" SAE Washer
12	1	WAS-0262	3/8" Split Lockwasher

CWO-3931 SMALL RETAINER BLOCK ASSEMBLY / DETAIL VIEW

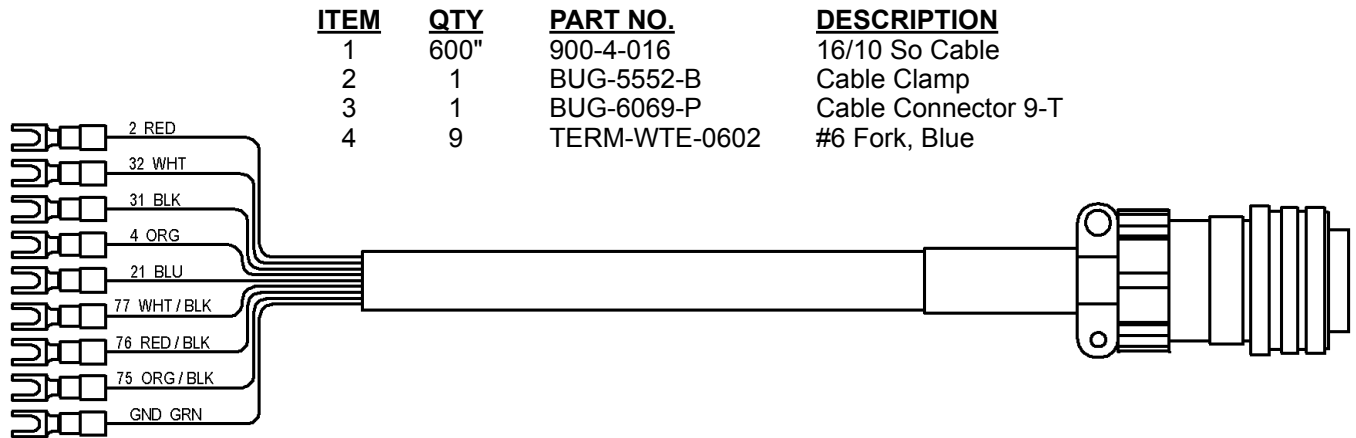


CWO-3969 TERMINAL BLOCK ASSEMBLY / EXPLODED VIEW / PARTS LIST

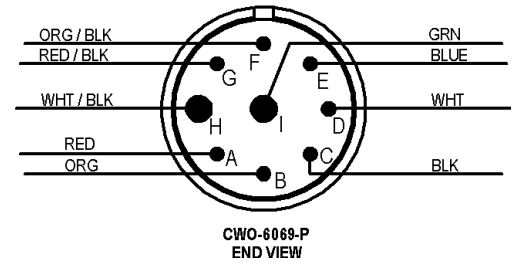


ITEM	QTY	PART NO.	DESCRIPTION
1	1	CWO-6726	Terminal Block 14-Pin
2	1	CWO-9071	Terminal Block Support CW-18
3	2	FAS-0215	Rnd Hd Scr 6-32 x 1/2"
4	1	FAS-0356	Hex Hd Cap Scr 1/4-20 x 5/8"
5	1	WAS-0243	1/4" Split Lock Washer

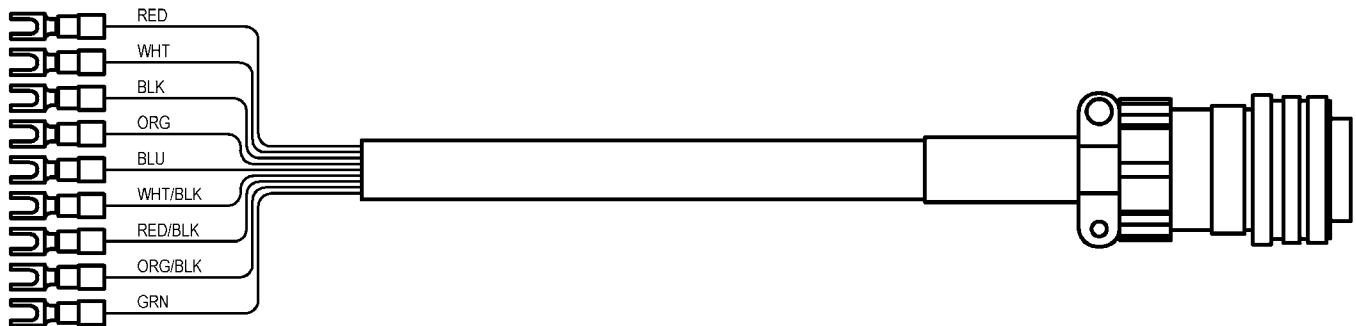
CWO-3971 CONTROL CABLE / DETAIL VIEW / PARTS LIST



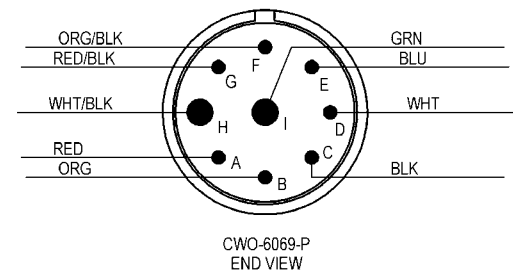
WIRE CHART	
2 RED	CONTACTOR
4 ORG	CONTACTOR
32 WHT	110 VAC
31 BLK	110 VAC
21 BLU	REMOTE VOLTAGE
75 ORG / BLK	REMOTE VOLTAGE
76 RED / BLK	REMOTE VOLTAGE
77 WHT / BLK	REMOTE VOLTAGE
GRN	GROUND



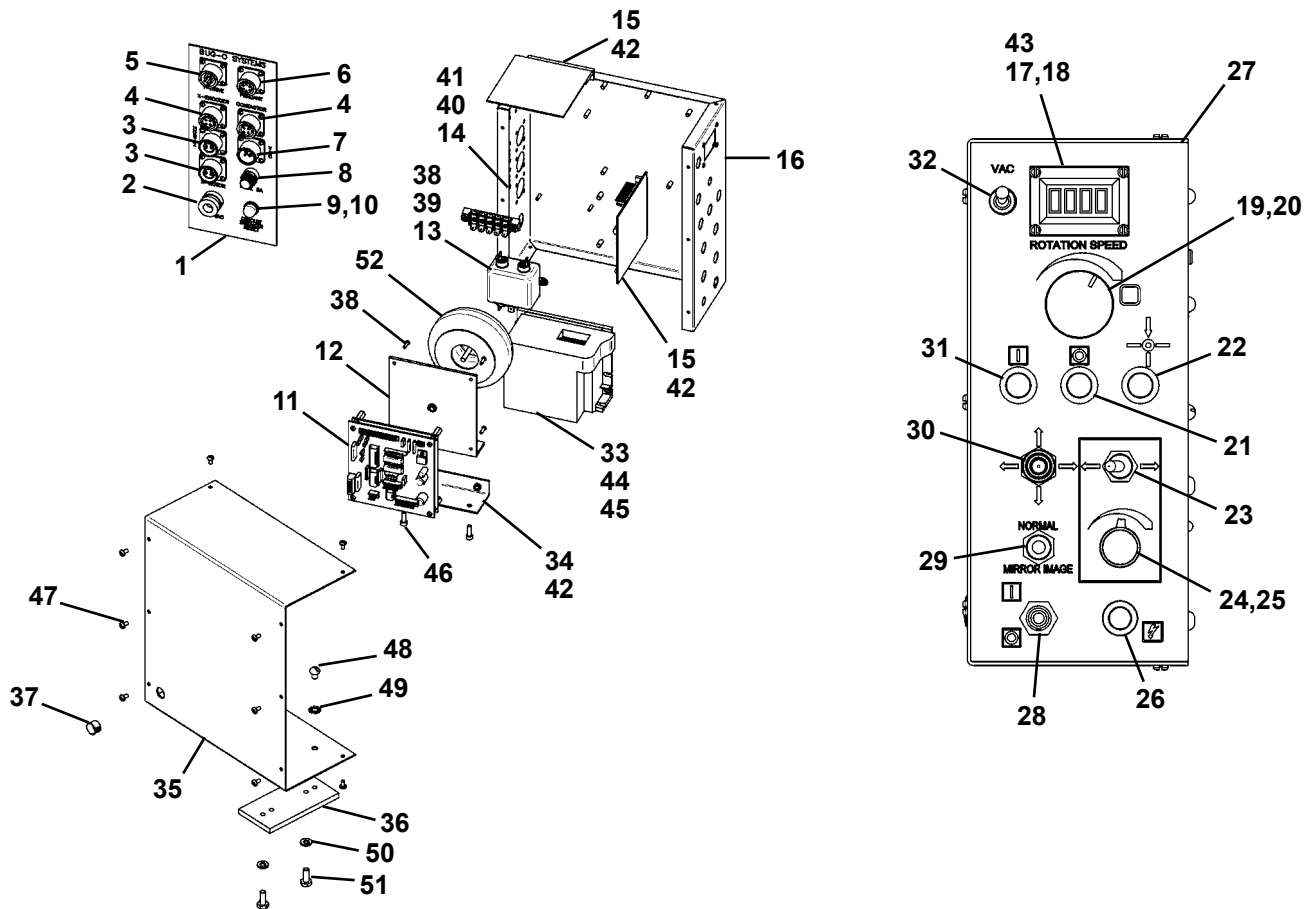
CWO-2978 FEEDER CONTROL BOX CABLE / DETAIL VIEW / PARTS LIST



ITEM	QTY	PART NO.	DESCRIPTION
1	32"	900-4-016	16/10 So Cable
2	1	BUG-5552-B	Cable Clamp
3	1	BUG-6069-P	Cable Connector 9-T, F
4	9	TERM-WTE-0602	#6 Fork, Blue

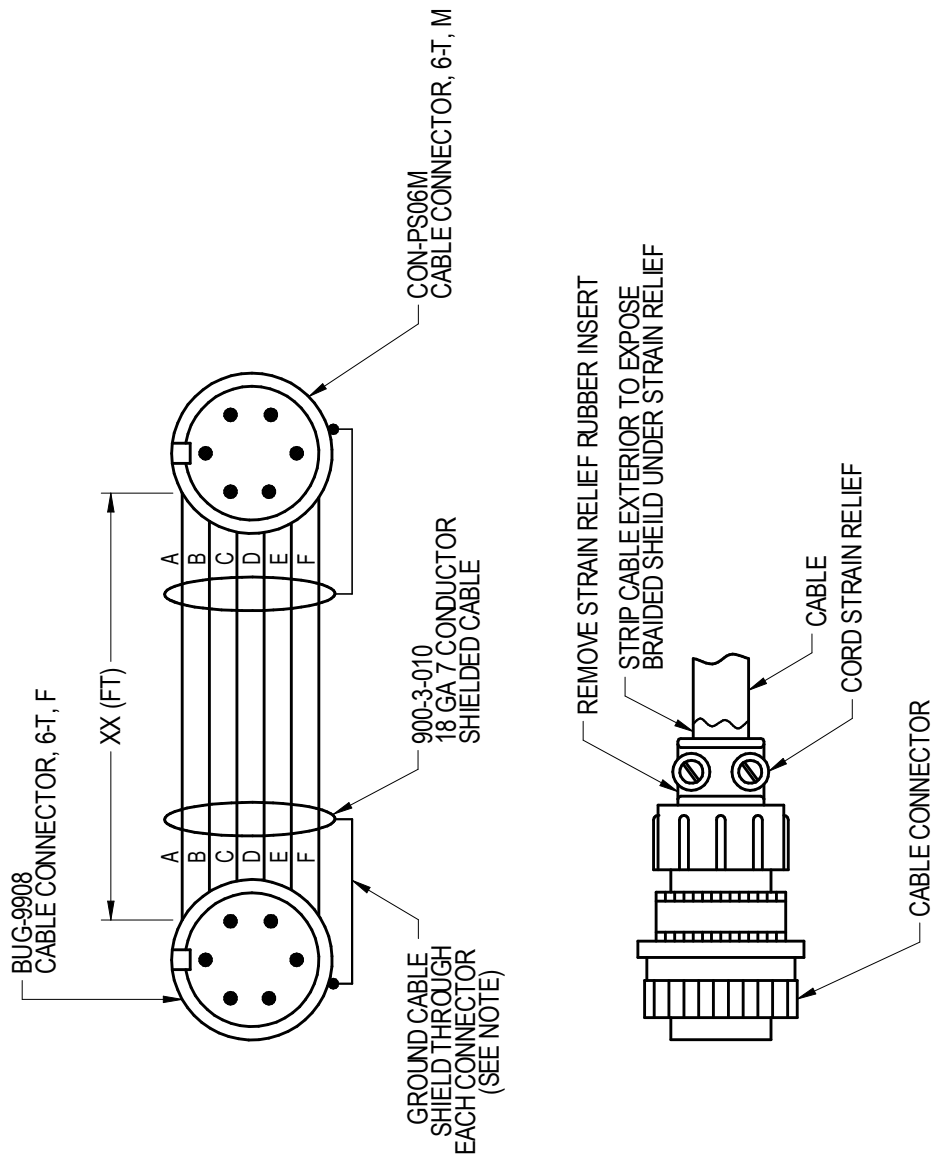


CBP-1550 ROTATION CONTROL / EXPLODED VIEW / PARTS LIST



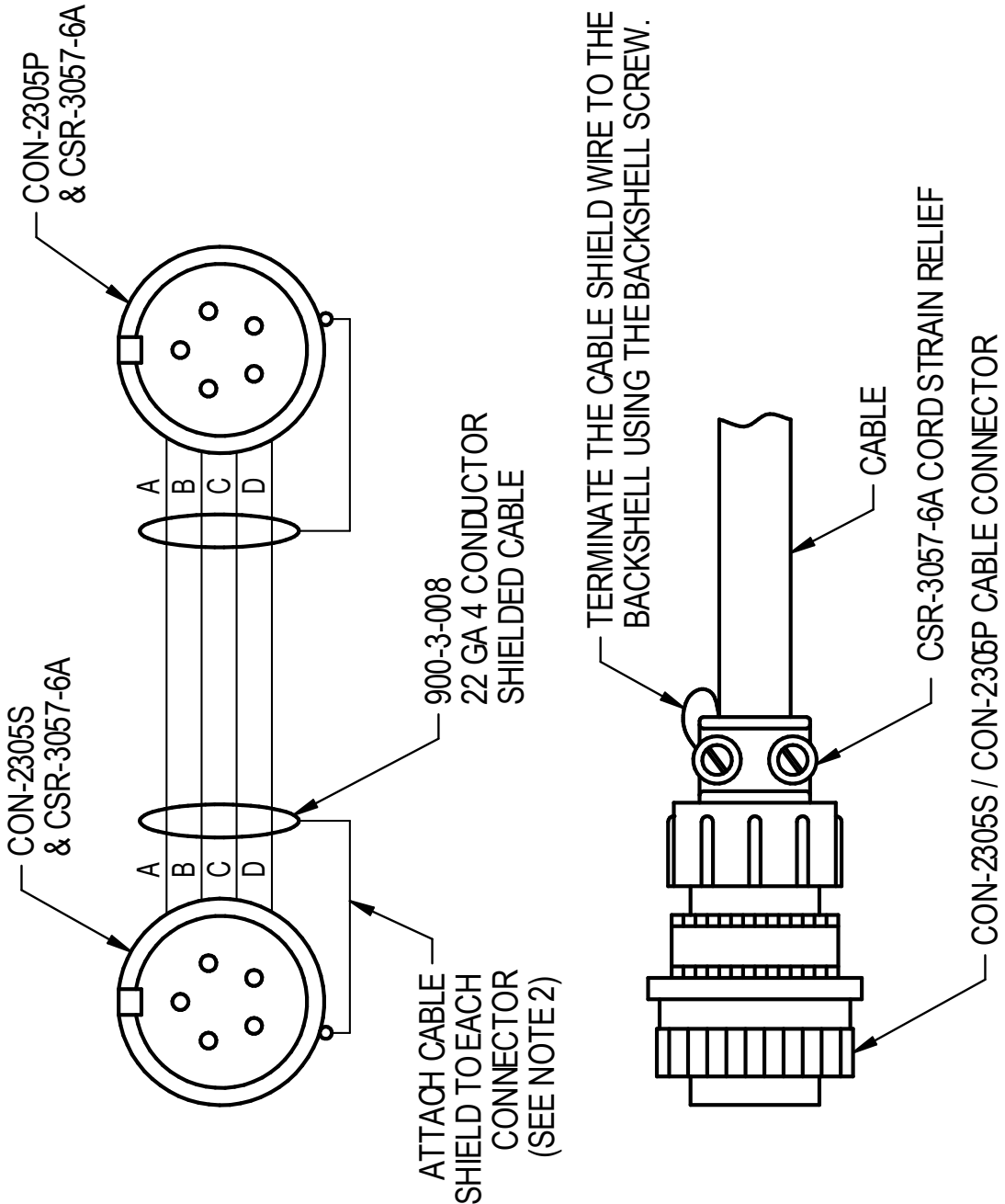
ITEM	QTY	PART NO.	DESCRIPTION	ITEM	QTY	PART NO.	DESCRIPTION
1	1	CBP-1556	Rear Legend Plate	27	1	CBP-1553	Front Legend Plate
2	1	BUG-9446	Cord Grip	28	1	ARM-2279	Toggle Switch, DPST
3	2	BUG-9856	Panel Connector, 2-T, F	29	1	SWT-3601	Toggle Switch, 4PDT
4	2	MUG-1156	Panel Connector, 4-T, F	30	1	PRS-1065	Joystick
5	1	BUG-9909	Panel Connector, 6-T, M	31	1	SWT-1113	Push Button Switch, Green
6	1	BUG-9902	Panel Connector, 6-T, F	32	1	ABP-1069	Toggle Switch, SPST
7	1	BUG-9486	Panel Connector, 2-T, M	33	1	CWO-6520	4-Quadrant Speed Control
8	1	FHO-0188	Fuse Holder, Panel Mount	34	1	CBP-1511	Transformer Bracket
9	1	BUG-2923	Circuit Breaker, 0.7 Amp	35	1	CBP-1551	Control Cover
10	1	BUG-2924	Reset Seal, Transparent	36	1	CWO-6417	Wire Feeder Mount Plate
11	1	CBP-6030	Control Module	37	1	MUG-1589	Hole Plug, 0.500"
12	1	BUG-6029	Bracket	38	34	FAS-0204	Screw, Rnd Hd Slit, 4-40 x 3/8
13	1	BUG-6031	Filter	39	30	FAS-1305	Hex Nut, 4-40
14	1	BUG-6028	Terminal Block, Kulka	40	2	FAS-0115	Screw, Pan Hd, 6-32 x 1/2
15	2	BUG-1770	Motor Control Board	41	2	FAS-1310	Hex Nut, 6-32
16	1	CBP-1557	Control Case	42	6	FAS-0224	Screw, Rnd Hd, 8-32 x 3/8
17	1	BUG-1764	Meter Display Board Ass'y	43	4	FAS-0104	Screw, Pan Hd, 4-40, Black
18	1	MDS-1011	Display Bezel	44	4	FAS-0244	Screw, Rnd Hd, 10-32 x 3/8
19	1	BUG-1562	Potentiometer, 10k, 3 Turn	45	4	FAS-1340	Hex Nut, 10-32
20	1	BUG-5757	Knob, Black	46	2	FAS-0525	Screw, Soc Hd Cap, 8-32 x 1/2
21	1	SWT-1112	Push Button Switch, Red	47	10	SCW WTE 0264	Screw, #6 x 1/4" Pan Hd
22	1	SWT-1111	Push Button Switch, Black	48	2	FAS-0253	Screw, Rnd Hd, 1/4-20 x 5/16"
23	1	MUG-1199	Toggle Switch, DPDT	49	2	WAS-0242	1/4" External Star Lockwasher
24	1	BUG-9677	Potentiometer, 10k ohms	50	2	WAS-0243	1/4" Split Lock Washer
25	1	MDS-1044	Knob, Yellow	51	2	FAS-0356	Screw, Hex Hd Cap, 1/4-20x5/8
26	1	CWO-6206	Red Neon Lamp, 125V	52	1	BUG-5218	Transformer, 117V 50/60 HZ

CBP-1534-XX SHIELDED CABLE 6-T, F&M WIRING DIAGRAM / PARTS LIST



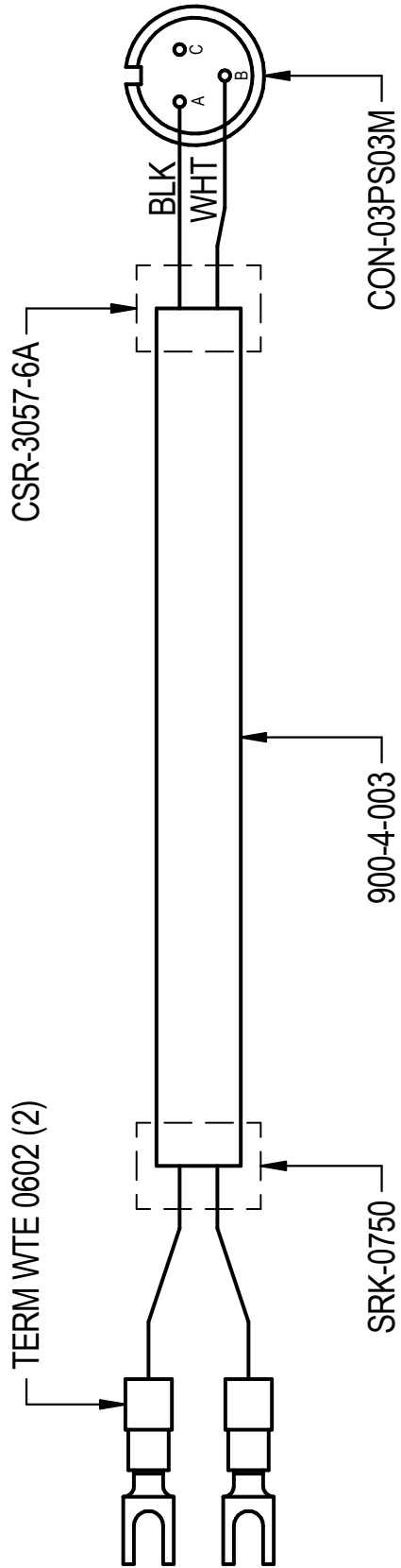
NOTE: BOTH CONNECTORS MUST MAKE ELECTRICAL CONTACT WITH THE CABLE SHIELD AS SHOWN

CBP-1532-XX SHIELDED CABLE 5-T, M WIRING DIAGRAM / PARTS LIST

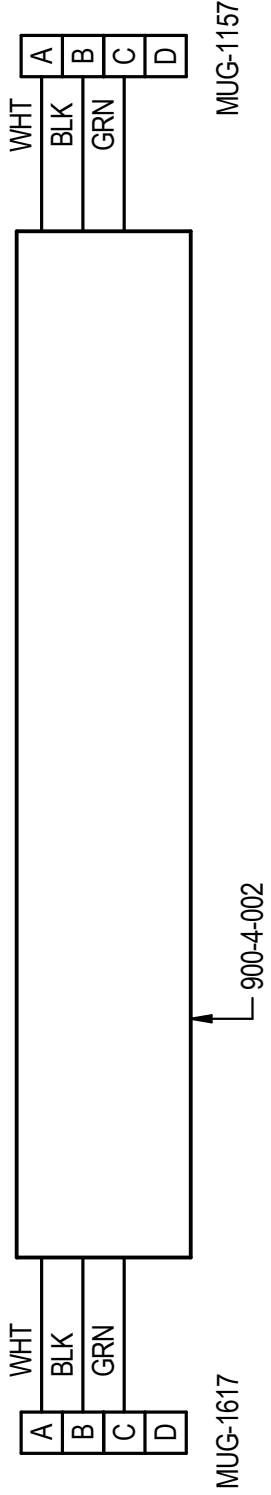


NOTE: BOTH CONNECTORS MUST MAKE ELECTRICAL CONTACT WITH THE CABLE SHIELD AS SHOWN.

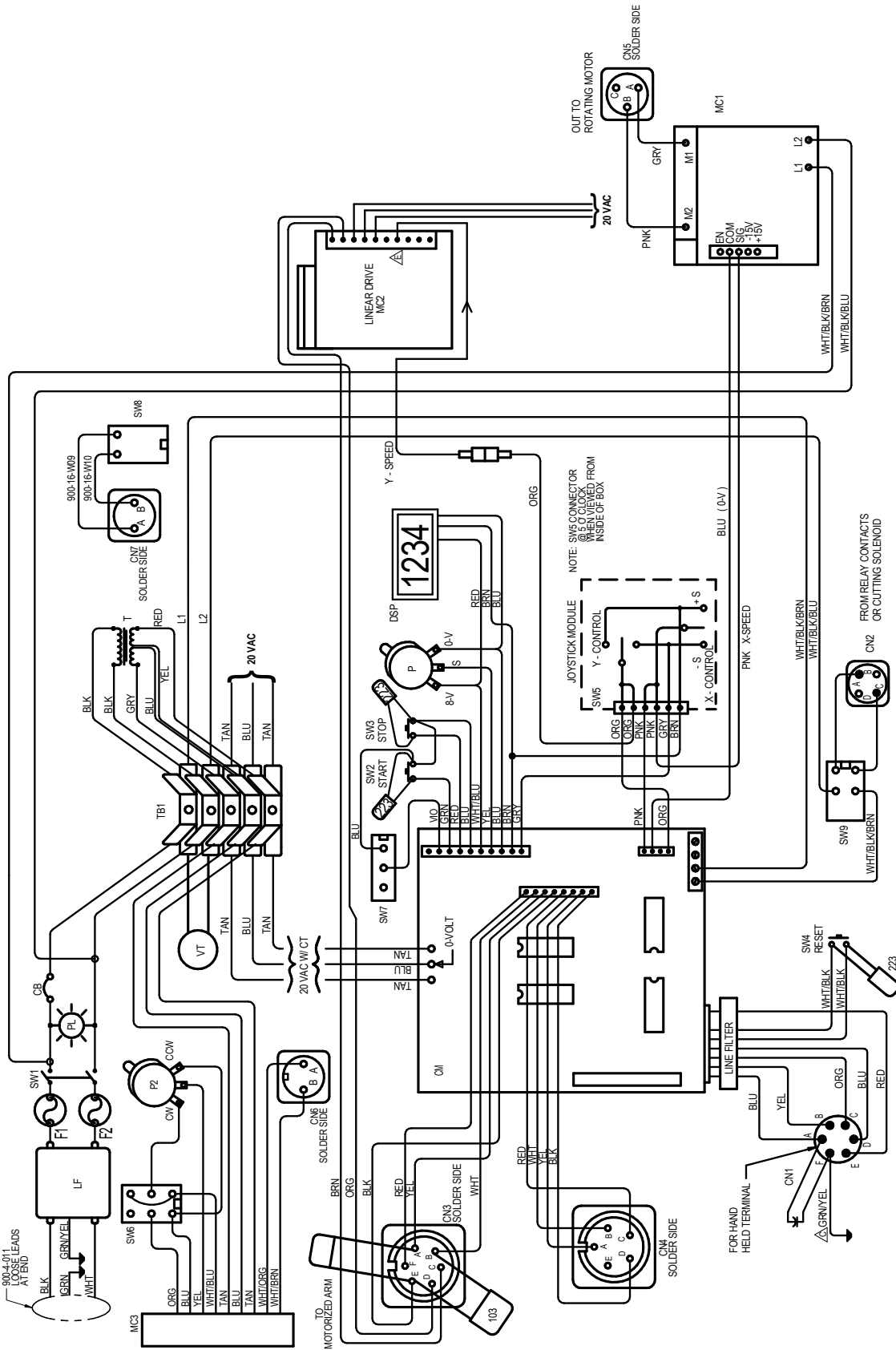
CBP-1533/CWP X-MOTOR CABLE WIRING DIAGRAM / PARTS LIST



CWP-1816/CWP START/STOP CABLE WIRING DIAGRAM / PARTS LIST



CBP-1550 ROTATION CONTROL / WIRING DIAGRAM

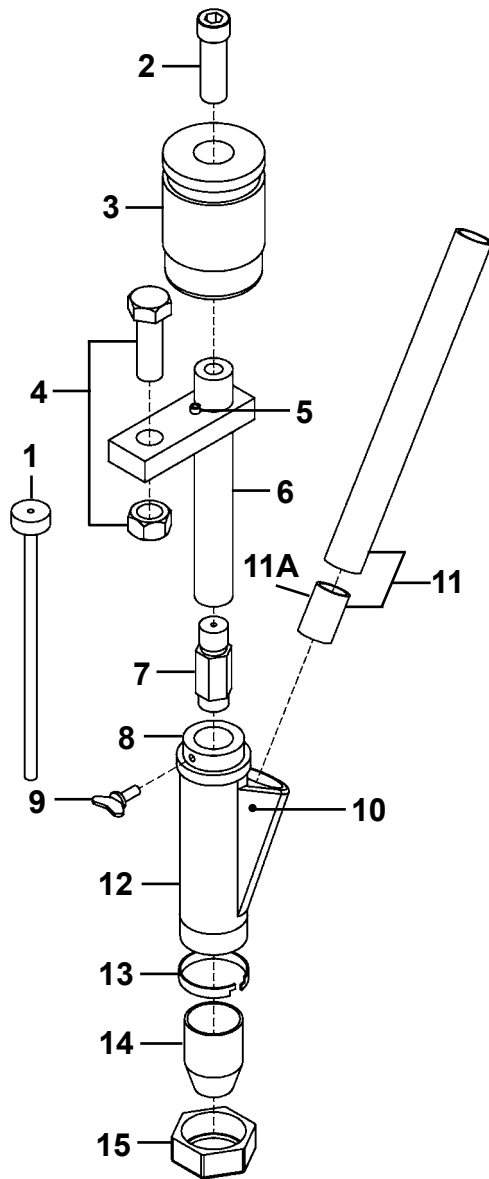


--- = INDICATES ITEMS THAT ARE SUPPLIED TOGETHER.

CBP-1550 ROTATION CONTROL / ELECTRICAL COMPONENT CHART

ITEM	DESCRIPTION	CBP-1550 120 VAC
CB	Circuit Breaker	BUG-2923
PL	Pilot Light	LED-2111
T	Transformer	BUG-5218
VT	Volt Trap	BUG-1393
MC1	4-Quadrant Speed Control	CWO-6520
CM	Control Module	CBP-6030
CN1	Connector (Pendant)	BUG-9902
CN2	Connector (Solenoid)	MUG-1156
CN3	Connector (Motor Arm)	CON-06RP06F
CN4	Connector (Aux.)	CON-1305S
CN5	Connector (Rot. Motor)	CON-03RS03F
CN6	Connector (Racker)	BUG-9856
CN7	Connector (Vacuum)	BUG-9486
DSP	Digital Display	BUG-1764
LF	Line Filter	BUG-6031
MC2	Motor Control Board	BUG-1770
MC3	Speed Control (Racker)	CAS-1770
P	Potentiometer	BUG-1562
P2	Potentiometer (Racker)	BUG-9677
SW1	Toggle Switch (Power)	ARM-2279
SW2	PB Switch (Start)	SWT-1113
SW3	PB Switch (Stop)	SWT-1112
SW4	PB Switch (Reset)	SWT-1111
SW5	Joystick Switch	PRS-1065
SW6	Switch (Racker)	MUG-1199
SW7	Mirror Switch	BUG-2626
SW8	Switch (Vacuum)	ABP-1069
SW9	Switch (Dry Run)	ARM-2279
TB1	Terminal Block	BUG-6028
F1,F2	5A Fuse	CWO-7076

CWO-3690-_ K231 SUB ARC GUN



ITEM	QTY	PART NO.	DESCRIPTION
1	1	PXS-15106-3/32	Nozzle Insert
2	1	PXT-10570	Socket Head Screw
3	1	PXS-10493-1	Nozzle Insulator
4	1	PXS-121312	Hex Hd Scr 1 1/2" & Nut 1/2"-13
5	1	PXT-9967-10	Nozzle Body Roll Pin
6	1	CWO-8052	Nozzle Body
7	1	PXS-10125-_	Contact Tip (Specify Wire Size)
8	1	PXS-10138	Flux Cone Plug (Insulator)
9	1	PXT-9078-1	Thumb Screw
10	1	PXT-9967-30	Flux Cone Roll Pin
11	1	PXT-13835	3/4" x 7" Flux Hose W/Fbr Ins
11A	1	PXT-3835-IN	Fiber Insulator
12	1	BUG-3161-P	Cone Body Assembly
13	1	BUG-3163	Locking Ferrule
14	1	BUG-3164	Flux Cone (KP2085-1)
15	1	BUG-3165	Retaining Nut

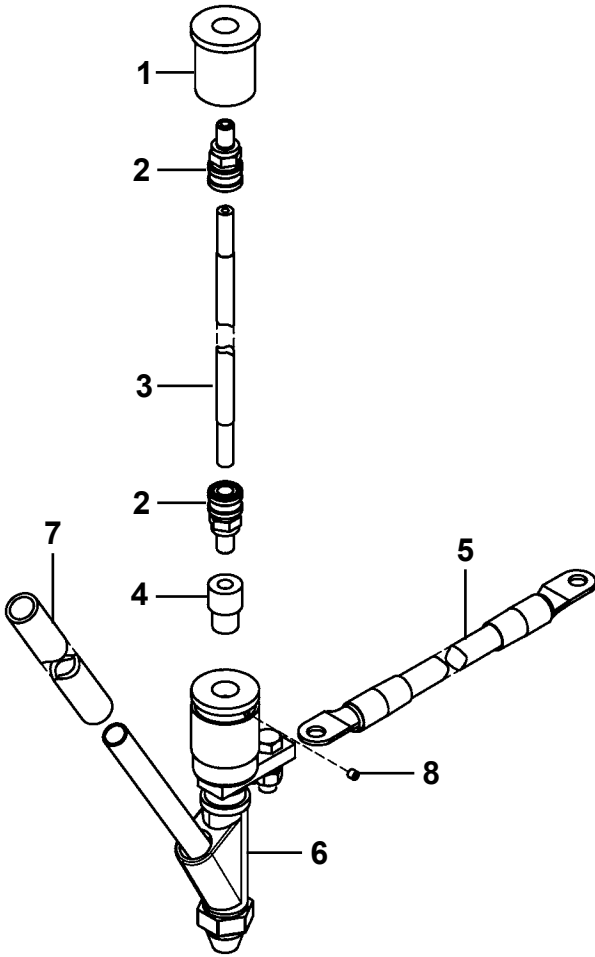
***WIRE SIZES AVAILABLE:**

PART NO.	WIRE SIZE
CWO-3690-1/16	1/16" (1.6 mm)
CWO-3690-5/64	5/64" (2.0 mm)
CWO-3690-3/32	3/32" (2.4 mm)
CWO-3690-1/8	1/8" (3.2 mm)
CWO-3690-5/32	5/32" (4.0 mm)
CWO-3690-3/16	3/16" (4.8 mm)
CWO-3690-7/32	7/32" (5.6 mm)

***REPLACEMENT CONTACT TIPS AVAILABLE:**

PART NO.	WIRE SIZE
CWO-8048	5/64" (2.0 mm)
CWO-8049	3/32" (2.4 mm)
CWO-8050	5/32" (4.0 mm)
CWO-8051	1/8" (3.2 mm)
PXS-10125XL-7/64	7/64" (2.8 mm)
PXS-10125XL-1/16	1/16" (1.6 mm)
PXS-10125XL-3/16	3/16" (4.8 mm)
PXS-10125XL-7/32	7/32" (5.6 mm)

CWO-3710-_ SUB ARC GUN ASSEMBLY



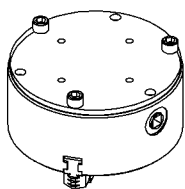
<u>ITEM</u>	<u>QTY</u>	<u>PART NO.</u>	<u>DESCRIPTION</u>
1	1	CWO-1816	Wire Feed Adaptor
2	2	CWO-1817	Bulk Head Connector QCB
3	1	CWO-3697	QCC 72" (1829 Mm) Liner
4	1	CWO-3695-1/2	Adaptor K231 1/2"
5	1	CWO-3970-72	Weld Cable 4/0 Assy. 72" (1829 mm) LG
6	1	CWO-3690-1/8	Sub-Arc Nozzle 1/8"
	1	CWO-3690-3/16	Sub-Arc Nozzle 3/16"
	1	CWO-3690-5/32	Sub-Arc Nozzle 5/32"
7	1	CWO-3491-48	Flux Hose 3/4" ID x 1" OD
8	1	FAS-0452	Set Scr 1/4-20 x 1/4
9*	1	BUG-2708	Clamp

*Item not shown in drawing.

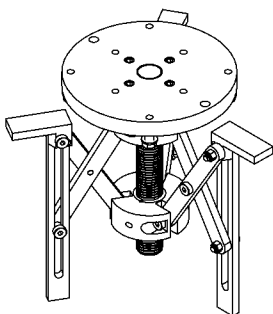
DRIVE ROLLS

<u>PART NO.</u>	<u>QTY</u>	<u>DESCRIPTION</u>
LDC-0013	1	3/32"-7/32" (2.4-5.6 mm) WIRE SIZES
LDC-0014	1	1/16"-3/32 (1.6-2.4 mm) WIRE SIZES
LDC-0015	1	.035"-.052" (.9-1.3 mm) SOLID WIRE

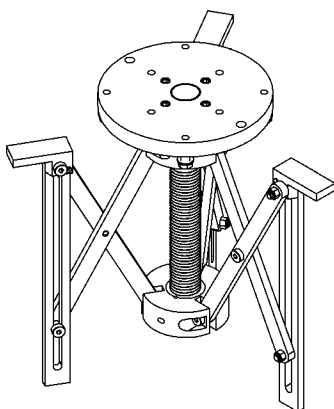
3-JAW EXPANDABLE CHUCKS



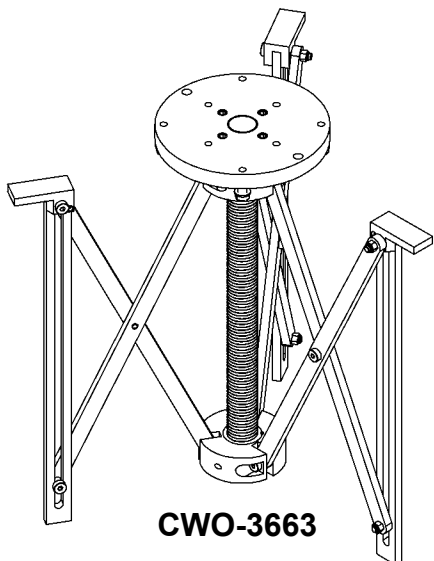
CWO-3660



CWO-3661



CWO-3662

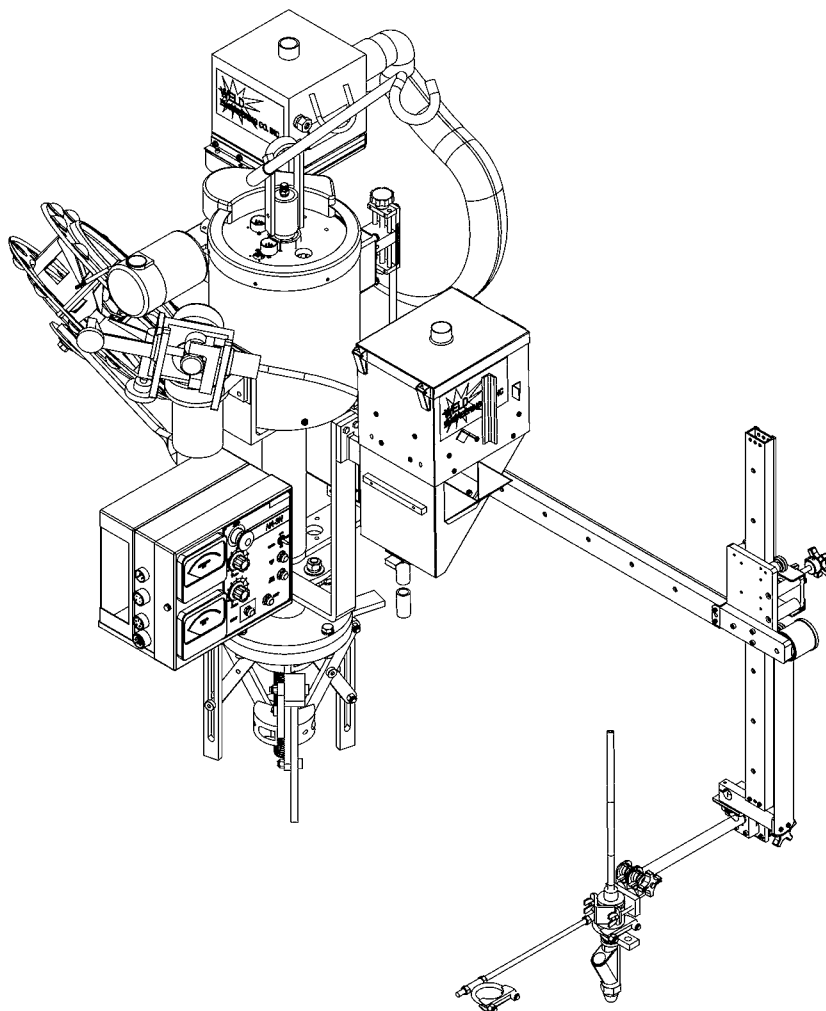


CWO-3663

3-Jaw Expandable Chucks

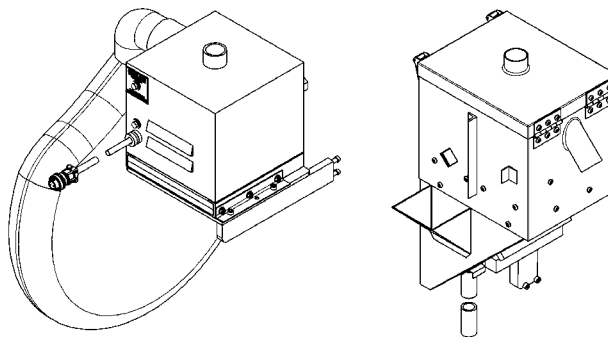
Mounts and automatically centers the Circle Welder on nozzles with or without flanges. As shown below.

PART NO.	FOR NOZZLE I.D.'S	WEIGHT
CWO-3660	2"-8" (51mm-204mm)	68 lbs. (31 kg)
CWO-3661	8"-16" (204-405 mm)	36 lbs. (16 kg)
CWO-3362	10"-24" (255-610 mm)	51 lbs. (23 kg)
CWO-3663	15.75"-47.25" (400-1200 mm)	64 lbs. (29 kg)



Options:

CWO-2020 Flux Recovery System



PREVENTIVE MAINTENANCE / CW-18 CIRCLE WELDER

IMPORTANT: Make sure the input power at the power source is turned off and the 50' weld cable is disconnected from the circle welder prior to working inside the circle welder.

AFTER DAILY USE:

Refer to CWP-18 Exploded View Parts List. (Pg. 14 & 15)

Racking System Item #11:

Inspect gear rack, hardened ways and wheels (remove all dirt, grease, weld spatter and rust). Check hardened ways for nicks and replace if necessary. Lubricate with a dry teflon or graphite spray lubricant. Adjust wheels for snug fit and smooth operation. Lubricate racker pinion with a dry teflon or graphite spray lubricant.

Large Horizontal Racker Item #3:

Inspect wheels (remove all dirt, grease, weld spatter and rust). Adjust wheels for snug fit and smooth operation. Lubricate racker pinion and wheels with a dry teflon or graphite spray lubricant.

Slide Bar Mounting Assembly Item #24:

Inspect hardened ways (remove all dirt, grease and weld spatter). Check hardened ways for nicks and replace if necessary. Lubricate with a dry teflon or graphite spray lubricant.

Refer to CWP-18 Electrical Component Chart. (Pg. 16)

NA-3 Control Cables #11, 14, 15:

Inspect cable connector to make sure threads are not stripped and that the connector is not cracked. Check the cable for cuts, missing insulation and burn spots, replace if necessary.

CW-18 Collector Ring Item #3:

Inspect cable connector to make sure threads are not stripped and that the connector is not cracked. Ensure that the connector is fastened properly to the large aluminum gear item #32 on the CW-18 Exploded View Parts List.

IMPORTANT: Make sure the input power at the power source is turned off and the 50' weld cable is disconnected from the circle welder prior to working inside the circle welder.

EVERY SIX MONTHS:

Refer to CWP-18 Exploded View Parts List. (Pg. 14 & 15)

Aluminum Gear Item #32:

Do not grease this gear. Inspect gear teeth (remove all dirt, grease and weld spatter). Lubricate with a dry teflon or graphite spray lubricant. Replace gear if excessively worn.

P.M. Motor Assembly Item #21:

Do not grease this pinion. Inspect the drive pinion (remove all dirt, grease and weld spatter). Lubricate with a dry teflon or graphite spray lubricant. Replace pinion if excessively worn. Check set screw and tighten if necessary. Adjust motor assembly using the four adjustable mounting fasteners so that proper gear mesh is achieved between the aluminum gear item #32 and the motor drive pinion.

Wire Reel Assembly Item #20:

Periodically coat the wire wheel shaft with a thin layer of grease as needed. Inspect the shoe assembly and replace if excessively worn.

PREVENTIVE MAINTENANCE / CW-18 CIRCLE WELDER, CONT'D.

Refer to CWP-18 Electrical Component Chart. (Pg. 16)

NA-3 Wire Feed Control Item #6:

Open control box, use an air hose to blow out dust and dirt. Check all wires for breaks and replace if necessary. Check all electrical connectors and plugs. If an electrical component fails refer to NA-3 Wire Feeder Control electrical component chart for replacement parts or return for service.

Rotation Control Item #12:

Open control box use an air hose to blow out dust and dirt. Check all wires for breaks and replace if necessary. Check all electrical connectors and plugs. If an electrical component fails refer to CBP-1550 Rotation Control electrical component chart for replacement parts or return for service.

NA-3 Wire Feeder Assembly Item #1:

Check brushes for wear. Brushes should be replaced when their length is less than 1/4 inch. Replace strain relief on wire if pulled out of motor housing.

Brush Holder & Support Item #4:

Inspect brush holder. Make sure constant tension is being applied on the brushes. Brushes should move freely within the brush holder. Check brushes for arc build-up. If brushes are pitted they will need replaced. Remove the brushes and sand them to ensure a smooth contact surface. Make sure all fasteners are tight.

Small Brush Retainer Assembly Item #7:

Inspect black brush holders for cracks and replace if needed. Check and make sure all wires are soldered properly to the holders. Replace the brushes when their length is less than 1/2 inch long. Remove the brushes and sand them to ensure a smooth contact surface. Make sure all fasteners are tight.

Terminal Block Item #8:

Inspect the plastic terminal strip and make sure it is not cracked, replace if necessary. Make sure all terminal connections are tight. Make sure all ground wires are connected to the mounting screws of the terminal strip.

PREVENTIVE MAINTENANCE / CW-18 CIRCLE WELDER, CONT'D.

IMPORTANT: Make sure the input power at the power source is turned off and the 50' weld cable is disconnected from the circle welder prior to working inside the circle welder.

EVERY TWELVE MONTHS:

Refer to CWP-18 Exploded View Parts List. (Pg. 14 & 15)

2" Bearing With Fasteners Item #22:

Do not grease the bearing, it is greased for life by the manufacturer. If the grease fitting has not been removed and plugged we suggest that you do so now. Earlier models may not have been plugged at time of assembly.

P.M. Motor Assembly Item #21:

Bodine gear motor lubrication. Fill gear motor to oil level indicator with worm gear oil conforming to AGMA#5EP compounded (SAE#90) oil or Bodine lubricant (#L-23). Do not overfill.

NA-3 Wire Feeder Assembly Item #34:

Apply graphite grease to the gear teeth. Inspect the drive roll portion of the assembly, clean as necessary. Do not use solvents on the idle roll because it may wash the lubricant out of the bearings. Do not apply grease to the drive rolls.

Refer to CWP-18 Electrical Component Chart. (Pg. 16)

CW-18 Collector Item #3:

The collector ring should be sanded once a year. If the collector ring is pitted too badly it should be replaced. Inspect all wires coming out of the collector ring for cut or missing insulation. All wires should be fastened to the center shaft with a nylon cable tie. Tighten four set screws if needed.

Weld Cable Inlet 4/0 Item #10:

Ensure that the cable is fastened tightly to the collector ring. Inspect the cable for cut or missing insulation. Make sure the micarta insulation tube on the cable is in good condition. Replace the cable if necessary.

NA-3 Control Cables #11, 14, 15:

Inspect the cable for cuts or missing insulation. Ensure that the elbow connector is not damaged. Ensure that all terminal ends are snug. Replace cable if necessary.

WARRANTY

Limited 3-Year Warranty

Model _____
Serial No. _____
Date Purchased: _____
Where Purchased: _____

For a period ending one (1) year from the date of invoice, Manufacturer warrants that any new machine or part is free from defects in materials and workmanship and Manufacturer agrees to repair or replace at its option, any defective part or machine. HOWEVER, if the invoiced customer registers the Product Warranty by returning the Warranty Registration Card supplied with the product within 90 days of the invoice date, or by registering on-line at www.bugo.com, Manufacturer will extend the warranty period an additional two (2) years which will provide three (3) total years from the date of original invoice to customer. This warranty does not apply to machines which, after Manufacturer's inspection are determined by Manufacturer to have been damaged due to neglect, abuse, overloading, accident or improper usage. All shipping and handling charges will be paid by the customer.

The foregoing express warranty is exclusive and Manufacturer makes no representation or warranty (either express or implied) other than as set forth expressly in the preceding sentence. Specifically, Manufacturer makes no express or implied warranty of merchantability or fitness for any particular purpose with respect to any goods. Manufacturer shall not be subject to any other obligations or liabilities whatsoever with respect to machines or parts furnished by Manufacturer.

Manufacturer shall not in any event be liable to Distributor or any customer for any loss of profits, incidental or consequential damages or special damages of any kind. Distributor's or customer's sole and exclusive remedy against Manufacturer for any breach of warranty, negligence, strict liability or any other claim relating to goods delivered pursuant hereto shall be for repair or replacement (at Manufacturer's option) of the machines or parts affected by such breach.

Distributor's Warranty:

In no event shall Manufacturer be liable to Distributor or to any customer thereof for any warranties, representations or promises, express or implied, extended by Distributor without the advance written consent of Manufacturer, including but not limited to any and all warranties of merchantability or fitness for a particular purpose and all warranties, representations or promises which exceed or are different from the express limited warranty set forth above. Distributor agrees to indemnify and hold Manufacturer harmless from any claim by a customer based upon any express or implied warranty by Distributor which exceeds or differs from Manufacturer's express limited warranty set forth above.

HOW TO OBTAIN SERVICE:

If you think this machine is not operating properly, re-read the instruction manual carefully, then call your Authorized BUG-O dealer/distributor. If they cannot give you the necessary service, write or phone us to tell us exactly what difficulty you have experienced. BE SURE to mention the MODEL and SERIAL numbers.