

INSTRUCTIONS AND PARTS MANUAL

ALL TIME GIRTH WELDER BGW-1000 BGW-2000

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-BGW-IPM-0311



B U G - O S Y S T E M S

A DIVISION OF WELD TOOLING CORPORATION



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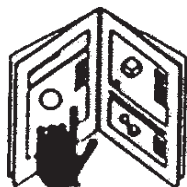
SAFETY

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. Remove from the worksite 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.

BUG-O ALL TIME GIRTH WELDER

INSTRUCTIONS AND PARTS MANUAL

TABLE OF CONTENTS

5	General Description
5	General Description / Single and Double Sided Welding
5	General Description / Welding Process
5	Technical Specifications
6	Key Components
6	Key Components / Main Frame
6	Key Components / Dual Motor Drive
6	Key Components / Welding Gear
7	Key Components / Weld Head Assembly
7	Key Components / Control
10	Key Components / Flux Recovery
10	Key Components / Electrical Cabinet & Power Supply Storage
11	Key Components / Electric Flux Winch
11	Installation and Operations
11	Installation and Operations / Frame Setup
13	Installation and Operations / Master Control Connection
13	Installation and Operations / Installation
14	Installation and Operations / Input Connection
14	Installation and Operations / Operation
15	Installation and Operations / Welding
16	Welding Procedure Guidelines
16	Welding Procedure Guidelines / Joint Design
16	Welding Procedure Guidelines / Typical Welding Parameters
19-20	Troubleshooting
21	Maintenance
22	Girth Welder / Parts List
23	Girth Welder / Exploded View
24	Control Box Assembly / Parts List
25	BGW-1500 / Exploded View / Parts List
26-32	AGWII Conversion Guide
33	Guide Wheel Assembly / Parts List
34	Guide Wheel Assembly / Exploded View
35	Operations Schematic
36	Wiring Diagram
37	Warranty

GENERAL DESCRIPTION

The (BGW) Automatic Girth Welder is a self-propelled machine for horizontal girth (3 o'clock) welding of large storage tank having 6' – 10.5' (1.8 – 3.2m) high plate courses.

The unit is supported by the shell plates to be welded; the machine has its own welding head, controls, flux belt assembly and flux recovery unit.

The standard welding equipment integrated is the Lincoln Electric USA submerged arc welding system.

Single and Double Sided Welding

With variations in designs; the Automatic Girth Welder can perform single sided (BGW -1000) or double sided (BGW-2000) operations.

BGW-1000

The single sided unit, BGW-1000 is the most commonly used unit due to its light weight and simplicity. It requires only one operator.

BGW-2000

Designed with the same principle as BGW-1000, but with an "A" frame that carries one set of weld head on each side.

One side, referred to as the master, can be used by itself for one side welding. The second side (slave) is hinged to the top of the master frame and is used when welding two sides.

The operator can move freely from one side of the machine to another by climbing up the ladder on one side to the common roof of the double sided machine.

A safety rail is provided at the roof of the main frame for safety purpose.

The BGW-2000 requires two welding power supplies. Each unit has a flux recovery unit and controls.

Welding Process

The BGW-1000 is normally equipped for single wire submerged arc welding.

Typical weld procedure called for a welding travel speed of around 18 in/min (450mm/min), 400A, 28-30V and WFS of 91" (2300 mm). Single torch deposition rate is approximately 11 lbs/hr. (5kg/hr.)

TECHNICAL SPECIFICATIONS

1. Input voltage:	3 phase, 380V±10% (Standard) * Consult factory for non-standard power input
2. Input frequency:	50Hz±5% / 60Hz±5%
3. Operation temperature:	14°F-----+122°F(-10°C-----+50°C); Relative humidity: >90%;
4. Environmental protection:	IP23 grade: F
5. Tank diameter operation range:	> 15' (4.5 M)
6. Operation tank shell plate width:	6'-10.5' (1.8-3.2m) [Standard] Max. 15' (4.5m) [Special]

* Models and specifications subject to change without notice.

KEY COMPONENTS

Main Frame

The Main frame of the girth welder is constructed of structural steel and square tube members. The slide square tube mechanism with locking pins and pin holes is used to adjust the frame height for welding different sizes of shell plates. The main frame of the girth welder is designed to support 550 lbs (250 kg) of weight, or enough for two operators.

The frame contains two serrated hardened steel flanged drive wheels manually adjusted to ride tank diameters down to a minimum of 15' (4.5 m.) The distance between wheel flanges is 1.8" (45mm) [standard] to accommodate the shell wall thickness.

The machine frame is equipped with a hand railed operator platform with seat, a ladder provides a means for operator to climb to the roof and access to the electric flux winch and separator tank for flux refill.

Guide wheel assembly at the lower end of the frame to simplify loading and unloading the machine on the tank. Canvas curtains offer arc and operator protection in windy conditions.

Dual Motor Drive

Each single flanged drive wheel is driven by an individual SAW motor / reducer to provide extra tracking force to prevent slipping that could cause weld defects. Drive motors are enclosed inside the frame top section with aluminum panel for good weather protection.

Speeds for both motors are electronically synchronized and governed by an inverter for accurate speed travel.

AC inverter:

1. Single-phase 220VAC input voltage
2. Automatic lift in torsion, 150% lift torsion in 6Hz.
3. Fully programmed & calibrated in factory
4. Soft PWM, running in low noise
5. 15 speed, PID, 4-20 MA input
6. Provides RS-485 communication



Caution: All the inverter drives inside the BGW control are pre-programmed before the girth welder is delivered to users on site. Please consult factory if re-programming is required.



The SEW motors and reducer requires minimal maintenance with advantages of low noise & vibration, with 96% high efficiency through the reducer. It consists of a high rigid housing and spur gear; all parts are precisely machined with minimum tolerance for accurate travel mechanism.

Welding Gear

The standard welding equipment supplied is the Lincoln USA NA3 control and weld head fitted with nozzle, wire feed rolls, wire straightener, and 50lbs (23Kg) wire reels for feeding up to 3.2 mm (1/8") diameter wire.

Lincoln USA DC600 is the standard power supply for the girth welder. Standard input power is 380V/3ph/50Hz and the line power requirement is 40kVA. Other voltages and frequencies are available, please consult factory for details.

Please refer to Lincoln's NA3 and DC600 Instruction manuals for more information on their welding equipment.

Power supplies are installed on a steel storage case with the electrical cabinet for weather protection.





Weld Head Assembly

The BGW weld head is mounted on a manual cross slide system, which allows the operator complete control of wire placement and joint tracking.

Due to the lack of visibility of the submerged arc welding process, a laser pointer is mounted on the nozzle to provide a position reference for operator while welding.

Control

Welding Control

The Lincoln USA NA3 welding control is normally supplied with the girth welder. It is mounted on the right hand side of the main frame for the operator to access easily. Directly on top of the NA3 control is the BGW master control.

Master Control

The BGW master control houses the electronic travel inverter drive and associated control relays; it provides a mean of integrated control of all the accessories of the girth welder (eg. flux vacuum, 220V single phase aux outlet, lamp, flux winch).

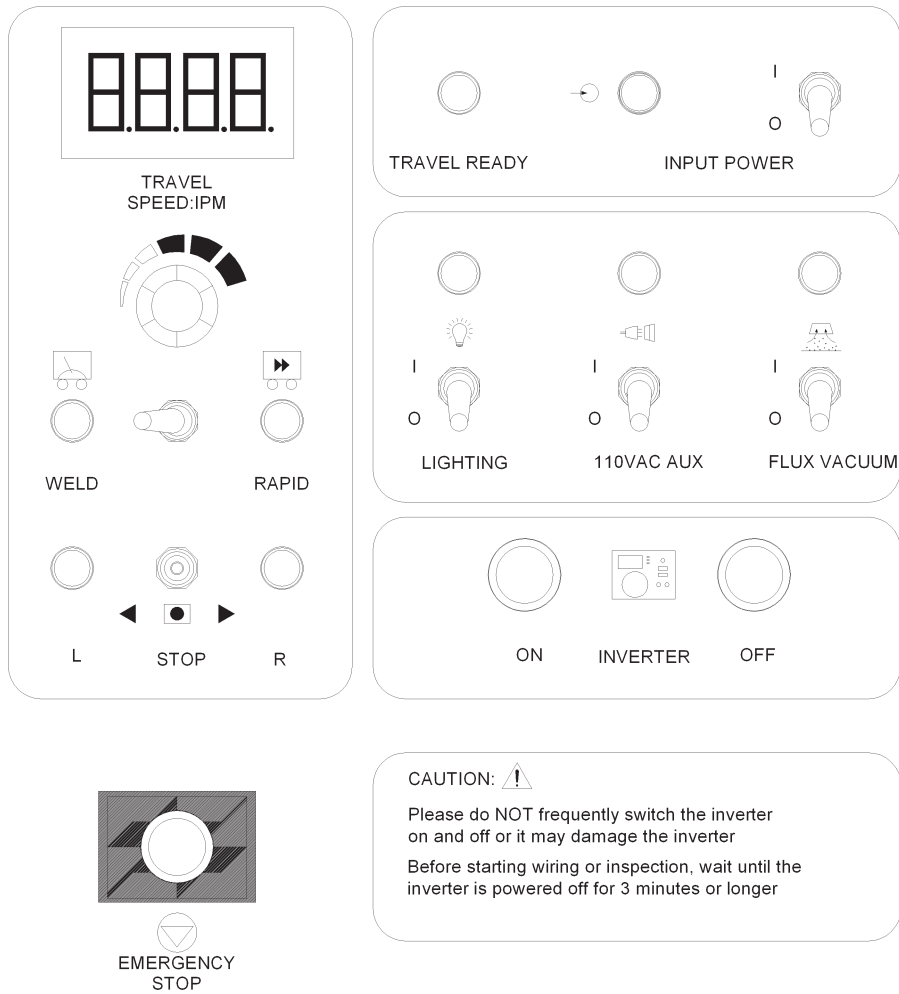
The control panel includes all necessary control knobs and switches such as the speed control potentiometer, direction switch, full speed travel switch as well as emergency stop button.

110V Aux Version Control System

The Bug-o All Time BGW sold in the market using 110V are equipped with a special circuitry to provide 110V aux outlet and lamps. The 110V outlet socket is identified with yellow color instead of blue as in the standard 220V aux power outlet.



ALL TIME GIRTH WELDER



Model:
BGW-1000 / YS-AGW1/S

“Power source switch”

Turns on the main power of the control.

“Left-Stop-Right” travel direction switch (S1)

Placing the switch in the selected side causes the machine to move in that particular welding direction.

For automatic travel, the travel switch on the NA3 must be in the travel position. To operate manually, the switch must be in the hand position.

“Speed potentiometer” (R1)

Accurately adjust speed travel speeds (cm/min) of the girth welder. The speed can be monitored at the control display.

U.S. version of Bug-o All Time BGW would be programmed to display travel speed in IPM (inch per minute).

Normal / full speed travel switch

Activate girth welder full speed travel when the welding equipment is set to “manual” mode or “off”.

“Flux recovery vacuum” switch (S2)

Turns on the power of the vacuum for flux recovery.

Inverter ON/OFF “Lighting switch”

Push button switches to power on / off the inverter. Switch on the hurricane lamp for night operation.

CAUTION: Switching the inverter on and off in Emergency stop short interval could cause damage to the inverter. It is not recommended to switch on the inverter again for at least three minutes after it is turned off.

“Lighting switch”

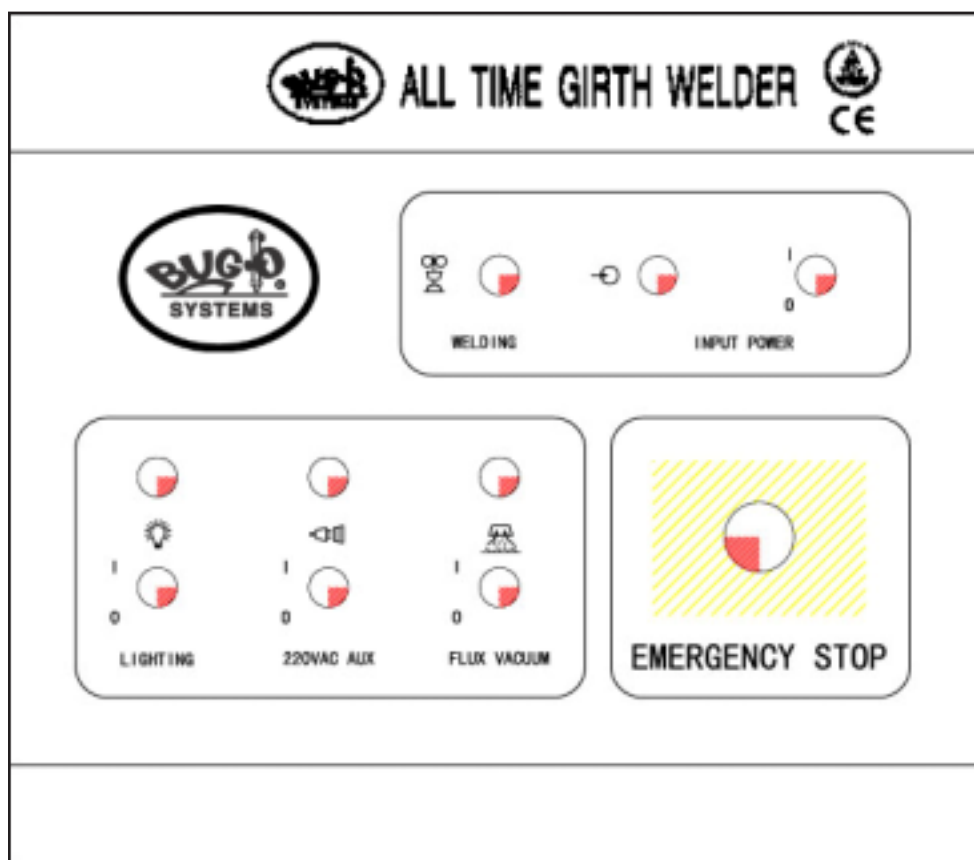
Switch on the hurricane lamp for night operation.

Emergency Stop

Push button stops all electronic functions including welding and travel.

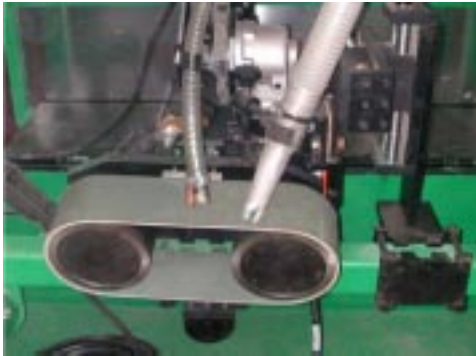
Slave Control (for BGWII double sided model ONLY)

Used at the slave side of the double sided girth welder, it is basically the same as the master control, but without the function to control the drive system.



Flux Recovery

The welding head assembly includes a flux belt mechanism for necessary flux recycling.

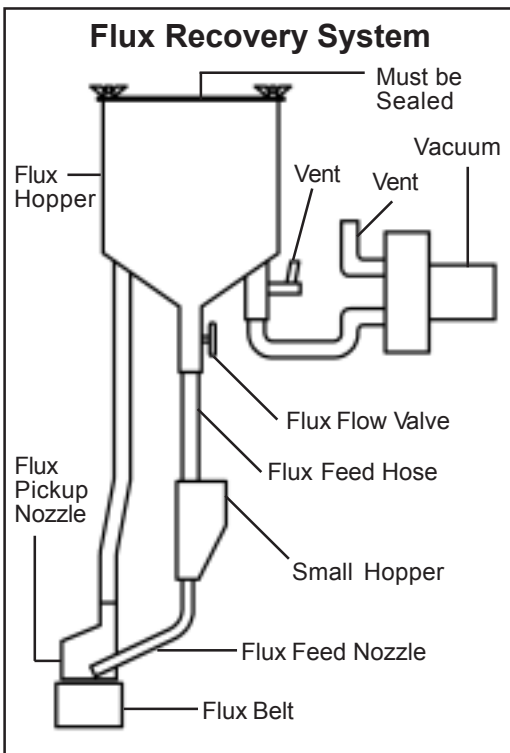


The flux belt is made of a heat resistant latex belt that can tolerate up to 250 degree C (480 F) of heat. The belt is mounted on two 6" (150mm) diameter rollers, which can be adjusted and positioned by the flux belt assembly hand wheel.

The welding flux that falls on the flux belt is extracted by the suction hose and is returned to the flux hopper 176 lbs. (80kg capacity) mounted on the platform.



The suction force is created by a 1400W cylindrical vacuum. A manual valve is applied between the vacuum and flux recovery system for necessary vacuum force adjustment.



Heavy Duty Blower Type Vacuum / Filter System (OPTIONAL)

The Bug-o All Time BGW may be equipped with a heavy duty blower type vacuum for multi shifts continuous operation. Such vacuum systems can be configured as follows to suitable various operation requirements:

- (a) Separator / Filter mounted on top of the operator platform.
- (b) Separator / Filter mounted on frame roof (vacuum system would move upward along with the roof and drive section of the BGW).



Electrical Cabinet & Power Supply Storage.

The electrical cabinet of the girth welder is inside the power source storage. It consists of a main circuit breaker at the left to receive the local 3 phase input (380V / 3ph/ 60Hz as standard) and distribute it to the power supply and the step down transformer, which in turn steps down the voltage to 220VAC single phase to the secondary circuit breaker.

The single phase 220VAC is required by the master control and all electrical accessories supported by the girth welder.

Electric flux winch

A 220VAC power winch is mounted on a “L” post at the roof of the girth welder, it provides a max. lifting capacity of 375 lbs. (170 kg) to lift welding flux up to 98' (30m) below the girth welder.

Please refer to the Winch MW170 manual for details.



INSTALLATION AND OPERATIONS

Correct installation and setup is critical to ensure proper operation of the BGW and welding equipment.

Frame Setup

Remove the machine from the crate. A lifting device capable of lifting 4,409 lbs. (2000 kg) is required. Place a crane hook to the lifting eye and carefully lift the machine upright.

CAUTION: When lifting the double frame (BGWII), please use the four lifting eyes at the middle of the double sided frame.



Remove the location pins of the four square tube members of the BGW use the lifting device to adjust the height of the BGW to the size of the shell plate. Relock the location pins when the appropriate position (pin holes) is found and apply a locking pin to secure the location pin at the appropriate pin holes on the square tubes.

These pin holes are drilled at an interval of 4" (100mm).

Set the separator tank on the roof and connect the flux hoses. Extra flux hose line is required to be added to the installed hose when setting the machine for a higher shell plate. **Except the models with flux recovery systems fixed right on top of the operator platform.**

Adjust drive wheels of the travel mechanism to the diameters of the tank, then lock them into position.

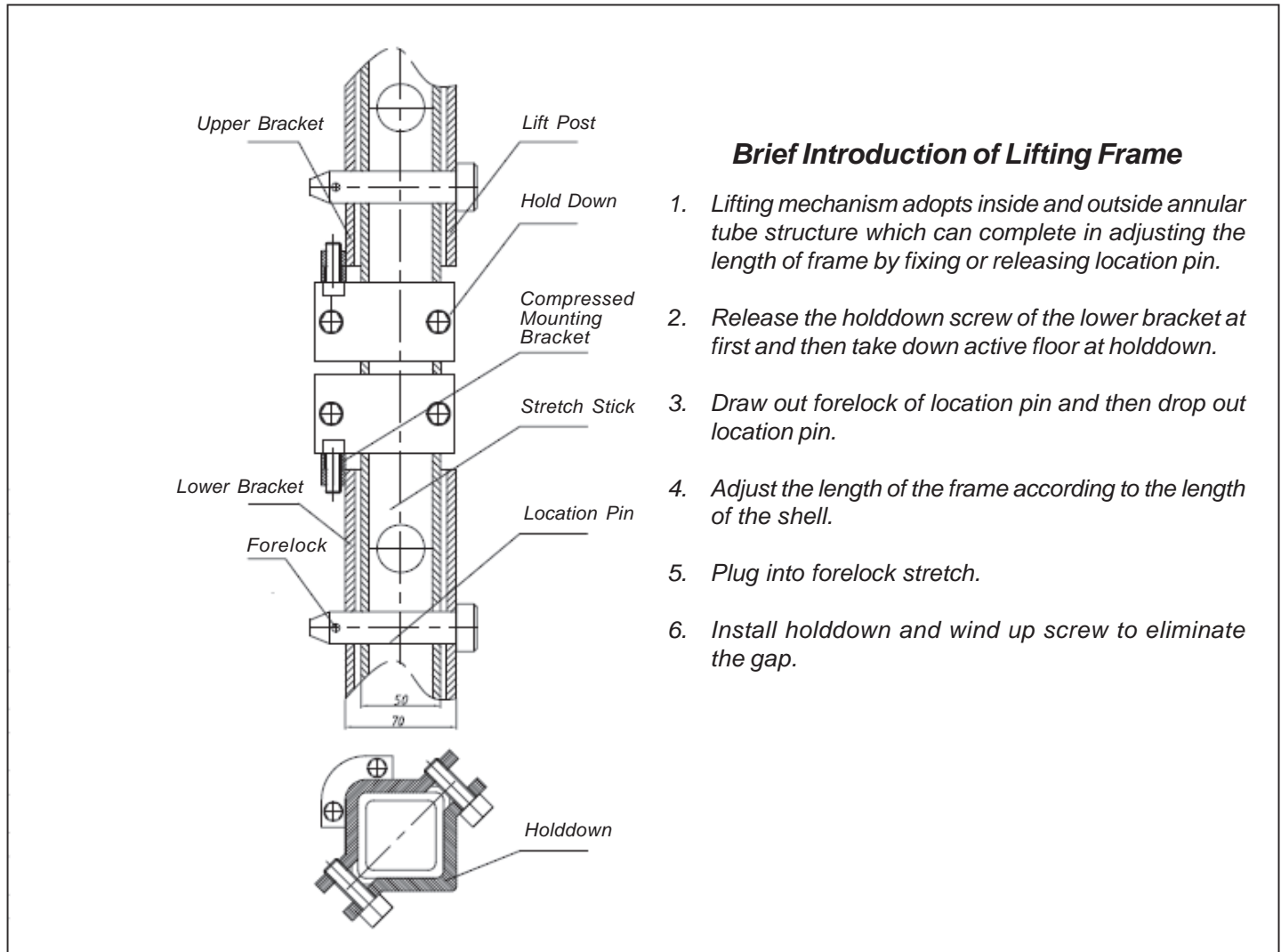
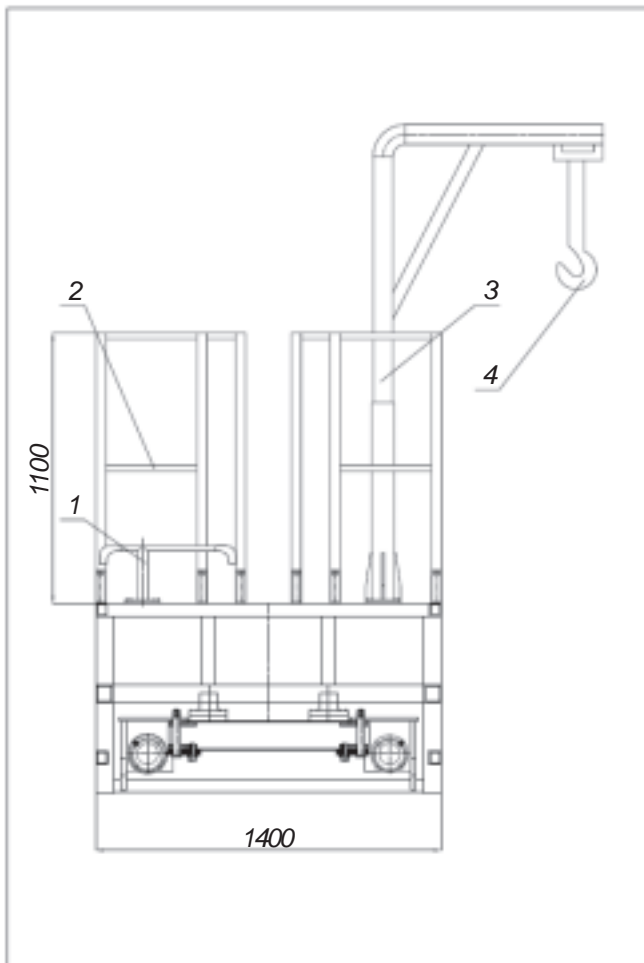


Fig. Square tub mechanism



Once the main frame is setup correctly , mount the cable hanger (1), safety hand rail (2), flux lifting post (3) and electric flux winch (4), on the frame roof.

Mount the NA-3 control and master control to the control mounting plate at the right hand side of the frame.

Master Control Connections

There are nine sets of receptacles (eight sets for some models) at the side of the control panel, each receptacle is DIFFERENT and only can mate with the correct connectors of the below components:

- a) Flux Vacuum
- b) Main power
- c) 110 or 220VAC/1ph aux output (for electrical hand tools such as a grinder)
- d) Laser pointer
- e) Lighting
- f) NA3 on/off
- g) Dual motor drive
- h) Flux lifting winch
- i) Cooling fan

Installation

When all components of the BGW are in place, hookup the lifting eye at the roof of the BGW with a crane and lift the frame off the ground, then hang drive wheels on top of the plate wall and lower it down, so the flanged wheel lands on top of the shell plate.

Note: For double sided unit (BGWII), operator is required to expand the hydraulic jack above the operator platform to “open up” the hinged master and slave frame, allowing the opened “A” frame of the double sided unit to straddle on the shell plate.

While loading, the angle between the lifting cable and the horizon should not be greater than 60°.

The guide wheels should be extended to the maximum extension with the hand wheel, and then bolted at the position perpendicular to the ground surface, it provides a moving support to the frame and prevents impact between the flux belt systems and the weld head to the shell plate.

When the BGW frame is secured, straddle on the shell plate, retract the support guide wheel by the hand wheel and bolt the orientation of the support wheel to the horizontal position.

The weight of the BGW frame should then be supported by the flanged metal wheels at the top as well as the flux belt assembly.

The welding power supply is intended to be located on the floor in the center of the storage tank. All of the cables are run from the power supply to the cable hanger at the roof of the machine frame.

All cable connections are made at this point and the hanger clamp fastened in a way that the connections themselves do not feel the strain of the cable weight.

Locate the power supply storage near the center of the tank. The storage case contains the main power distribution disconnect, distribution transformer, and the welding power supply.



Input Connection

WARNING!

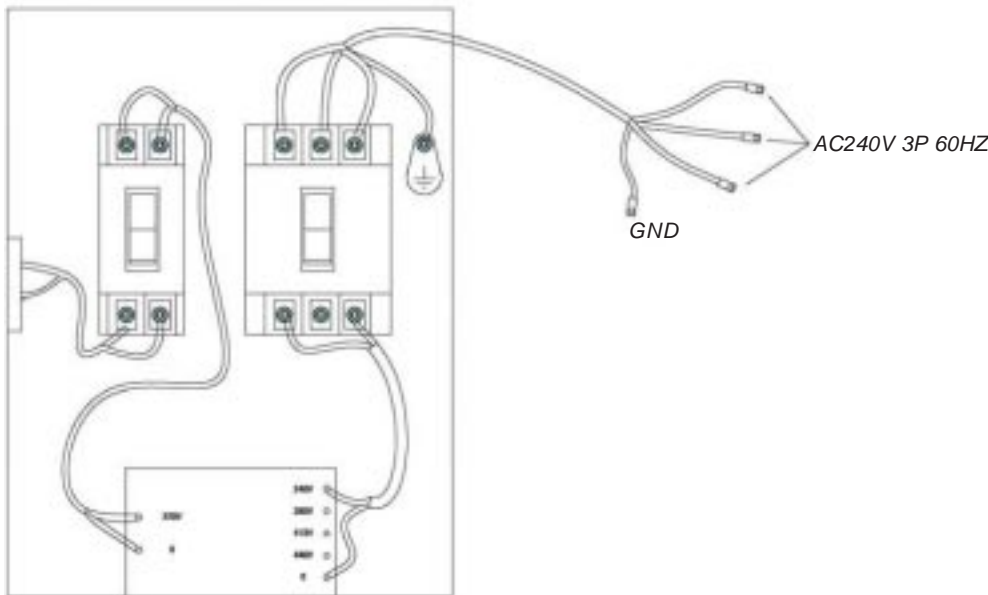
Only a qualified electrician should connect the input leads to the BGW-1000. Connections should be made in accordance with all local and national electrical codes.

Connect the three phase supply line (380V for standard BGW, 240V / 440V for special version) to L1, L2, L3 and ground to the input lug of the 3-phase circuit breaker inside the electrical cabinet as illustrated to the input supply connection diagram below.

Connect the output of the 3-phase circuit breaker with the welding power supply input.

The electrical cabinet also consists of a step down transformer and a secondary circuit breaker for 1 phase / 220V input to the BGW. The BGWs are shipped connected for the input voltage specified for the destination of the machine in factory.

NOTE: Turn main input power of the machine OFF before performing reconnects procedure. Failure to do so will result in damage to the machine.



Above: non-standard input at 240V/3ph/60Hz connection.

OPERATION

After the BGW frame is securely straddled on the shell plate, extend the guide wheel to support the weight of the frame and clear the flux belt from the tank wall for welding setup.

Adjust the flux belt surface by manual cross slide and keep it .6"-.8" (15 – 20 mm) below the weld seam.

Adjust the torch angle and contact tip placement to the appropriate welding position.

When the weld head setup is done, retract the guide wheels assembly and allow the weight of the frame to lean on the shell wall via the flux belt, the flux belt would be pressed tightly below the weld seam to prevent drop off the welding flux.

Connect the weld and ground cables.

Power up the main switches at the electric cabinet, verify the weld gears and drive system are functioning.

Test all the switches on the master control panel and monitor the LEDs.

NOTE: The BGW master control is powered by 220V/1ph VAC, please check for first time operation.

CAUTION: After switching off the inverter, please wait for at least 3 minutes before switching it on again. Quick repetitions to switch the inverter on and off could damage the inverter due to the residual voltage. Please refer to the inverter manual for details.

Check the flux vacuum is properly powered by the toggle switch at the master control, make sure enough flux is filled to the flux separator and the correct flux valves of the flux feed / recovery hoses are open.

Test the switches on the wire feeding control (eg. Lincoln NA3) make sure there is wire feed to the nozzle.

As soon as the inverter is powered up, the speed display should indicate the speed preset by the users. User can test run the BGW at the preset speed and full speed.

NOTE: When the inverter is off, the display should indicate "000" when the frame is not moving.

WELDING

Choose the weld direction by setting the travel switch to left or right, adjust the weld speed according to the welding procedure. Set NA-3 travel switch to "hand" so the frame would travel without welding.

Set to correct CV-VV switch position inside the NAControl. Preset appropriate welding voltage / current at the NA-3 control, then switch NA-3 to "Auto".

Release the flux valve to allow sufficient amount of flux to drop on the arc start area and cover the wire stick out.

NOTE: For models with electric flux valve option, the flux would feed automatically when the wire touches the work when the operator presses "inch down" to feed wire prior welding.

Press "start" pushbutton of the NA3 and the start the weld sequence (wire slowly feeds to the work, the arc strikes and weld travel begins).

During welding, operator should closely observe if the welding arc is tracking the weld joint, use the laser pointer as the position indicator and finely adjust the torch position via the manual cross slide if necessary.

When the welding operation is complete, simply press the "STOP" button at the NA3 control panel and the BGW frame would stop traveling with the termination of the welding arc.

NOTE:

** For safety reasons, please power off the system before disconnecting any of the control cables to the master control.*

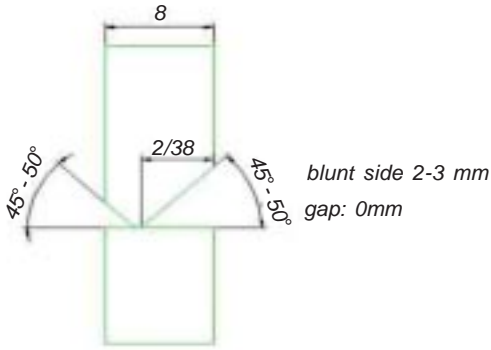
** In order to increase the consumed life of the flux belt mechanism, user is recommended to extend the support guide wheels as the mean of support when the BGW is not welding (flux belt must be firmly in contact with the shell plate during welding operation for flux recovery).*

** Excessive suction force would prohibit flux feeding during the welding operation, adjust the vacuum hose valve if necessary.*

If the machine is going to weld in the direction opposite of what it was previously set up for, simply shut down the manual hose valve at one side and open the hose valve at the other side.

WELDING PROCEDURE GUIDELINES

Joint Design



Typical Welding Parameters (for 3.2mm wire)

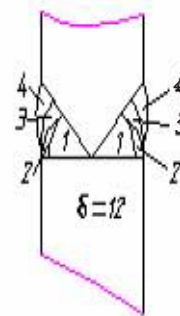
Wall Thickness	Voltage(V)	Amp(A)	Travel Speed	Torch Angle	Shell Course
.4"-.55" (10-14 mm)	26-27	320-350	15-17 in/min 380-420 (mm/min)	15°-20°	1st
	27-29	450-480	19-20 in/min 480-520 (mm/min)		2nd
.63"-.71" (16-18 mm)	26-27	380-420	15-18 in/min 380-450 (mm/min)	15°-20°	1st
	27-29	450-480	19-20 in/min 480-520 (mm/min)		2nd
	28-31	450-520	20-26 in/min 500-650 (mm/min)		3rd
.79"-.87" (20-22 mm)	26-27	380-420	15-18 in/min 380-450 (mm/min)	15°-20°	1st
	27-29	450-480	19-20.5 in/min 480-520 (mm/min)		2nd
	28-31	450-520	20-26 in/min 480-520 (mm/min)		3rd
	28-31	470-520	22-26 (in/min) 550-650 (mm/min)		4th
.95"-1.26" (24-32 mm)	26-27	380-420	15-18 (in/min) 380-450 (mm/min)	15°-20°	1st
	27-29	450-480	19-20 (in/min) 480-520 (mm/min)		2nd
	28-31	450-520	20-26 (in/min) 500-650 (mm/min)		3rd
	28-31	480-520	22-26 (in/min) 550-650 (mm/min)		4th & up

Note: The serviceability of a product or structure utilizing the information in these guidelines must be the sole responsibility of the builder. Many variables in design, fabrication and service conditions affect the results obtained in applying this type of information.

WELDING PROCEDURE GUIDELINES, CONTINUED

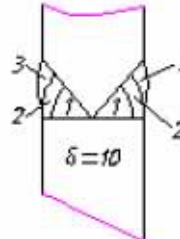
Wire Diameter F2.4mm; F = Front; B = Back

WT $\delta=12$	Current(A)	Voltage(V)	Travel Speed
F(1) .5" (12mm)	380~400	25~26	20~24 in/min 50~60 cm/min
B(1) .5" 12mm	360-380	25~26	20~24 in/min 50~60 cm/min
F(1) .5" 12mm	400	26	22~26 in/min 55~65 cm/min
B(1) .5" 12mm	380	25	22~26 in/min 55~65 cm/min
F(1) .5" 12mm	380	25	26~28 in/min 65~70 cm/min
B(1) .5" 12mm	380	25	26~28 in/min 65~70 cm/min
F(1) .5" 12mm	360	24~25	28~30 in/min 70~75 cm/min
B(1) .5" 12mm	350	24~25	28~30 in/min 70~75 cm/min



A) Shell Wall Thickness .4" (10mm)

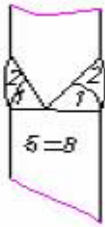
WT $\delta=10$	Current(A)	Voltage(V)	Travel Speed
F(1) .4" 10mm	360~380	25~26	28~30 in/min 70~75 cm/min
B(1) .4" 10mm	360	26	28~30 in/min 70~75 cm/min
F(2) .4" 10mm	380	24~25	30~31 in/min 75~80 cm/min
B(2) .4" 10mm	360	24~25	30~31 in/min 75~80 cm/min
F(3) .4" 10mm	350	25	31~33 in/min 80~85 cm/min
B(3) .4" 10mm	320	24	31~33 in/min 80~85 cm/min



WELDING PROCEDURE GUIDELINES, CONTINUED

B) Shell Wall Thickness .3" (8mm)

WTδ=8	Current(A)	Voltage(V)	Travel Speed
F(1) .3" (8mm)	320	24	31~33 in/min 80~85 cm/min
B(1) .3" 8mm	300	23	31~33 in/min 80~85 cm/min
F(2) .3" 8mm	300	24	33~37 in/min 85~95 cm/min
B(2) .3" 8mm	280	24	33~37 in/min 85~95 cm/min



Note: The serviceability of a product or structure utilizing the information in these guidelines must be the sole responsibly of the builder. Many variables in design, fabrication and service conditions affect the results obtained in applying this type of information.

TROUBLESHOOTING

Problems	Possible Causes	Recommended Action
Improper control or feeding of welding wire.	Lincoln welding control or power supply is abnormal.	<ol style="list-style-type: none"> 1. Check all fuses. 2. Check Lincoln control switch is "on" and polarity switch on the power supplies must be in "+" or "-". 3. Review Lincoln service manuals and diagnose possible PCBs failures.
The indication light of the master control fails to ignite.	<ol style="list-style-type: none"> 1. Power supply is off. 2. 3 pin control cable connector is loose. 3. 3 pin control cable is bad. 	<ol style="list-style-type: none"> 1. Turn on power supply. 2. Check 3 pin connector. 3. Check 3 pin control cable.
Flux vacuum cannot operate.	<ol style="list-style-type: none"> 1. Bad vacuum relay in the control. 2. Vacuum itself is faulty. 	<ol style="list-style-type: none"> 1. Replace control relay/switch. 2. Replace flux vacuum.
Lamp is off.	<ol style="list-style-type: none"> 1. Bad lighting relay in the control. 2. Control cable is loose or bad. 3. Light bulb is bad. 	<ol style="list-style-type: none"> 1. Replace relay/switch. 2. Check control cable & connector. 3. Replace light bulb.
Electric winch does not work.	<ol style="list-style-type: none"> 1. Control cable is loose or bad. 2. Winch failure. 	<ol style="list-style-type: none"> 1. Check control cable & connector. 2. Replace winch.
Main frame cannot travel.	<ol style="list-style-type: none"> 1. Bad travel direction switch. 2. Bad speed potentiometer. 3. Bad travel control relay . 4. Incorrect inverter setting. 5. Faulty inverter. 	<ol style="list-style-type: none"> 1. Replace switch. 2. Replace potentiometer. 3. Replace relay. 4. Check inverter setting * 5. Replace inverter

TROUBLESHOOTING, CONTINUED

Problems	Possible Causes	Recommended Action
Main frame travels at manual mode but not under auto mode.	1. Welding control faults.	1. Check welding control. * Please refer to Lincoln NA3 for details.
Vacuum fails to recover flux.	1. Both flux valves are open. 2. Flux separator is open 3. Air leak at the flux hoses. 4. Flux valves are incorrectly adjusted. 5. Vacuum is blocked.	1. Close one of the valves. 2. Close separator lid. 3. Repair or replace flux recovery hose. 4. Adjust flux valves. 5. Check vacuum.
No flux feeding	1. Flux inlet valve is too close. 2. Flux hose leakage.	1. Adjust and open up flux valve. 2. Repair or replace flux recovery hose.
Insufficient amount of flux is recovered.	1. Suction nozzle is too far from the weld. 2. Wrong flux suction nozzle setup.	1. Adjust suction head position. 2. Adjust suction head angle.
Flux belt is burnt by slag.	1. Flux support belt too close to the weld seam. 2. Weld travel is off.	1. Adjust the distance to .6"-.98" (15–25mm). 2. Switch on weld travel.

Note: The electrical circuitry of the YS-BGW is straightforward and can usually be traced through by a local electrician using the electrical schematic diagram included in this manual.

Consult the factory if all the above measures fail to resolve the problem.

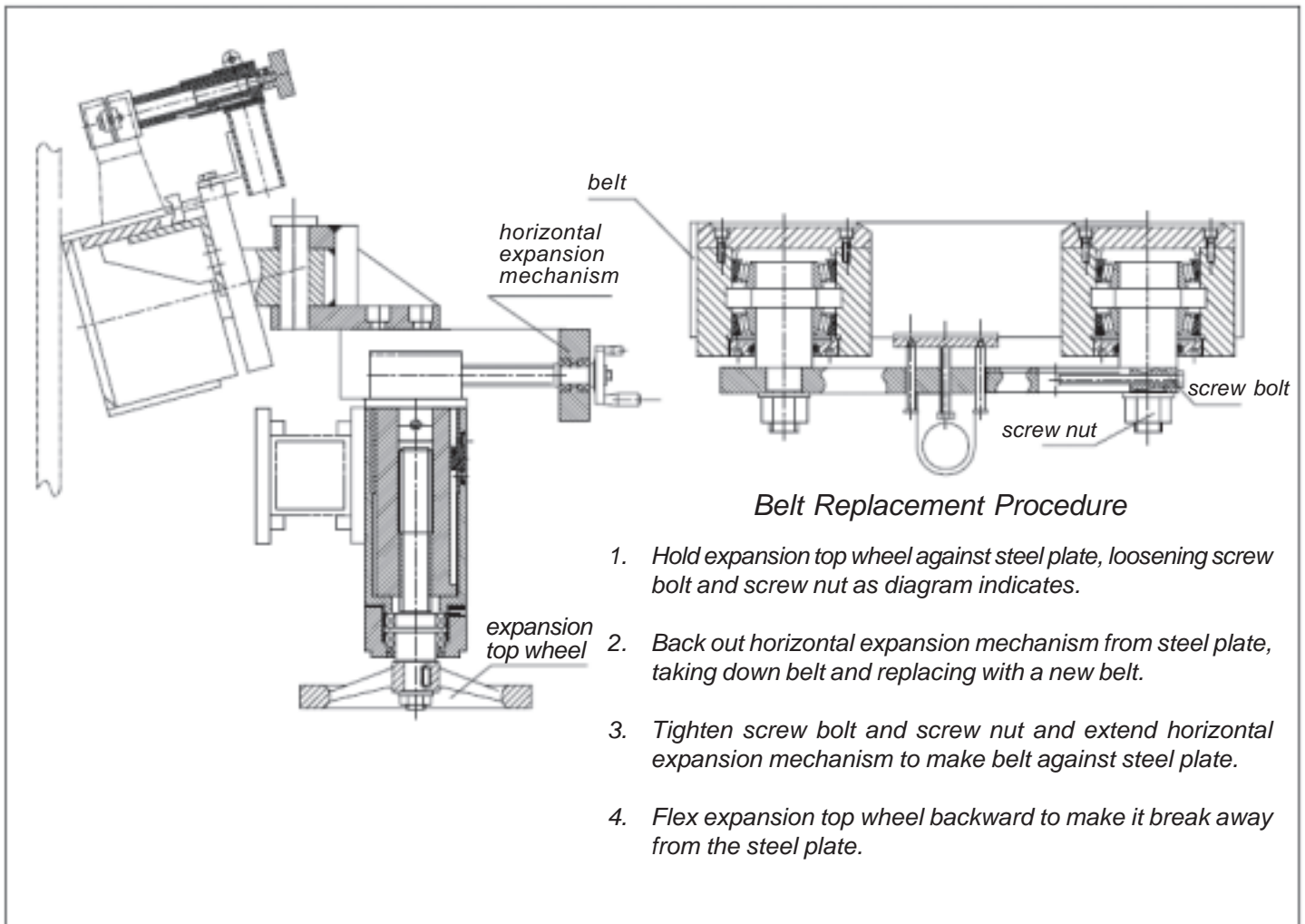
MAINTENANCE

Flux belt must be properly adjusted, during operation, the latex flux belt should be snug and both roll centerlines are parallel. Overly tight belt tension would cause the rollers to skew bending both rollers and cause the belt to roll off.

The flux belt is considered a consumable and should be replaced when it is worn or seriously burnt.

Both SEW motors and reducers of the BGW drive system should be regularly lubricated, please refer to SEW operating instruction manuals for detail maintenance instructions.

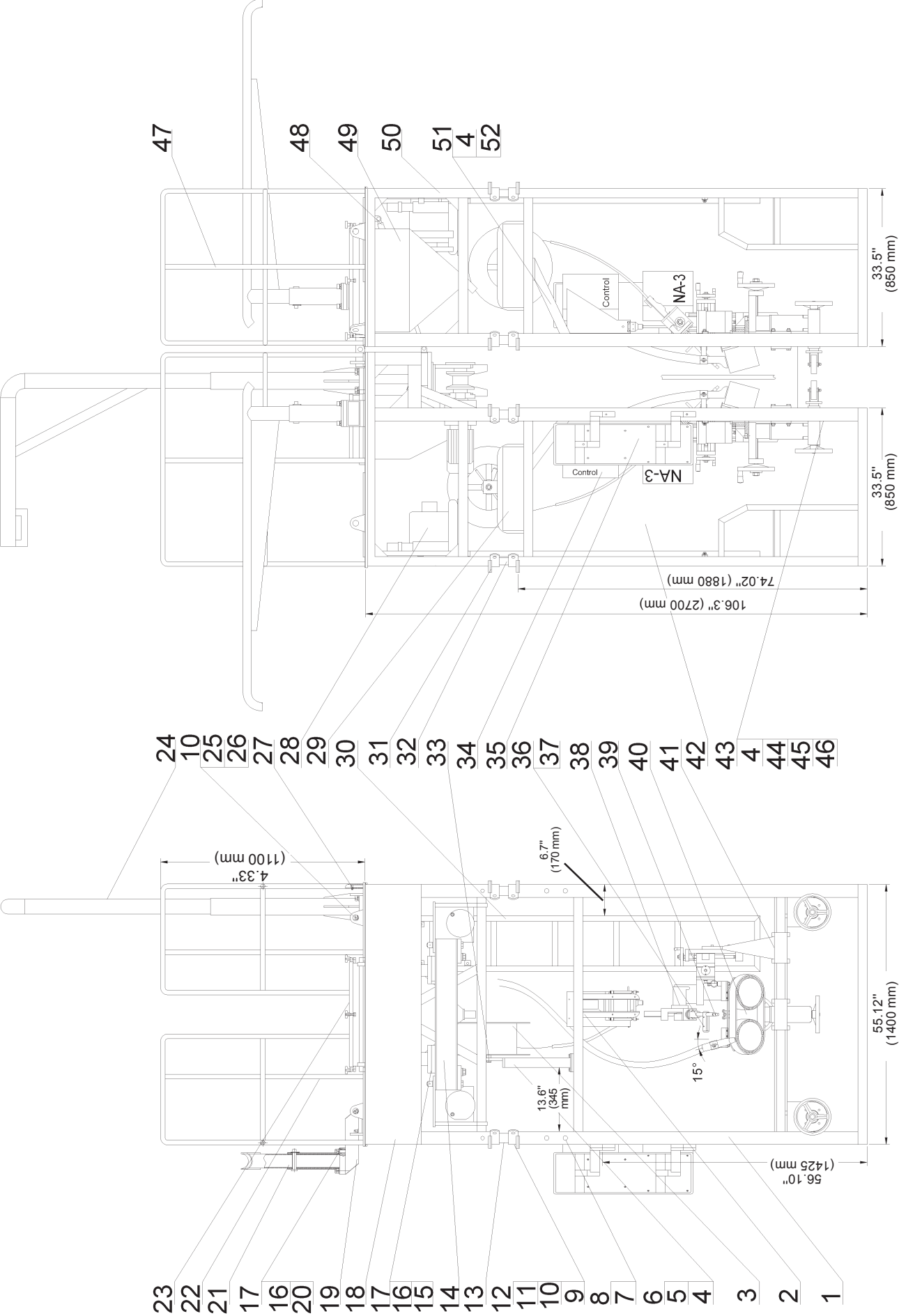
The serrated flanged drive wheel would need to be replaced if it is worn and loose the necessary grip to keep the girth welder travel steadily on the tank shells.



GIRTH WELDER / PART S LIST

ITEM	QTY	PART NUMBER	DESCRIPTION
1	2	BGW-1030	MIDDLE FRAME
2	2	BGW-1032	FLUX HOPPER
3	2	BGW-1033	REEL
4	18	BGW-1034	HEX SOCKET CAP SCREW M12X35
5	1	BGW-1036	FLAT WASHER 12
6	1	BGW-1037	REEL BRACKET
7	16	BGW-1038	CONNECTION PIN
8	16	BGW-1039	STAINLESS STEEL SPRING CLIP
9	8	BGW-1041	FRONT CLAMP
10	52	BGW-1042	HEX SOCKET CAP SCREW M10X25
11	48	BGW-1043	FLAT WASHER 8
12	48	BGW-1044	SPRING WASHER 8
13	4	BGW-1046	FRAME HEIGHT ADJUSTER 1
14	1	BGW-1047	TRAVELING UNIT
15	8	BGW-1048	HEX SOCKET CAP SCREW M16X45
16	16	BGW-1049	FLAT WASHER 16
17	16	BGW-1051	SPRING WASHER 16
18	1	BGW-1052	TOP FRAME
19	2	BGW-1053	CABLE BRACKET SUPPORTER
20	8	BGW-1054	HEX SOCKET CAP SCREW M16X40
21	2	BGW-1056	CABLE CARRIER
22	1	BGW-1057	FENCE PROTECTION
23	1	BGW-1058	FLUX CONTAINER
24	1	BGW-1059	HOIST BRACKET
25	4	BGW-1061	FLAT WASHER 10
26	4	BGW-1062	SPRING WASHER 10
27	12	BGW-1063	HEX SOCKET SCREW M5X8
28	2	BGW-1064	HEAVY DUTY FLUX BLOWER
29	4	BGW-1066	LIGHT BRACKET
30	2	BGW-1067	LADDER
31	8	BGW-1068	REAR CLAMP
32	4	BGW-1069	FRAME HEIGHT ADJUSTER 2
33	2	BGW-1071	REEL CONNECTOR
34	1	BGW-1072	AGW CONTROL
35	2	BGW-1073	AGW CONTROL BRACKET
36	2	BGW-1074	LASER INDICATOR BRACKET
37	4	BGW-1076	M8X30 CROSS SCREW
38	2	BGW-1077	CROSS SEAM ADJUSTER
39	2	BGW-1078	WIRE FEEDER
40	2	BGW-1079	FLUX SUPPORT UNIT
41	2	BGW-1081	WIRE FEEDER BRACKET
42	2	BGW-1082	AGW CURTAIN
43	4	BGW-1083	GUIDE WHEEL ASSEMBLY
44	16	BGW-1084	FLAT WASHER 12
45	16	BGW-1086	SPRING WASHER 12
46	16	BGW-1087	SCREW 12
47	1	BGW-1088	FENCE PROTECTION
48	1	BGW-1089	HYDRAULIC EXPANSION JACK
49	1	BGW-1091	FLUX CONTAINER
50	1	BGW-1092	UPPER FRAME
51	1	BGW-1093	REEL BRACKET
52	1	BGW-1094	FLAT SCREW 12

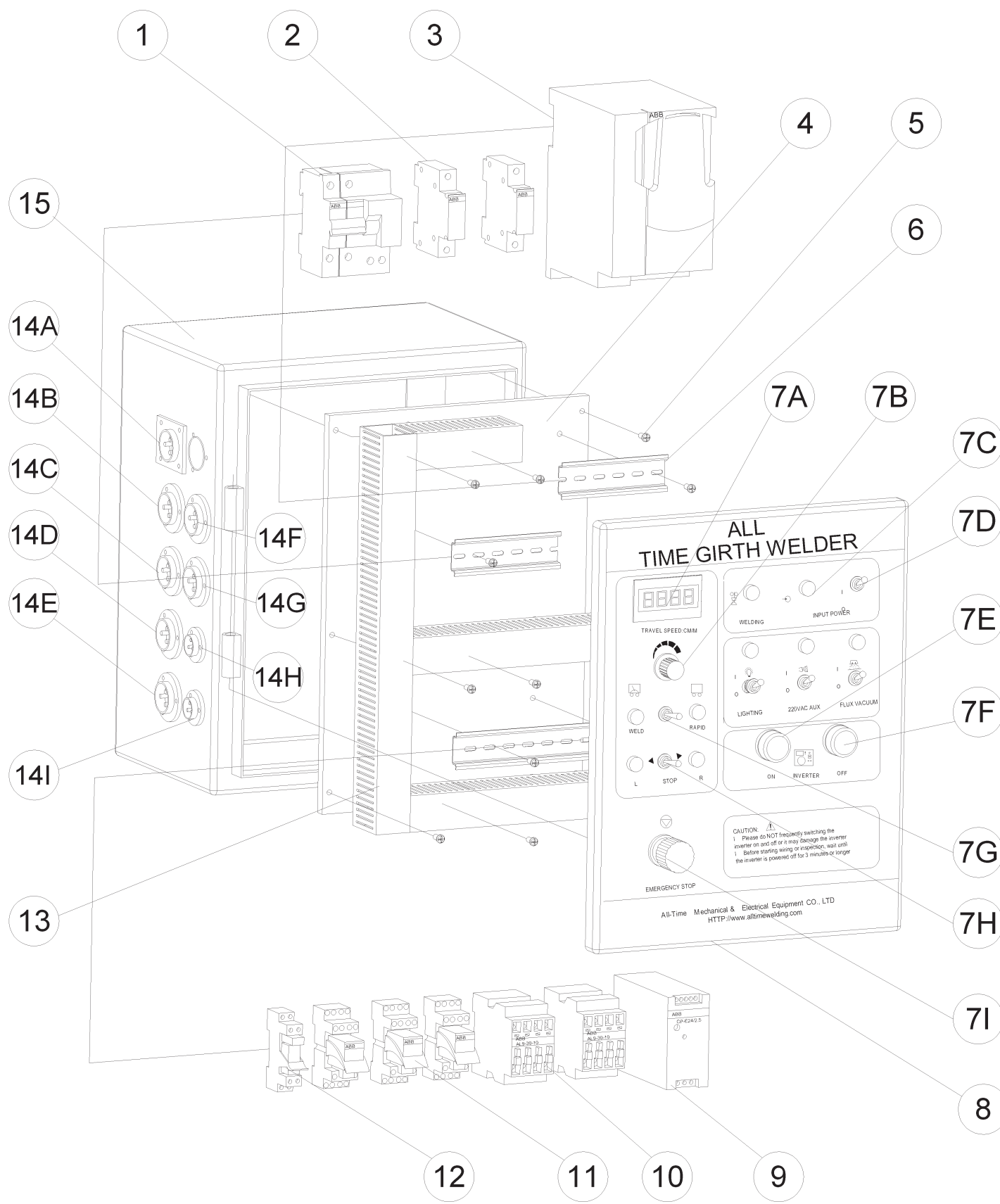
GIRTH WELDER / EXPLODED VIEW

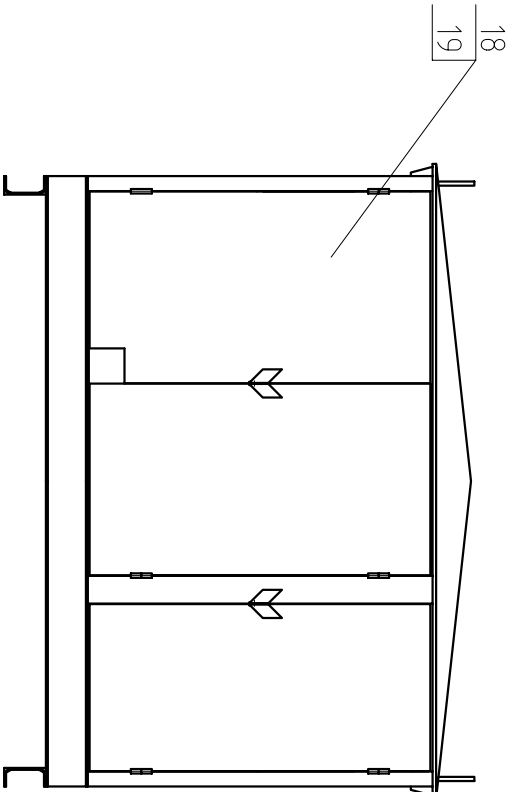
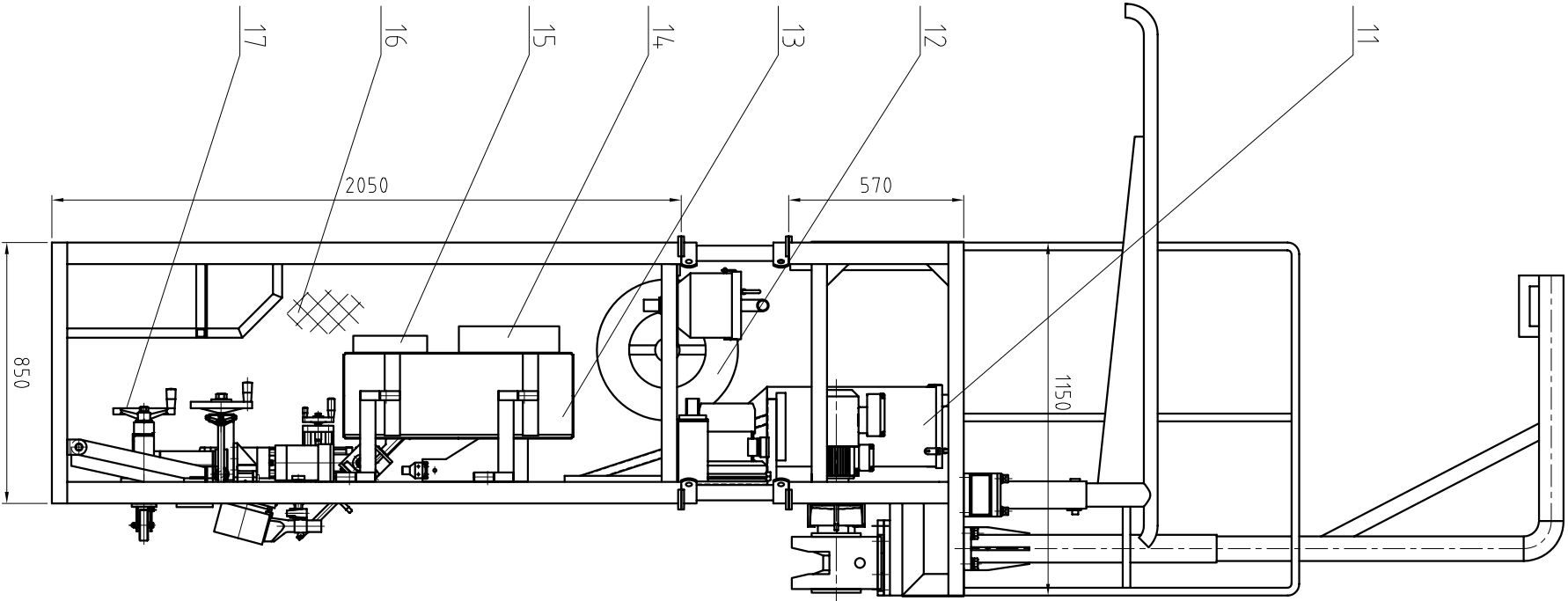
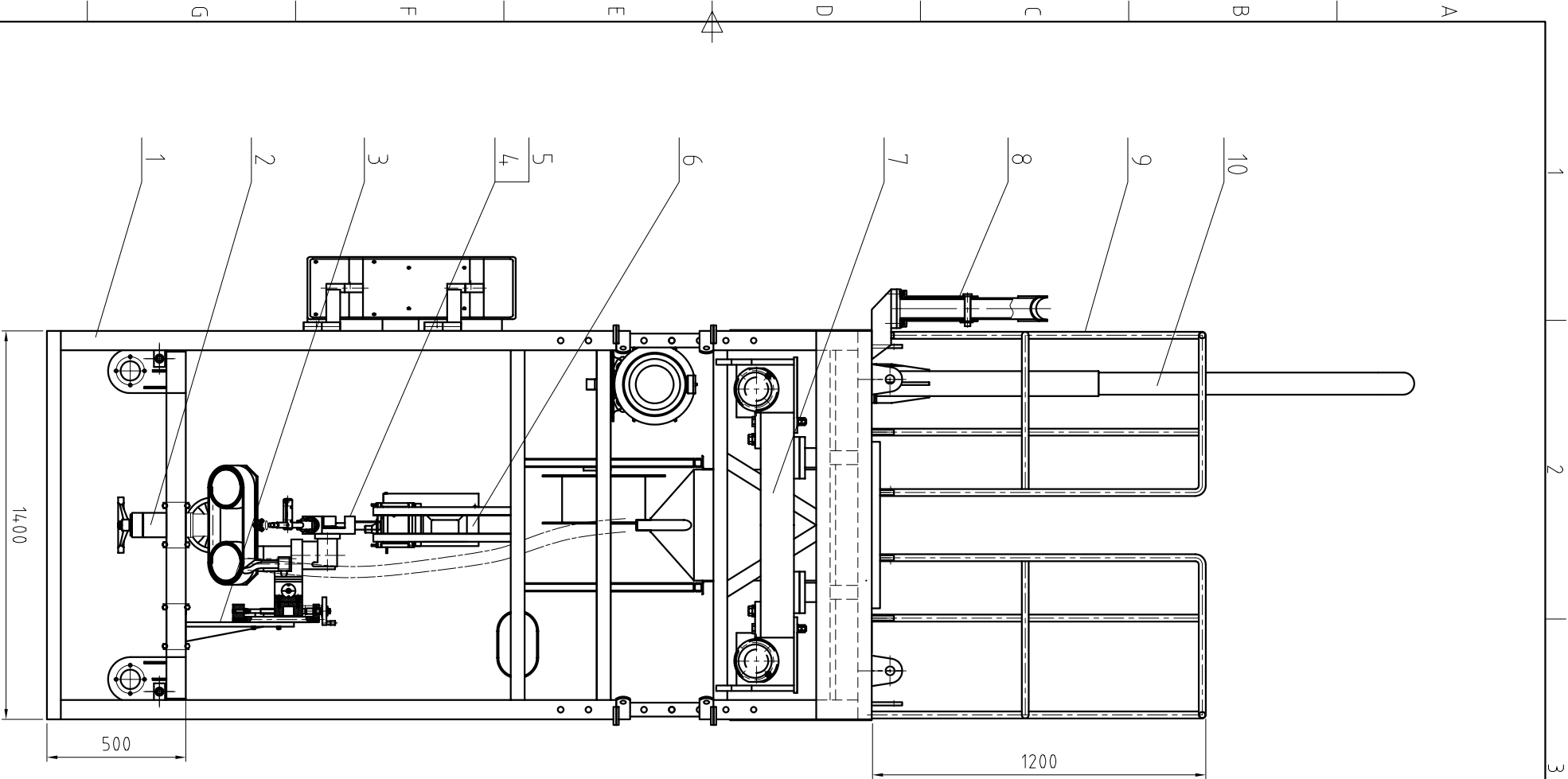


CONTROL BOX ASSEMBLY / PARTS LIST

ITEM	QTY	PART NUMBER	DESCRIPTION
1	1	BGW-1101	RESIDUAL CURRENT PROTECTOR
2	2	BGW-1102	FUSE E931-32
3	1	BGW-1013	INVERTER DRIVE (ABB)ACS350-01E-07A5-2
4	1	BGW-1103	INSULATION PANEL
5	22	BGW-1104	SCREW M4*10
6	3	BGW-1106	INSTALLATION RAIL
7A	1	BGW-1014	SPEED DISPLAY HB5735B 0~10V 0~299
7B	1	BGW-1107	SPEED POTENTIOMETER 3590S-103L
7C	9	BGW-1108	LED AD16 24V DC
7D	4	BGW-1109	TOGGLE SWITCH T-12
7E	1	BGW-1111	BUTTON SWITCH (ILLUMINATE) MP1-42G-10
7F	1	BGW-1112	BUTTON SWITCH CP1-10R-01
7G	1	BGW-1113	TOGGLE SWITCH T-22
7H	1	BGW-1114	TOGGLE SWITCH T-23
7I	1	BGW-1115	EMERGENCY STOP BUTTON CE3T-10R-01
8	1	BGW-1116	FRONT PANEL
9	1	BGW-1019	POWER SWITCH CP-E24/2.5
10	2	BGW-1021	DC CONTACTOR AL9-30-10
11	3	BGW-1017	RELAY CR-M024DC2L/M2SS/-P/M42
12	1	BGW-1018	RELAY CR-P110AC2L/PSS/-P/M42
13	3	BGW-1118	CABLE SLEEVE 5035
14A	9	BGW-1023	CONNECTOR WS32-4K
14B	1	BGW-1024	CONNECTOR 30MF-3P
14C	1	BGW-1025	CONNECTOR 30MF-4P
14D	1	BGW-1026	CONNECTOR 30MF-5P
14E	1	BGW-1027	CONNECTOR 30MF-6P
14F	1	BGW-1022	CONNECTOR 30MF-7P
14G	1	BGW-1028	CONNECTOR 30MF-2P
14H	1	BGW-1029	CONNECTOR 20M-4P
14I	1	BGW-1030	CONNECTOR 20M-3P
15	1	BGW-1117	CONTROL BOX

CONTROL BOX ASSEMBLY / EXPLODED VIEW





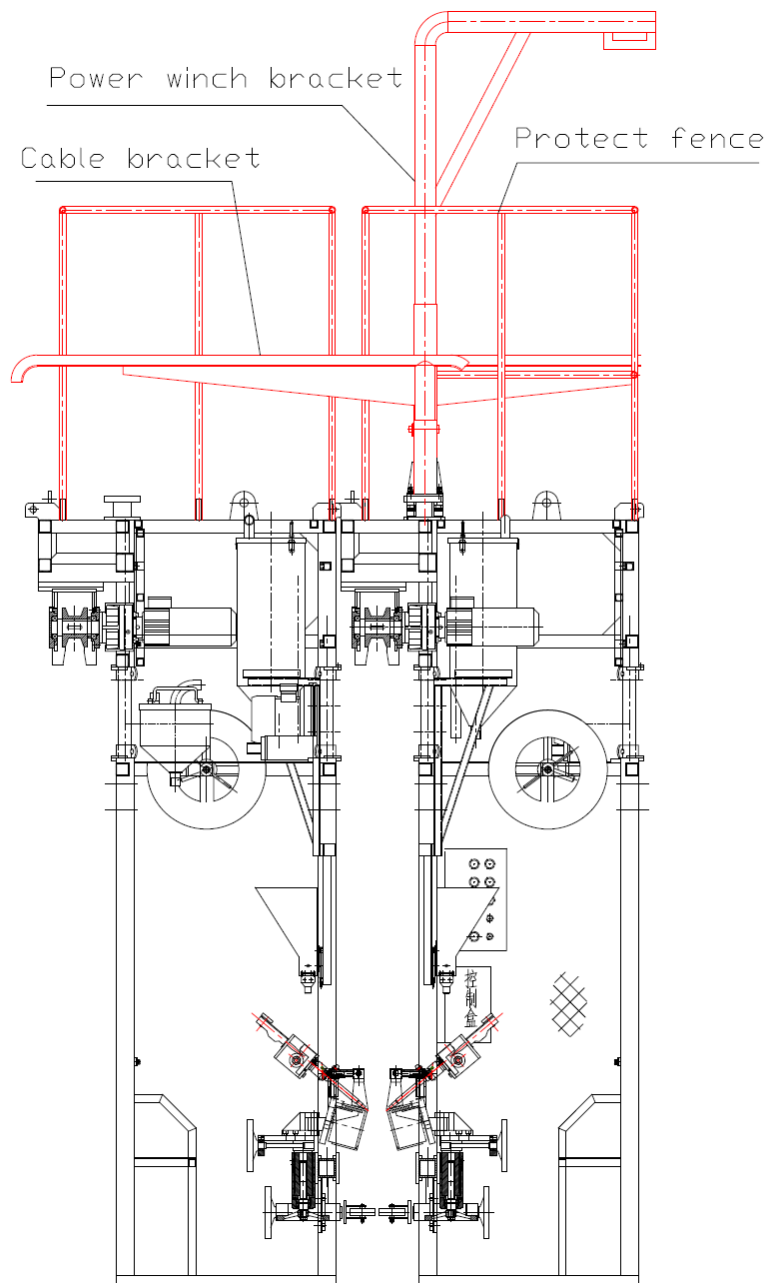
19	K1365-23	Welding power source	1					lincoln
18	YS-AGW-IS.13	Electrical Cabinet	1					
17	YS-AGW-IS.11	Guide Wheel Ass	2					
16	BGW-IS.06	Frame Canvas	1					
15	K210-2	NA-3S Control box	1					lincoln
14	YS-AGW-IS.12	All Time Control box	1					
13	YS-AGW-IS.08	Control box mountplate	1					
12	K299	Wire reel	1					lincoln
11	BGW-IS.02	Flux recovery unit	1					
10	YS-AGW-IS.07	Hanger assembly	1					
9	YS-AGW-IS.05	Guardrail	1					
8	YS-AGW-IS.04	Cable Bracket	1					
7	YS-AGW-IS.03	Serrated drive wheel Ass	1					
6	K219	Flux hose	1					lincoln
5	YS-AGW-IS.14	Tarch angle adjuster	1					
4	K209A	NA-3S Wire feeder	1					lincoln
3	YS-AGW-IS.10	Weld head Ass	1					
2	YS-AGW-IS.09	Flux belt Ass	1					
1	BGW-IS.01	AGW Frame	1					
No	Part No	Name	Qty	Material	Part Total Weight	Remark		

DESCRIPTION		PLAN HISTORY		ALT. MARK		CONFIRMED BY	
NO.	DATE	PROJECT	TITLE :	NO.	DATE	NO.	DATE
CUSTOMER							
MANAGER							
CHEF							
CHK. BY							
DWG. BY	QL		BGW-1000				
DWG. DATE : 2010-11-20				SCALE : 1:15			
All Time Mechanical &Electrical Equipment Co.,Ltd.				DWG. NO. BGW-15.00			

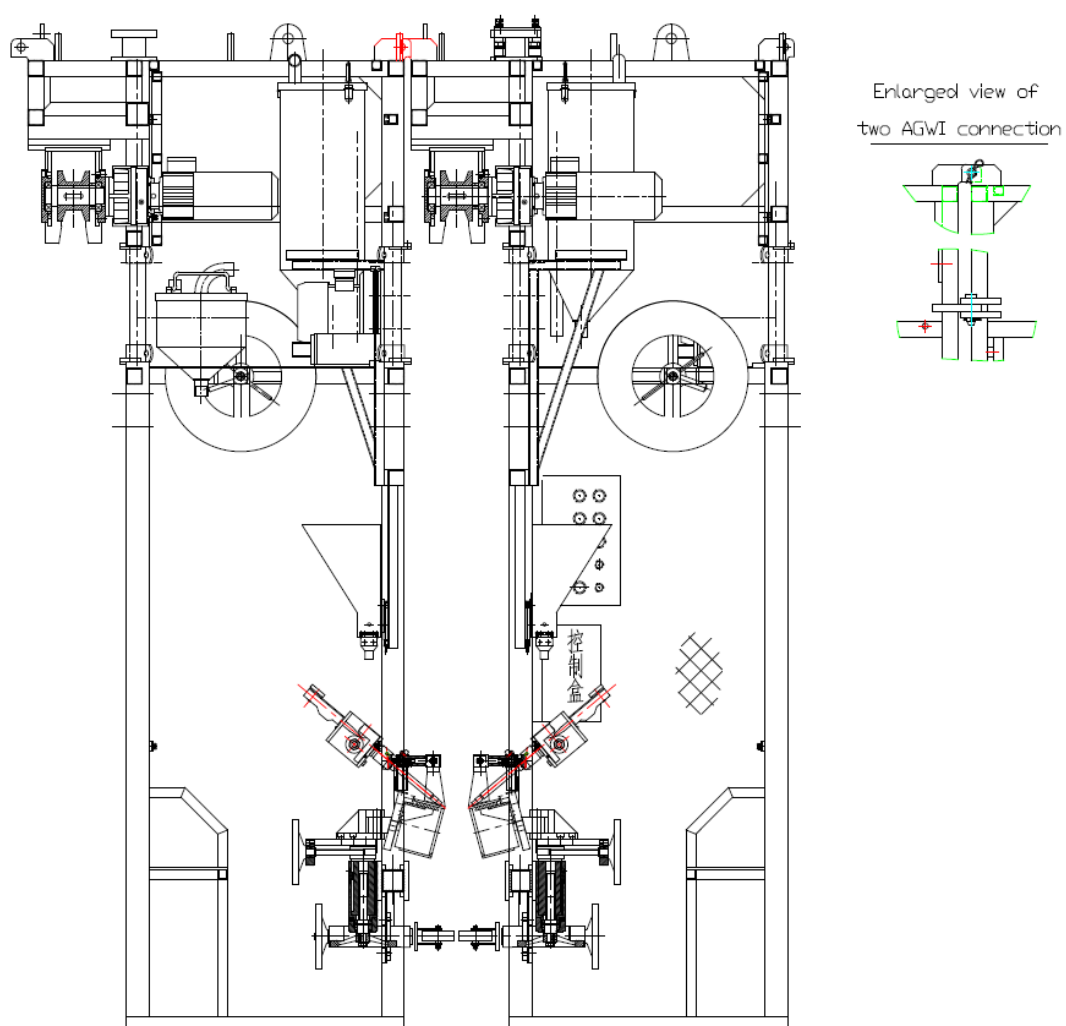
INSTRUTION OF CONVERTING

1 ea AGWII TO 2 ea AGWI

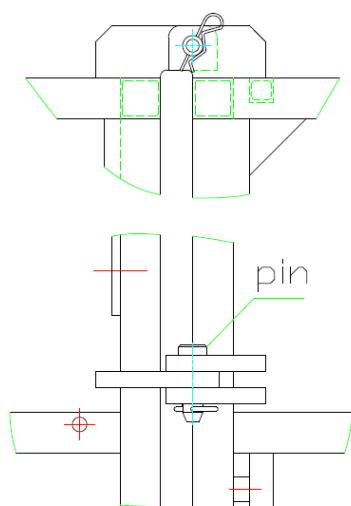
1. Uninstall protect fence, cable bracket and power winch bracket at first.



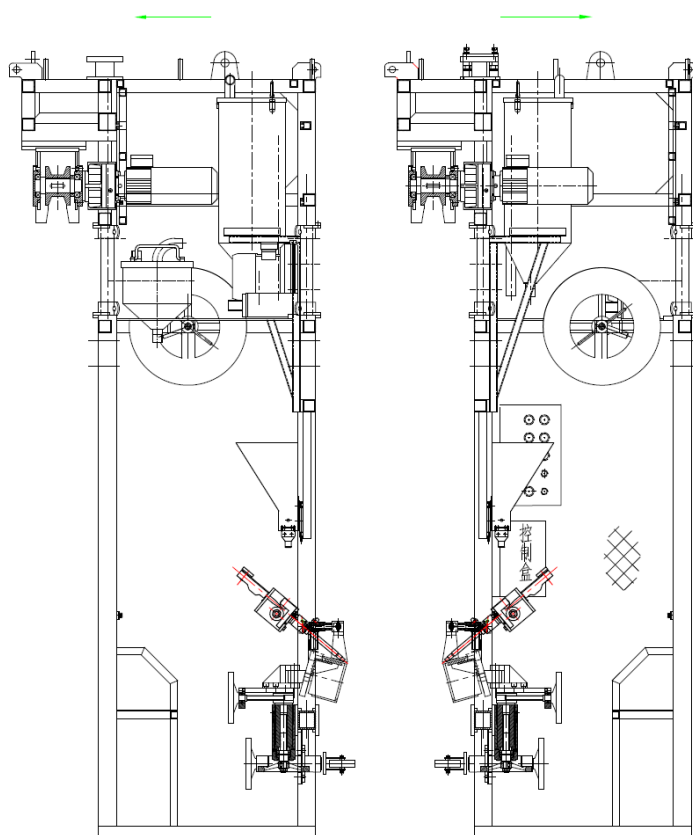
2. Disconnect slave AGW1 frame from main AGW 1frame



Enlarged view of two AGWI connection

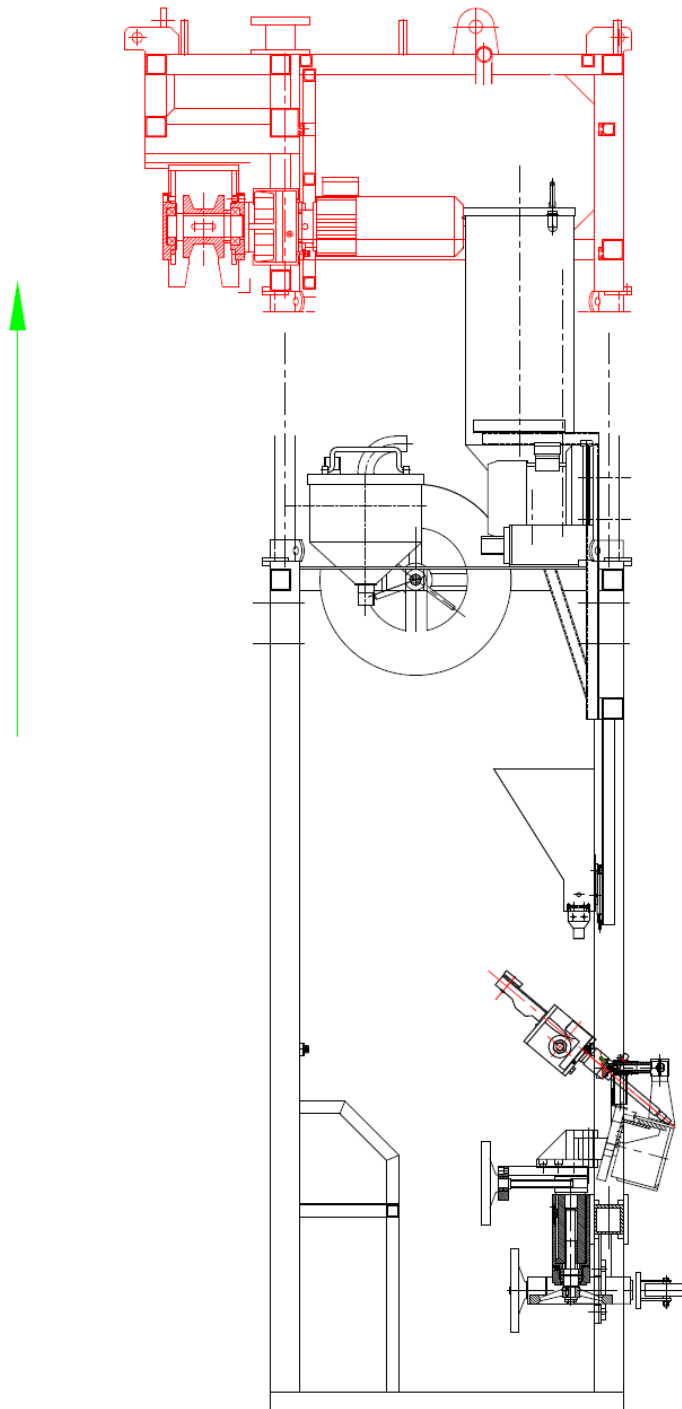


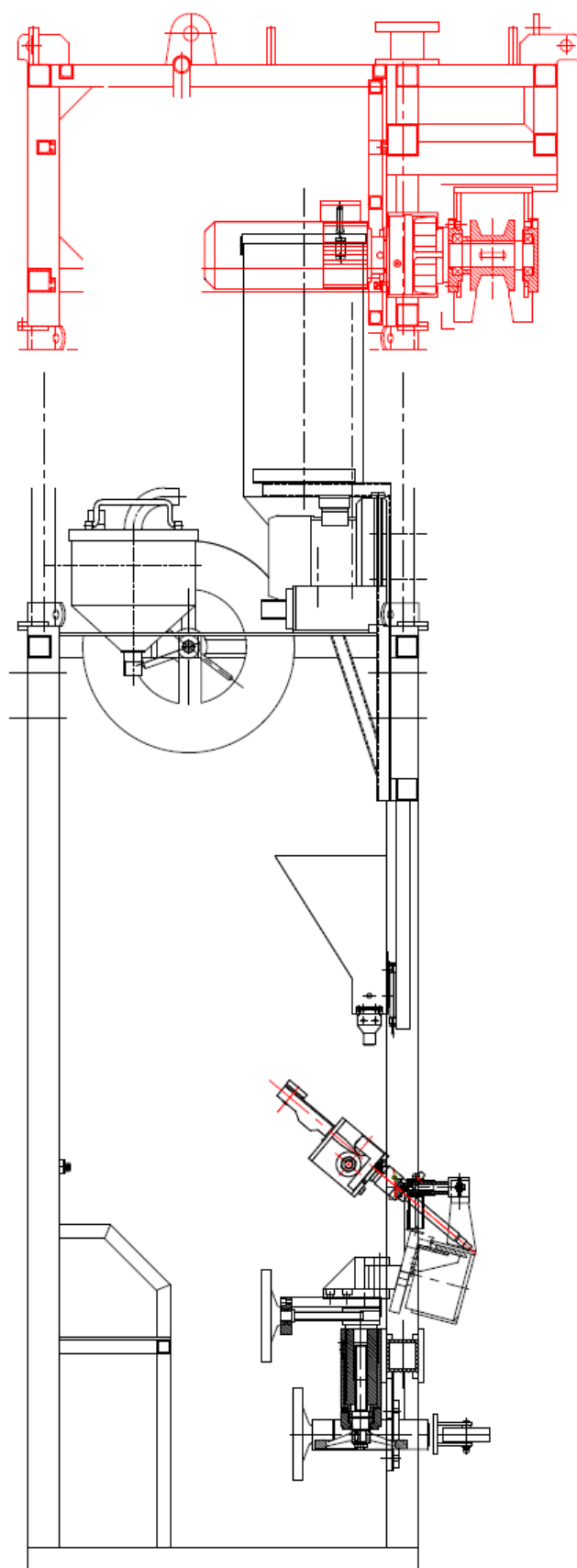
Hang up the two AGW frames, and then put the pin out. The two AGW frames will be disconnected.



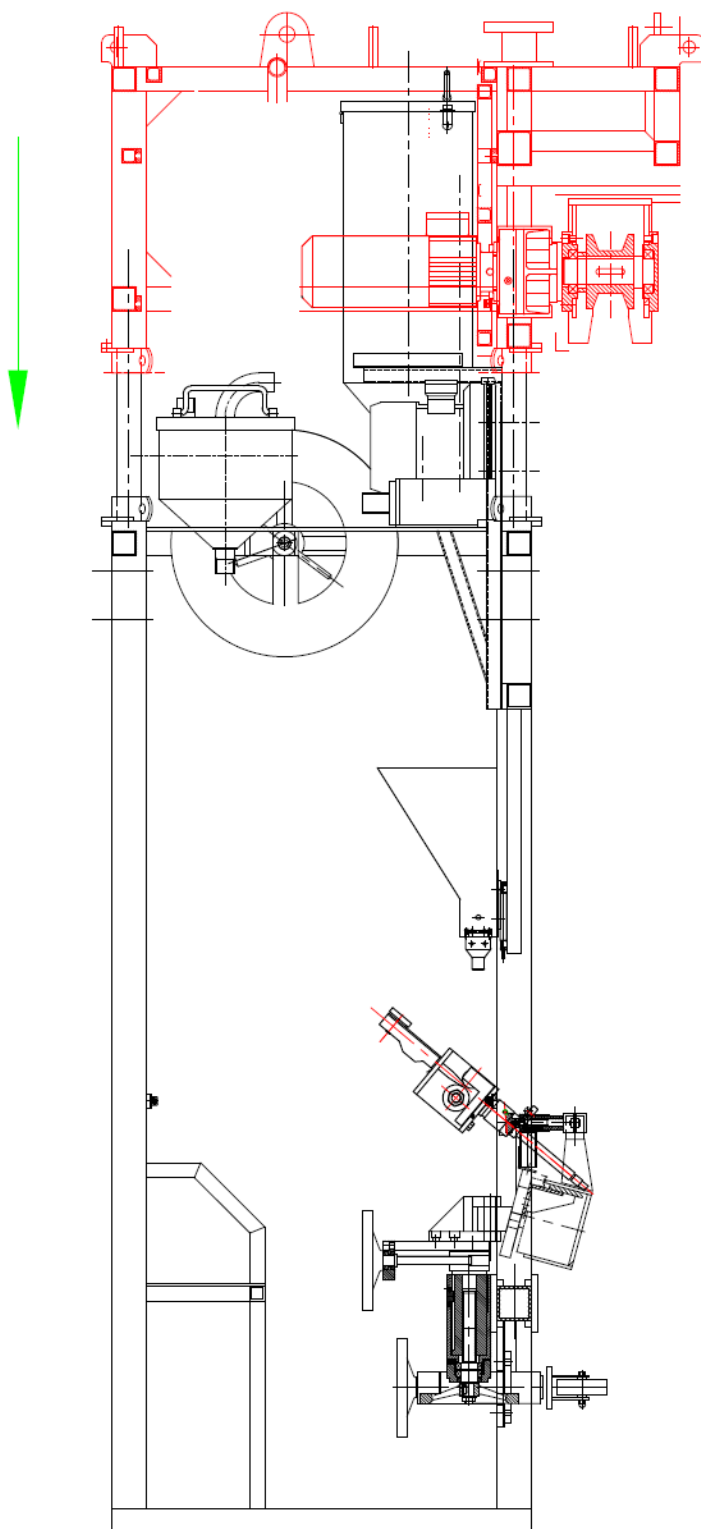
3. Install idle AGW frame

- (1) Disconnect the top frame with the bottom frame, and rotate it 180°





(2) Connect the top frame and bottom frame



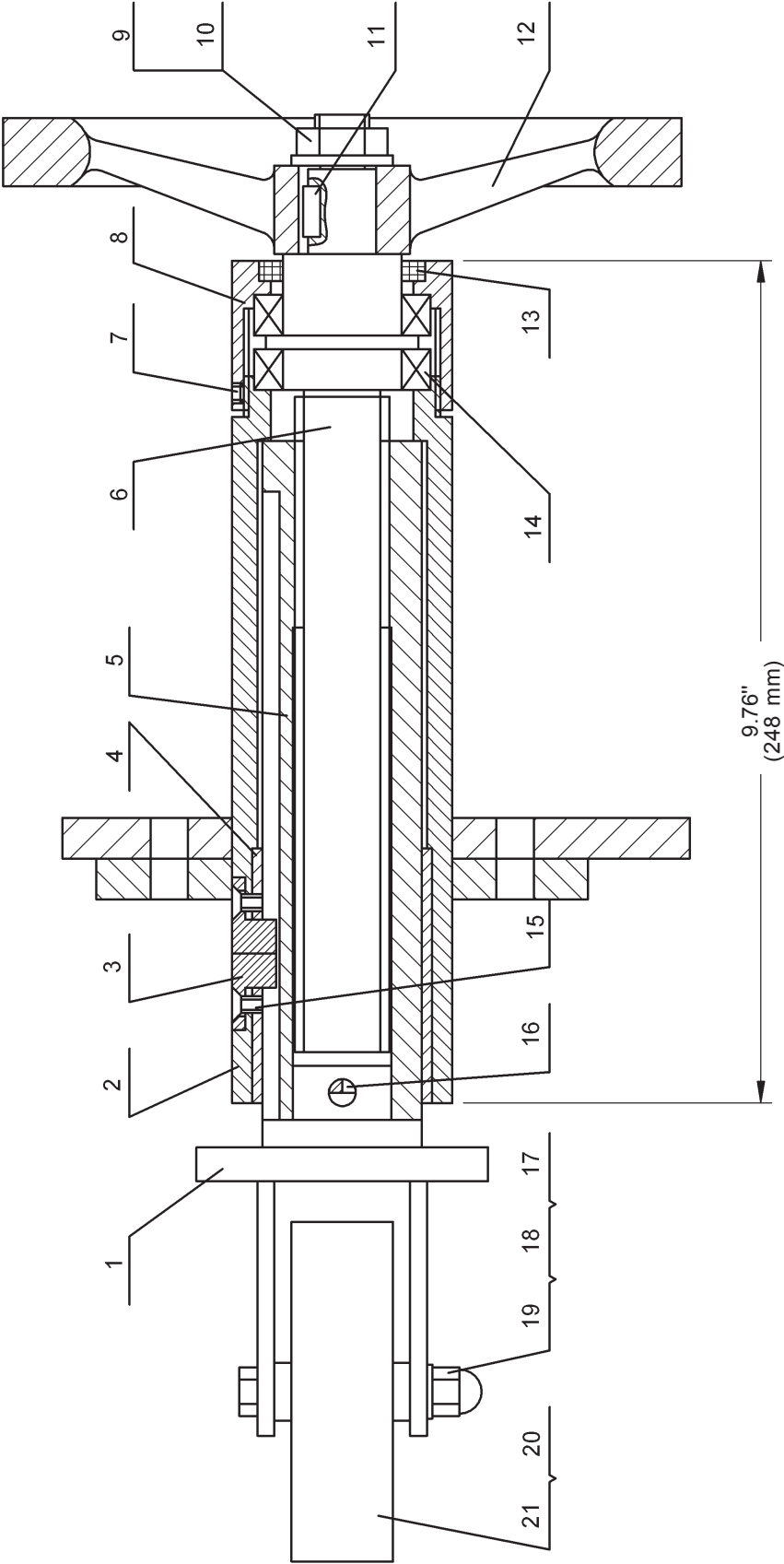
(3) Install protect fence, cable bracket, power winch bracket and so on.

BGW-1087 GUIDE WHEEL ASSEMBLY / PARTS LIST

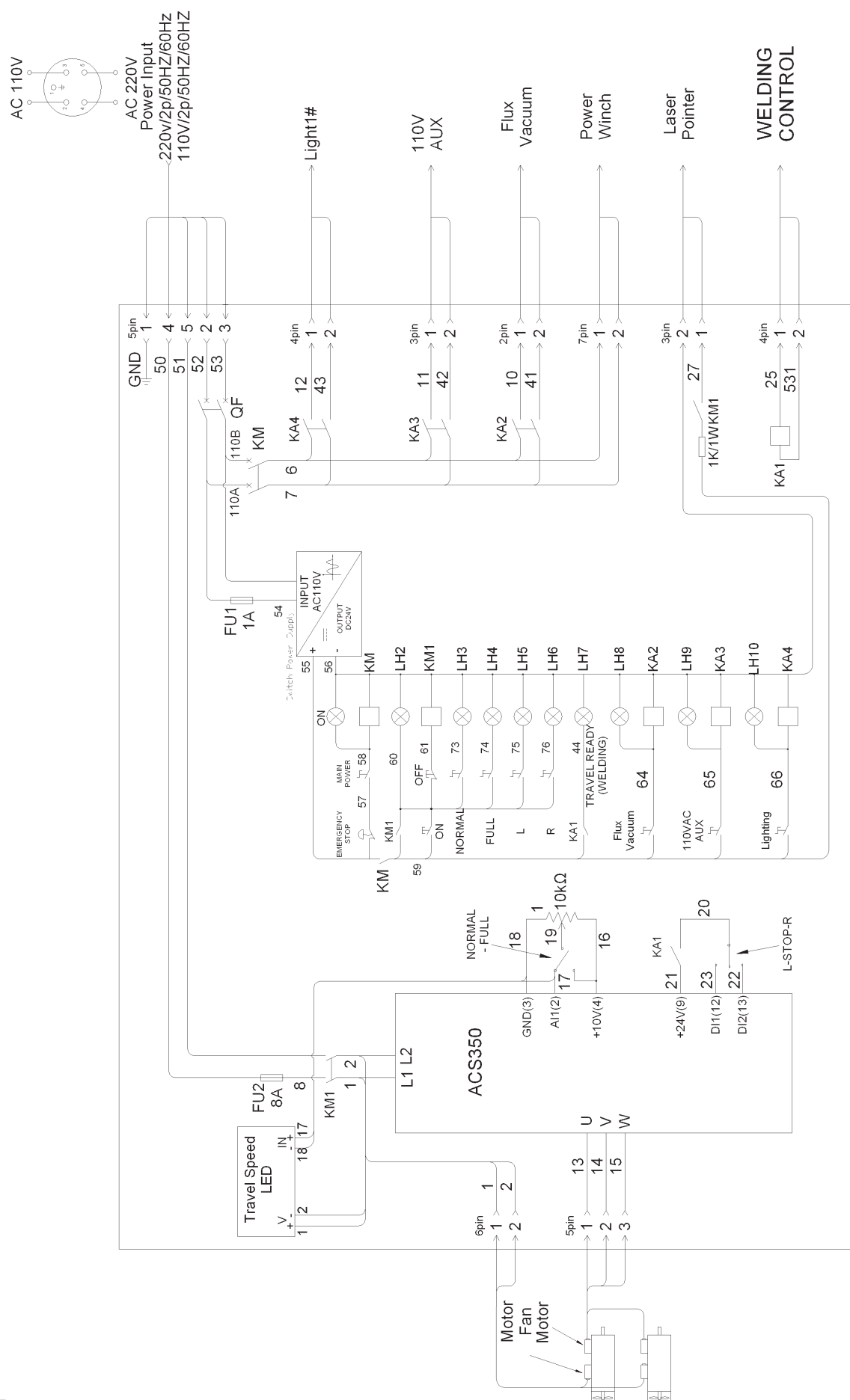
(please refer to the drawing in p.23)

Item No	Descriptions	Part No.	Qty
1	Bracket	BGW-1171	1
2	Sleeve	BGW-1172	1
3	Direction plate	BGW-1173	1
4	Copper Bushing	BGW-1174	1
5	Inside Sleeve	BGW-1176	1
6	Lead Screw	BGW-1177	1
7	Screw GB/T77-1985 M6*4 1	BGW-1178	1
8	Nut Lid	BGW-1179	1
9	Nut	BGW-1181	1
10	Washer	BGW-1182	1
11	Key	BGW-1183	1
12	Hand Wheel .200*.18	BGW-1184	1
13	Oil Seal	BGW-1186	1
14	Bearing	BGW-1187	2
15	Screw	BGW-1188	2
16	Pin	BGW-1189	1
17	Screw	BGW-1191	1
18	Nut	BGW-1192	1
19	Washer	BGW-1193	1
20	Support Wheel .100	BGW-1194	1
21	Bearing 6202	BGW-1196	2

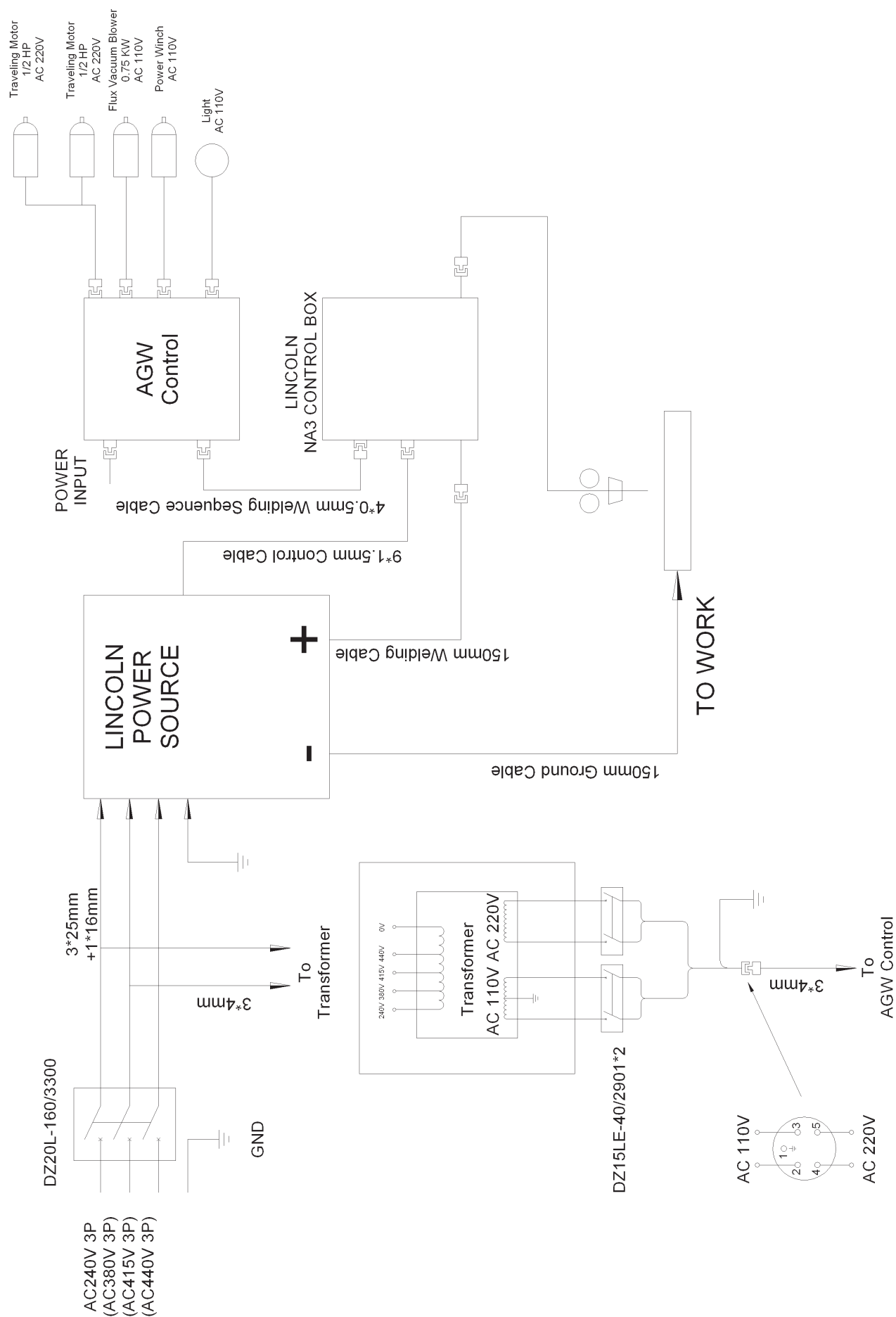
BGW-1087 GUIDE WHEEL ASSEMBLY / EXPLODED VIEW



OPERATIONS SCHEMATIC



WIRING DIAGRAM



WARRANTY

LIMITED WARRANTY

MODEL _____
SERIAL NO. _____
DATE PURCHASED: _____

FOR A PERIOD OF TWELVE (12) MONTHS FROM DELIVERY, BUG-O SYSTEMS WARRANTS TO THE ORIGINAL PURCHASER (DOES NOT INCLUDE AUTHORIZED DISTRIBUTORS), THAT A NEW MACHINE IS FREE FROM DEFECTS IN MATERIAL AND WORKMANSHIP AND AGREES TO REPAIR OR REPLACE, AT ITS OPTION, ANY DEFECTIVE PARTS OR MACHINE. THIS WARRANTY DOES NOT APPLY TO MACHINES, WHICH AFTER OUR INSPECTION, ARE DETERMINED TO HAVE BEEN DAMAGED DUE TO NEGLIGENCE, ABUSE, OVERLOADING, ACCIDENT OR IMPROPER USAGE. ALL SHIPPING AND HANDLING CHARGES WILL BE PAID BY CUSTOMER.

BUG-O SYSTEMS MAKES NO WARRANTY OF MERCHANTABILITY AND MAKES NO OTHER WARRANTY, EXPRESSED OR IMPLIED, BEYOND THE WARRANTY EXPRESSLY SET FORTH ABOVE. BUYER'S REMEDY FOR BREACH OF WARRANTY, HEREUNDER, SHALL BE LIMITED TO REPAIR OR REPLACEMENT OF NON-CONFORMING PARTS AND MACHINES. UNDER NO CIRCUMSTANCES SHALL CONSEQUENTIAL DAMAGES BE RECOVERABLE.

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 HE 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.