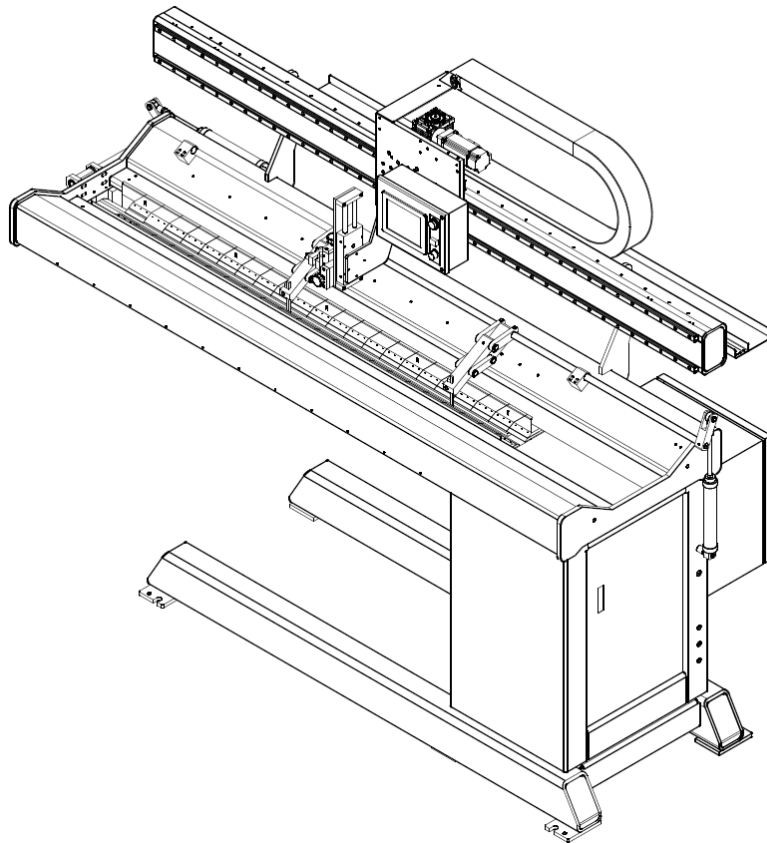


OWNER'S MANUAL

RD-8472E

Important : Read these instructions before installing, operating or servicing this product.

MODEL : LS – XX LONGITUDINAL SEAMER (For Servo System)



Serial Number : 1906001 ~ and later

Revised Date : Jul. 05, 2019

UNITED PROARC CORPORATION

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INSTRUCTION



WARNING

Read and understand this entire manual regarding the rules for users' safety before installing, operating, or servicing the equipment.



WARNING

A procedure, which if not properly followed, may cause injury to the operator or others in the operating area.

Equipment identification

The identification number specification or part number, model, and serial number of this unit usually appear on a nameplate attached to the control panel. Record these numbers for future reference.

Receipt of equipment

When you receive the equipment, check it against the shipping documents. Make sure it is complete and inspect the equipment for possible damage during shipping. If there is any damage, notify the carrier immediately to file a claim.

Furnish complete information concerning damage claims or mistake(s) in shipment to United ProArc Corporation: No. 3 Gungye 10th Road, Pingjen Ind. Park, Pingjen City, Taoyuan, Taiwan. Include the equipment identification number along with a description of the parts in question.

Move the equipment to the installation site before uncrating the unit. Use care to avoid damaging the equipment when using bars, hammers, etc. to uncrate the unit.



WARNING

Falling machine due to lifting device failure may cause death or injury.

- * Lifting device may fail when overloaded
- * Avoid sudden jerks, drops or swinging
- * Check lifting device components visually for looseness and signs of metal fatigue Before changing any hardware, check grade and size of bolts, and replace with bolts of equal or higher size and grade.

SAFETY PRECAUTIONS



WARNING

Operation and maintenance involves potential hazards. All operators and personnel should be alerted to possible hazards and precautions should be taken to prevent possible injury.

Electrical safety

Machine :

- * The counter, safety device against excess current and electrical installation, are compatible with its maximum power and its main voltage.
- * The connection, single-phase or three-phase, is possible on a stand compatible with the plug of its cable link.
- * If the cable is connected with the electrical network, the earth, must never be cut by the protection device against electrical shocks.

Work place :

- * Be very careful to avoid contact between metal part and phase conductor and the neutral of electric network.
- * Electrical messes of different electrical machine and apparatus are connected between themselves and with the terminal of earth neutral wire.

Interventions :

- * Before control and repair, see to it that the apparatus is switched off and insulated.
- * Connection with fixed installation cable is impossible.
- * It's on "STOP" and connection is impossible.
- * Some apparatus are provided with starting circuit HT HF (with a plate). Never enter into the corresponding switch cupboard.
- * Only qualified persons are authorized for intervention concerning electrical installation.

Maintenance

- * Often check the insulation and connection good state of apparatus and electrical accessories : taps, appliance cords, coatings, switch, extension cords, etc.
 - * Maintenance and repair of insulating coatings operations are very important.
 - * Do repair with a specialist or better replace defective accessories.
 - * Check regularly the right adjustment and the non-heating of electrical connections.
- Each of water and gas circuit has a general insulation valve.

Safety of fluids (Water & Gas)

Gas :

- * If there is use of gas bottles, do assure their stowage to avoid the falls. No excessive heat (>50°C).
- * Check regularly (once a month) the good running of circuits and accessories. Every worn conduit must be replaced by a new and equivalent one.
- * The operator must be dressed and protected in relation with his work.
- * Avoid contacting metal parts connected or accidentally connected.
- * Wear leather gloves with gauntlet.

Individual safety

Fire



- * Safety clothes : gloves, apron, safety shoes protect the operator and his assistants against burns of hot parts, projections and slag.
- * Fire can be caused by hot slag and sparks.
- * Remove combustibles from working area or provide a fire watch.
- * Do not cut containers that have held combustibles. Remove all flammable and combustible materials in the operating area that may be ignited by sparks.

LIMITED WARRANTY

UNITED PROARC CORPORATION warrants all new equipment to be free from defects in material and workmanship, provided that the equipment is installed and operated according to instructions stated in this manual.

UNITED PROARC's obligation under this warranty policy is expressly limited to the replace or repair, at its option, of the defected part only. ProArc's option to repair or replacement of a defected part under this warranty shall be based on FOB Taiwan basis.

The warranty period begins on the date of sale to the original-purchase user of the equipment.

UNITED PROARC CORPORATION shall not be liable for any loss or consequential damage or express accruing directly or indirectly from the use of equipment covered by this warranty.

This warranty supersedes all previous ProArc warranties and is exclusive with no other guarantees or warranties expressed or implied.

This warranty excludes the consumable parts that are used in normal operation.

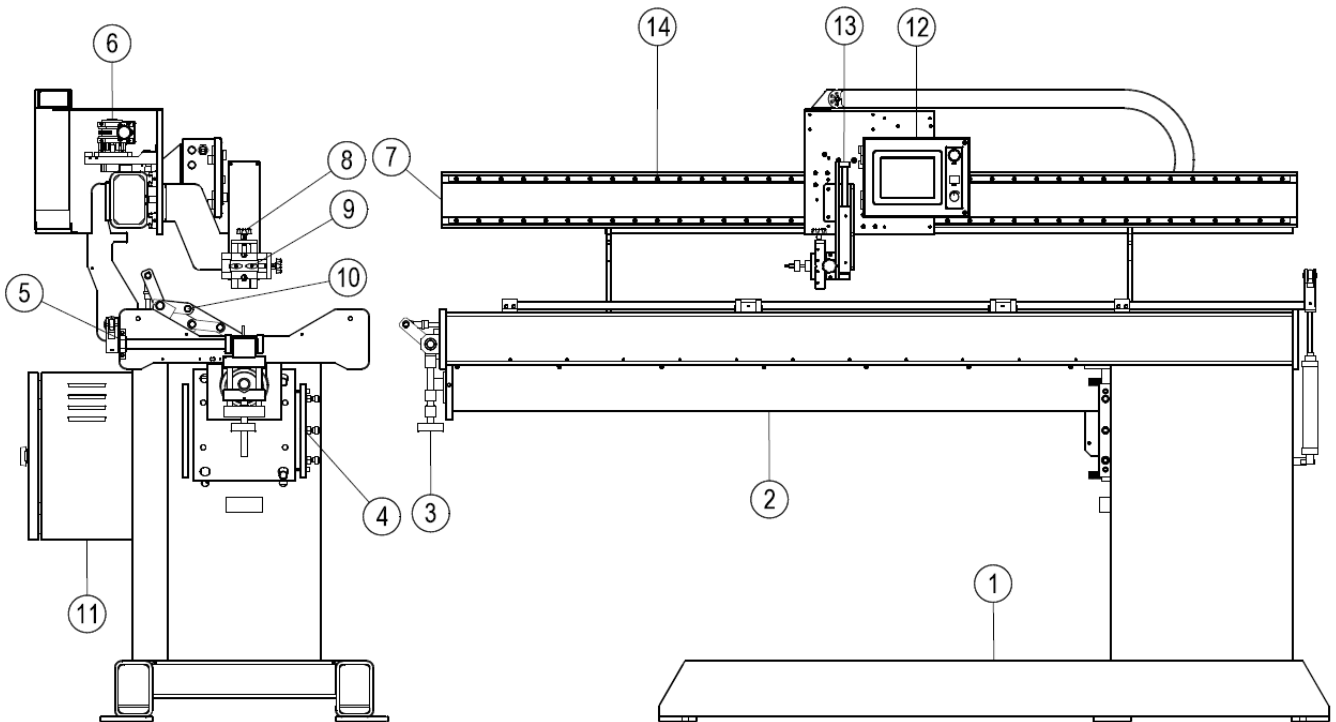
1.1 SPECIFICATION

General description

- * This system is a longitudinal seam welding type equipment, that provides automatic welding process for flat-plate or round tank/vessel seam welding.
- * Easy operation - anyone without weld experience can operate the machine after a short training. The system can be equipped with MIG / TIG / Plasma / Submerged Arc weld / Laser weld...etc different welding power source.
- * The work clamp adopts Keyboard design with air-bag. The combination provides average pressure on the work-pieces while welding.
- * Welding Side-Beam is equipped with double linear guide way for high load capacity, high reliability, and high welding performance repeatability.
- * Side-Beam utilizes precision rack and pinion with servo driving motor to achieve stable speed and precision.
- * Mandrel adopts special design backing-bar (it would be change according to different material or plate thickness).

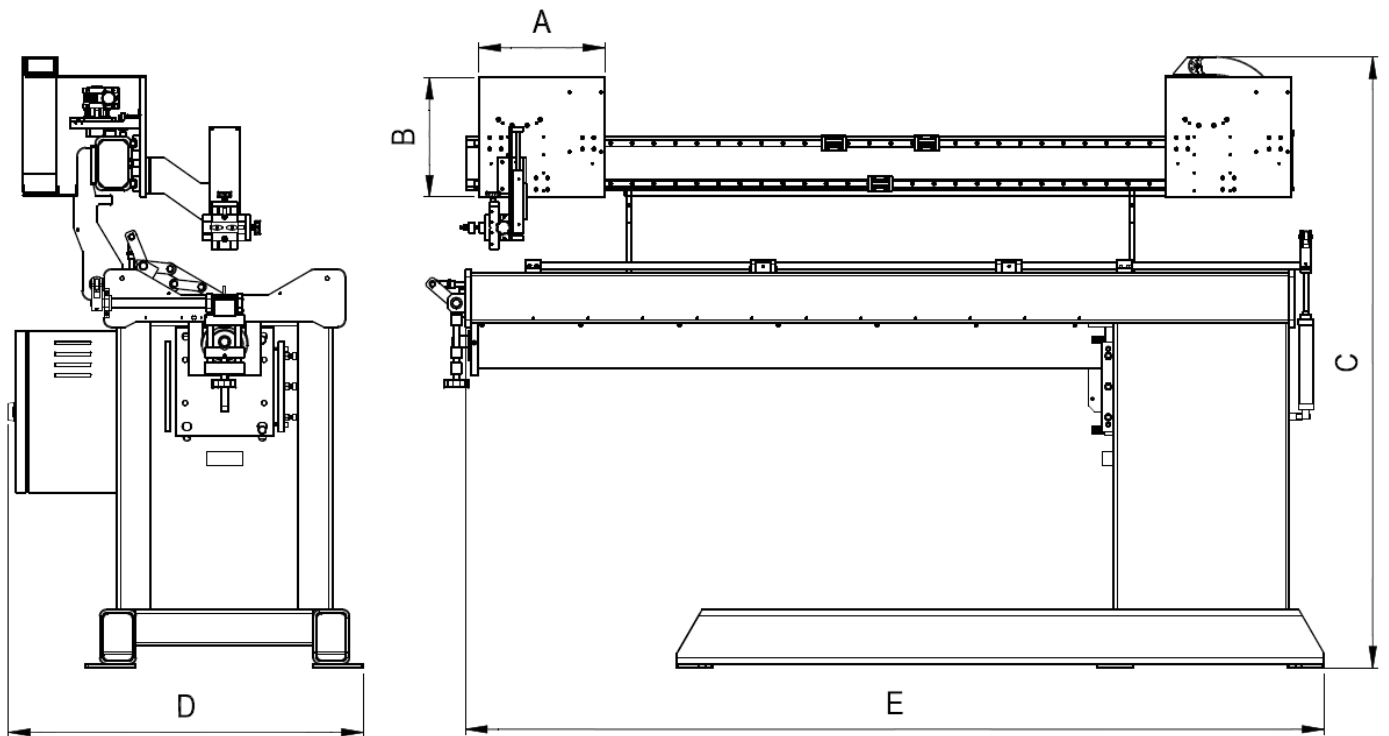
1.2 EXTERNAL LAYOUT

1. Machine body.
2. Mandrel.
3. Pneumatic mandrel safety switch — LS-009. (Optional)
4. Mandrel horizontal / vertical adjustment.
5. Clamp-Plate.
6. Driver.
7. Side beam.
8. Torch slide — SL-050. (Optional)
9. V-Block torch holder — VH-035 (Optional)
Swivel Torch Holder — SW180. (Optional)
10. Pneumatic Edge alignment device — LS-002 (Optional)
Retractable Edge alignment device — LS-001 (Optional)
11. Control box.
12. HMI Control box.
13. Pneumatic torch lifter unit — LS-005. (Optional)
14. Linear guideway.



1.3 SPECIFICATIONS

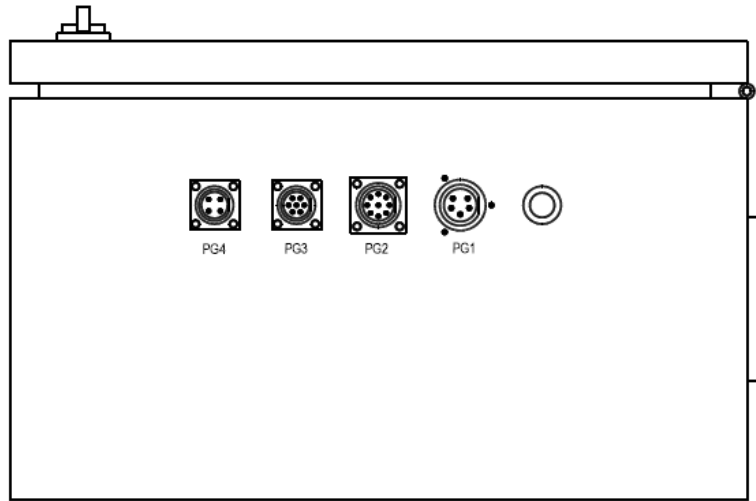
Model	Unit	LS-06	LS-09	LS-12	LS-15	LS-18	LS-24	LS-30	LS-036
Power input	~	1 Phase, 200~230VAC \pm 10%, 6A 50/60Hz							
Motor model	--	Servo Motor							
Motor rated power	W	200W							
Welding length	mm	684	988	1,296	1,596	1,900	2,508	3,116	3,724
Thickness range	mm	0.1-10							
Min. dia. Work piece	mm	67	89	108	133	152	184	241	311
Max. dia. Work piece	mm	850							
Travel accuracy	mm	\pm 0.05							
Carriage speed range	mm/min	2 ~ 16,000 (1~629.9 inch / min)							
Carriage drive	-	Rack and Pinion							
Carriage width (A)	mm	350							
Carriage height (B)	mm	332							
Overall height (C)	mm	1,720							
Overall width (D)	mm	990							
Overall length (E)	mm	1,480	1,780	2,085	2,390	2,820	3,430	4,140	4,740
Net weight (Approx.)	kg	550	650	750	850	1,050	1,150	1,250	1,450



1.4 CABLE CONNECTION

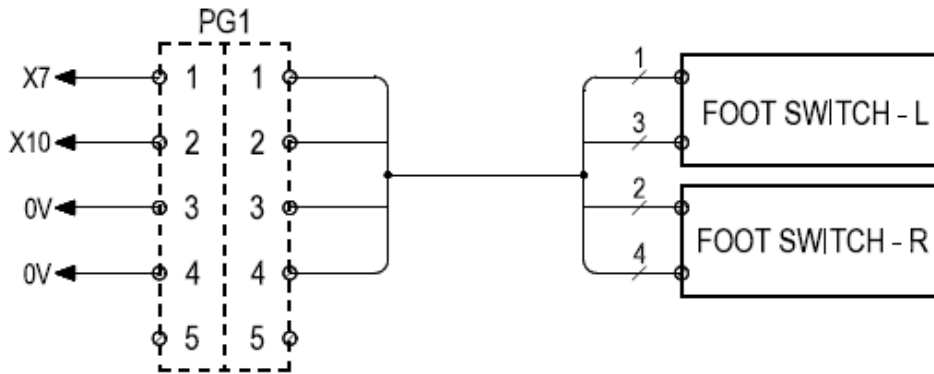
Connector Information :

The connecting socket is located on the bottom of the control box. There are a total of 4 metal connectors : One 5Pin (PG1) connector and the other (PG2) 10Pin connector & (PG3) 7Pin connector & (PG4) 4Pin connector.

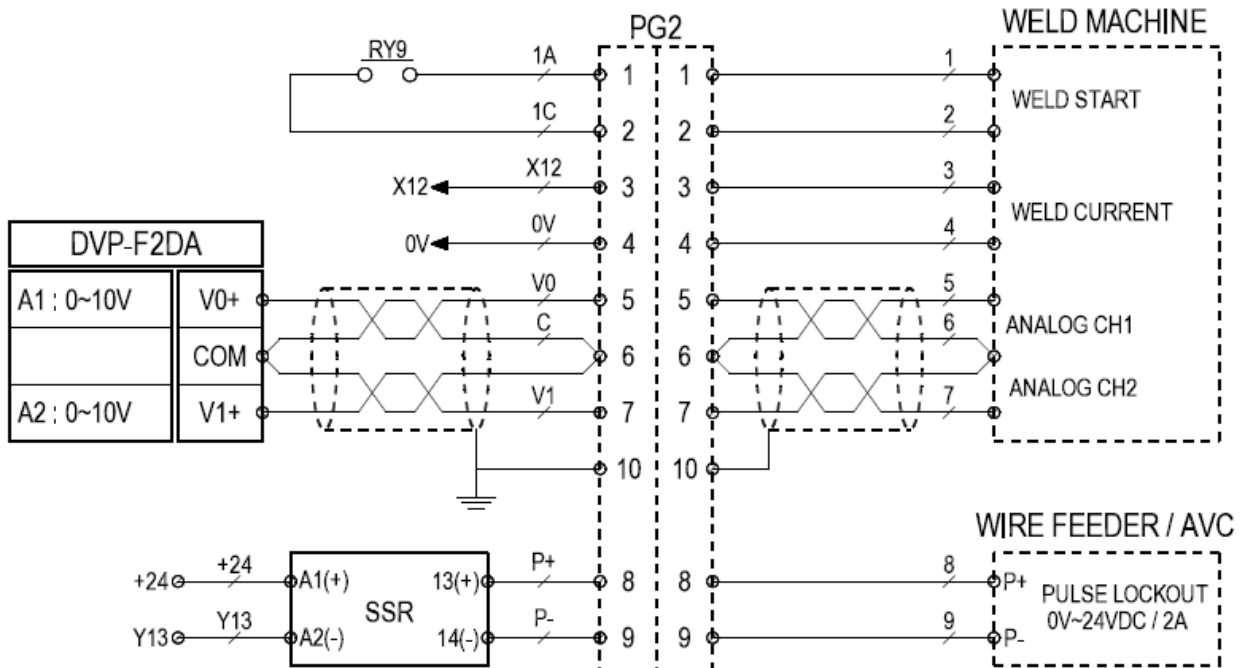


Control box to external components connection diagram :

1. Foot Switch connection :

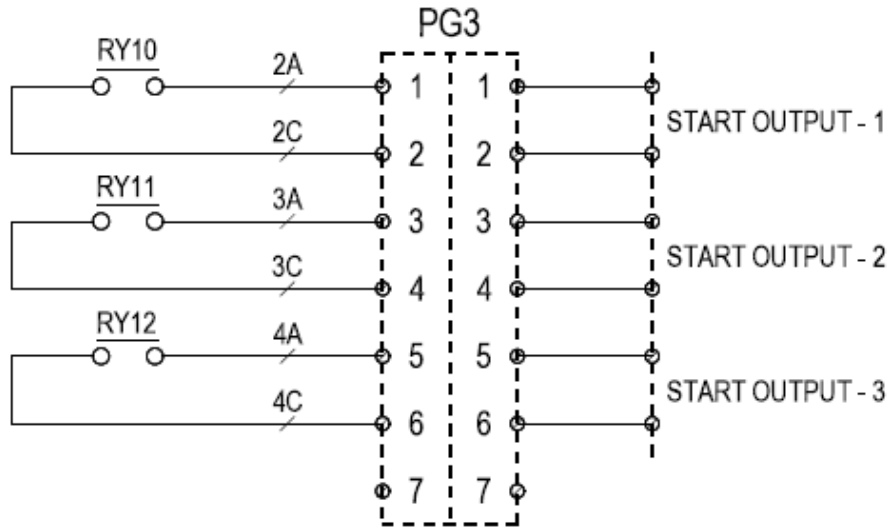


2. Control box to welding machine connection :



1.4 CABLE CONNECTION

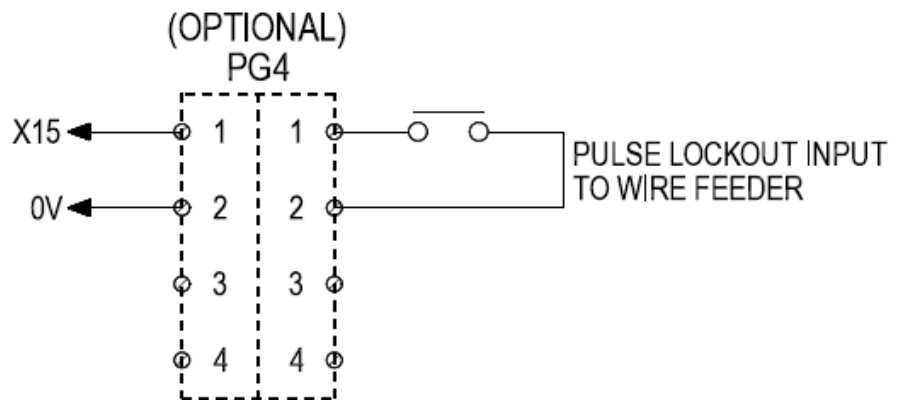
3. Welder Connection Interface:



4. External wire feeder lockout connection interface.

Only LS with wire feeder integration has this interface. This input is used to slow/freeze/rewind wire feeder movement, allowing synchronization with external welder.

Closing the connection (with dry contact) put the wire feeder in slow/freeze/rewind speed.



1.5 SYSTEM INTRODUCTION

1. Full Digital Control :

PLC controller with 7-inch touch screen and servo drive system.

Fully numerical and graphical for the precision speed and positioning control.

Improve the control accuracy, product quality and production efficiency.

2. Interactive graphics operations and Chinese-English conversion:

It can switch Chinese and English screens for easy operation.

3. Flexible welding sequence settings:

Graphically can display 11 welding sequence of welding cycle.

It can set line welding, multi-segment line welding and multi-point spot welding.

Built-in analog voltage DC 0~10V output, support analog welder current control.

4. Accurate speed control:

The servo motor drive system has stable speed control for perfect quality welding.

5. Welding parameters programmed:

It can store 100 sets of welding parameters and back up on USB flash drive.

6. New function of the foot switch:

Foot switch program control: The left pedal is stepped, will operate in the order of the working procedure.

The right pedal will reverse the previous action.

Foot switch without program control: Only traditional foot switch function.

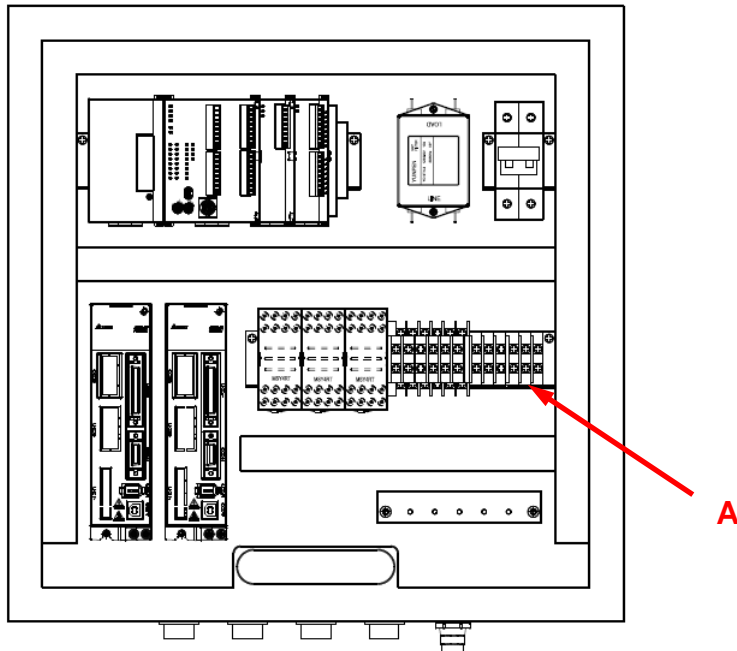
7. Maintenance record function:

PLC I/O monitoring function can immediately understand the cause of the abnormality.

8. CE conformity

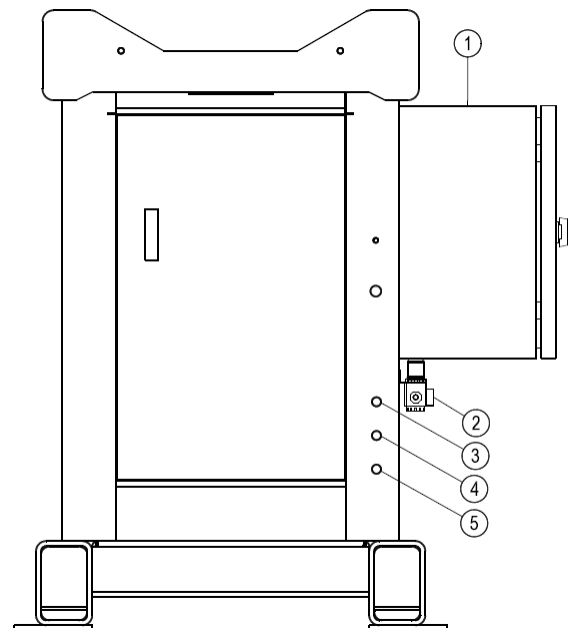
2.1 INSTALLATION

Work place	* The machine, suitable for indoors, should be placed and fixed on a smooth level ground using 1/2" inflated screws to avoid tilting.
Input power	* The input power of the system (Pic1-A), 1Ph-220VAC-50/60Hz, needs to be connected by user to its local power breaker. * The wiring of the input power should adopt No-Fuse-Breaker to ensure the electrical safety.
Air Pressure	* The machine uses 5kg/cm ² compressed air, compressed air can be connected to the terminal located at the rear side of the machine, inlet fitting 1/2" dia.
Back-up gas	* Optional-Dual side pressure individual control device. * Optional-Inserts providing insert gas backing-up, flow rate 0-15LPM. The fitting can be found at right side of the machine, inlet fitting 5/16" dia.
Water cooling	* Optional-The machine should use a water cooling system for cooling mandrel, pressure 30 psi. The inlet and outlet fitting of water cooling is located at the right side of the machine, inlet/outlet fitting 5/16" dia.



Pic 1

Item.	Description	Remark
1	Control box	
2	Air Pressure inlet	
3	Back-up gas inlet	Option
4	Water cooling outlet	Option
5	Water cooling inlet	Option



2.2 ADJUSTMENT

Mandrel adjustment

Depend on the different work-pieces or plate thickness, user have to do following adjustment for welding requirement:

1. With the mandrel anchor bar nuts slightly loose. (As Fig. A)
2. First, to adjust mandrel horizontal and vertical with adjustment screw to make the mandrel and insert parallel with the underside of the clamping fingers, and align the insert (backing-bar) center with the welding torch centerline, then fix the nuts. (As Fig. A)
3. Press down the mandrel-support unit, and adjust the vertical bolt slightly loose, to make the parallel with the underside of the clamping fingers when the clamping fingers clamping. (As Fig. A)
4. Lock the fixation screw of the mandrel support unit,

Work-pieces isn't clamped down

Assume the clamping fingers couldn't clamp down the work pieces, it represent the mandrel height is not enough. So user has to adjust the level of height :

1. To lose the mandrel and mandrel support unit fixation screw, then adjust the support unit and mandrel vertical bolt upward according to the thickness.
2. To rectify the mandrel and insert parallel / centerline with the underside of the clamping fingers. (Please follow the above steps)

Clamping fingers distance adjustment

1. To lose the nuts of the adjustment screw,
2. Clockwise-the clamping fingers is forward, Counter Clockwise-the clamping fingers will reverse, please make the distance align with the insert bar centerline, and lock the nuts after adjusting.

【Caution】 :

- a. To adjust the screw one by one, jump- adjusting is inhibited.
- b. Please make the distance align with the insert bar centerline and two side clamping fingers distance should be equal.
- c. To ensure the clamping fingers edge straightly and the distance with two clamping fingers wouldn't great than 1/4" base on each plate thickness.

Clamping fingers press down foot switch

1. Left side foot switch control the left side clamping fingers, **ON/OFF control is circulation control.**
2. Right side foot switch control the right side clamping fingers, **ON/OFF control is circulation control.**

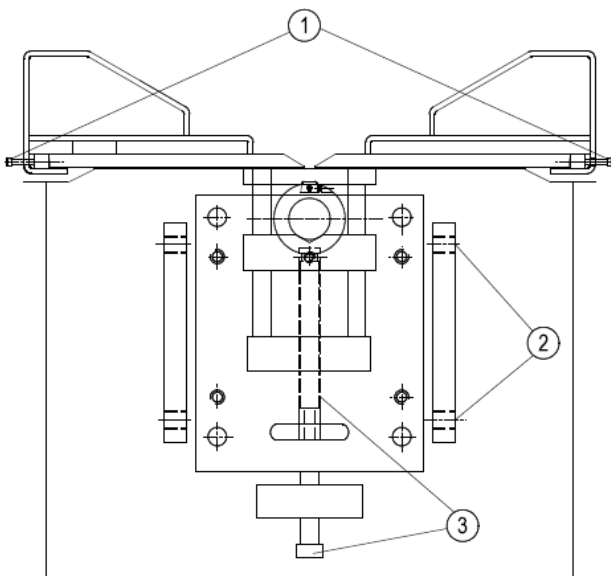


Fig. A

Item.	Description	Remark
1	Clamping fingers adjust	
2	Mandrel L/R adjust	
3	Mandrel Up/Down adjust	

2.2 ADJUSTMENT

Retract center alignment unit

Steps :

1. Turn the centering JIG with handle-Bar in position, then make the plate-edge (right side) to contact with centering JIG, and press the foot switch of right side clamp fingers to clamp the plate.(As Fig. C)
2. Turn the centering JIG up.
3. To make the plate-edge (left side) to contact with the right side edge, the press the foot switch of left side clamp fingers to clamp the plate.

【Note】 : It's unnecessary if the tank / cylinder was pre-tack.

Welding torch adjustment

Steps :

1. Welding torch left/right, or up/down distance have to adjust base on the different condition of material thickness, welding conditions....(As Fig. B)
2. The side-beam and the mandrel alignment had done before leaving the factory. If the side-beam adjustment is necessary please loose the adjusting screw nuts that locate on the support stand, and adjust the screws to make the alignment with the mandrel. (After adjusting, please fix the nuts again)
3. Option parts : Pneumatic slide cylinder unit.

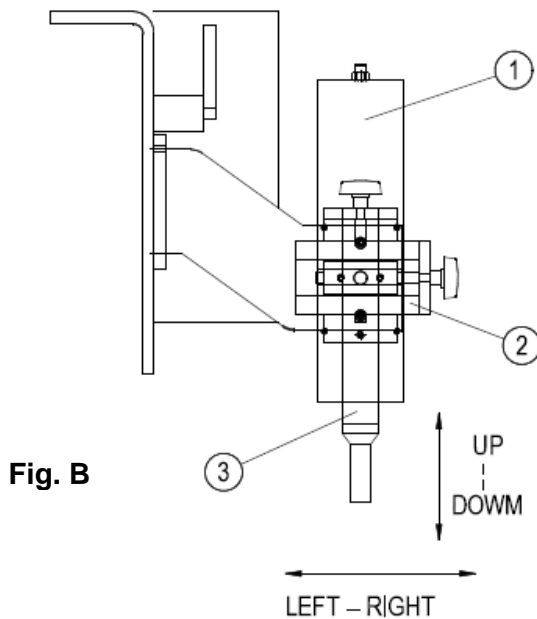


Fig. B

Item.	Description	Remark
1	Pneumatic cylinder	Option
2	X、Y Slide Table	
3	Torch	

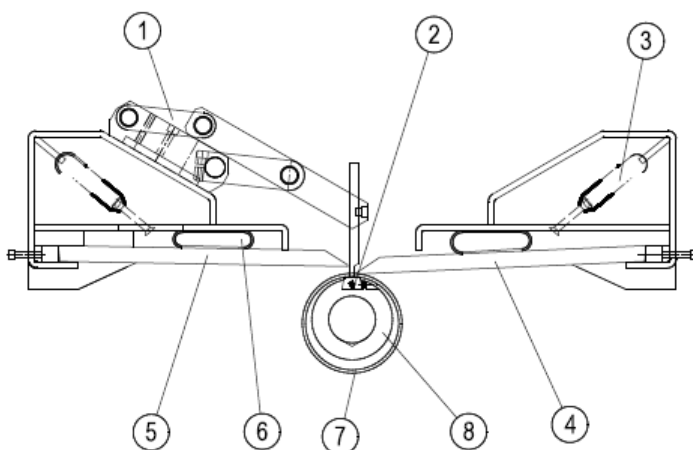


Fig. C

Item.	Description	Remark
1	Centering-JIG	Option
2	Insert (backing-bar)	
3	Retaining spring	
4	Right-clamp fingers	
5	Left-clamp fingers	
6	Air-Hose	
7	Cylinder	
8	Mandrel	Option

2.2 ADJUSTMENT

Air bags pressure adjust : 2~ 7kg/cm² (As Fig. D).



Fig. D

2.2.1 LEFT RIGHT CLAMP SPACING ADJUSTMENT

1. Use a wrench to loosen all the fixing nuts located on the side of LS system (as seen in Fig A ①)

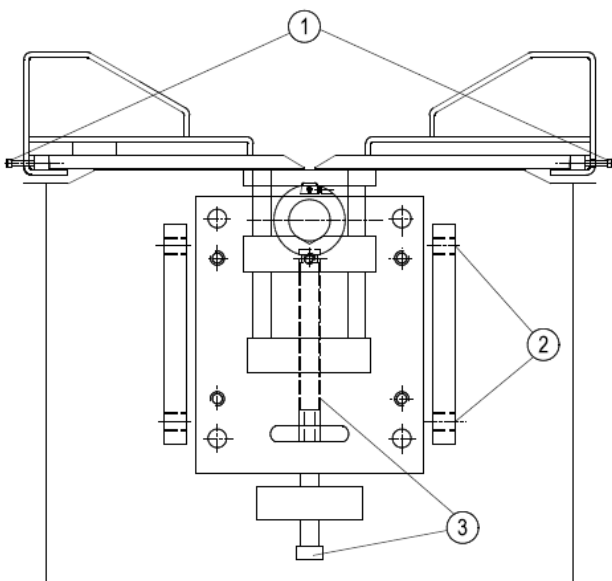
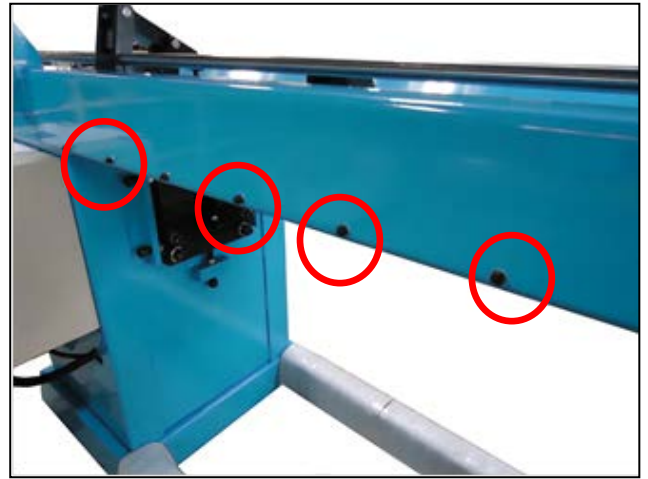
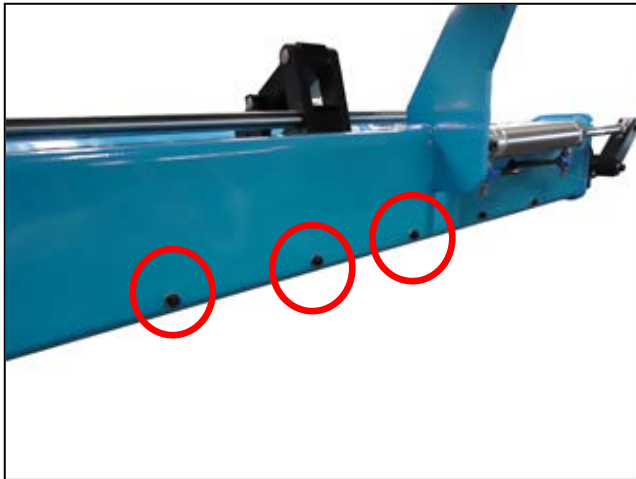
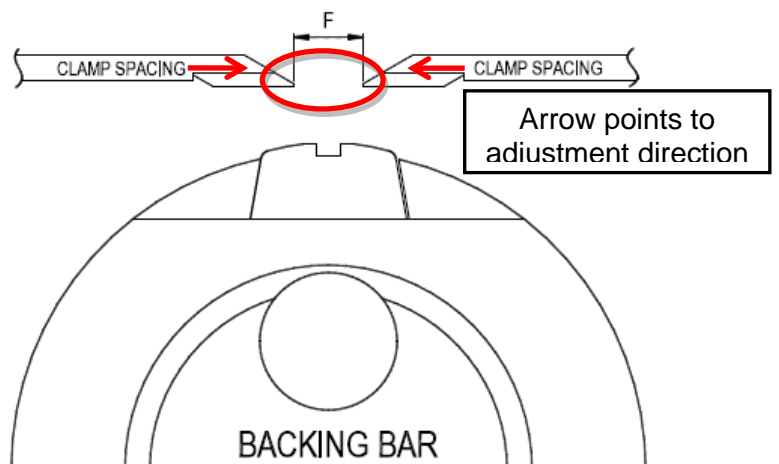


Fig. A

Item.	Description	Remark
1	Clamping fingers adjust	
2	Mandrel L / R adjust	
3	Mandrel Up / Down adjust	



Arrow points to adjustment direction

2.2.1 LEFT RIGHT CLAMP SPACING ADJUSTMENT

- Use hex screw to loosen all clamp spacing adjustment screws. While loosening the screws, you should notice the clamp spacing becomes wider. (Fig C, ④ & ⑤).

【Note】 : loosen the screws all the way open.

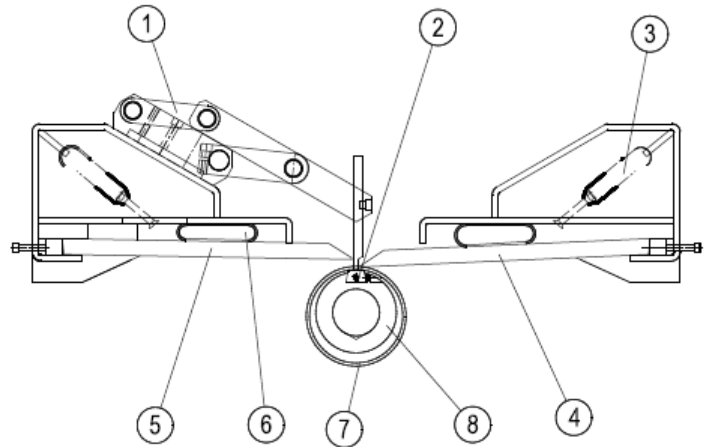
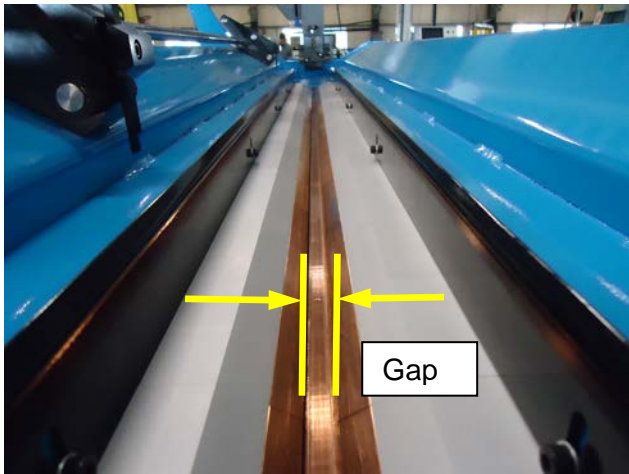


Fig. C

- Measure the spacing between clamps with the adjustment screws opened all the way.



- Calculate amount of adjustment.

If step 3 measures 7mm and we need a spacing of 4mm, then each clamp requires an adjustment of $(7-4)/2 = 1.5\text{mm}$.

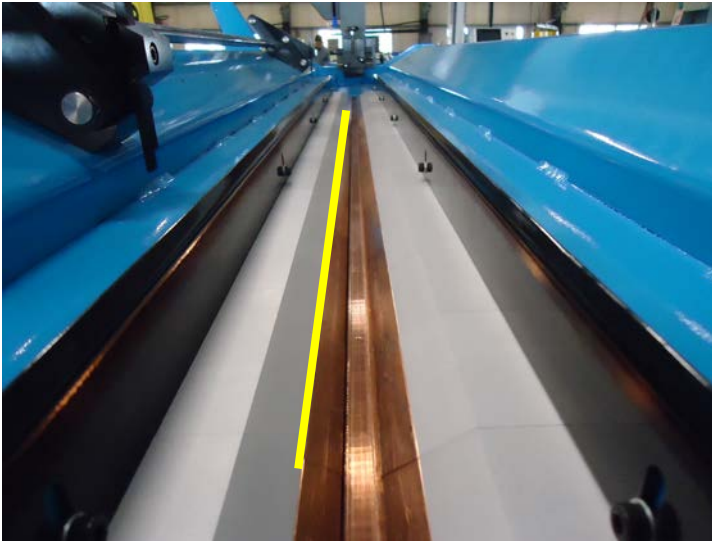
For calibration convenience, leave 1mm for each clamp, so this means that we only requires $1.5-1=0.5\text{mm}$ adjustment.

- Use hex wrench to set all adjustment screws.
- Begin tightening the adjustment screw, one round of adjustment advances clamp by 1mm. According to calculation in step 4, rotate the screw half round for each clamp. This would narrow the clamps spacing by 1mm.
- After step 6, fine tune by rotating the adjustment screw CW to advance the clamp, rotate CCW to retract the clamps. Each adjustment screws advance multi

2.2.1 LEFT RIGHT CLAMP SPACING ADJUSTMENT

【Note】 :

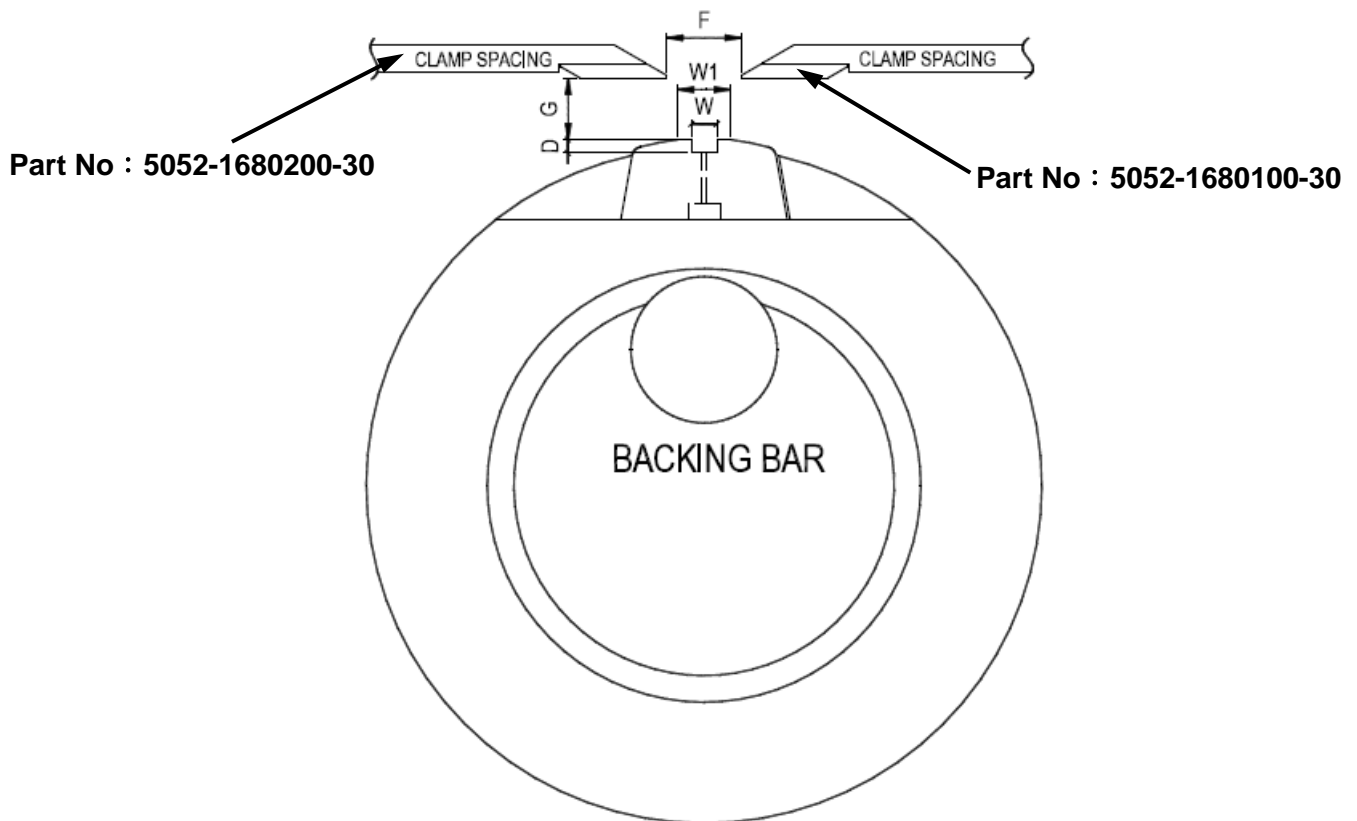
- a. Adjust the screw one by one in sequence screw at a time, don't skip any screw.
- b. Do not adjust only one side of clamps. This can cause uneven clamping and affect welding quality. Do adjust (either by advancing or retracting) both side of clamp at the same time.
- c. Please adjust the clamp in such a way that all clamp edge is aligned as seen in following picture.
※ Misaligned clamp can cause uneven clamp and affect welding quality.



- d. Detail spacing can be found in Appendix 2.2.2 (P14~P16).

2.2.2 COPPER BACKING BAR DIMENSION ADJUSTMENT

Backing Bar Dimension and System Adjustment Parameters							
No Filler							
Work Thickness	W1	W	D	F	G	Center Alignment Tip Thickness	Clamp Pressure PSI (Kgf / cm ²)
0.1~0.3	6	1	0.25	2.5	2.1~2.3	1mm	25(1.8)
0.3~0.5	6	1.6	0.25	2.5	2.3~2.5	1mm	25(1.8)
0.5~0.8	6	2.4	0.25	3.2	2.5~2.8	1mm	25(1.8)
0.8~1.3	6	3.2	0.5	4.8	2.8~3.3	2mm	25(1.8)
1.3~1.8	6	4.8	0.5	6	3.3~3.8	2mm	37(3.0)
1.8~3.2	8	6.35	0.5	11	3.8~5.2	3mm	50(3.5)
3.2~6.4	10	8	0.5	12.7	7~8.4	3mm	75(5.25)
6.4~10	12	9.5	0.75	14	8.4~12	3mm	100(7)
With Filler							
Work Thickness	W1	W	D	F	G	Center Alignment Tip Thickness	Clamp Pressure PSI (Kgf / cm ²)
0.5~0.8	6	3.2	0.5	4.8	2.5~2.8	2mm	25(1.8)
0.8~1.3	6	4.8	0.6	7	2.8~3.3	3mm	25(1.8)
1.3~1.8	8	6.35	1	10	3.3~3.8	3mm	37(3.0)
1.8~3.2	10	8	1	12.7	3.8~5.2	3mm	50(3.5)
3.2~6.4	12	9.5	1.25	15	5.2~8.4	3mm	75(5.25)
6.4~10	13	11.1	1.5	16	8.4~12	3mm	100(7)



2.2.2 COPPER BACKING BAR DIMENSION ADJUSTMENT

No Filler (Backing bar part number) LS-06 ~ LS-15				
Work Thickness	LS-06	LS-09	LS-12	LS-15
0.1~0.3	5052-1050611-11	5052-1050911-11	5052-1051211-11	5052-1051511-11
0.3~0.5	5052-1050612-11	5052-1050912-11	5052-1051212-11	5052-1051512-11
0.5~0.8	5052-1050613-11	5052-1050913-11	5052-1051213-11	5052-1051513-11
0.8~1.3	5052-1050614-11	5052-1050914-11	5052-1051214-11	5052-1051514-11
1.3~1.8	5052-1050615-11	5052-1050915-11	5052-1051215-11	5052-1051515-11
1.8~3.2	5052-1050616-11	5052-1050916-11	5052-1051216-11	5052-1051516-11
3.2~6.4	5052-1050617-11	5052-1050917-11	5052-1051217-11	5052-1051517-11
6.4~10	5052-1050618-11	5052-1050918-11	5052-1051218-11	5052-1051518-11

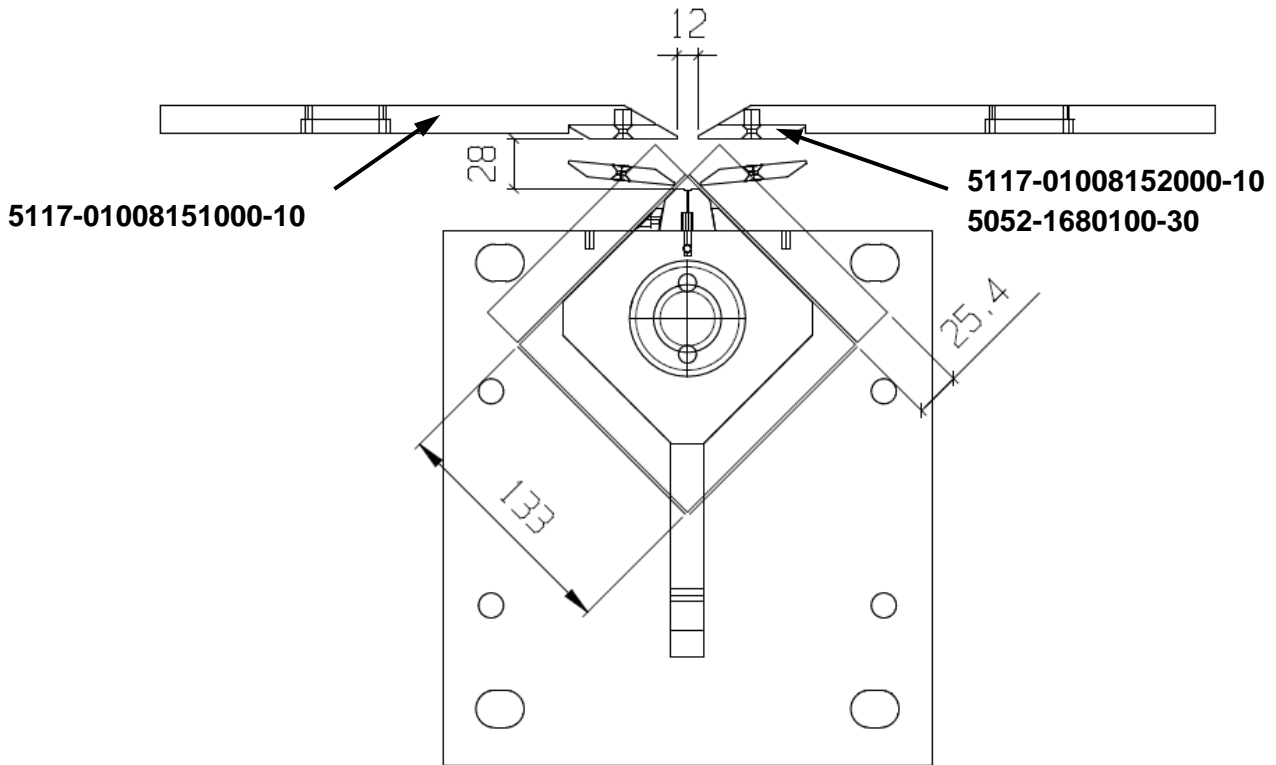
No Filler (Backing bar part number) LS-18 ~ LS-36				
Work Thickness	LS-18	LS-24	LS-30	LS-36
0.1~0.3	5052-1051811-11	5052-1052411-11	5052-1053011-11	5052-1053611-11
0.3~0.5	5052-1051812-11	5052-1052412-11	5052-1053012-11	5052-1053612-11
0.5~0.8	5052-1051813-11	5052-1052413-11	5052-1053013-11	5052-1053613-11
0.8~1.3	5052-1051814-11	5052-1052414-11	5052-1053014-11	5052-1053614-11
1.3~1.8	5052-1051815-11	5052-1052415-11	5052-1053015-11	5052-1053615-11
1.8~3.2	5052-1051816-11	5052-1052416-11	5052-1053016-11	5052-1053616-11
3.2~6.4	5052-1051817-11	5052-1052417-11	5052-1053017-11	5052-1053617-11
6.4~10	5052-1051818-11	5052-1052418-11	5052-1053018-11	5052-1053618-11

With Filler (Backing bar part number) LS-09 ~ LS-15				
Work Thickness	LS-06	LS-09	LS-12	LS-15
0.5~0.8	5052-1050621-11	5052-1050921-11	5052-1051221-11	5052-1051521-11
0.8~1.3	5052-1050622-11	5052-1050922-11	5052-1051222-11	5052-1051522-11
1.3~1.8	5052-1050623-11	5052-1050923-11	5052-1051223-11	5052-1051523-11
1.8~3.2	5052-1050624-11	5052-1050924-11	5052-1051224-11	5052-1051524-11
3.2~6.4	5052-1050625-11	5052-1050925-11	5052-1051225-11	5052-1051525-11
6.4~10	5052-1050626-11	5052-1050926-11	5052-1051226-11	5052-1051526-11

With Filler (Backing bar part number) LS-18 ~ LS-36				
Work Thickness	LS-18	LS-24	LS-30	LS-36
0.5~0.8	5052-1051821-11	5052-1052421-11	5052-1053021-11	5052-1053621-11
0.8~1.3	5052-1051822-11	5052-1052422-11	5052-1053022-11	5052-1053622-11
1.3~1.8	5052-1051823-11	5052-1052423-11	5052-1053023-11	5052-1053623-11
1.8~3.2	5052-1051824-11	5052-1052424-11	5052-1053024-11	5052-1053624-11
3.2~6.4	5052-1051825-11	5052-1052425-11	5052-1053025-11	5052-1053625-11
6.4~10	5052-1051826-11	5052-1052426-11	5052-1053026-11	5052-1053626-11

2.2.3 COPPER BACKING BAR DIMENSION ADJUSTMENT (SQUARE)

Part No.	Description	LS-18	LS-30
5052-1680100-30	Copper Plate	44 Pcs	76 Pcs
5117-01008151000-10	Clamp Spacing	50 Pcs	82 Pcs
5117-01008152000-10	Copper Plate	6 Pcs	6 Pcs



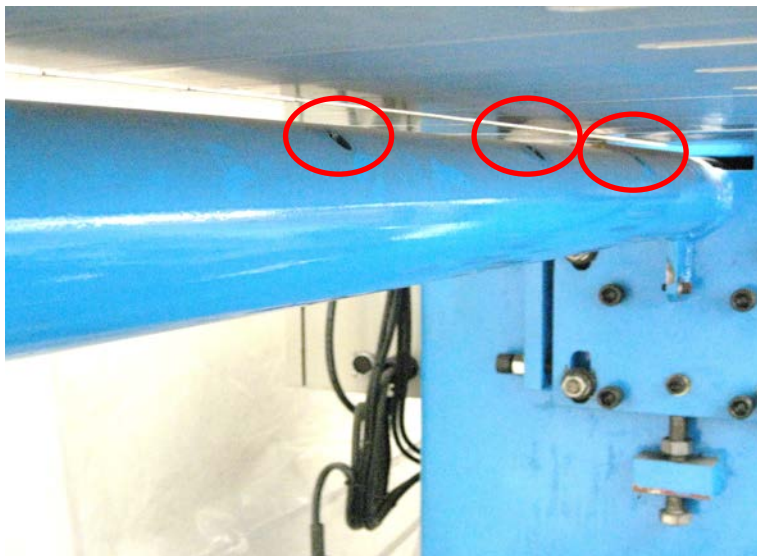
No Filler (Backing bar part number) LS-18 / LS-30		
Work Thickness	LS-18	LS-30
3.2~6.4	5117-01008501000-10 Square backing bar	5117-09003501000-10 Square backing bar

2.2.4 COPPER BACKING BAR REPLACEMENT

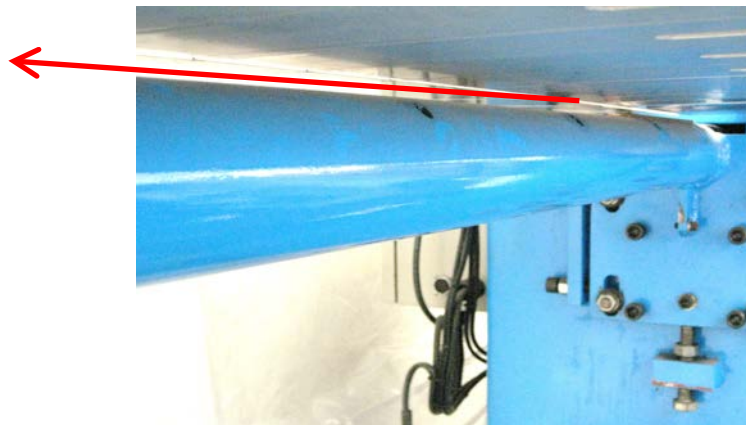
1. Backing bar is the copper stripe located above the mandrel.



2. Open / release both side of clamps.
3. Use hex wrench to loosen the screw on the side of mandrel. Do not take out the screws.



4. Slide the backing bar out toward the direction as seen below shown below. Then insert the new backing bar.

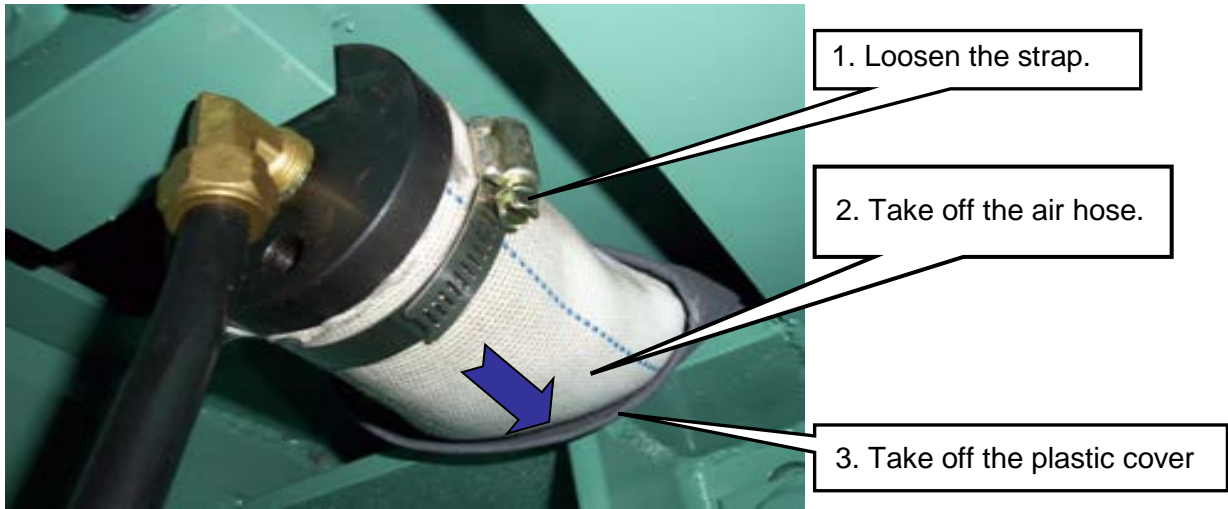


5. Activate the clamp. Important, don't forget.
6. Use hex wrench to tighten the five screws into the mendrel.

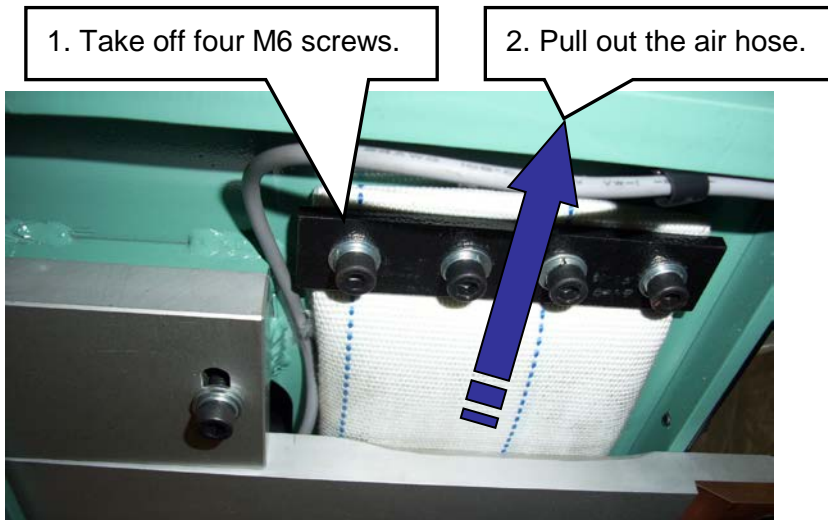
2.3 INSTRUCTION FOR AIR BAG REPLACEMENT

Dismantle Step :

1.



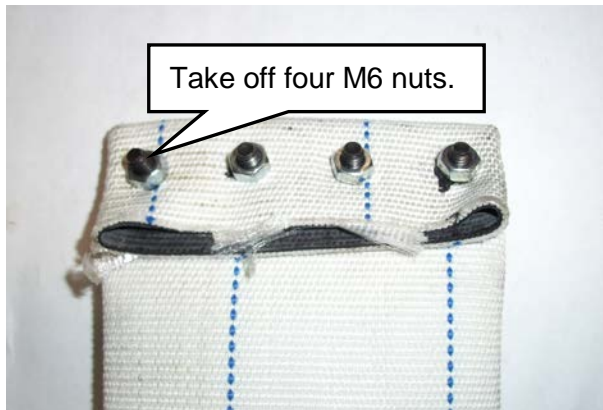
2.



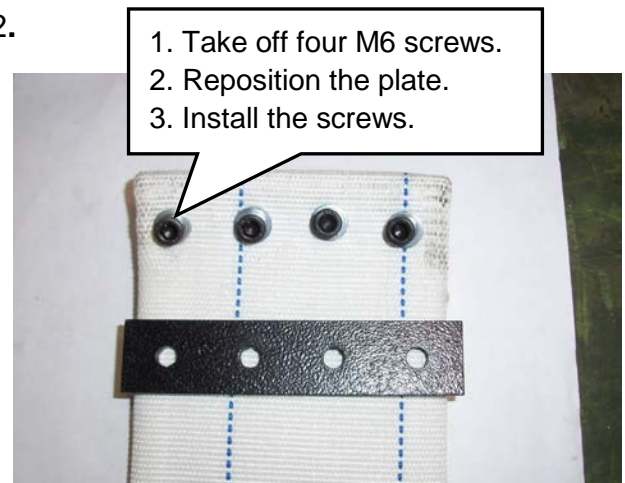
2.3 INSTRUCTION FOR AIR BAG REPLACEMENT

Installation Step :

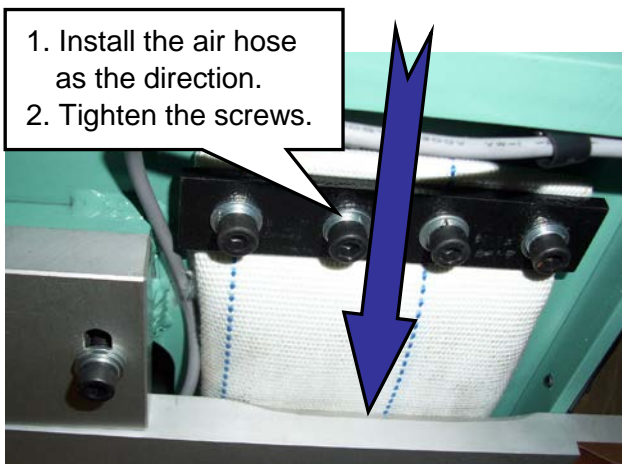
1.



2.



3.

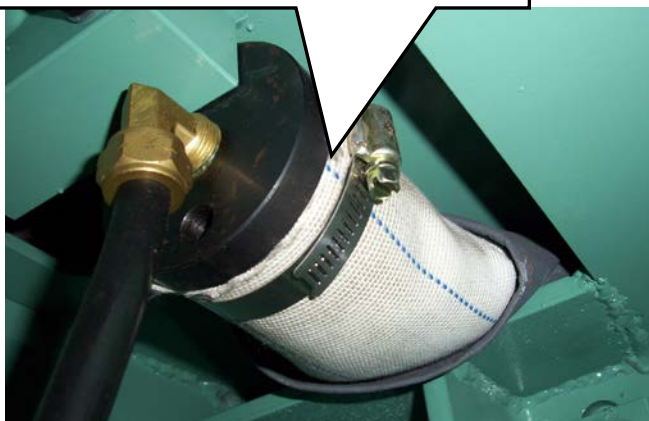


4.



5.






1. Cut the unnecessary air hose.
2. Install the air hose into the connector, tighten the strap for the fixation.



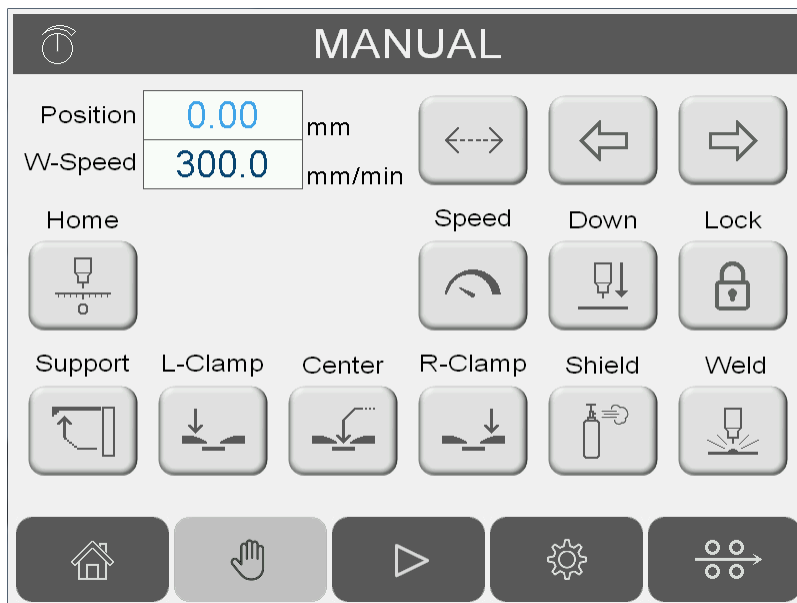
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3. MAIN SCREEN











	Multi – Language.
	To Manual mode screen
	To Auto mode screen
	To Setting screen
	To Information screen

3.1 MANUAL MODE

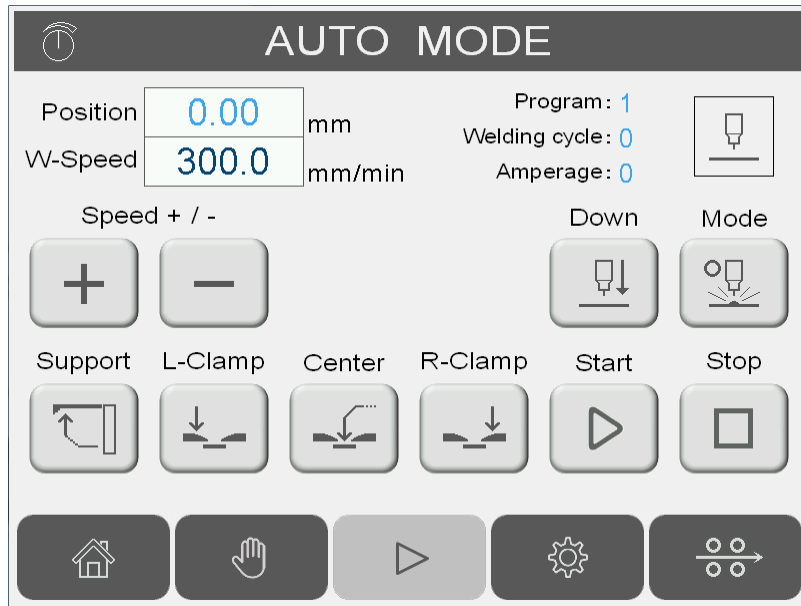


	Carriage's current position.
	Carriage welding speed.
	Homing button. Move the carriage to the home position and reset the coordinate to zero.
	Switch the carriage moving speed between weld speed or Full Speed.
	Carriage operation mode. Jog mode or location mode.
	<p>In Jog Mode : Carriage moves. Movement is disabled once the carriage touches the software limit. Software limit setting is detailed in section 3.3.6</p> <p>In Location Mode : Positioning between home, weld start position and weld end position.</p>

3.1 MANUAL MODE









	<p>Lock / Unlock mandrel support.</p>
	<p>Left clamp On / Off control. Clamps are used to fix the intended weld piece.</p>
	<p>Center positioning Unit On / Off control. Center positioning unit is used for weld piece alignment.</p>
	<p>Right clamp On / Off control. Clamps are used to fix the weld piece.</p>
	<p>Torch Up / Down control. Torch will move to stand by/welding position.</p>
	<p>Mandrel auxiliary welding gas On / Off button. Activate mandrel auxiliary welding gas. The gas emitted from mandrel helps creates a region devoid of oxygen under the welding path, which in turn improve the welding quality.</p>
	<p>Welding Function On / Off button. A safety button used to activate the welding function. The operator needs to switch this to “O” in order to be able to manually activate the welding machine (see Welding On / Off button).</p>
	<p>Welding On / Off button. Activate the welding machine manually.</p>

3.2 AUTO MODE

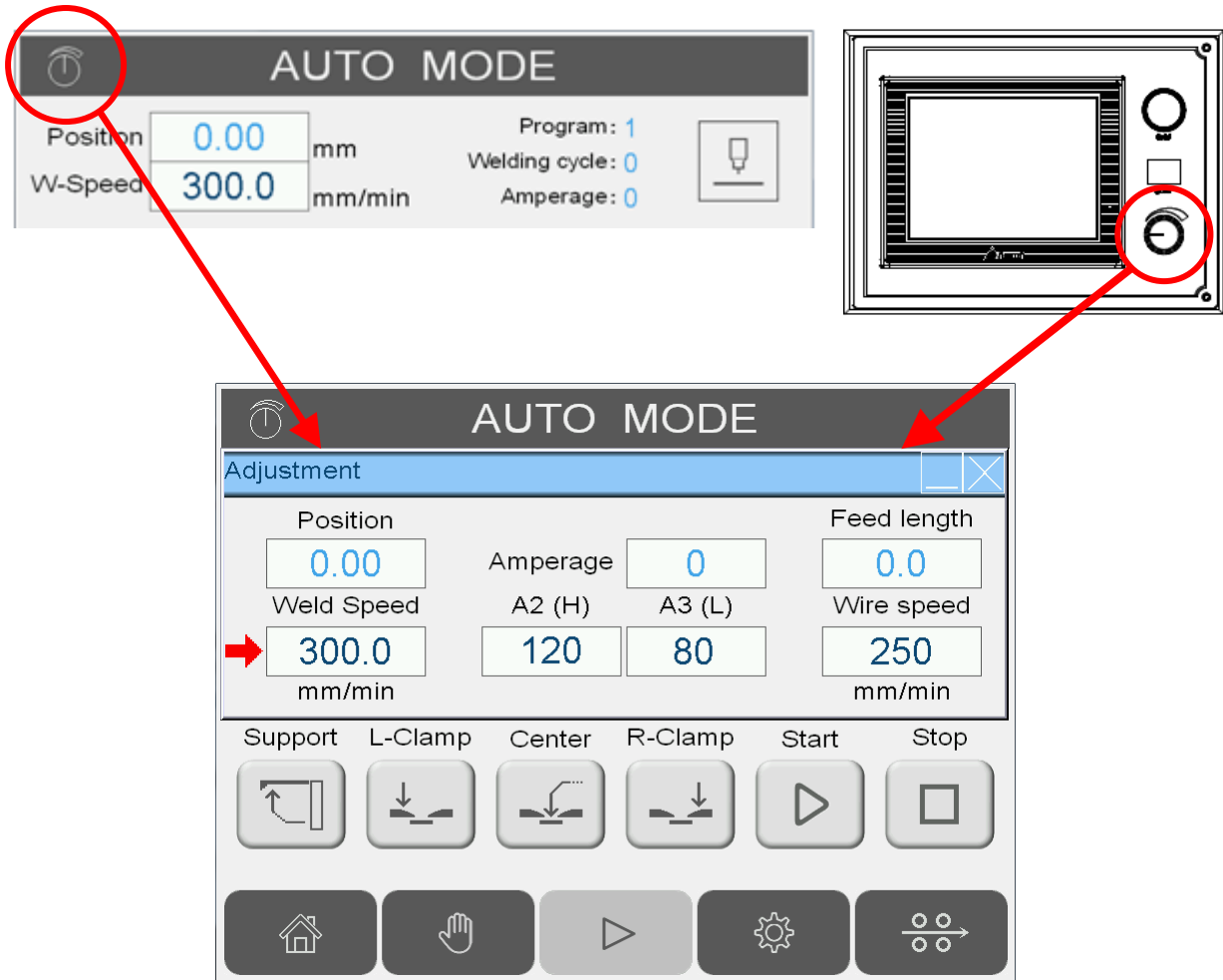



	Carriage's current position.
	Carriage welding speed.
	Display current program number. Display current number of sequence in multi weld procedure. Display controlled output welding amperage.
	Carriage welding speed +
	Carriage welding speed -
	Auto mode status display: Standby, torch up, positioning, torch down, weld on.

3.2 AUTO MODE

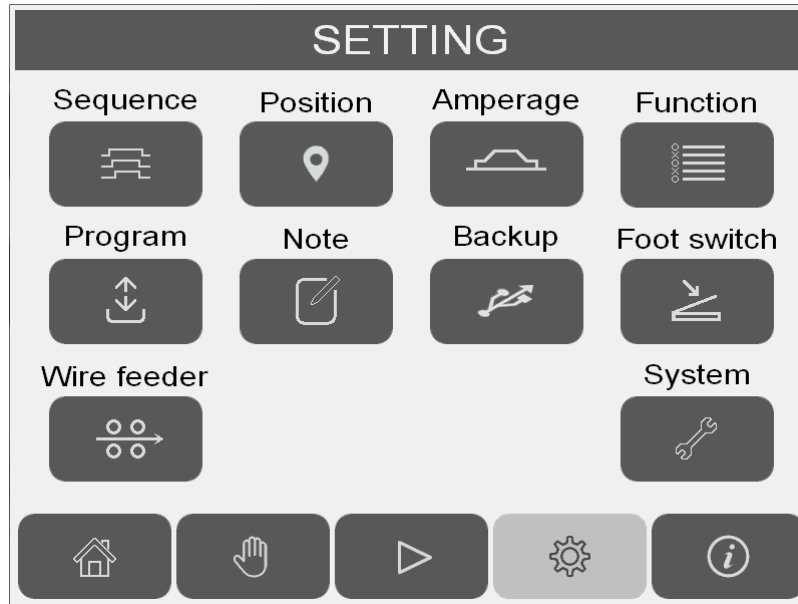
	<p>Mandrel support lock / unlock button. The operator needs to unlock the mandrel support in order to take out the finished weld piece.</p>
	<p>Left clamp On / Off control. Clamps are used to fix the intended weld piece.</p>
	<p>Center positioning Unit On / Off control. Center positioning unit is used for weld piece alignment.</p>
	<p>Right clamp On / Off control. Clamps are used to fix the weld piece.</p>
	<p>Torch Up / Down control. Torch will move to stand by/welding position.</p>
	<p>Welding mode / test mode selection.</p>
	<p>Welding start / stop</p>
	<p>Welding stop</p>



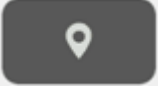







3.2 AUTO MODE



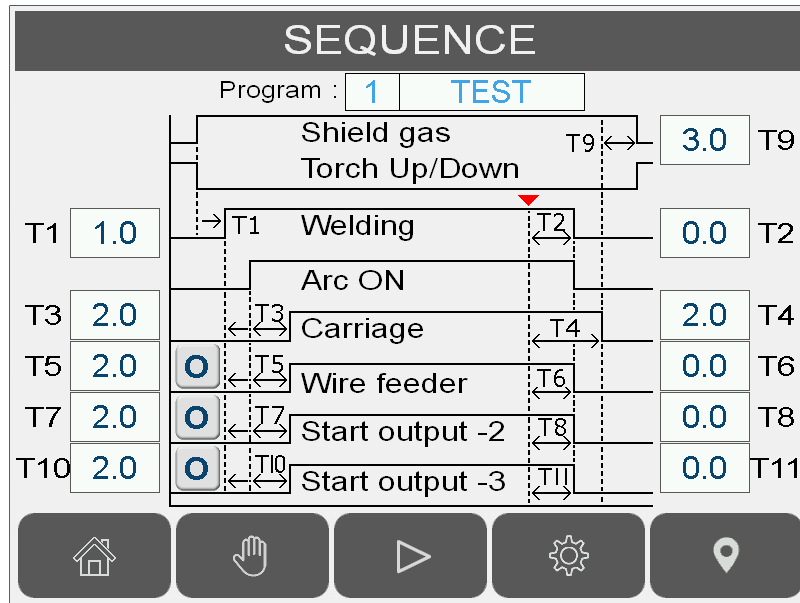
1. The speed and amperage adjustment sub-screen would appear after pressing the icon  on the upper left corner of the screen, or by pressing the pulse speed knob on the HMI box.
2. Press the pulse speed knob again to rotate between different parameter field. Rotate the knob to modify the parameters.
3. Operator can also click on the HMI to modify the parameters.
4. A2 (H) means peak current, A3 (L) means lower current, A3 must be smaller than A2. Rotate the pulse speed knob to adjust A2 (H) and A3 (L) simultaneously. Click on the HMI to adjust individually.
5. Click on the "X" icon on the upper right corner, or long press the pulse speed knob to close the window.

3.3 SETUP



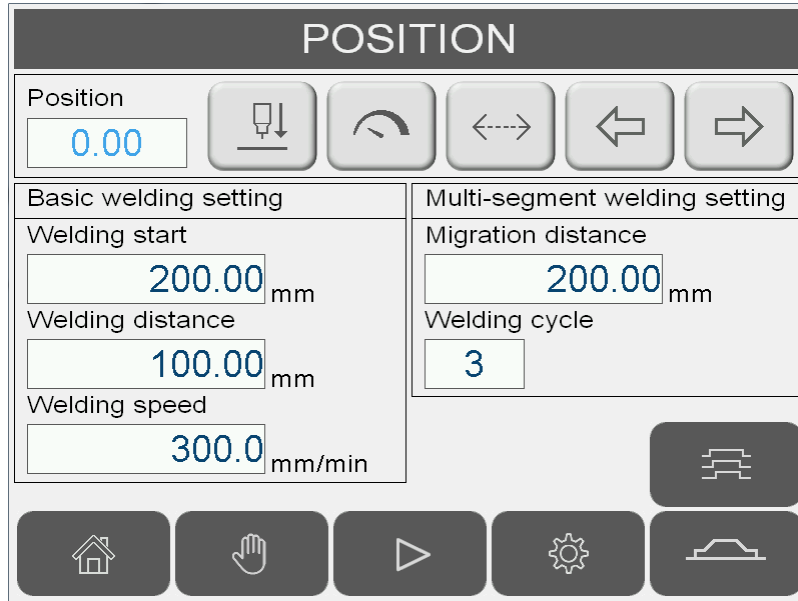
	Switch to sequence screen, for auto welding sequence parameter editing.		Go to Note screen. User can include additional comments for the particular welding sequence.
	Switch to Position screen.		Switch to Backup screen
	Switch to Amperage screen.		Switch to Foot switch screen.
	Auto run procedure selection		Switch to Wire Feeder screen if available.
	<p>Program Save :</p> <p>The user can save up to 100 sets of welding sequence parameter. The system allows 8 English / numeric letters for the file name and a file name search feature. The parameters that can be saved include file name, position, speed, sequence Timer.</p>		<p>Go to system screen. System screen contains setting including password, unit, maximum speed...etc.</p> <p>The access of system screen is protected by password. The operator is required to enter level 1 access password.</p> <p>Factory default password : Level 1 access : 123, Level 2 access : 456.</p>

3.3.1 PARAMETER SETUP : SEQUENCE



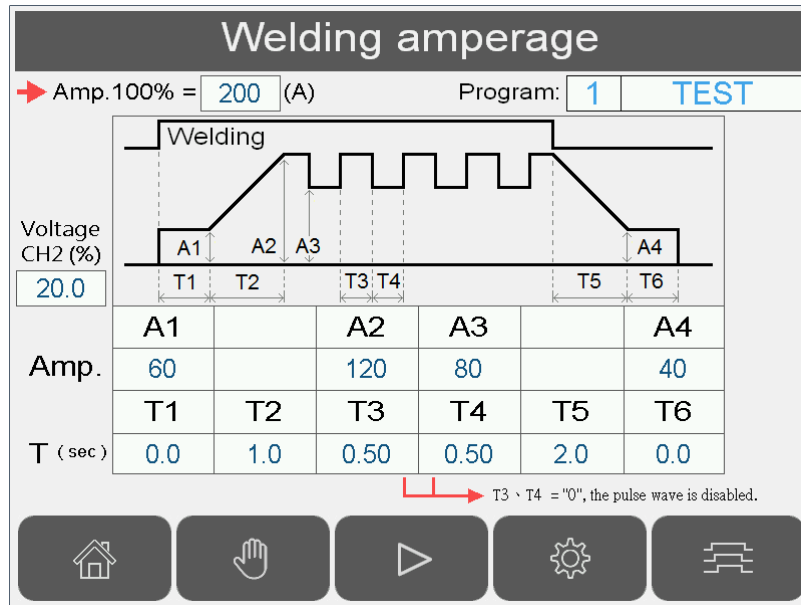
T1	Welding start delay.
T3	Carriage start delay.
T5	Output-1 ON delay after welding start is ON. For integrated wire feeder system, this is used for wire feeder start delay. <input type="radio"/> : function enabled <input checked="" type="radio"/> : function disabled
T7	Output-2 ON delay after welding start is ON <input type="radio"/> : output-2 function enabled <input checked="" type="radio"/> : output-2 function disabled
T10	Output-3 ON delay after welding start is ON. <input type="radio"/> : output-2 function enabled <input checked="" type="radio"/> : output-2 function disabled
T2	Welding stop delay.
T4	Carriage stop delay.
T6	Output-1 OFF delay after system has reach welding end position. For integrated wire feeder system, this is used for wire feeder stop delay.
T8	Output-2 OFF delay after system has reach welding end position.
T11	Output-3 OFF delay after system has reach welding end position.
T9	Shield gas stop delay.

3.3.2 PARAMETER SETUP : POSITION



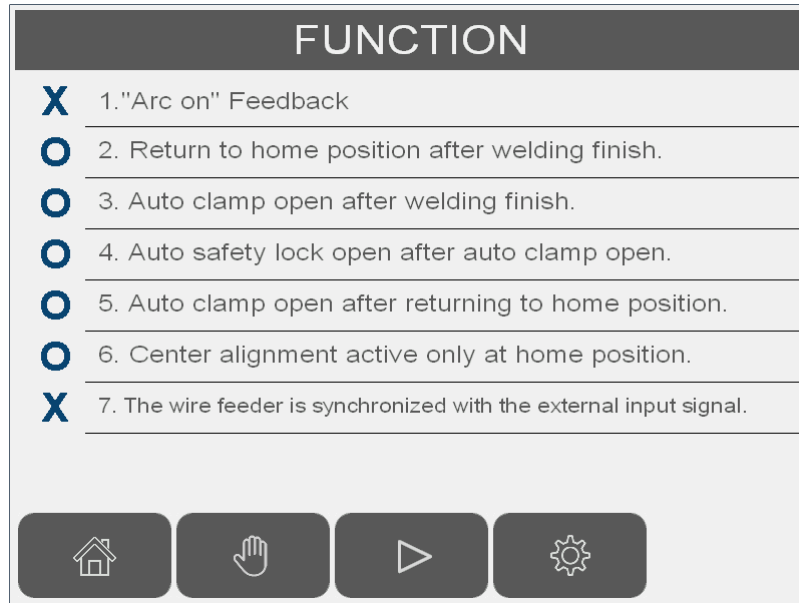
	Manual Operation Function
	<p>Set welding start location. Setting range : 0 to Software limit position Please refer to section 3.3.6 for more software limit details.</p>
	<p>Set welding distance. Setting range : Forward welding : 0 to (Software limit position – welding begin position) Reverse welding : (- welding begin position) to 0.</p>
	<p>Set welding speed.</p>
	<p>Migration Distance: the position offset distance between end of previous welding segment and the start of 2nd next welding segment. Welding cycle: number of welding repetition.</p>

3.3.3 WELDING AMPERAGE



→ Amp. 100% = 200 (A)		100% amperage value setting.
A1	Initial current (A)	Initial current level after arc ON signal is received.
A2	Peak current (A)	Main welding current. If pulse wave function is enabled, this value is the peak current value.
A3	Valley(low)current (A)	If pulse wave function is enabled, this value is the low current value. Can't set more than A2.
A4	Welding crater current (A)	Welding ending current.
T1	Initial current time(s)	0~10s, initial arc stabilize time after arc ON signal is received.
T2	Rise current time(s)	0~10s, rise time from initial current A1 to peak current A2.
T3	Peak current time(s)	0.01~10 sec, peak current duration before change to valley current.
T4	Valley current time(s)	0.01~10 sec, valley current duration before change to peak current.
T5	Current fall time(s)	0~10s, amount of time current drop from A2 to A4. The count starts after welder output is switched off.
T6	Welding crater time(s)	0~10s, amount of time for crater current.
CH2	Analog voltage (%)	Channel 2 analog voltage 0~100% = 0~10VDC.

3.3.4 AUTO RUN FUNCTION

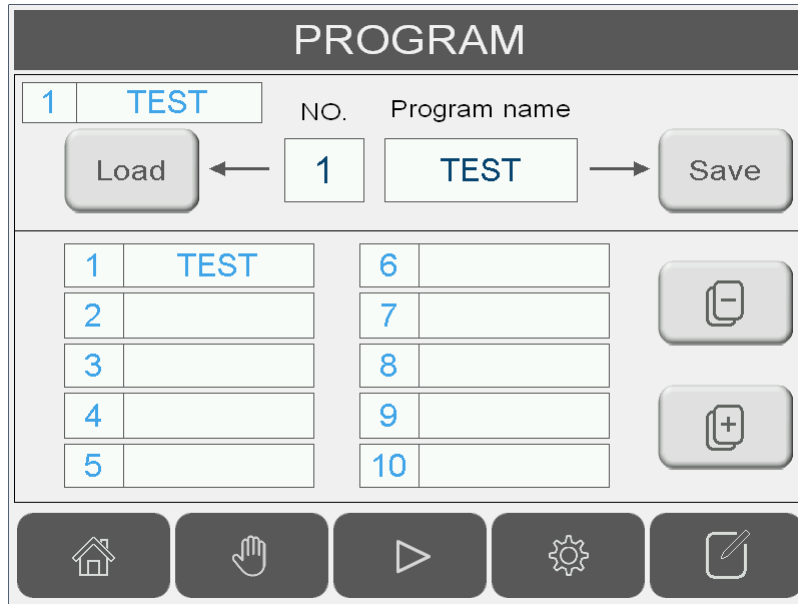


Press to toggle between active / disable state.

: Active : Disable

1. Arc on feedback signal is required from welding source.
2. Automatically return to home position after welding process is completed.
3. Automatically open both work clamp after the welding process is completed.
4. Following function "3". Automatically open the safety lock after function "3" (open work clamp) is completed.
5. Following function "3", delay opening of work clamp until carriage returns to home position.
6. Center alignment device can only be activated when the carriage is at the home position.
7. Wire feeder is synchronized with welder external trigger (if supported). This option is for integrated wire feeder option. When OFF: wire feeder's high/low feed speed is synchronized with T3 (peak current time) and T4 (valley current time). When ON: wire feeder's high/low feed speed is synchronized with external trigger signal. (Please refer to section 1.4 for external trigger interface connection)

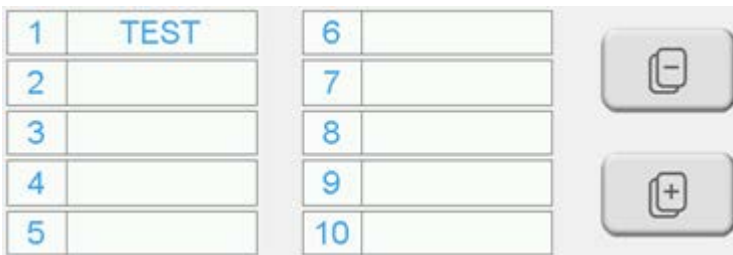
3.3.5 SAVING THE PROGRAM



In order to load the parameters, first enter the program's address number (1~100) and press "Load".



In order to save the parameters, first enter the address number, type in the program name (with a maximum of 8 letters) and press "Save".(This function requires level 1 user access level)




The user can review the saved program, press or to change pages.



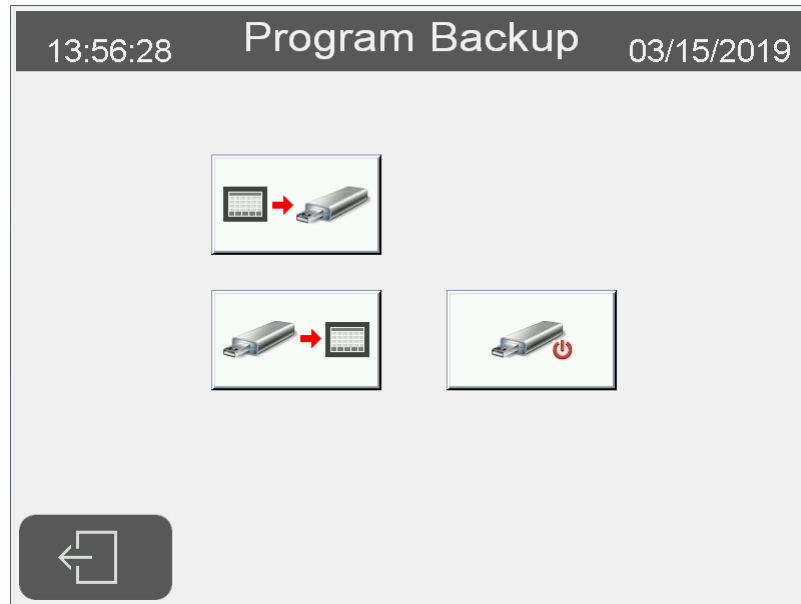
To Program note screen

3.3.6 PROGRAM NOTE

Program Note : Up to 10 English letters or numbers can be entered in the short field and up to 24 English letters or numbers can be entered in the long field.
A mini keyboard would appear if field is pressed.

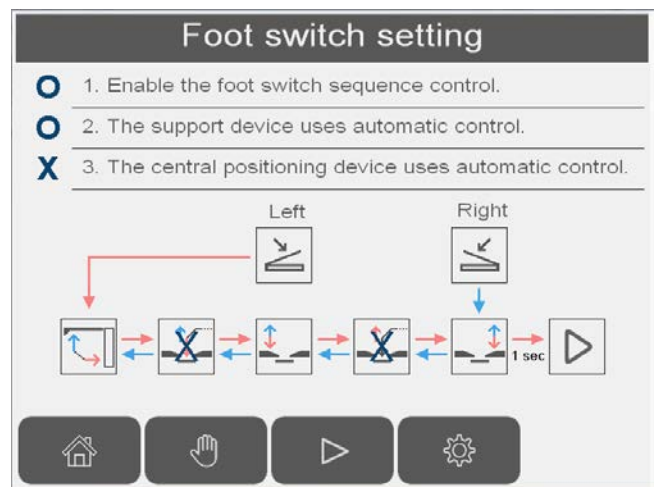
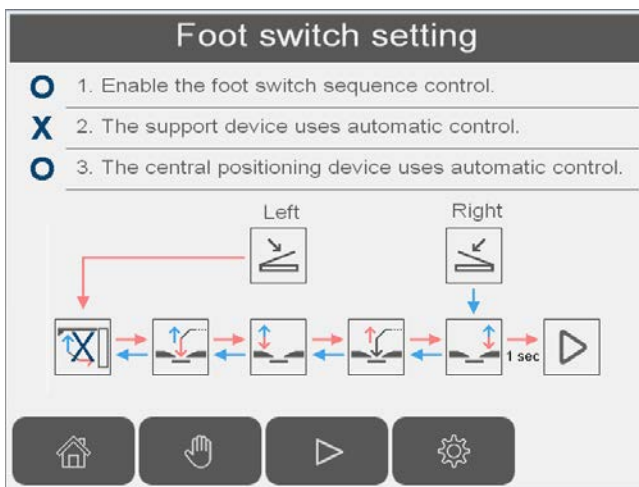
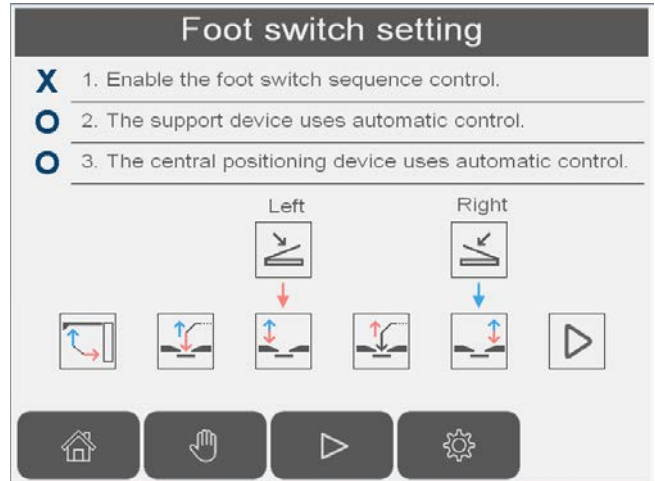
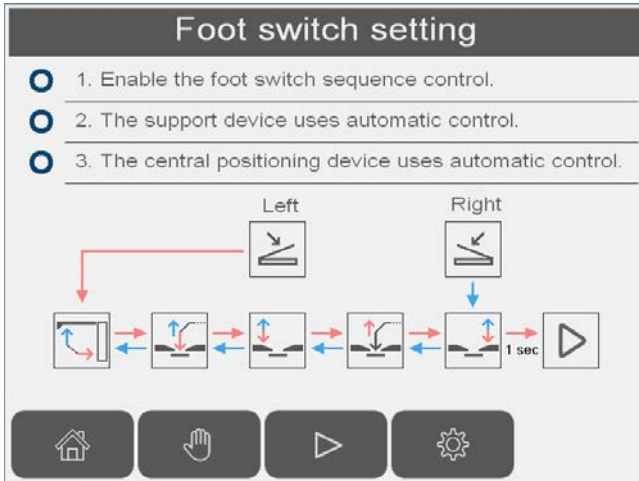
1 TEST		NOTE
A = 100		1234567890
V = 70		
ABCDEFGHIJKLMN OPQRSTUVWXYZ		
abcdefghijklmnopqrstuvwx		
		

3.3.7 PROGRAM BACKUP



	<p>Export all 100 welding setting and store into USB.</p>
	<p>Import all 100 welding setting and store into system.</p>
	<p>Stop USB function. Activate this function before extract USB.</p>

3.3.8 FOOT SWITCH SETTING



Press button to change setting.

Indicates Yes indicates No.

1. : activate foot switch sequence control :

Press left peddle to cycle through displayed red arrow action.

Press right peddle to cycle through displayed blue arrow action.

: Disable foot switch sequence control. Left peddle opens/closes left clamp. Right peddle opens/closes right clamp.

2. The support device uses automatic control.

: Mandrel safety switch is pneumatic and can be controlled by the system.

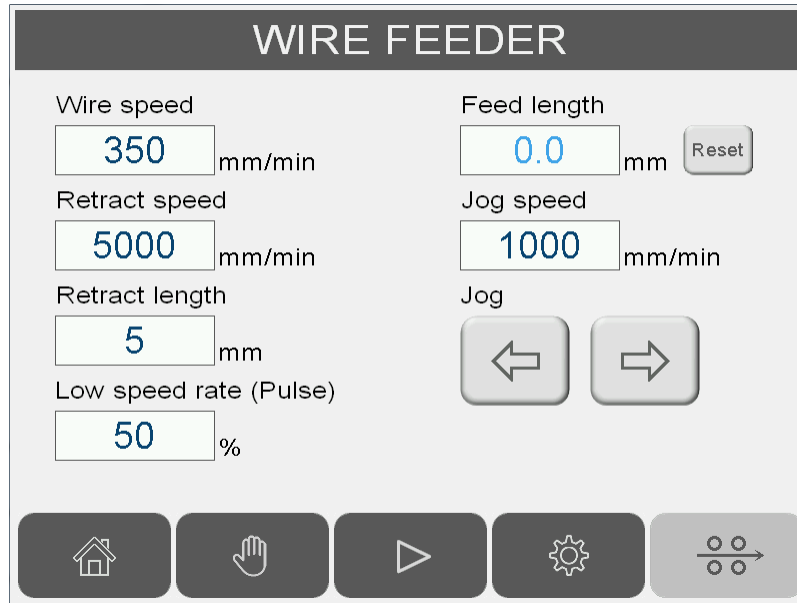
: Mandrel safety switch is manual.

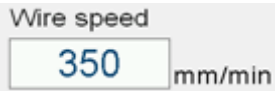
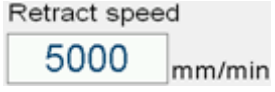
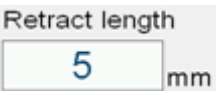
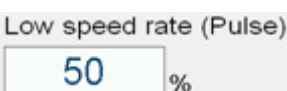
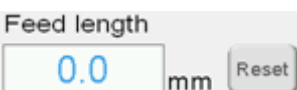


3. The central positioning device uses automatic control.

: Center positioning device is pneumatic and can be controlled by the system.

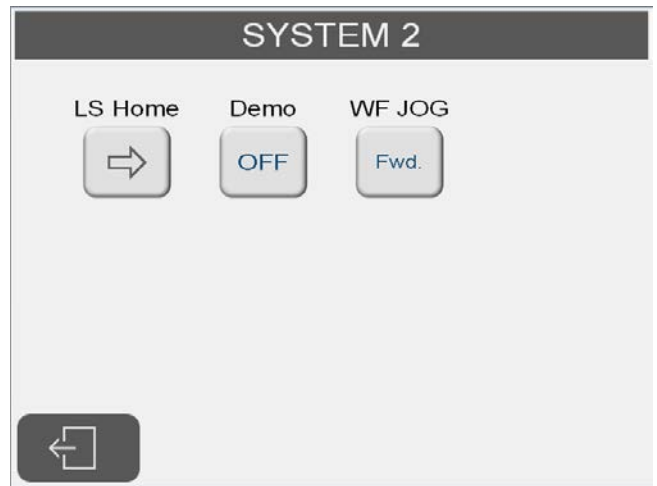
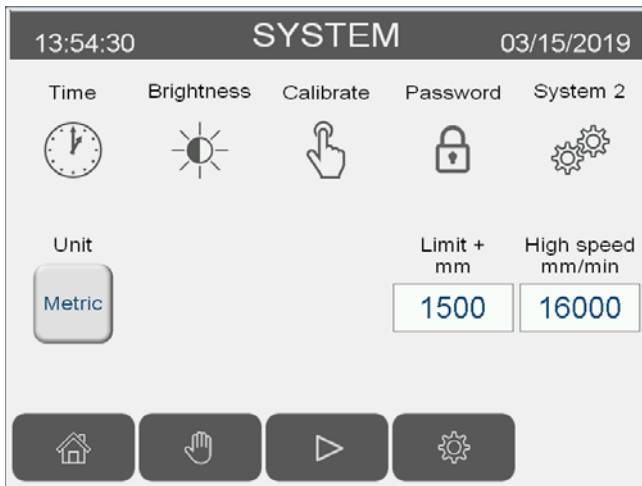
: Center positioning device is manual.

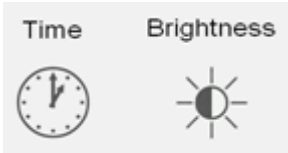




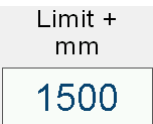
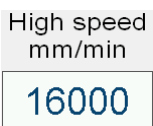
3.3.9 WIRE FEEDER



	Wire feeder feed speed during welding.
	Weld end feeder retract speed.
	Weld end feeder retract length.
	Wire feeder feed speed while external lock trigger (from welder) is active, or when welding pulse function is in valley period. The feed speed is represented as a percentage of normal feed speed.
	Cumulated wire feed length. Press “Reset” button to reset to 0mm. Automatically reset to 0mm when auto mode is activated.
	Wire feeder jog feed speed.
	Wire feeder jog operation.

3.3.10 SYSTEM





	<p>System time and date adjustment. Backlight adjustment.</p>
	<p>HMI touch screen adjustment.</p>
	<p>Password setup, require level 2 access.</p>
	<p>Screen for homing direction setting and demonstration mode and wire feeder JOG direction setting.</p>
	<p>Switch between metric or imperial unit.</p>
	<p>System's software limit position. Controller decelerates to stop upon reaching this position. Setting range : 500~4000mm.</p>
	<p>Maximum positioning speed. Setting range : 1000~16000mm / min ◦</p>

3.4 INFORMATION

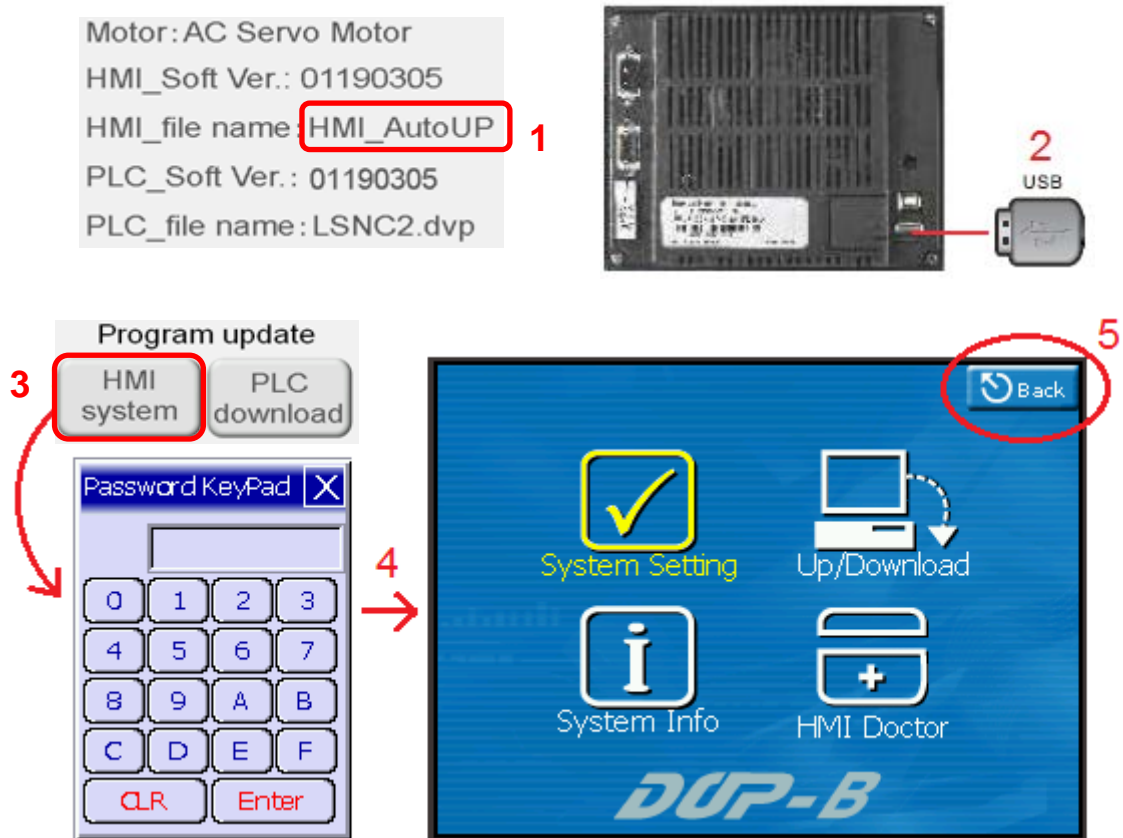
1. System information : Motor type 、 Program and version.
2. Program update : Update the system program through USB hardware.
3. I/O monitor and alarm history.



4.

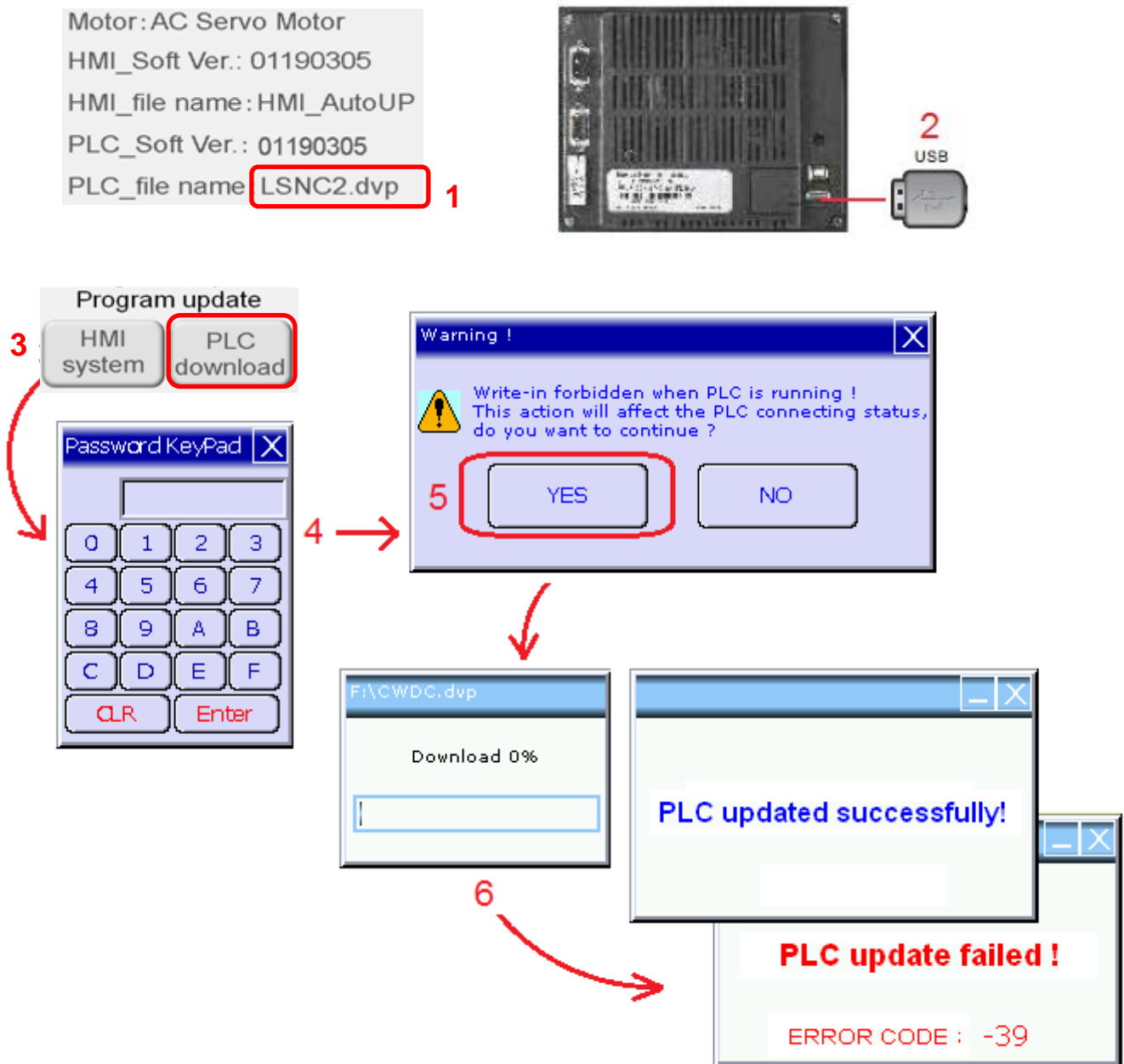
<p>Motor: AC Servo Motor HMI_Soft Ver.: 01190305 HMI_file name: HMI_AutoUP PLC_Soft Ver.: 01190305 PLC_file name: LSNC2.dvp</p>	<ol style="list-style-type: none"> 1. Motor type. 2. HMI software version ◦ 3. HMI program ◦ 4. PLC software version. 5. PLC program.
<p>Program update</p> <p>HMI system PLC download</p>	<p>HMI 、 PLC Program update.</p>
<p>I/O list History</p> <p> </p>	<p>I/O monitor and alarm history.</p>

3.4.1 HMI PROGRAM UPDATE



1. A new program "HMI_AutoUP " will be emailed Please save it into a USB.
2. Plug the USB into the USB port behind the HMI.
3. Press the "HMI system" button and enter the password.
4. Correct password would bring you to the HMI system page.
5. Press the "Back" button on the upper right corner and the HMI would restart the system and perform HMI update.

3.4.2 PLC PROGRAM UPDATE








1. A new PLC Program “ LSNC.dvp “ will be emailed . Please save it into a USB.
2. Plug the USB into the USB port behind the HMI.
3. Press the “PLC download” button and enter the password.
4. Correct password would bring you to a warning prompt.
5. Press “YES” to begin download the file.
6. After the process is finished, the system would prompt either a “update successfully” or “update failed” window.
7. If update process has failed, please write down the error code and email it back to the manufacturer.

3.4.3 PLC I/O CHECK

Input signals, for monitor purpose only.

INPUT LIST -1

X00 Pulse : A phase	X10 Right Foot Switch
X01 Pulse : B phase	X11 Torch lifter - Lower
X02 Pulse generator-PB	X12 Arc On Feedback
X03 LS : Servo Alarm	X13 Front Limit
X04 LS : Servo in position	X14 Back Limit/Home Pstion
X05 Backing Bar Close	X15
X06 Center - Top	X16
X07 Left Foot Switch	X17



Output signals. The user can force the output On for maintenance purpose.(PLC in stop)



OUTPUT LIST -1

Y00 LS : Pulse	Y10 Right Clamp
Y01 LS : Direction	Y11 Torch down
Y02	Y12 Shield Gas
Y03	Y13 Pulse lockout output
Y04	
Y05 Backing Bar Open	
Y06 Center	
Y07 Left Clamp	



3.4.4 ALARM HISTORY

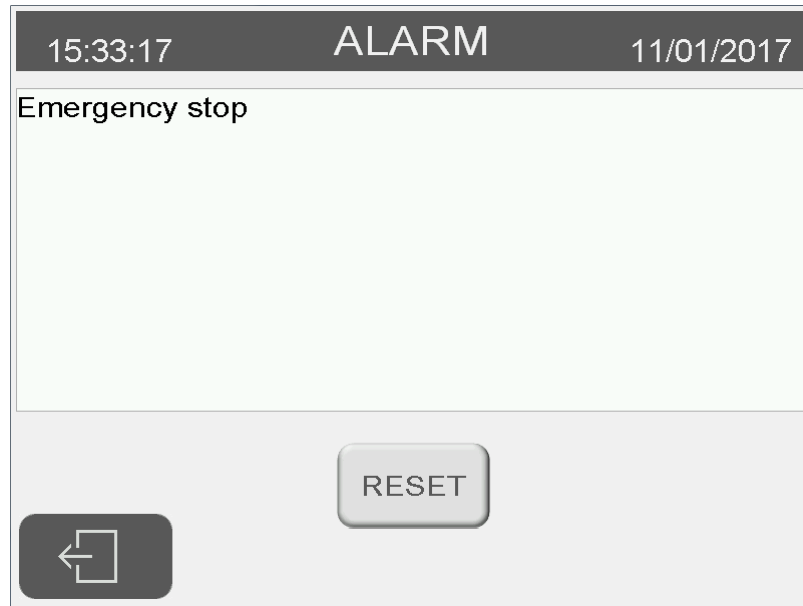
15:35:57		HISTORY		11/01/2017	
O	15:34	01/11/2017	Emergency stop		
X	15:35	01/11/2017	Emergency stop		



Alarm History :

1. Any occurred error will be recorded in Alarm History. The maximum number of recorded alarm is 500. Alarm History cannot be deleted.
2. In the first column on the left, a 「O」 means an occurred error, a 「X」 means corrected errors.

3.5 ALARM MESSAGE












Alarm Message Screen :





1. The screen above only shows up whenever an error has occurred. Please check the system and troubleshoot according to the description of the error in section 3.
2. Press the "RESET" button to reset the alarm and go back to the previous screen. If the error still persists, there would be a flashing "ALARM" on the top right corner of the screen. The operator can come back to the Alarm Message screen by pressing the flashing "ALARM".











4. ALARM MESSAGE AND TROUBLESHOOTING

No.	Error Message	Description and Troubleshooting
M400	Mandrel support not engaged	<p>Mandrel support is not properly engaged while activating the welding start sequence.</p> <p>1. Press. </p> <p>2. Press. </p>
M401	Center positioning unit not retracted	<p>Center positioning unit is not retracted while activating the welding start sequence.</p> <p>1. Press. </p> <p>2. Press. </p>
M402	Clamp not engaged	<p>Left / Right clamping unit is not engaged while activating the welding start sequence.</p> <p>1. Press. </p> <p>2. Press.  </p>
M403	Emergency stop activated	<p>E-Stop button activated, or the normal closed signal is interrupted due to broken wire.</p> <p>1. Release the E-Stop button</p> <p>2. Check if the E-Stop wire is broken.</p> <p>3. Press. </p>
M404	Front limit switch activated!	<p>The carriage has touched the front limit switch, or the limit switch wire is broken.</p> <p>1. Move the carriage away from the switch.</p> <p>2. Check the limit switch signal path for broken wire</p> <p>3. Press. </p>



4. ALARM MESSAGE AND TROUBLESHOOTING

No.	Error Message	Description and Troubleshooting
M405	Rear limit switch activated!!	<p>The carriage has touched the rear limit switch, or the wire is broken.</p> <ol style="list-style-type: none"> 1. Move the carriage away from the switch. 2. Check the limit switch signal path for broken wire 3. Press. 
M406	Torch down error	<p>An error has occurred while attempting to move the torch down</p> <ol style="list-style-type: none"> 1. Please check the positioning reed switch for any abnormality. 2. Please check the position of the reed switch. 3. Please check the reed switch signal and its wire 4. Make sure the pressurized gas solenoid is functioning properly. 5. Check the air pressure. 6. Press. 
M407	Arc on error	<p>No arc on feedback signal after activating the welding machine</p> <ol style="list-style-type: none"> 1. Arc on failure. 2. Please check for loose / broken feedback signal wire. 3. Press. 
M408	Carriage : Servo alarm	<p>Carriage servo error.</p> <ol style="list-style-type: none"> 1. Open the control box cover and check the servo amp's display for any error code. 2. Check whether motor encoder/power cable is loose or disconnected. 3. Any obstruction in mechanical components. 4. Press RESET to reset the error, or shut down the power for 10 second and restart. Contact the original manufacturer if the error persists.
M409	Torch up error	<p>Torch up error.</p> <ol style="list-style-type: none"> 1. Please check the position of the reed switch and move it to the correct position. 2. Please check the air pressure. 3. Press. 

4. ALARM MESSAGE AND TROUBLESHOOTING

No.	Error Message	Description and Troubleshooting
M410	Clamp unlocked while attempting to torch down	<p>Attempting to lower the torch to welding position while the clamp is not engaged.</p> <ol style="list-style-type: none"> 1. Press.  2. Press.  
M411	Please execute homing.	<p>Start button is pressed without performing homing sequence.</p> <ol style="list-style-type: none"> 1. Press.  2. Press. 
M412	Torch not lifted	<p>The torch is not in the correct (Upward) position while attempting to perform homing.</p> <ol style="list-style-type: none"> 1. Press. 
M413	Carriage not in home position	<p>Carriage not in home position.</p> <ol style="list-style-type: none"> 1. Press.  2. Carriage move to ≤ 0 °
M414	PLC battery alarm	<p>PLC's battery is either not installed, at a too low voltage level or malfunctioned.</p> <ol style="list-style-type: none"> 1. Check if PLC's battery indicator is flashing. 2. Check if PLC's battery is present and well connected. 3. If any of the above happens, please install / change the battery A.S.A.P. The system can still be operated without the battery. However, the alarm message cannot be cleared. 4. Do not switch off the power before and during the battery change in order to preserve the PLC program. ° 5. Press. 

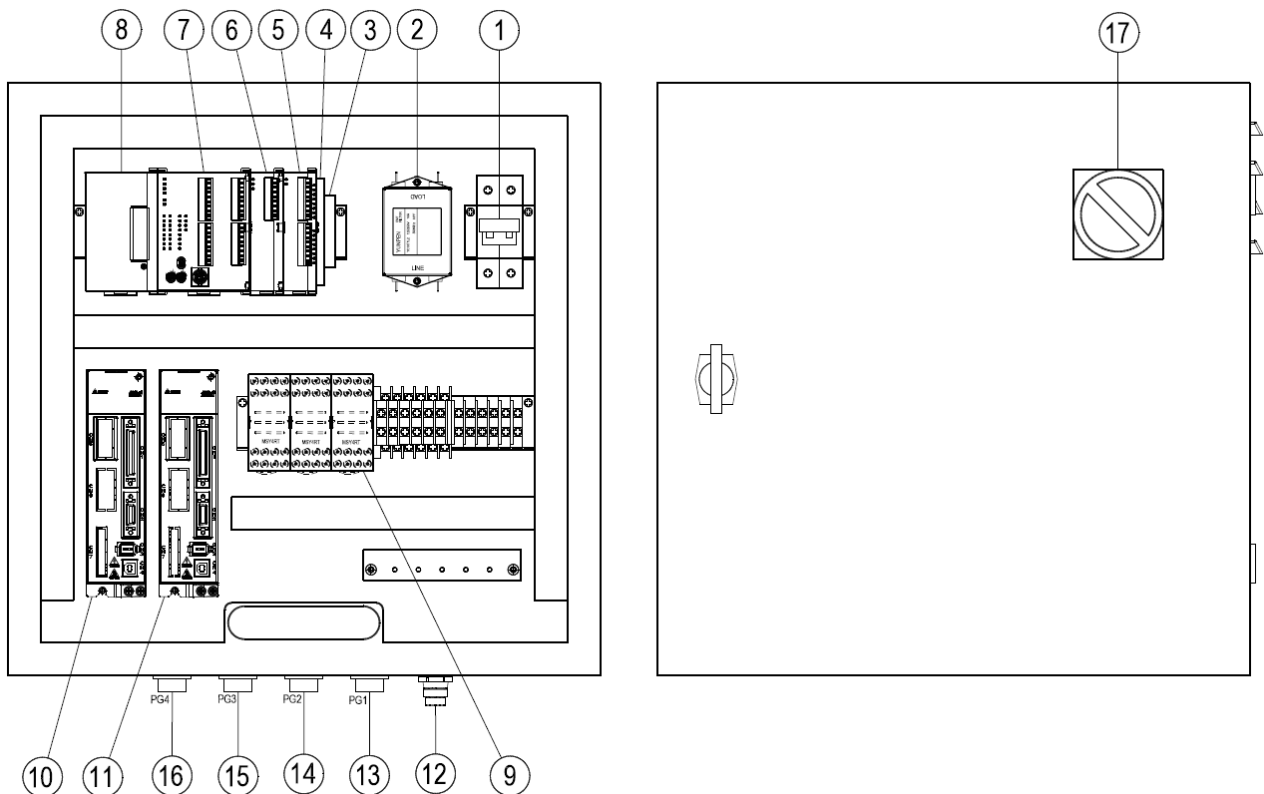
4. ALARM MESSAGE AND TROUBLESHOOTING

No.	Error Message	Description and Troubleshooting
M415	Clamp is not opened	<p>Attempt to open mandrel safety switch or activate center positioning device while clamp is activated.</p> <ol style="list-style-type: none"> 1. Press  2. Release the clamp.
M416	Parameter setting is out of range	<p>Positioning parameter out of software limit range. Positioning parameters include weld start, weld length, migration distance, weld cycle.</p> <ol style="list-style-type: none"> 1. Enter the correct parameters. 2. Press 
M419	WF: motor alarm	<p>Integrated wire feeder servo motor error.</p> <ol style="list-style-type: none"> 1. Open the control box cover and check the servo amp's display for any error code. 2. Check whether motor encoder/power cable is loose or disconnected. 3. Any obstruction in mechanical components. 4. Press RESET to reset the error, or shut down the power for 10 second and restart. Contact the original manufacturer if the error persists.

5.1 PART LIST — CONTROL BOX

Item.	Part No.	Description	Qty.	Remark
1	3221-2004	No Fuse Breaker	1	
2	3331-1201	EMI Filter	1	
3	3325-3104	SSR Module	1	
4	3326-1003	DIN Rail fuse socket	1	
	3326-1002	Fuse Socket	1	
5	3013-0006	Analog output module	1	
8	3012-2103	PLC I/O Module	1	
7	* 2500-0911-01	PLC Control & Software	1	
8	3011-0003	Power Module	1	
9	3251-4207	Relay with terminal	3	
10	* 3031-2212	Servo amplifier (200W)	1	
12	3031-2212	Servo amplifier (200W)	1	Wire Feeder (Option)
12	3534-3005	Nylon cable gland	1	
13	3122-8001	Metal socket female 5Pin	1	PG1 Foot switch
14	3121-6002	Metal plug male 10Pin	1	PG2 Weld Machine
	3122-4004	Metal socket female 10Pin	1	PG2 Weld Machine
15	3121-4003	Metal plug male 7Pin	1	PG3 Start output
	3122-4003	Metal socket female 7Pin	1	PG3 Start output
16	3121-4002	Metal plug male 4Pin	1	PG4 (Optional)
	3122-4002	Metal socket female 4Pin	1	PG4 (Optional)
17	3216-1001	Rotaryes switch	1	

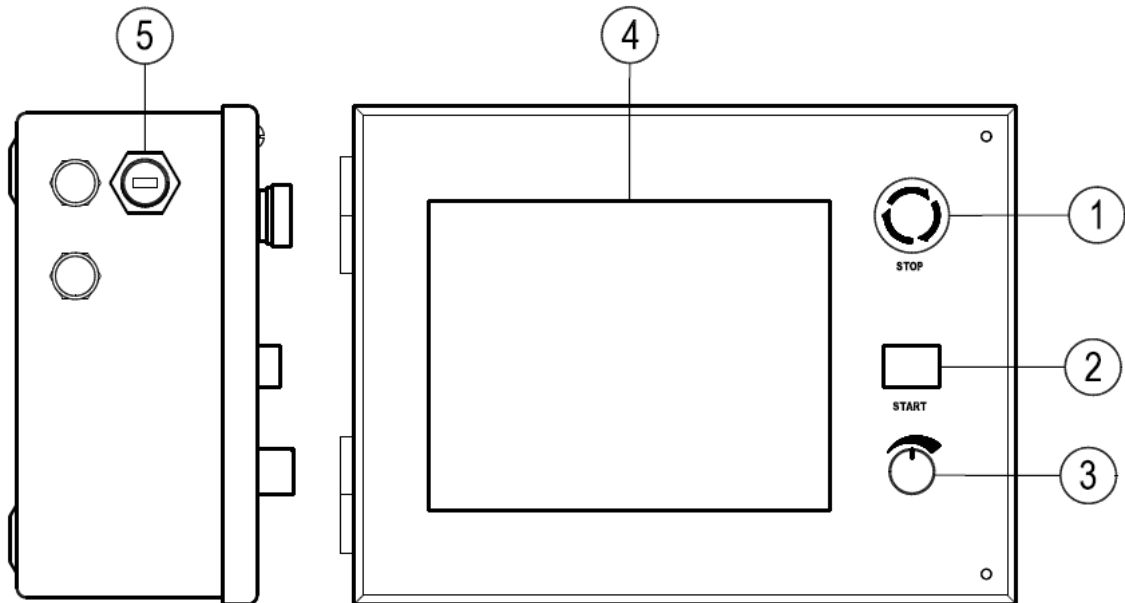
* Recommended spare parts



5.2 PART LIST — HMI CONTROL BOX

Item.	Part No.	Description	Qty.	Remark
1	3214-2005	E.S Push button	1	Stop
2	3271-2005	Push-button switch (LED)	1	Start
3	3216-1004	Knob	1	
4	2500-0912-01	HMI & Software	1	
5	3017-1005-9	USB PORT Cable	1	
	3017-1006	Bulkhead cover	1	

* Recommended spare parts

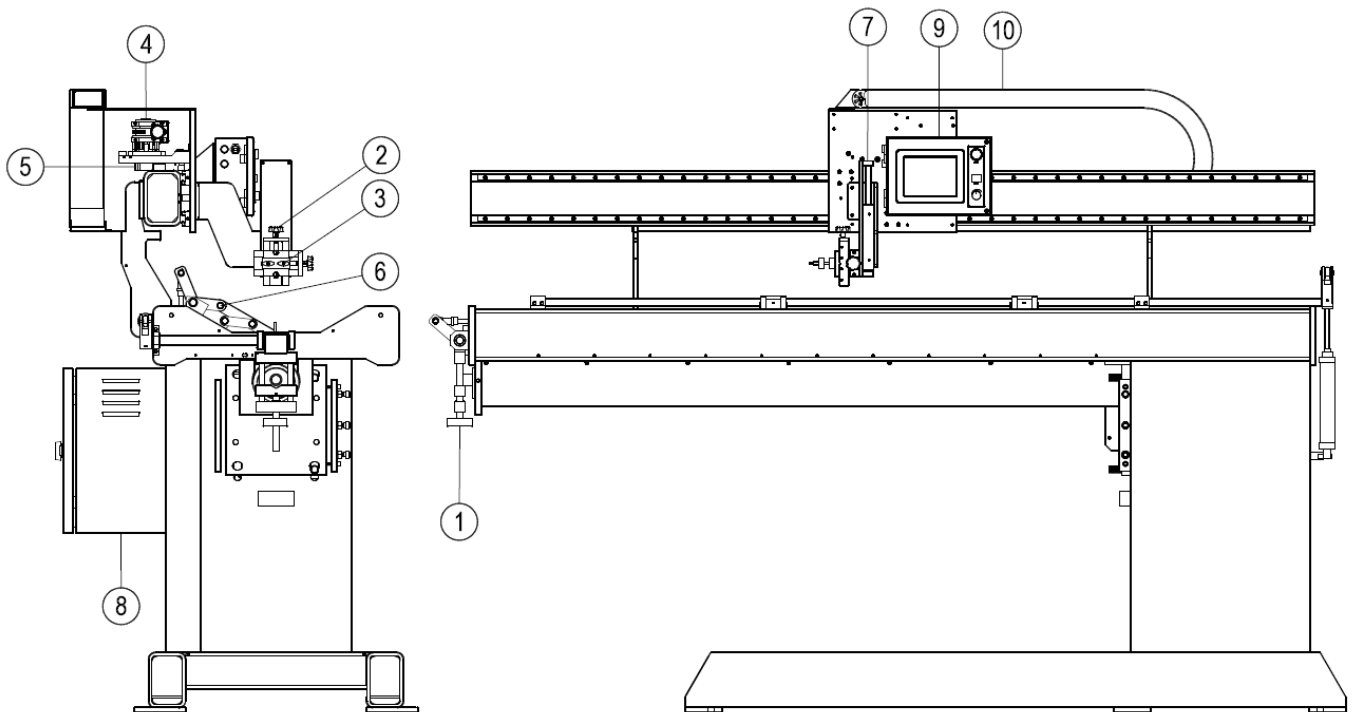


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5.3 PART LIST — MAIN MACHINERY

Item.	Part No.	Description	Qty.	Remark
1	6102-0091	Retractable Edge alignment device	1	LS-009 (Option)
2	6402-0500	X/Y Manual slide	2	SL-050 (Option)
3	6230-3511	V-Block torch holder	1	VH-035 (Option)
	6231-8000	Swivel torch holder	1	SW-180 (Option)
4	* 0353-0301	Reducer	1	
	* 0353-0302	Flange	1	
	* 0364-0209	AC servo motor	1	
5	* 5052-1260300-31	Gear	1	
6	6102-0021	Pneumatic Edge alignment device	1	LS-002 (Option)
	5118-03008100000-10	Pneumatic Edge alignment device	1	LS-002-1 (Option)
	6102-0011	Retractable alignment device	1	LS-001 (Option)
7	6102-0052	Pneumatic torch lifter unit	1	LS-005 (Option)
8	6500-0953	Control box	1	
9	6500-0963	HMI Control box	1	
10	0141-1317	Cable chain	M	LS-XX
	0141-1115-9	Cable chain flange	1	

* Recommended spare parts

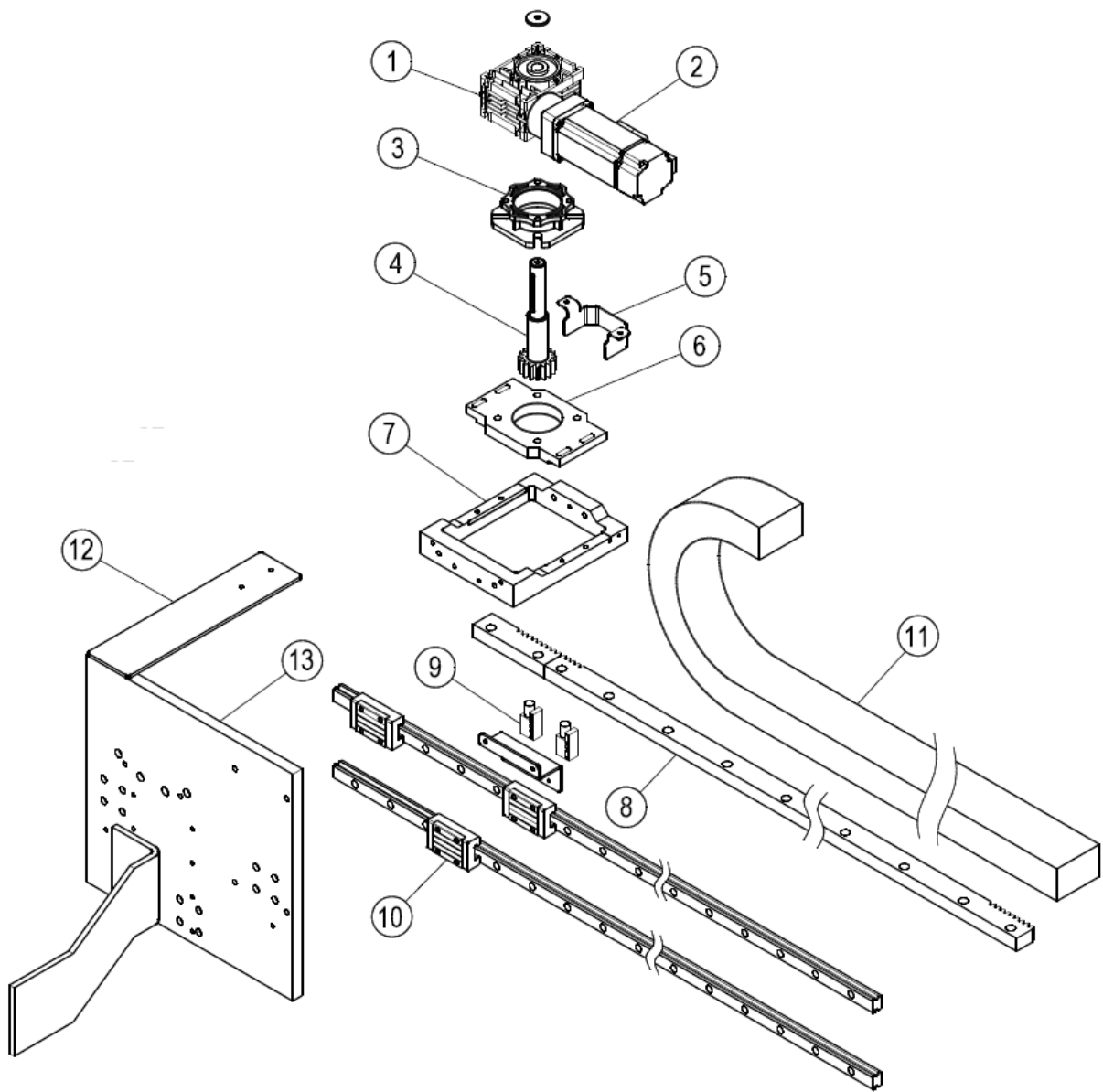


5.4 PART LIST — TRANSMISSION

Item.	Part No.	Description	Qty.	Remark
1	* 0353-0301	Worm reducer	1	
2	* 0364-0209	AC servo motor	1	
3	* 0353-0302	Flange	1	
4	* 5052-1260300-31	Pinion	1	
5	5052-1230100-10	Pinion protective plate	1	
6	5052-1230000-32	Reducer base plate	1	
7	5034-5710000-22	Slide	1	
8	5034-5060000-41	Transverse axis rack	1/2	LS-06/LS-09,LS-12,15
	5034-5060000-41	Transverse axis rack	3/4/5	LS-18,24/LS-30/LS-36
	5034-5060200-10	Transverse axis rack	1/0.5	LS-06 / LS-15
9	* 3231-2010-9	Proximity sensor with connector	2	X12,X13
10	0321-2009	Linear way guide	2	LS-18 (2740L)
	0321-2011	Linear way guide	2	LS-09 (1692L)
	0321-2027	Linear way guide	2	LS-12 (1996L)
	0321-2012	Linear way guide	2	LS-15 (2292L)
	0321-2018	Linear way guide	2	LS-24 (3312L)
	0321-2034	Linear way guide	2	LS-06 (1396L)
	0321-2033	Linear way guide	2	LS-30 (3960L)
	0321-2032	Linear way guide	2	LS-36 (4620L)
	* 0322-2004	Runner block	3	LS-XX
11	0141-1115-9	Cable chain flange	1	
	0141-1317	Cable chain	M	LS-XX
12	5052-1250000-32	Cable chain tray	1	
13	5052-1200000-33	Carriage	1	Right
	5052-1200010-33	Carriage	1	Lift

* Recommended spare parts

5.4 PART LIST — TRANSMISSION

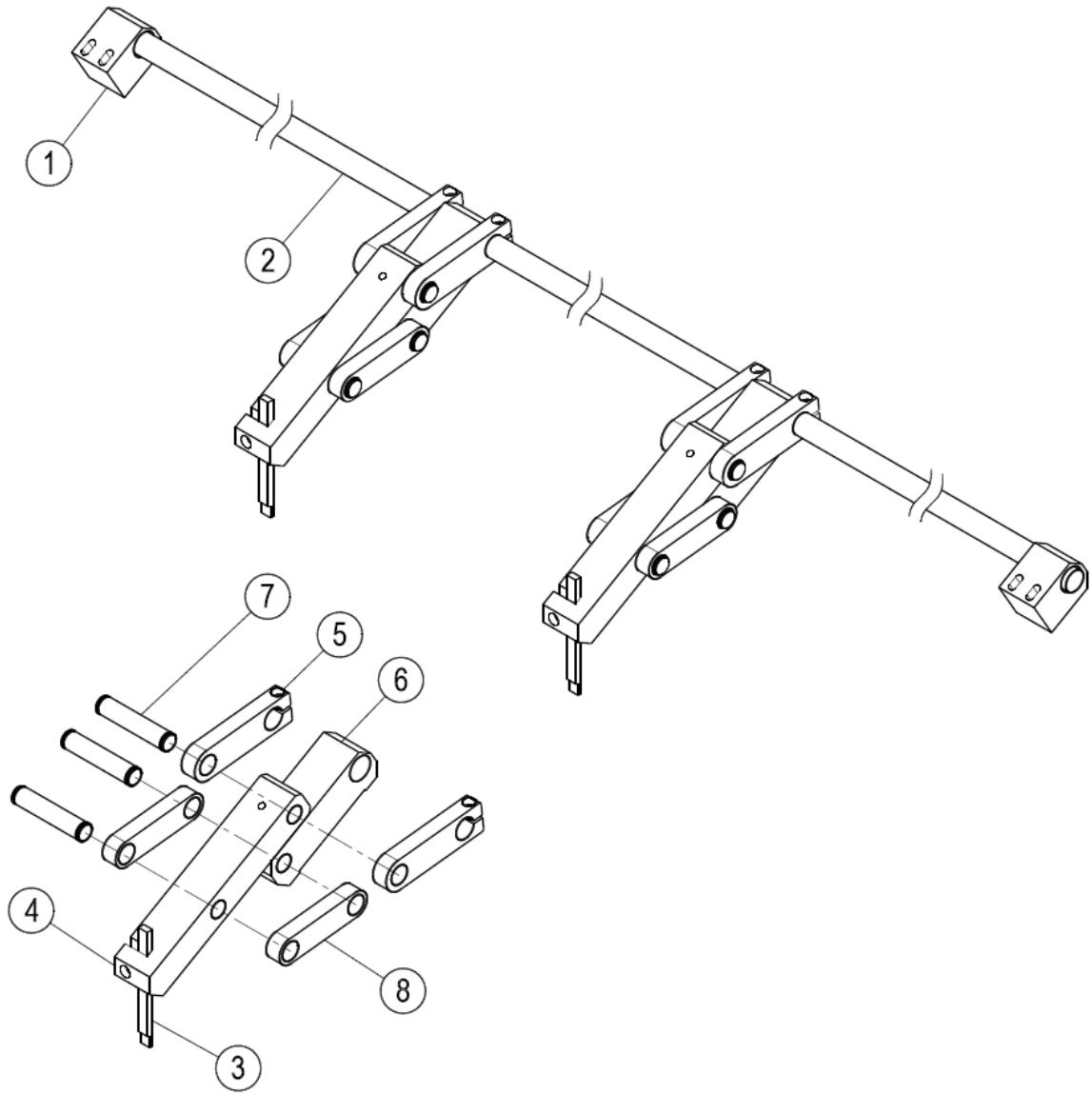


5.5 OPTIONAL — RETRACTABLE EDGE ALIGNMENT DEVICE (LS-001)

Item.	Part No.	Description	Qty.	Remark
1	5052-1400000-10	Fixed place	2	
	* 0331-2001	Self-Lubricating bushing	4	
2	5052-1411100-30	Lead screw	1	764L (LS-06)
	5052-1411200-30	Lead screw	1	1080L (LS-09)
	5052-1411300-30	Lead screw	1	1372L (LS-12)
	5052-1411400-30	Lead screw	1	1686L (LS-15)
	5052-1411500-30	Lead screw	1	1996L (LS-18)
	5052-1411600-30	Lead screw	1	2588L (LS-24)
	5052-1411700-30	Lead screw	1	3062L (LS-30)
	5052-1411800-30	Lead screw	1	3670L (LS-36)
3	5052-1470000-10	Centre piece	2	6.4~ No Filler & Filler
	5052-1470100-10	Centre piece	2	3.2~6.4 No Filler & Filler
	5052-1470200-10	Centre piece	2	0.1~3.2 No Filler & Filler
	5114-10006216000-10	Centre piece	2	3.2~6.4 (LS-30~LS-36)
4	5052-1460000-10	Fixed position piece	2	
5	5052-1430000-11	Whirling arm	4	
	* 0331-1601	Self-Lubricating bushing	4	
	* 0331-2001	Self-Lubricating bushing	4	
6	5052-1420000-11	Slide	2	
7	5052-1440000-11	Inserted pin	6	
	0140-0060	Cramp ring	12	
8	5052-1450000-11	Parallel arm	4	
	* 0331-1601	Self-Lubricating bushing	8	

* Recommended spare parts

5.5 OPTIONAL — RETRACTABLE EDGE ALIGNMENT DEVICE (LS-001)

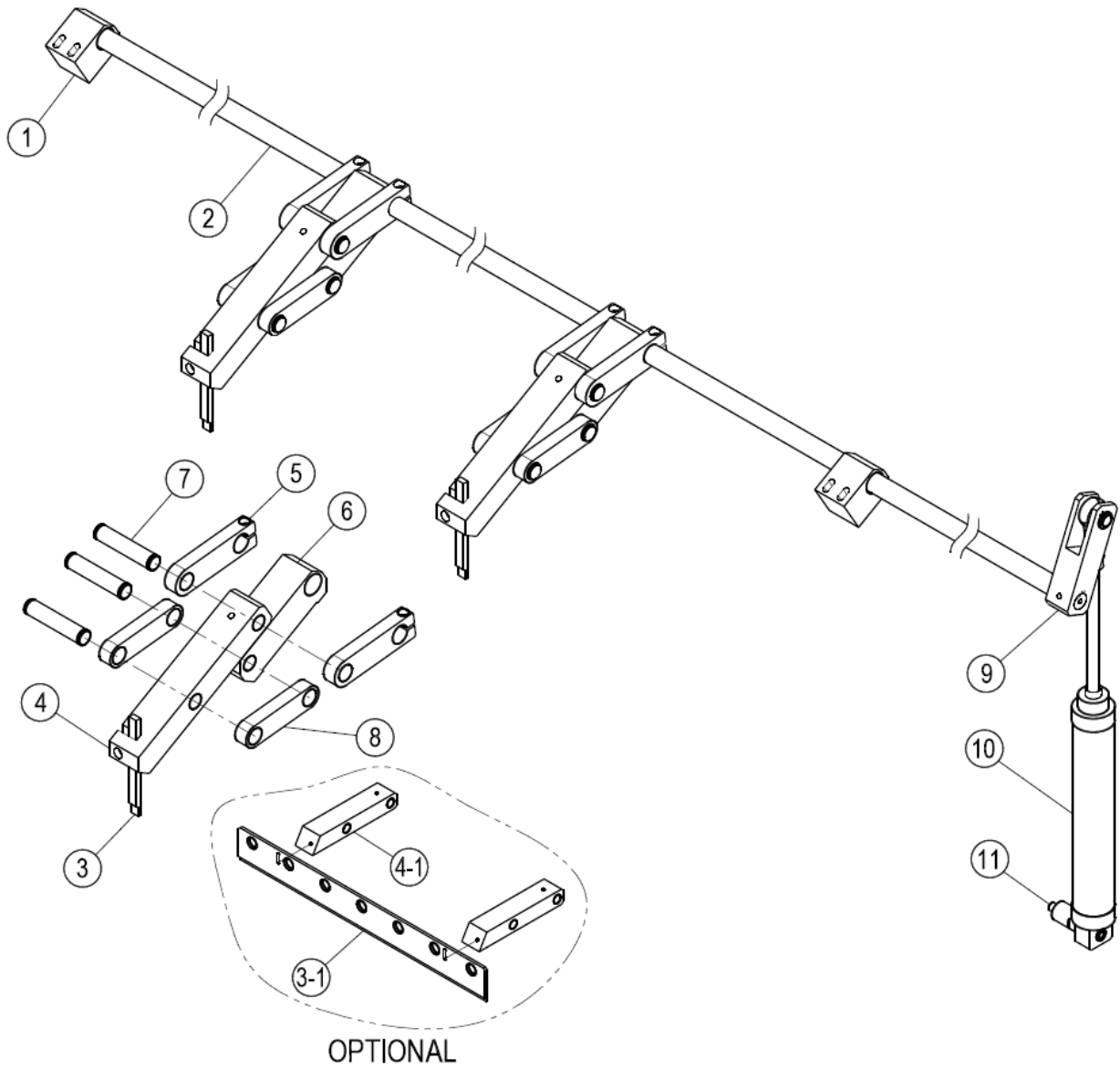


5.6 OPTIONAL — PNEUMATIC EDGE ALIGNMENT DEVICE (LS-002)

Item.	Part No.	Description	Qty.	Remark
1	5052-1400000-10	Fixed place	2	
	* 0331-2001	Self-Lubricating Bushing	4	
2	5052-1410100-30	Lead screw	1	1275L (LS-06)
	5052-1410200-30	Lead screw	1	1579L (LS-09)
	5052-1410300-30	Lead screw	1	1883L (LS-12)
	5052-1410400-30	Lead screw	1	2187L (LS-15)
	5052-1410500-30	Lead screw	1	2591L (LS-18)
	5052-1410600-30	Lead screw	1	3199L (LS-24)
	5052-1410700-30	Lead screw	1	3777L (LS-30)
3	5052-1470000-10	Centre piece	2	6.4~ No Filler & Filler
	5052-1470100-10	Centre piece	2	3.2~6.4 No Filler & Filler
	5052-1470200-10	Centre piece	2	0.3~3.2 No Filler & Filler
	5114-10006216000-10	Centre piece	2	3.2~6.4 (LS-30~LS-36)
3-1	5118-03008101000-10	Centre piece	1	LS-06 (Option)
	5118-08001101000-10	Centre piece	1	LS-09 (Option)
	5118-12005301000-10	Centre piece	1	LS-12 (Option)
4	5052-1460000-10	Fixed position piece	2	
4-1	5118-03008102000-10	Fixed position piece	2	Option
5	5052-1430000-11	Whirling arm	4	
	* 0331-1601	Self-Lubricating bushing	4	
	* 0331-2001	Self-Lubricating bushing	4	
6	5052-1420000-11	Slide	2	
7	5052-1440000-11	Inserted pin	6	
	0140-0060	Cramp ring	12	
8	5052-1450000-11	Parallel arm	4	
	* 0331-1601	Self-Lubricating bushing	8	
9	5052-1480000-10	Pneumatic crank web	1	
10	0201-4016	Pneumatic cylinder	1	
11	5052-1490000-10	Tail stock	1	

* Recommended spare parts

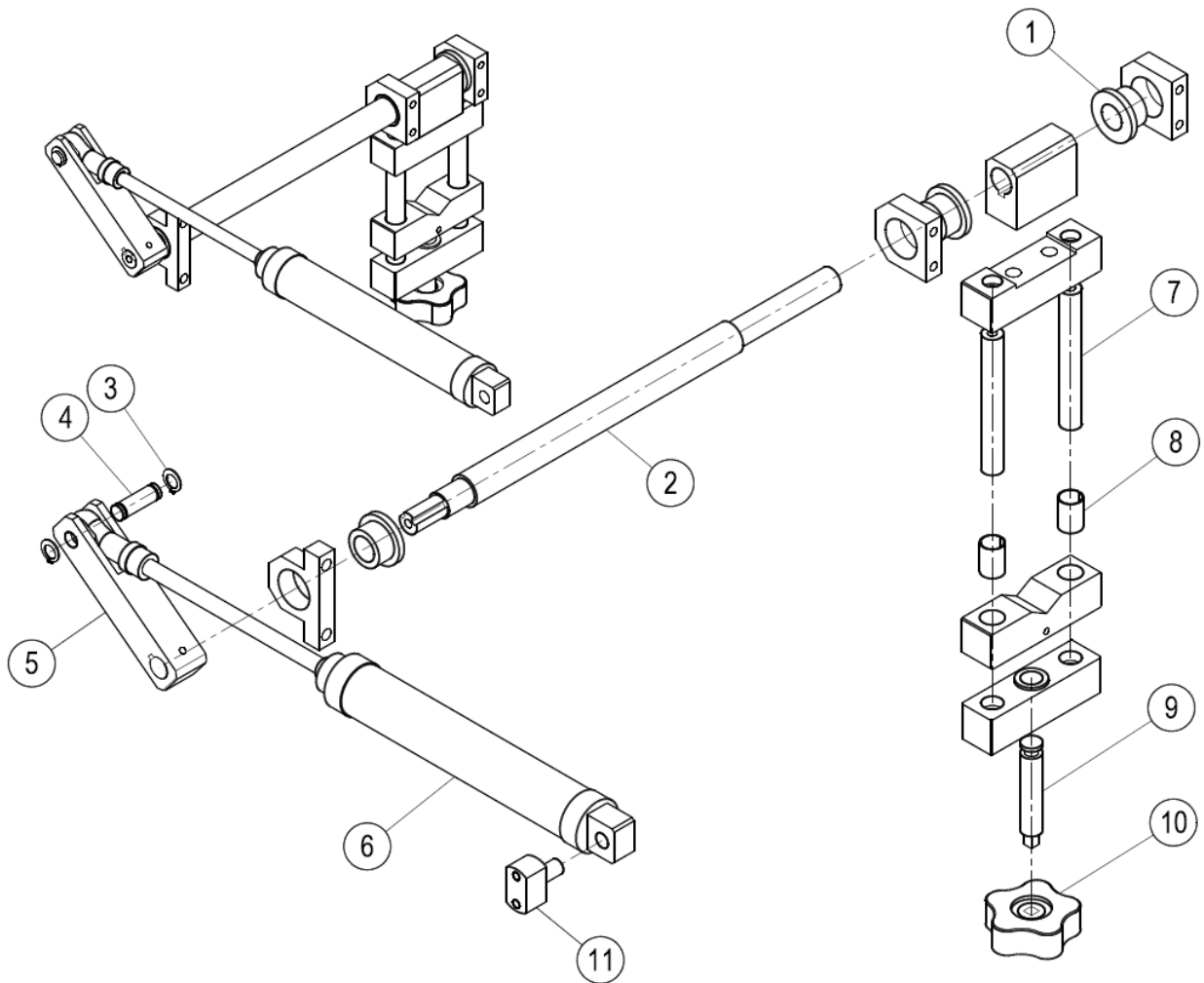
5.6 OPTIONAL — PNEUMATIC EDGE ALIGNMENT DEVICE (LS-002)



5.7 OPTIONAL — PNEUMATIC MANDREL SAFETY SWITCH (LS-009)

Item.	Part No.	Description	Qty.	Remark
1	0332-2002	Self-Lubricating bearing	3	
2	5052-1330000-11	Pneumatic link	1	
3	0140-0037	Cramp ring	2	
4	5052-1340200-10	Inserted pin	1	
5	5052-148	Pneumatic crank web	1	
6	* 5052-1340100-10	Pneumatic cylinder	1	
7	5052-1360000-11	Guide bar	2	
8	0331-1602	Self-Lubricating bushing	2	
9	5052-1390100-12	Screw	2	
10	0130-0005	Handle	1	
11	5052-1350000-11	Tail stock	1	

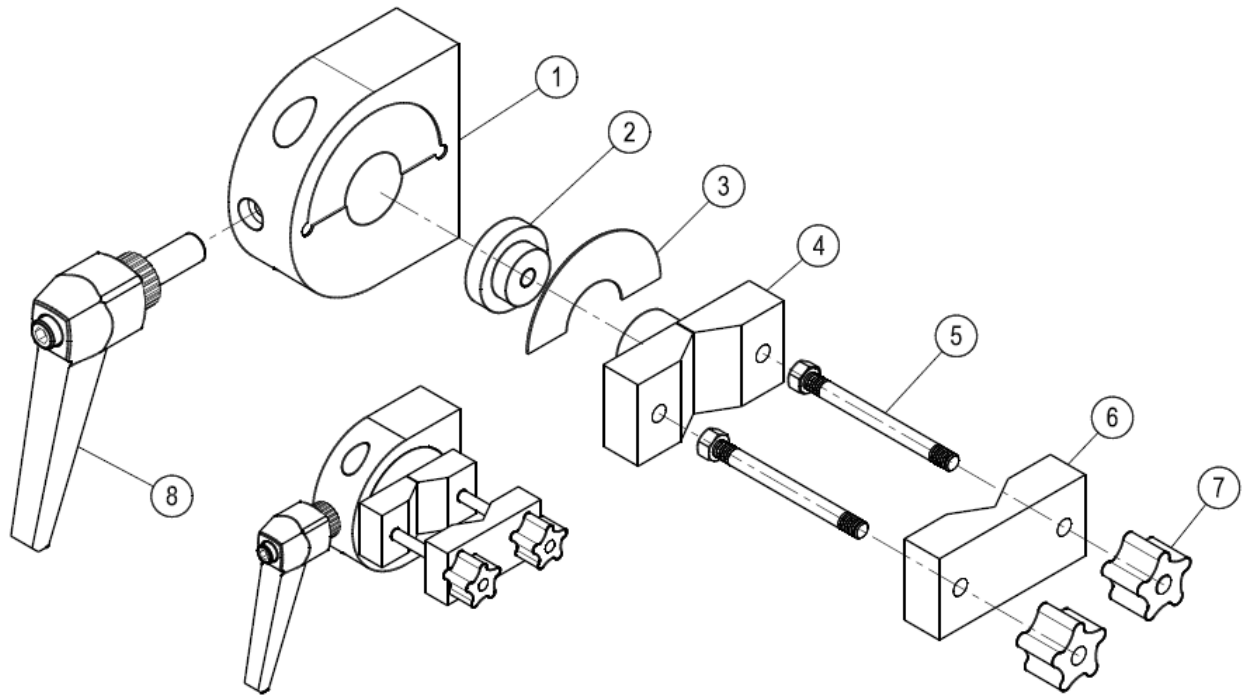
* Recommended spare parts



5.8.1 OPTIONAL — SWIVEL TORCH HOLDER (SW-180)

Item.	Part No.	Description	Qty.	Remark
1	5052-4250000-10	Base	1	
2	5052-4260000-10	Shaft	1	
3	0160-0142	Angle ruler	1	
4	5052-2470000-20	Torch holder	1	
5	0106-0603	Screw	2	
6	5052-2480000-10	Upper cover plate	1	
7	0130-0136	Knob	2	
8	0130-0137	Handle	1	

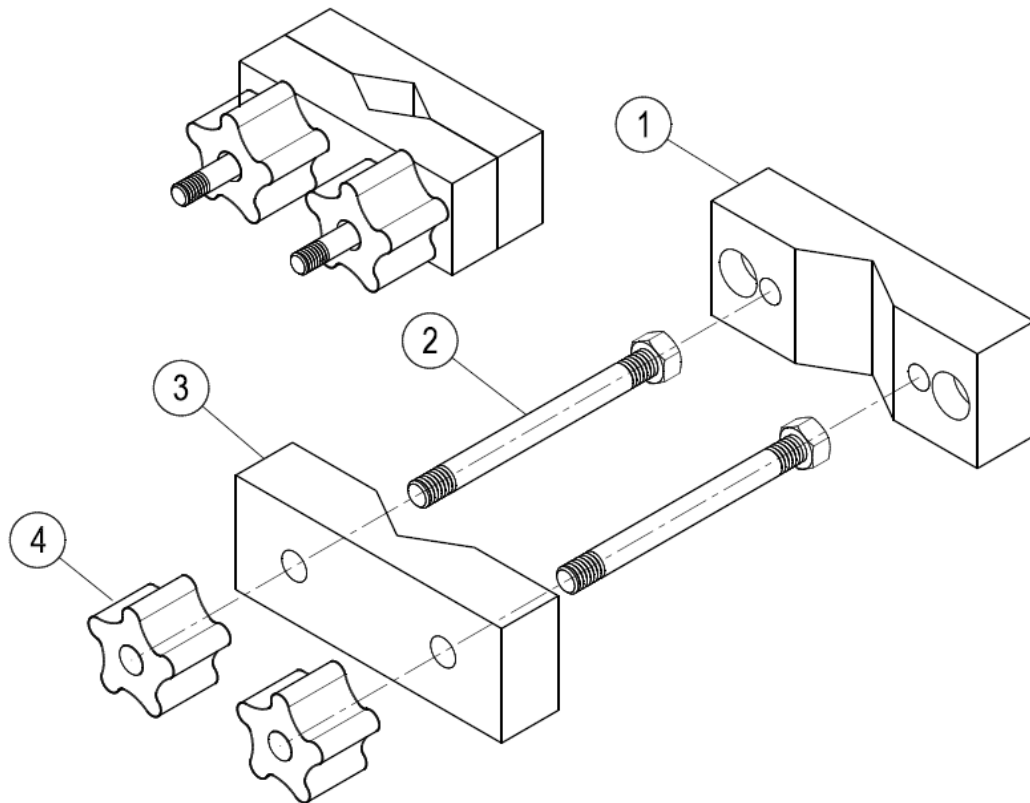
* Recommended spare parts



5.8.2 OPTIONAL — V-BLOCK TORCH HOLDER (VH-035)

Item.	Part No.	Description	Qty.	Remark
1	5010-6180110-20	V-Block torch holder	1	
2	0106-0603	Screw	3	
3	5010-6180120-20	Upper cover plate	1	
4	0130-0136	Knob	2	

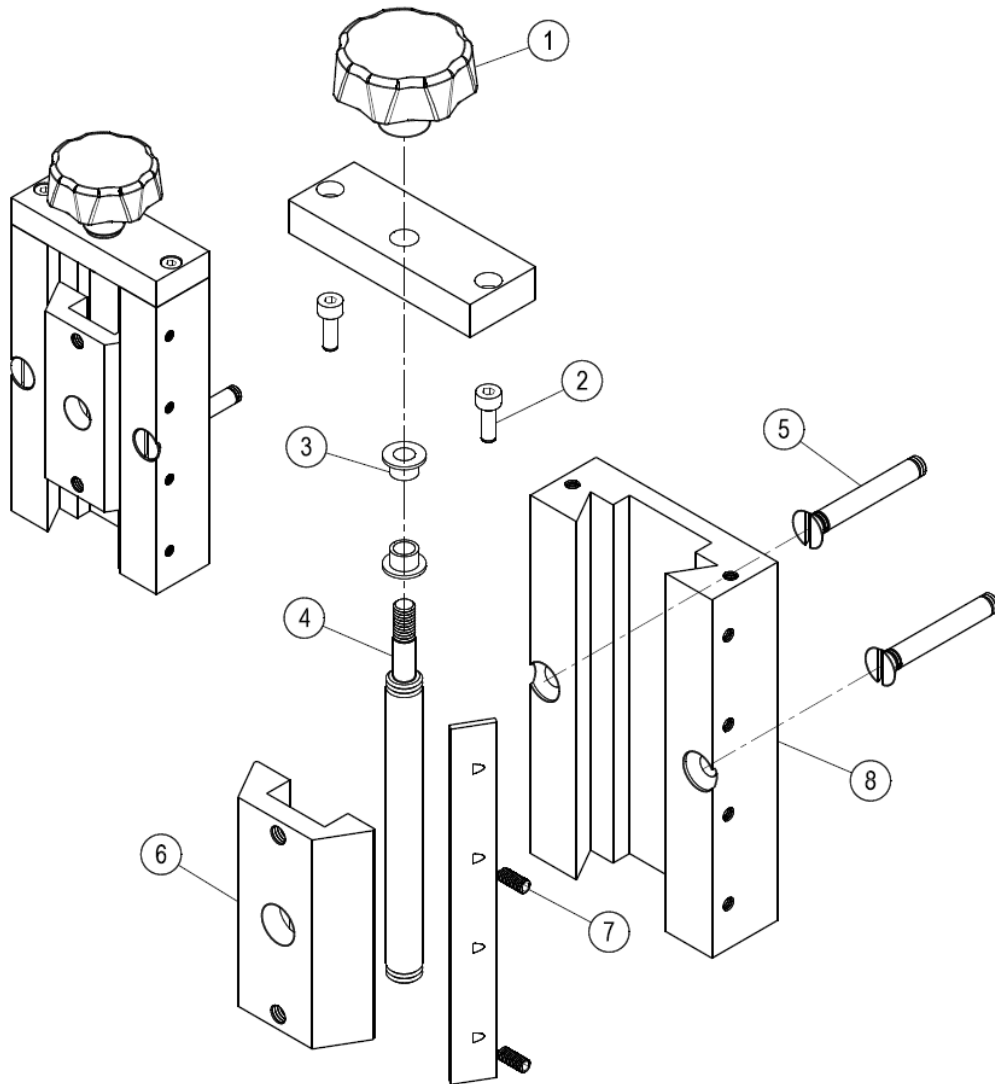
* Recommended spare parts



5.8.3 OPTIONAL — X/Y MANUAL SLIDE (SL-050)

Item.	Part No.	Description	Qty.	Remark
1	5013-1040300-10	Knob	1	
2	0101-0405	Screw	2	
3	0331-0601	Self-Lubricating bushing	2	
4	* 5013-1040100-10	Ladder screw	1	
5	0103-0609	Screw	2	
6	5013-1010000-10	Slide	1	
7	0105-0406	Screw	4	
8	5013-102000-11	Slide body	1	

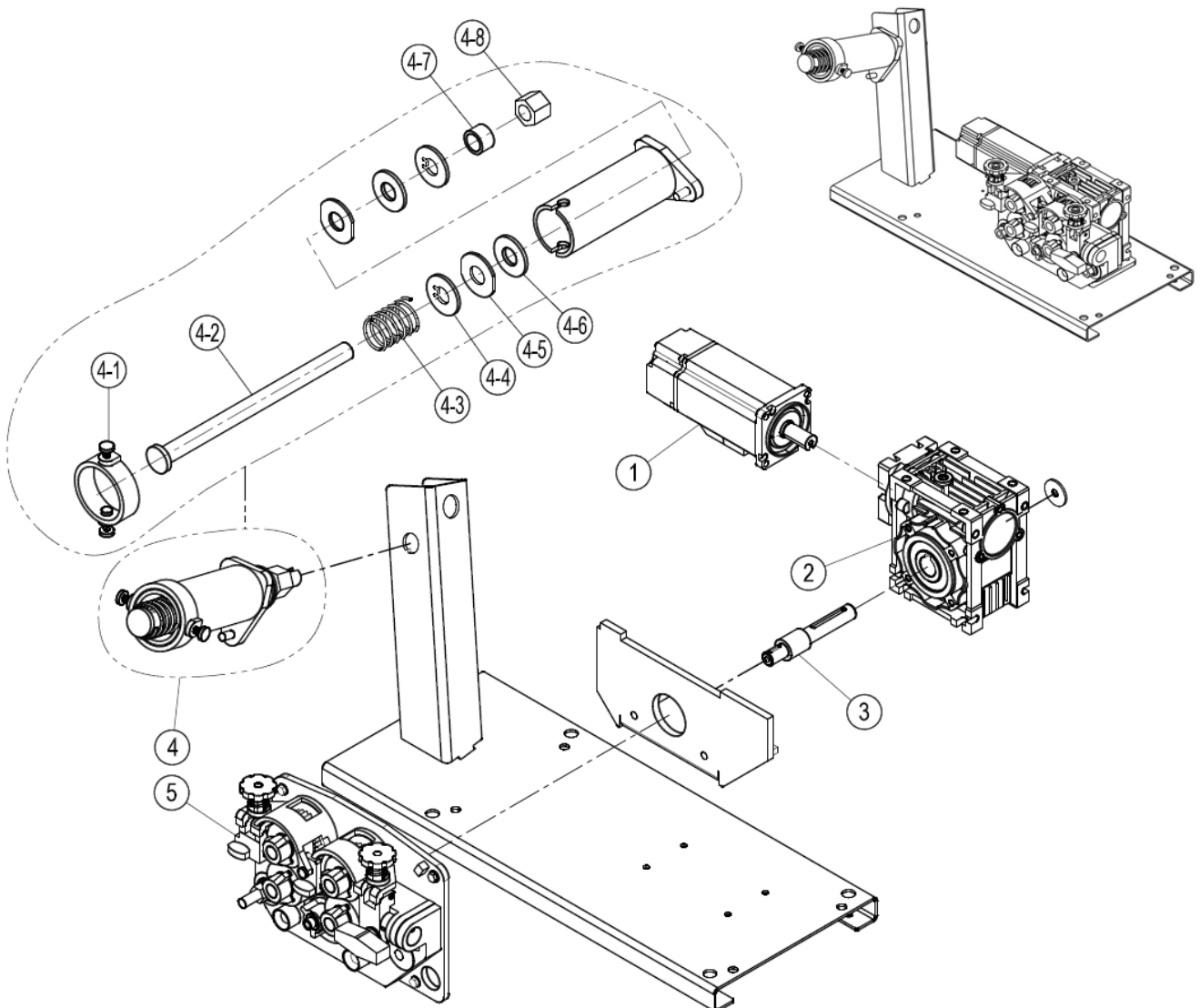
* Recommended spare parts



5.9.1 OPTIONAL — COLD WIRE FEEDER (WF-10)

Item	Part No.	Description	Qty	Remark
1	* 0364-0209	Servo motor	1	200W
2	* 0353-0301	Worm reducer	1	
3	* 5113-08211103000-20	Transmission axle	1	
4	5113-08211850000-10	Wire clamp pinion assembly	1	Please see 5.9.2
4-1	4000-058427	Ring	1	
4-2	4000-180572	Spool support	1	
4-3	* 4000-010223	Spring	1	
4-4	4000-057971	Washer flat Stl keyed	2	
4-5	4000-058628	Washer Brake	2	
4-6	4000-010191	Washer	2	
4-7	4000-248947	Tubing	1	
4-8	4000-135205	Nut	1	
5	5113-08211800000-10	Wire wheel axle assembly	1	Please see 5.9.3

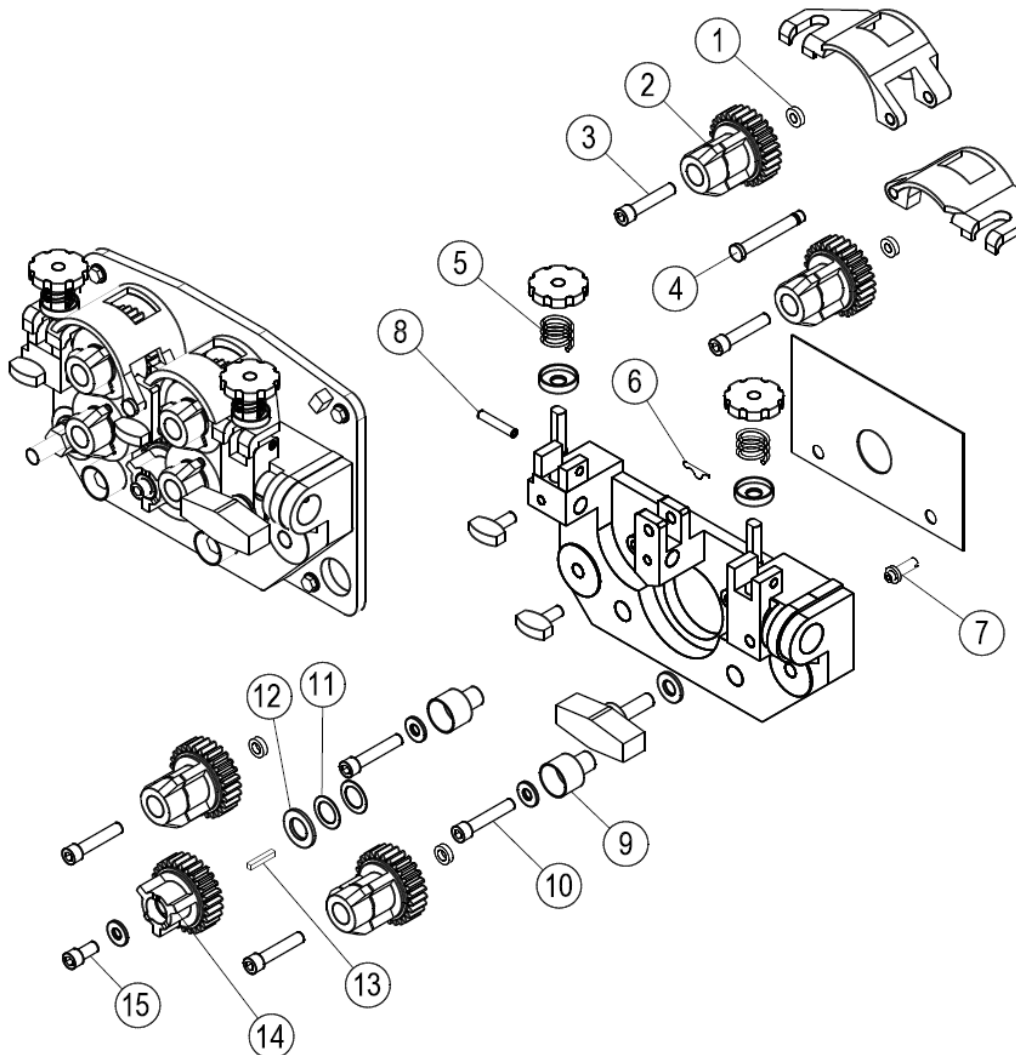
* Recommended spare



5.9.2 OPTIONAL — WIRE WHEEL AXLE ASSEMBLY (WF-10)

Item	Part No.	Description	Qty	Remark
1	4000-166072	Spacer	4	
2	* 4000-172075	Drive roll	4	
3	4000-602009	Screw	4	
4	4000-273112	Pin	1	
5	* 4000-089447	Spring	2	
6	4000-151828	Cotter hair	1	
7	4000-144172	Hose Brs barbed	1	
8	4000-010224	Pin	2	
9	4000-221654	Shldr Insulating	2	
10	0101-0632	Screw	2	
11	4000-079625	Wave	2	
12	4000-253187	Spacer	1	
13	4000-092865	Key	1	
14	* 4000-172077	Drive Roll	1	
15	0101-0642	Screw	1	

* Recommended spare

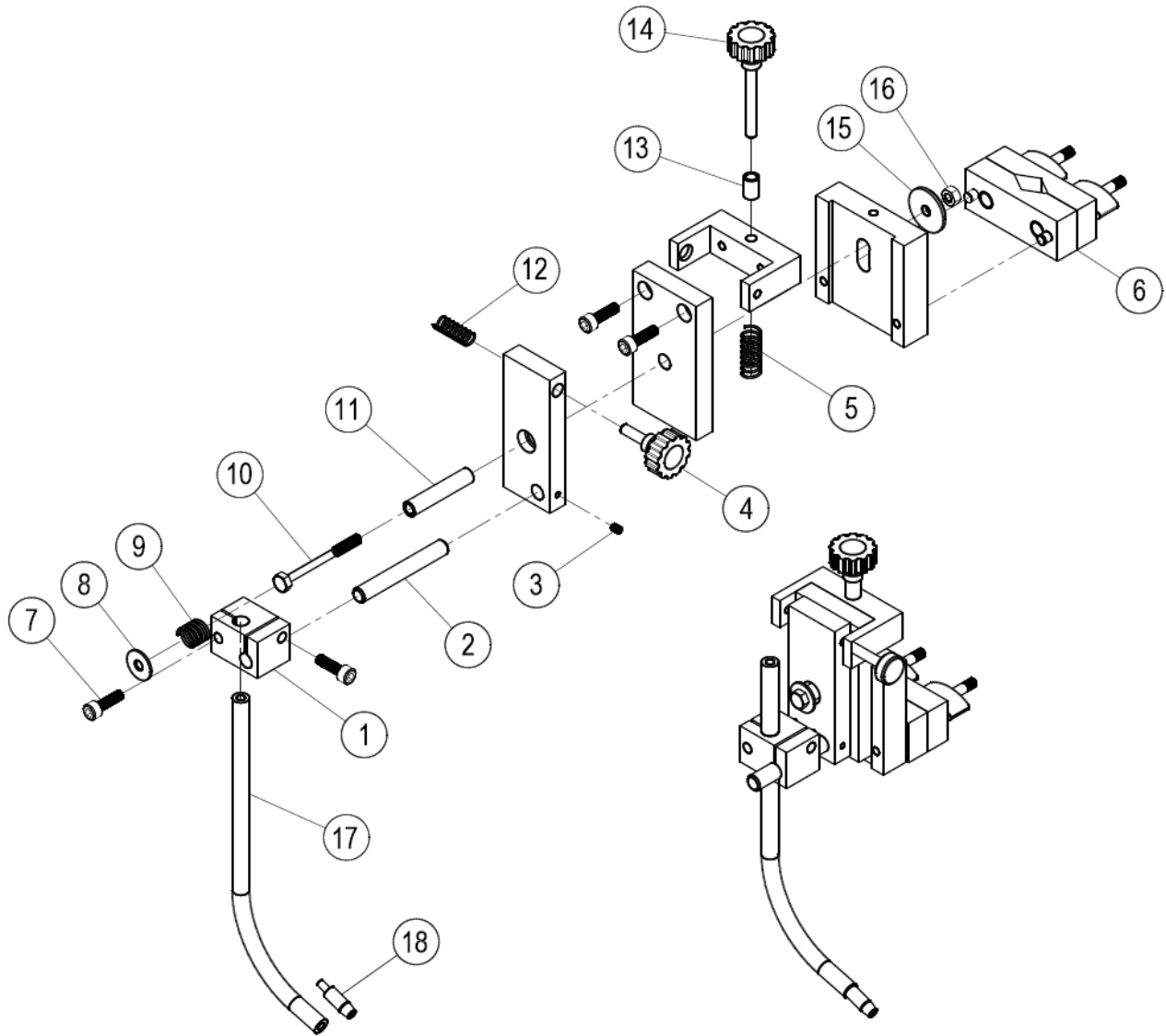


5.9.3 OPTIONAL — MOUNTING BRACKET (WF-10)

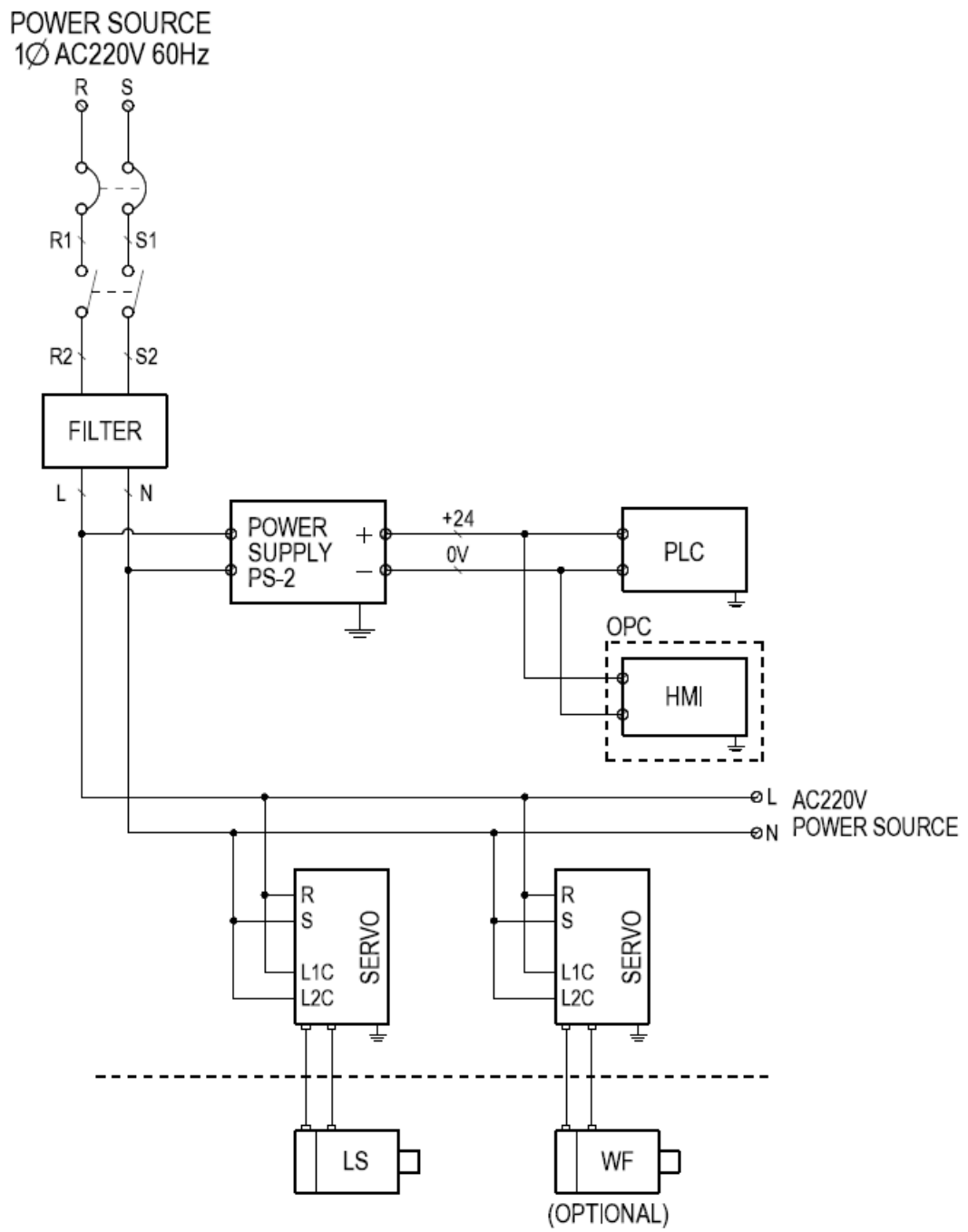
Item	Part No.	Description	Qty	Remark
1	5113-08211301000-10	Clamp base	1	
2	5113-08211302000-10	Adjustment shaft	1	
3	* 0105-0401	Screw	1	
4	0100-0058	Screw	1	
5	* 0144-0051	Spring	1	
6	6230-3511	V-Block torch holder	1	VH-035
7	0101-0609	Screw	4	
8	0121-0600	Washer	1	
9	* 0144-0052	Spring	1	
10	0106-0613	Screw	1	
11	5113-08211306000-10	Shaft	1	
12	* 0144-0053	Spring	1	
13	5113-08211308000-10	Bush	1	
14	0130-0113	Knob	1	
15	5052-1670000-11	Spacer	1	
16	0123-0600	Nut	1	
17	5113-08211501000-11	Swan neck	1	With 0.8~1.6
	5113-08211521000-21	Swan neck	1	With 2.0
18	5113-08211502000-10	Liner	1	With 0.8~1.6
	5113-08211522000-10	Liner	1	With 2.0

* Recommended spare

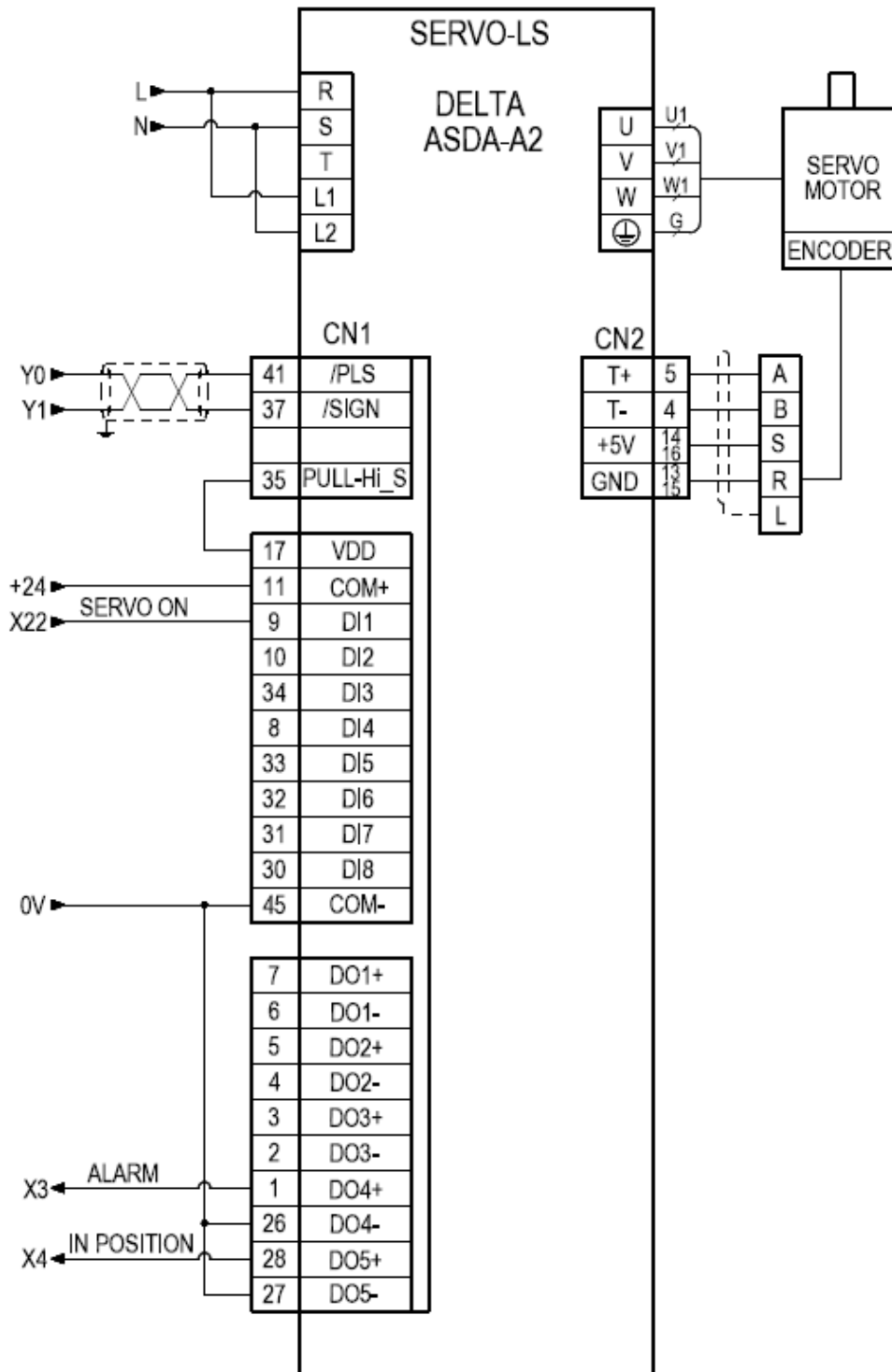
5.9.3 OPTIONAL — MOUNTING BRACKET FOR (WGP-3 WF-10)



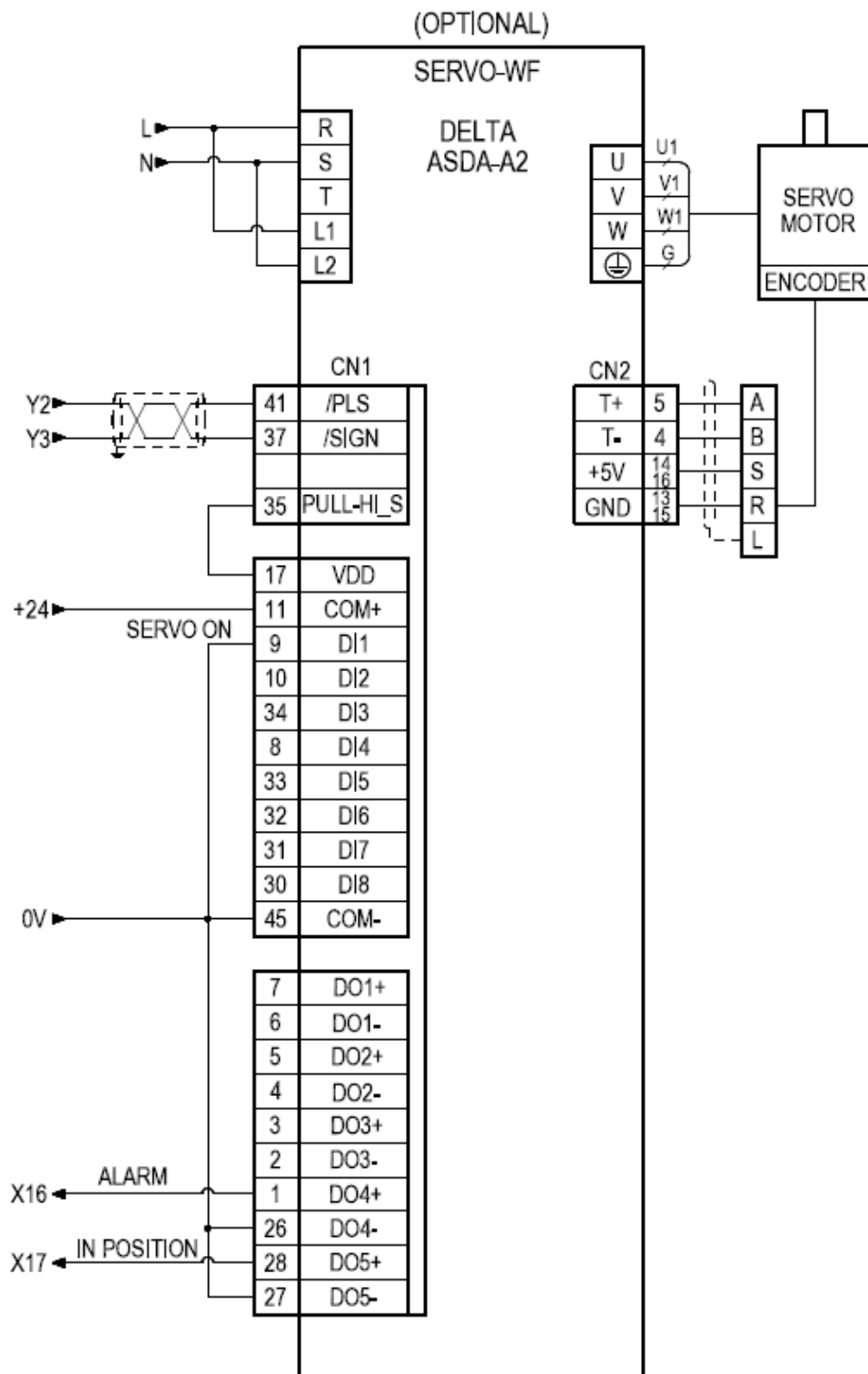
6. CIRCUIT DIAGRAM



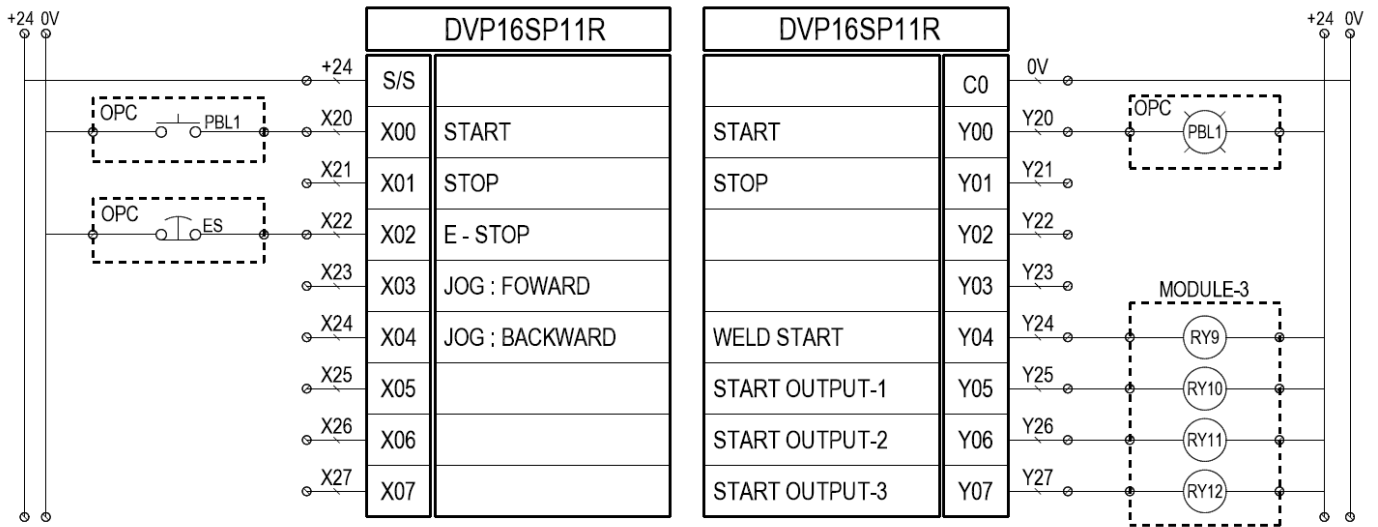
6. CIRCUIT DIAGRAM



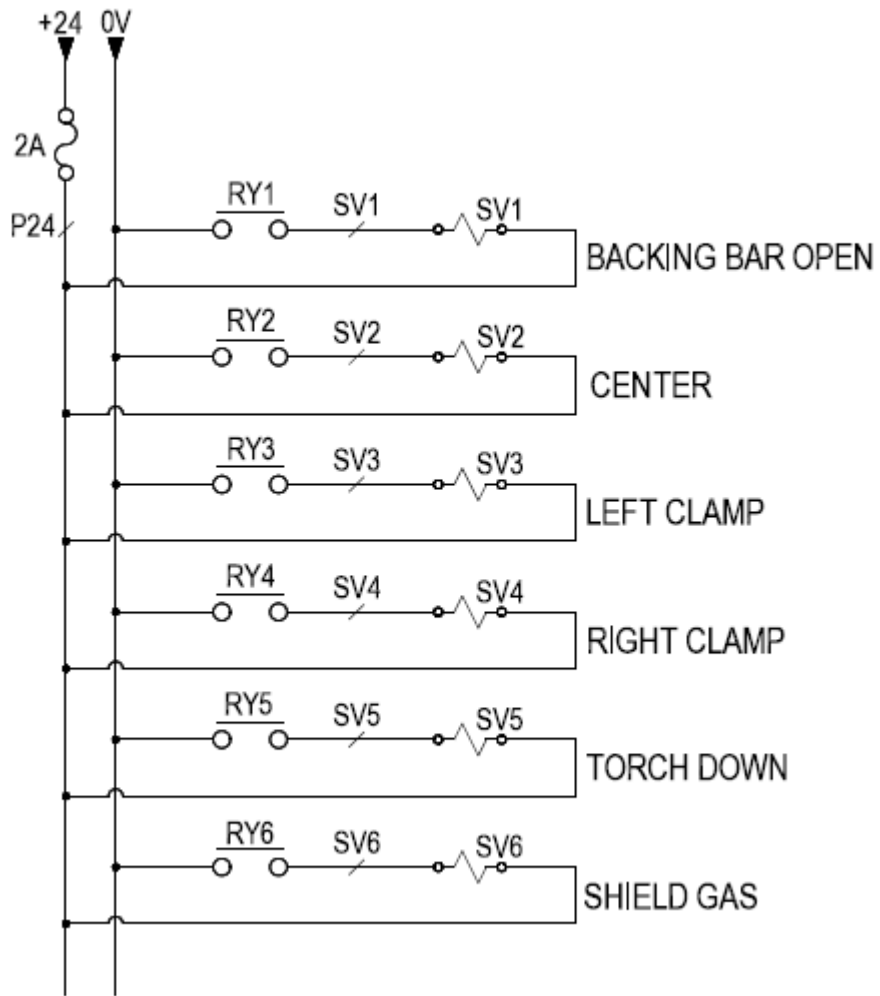
6. CIRCUIT DIAGRAM



6. CIRCUIT DIAGRAM



6. CIRCUIT DIAGRAM



LS- Pneumatic system

