

OWNER'S MANUAL

RD-8824AE

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

Model : MP-1212E For CW-350T Manipulator

Serial number : 2205010

Date : July. 11th, 2022

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SAFETY PRECAUTIONS



WARNING

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

Electrical safety

Operator needs to take proper electrical insulation from work and electrical ground (PPE) to prevent electric shocks.

- * The equipment needs to be properly electrically grounded to prevent high frequency interference.
- * All power and ground cables PVC insulation need to be inspected periodically for any melting point. Replace the cable whenever necessary.
- * Turn off the equipment before maintenance/service.

Individual safety



* Gases/fumes from welding are hazardous. Good ventilation is important. Use air supplied personal protective equipment in confined space when conventional ventilation is not adequate



* Oil/grease in combination with oxygen may cause violent combustion. Keep cylinders, valves, couplings, regulators, hoses, and other apparatus oil free..

* Do not use oxygen as a substitute for compressed air.

Fire



* Fire can be started by welding sparks. Remove combustibles material from surrounding. Keep fire extinguisher nearby in case of fire.

Noise



* Process noise may cause permanent hearing loss. Wear proper PPE or ear plugs. Make sure others in the operation vicinity are protected from noise.

Protection goggle

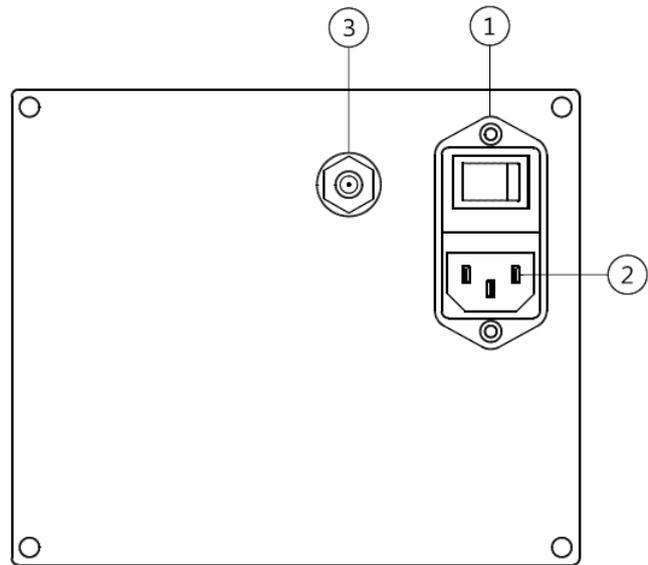


* Welding arc radiation may cause permanent sight damage. Avoid direct eye contact or wear protection goggle.

1.2 OPERATION PANEL

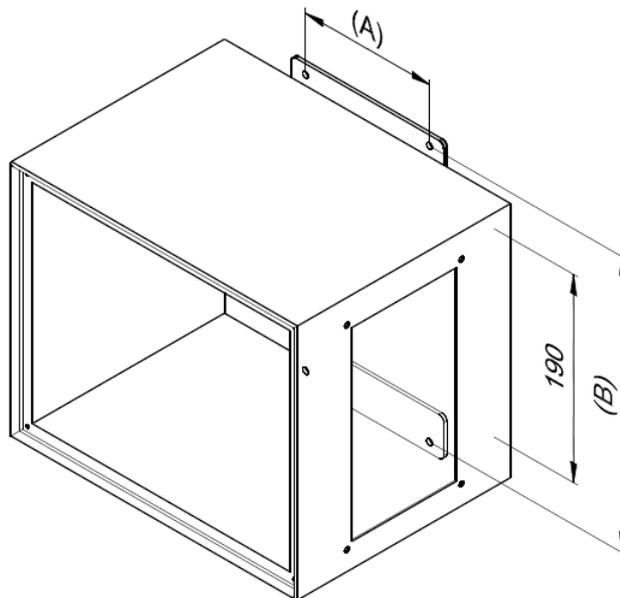
A. MP-1212E Operation Panel

1. Power socket
2. Power cord
3. Boom Up / Down control.



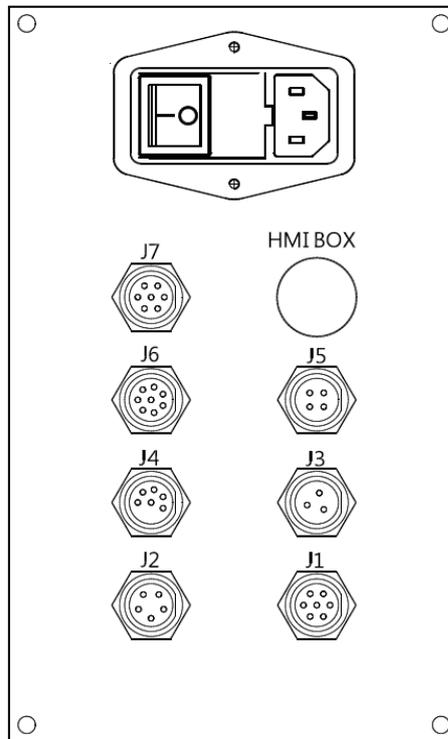
B. CW-350T Control box

Control box model	Unit	CB-107-1
Mounting hole spacing (A)	mm (Inch)	130mm (5.12")
Mounting hole spacing (B)	mm (Inch)	270mm (10.63")
Control box dim.(W x H x D)	mm (Inch)	300 x 290 x 228.2mm
HMI box dim.(W x H x D)	mm (Inch)	264 x 173 x 63.4 mm



1.3 CONNECTIONS

Connection interface drawing : Connection Interface is located on the side of the control box. There are 6 metal connectors from 3 Pins to 8 Pins, one power fuse, and one HMI communication connector.



Connection Interface Information :

1. Power switch with fuse : 1 Phase 100 ~ 240V 2A 50/60Hz

Please make sure the grounding is properly connected and use power cables provided by the original manufacture.

2. PLC I/O definition list :

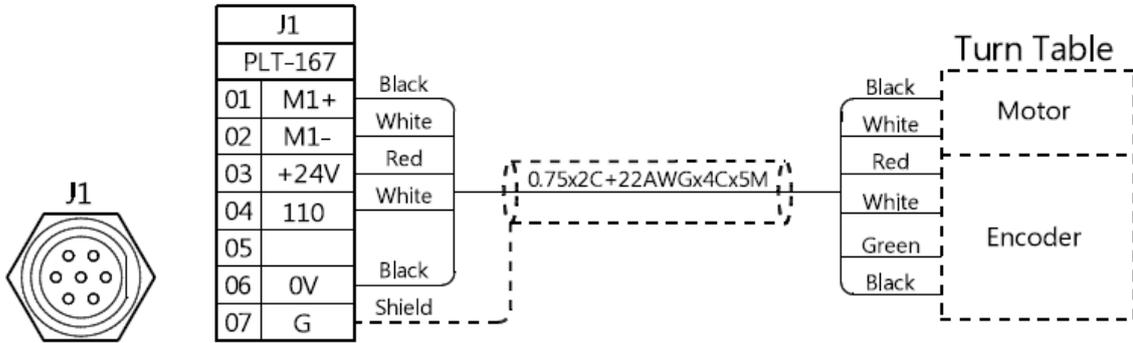
100	
101	Arc on feedback
102	E. Stop (External)
103	Start (External)
104	Foot switch
105	Tailstock is forward
106	Torch slide is down
107	Aux. stand is down
110	Encoder - A Phase
113	Tailstock On/Off

200	Torch on
201	Wire feeder start
202	Oscillator start
203	Turn table CW
204	Turn table CCW
205	Tailstock forward
206	Torch lifter down
207	Aux. stand down

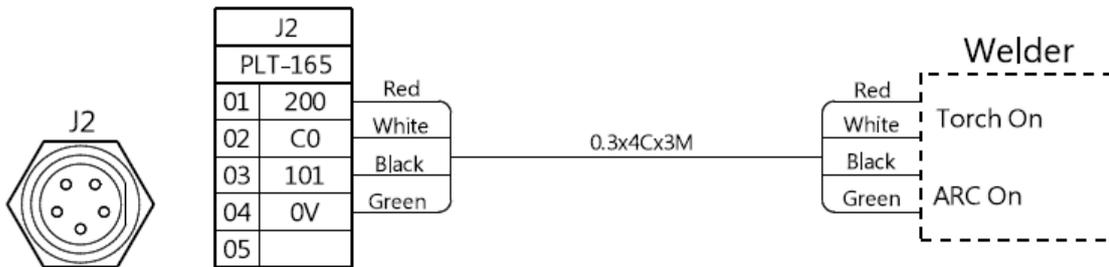
1.3 CONNECTIONS

3. Control box metal connector pin arrangement :

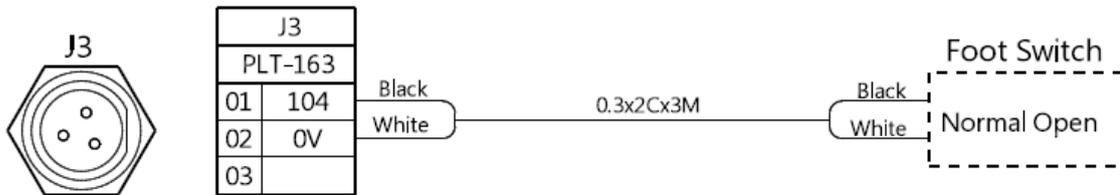
J1 – Moto / Encoder interface.



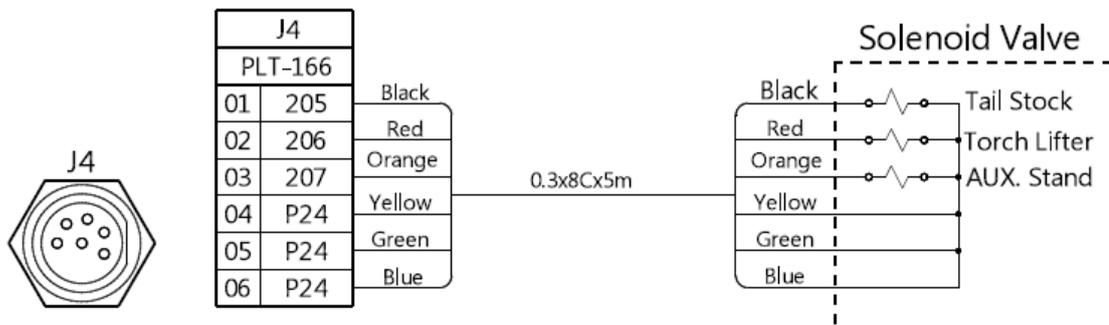
J2 – Welder interface.



J3 – Footswitch interface.

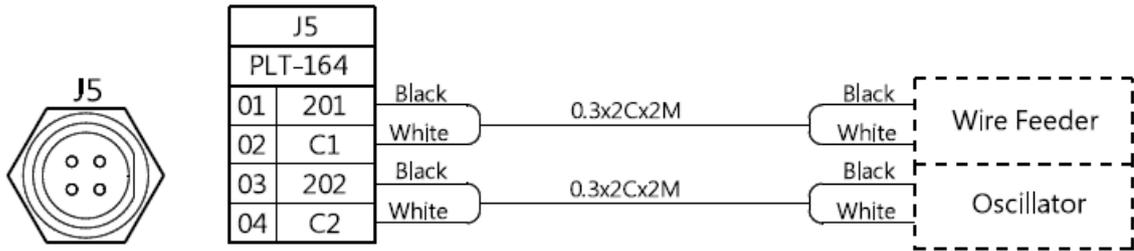


J4 – Pneumatic Cylinder Interface.

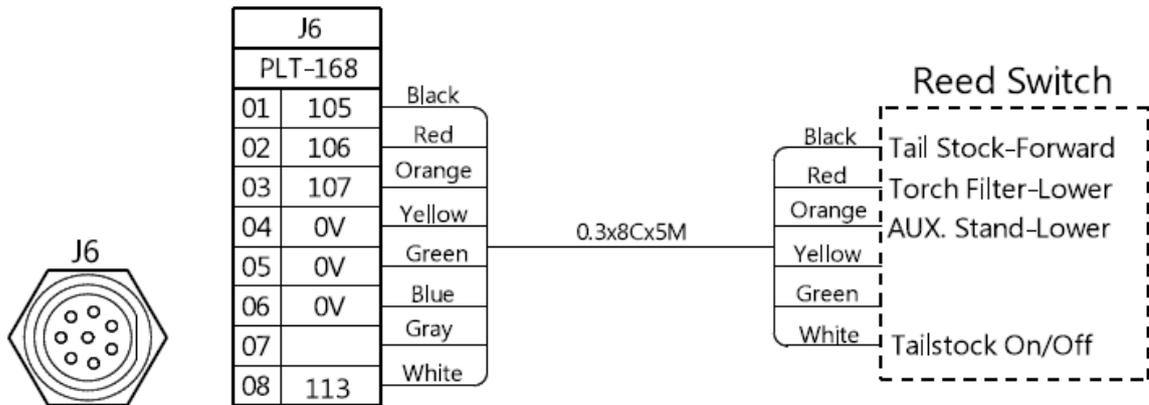


1.3 CONNECTIONS

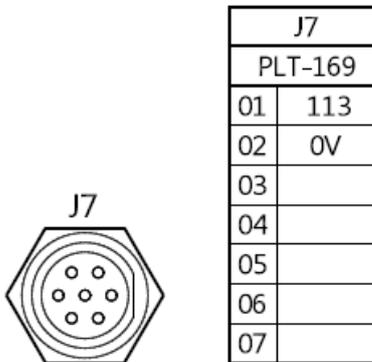
J5 – Wire feeder and oscillator interface.



J6 - Reed switch connection.

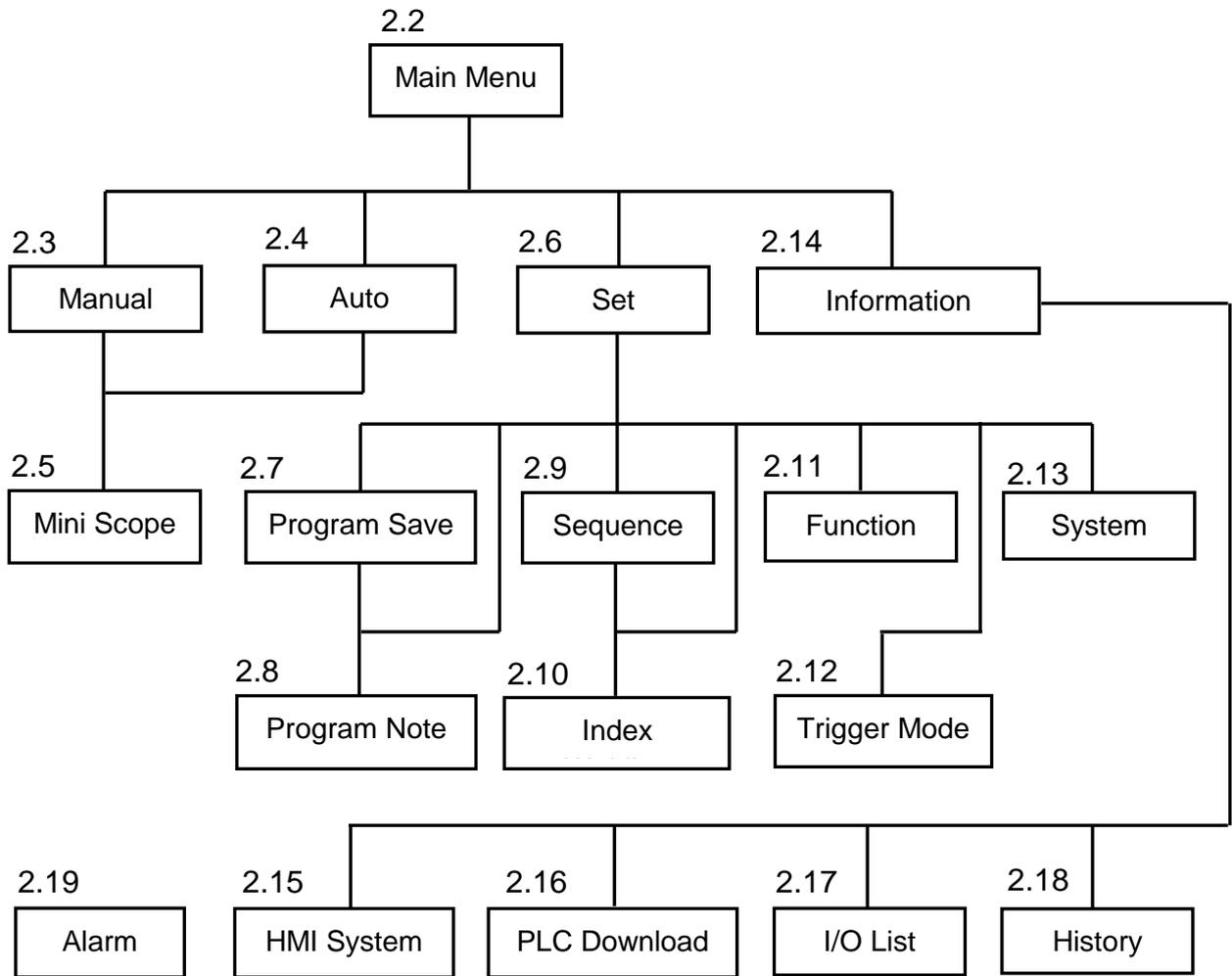


J7 – Tailstock Button.



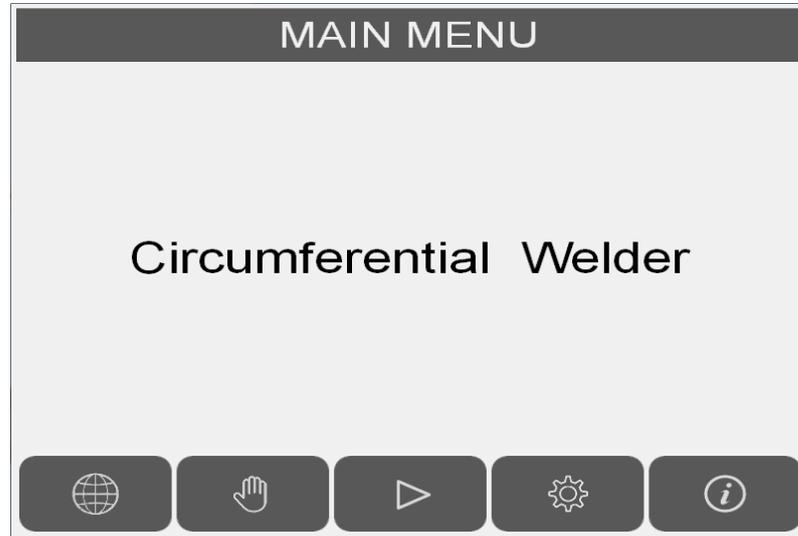
2.1 HUMAN MACHINE INTERFACE OPERATION

HMI Architecture : You can refer to the related chapter according to the number on the top left of each block diagram.



2.2 MAIN SCREEN

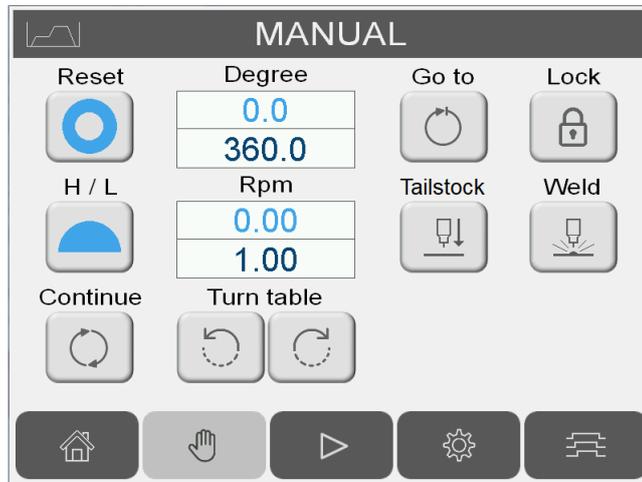
Main screen : The main screen houses several button pointing to different screen, including Chinese / English language interchange, manual mode screen, Auto mode screen, setting screen and alarm history screen.



	Multi – Language.
	To Manual mode screen.
	To Auto mode screen. Default user level 1 clearance password : 123 Default user level 2 clearance password : 456
	To Setting screen.
	To Alarm history screen.

2.3 MANUAL

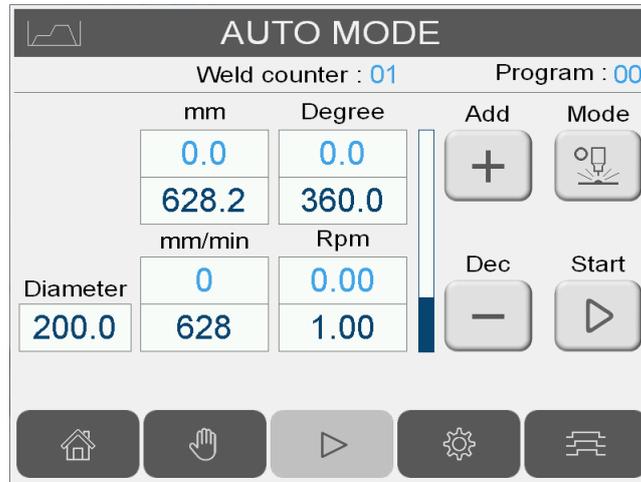
Manual Screen : provides manual operation and testing on the system. The Mini-Scope can be accessed from this screen.



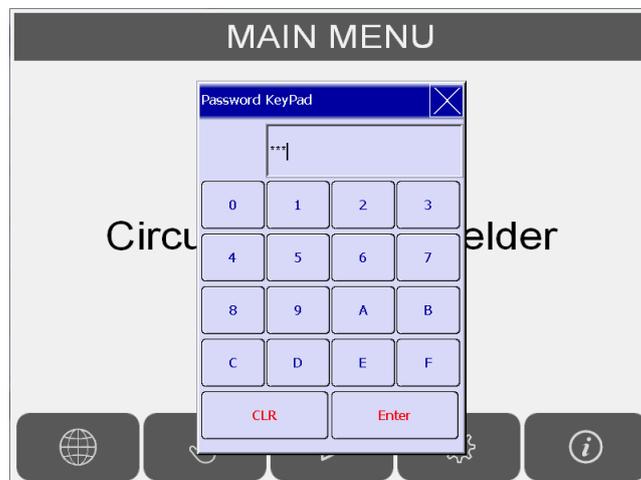
<p>Degree</p> <p>0.0</p> <p>360.0</p>	<p>Turn table current angle (inside the box) and setting (below the box), the setting can be changed using the numeric keypad. Input range : -1800° ~ 1800°</p>		
<p>Rpm</p> <p>0.00</p> <p>1.00</p>	<p>Turn table current speed (RPM) and setting (below the box). The setting can be changed using the numeric keypad. Input range : The actual turn table speed depends on the reducer. The max and min value will be automatically adjusted according to the ratio.</p>		
<p>Continue</p> 	<p>Manual turn table operation selection. Jog Mode : buttons need to be held in order to move the turntable. Continue mode : buttons need to be press only once for the turn table to move.</p>		
<p>H / L</p> 	<p>Turn table graphical speed display and weld/full speed shift.</p>	<p>Go to</p> 	<p>Go to user defined position.</p>
<p>Turn table</p> 	<p>Manual clockwise and counter clockwise buttons.</p>	<p>Weld</p> 	<p>Welding start (Manual).</p>
<p>Tailstock</p> 	<p>Tailstock down.</p>		<p>To Main screen.</p>
<p>Lock</p> 	<p>Welding enabled (Manual).</p>		<p>To Mini-Scope screen.</p>
<p>Reset</p> 	<p>Turn table graphical position display and zero set.</p>		

2.4 AUTO MODE

Auto mode : The welding sequence follows the user setting and maintains speed and position.



As a safety precaution, user is required to enter password before accessing AUTO MODE.



To modify or cancel the above function, please refer to section 2.6.

2.4 AUTO MODE

<p>Degree</p> <p>0.0</p> <p>360.0</p>	<p>Turn table angle (inside the box) and setting (below the box), the setting can be changed using the numeric keypad.</p> <p>Input range : -1800° ~ 1800°</p>		<p>Auto mode welding start. The program number is shown on top of the button.</p>
<p>Rpm</p> <p>0.00</p> <p>1.00</p>	<p>Turn table speed (RPM) and setting (below the box). The setting can be changed using the numeric keypad.</p> <p>Input range : Motor speed ranges from 80 ~ 1800rpm. The actual turn table speed depends on the reducer. The maximum and minimum value will be automatically adjusted according to the ratio.</p>		<p>Speed adjustment button. Can be modified during welding run. The speed level bar on the left represents the current turn table speed.</p>
<p>Diameter</p> <p>200.0</p>	<p>Work piece diameter(mm), Input Range : 10mm ~ 500mm.</p>		<p>To Main screen.</p>
<p>mm</p> <p>0.0</p> <p>628.2</p>	<p>The travel distance, calculated according to work piece diameter value.</p> <p>Input range : -7854mm ~ 7854mm, the range may vary according to the work piece diameter setting.</p>		<p>To Manual mode screen.</p>
<p>mm/min</p> <p>0</p> <p>628</p>	<p>The linear speed, calculated according to work piece diameter (mm/min),</p> <p>Input range : calculated according to rotating speed and work piece diameter.</p>		<p>To Setting screen.</p>
<p>Mode</p> 	<p>Weld Mode <-> Test Mode. The user can simulate the welding run with the Test Mode. (Welding machine is disabled during test mode, only motion is enabled.)</p>		<p>To Mini-Scope screen.</p>

2.5 MINI – SCOPE

Mini-Scope : The Mini-Scope can simultaneously record 3 dynamic data, including motor speed, control voltage and turn table angle. The feature can be enabled via “Scope On/Off” button. The scroll bar allow user to monitor up to 6 minutes into the past. The feature helps the user better understand motor characteristic under different work load and adjust the motor parameters accordingly. The parameters are saved with the welding sequence parameters.



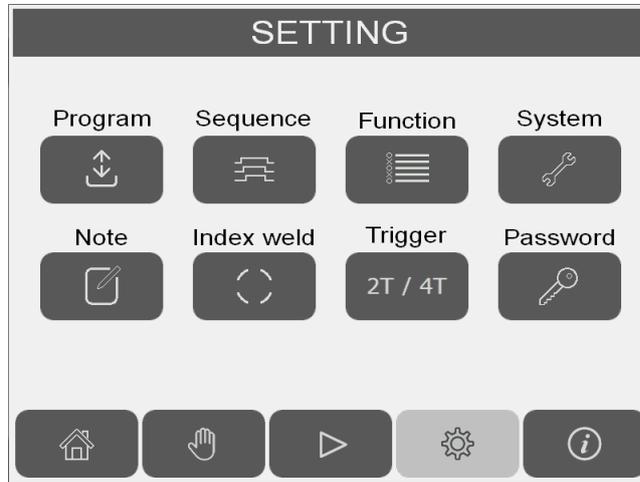
	<p>Start record / Stop record button.</p>
<p>Motor Parameter : P Gain: 0 Offset: 0</p>	<p>The motor's Pgain and offset. The larger value will cause the motor to accelerate faster, but too large the value will cause the motor speed to overshoot. The controller will correct the overshoot after some amount of time.</p>
<p>0 rpm 0.00v 0.0 deg 0.7 sec</p>	<p>The upper left indicates the motor RPM, lower left shows the control voltage, the upper right is the turn table angle and the bottom right represents the elapsed continuous motor operating time.</p>
	<p>Motor manual move operation, speed control and manual welding start switch.</p>

2.6 SETTING MENU

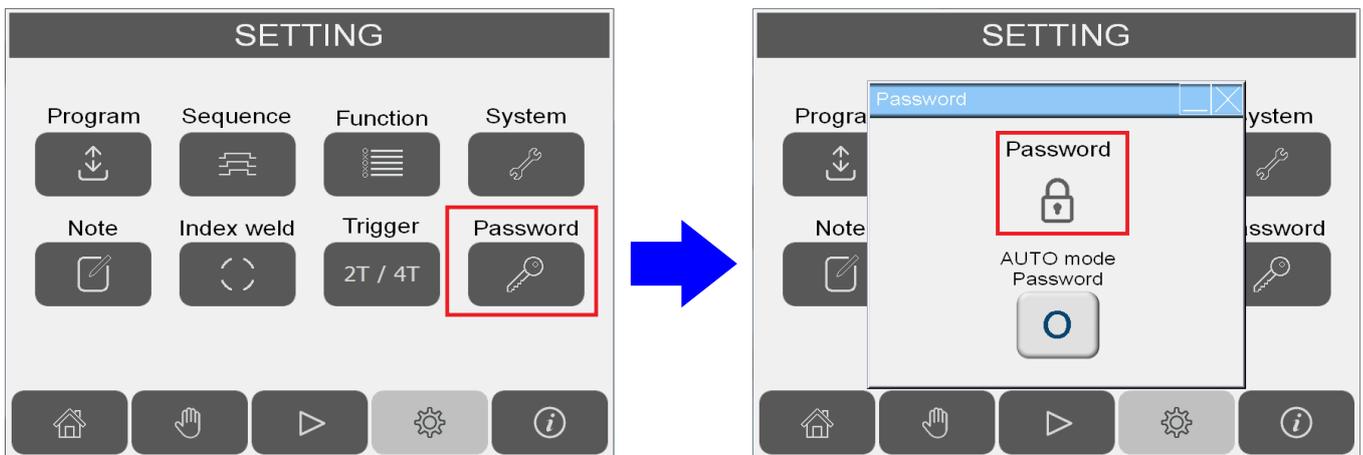
Setting Menu : Program, Sequence, Function, System setting, Note, Index weld, Trigger, Auto mode password can be accessed through this page.

Default user level 1 clearance password : 123

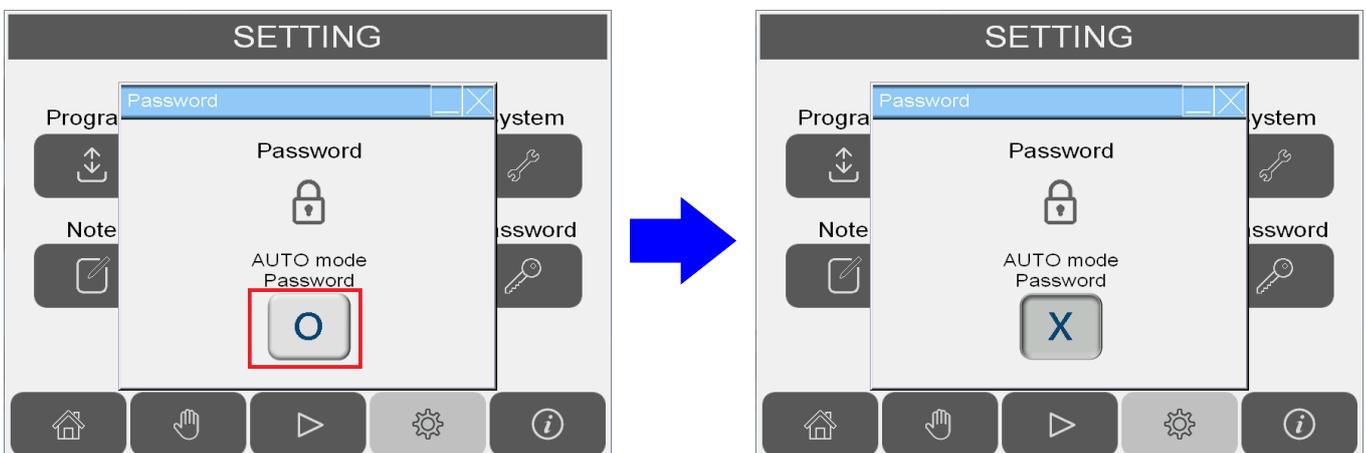
Default user level 2 clearance password : 456



To change the Auto Mode entry password shown in section 2.4. Click on the “Password” button, then click on the Password icon and enter the desired password.

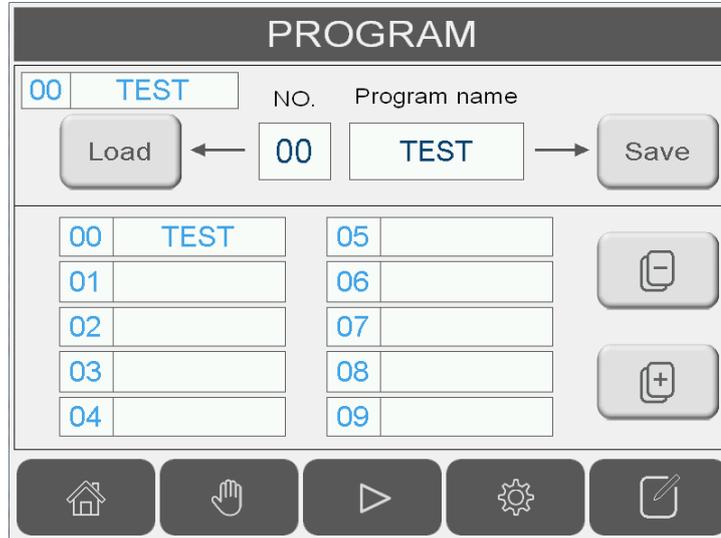


To enable/disable the Auto Mode entry password feature. Click on the “O” button to change it to “X” button.



2.7 PROGRAM SAVE

Program Save : 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, motor parameters (Pgain and Offset).



<p>A screenshot showing the 'Load' button. To its left is a 'NO.' field containing '00'. To its right is a 'Program name' field containing 'TEST'.</p>	<p>In order to load the parameters, first enter the program's address number and press "Load".</p>
<p>A screenshot showing the 'Save' button. To its left is a 'NO.' field containing '00'. To its right is a 'Program name' field containing 'TEST'.</p>	<p>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".</p>
<p>A screenshot showing a list of program addresses from 00 to 09. Address 00 contains 'TEST'. To the right of the list are 'Previous' and 'Next' page navigation buttons.</p>	<p>The user can review the saved program, press or to change pages.</p>
<p>A screenshot showing a button with a notepad icon, used to access the program note screen.</p>	<p>To Program note screen.</p>

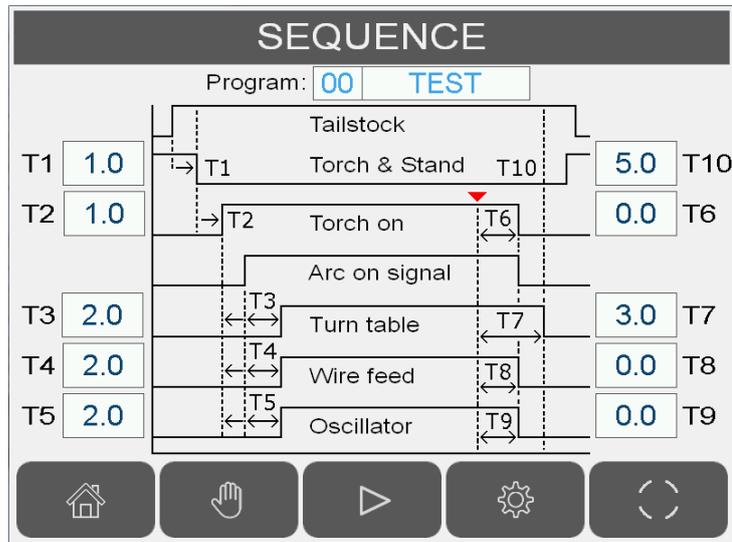
2.8 PROGRAM NOTE

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.

00 TEST NOTE	
A=100	1234567890
V=12	
ABCDEFGHIJKLMNOPQRSTUVWXYZ	
abcdefghijklmnopqrstuvwxyz	
	

2.9 WELD SEQUENCE SETTING

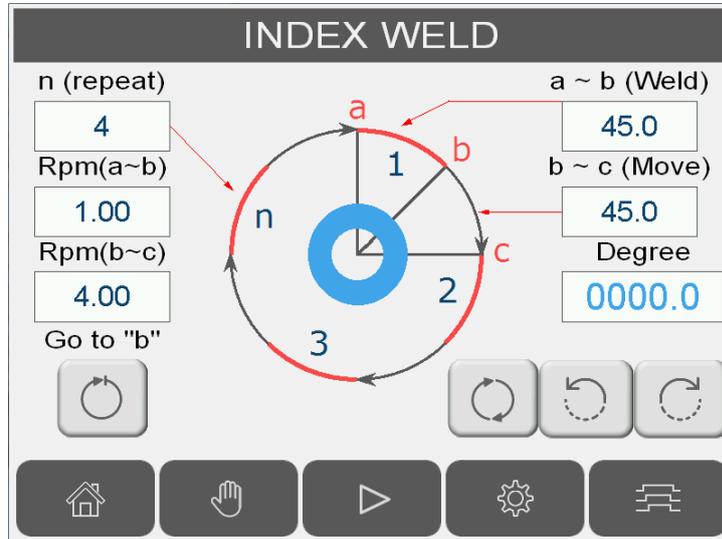
Weld sequence setting : Set the welding timer and motor characteristic according to the work piece.



T1	Tailstock forward delay (T1 ON, torch lifter & Aux. stand down)
T2	Torch lifter & Aux. stand down delay (T2 ON, Torch ON)
T3	Turn table ON delay after Torch ON. (T3 ON, turn table ON)
T4	Wire feeder ON delay after Torch ON. (T4 ON, wire feeder ON)
T5	Oscillator On delay after Torch ON. (T5 ON, oscillator ON)
T6	Welding machine OFF delay (T6 ON Torch OFF)
T7	Turn table OFF delay after Torch OFF. (T7 ON, turn table stop)
T8	Wire feeder OFF delay after Torch OFF. (T7 ON, wire feeder stop)
T9	Oscillator OFF delay after Torch OFF. (T8 ON, oscillator stop)
T10	Torch lifter & Aux. stand up delay after Turn table stop.
	To index weld setting screen.

2.10 INDEX WELD SETTING

Index Welding Function : The welding angle, moving angle, and number of repetition can be set in this screen. The maximum number of repetition (a → b → c) is 36.



	<p>a ~ b : Welding angle setting. b ~ c : Moving angle setting.</p>
	<p>a → b → c forms an independent welding sequence, which can be repeated by setting “ n (repeat) ”. The speed of rotation can be set in “ Rpm ” field.</p>

2.11 AUTORUN FUNCTION

Press to enable/disable selected function.

= enabled.

= disabled.

FUNCTION

<input checked="" type="checkbox"/>	1. "Arc on" Feedback
<input type="checkbox"/>	2. After welding stop, tailstock auto return.
<input type="checkbox"/>	3. When the E-STOP, torch lifter and tailstock is hold.
<input type="checkbox"/>	4. In auto mode, foot switch can start autorun.
<input type="checkbox"/>	5. After welding stop, return to the starting point.
<input checked="" type="checkbox"/>	6. Reed switch check → Tailstock - Forward
<input checked="" type="checkbox"/>	7. Reed switch check → Torch slide - Lower
<input checked="" type="checkbox"/>	8. Reed switch check → Aux. stand - Lower

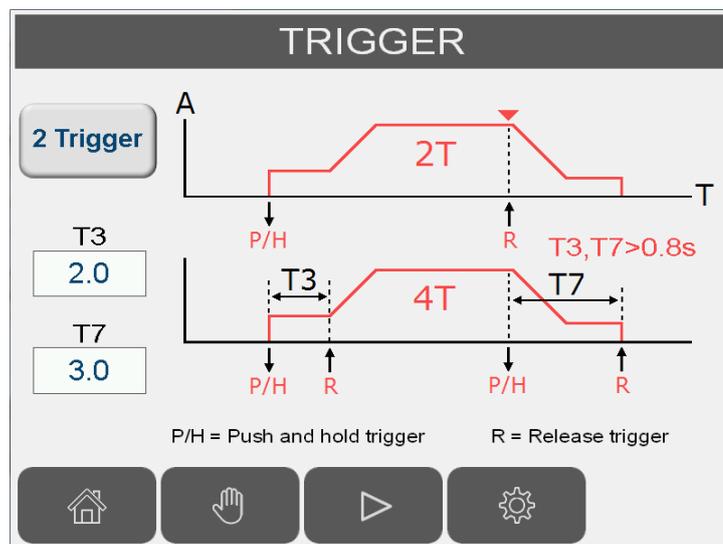
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▶
⚙️

2.12 WELD START MODE SETTING

Welding start trigger mode : Different starting method can be configured according to the welding power supply.

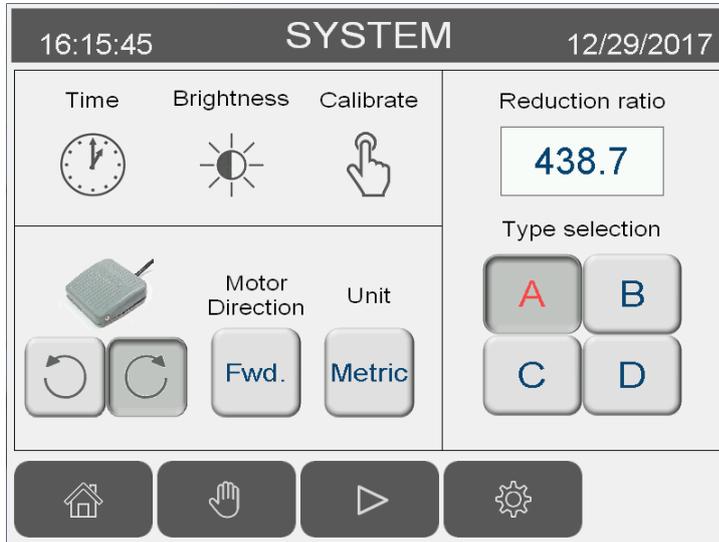
2 Trigger mode : The default mode is 2 Trigger Mode, where the trigger signal is held ON until the end of welding sequence. The sequence can be set in section 2.9 (welding sequence setting).

4 Trigger mode : Some welding machine supports 4 Trigger Mode, where the trigger is held on only during the initial arc on phase and final arc off phase. The configuration in section 2.9 is still valid for 4 Trigger Mode.



2.13 SYSTEM SETTING

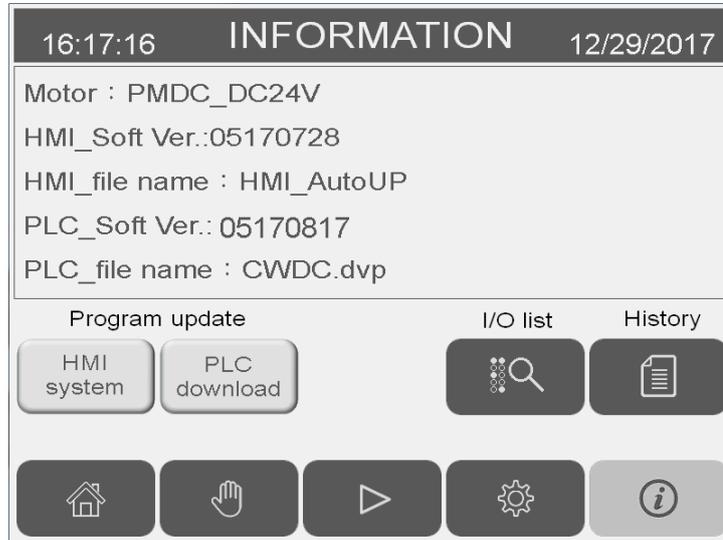
System setting : Reducer ratio setting, Metric / Inch units setting, Motor direction setting, Time / Data, Back light setting.



	<p>Reducers are divided into A, B, C and D types. The type of reducer and its corresponding reduction ratio can be selected by pressing the A,B,C or D buttons.</p> <p>Note1 : Incorrect reducer type may result in machine damage.</p> <p>Note2 : The reduction ratio is password protected.</p>		<p>Under Manual Mode, Foot switch can be set to forward or reverse.</p>
	<p>Metric / Inch units, instant switching.</p>		<p>System time and date adjustment. Backlight adjustment.</p>
	<p>Reverse motor direction.</p>		<p>HMI touch screen adjustment.</p>

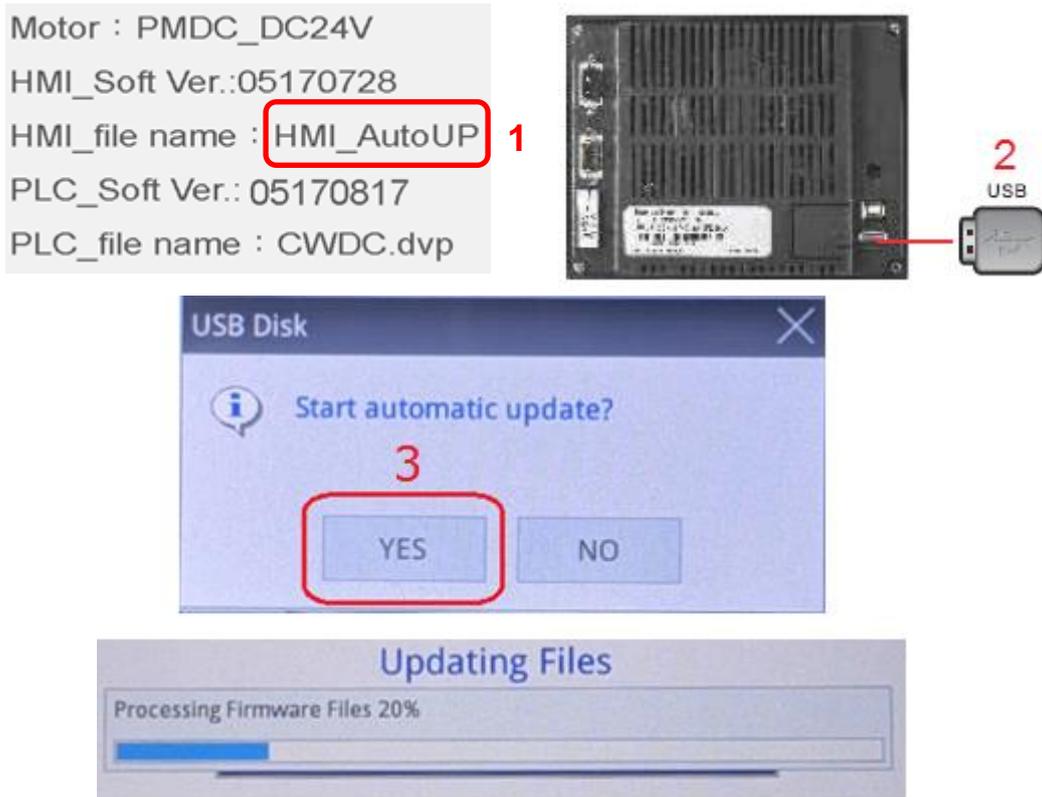
2.14 INFORMATION

1. System Information : Provide system info, hardware info and program version.
2. Program Update : Update the system program through USB hardware.
3. IO monitor and alarm history.



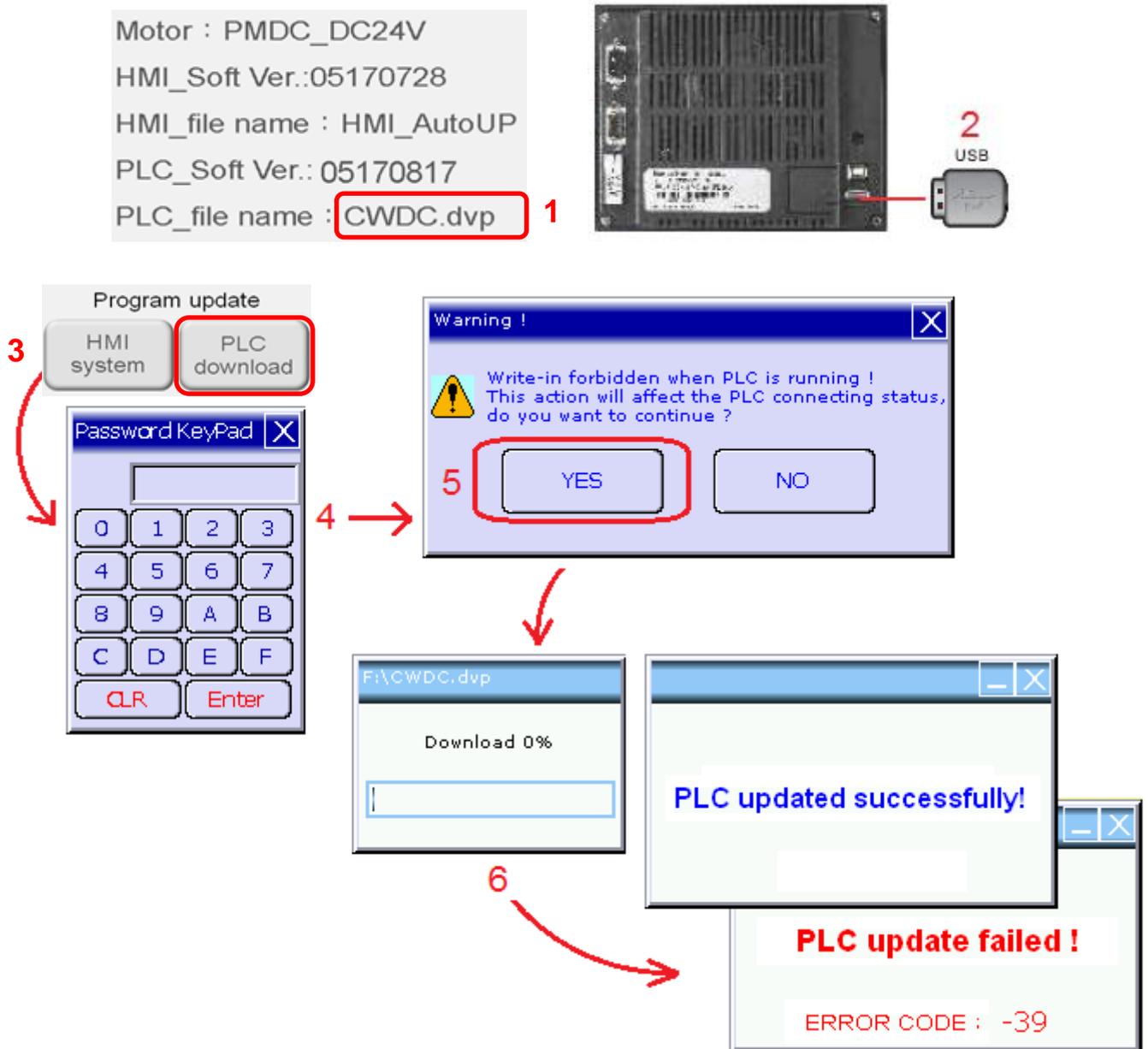
<p>Motor : PMDC_DC24V HMI_Soft Ver.:05170728 HMI_file name : HMI_AutoUP PLC_Soft Ver.: 05170817 PLC_file name : CWDC.dvp</p>	<ol style="list-style-type: none"> 1. Motor type. 2. HMI hardware and software version. 3. HMI program. 4. PLC hardware and software version. 5. PLC program.
<p>Program update</p> <p>HMI system PLC download</p>	<p>HMI/PLC program update.</p>
<p>I/O list History</p> <p> </p>	<p>IO monitor and alarm history.</p>

2.15 HMI PROGRAM UPDATE



1. A new program named “HMI_AutoUP” will be emailed. Please save it into a USB.
2. Plug the USB into the USB port behind the HMI.
3. Click YES to automatically update the HMI program.

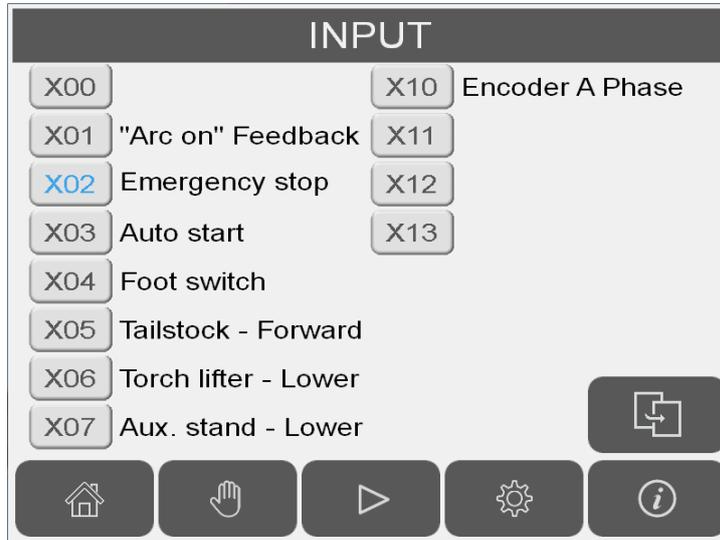
2.16 PLC PROGRAM UPDATE



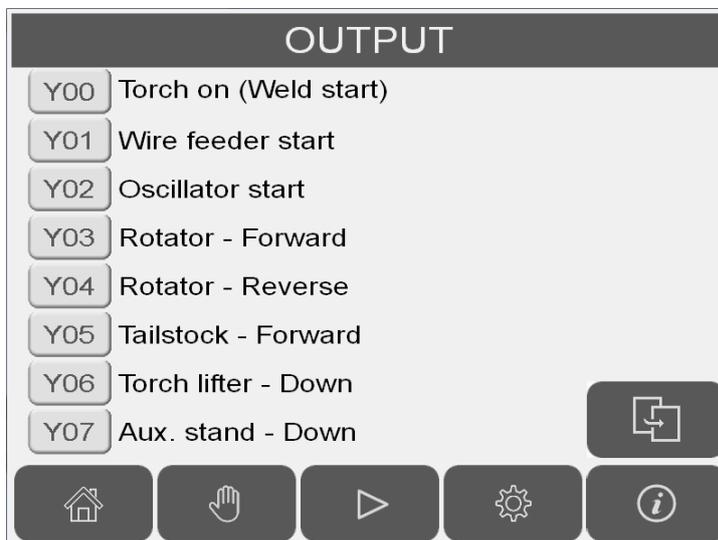
1. A new PLC program “CWDC.dvp” will be emailed. Please save it into USB.
2. Plug the USB into the USB port behind the HMI.
3. Press the “PLC download” button and enter the password.
4. Correct password would bring you to a warning prompt.
5. Press “YES” to begin download the file.
6. After the process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

2.17 PLC I/O TEST

PLC I/O INPUT LIST : INPUT signals, for monitor purpose only.



PLC I/O OUTPUT LIST : OUTPUT signals. The user can force the output ON for maintenance purpose.



2.18 ALARM HISTORY

16:26:24		HISTORY		12/29/2017
O	16:23	29/12/2017	M481-Emergency Stop	
X	16:25	29/12/2017	M481-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 that the error has been corrected.
- (3) Second and third column indicate the time and date of the occurred errors.
- (4) Fourth column contains the description of errors, M48X prefix is PLC's device number. This number only serves as debugging information for the program designer.

2.19 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 “Rest” 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”.
3. If the error type is “PLC Battery low”, DO NOT TURN OFF the power and DO replace the battery A.S.A.P WHILE THE POWER IS ON. The system can still be operated with this error. However, this error message cannot be resettled without replacing the battery.

3.1 ALARM MESSAGE AND TROUBLESHOOTING

No.	Error Message	Description And Troubleshooting
002	M481- Emergency stop	<p>Emergency stop</p> <ol style="list-style-type: none"> 1. Please reset the E-stop to resume normal function. 2. Please check if Interlock Input PLC_Input_X02 is disconnected or broken.
003	M482-PLC Low battery	<p>PLC's battery is either not installed, 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.
004	M483-PLC 24VDC low	<p>Abnormal DC24V (below system threshold)</p> <ol style="list-style-type: none"> 1. This error will only show up in the alarm history and won't stop the system while it's running. 2. Please observe if the system is disabled by this error. If yes, please measure the DC24V. 3. If DC24V is not present or is too low, please check the DC24V connection and see if any short circuit is present, which may pull the 24V down to insufficient level.
005	M484-PLC program error	<p>PLC program / syntax error</p> <ol style="list-style-type: none"> 1. Please reset the error. If the error cannot be reset, shut down and restart in 5 seconds. 2. If the error still persists, please contact the original manufacture for more information on how to proceed.
006	M485-Abnormal motor speed	<p>Abnormal encoder feedback.</p> <ol style="list-style-type: none"> 1. Check if the motor is turning. If not, please check the circuit and the mechanical part for any abnormal event, correct DC supply voltage and functional motor driver board. 2. If the motor speed is correct while this error occurs, please check the encoder and its circuit for any loose part or abnormality.

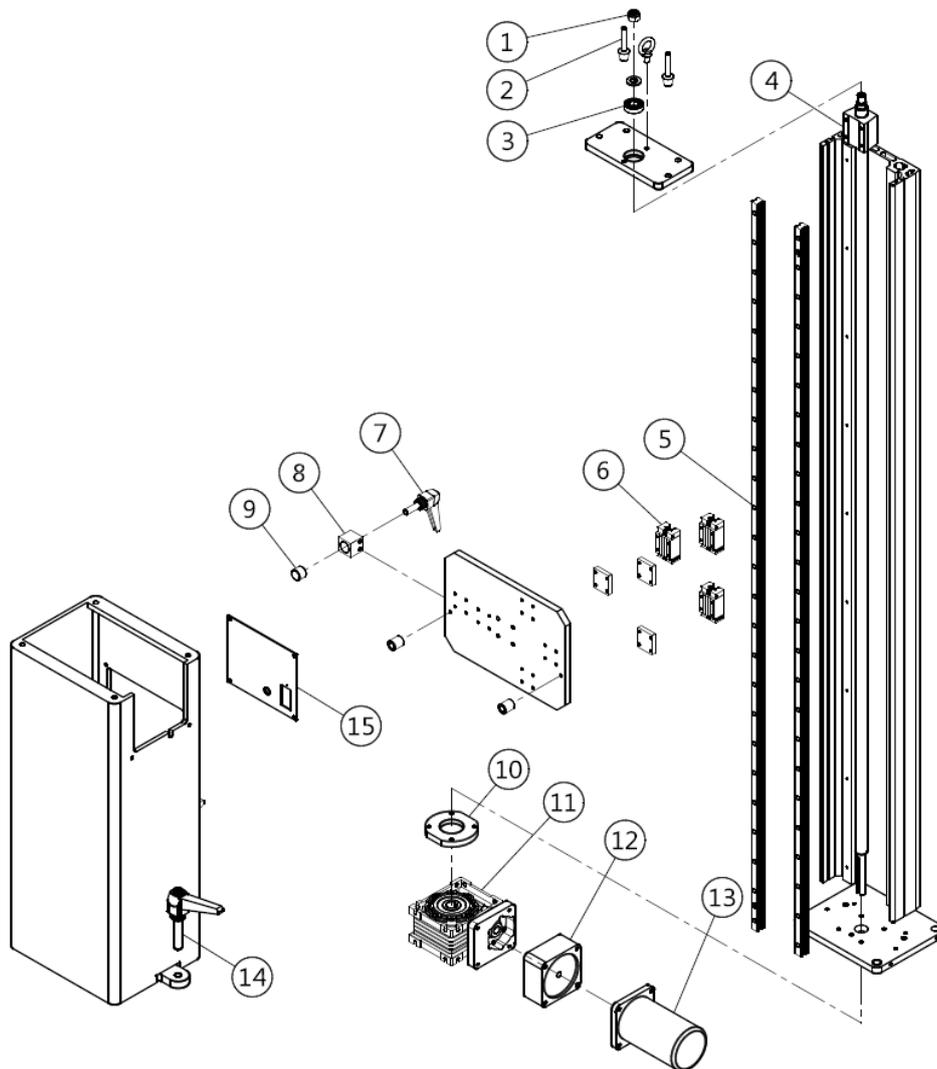
3.1 ALARM MESSAGE AND TROUBLESHOOTING

No.	Error Message	Description And Troubleshooting
007	M486-Motor overload protection	<p>The motor can't achieve its setting speed in a predefined amount of time.</p> <ol style="list-style-type: none"> 1. Please check if the work load is too heavy, which causes the error. 2. Check for any abnormal mechanical interruption. 3. Please check the motor and encoder temperature. <p>Please check the DC power supply and motor driver board output voltage.</p>
010	M489-Tailstock timeout	<p>Tailstock is not in the correct (forward) position in a predefined amount of time.</p> <ol style="list-style-type: none"> 1. Check the air supply connection. 2. Check for any abnormal mechanical interruption. 3. Check PLC Input_X05 sensor circuit and see if it's well connected and normal.
011	M490 - Aux. stand timeout!	<p>Aux. Stand is not in the correct (downward) position in a predefined amount of time.</p> <ol style="list-style-type: none"> 1. Check the air supply connection 2. Check for any abnormal mechanical interruption. 3. Check PLC Input_X07 sensor circuit and see if it's well connected and normal.
012	M491-Torch lifter timeout!	<p>Torch lifter is not in the correct (downward) position in a predefined amount of time.</p> <ol style="list-style-type: none"> 1. Check the air supply connection 2. Check for any abnormal mechanical interruption. 3. Check PLC Input_X06 sensor circuit and see if it's well connected and normal.
013	M492-Arc On failure!	<p>No arc on feedback signal detected in 5 seconds.</p> <ol style="list-style-type: none"> 1. If the welding power supply doesn't support arc on feedback signal, please go to Auto Mode → Setting and turn of the arc on feedback function. 2. Check the welding power supply and welding torch for any damage. 3. Check the arc on feedback signal connection.

4.1 PART LIST — COLUMN

Item.	Part No.	Description	Q'ty.	Remark
1	0124-1201	Nylon insert lock nut	1	M12
2	0140-0086	Machine mount	4	
3	0301-2005	Bearing	1	
4	5022-2780000-10	Ball screw	1	
5	5022-2770000-30	Linear guideway	2	
6	* 0322-1519	Runner block	3	
7	0130-0134	Handle	2	
8	5022-2360000-30	Base	2	
9	5115-08006312000-10	Pressure block	1	
10	5022-2230000-10	Spacer	1	
11	* 0353-0349	Worm reducer	1	
12	* 0351-0129	Gear reducer	1	
13	* 0361-1002-8	PMDC motor w/cable & terminals	1	65W
14	0130-0134-9	Handle	2	
15	6501-3620	Control panel	1	

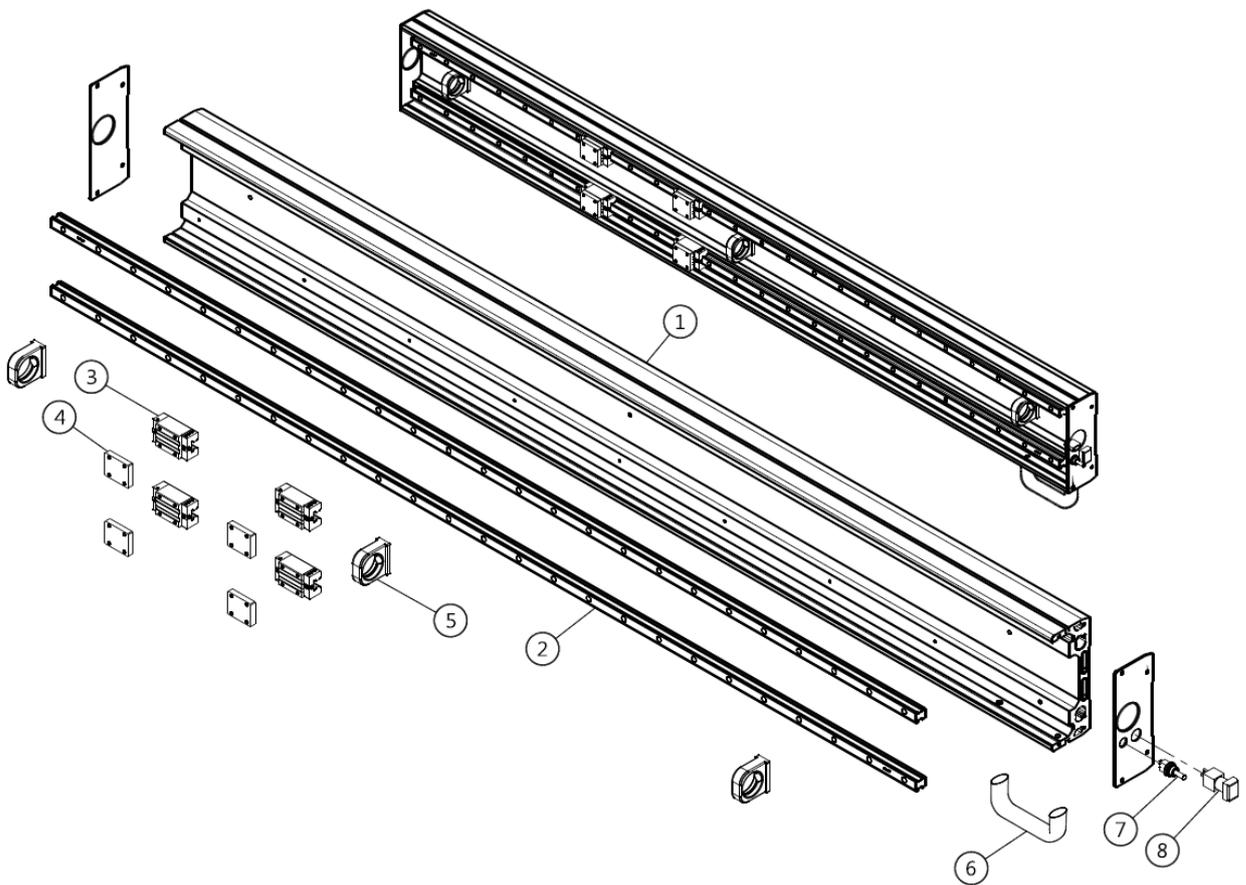
* Recommended spare parts



4.2 PART LIST — BOOM

Item.	Part No.	Description	Q'ty.	Remark
1	5122-02018253000-10	Boom	1	
2	5022-2770000-30	Linear guideway	1	
3	* 0322-1519	Runner block	4	
4	5022-2721100-30	Runner block plate	4	
5	3533-0002	Securing clip	3	
6	0130-1012	Handle	1	
7	3213-4008	Toggle switch	1	
8	3271-2005	Push button	1	

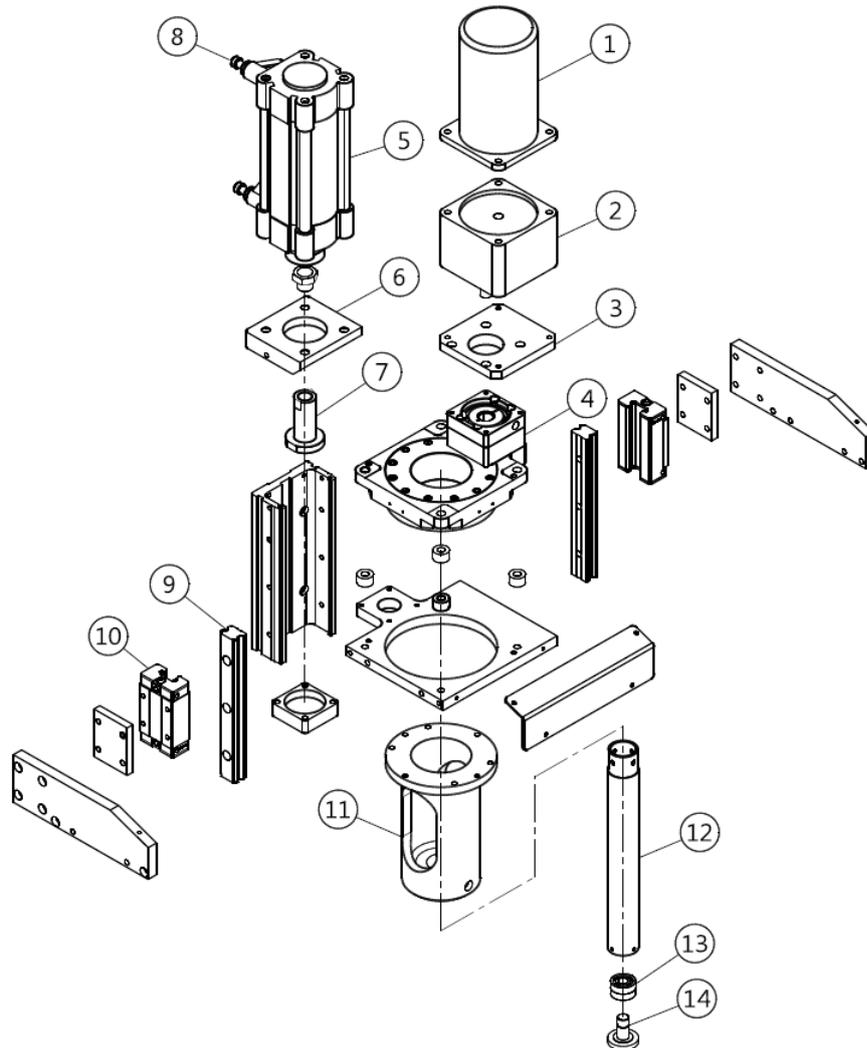
* Recommended spare parts



4.3 HEAD STOCK

Item.	Part No.	Description	Q'ty.	Remark
1	* 0361-1104	PMDC Motor	1	
	* 3169-1224-9	Encoder w/connector & cover	1	
2	* 0351-0115	Gear reducer	1	
3	5121-0501301000-10	Reducer flange	1	
4	* 0352-0605	Reducer	1	
5	* 0201-6307	Pneumatic cylinder	1	
6	* 5122-02018302000-10	Flange	1	
7	5122-02018307000-10	Connector	1	
8	0212-0008	Speed control valve	1	
8-1	0212-0033	Speed control valve	2	
9	5122-02018311000-10	Linear guideway	2	
10	0322-2513	Runner block	2	
11	5035-6160000-21	Reducer flange	1	
12	5122-02018312000-10	Tube	1	
13	0300-0025	Bearing	1	
14	5122-02018310000-10	Live center	1	

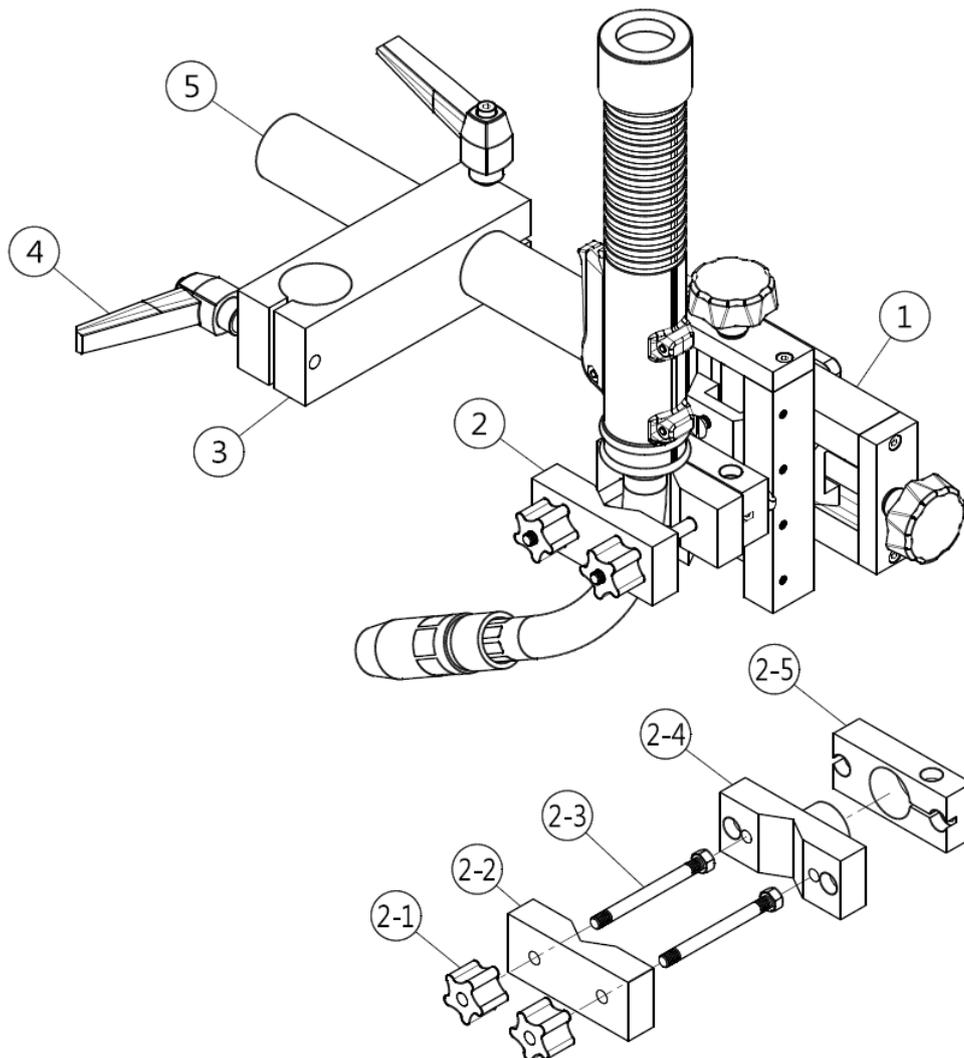
* Recommended spare parts



4.4 TORCH HOLDER

Item.	Part No.	Description	Q'ty.	Remark
1	6402-0050	Slide	2	Please see 4.5.2
2	5035-3060000-10	V-Block torch holder	1	
2-1	0130-0136	Knob	2	
2-2	5010-6180120-20	Upper cover plate	1	
2-3	0106-0603	Screw	2	
2-4	5035-3060200-10	Torch holder	1	
2-5	5035-3060100-10	Torch connect base	1	
3	5122-02018401000-10	Support unit	1	
4	0130-0110	Handle	2	
5	5122-02018402000-10	Torch boom tube	1	

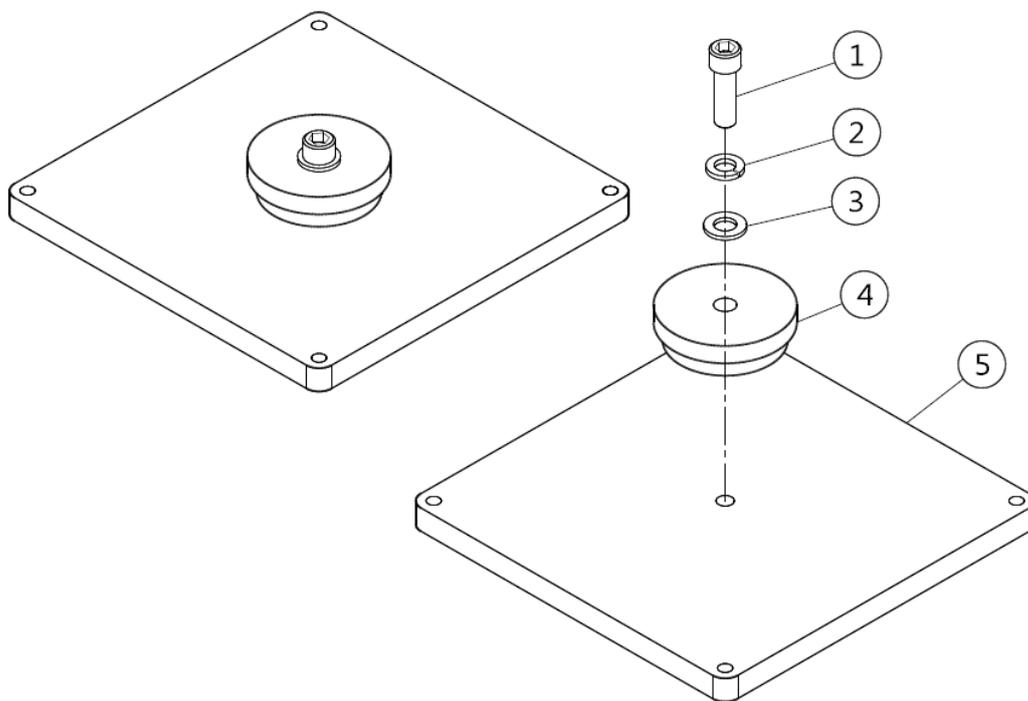
* Recommended spare parts



4.5.1 PART LIST — ROTATION BASE (MP-001)

Item.	Part No.	Description	Q'ty.	Remark
1	0101-1205	Screws	1	M12x40
2	* 0122-1200	Spring washer	1	M12
3	0121-1200	Washer	1	M12
4	* 5022-2220000-30	Shaft	1	
5	5022-2240000-30	Base	1	

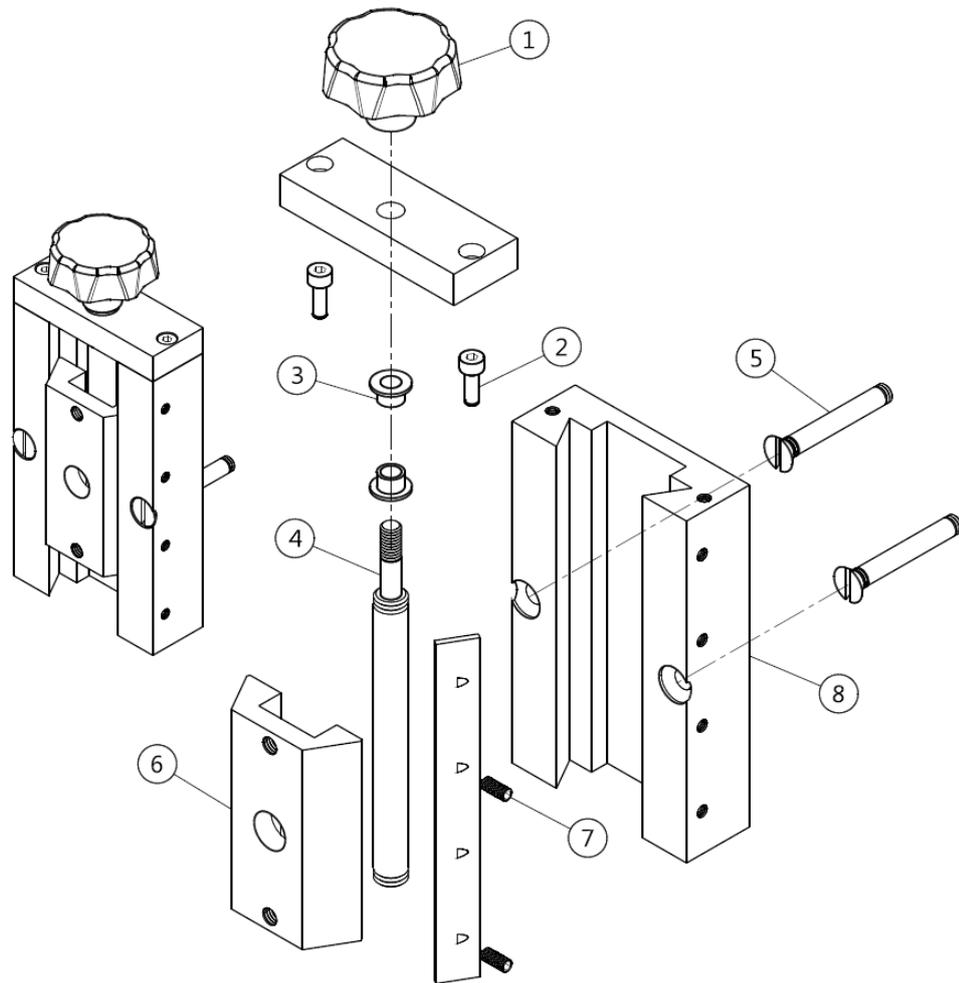
* Recommended spare parts



4.5.2 PART LIST — 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	

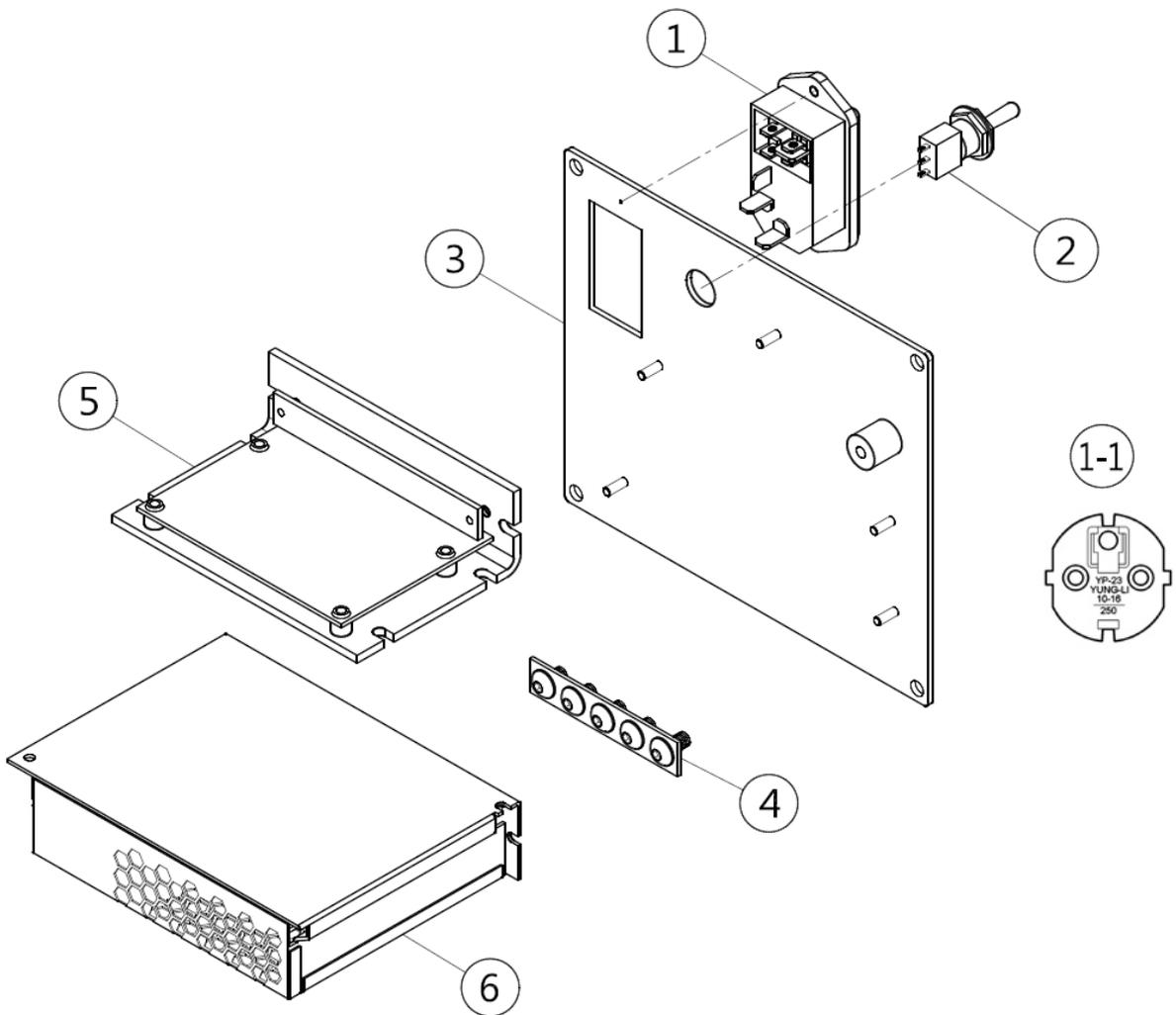
* Recommended spare parts



4.6.1 PART LIST — OPERATION PANEL (MP-1212E)

Item.	Part No.	Description	Q'ty.	Remark
1	3445-2009	Power socket	1	
1-1	3446-0003	Power cord	1	
2	* 3213-4008	Toggle Switch	1	
3	5022-2510000-12	Control panel	1	
4	3545-5001	Grounding copper bar	1	
5	* 6651-1010	DC Motor control	1	
6	3326-0008	Power supply	1	

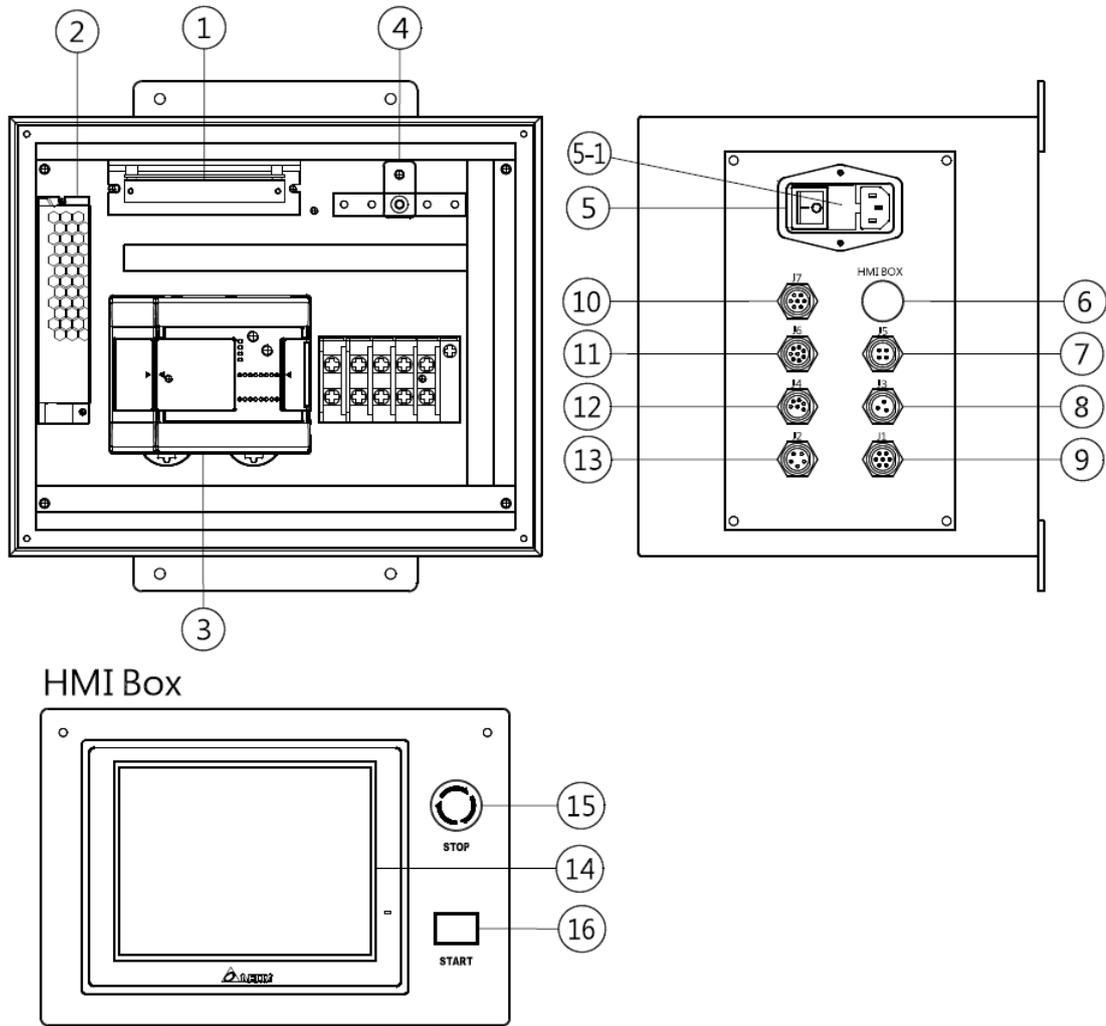
* Recommended spare parts



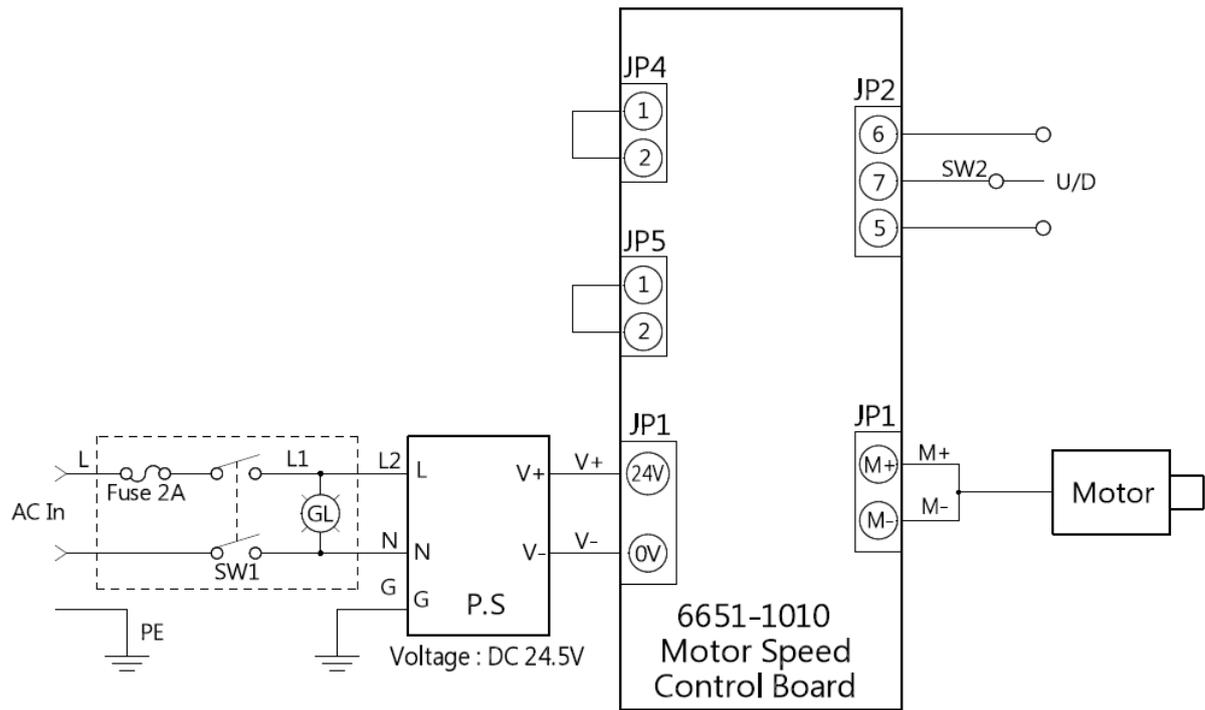
4.6.2 PART LIST — CONTROL BOX & HMI BOX (CW-350T)

Item.	Part No	Description	Q'ty.	Remark
1	* 6651-1010	Printed circuit board	1	Motor control board
2	3326-0008	Power supply	1	
3	* 2511-0791-01	PLC & Software	1	PLC
4	3545-5002	Grounding copper bar	1	
5	3331-2001	IEC Inlet filter	1	
5-1	* 3226-2002	Fuse	1	
6	0325-0016	PU Hose	10.4	
8	3124-2005	Socket male 4Pin	1	J5 (SLO-150 / Wire feed)
7	3124-2004	Socket male 3Pin	1	J3 (Foot switch)
9	3124-2008	Socket male 7Pin	1	J1 (Motor)
10	3124-2008	Socket male 7Pin	1	J7 (Tailstock)
11	3124-2009	Socket male 8Pin	1	J6 (Reed switch)
12	3124-2007	Socket male 6Pin	1	J4 (Solenoid valve)
13	3124-2006	Socket male 5Pin	1	J2 (Welder)
14	2511-0792-01	HMI & Software	1	HMI
15	3271-2005	Push button	1	
16	3214-2009	Push button	1	

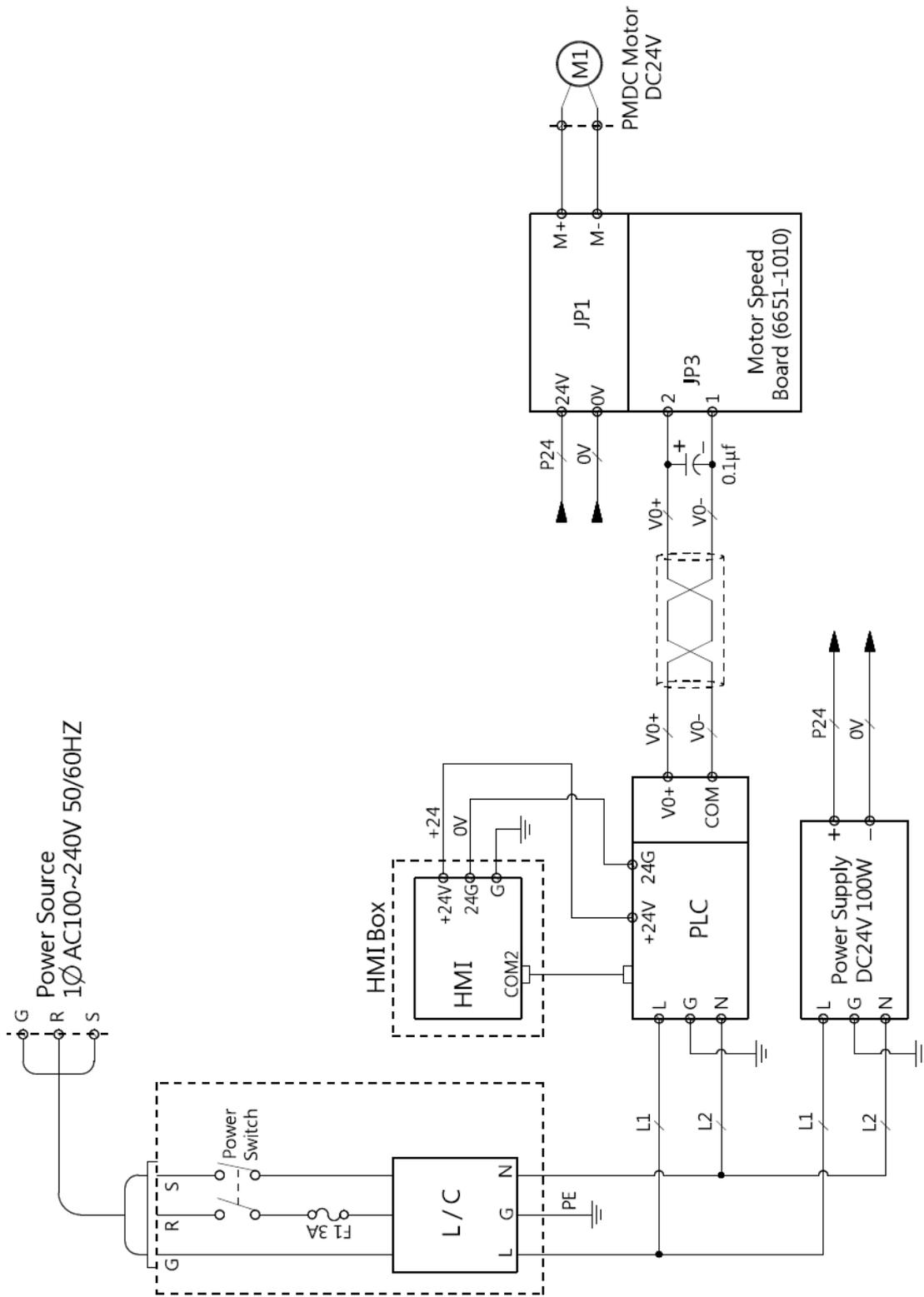
* Recommended spare parts



5. CIRCUIT DIAGRAM — MP-1212



5. CIRCUIT DIAGRAM — POWER



5. CIRCUIT DIAGRAM — I/O LIST

