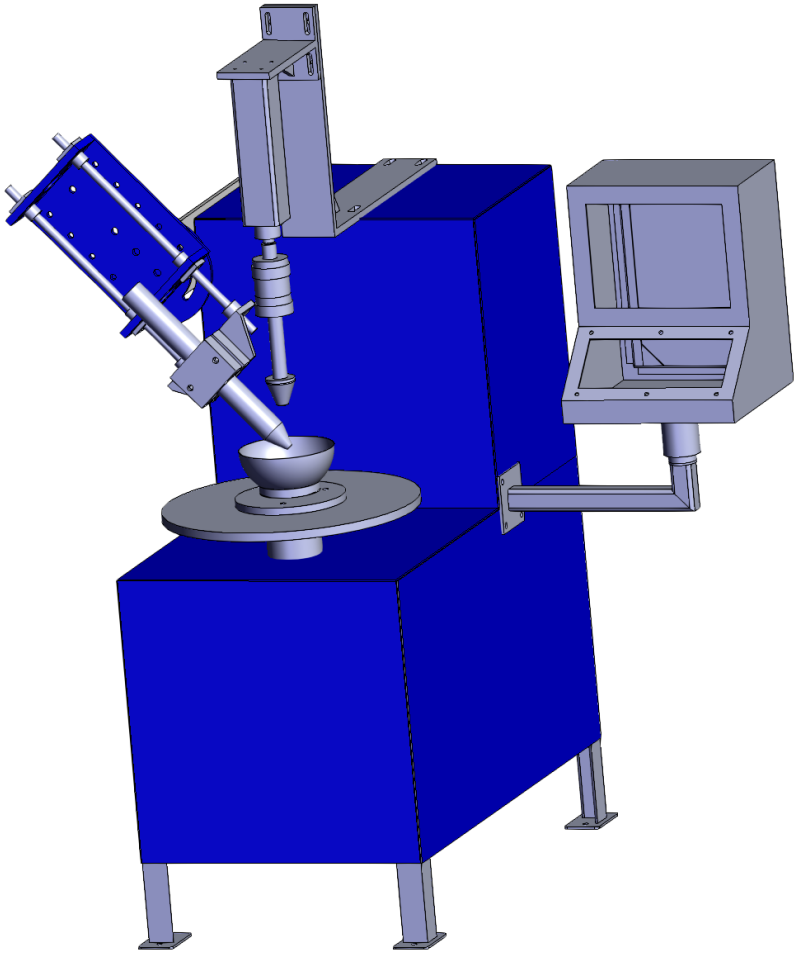
OPERATING MANUAL FOR IMPELLER WELDING AUTOMATION



PREFACE

Thanks for purchasing our product and looking forward to your precious advice for the improvement of our product. We will dedicate ourselves to producing the best products and offer the best services.

The machine has been carefully inspected, both mechanically and electrically, before it left the factory. The machine should be initially inspected upon receipt, if any damage which may have occurred in transit, inform WARPP ENGINEERS PVT.LTD. or its Dealer immediately.

Check for the accessories supplied against those listed in packing slip.

Caution: Before attempting to connect the equipment to any power source, read instructions carefully. In case of any defect or deficiency, contact “WARPP ENGINEERS PVT.LTD.” or its authorized Dealer. Make sure to quote model number and serial number of the equipment in all correspondence.

THE DESIGN OF THIS EQUIPMENT IS SUBJECT TO CONTINUOS DEVELOPMENT AND IMPROVEMENTS, CONSEQUENTLY “WARPP ENGINEERS PVT.LTD.” RESERVES THE RIGHT TO INCORPORATE MINOR CHANGES FROM THE INFORMATION CONTAINED IN THIS MANUAL.

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1. SAFETY

Our machines are designed and built with ample safety considerations. However, proper installation & operation of the machine will increase your safety.

DO NOT INSTALL, OPEARTE OR REPAIR THIS EQIPMENT WITHOUT READING THIS MANUAL

Following points to be taken care while installing the machine

- Ensure that the machine is placed properly, so that it has enough ventilation and stability so that it does not fall.
- Any safety items fitted must not be bypassed or removed. If they must be removed, then the equipment should be put out of operation, until repair is completed.
- Always keep the workplace clean & free from obstacles.
- Make sure that the work area is well lit.
- Ensure that the machine is regularly maintained.
- All electrical supply terminals shall be well covered and insulated.
- Always use proper hand gloves and other safety equipment while operating the machine
- Use proper shaded welding screen as the arc has ultraviolet rays which can damage the eyesight.
- Do not obstruct any moving parts as it may cause harm.
- Ensure that the clothing is fire resistant to protect your

skin from burns and arc rays.

- When compressed gas is to be used, then special precautions are to be taken to prevent explosion.
- Please make sure that no inflammable items are there in the weld area.
- Spatters can cause burns ensure that you use all personnel protectiveequipment.
- Newly supplied machines, which is packed in either corrugated boxes or wooden boxes shall be shifted using a forklift.
- Proper care shall be taken while shifting or relocating the machines. Uselifting hooks / mechanism provided on the machine.

2. DESCRIPTION

Impeller welding SPM Offers Precision Welding with an advanced level of process control and automation.

The 'WARPP' Impeller welding SPM is designed to complete circumferential welds on Impellers used in pumps.

The system comprises a Turn Table with Adjustable Welding Torch arm & Job Clamp Arm to achieve welding on different diameter impeller bodies.

The turn table consists of a fully earthed face plate with mounting slots and reference circles suitable for impeller bodies of variable diameter.

Variable speed rotation of the turn table is achieved by DC stepper motor with reduction gearbox.

Job Clamp arm is a pneumatically powered arm to hold the impeller in place dure the course of welding.

Welding torch arm is also a pneumatically powered arm which extends and retracts the welding torch.

3. WORKING CONDITION & ENVIRONMENT

1) Please note that this equipment to be installed in a clean place free from dirt and moisture.
2) Avoid direct exposure to sunlight.
3) Care should be taken to see that it is not exposed to rain.
4) Whenever the machine to be used at a site make sure proper shade is provided for the machine.
5) Do not keep the machine near an oven or furnace where the temperature is at higher side, and it can affect the performance of the machine.
6) Always keep the machines at lease with a gap of 300 mm around the machineas it is required for free circulation of air.
7) Keep the machine in an upright position.
8) Use cables with proper cross section based on the input power requirement of the machine.
9) When long cables are used you need to select higher cross-sectional area of conductors to avoid voltage drop during the usage

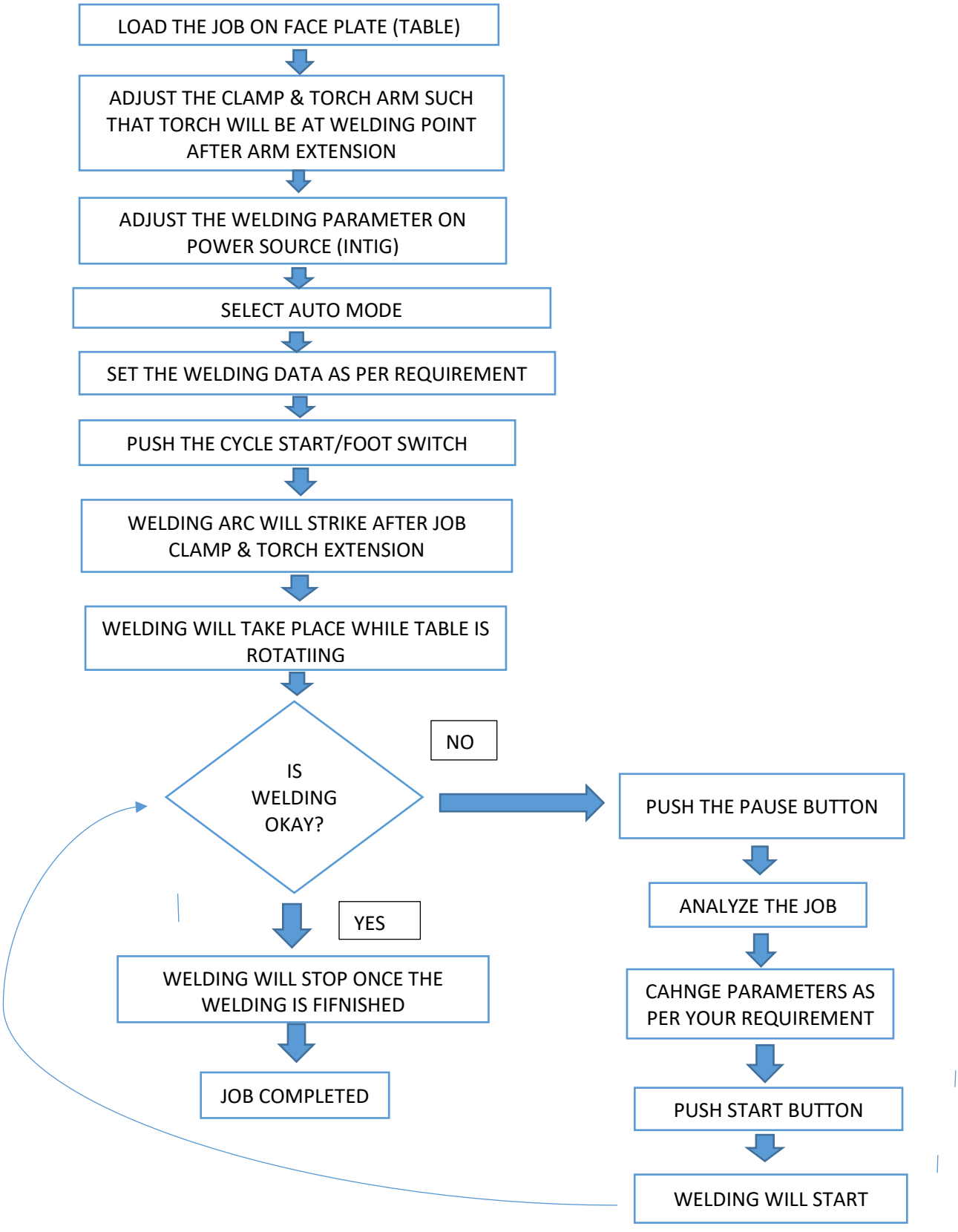
Selection guide for type of MCB

MCB Type	Tripping Current	Application
B	3 to 5 times the rated current	Purely resistive load like lighting and general-purpose outlets
C	5 to 10 times the rated current	Moderate inductive load like air conditioners, residential / commercial pumps
D	10 to 20 times the rated current	Heavy inductive loads like heavy induction motor and welding machines

4. INSTALLATION

1. The machine should be installed on a level concrete surface with access to all sides of the machine.
2. The floor should be capable of withstanding the weight of the system.
3. Please have the power source & gas cylinder as per your requirement.
4. Unwrap the machine and connect Power connection.
5. Provide pneumatic supply (5 bar).
6. Connect the welding power source and mount TIG nozzle on Torch Arm. Routhe the gas & power cable from the cale holder.
7. Connect the Foot Switch.
8. Turn On the machine & manually check operation of Turn Table, Clamp arm & Nozzle arm.

5.WORKING OPERATION FLOWCHART



6. CONTROL PANEL INTRODUCTION

HMI- HMI stands for **Human Machine Interface**. An HMI is a software application that presents information to an operator or user about the state of a process, and to accept instructions.

CYCLE START - when you press the start button the operation cycle will start. The sequence of events will be as per the program written in PLC.

CYCLE PAUSE – when you press the pause button the operation cycle will pause.

CYCLE STOP – When you press the stop button the operation cycle will stop.

EMERGENCY STOP - emergency power off (**EPO**), is a safety mechanism used to shut off machinery in an emergency, when it cannot be shut down in the usual manner. Unlike a normal shut-down switch or shut-down procedure, which shuts down all systems for safety of machine & human.

7. PLC CONTROL

PLC is used in the system to control all the sequence of events and a 7-inch LCD display is used as HMI (Human Machine Interface). This is a touch screen display. This screen is used for both display and control.

Different screens along with the meaning and its operation is explained below.

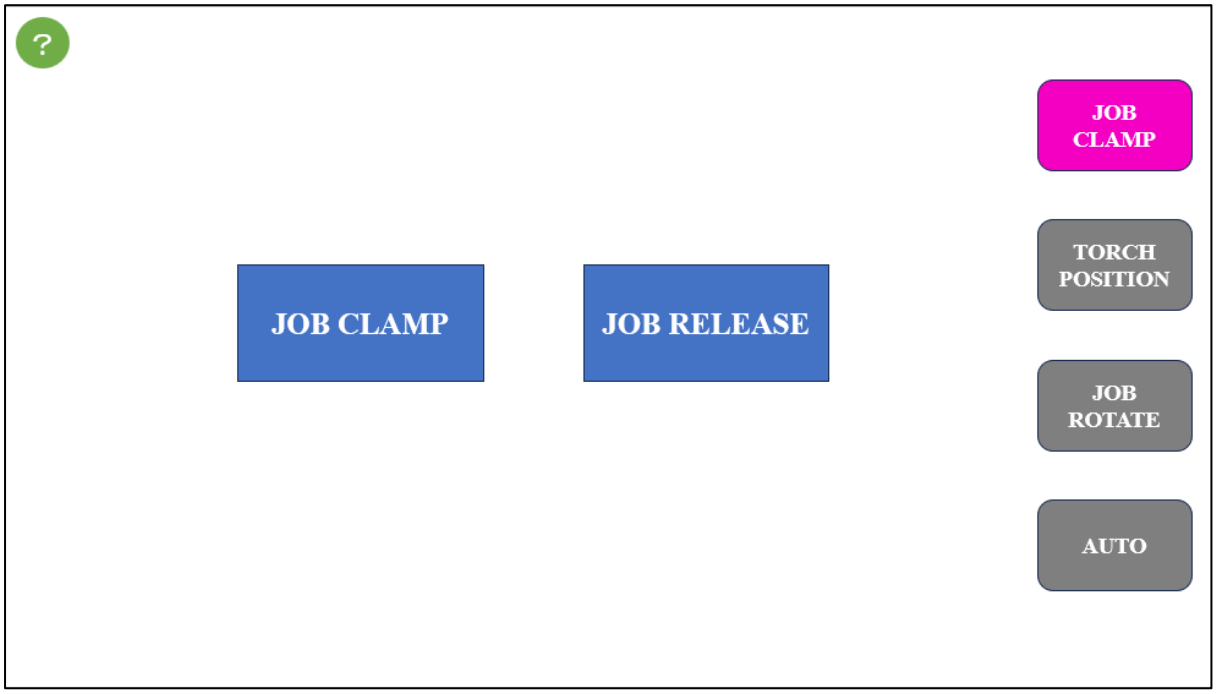
Home Screen

Turn ON the machine & wait for some time, following screen will appear.

This Screen is called welcome screen.

When you press NEXT, following screen will appear.

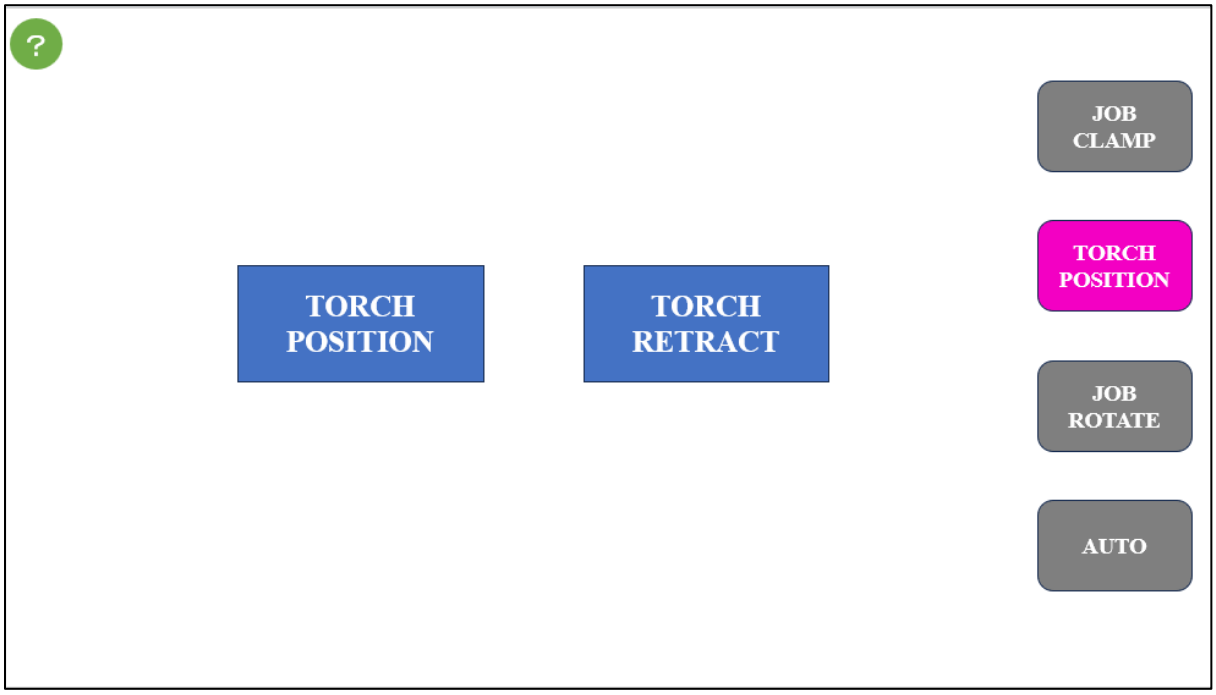
1. JOB CLAMP



This is where user can manually check the clamping setting and adjust the same if required.

JOB CLAMP	When you press this, the pneumatic cylinder used to clamp the job will operate and clamp the job.
JOB RELEASE	When you press this, the job will get De-Clamped.

2. JOB RELEASE

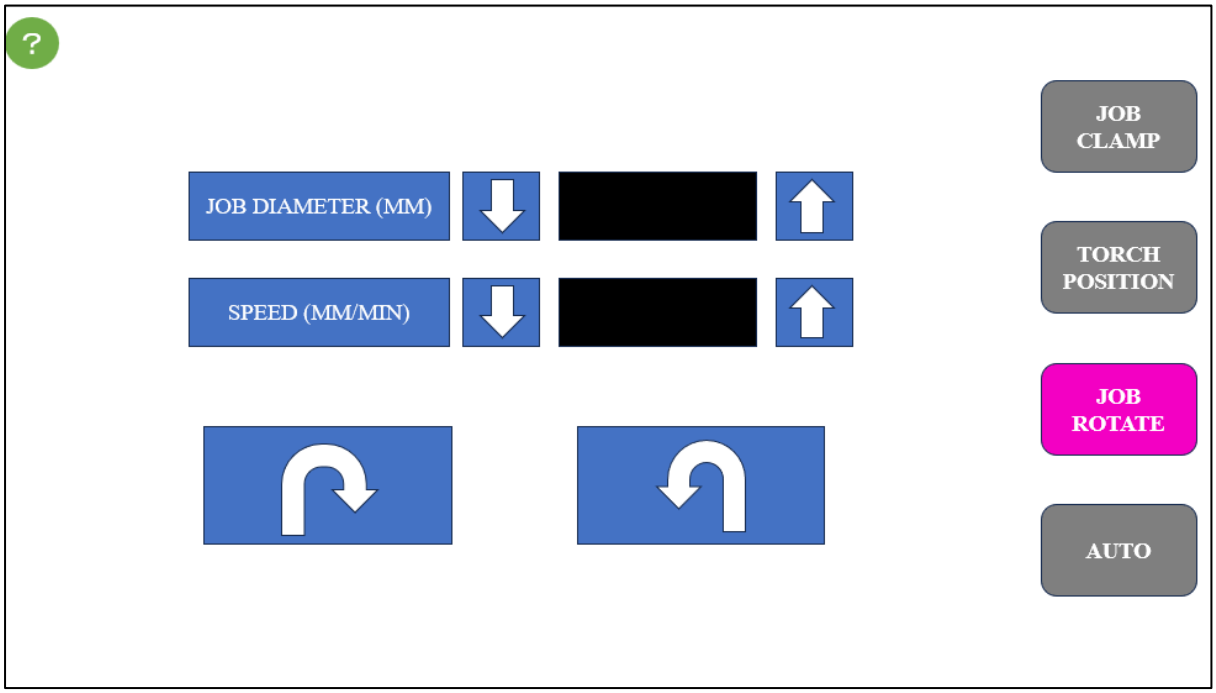


This is where user can manually check the welding torch position setting and adjust the same if required.

TORCH POSITION When you press this, the torch will come to the welding position.

TORCH RETRACT When you press this, the torch will go back to the home position.

3. JOB ROTATE



This is where user can manually rovolve the table, check the welding perimeter alignment setting and adjust the same if required.

JOB DIAMETER (MM)

It is the diameter at which welding is done.

SPEED (MM/MIN)

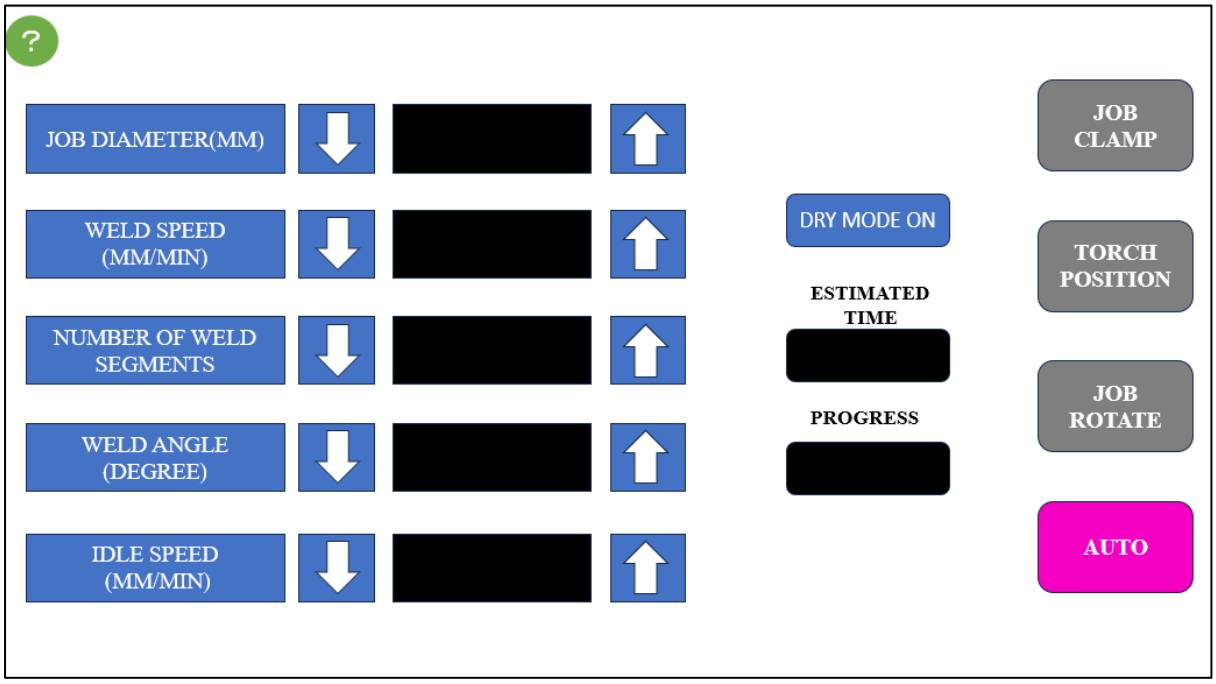
Linear speed in MM/Min for the diameter described above.

When you press on this, a keyboard will appear, and the operator can enter the values from the keyboard.

When you press on this the job will rotate in clockwise direction. The job will rotate if you keep it pressed.

When you press on this the job will rotate in anti-clockwise direction. The job will rotate if you keep it pressed.

4. Auto



This is where user can define the job travel parameters & perform the welding operation.

JOB DIAMETER(MM)	Diameter at which welding is done.
WELD SPEED (MM/MIN)	Linear speed at which the job will rotate while welding is ON.
NUMBER OF WELD SEGMENTS	It is the number of segments for which welding needs to be done. For example, if operator enter 2 here then there will be welding in 2 segments of the 360 degrees. Welding length is decided by the weld angle.
WELD ANGLE (DEGREE)	If operator enters 30 here, it means that the welding will be done on 30 degrees.
IDLE SPEED (MM/MIN)	Linear speed at which the job will rotate while welding is not ON.
	When you press on this a keyboard will appear and the operator can enter the values from the keyboard.
DRY MODE	When Dry Mode is ON Everything Except welding will work. This mode is just to check if everything else is working fine.

Welding Operation Sequence

1. Start signal from “START” button or foot switch activates Clamp Solenoid DCV.
2. Job Clamp cylinder extends the clamping arm and triggers the Proximity sensor.
3. Proximity sensor on Clamp arm activates the Torch Solenoid DCV.
4. The torch extends forward and triggers the Proximity sensor.
5. Proximity sensor on Torch arm triggers the Turn table motor and it begins to revolve as per set parameters.
6. After finishing the operation, first the torch retracts followed by the clamping arm.

Any interruption in the above sequence may halt the process.

8. HOW TO OPERATE THE MACHINE

1. Make sure all systems are turned on.
2. Set required welding parameters in the power source.
3. Go to JOB CLAMP mode and set clamping.
4. Go to TORCH POSITION mode and set position.
5. Go to JOB ROTATE and verify the fixtures concentricity. Check whether the torch travel is in line with the welding path.
6. Go to AUTO mode and set all necessary parameters.
7. Initiate the welding by pressing the fool switch or START button.
8. Check the weld quality and fine tune the parameters if necessary.

9. MAINTENANCE

Pneumatic System

- One thing user should get in the habit of doing is regularly inspecting and maintaining your pneumatic cylinders. There are times when something just breaks or goes askew, but most often, repairs become necessary due to wear and tear. Cylinders that receive regular attention perform the best and last the longest.
- Clean external parts, so you can see if there is any leakage or damage to seals. If there are any, make repairs or replace the seals right away.
- Always check the cylinder, plus the rod or cable seal and tube, because these are the most at-risk components. For cable cylinders, be sure to inspect the nylon jacket around the cable O.D. Be sure that the nylon coating is free of marks or nicks that may wear out the main seal. Use emery cloth to buff out minor damage. If severe, a replacement cable assembly is required.
- Check to be sure all components have adequate lubrication (touch it up, if necessary).
- Drain the FR unit in regular intervals.

Turn Table

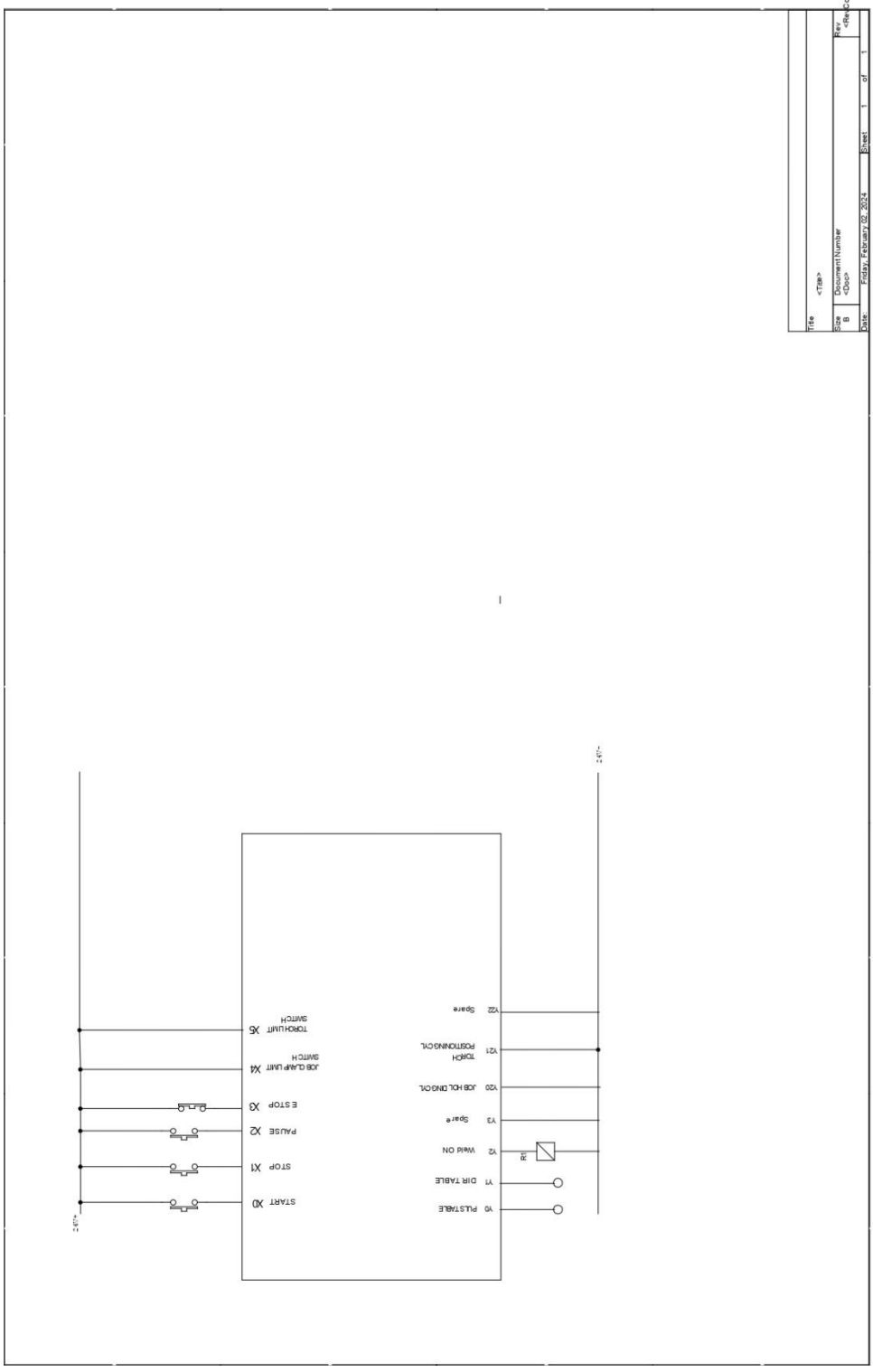
- Make sure that the table surface is coated with a thin lubricant layer when it is not in use.
- Ensure the greasing of block bearing once in a year or more frequently as per operation cycle.

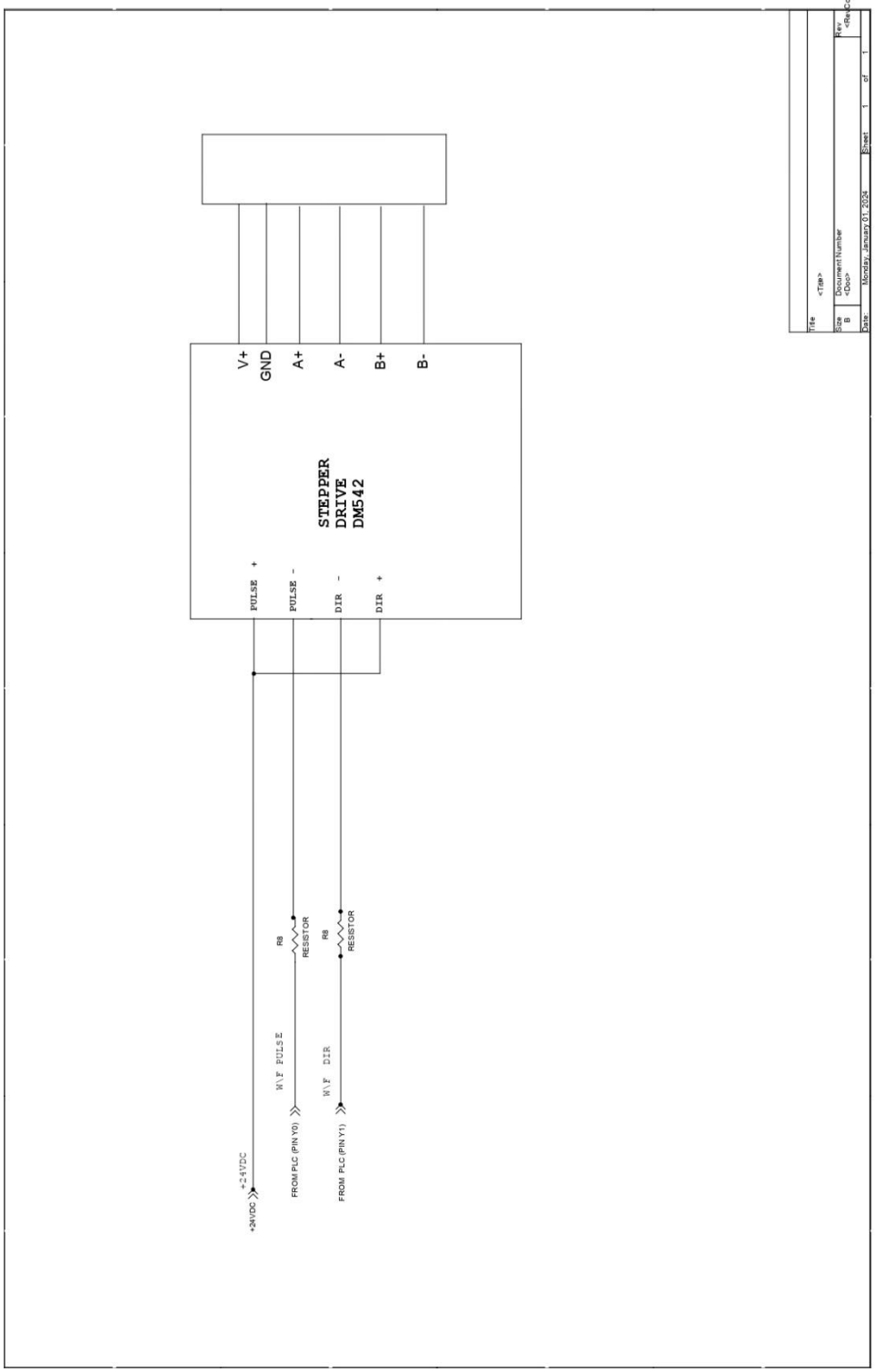
10. SPARES LIST

Description	Qty.
Stepper Motor (Bholenath make 24VDC 1.8˚ NEMA 24)	1
Gera Box (Bholenath make 20 Ratio)	1
FR Unit (1/2”)	1
Pneumatic Cylinder (Airmax make VNC S20 40x100mm)	2
5/2 Direction Control Valve (1/4” BSP)	2
Flow Control Valve (1/4” BSP)	4
PU Elbow (8mm Push type)	12
PU Hose 8mm	~4 Meter
Proximity Sensor (M12 PNP NO)	2
Stepper Drive (Landshine Make DM 542)	1
SMPS (Shavision make G41 60-24)	1

Note: This is not a detailed list and only contains the consumable spares that might be required for future maintenance purposes.

11. WIRING DIAGRAMS




V+
GND
A+
A-
B+
B-
STEPPER
DRIVE
DM542
PULSE +
PULSE -
DIR -
DIR +
R8
RESISTOR
R8
RESISTOR
W\F PULSE
W\F DIR
FROM PLC (PIN Y0)
FROM PLC (PIN Y1)
+24VDC
+24VDC
Title
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Size
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Date
Monday, January 01, 2024
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