

User Manual

Software

Main flow

The main flow is used to follow the flow of sub programs. This is done for readability and expandability. Therefore most of the sub flow are only used in the main page. If decided that a sub flow must be edited, it will not affect the other code. The code will first run a few sub flows to establish its base and product. After the robot has established this, the robot will start to move to the respected points and start grinding.

Sub flows

Landmark

The landmark sub flow is used to make a new base in the program. The robot goes to a general position to detect the landmark. After detecting it will move closer for better inspection and a definite setting for the base. If a new product is initiated only the first position must be adjusted.

Product ID

The product ID sub flow is used to read a barcode. The flow will output a variable which is then checked against a variable in the main flow. Each series of products get a unique code.

Product path

The product path sub flow is used to store all the start points for each weld. In between each point is a move command that will move the robot vertically, this is done to prevent the robot moving into the product during point-to-point transitions.

Grinding path

The grinding path sub flow is a relative move command. Because the robot is grinding under an eight-degree angle, the robot must compensate in height for the path. This is being done in this sub-flow.

User interface

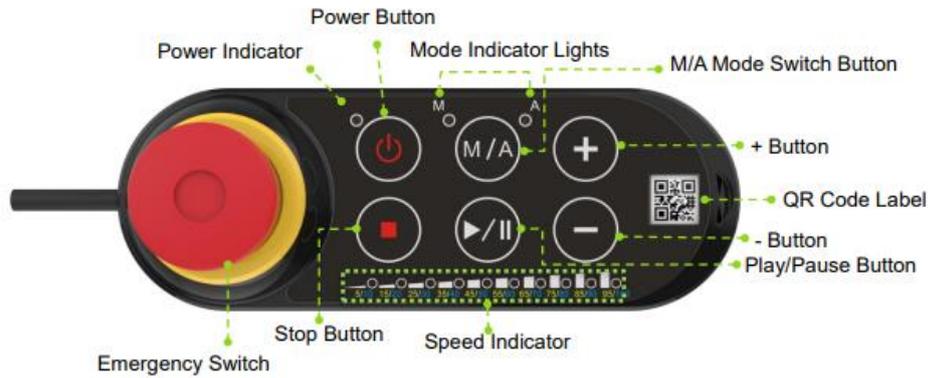
Buttons/switches

Handheld 1 (dead man's switch)

- | | | |
|--------------|---|--|
| Black button | - | Press to suspend the program. |
| White button | - | Press and hold to confirm a safe environmental situation is occurring. Releasing the button stops the spindle. |

Handheld 2 (teach panel)

The Robot Stick has 6 function buttons, 3 indicator lights, 1 Emergency Switch, 1 set of speed indicator, and 1 QR-code. Their functions are as follow:



Items	Basic Function
Emergency Switch	Default emergency button for the robot
Power Button	Power initiation (single press)/ Shutdown (long press)
M/A Mode Switch Button	Toggle Manual/Auto Mode (single press). See <i>Safety Manual</i> for details.
Play/Pause Button	Play/Pause Project (single press)
Stop Button	Press this button to stop any project.

+ - Button	Adjust project speed (single press) under Manual Trial Run Mode. See <i>Safety Manual</i> for details.
Power Indicator	This indicator shows the robot's power status. Not on: Switched off Flashing: Booting Constant: Startup completed
Mode Indicator Lights	One is Manual Mode, the other one is Auto Mode. They show the robot's current operating mode. Once boot up is complete only one will always be on.
Speed Indicator	Display the current project speed. Lit in green for 5% and in blue for 10% such as 4 in blue and 1 in green equals to 45%.
QR Code Label	The content of the SSID is also the robot's name in TCP/IP network.

Items	Advanced Function
Emergency Switch	- Press and release, and then wait for 3 seconds to enter Safe Start up Mode. - Press and release to enter Safe Start up Mode while booting.
Play/Pause Button	Play/pause visual calibration operation (single press)
Stop Button	Stop visual calibration operation (single press)
+ - Button	- Hold to jog the robot at the HMI robot controller page (Hold to Run). See <i>Safety Manual</i> for details. - Lock/ Unlock: press and hold both the + button and the - button until the mode indicator light flashes, then follow the sequence "-", "+, -, -, +" to lock/unlock the Robot Stick (except the Power Button)

The figure and the tables shown above are directly copied from the user manual of the robot. Further explanations and cautions can be found in this same user manual.

Control panel

- ON/OFF - Switches the power of the system ON or OFF. To turn OFF, hold for 5 seconds.
- START - Press to start the program.
- STOP - Press to suspend the program.
- PAUSE - Turn the switch to pause. To resume the program, turn the switch back and press start.
- CLAMPER - Turn the switch to activate the clasper. Turn the switch back to deactivate.
- EMERGENCY STOP - Press in case of emergency. The program, the robot and the spindle will turn off immediately.
- Yellow button - Press to confirm the disapproved ground seams after the vision has been completed.

Lights

Control panel

- Green - Indicates that a program is running.
- Yellow - Indicates a disapproved ground seam.
- Red - Indicates an error through not being able to start the spindle. Either the pause switch is activated, the dead man's button is not being pressed or the emergency stop is activated.

Pneumatic

Rotary knobs

- Main regulator/filter - Turn to adjust the pressure regulated through the system.
- Precision reducer - Turn to adjust the pressure regulated through the pressure cylinder of the spindle.