Serra Laser Center
glennkline@serralaser.com
906-367-0026 cell phone
IPG -FANUC Integrator

LightWELD – Fanuc CRX Co Robot System

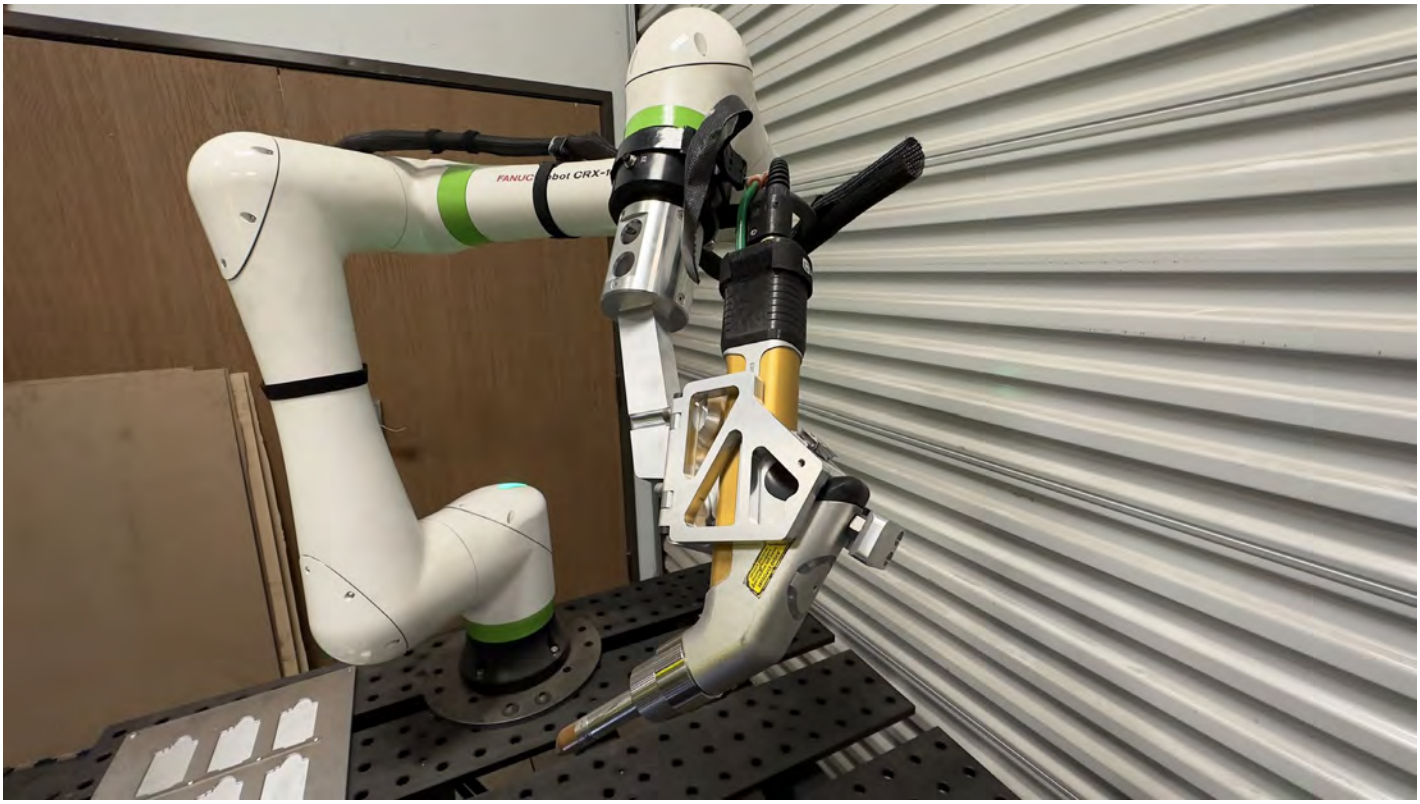
There is a co robot solution that can be added to the IPG LightWELD hand held laser welders. This system is completely retrofittable to any LightWELD system, or added new. The system has been developed to allow fast change over from hand held laser welding to co robot laser welding in under 5 minutes. This allows best case manufacturing decisions to be made – hand held where it makes sense or co robot or both. The Fanuc CRX has a unique Timeline – Icon programming system. LightBOT programming icons – supplied by Serra Laser – IPGs Fanuc integrator and partner - have been developed to make programming easy to do and understand by the LightWELD welder. Wire Feed Option includes modification of the wire feeder supplied by IPG and Fanuc Control Card for Wire Feed Control. **Install Included**

3 Models Are Available

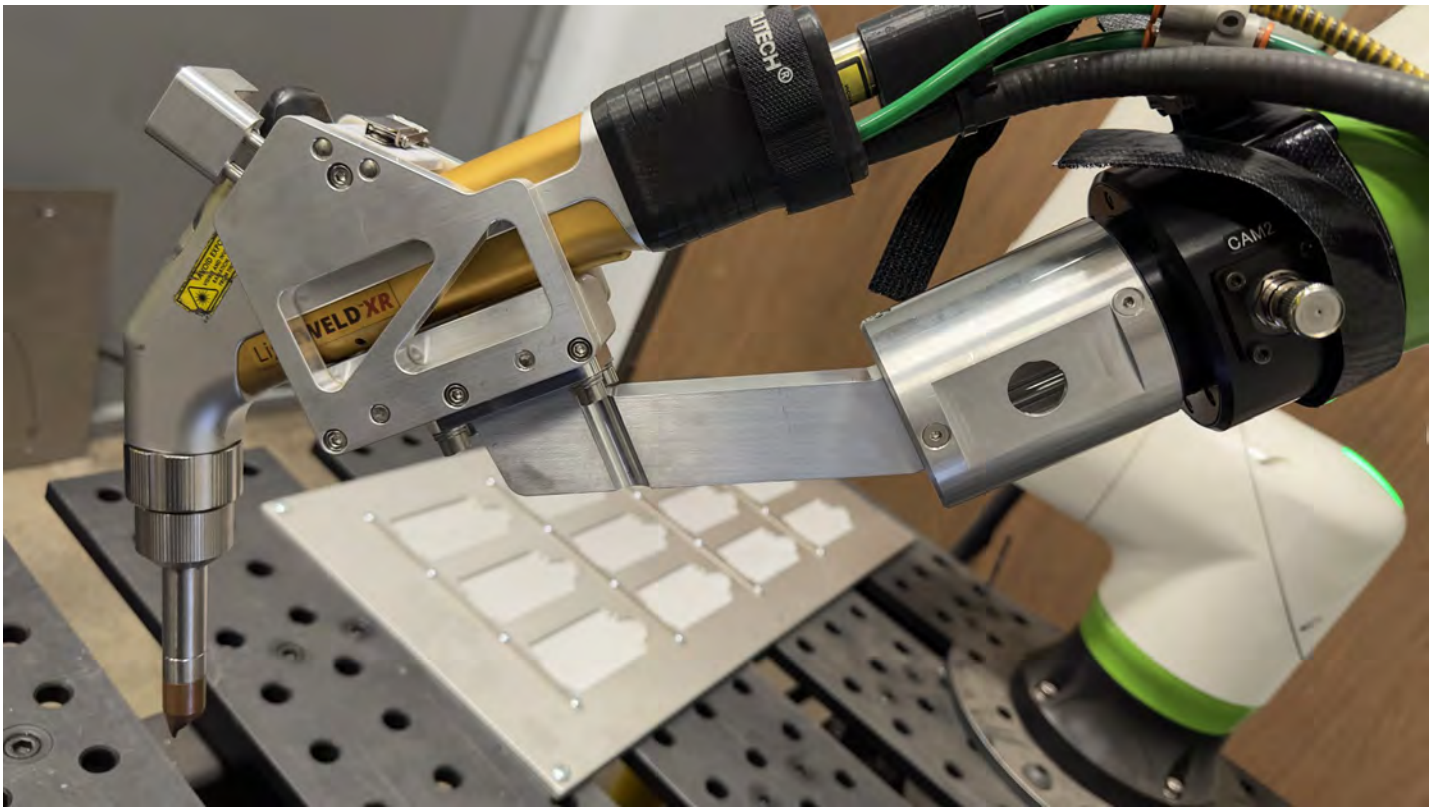
FANUC CRX 10iA
MAX REACH – **49 INCHES**
PAYLOAD – 22 LBS
PRICE - $69,750
Includes IPG co robot kit and Serra LightBOT Icon Set
Wire Feeder OPTION ($4000)

FANUC CRX 10iAL
MAX REACH **– 55 INCHES**
PAYLOAD – 22 LBS
PRICE - $75,750
Includes IPG co robot kit and Serra LightBOT Icon Set
Wire Feeder OPTION ($4000)

FANUC CRX 25iA
MAX REACH – **74 INCHES**
PAYLOAD – 55 LBS
PRICE - $89,750
Includes IPG co robot kit and Serra LightBOT Icon Set
Wire Feeder OPTION ($4000)



The IPG co robot gun holder uses the standard LightWELD GUN to allow safe control by the Fanuc CRX controller.



IPG Supplied Co Robot Parts – IPG supplies several critical parts of the co robot interface. Software upgrade to allow co robot control, LightWELD gun holder, LightWELD switch box, and LightWELD TCP calibration tools are supplied by IPG Photonics. This does not include the LightBOT icon set which is used by the Fanuc CRX timeline method of programming. These LightBOT icon set is supplied and developed by Serra Laser Center – IPG partner in developing the co robot solution for the LightWELD. Serra Laser also supplies the wire feed modification needed for wire speed control.

IPG LightWELD Kit

Included in this kit are

1. Gun Holder – The gun holder is designed to allow co robot operation only when the gun is in the LightWELD gun holder. Very well made and adaptable to Fanuc co robots.

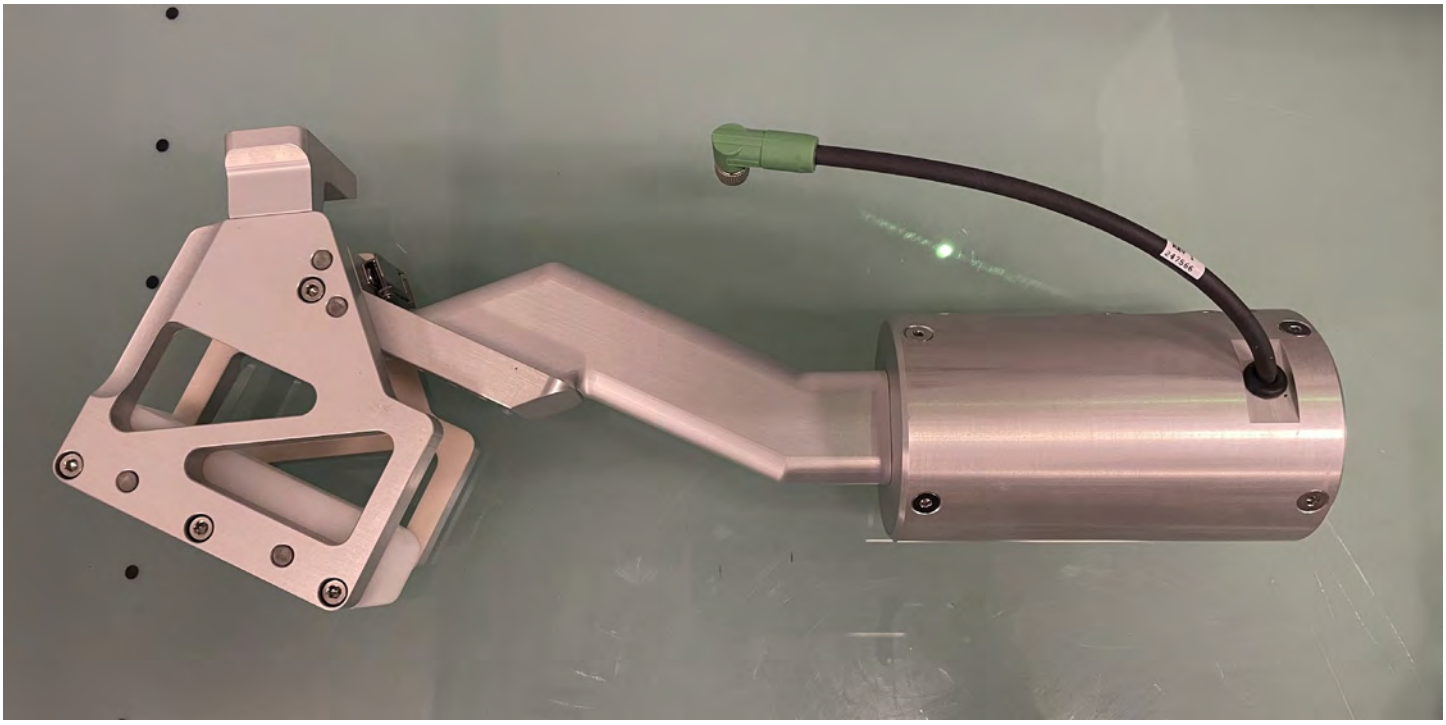
2. Co Robot Switch Box – Switch box uses a toggle switch between hand held and co robot welding

3. Calibration tools – IPG supplies a tool center point calibration nozzle and block to make easy setting of tool center point on the Fanuc Co Robot.

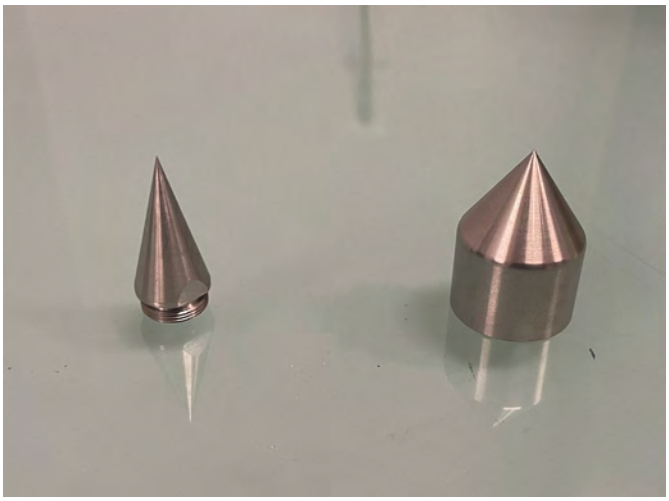
4. Velcro Straps – Helps organize the LightWELD cabling

5. IPG Co Robot SW upgrade – Opens the LightWELD to co robot control

IPG LightWELD Gun Holder – This has been specially developed by IPG for co robots. A concern on adapting the LightWELD System was inadvertent firing of the gun by the robot controller. A protocol has been established where the LightWELD can only be fired when the LightWELD gun is secured in the co robot gun holder – and the co robot switch box toggle switch in the co robot position. The gun holder holds both triggers closed and only in this position can it be fired from the Fanuc Controller. Gun can be secured in the gun holder in a few seconds and requires no tools to do it.



IPG Co Robot TCP Calibration Tools



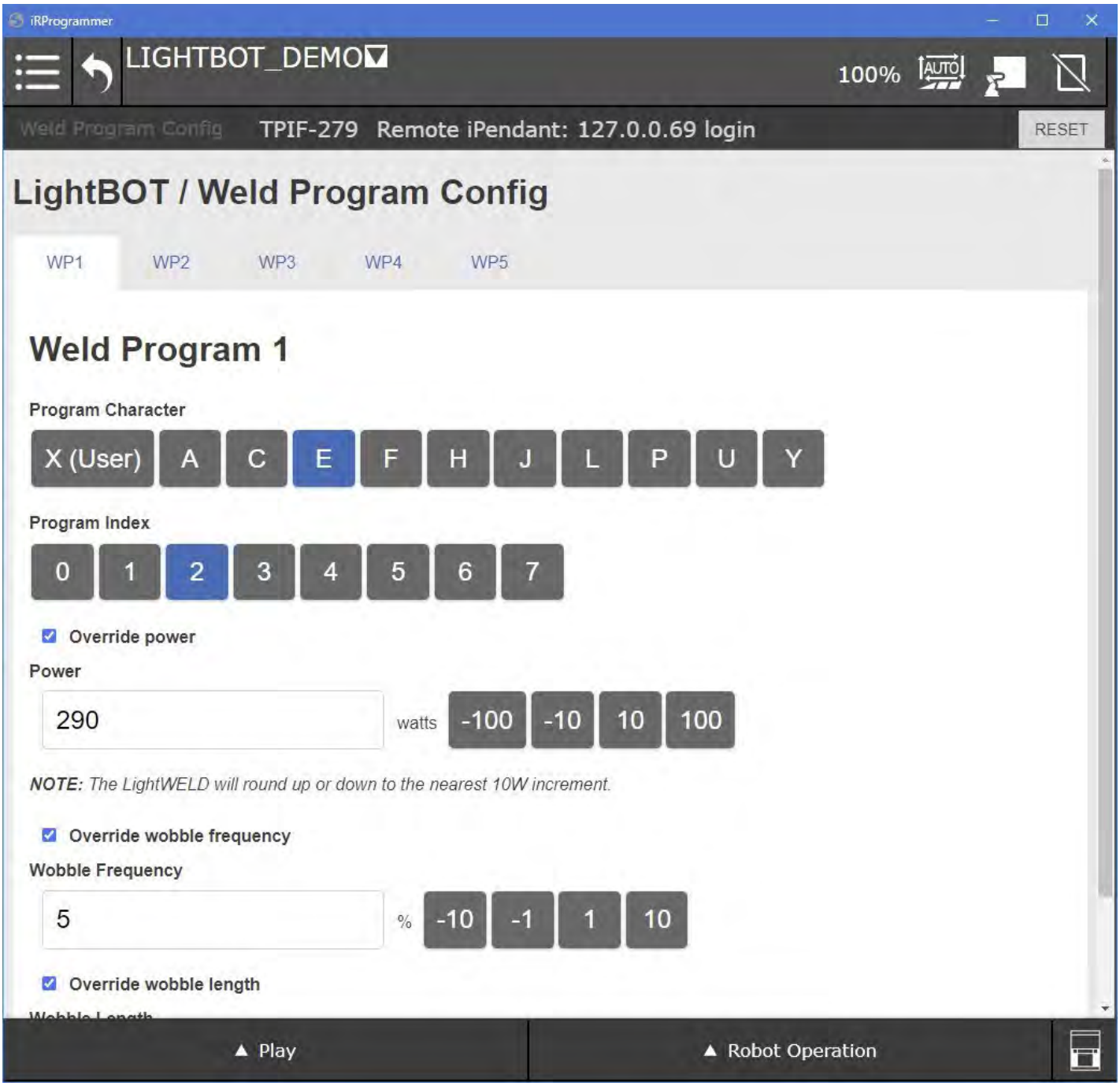
Velcro Straps Help Organize Co Robot Cabling

LightBOT™ Programming Icons for Fanuc CRX

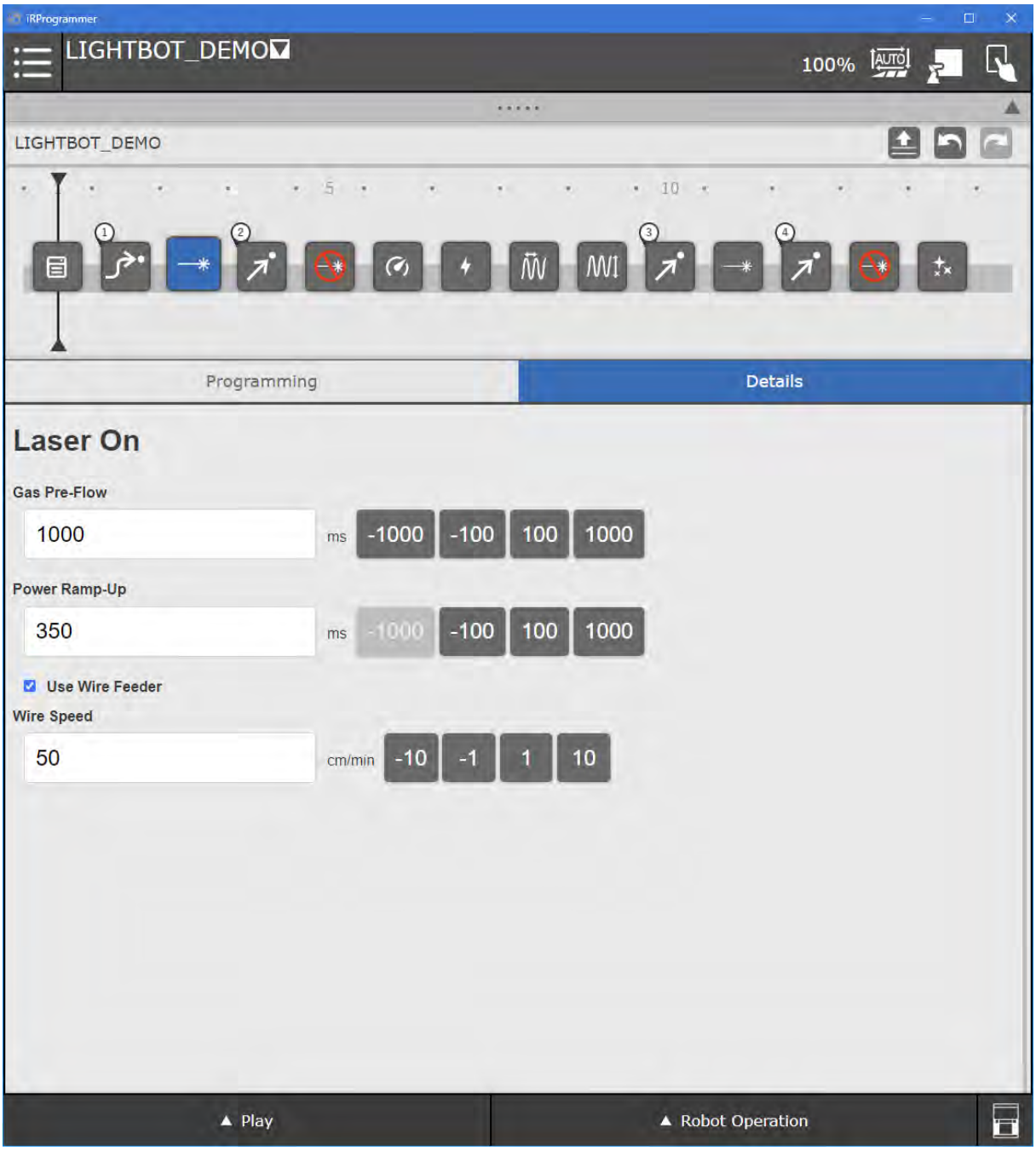
The LightBOT Programming Icons, devloped by Serra Laser, allow the Fanuc CRX to control the LightWELD system in a manner that is the same way a welder would control the LightWELD when welding by hand. This allows quick adpation by welder as co robot LightWELDing uses the existing IPG Presets and User Presets - Controls the Wire Speed - Power - Wobble Width - Wobble Frequency - which are controlled by the LightBOT Icon Set. The CRX uses theFanuc CRX Timeline Programming and can be programmed offline.

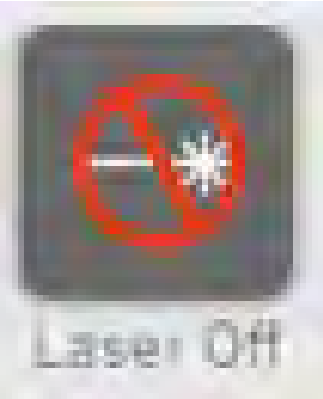
This is a screen shot of the Fanuc CRX control table with LightBOT Icon Set **from Serra Laser Center.**

WELD PROGRAM ICONS – This section is where the welder selects the IPG Preset or User Preset Welding Conditions (just like hand laser welding) using the IPG Welding Condition Chart. Multiple preset welding conditions can be selected, up to 5 total. This allows the LightBOT to change welding conditions on the fly or allows multiple welding set ups within the same program – such as tack welds, IPG Presets, User Presets, or Cleaning Presets. Within each Icon a different power, wobble width, or wobble frequency can be selected to further fine tune the co robot welding program. The welder does not have to change these manually at the LightWELD – the Fanuc CRX will change them on the fly. Each Weld Program – WP1, WP2, WP3 for example can recall completely different presets. This allows changing the weld program by swiping up different icons onto the Fanuc CRX timeline.

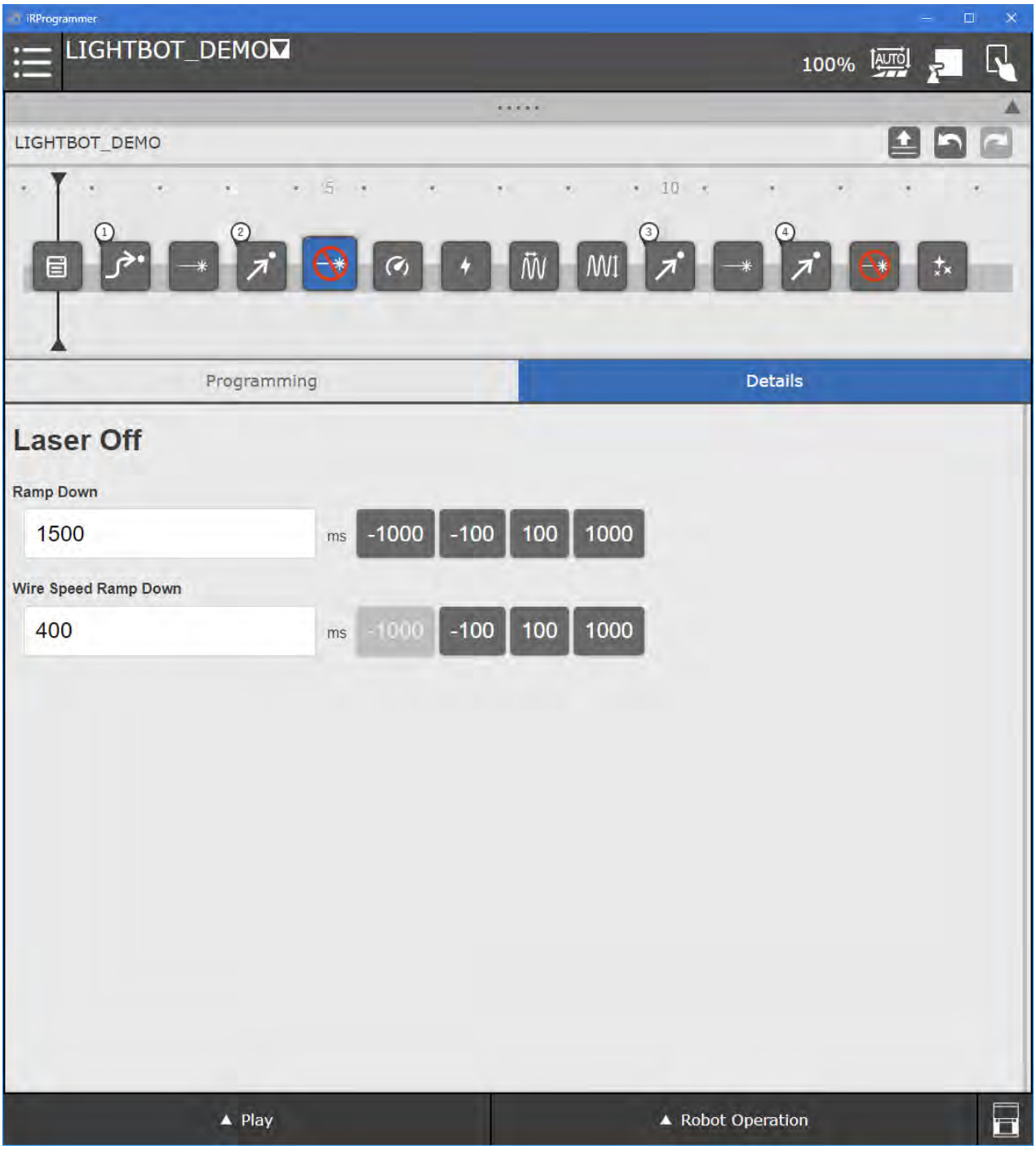


Laser On Icon – The laser on Icon turns on the laser beam for welding. From this Icon Gas Pre-Flow can be set for shield gas control, and Power Ramp Up can be set. When wire welding speed of the wire can also be set. This sequence is the same as pulling Trigger one and Trigger two when Hand LightWelding, with the addition that the wire speed can also be set. No need to input a wire feed speed at the wire feeder screen.





Laser Off icon turns the laser beam off. Ramp down can be set to control heat input into a part which might be needed at the end of a weld. Wire speed ramp down can also be set to allow further control. This is the same as releasing the triggers when hand LightWELDing



Wire Speed Setting Icon. Wire speed can be set in multiple ways, such as thru the Program Set Icon or the Wire Speed Icons. Multiple Wire Speed Icons can be set up, which might be useful in case some parts of a program use different wire welding speeds – allowing the flexibility to use different wire speeds on different parts of a weldment. This might be done to fill a bigger weld gap for example.

Wire Speed Presets

Wire Speed 1

3 cm/min -10 -1 1 10

Wire Speed 2

3 cm/min -10 -1 1 10

Wire Speed 3

3 cm/min -10 -1 1 10

Wire Speed 4

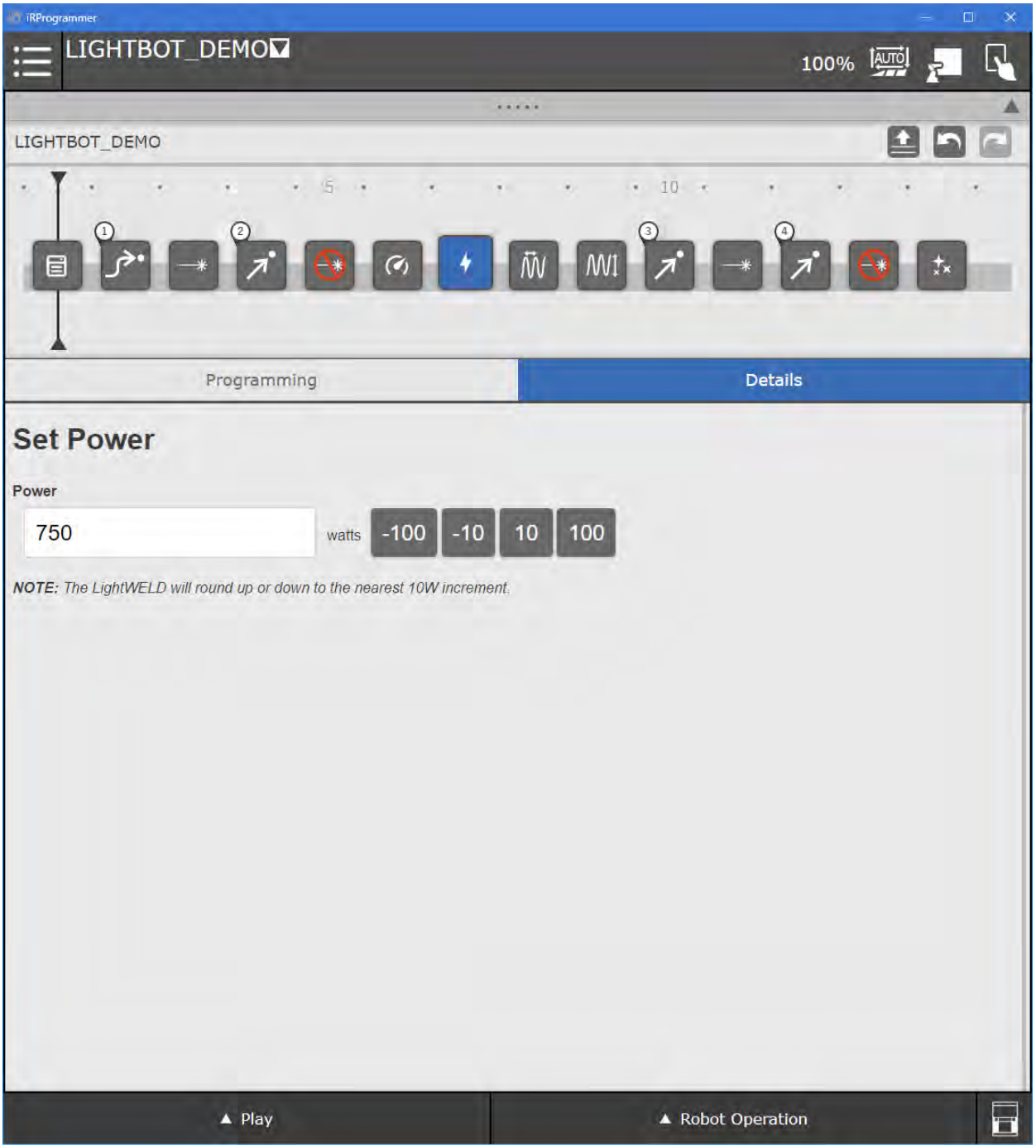
3 cm/min -10 -1 1 10

Wire Speed 5

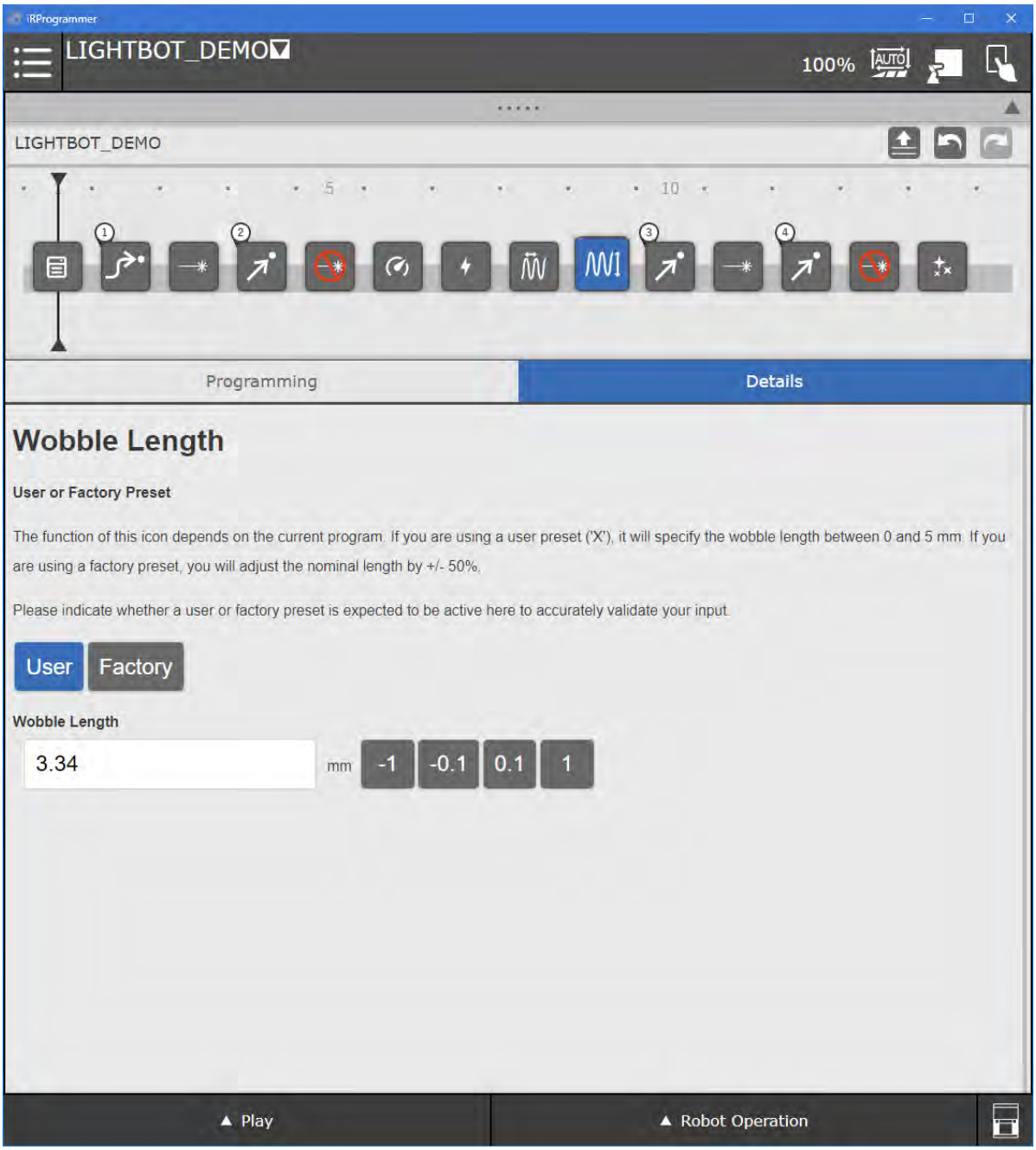
3 cm/min -10 -1 1 10

The Set Power Icon is the same as changing the power on the power knob when Hand Light Welding. This can be convenient for adjusting the penetration depth on a weldment.

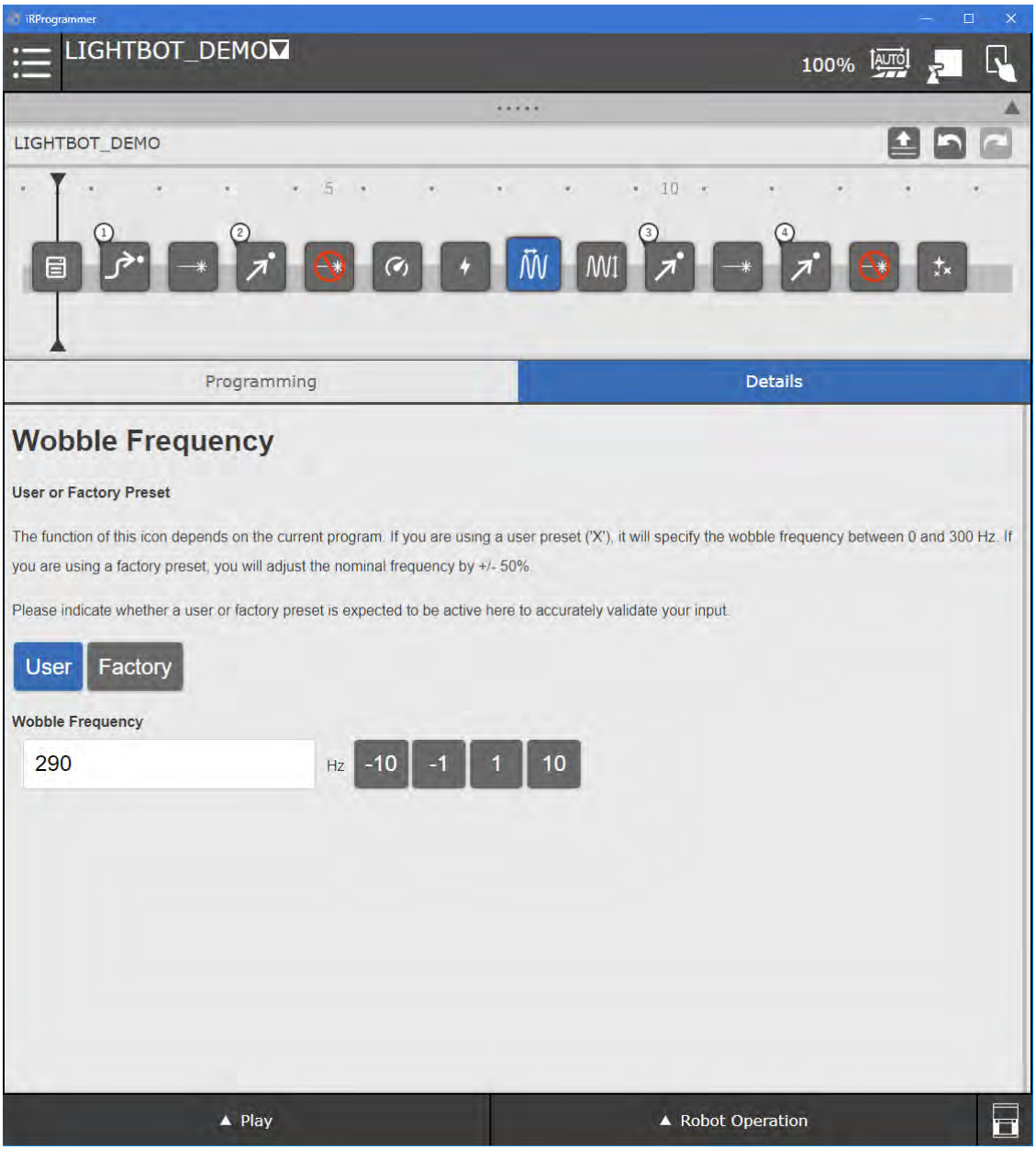
Power can be changed mid weld. This allows fine tuning of the power setting at the end of a weld for example, where heat control might be needed. For a weldment with different material types of thicknesses control of the power – penetration – can be quite useful to allow successful co robot use.



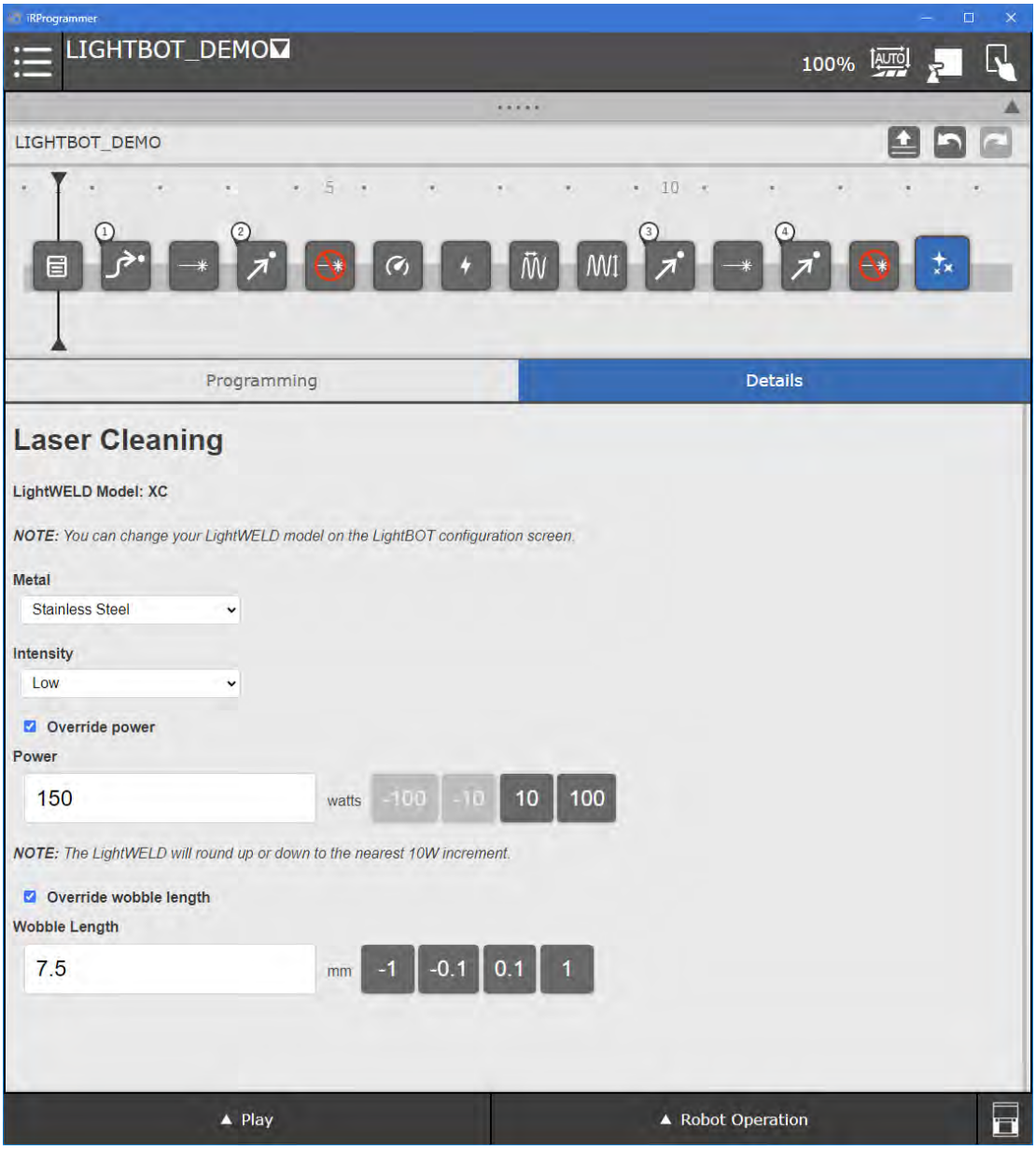
Wobble Length Icon is the same control as the bottom knob on the LightWELD system. It has two different modes of working depending on if a IPG preset is being used – in this case its an adjustment of a percentage + or – 50% of the IPG Preset – or if a User Preset it is an adjustment of the width of the wobble in mm. This might be used to widen a weld on an outside corner or to have deeper penetration on a weld by making it narrower.



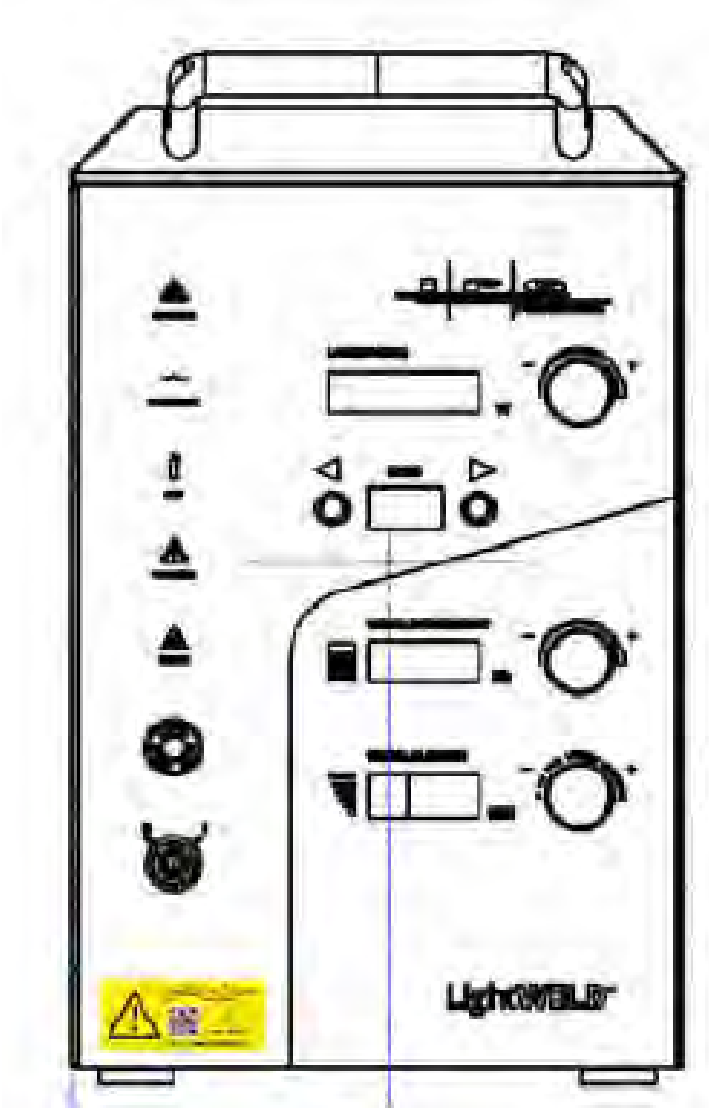
Wobble Frequency Icon. This is the same as the 2nd knob from the bottom on the hand held LightWELD system. When using in conjunction with the IPG Preset this sets the frequency as a percentage of the preset, + or – 50%. When used with a user preset it adjusts thee frequency in HZ per second. This might be used to adjust the look of a zig zag weld for example.



Laser Cleaning Icon allows the LightWELD Cleaning function to be easily set by material type and intensity – without changing or setting the Weld Program. Laser Cleaning can also be used for part stenciling allows part numbers or other items to be “stenciled” onto a part.



LightWELD Manual Operation = LightBOT™ Fanuc CRX Co Robot Icons



Set Power Icon does the same Function as Power Knob on LightWELD

Weld Program Icons 1 - 5 allow multiple IPG Presets and User Preset Welding Conditions to be called

Wobble Frequency Icons do the same Function as Wobble Frequency Knob on LightWELD

Wobble Length Icons do the same Function as Wobble Length Knob on the LightWELD

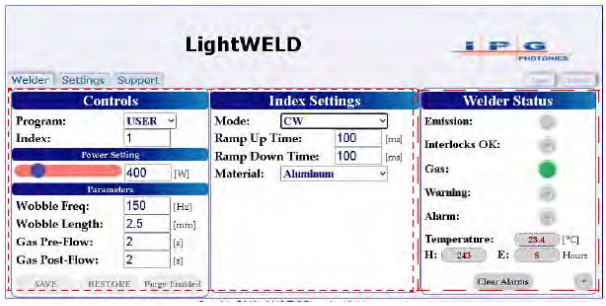
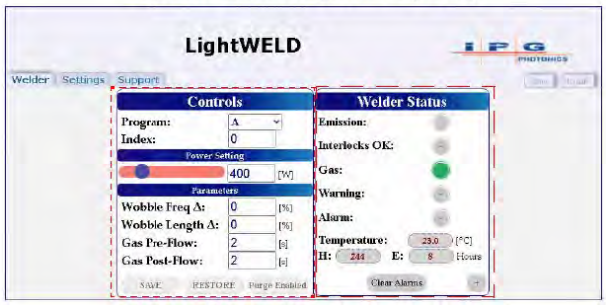


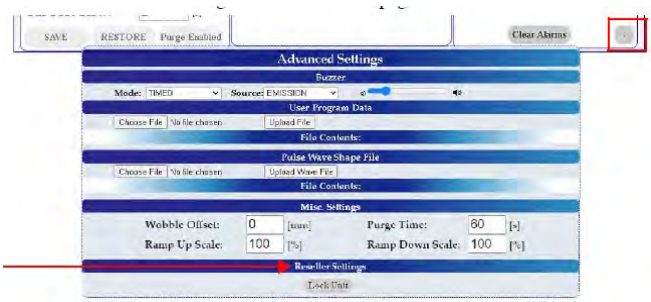
Figure 9-14. Laser Welder Page - Preset Program Recipe

The LightWELD Interface is available directly from the Fanuc CRX Tablet. This allows the welder to alter IPG Preset Welding Conditions from the Fanuc tablet and also to develop and change IPG User Presets . There is no need to plug in a separate computer to do this.

The Fanuc Tablet displays the IPG Welder Status indicators and alarms, making it easy for the welder to troubleshoot problems.

This includes the Advanced Setting Page where advanced settings such as buzzer control, Pulse Wave Shapes, and Wobble Alignment can be done.





LightBOT™ Icon Set for Fanuc CRX to IPG LightWELD Co Robot Timeline Programming