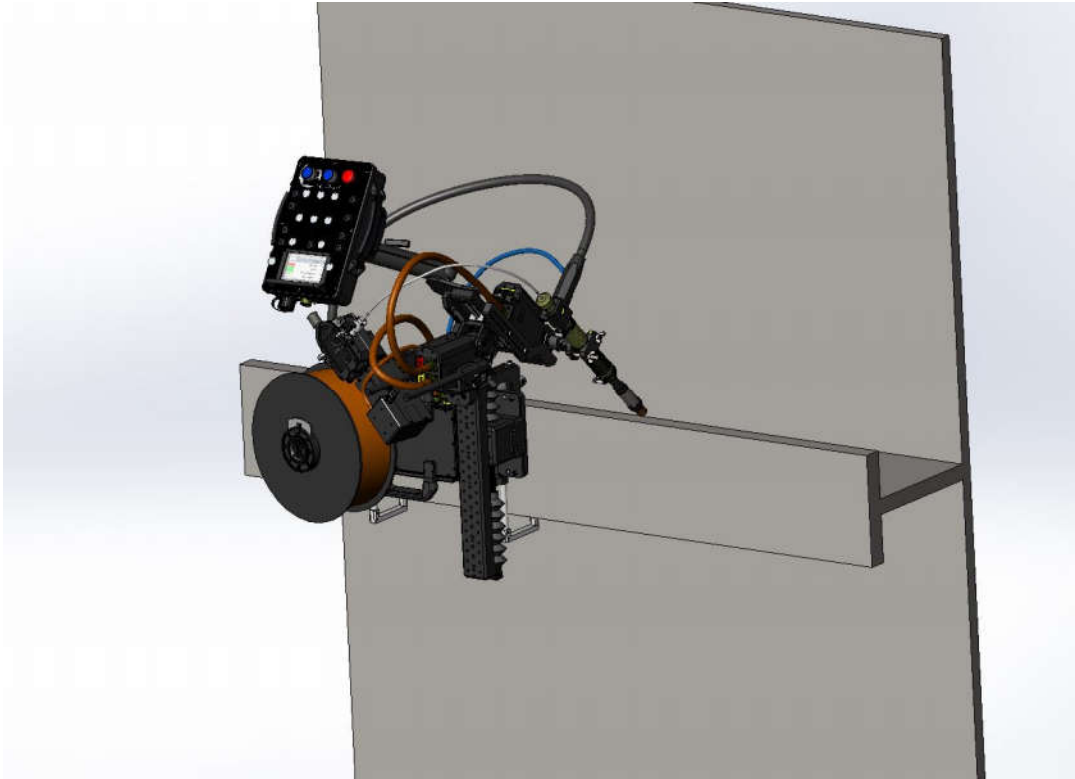


T-Frame Welder



System Description

The T-Frame Welder is a full-function automated welding system. The system includes axes to control travel, cross-seam, torch height and oscillation. It does not require a track and is designed to clamp onto a T or L stiffener. The T-Frame Welder can travel along straight or curved sections.

Welding and control power is provided by one of the Lincoln Electric Power Wave® series welding power sources such as the S350, S500 or S700. The T-Frame Welder is fully integrated to the Power Wave through the use of its ArcLink digital interface. With the EMI wire feeder the system remains modular and compact.

Composed of lightweight modules that can be rapidly disassembled for ease of transport, the entire T-Frame Welding system weighs less than 70 pounds. The torch height controller, oscillator, and wire feeder can all be detached from the universal weld carriage with a single T-handle Allen wrench.

Designed to optimize weld process control while minimizing operator training, the weld control system is comprised of: a) main system control board, b) pendant, c) network of 'intelligent' motors. The system provides control for all system axes and weld sequence parameters. These parameters are easily adjusted from the operator pendant. The pendant mounts to the weld carriage with a universal swivel. The pendant can also be detached to allow the operator to control the system remotely.

System Architecture

Weld process control is accomplished via several modules. A microprocessor based communication module handles the communication to the welding power supply while a system control processor is responsible for weld process sequencing. A third processor is located in the operator pendant providing a flexible, high-resolution color display.

All motorized axes utilize high-torque DC stepper motors with integrated motion controllers. The use of stepper motors and precision circuit design enables the T-Frame Welder process control system to operate without requiring field calibration.

All sub-systems communicate with one another through a digital link.

System Axes

- **Travel**– Moves the weld carriage along the stiffener, parallel to the joint to be welded. The only limit to travel axis distance is the amount of track. The travel axis is rated to carry the carriage, torch, wire spool and can tow an additional 90 lb load (cable weight) depending on drive-to-flange friction. A two-speed travel jog allows for precise torch positioning as well as rapid traverse in order to position the carriage assembly quickly and precisely during setup and welding modes.
- **Cross-Seam** – The Cross-Seam axis moves parallel to the flange. The typical orientation of the T-Frame Welder sets the height of the AHC and Oscillator assembly. The cross-seam axis can be used to manually steer the torch during welding.
- **Automatic Height Control (AHC)** – When AHC is enabled, this axis will automatically maintain a constant torch height based on the welding feedback current. The axis can be disabled so that an operator can manually control the torch height while welding. The welding current is supplied directly from the Power Wave® through the ArcLink network
- **Oscillator** – This axis sweeps the torch assembly across the weld joint. The oscillation axis is used to weave during the weld process. Since the sweep distance is dependent on the torch length/position, oscillator specifications are based in degrees.
- **Wire Feeder** – Pulls wire from the spool and delivers it to the weld torch at the desired rate when welding.

System Specifications

Weights	
Base System	67.2 lbs
With Wire Spool and Torch	112.2 lbs
Motion	
Travel Speed- Full Load	1.0-100.0 IPM
AHC Stroke	4"
Cross-Seam Stroke	7.75"
Oscillation Sweep	25°
Oscillation Speed	50°/s
Oscillation Dwell	0 - 2.5 s
Weld Sequence Timers	
Pre/Post Purge Time	0 - 10 s
Burnback Time	1 - 200 ms
Travel Start Delay	0-5 s
Weld Parameters	
Weld Voltage	Power Wave® Dependent
Weld Current	Power Wave® Dependent
Wire Feed Speed	50 - 900 IPM
Weldment Measurements	
Minimum Flange Depth ¹	2"
Flange Thickness Range ¹	.75" – 1.50"
Web Depth ¹	5" – 12"

¹ Ranges should be verified with the application. Additional range may be achievable with simple bracketry changes.

ArcLink System Interface

The system is integrated to the Lincoln Electric ArcLink fieldbus. ArcLink is a standard that was developed by Lincoln Electric so that peripheral devices can be connected to the welding equipment. A single 5-pin cable provides the operating power (40VDC) for the motors and control system as well as the communication to the welding equipment. The digital link is used for the purpose of providing control and feedback signals. Communication is achieved through a CAN-based digital protocol. The CAN standard was originally designed for automobile control systems and has been implemented in a variety of industrial networking schemes.

The Encompass system is ArcLink compliant and provides access to all available welding modes and associated controls. An ArcLink based Wire Drive module allows the system to utilize the Power Wave's full library of Synergic waveforms.

In order to ensure communication reliability, the ArcLink protocol specifies that all client objects respond to a periodic 'heartbeat'. In the event of a heartbeat failure, the client objects are required to shutdown and wait for communication to be reestablished. This important safety feature prevents a runaway condition in the event that communication was interrupted while the system was active.