

PIPER-PLUS

The Advanced Pipe Welding System

The Piper-Plus integrated with Lincoln Power Wave® or Miller® PipeWorx, utilizes the latest in advanced digital weld process control.



Bug-O Systems is committed to empowering our customers by providing operator controlled mechanized solutions for their welding, cutting and custom applications.

412-331-1776 www.bugo.com



PIPER-PLUS MECHANIZED PIPE WELDING SYSTEM

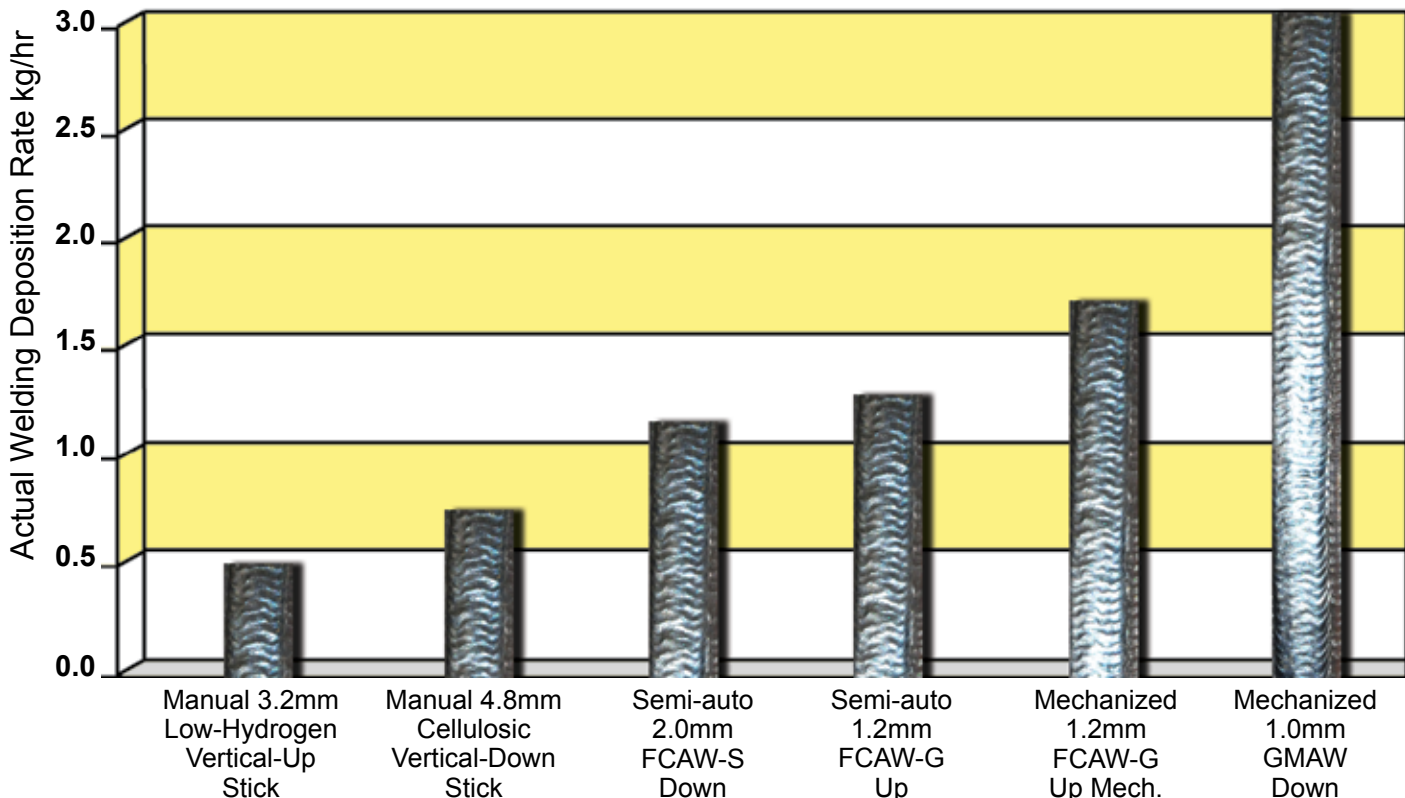


The **PIPER-PLUS** is a self contained, digitally controlled, mechanized pipe welding system, producing high deposition rates with excellent weld quality to reduce pipe welding costs. Increased duty cycle and arc-on time provide significant improvements in productivity. All welding parameters, including voltage, wire feed speed, current, travel and oscillation are programmable and digitally controlled with the Piper-Plus.

Manual pipe welding requires a high level of training and skill. As skilled pipe welders become more difficult to find, mechanized welding is an economical alternative. Less welder skill and physical effort are required using mechanized welding. Handheld wire welding results in a

typical operating factor (or percent arc-on time) of 40-50%, mechanizing increases the operating factor to 70% or higher. The increased arc-on time reduces the number of welders and welding stations required. Also, the precise procedure control and excellent repeatability ensures consistent weld quality around each pipe joint and from one joint to the next.

Actual Welding Deposition Rate
(Deposition Rate x Operating Factor)



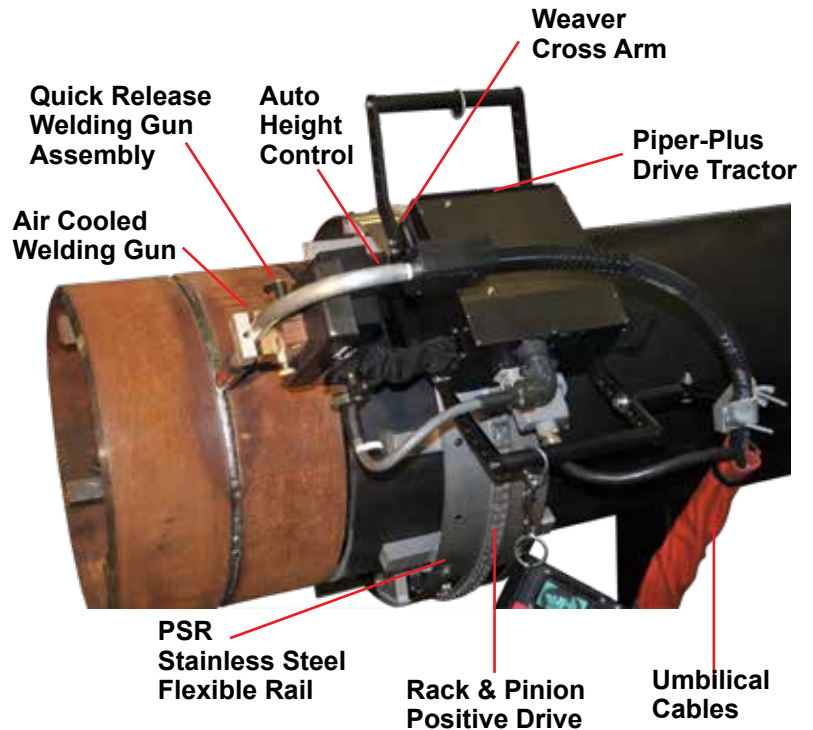


PIPER-PLUS MECHANIZED PIPE WELDING SYSTEM

Piper-Plus Overview

The **BUG-O PIPER-PLUS** is a complete Pipe Welding System that can be integrated with the Lincoln Electric® Power Wave or Miller® PipeWorx Welding Systems

- Unique digital control box
- Microprocessor controlled panel with graphic and pendant user interfaces
- Two pendant user options
- Two rail and tractor carriage options
 - Quick attached custom-bent Aluminum Rigid Ring Rail with spring loaded spacer bars
 - Bug-O PSR Piper Flex Band Rails made of Flexible Stainless Steel Rail to provide versatility and flexibility
- Supports advanced processes of Lincoln Electric® or Miller®
- Full digital control of all welding parameters
- Active monitoring and display of real time welding status
- Built tough for demanding environments. Rated for operating temperatures from -20°C (-4°F) to 50°C (122°F) and up to 100%RH



Features:

- Closed loop feedback of travel, height control and all motion parameters
- Distinctive on-board current monitoring and adjustments
- Programmed for exact multi-parameter output
- Supervisor set operating limits to every adjustable parameter
- Pre-programming of an infinite number of procedures and weld passes
- Air-cooled or optional water-cooled welding guns available
- Automatic Height Control provides constant tip to work distance control. Total travel of 4" (100 mm)

Benefits:

- Travel speed can be calibrated to provide actual travel speed at pipe surface
- Automatic Height Control maintains constant torch height, ensuring stable welding arc and consistent heat input
- Accurate process control
- Allows for many different geometries and material thicknesses
- Water cooled torch can be used for heavy wall applications

Bug-O's Piper-Plus was originally designed and built for the Pipe Industry. Like all Bug-O products they are lightweight, portable and adaptable for use anywhere the weld process control must be tightly controlled and monitored.



PIPER-PLUS MECHANIZED PIPE WELDING SYSTEM

Bug-O Rail

Bug-O rail systems are lightweight and durable providing versatility for all kinds of applications beyond Pipeline applications. All rail and tractors utilize rack and pinion positive drives. All carriages can be installed and removed from any point of the rail. Our Aluminum Rigid Rail design was first developed in 1948, and it has stood the test of time serving clients around the world for over 60 years. We also offer the new stainless steel rail which provides even more stability and durability.



Features:

- Quick attach ring rail mounts quickly and easily to the pipe
- Spacer bars adjust and center the ring to the pipe surface
- Powerful latches lock the rail into position
- Machine mounts quickly to the rail using standoffs and a split carriage
- Accommodates pipes with a minimum outside diameter of 12" (30.48 cm) or larger

Benefits:

- Lightweight and easy to move from pipe to pipe
- Fast, repeatable setup
- Fast removal
- Large surface area on spacer bars protects the pipe surface

PSR-2000-XX (Piper Steel Rail)

Flexible stainless steel 6" in width designed for specific pipe outside diameters. Equipped with Rigidly Adjustable Feet and Latch Assembly. (XX= Diameter specified by customer including coating if applicable.)



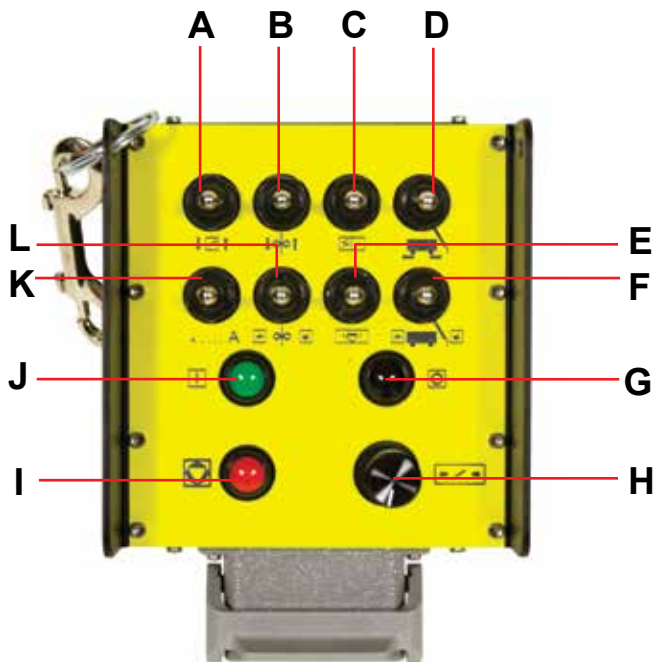
BRR-3250-XX (Bent Rigid Rail)

Aluminum extrusion rolled to custom dimensions for a specific pipe outside diameter for your specific application, utilizes a hinge and locking clamps with spring loaded stand offs for quick removal and relocation. (XX= Diameter specified by customer including coating if applicable.)



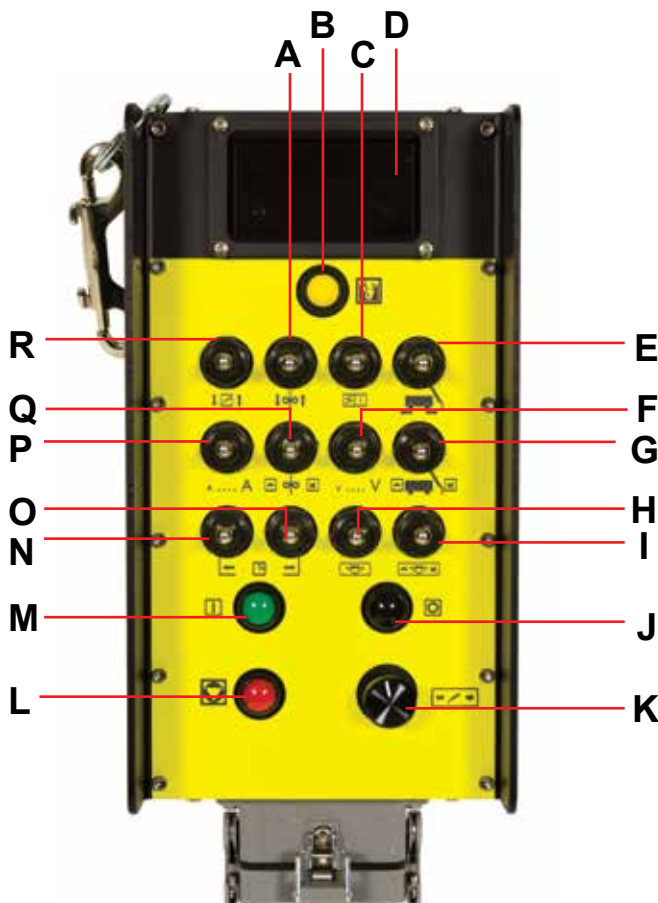


PIPER-PLUS MECHANIZED PIPE WELDING SYSTEM



Limited Function Pendant:

- A. Torch Jog - Up/Down
- B. Wire Feed Jog – In/Out
- C. Oscillation Check
- D. Travel Jog – Forward/Reverse
- E. Welding Voltage – Increase/Decrease
- F. Tractor Travel Speed – Increase/Decrease
- G. Cycle Stop (Gas Purge in Jog Mode)
- H. Torch Position Steering
- I. Emergency Stop
- J. Cycle Start
- K. Welding Current – Increase/Decrease (Adjusts torch height while welding)
- L. Wire Feed Speed – Increase/Decrease



Full Function Pendant:

- A. Wire Feed Jog – In/Out
- B. Welding Pass Select
- C. Oscillation Check
- D. Display Screen - Provides selected welding parameter information to the operator
- E. Travel Jog – Forward/Reverse
- F. Welding Voltage – Increase/Decrease
- G. Tractor Travel Speed – Increase/Decrease
- H. Oscillation Width – Increase/Decrease
- I. Oscillation Speed - Increase/Decrease
- J. Cycle Stop (Gas Purge in Jog Mode)
- K. Torch Position Steering
- L. Emergency Stop
- M. Cycle Start
- N. Oscillation Dwell Time Left - Increase/Decrease
- O. Oscillation Dwell Time Right - Increase/Decrease
- P. Welding Current – Increase/Decrease (Adjusts torch height while welding)
- Q. Wire Feed Speed – Increase/Decrease
- R. Torch Jog - Up/Down



PIPER-PLUS MECHANIZED PIPE WELDING SYSTEM

Control Box

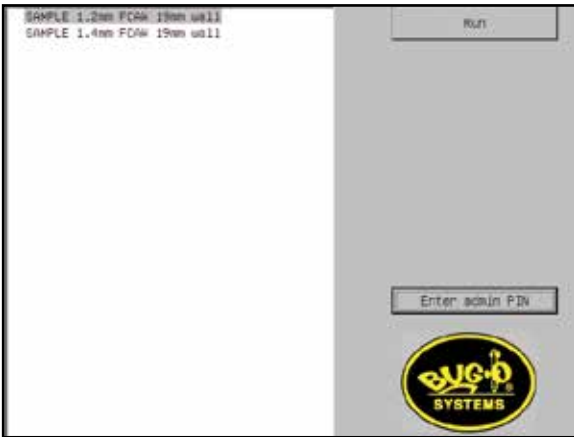


Features:

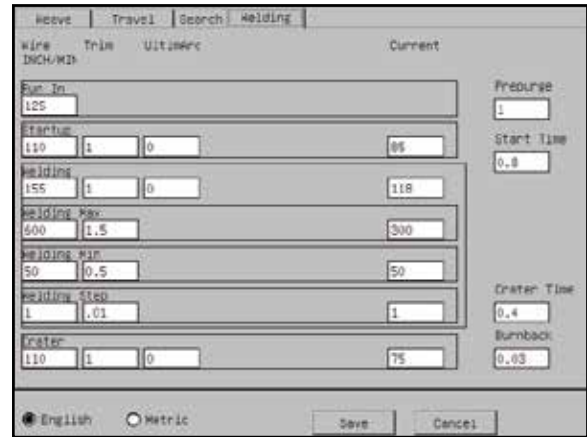
1. Microprocessor controlled panel with graphic and pendant user interfaces.
2. The large LCD panel allows quick viewing of large groups of related information.
3. Intuitive parameter input using a touch mouse and keypad.
4. USB port for program transport between systems.

Control Box Programming:

Note: Numbers shown on the following screenshots are for display purposes only and are not intended for actual welding procedures.



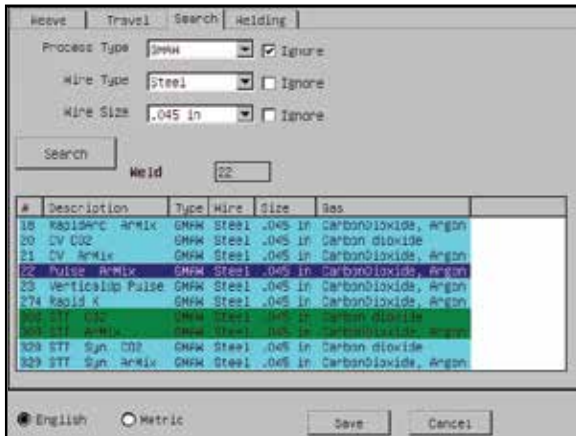
Primary Organization Screen – Allows project managers the ability to organize and modify information for each application. This information is password protected. Limited access ensures repeatability and accountability.



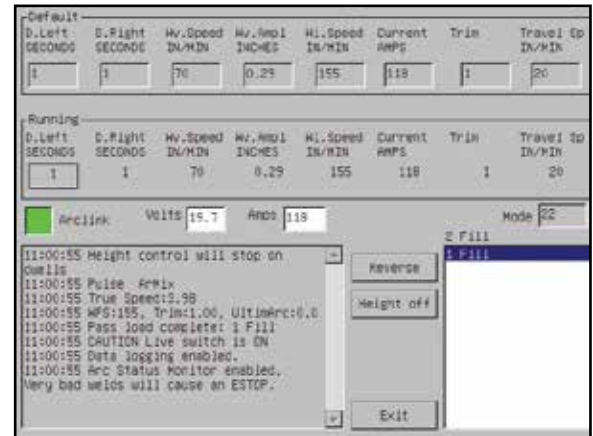
Parameter Input Screen – All data for the weld pass is input here. Unique tabs are supplied in this screen for Weave Data, Drive Travel Data, Welding Power Source Data Search and Welding Parameter Data. Data is input with upper and lower limits for each individual parameter thus ensuring that the resulting weld is within specifications.



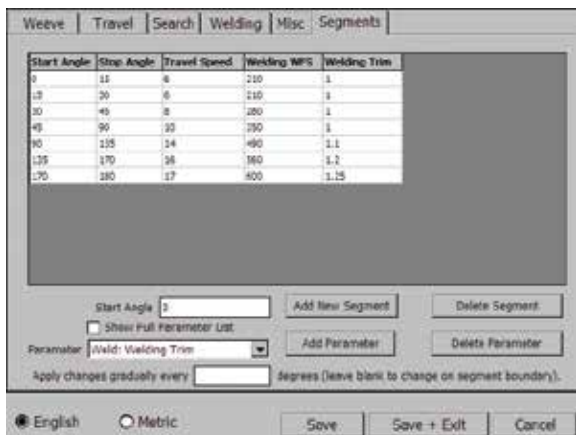
PIPER-PLUS MECHANIZED PIPE WELDING SYSTEM



Search Function – Located within the Parameter Input Screen is the welding waveform program chart. This data resides in the welding power source. This table of data, displayed on the Piper Plus Control Box Screen, allows for easy standard program selection. Delivering an unprecedented level of arc control, the Piper Plus interfaced with power sources designed for pipe welding, include a number of preset welding waveform programs for applications on a variety of materials, including stainless steel, nickel alloys and silicon bronze.



Operating Screen – This screen is displayed during operation. The pre-set points for the pass are displayed along with the actual data being used. The message screen in the lower left corner displays the operation sequences as they occur, displays error messages as needed and provides detailed information about welding wave form data. The lower right screen displays the weld pass that is active along with all other passes that are available to be selected.



OPTION

Segmented Parameter Change Based on Angular Position – The angle of the Piper Plus Drive can be measured by an internal digital sensor installed within the tractor as the drive travels around the pipe. During procedure development, an Administrator can choose which welding parameter(s) can be changed due to angular data received from the internal sensor. Segment length (as a result of angular change) and quantity of parameter change are both independently controlled. All welding parameters that can be set within the control are available for segmentation.

This option can be factory installed on in-service systems as well.



PIPER-PLUS MECHANIZED PIPE WELDING SYSTEM

Interfaced Power Source: Lincoln Electric

Features:

Lincoln Electric's Power Wave® S500 Advanced Process Welder System, LDC-

- Multi-process inverter, MIG, Stick, TIG, Arc Gouging
- 425 amp power source; 500 amps 100% duty cycle
- Smart robust design
- Portable

Benefits:

- Flexibility with processes when not used on the pipeline
- Energy efficient
- Rough handling - tried and tested all over the pipeline world
- Easy to use controls



Interfaced Power Source: Miller

Features:

Miller PipeWorx Welding System MIL-0001

- Multi-processes, stick, DC TIG, MIG, RMD®, Pulsed MIG, Flux-Cored
- 400 A at 36 VDC, 100% duty cycle
- Simple setup
- Designed exclusively for pipe fabrication shops
- Insight Welding Intelligence™
- Streamlined system
- Quick process changeover
- Accu-Power® memory

Benefits:

- Provide all weld process common to pipe welding
- Easy to use controls
- Well respected pipe welding solution throughout the industry





PIPER-PLUS MECHANIZED PIPE WELDING SYSTEM



PWS-4100 Wire Feeder

PWS-4100 Wire Feed Assembly is an integrated package of Lincoln Electric Wire Drive and feed components that are mounted to a frame so you can place it for convenience.

PWS-4100 Wire Feed Assembly consists of:

Lincoln Electric AutoDrive® 4R220 4-Roll Wire Drive.

Wire Size Range:

Solid: .023 – 1/16" (0.6 – 1.6mm)

Cored: .035 – 5/64" (0.9 - 2.0mm)

Wire Feed Speed Range:

30 – 1200 in/min (0.8 – 30.5 m/min)

Includes remote "Purge" and "Wire Jog" functions on feeder frame.

Lincoln Electric AutoDrive® 19

Provides digital communication linking to Lincoln Electric's Power Wave® Power Source.



PipeWorx Dual Feeder (part of MIL-0001)

The PipeWorx Dual Feeder is a Miller Designed and built wire feeder with dual wire feed capabilities. One side is configured to operate with the Piper-Plus, the other side is set up for manual operation.

Wire Size Range:

.035 – .062" (0.9 – 1.6mm)

Wire Feed Speed Range:

50 – 780 ipm (1.3 – 19.8 mpm)

Includes all standard Miller wire feeder functions





PIPER-PLUS MECHANIZED PIPE WELDING SYSTEM

Piper-Plus Pipe Welding Kit

Each Piper Plus System Includes:

- Tractor Drive Unit
- Operator Control Pendants (2)
- Control Box
- Gas Regulator



- Lincoln Electric Power Wave® S500
- PWS-4100 Wire Feed Assembly
- Welding Gun, 450 AMP Capacity

Requires Consumable Parts Kit (see p.11 for details) which defines and consists of wire size, drive roll type, nozzle opening diameter, tip extension, and tip shape.



- Miller® PipeWorx 400
- Dual Wire Feeder





PIPER-PLUS MECHANIZED PIPE WELDING SYSTEM

PIPER-BUG and PIPER-PLUS

PART NUMBER CONVENTION

PWS-ABCD-EF

- **Cooling Type**
AC = Air Cooled
WCDF = Water Cooled
- **D = European Conformance***
0 = 120 VAC control box, NON-CE power source
2 = 240 VAC control box, NON-CE power source
5 = CE 240 VAC
- **C = Wire Feeder & Power Source**
0 = Lincoln Wire Feeder – NO Welding Power System
5 = Lincoln Wire Feeder & Welding Power System
6 = Lincoln Wire Feeder + Power Source + STT Module
7 = Miller PipeWorx
8 = Miller Prep. - no PipeWorx
- **B = Rail Type**
1 = BRR – bent rigid
2 = PSR – stainless
- **A = System**
2 = Piper
5 = Piper-Plus

CONSUMABLE KITS

PWS-ABCD-0.0-E00FG-H

- **Power Source**
L = Lincoln
M = Miller
- **Tip Shape**
T = Tapered
S = Standard
- **Tip Extension**
F = Flush
R = Recessed
E = Extended
- **Nozzle Opening Diameter**
13 – 1/2" (13 mm) opening
16 – 5/8" (16 mm) opening
19 – 3/4" (19 mm) opening
- **Drive Roll Type**
K = cored wire knurled V groove
V = solid wire V groove
- **Wire Diameter (mm)**
1.2, 1.4, 1.6
- 4600 Air Cooled Consumable Kit
4600 DF Water Cooled Consumable Kit



RING RAILS

- PSR-ABCD-XX
 - Pipe O.D. (inches or mm)
16, 18, 20, etc
 - 2000 Piper Stainless Rail
- BRR-3250-XX
 - Pipe O.D. (inches or mm)
16, 18, 20, etc.

*All of our Piper-Bug control boxes are CE compliant.



PIPER-PLUS MECHANIZED PIPE WELDING SYSTEM

Power Requirements:

120VAC or 240VAC / 50-60Hz / 1PH

Weights:

w/o cables- 24.72 lbs (12.44 kg)

15 ft cables- 47.56 lbs (20.72 kg)

Total cap.- 60 lbs (27 kg)

Operating Temperatures:

-4°F to 122°F (-20°C to 50°C)

Welding Process:

GMAW, GMAW-Pulsed, FCAW, STT®

Travel:

Fwd/Off/Rev (Selectable)

Steering:

50.8mm (2") Left & Right Of Center

101.6mm (4") Total

Drive / Brake:

Rack & Pinion Drive / Dynamic Braking

Speed:

Linear- 0 – 80 ipm (0-200 cm/m)

Weave- 5 – 130 ipm (12.7 – 330.2 cm/m)

Dwell Times:

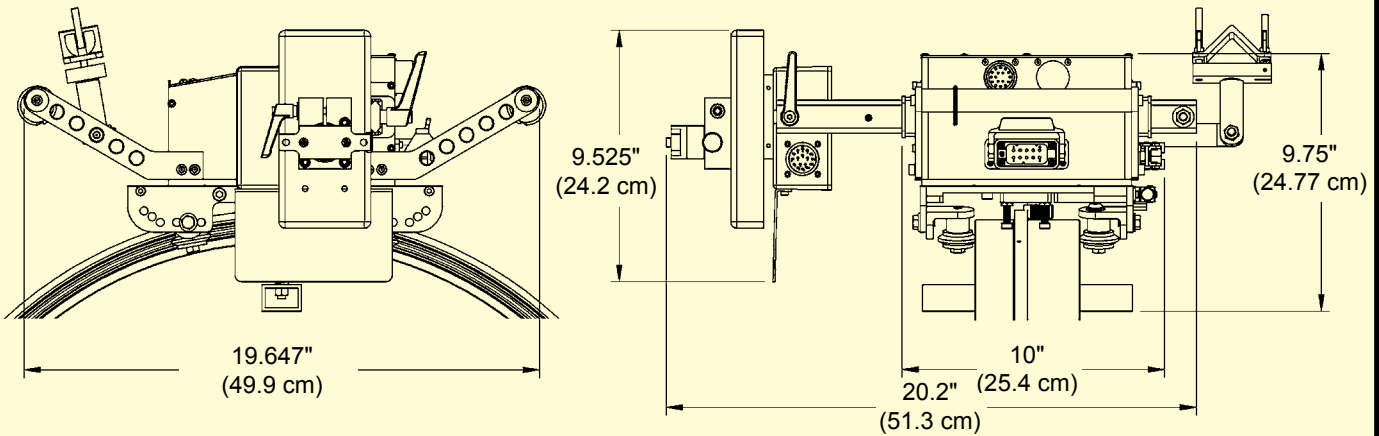
0 – 10 Seconds Left & Right, Independently Set

Weave Width:

.25 – 50 mm (.01 – 2")

Dimensions:

Piper Plus w/ BRR-3250-xx Rail & Legs



Piper Plus w/ PSR-2000-xx Rail & Legs

