

# POWER WAVE<sup>®</sup> AC/DC 1000<sup>®</sup>

BIGGER WELDS,  
FASTER<sup>™</sup>



## CHOOSE YOUR SOLUTION:

### Mobile Application

#### CRUISER<sup>™</sup> TRACTOR

Flexible wire feeding tractor for heavy plate in field and yard applications.



### In-Plant Application

#### POWER FEED<sup>™</sup> 10A CONTROLLER

Easy to integrate wire feeder and controller for repeatability in single or multiple arc applications.



# Power Wave® AC/DC 1000®

## Increase Productivity, Quality and Flexibility

The Power Wave® AC/DC 1000® is the first power source to introduce Waveform Control Technology® to submerged arc welding. Variable frequency and amplitude AC, DC positive or DC negative output allows the user to control the deposition rate and penetration. Constant current and constant voltage modes are available.

An operator can increase weld speeds, yield higher quality welds and improve efficiencies in a single or multi-arc environment. Depending on the output, a welding arc may be driven by a single machine or multiple machines in parallel for applications that require more than 1000 amps of continuous operation.

### Processes

Submerged Arc



### Output



### Input



## Key Features

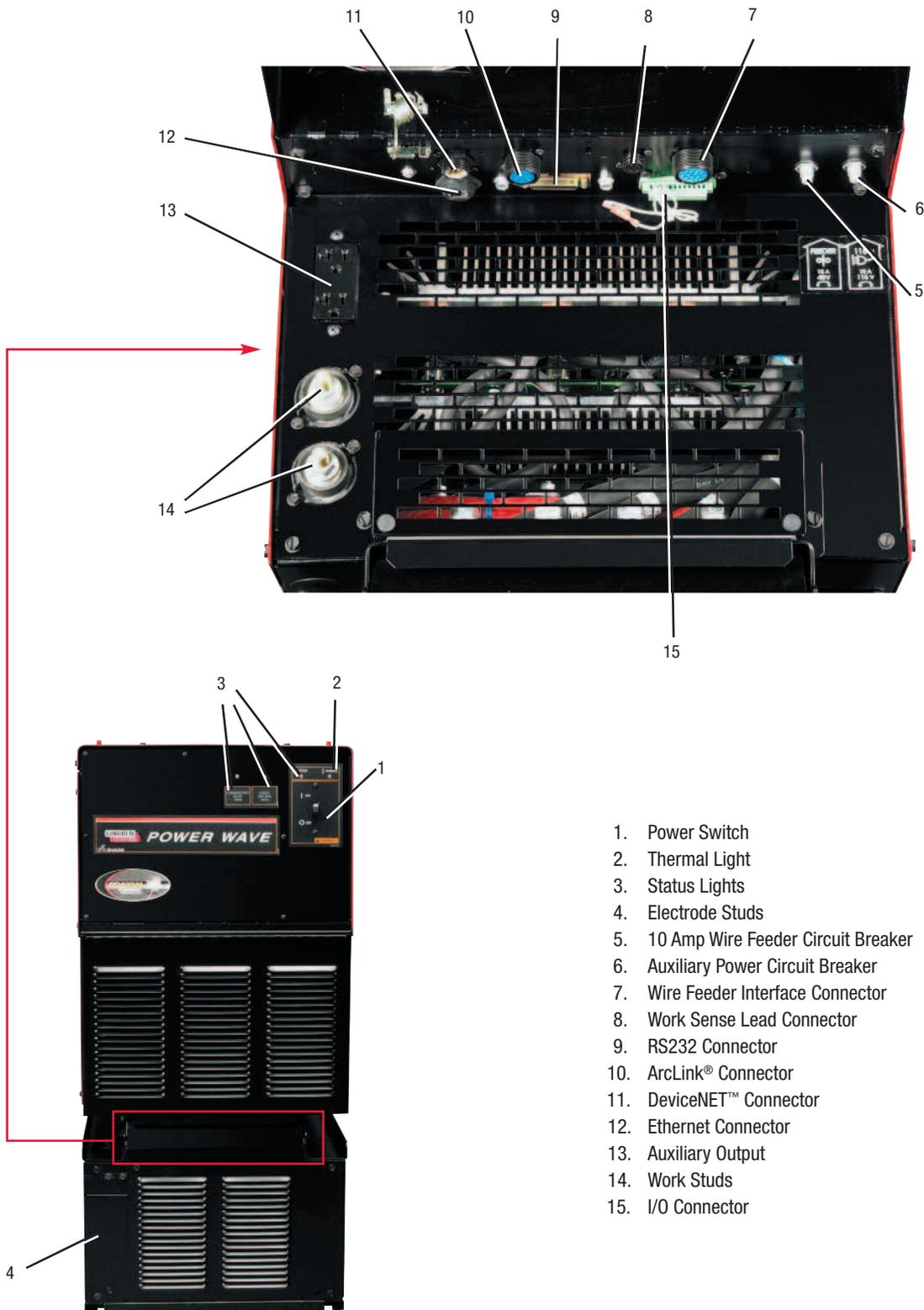
- **95% Power Factor Correction** – Enables connection of multiple machines on the same plant infrastructure for lower installation costs.
- **ArcLink®, Ethernet, and DeviceNet™ Communication** – Offers remote process monitoring, control and troubleshooting.
- **380 - 575 VAC, 50/60Hz Voltage Input** – Offers the ability to be connected anywhere in the world.
- **Voltage Compensation and Reliable Input Voltage Connection** – Provides consistent operation over ± 10% input voltage variation.
- **No Hardware Reconfiguration Required with Easy Polarity Switching** – Eliminates downtime.
- **Software Based Controls** – Can be upgraded as new features become available.

## Technical Specifications

Product Name	Product Number	Input Voltage	Rated Output Current/Voltage/Duty Cycle	Input Current @ Rated Output	Output Range	Dimensions H x W x D in. (mm)	Net Weight lbs. (kg)
Power Wave® AC/DC 1000®	K2344-2 <sup>(1)</sup>	380/400/460/500/575/3/50/60	1000/44/100%	82/79/69/62/55	200-1000A	43.5 x 19.2 x 33 (1105 x 488 x 838)	650 (295)

<sup>(1)</sup> External Filter is required to meet CE conducted emission requirements. The K2444-1 must be used with the K2344-2.

**KEY CONTROLS**



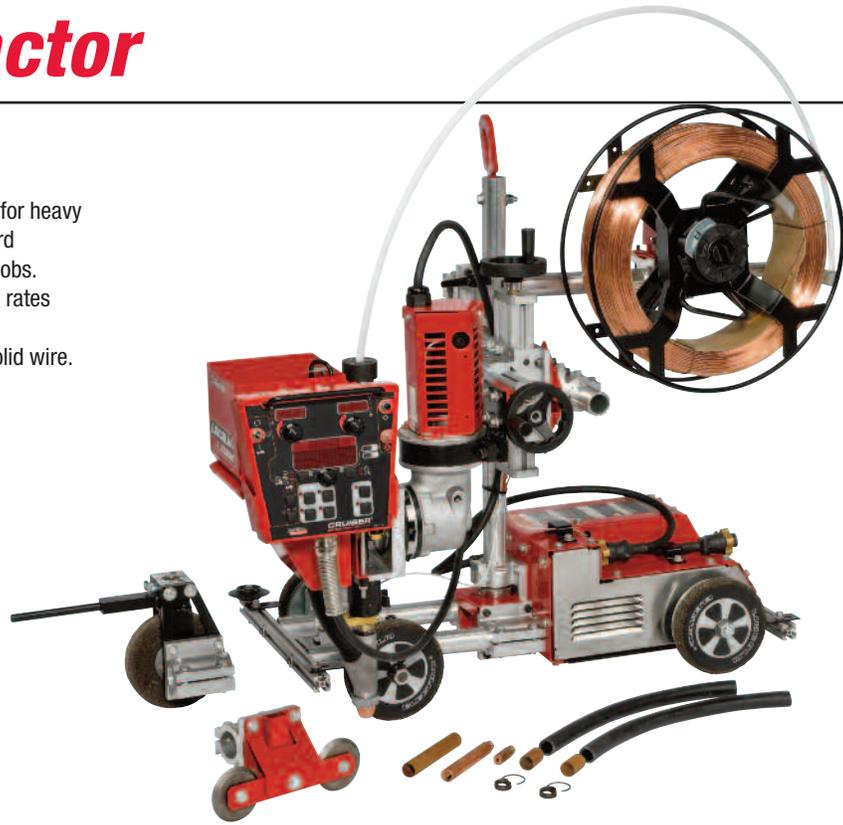
- 1. Power Switch
- 2. Thermal Light
- 3. Status Lights
- 4. Electrode Studs
- 5. 10 Amp Wire Feeder Circuit Breaker
- 6. Auxiliary Power Circuit Breaker
- 7. Wire Feeder Interface Connector
- 8. Work Sense Lead Connector
- 9. RS232 Connector
- 10. ArcLink® Connector
- 11. DeviceNET™ Connector
- 12. Ethernet Connector
- 13. Auxiliary Output
- 14. Work Studs
- 15. I/O Connector

# Cruiser™ Tractor

## For The Long Haul

The Cruiser is a flexible wire feeding tractor for heavy plate submerged arc welding in field and yard applications. Designed for big joints on big jobs. Weld butt joints and fillet joints at deposition rates up to 30 lbs./hr. Comes ready to weld with joint tracking kits and drive rolls for 5/32" solid wire.

**Processes**  
Submerged Arc



Output



Input



### Key Features

- **Designed for Welding Big Joints on Big Jobs** – Ideal for welding heavy plate on barges, ships, large tanks, bridges, and offshore platforms.
- **High Deposition rates up to 30 lbs/hr.** – Rated output of 1000 amps at 100% duty cycle.
- **Versatile Travel Capabilities** – 3 or 4 wheel configuration for use with or without track.
- **Lightweight Pendant Control with Digital Meters** – Save procedures, apply procedure limits, and lockout any or all controls.
- **Rugged Mast and Arm** – Keeps the wire drive in a steady position and allows flexible adjustment.
- **Proven Industrial Power Feed™ 10S Wire Drive Design** – Rotates on two axis and is attached to heavy duty cross slides for any torch angle and feeds up to 7/32" diameter wire.

### K2607-1 Includes

- Pendant Control
- Butt, Fillet and Lap Joint Tracker
- 50-60 Lb. Coil Adapter
- Wire Straightener
- Drive Roll/Guide Tube for 5/32 solid wire
- Contact Nozzle Assembly
- Nozzle Extension
- Contact Tip for 5/32 solid wire

### Technical Specifications

Product Name	Product Number	Input Power	Rated Output Current/Duty Cycle	Travel Speed in/min (m/min)	Gearing	Wire Feed Speed Range ipm (m/min)	Wire Size Range in. (mm) Solid	Dimensions H x W x D in. (mm)	Net Weight lbs. (kg)
Cruiser™	K2607-1	40 VDC	1000A / 100%	10 - 100 (0.25 - 2.5)	142:1	15 - 200 (0.4 - 5.0)	1/16 - 7/32 (1.6 - 5.6)	29 x 23 x 36 (737 x 584 x 914)	140 (63.5)

## KEY CONTROLS



### 1. Digital Meters

### 2. 3 Position Travel Toggle Switch

- Auto
- Off
- Manual

### 3. Pushbutton Menu Options

- Weld Mode Select
- Frequency and Balance
- Travel Options

### 4. Travel Direction:

- Forward
- Reverse

### 5. Jog

### 6. Start and Stop Pushbutton

### 7. Arc Start and End Set-Up Options

### 8. Inch Up/Inch Down Pushbuttons

- Feed up and down

### 9. 4 Memory Buttons:

- Save common procedures. (including travel)
- Apply operator range or limits
- Lockout changes for procedure control

## RUGGED DESIGN & FLEXIBLE ADJUSTMENT FOR ANY CONFIGURATION

### 1. Mast and Frame

- Heat treated aluminum alloy tubing
- Creates a rigid frame for steady position
- Mast and boom completely separates from the base for mobility

### 2. Heavy Duty Cross Slides

- Easy adjustment of electrode stick-out and position
- Accurate positioning of the electrode in joint
- Easy adjustment and changes make the design efficient to use

### 3. Hardened Base Construction

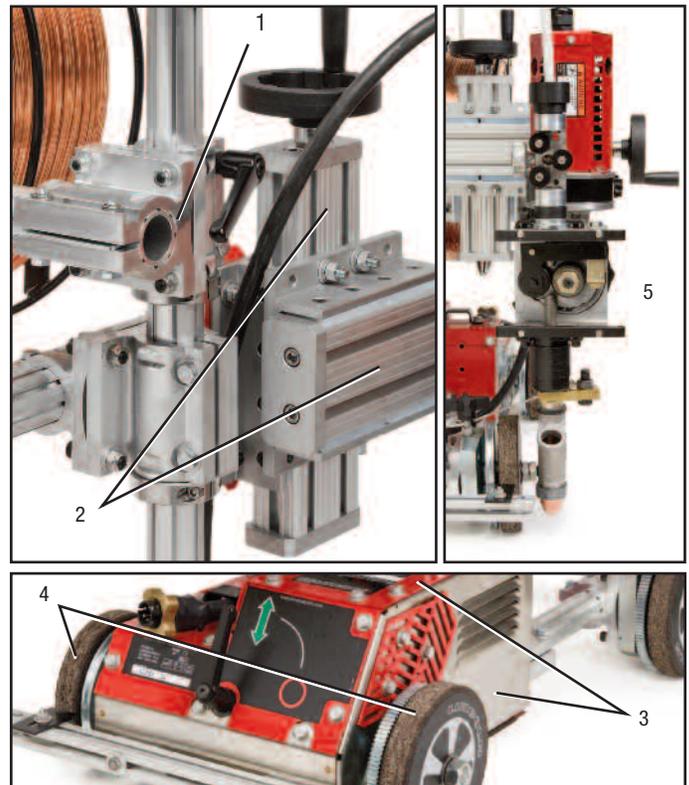
- Stainless steel to reduce corrosion
- Heat shield to withstand preheated plate
- Environmentally hardened (IP23 Rated)

### 4. Stable Travel and Tracking

- 3 or 4 wheel configuration on same model
- Easy to use clutch
- Factory ready for use with or without track
- Patent Pending wheel design that endures impacts, is high temperature resistant and excellent traction

### 5. Proven Industrial Wire Drive

- Feeds wire up to 7/32" diameter
- Changeable gears for a wide range of wire feed speed range
- Rotation in two directions for any torch angle
- 1000A, 100% Duty Cycle



# Power Feed™ 10A Controller & Power Feed™ 10S Heads

## ArcLink® Controller for Power Wave® AC/DC 1000® Systems

The Power Feed™ 10A eliminates the need for a separate AC and DC controller, making this powerful hard automation system controllable, adaptable and easy to use. The user-friendly control panel offers a single-point of control over the entire welding cell.

**Processes**  
Submerged Arc



Output



Input



### Key Features

- **Process Controller** – Provides clear dual digital display of set-up and weld modes, six memories, AC controls, strike/start/end options, travel stop/start, and timers.
- **Waveform Control Technology®** – Offers the ability to select the right waveform for each application.
- **User-Friendly Controls** – Can be adjusted on-the-fly to change welding parameters within the same welding mode.
- **Travel Carriage Available** – For easy attachment to standard I-Beams.
- **Controller with Digital Meters** – Save procedures, apply procedure limits, and lockout any or all controls.

### Technical Specifications

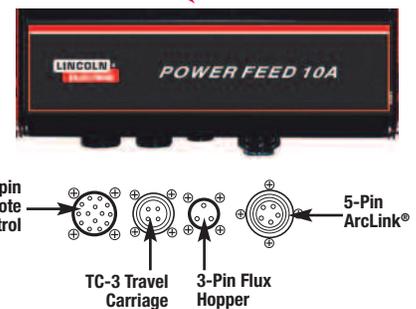
	Product Name	Product Number	Input Power <sup>(1)</sup>	Rated Output Current / Duty Cycle	Gear Box	Wire Feed Speed Range <sup>(1)</sup> imp (m/min)	Wire Size Range <sup>(1)</sup> in. (mm) Solid	Dimensions H x W x D in. (mm)	Net Weight lbs. (kg)
Controller	Power Feed™ 10A Controller	K2362-1	40 VDC	1000A / 100%	142:1 <sup>(1)</sup>	10 - 200 (.25 - 5.08)	5/32 - 7/32 (4.0 - 5.6)	15 x 13 x 4 (381 x 259 x 102)	25 (11.3)
					95:1 <sup>(1)</sup>	10 - 300 (.25 - 7.62)	1/8 - 5/32 (3.2 - 4.0)		
					57:1 <sup>(1)</sup>	10 - 450 (.25 - 11.4)	.045 - 1/16 (1.1 - 1.6)		
Heads	Power Feed™ 10S Head (includes flux hopper)	K2370-1	40 VDC	1000A / 100%	142:1 <sup>(1)</sup>	10 - 200 (.25 - 5.08)	5/32 - 7/32 (4.0 - 5.6)	12 x 14 x 10 (305 x 355 x 254)	80 (36.3)
					95:1 <sup>(1)</sup>	10 - 300 (.25 - 7.62)	1/8 - 5/32 (3.2 - 4.0)		
					57:1 <sup>(1)</sup>	10 - 450 (.25 - 11.4)	.045 - 1/16 (1.1 - 1.6)		
	Power Feed™ 10SF Head	K2312-1	40 VDC	1000A / 100%	142:1 <sup>(1)</sup>	10 - 200 (.25 - 5.08)	5/32 - 7/32 (4.0 - 5.6)	12 x 14 x 10 (305 x 355 x 254)	35 (15.9)
					95:1 <sup>(1)</sup>	10 - 300 (.25 - 7.62)	1/8 - 5/32 (3.2 - 4.0)		
					57:1 <sup>(1)</sup>	10 - 450 (.25 - 11.4)	.045 - 1/16 (1.1 - 1.6)		

(1) 142:1 gear box is standard. Conversion Kit supplied for conversion to 95:1 with Wire Drive (K2370-1, K2312-1, or K2311-1)

## KEY CONTROLS



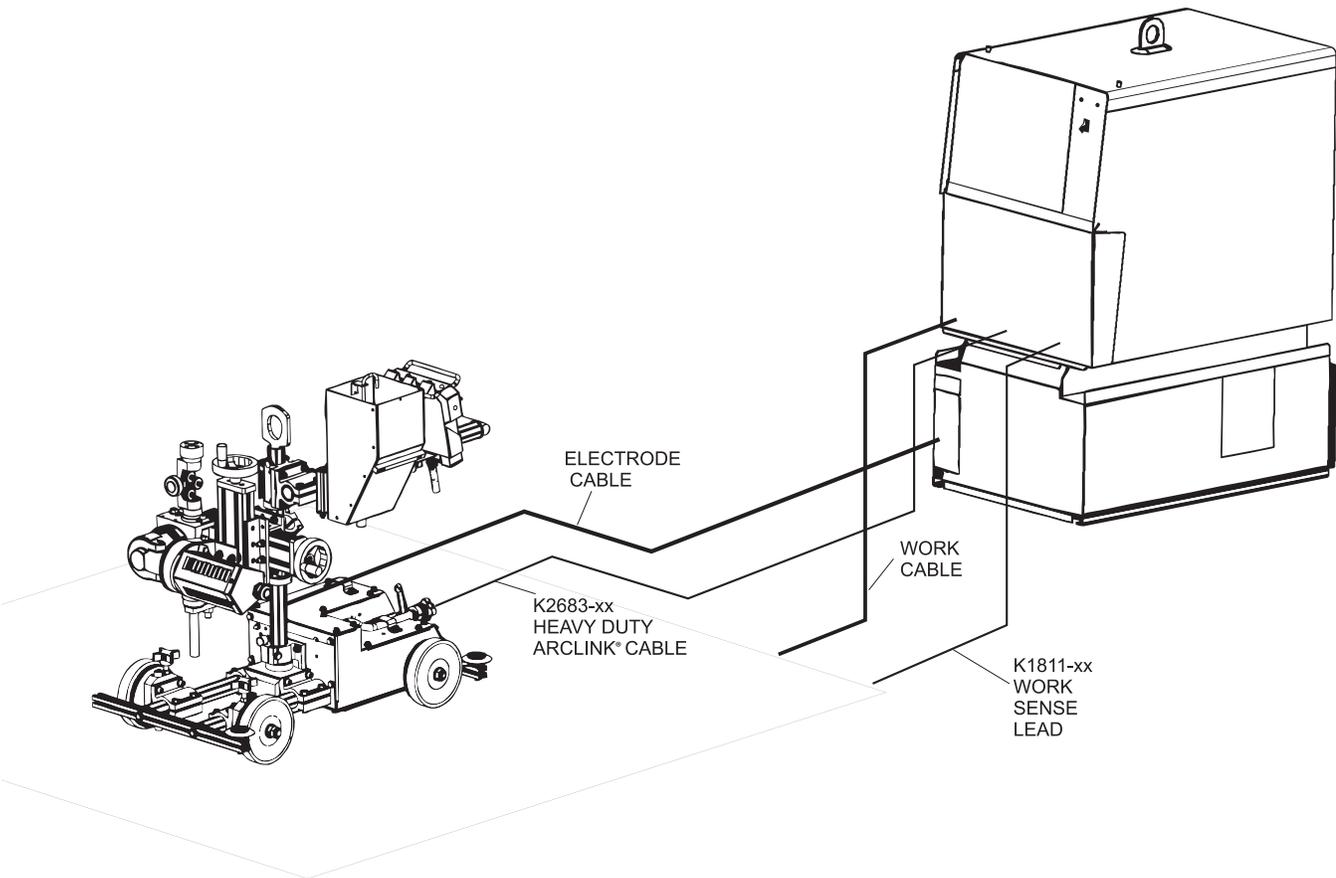
1. Two **control knobs** can increase or decrease Wire Feed Speed (WFS), Voltage, and Amps. Any of these adjustments can be made “on-the-fly”.
2. The **switch panel** can also be used as a remote pendant. From here, start and stop the weld, inch the electrode wire, activate the flux hopper, and control travel.
3. **Memory panel** can store up to six welding procedures.
  - **Limits** are set from the memory panel.
  - On-the-fly procedure changes can be made.
4. Left Pushbutton:
  - Selects **Weld Mode** based on weld procedure and wire diameter.
  - Sets **AC Control: Balance, DC Offset, Frequency**
5. Right Pushbutton:
  - Sets **Start Options: Strike WFS, Volts, Time Start Arc Force Upslope Time**
  - Sets **End Options: Downslope Time Crater WFS/Amps, Volts, Time, Arc Force Burnback Time**



**SINGLE ARC MOBILE CONFIGURATION**

**RECOMMENDED EQUIPMENT**

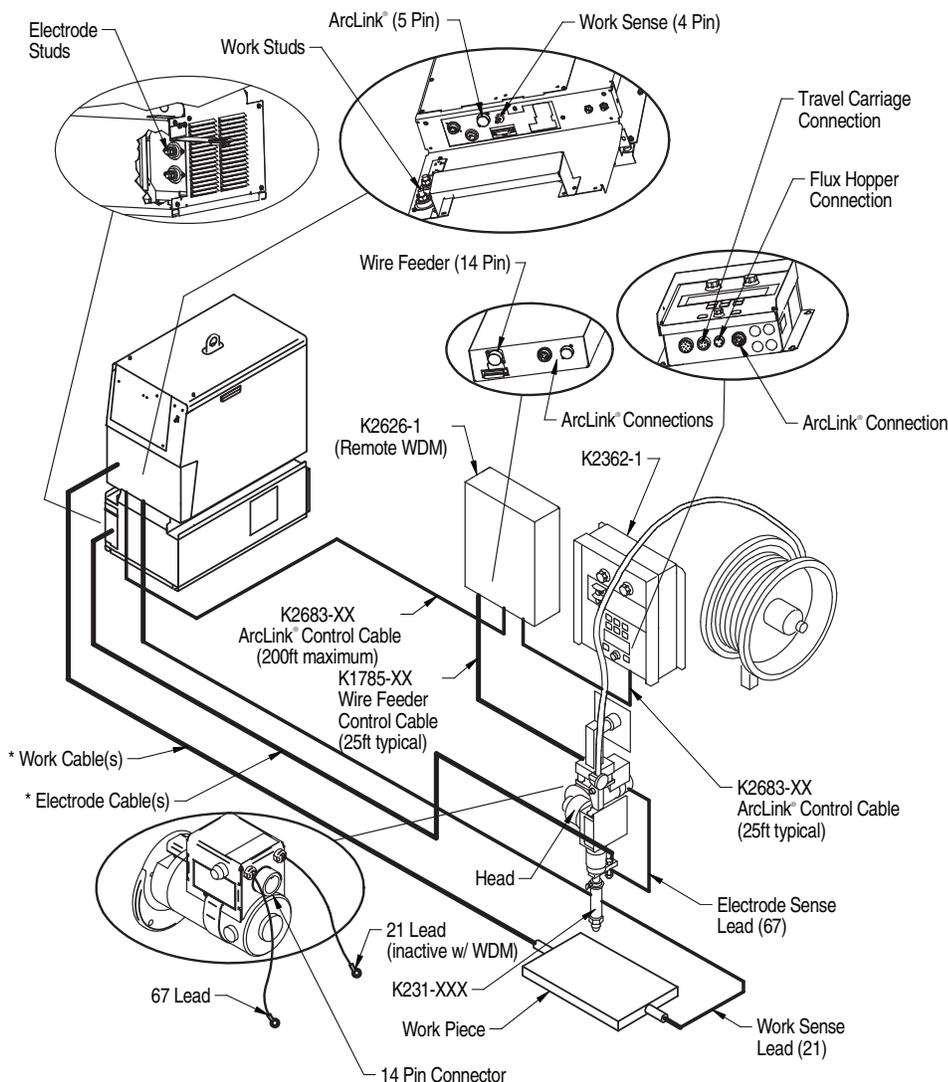
System Identifier	Product Number	Product Description	Qty. Required
Power Source	K2344-2	Power Wave® AC/DC 1000®	1
Tractor	K2607-1	Cruiser™	1
Track	K396	Track Section	Optional
Nozzle	K231-xx	Submerged Arc Contact Nozzle Assembly	Included
Nozzle	K148A, K148B	Positive Contact Nozzle Assembly	Optional
Flux Cone	K285	Concentric Flux Cone Assemble	Optional
ArcLink® Digital Communication Cable	K2683-xx	Heavy Duty ArcLink® Cable	1
Sense Leads	K1811-xx	Work Sense Lead	1



**SINGLE ARC IN-PLANT CONFIGURATION**

RECOMMENDED EQUIPMENT			
System Identifier	Product Number	Product Description	Qty. Required
Power Source	K2344-2	Power Wave® AC/DC 1000® Power Source	1
Head	K2370-1 or K2312-1	Power Feed™ 10S head for 3/32 to 7/32 in. solid wire (Includes hopper, wire straightener, cross seam adjuster, head mounting hardware) or Power Feed™ 10SF Head for 3/32 to 7/32 in. solid wire Fixture Builders Head (Insulators not included)	1
User Interface	K2362-1	Power Feed™ 10A Controller	1
ArcLink® Digital Communication Cable	K2683-xx	ArcLink® (5 pin) from power source to the Remote Wire Drive Module.	2
Welding Cables	K2163-xx or K1842-xx	Weld Power Cables from the Power Source to the Contact Nozzle and from Power Source to Work	4 Cables Per Arc
Wire Drive Module to Head Control Cable	K1785-xx	Feeder Control Cable (14 pin) from the Head to the Wire Drive Module. Cannot be extended.	1
Torch	K231-xx	Submerged Arc Contact Nozzle Assembly	1
Remote Wire Drive Module	K2626-1	Remote Wire Drive Module	1

System Component
PLC (contact Lincoln)
Ethernet Switch (customer supplied). Required for arcs > 1000A
Computer (customer supplied). Required for use of the Submerged Arc Software Suite.
K325-x TC-3 Travel Carriage
K96 Horizontal Lift Adjuster
K29 Vertical Lift Adjuster
K299 Wire Reel Assembly
K2462-1 Power Feed™ 10A Mounting Bracket (K299 cannot be used if the mounting bracket is attached. A K390 is recommended instead.)





**RECOMMENDED ACCESSORIES AND OPTIONS**

**DRIVE ROLL KIT INFORMATION**

KP1899 Drive Roll Kit			Included with Kit			
Drive Roll Kit Number	Wire Sizes and Types		Part Number	No. Required	Incoming Guide	Outgoing Guide
KP1899-1	3/32" - 7/32"	Wires	KP1885-1	2	KP2116-2	KP1963-1
KP1899-2	1/16" - 3/32"	Wires	KP1886-1	2	KP2116-1	KP2097-2
KP1899-3	.035" - .052"	Solid Wire	KP1887-1	1	KP1967-1	KP2097-1
KP1899-4	.045" - .052"	Cored Wire	KP1892-1	2	KP1967-1	KP2097-1



**ArcLink®/LincNet™ Cable (5-pin)**  
Connects Power Feed™ to Power Wave®. Can be extended.  
**Order K1543-XX**



**System Interface**  
External controller required for multi-arc applications provides arc-to-arc phase relationship.



**Sense Lead Kit**  
Required to accurately monitor voltage at the arc for heavy duty applications.  
**Order K1811-50** for 50 ft. (15.2 m)  
**Order K1811-75** for 75 ft. (23 m)  
**Order K1811-100** for 100 ft. (30 m)



**Heavy-Duty ArcLink® Cable (5-pin)**  
Connects Power Feed™ to Power Wave®. Can be extended.  
**Order K2683-xx**

**Order K2282-1 CE Filter**  
The K2444-2 Power Wave® AC/DC 1000® CE Module is a high power filter that enables the K2344-2 Power Wave® AC/DC 1000® CE "ready" machine to conform to the EMC standards of Europe and Australia. Electrically, the module is connected between the power line and the input of the K2344-2 machine. The filter provides high differential and common mode attenuation to reduce conducted emissions on the power line. *Note: K2344-1 cannot be used with K2444-1 for CE conformance.*  
**Order K2444-2**



**POWER FEED™ 10S HEADS**



**Feeder Control Cable (14-pin)**  
Connects Power Wave® power source to wire feeder. Cannot be extended.  
**Order K1785-XX**



**TC-3 Self-Propelled Travel Carriage**  
TC-3 high capacity travel carriage, multiple heads & controls, 5-75 ipm.  
**Order K325 HCS**  
TC-3 high capacity travel carriage, multiple heads & controls, 15-270 ipm.  
**Order K325 HCF (made to order)**

**POWER WAVE® AC/DC 1000®**

**Remote Wire Drive Module**  
Designed for the Power Wave® AC/DC 1000® system, the Remote Wire Drive module enables you to remove and remotely locate your Wire Drive Module outside of the power source to support extended ArcLink® cable lengths. Recommended for applications where the Power Feed™ Head is installed at more than 25 ft (7.6 m) away from the power source.  
**Order K2626-1**



**Interface Control Cable (22-pin)**  
Required to parallel multiple Power Wave® power sources — one per machine required. Can be extended.  
**Order K1795-XX**



**Large Wire Twinarc® Contact Assemblies**  
Feeds two 5/64" (2.0 mm), 3/32" (2.4 mm) or 1/8" (3.2 mm) wires for submerged arc welding on "Fast-Fill" joints or hardfacing beads.  
**Order K225**



**Tiny Twinarc® Contact Assemblies**  
Feeds two electrodes for high speed submerged arc welds. Includes contact nozzle, wire guides, drive rolls and guides, and a second wire reel and mounting bracket.  
**Order K129-xx**

**RECOMMENDED ACCESSORIES AND OPTIONS (CONT.)**

**POWER FEED™  
10S HEADS and  
TC-3 TRACTOR**

**Tandem Arc Framework**  
Provides mountings with desired positioning adjustments for two standard Automatic Wire Feed Heads. Includes insulation and hardware to permit direct mounting to a high capacity TC-3 Carriage, or to the user's gantry or fixture for either direction of travel.  
**Order K387**



**Tandem Reels**  
Two Wire Reel Mounting for TC-3.  
**Order K390**

**Flux Hopper for Tandem Arc**  
Flux Hopper for K387 mountings.  
**Order K389**



**Vertical Lift Adjuster**  
Provides 4" (102 mm) hand crank adjustment of vertical head position. It also includes up to 3-3/4" (95.2 mm) in-and-out horizontal adjustment with stops that can be preset for simple repetition of the same adjustment.  
**Order K29**



**Horizontal Adjuster**  
Provides crank adjustment of head position. Has 2" (51mm) horizontal travel.  
**Order K96**



**Wire Reel Assembly for 50-60 lb. Coils**  
Accommodates 50 lb. (22.7 kg) or 60 lb. (27.2 kg) coils of wire on automatic wire feeders. The unit includes a wire reel mounting spindle and braking system.  
**Order K299**



**SpreadArc Oscillator**  
Oscillates head across the line of travel. Calibrated dwell time and oscillation speed controls permit the SpreadArc to cover large areas quickly with smooth beads of minimum admixture.  
**Order K278-1**



**POWER FEED™  
10S HEADS and  
CRUISER™ TRACTOR**

**Wire Straightener (Subarc)**  
Includes: A three roll wire straightener with adjustable pressure. (1 included with each tractor)  
**Order K1733-5**

**Magnetic Flux Screen Separator**  
For submerged arc welding. Removes foreign magnetic particles from reused flux.  
**Order K58**

**POWER FEED™  
10S HEADS and  
CRUISER™ TRACTOR**

**Submerged Arc Contact Nozzle Assembly**  
For 5/64 thru 3/16" (2.0 thru 4.8 mm) electrode at currents generally below 600 amps. Outer flux cone gives full flux coverage with minimum consumption. (Rated for up to 650 amps)  
**Order K231 - 5/64  
K231 - 3/32  
K231 - 1/8  
K231 - 5/32  
K231 - 3/16**



**Positive Contact Assembly**  
For single arc welding at high currents (optional T12928 water cooling attachment recommended when Innershield® welding over 600 amps).  
**Order K148A, K148B**



**Concentric Flux Cone Assembly**  
For use with K148B, Positive Contact Nozzle Assembly. Gives concentric flux coverage around the electrode.  
**Order K285**



**Contact Jaw Assembly**  
Single arc contact jaw assembly for 1/8-7/32" (3.2-5.6 mm) diameter wire. Rugged contact jaws for maximum life at currents over 600 amps.  
**Order K226R**



**Linc-Fill Long Stickout Extension**  
Linc-Fill long stickout extension for K148A Single Arc Positive Contact Nozzle Assembly. Required for long stickout technique.  
**Order K149-x**



**Narrow Gap Deep Groove Nozzle**  
For single arc 3/32" (2.4 mm) diameter wire welding on thick walled steel plate with nearly parallel-sided, narrow gap joint preparations.  
**Order K386**

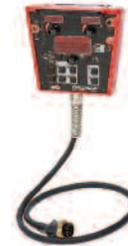


**Twinarc® Solid Wire Straightener**  
Straightens wire diameters .045 thru 3/32" (1.2 thru 2.4 mm). Particularly valuable on longer electrical stickout procedures.  
**Order K281**



**CRUISER™  
TRACTOR**

**Pendant**  
Includes: One Tractor pendant with 3.5' of cable. (1 included with tractor)  
**Order K2684-1**



**Tube and Clamp Kit (Subarc)**  
Includes: Two 15" splined tubes, two 30" splined tubes, 4 clamps with keys and handles, and mounting hardware.  
**Order K2716-1**



**Cross Slide Assembly (Subarc)**  
Includes: Two slides with 4 inches of travel. (Two slide assemblies and 1 cross slide assembly included with each tractor).  
**Order K2714-1**



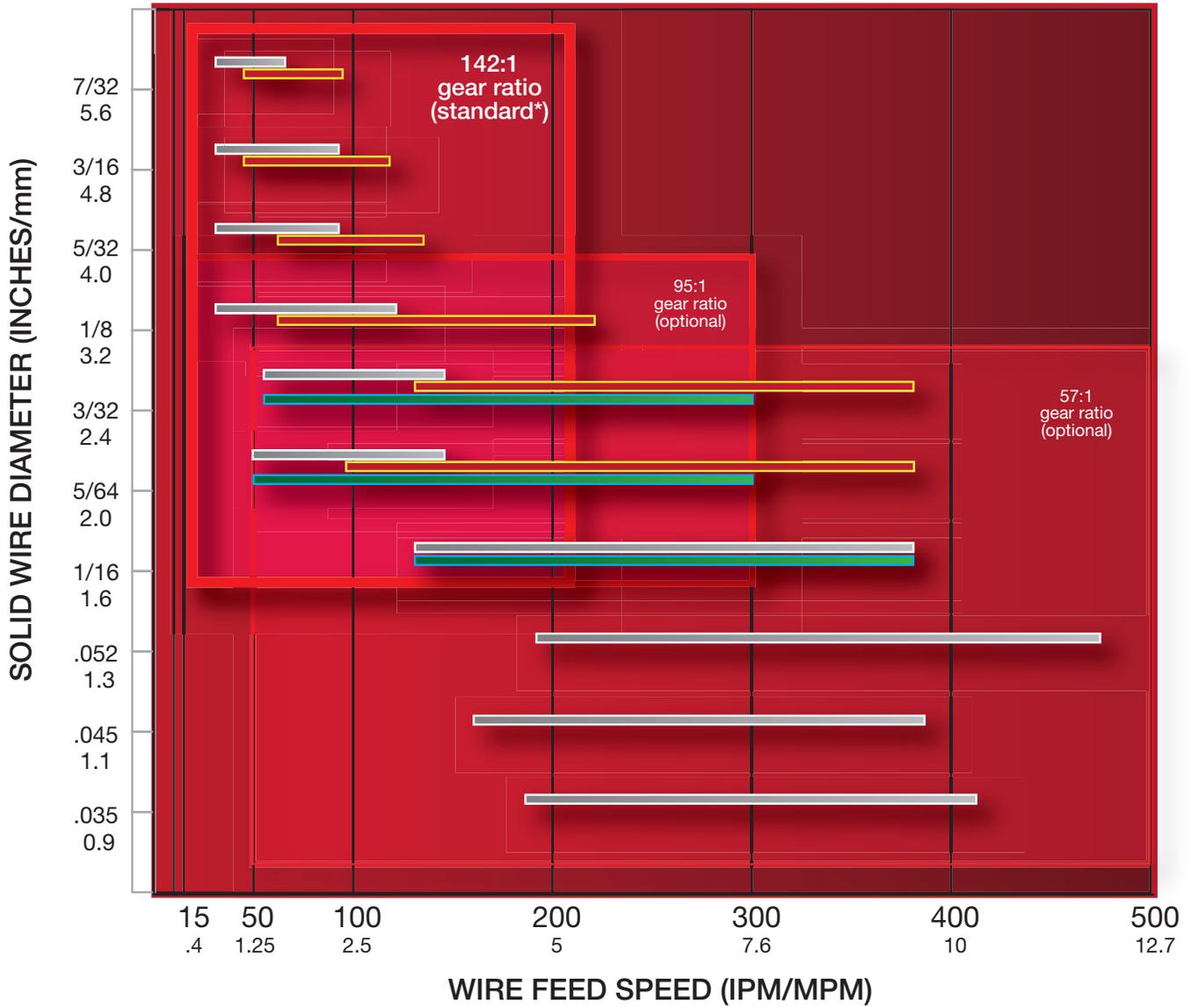
**Track Section**  
Includes: a single section of 70 in (1.8m) of track.  
**Order K396**



**50-60 lb. Coil Adapter**  
Adapts 50-60 lb. (22.6-27.2 kg) coils of Lincoln Electric electrode to 2" (51 mm) spindle.  
**Order K1504-1**



# Mild Steel SAW Wire Feeding Capability



\* On Power Feed™ 10A

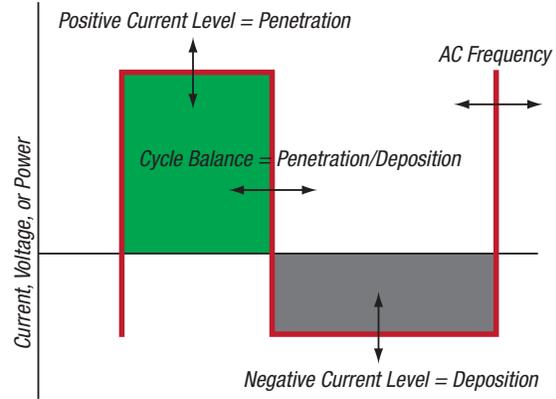
# Waveform Control Technology®

The waveform may be varied to:

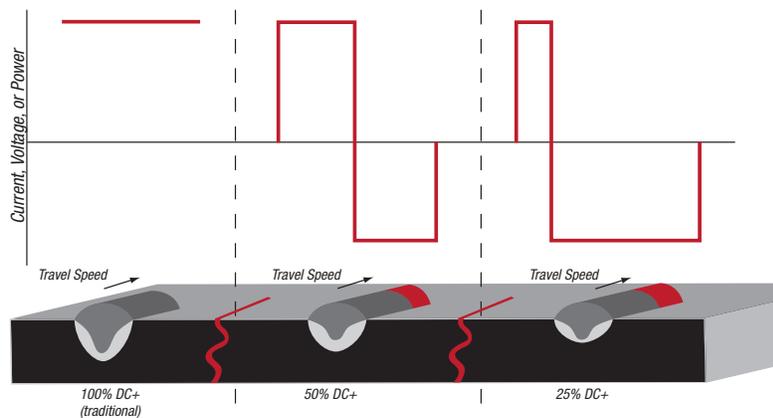
- Control Penetration
- Control Bead Shape
- Minimize arc interactions which can cause arc blow

Waveform Control Technology® capability provides precise control over:

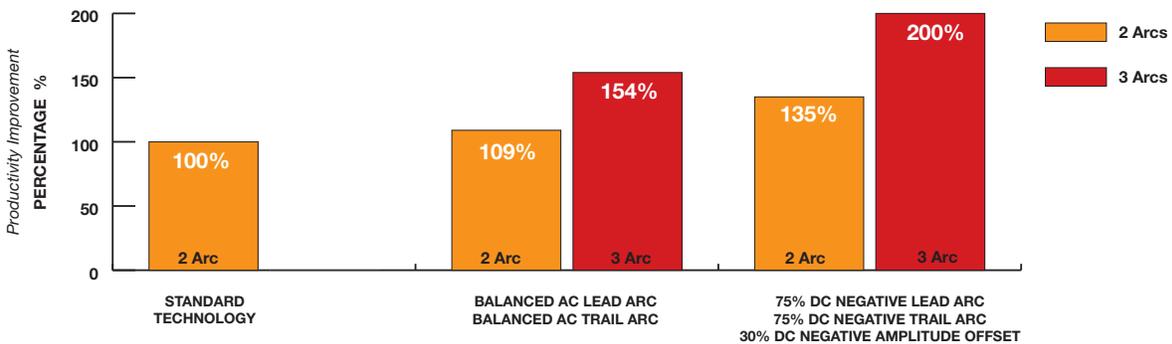
- AC Frequency
- Balance (Percentage of time in the positive polarity portion of one Cycle)
- Offset (Negative Amplitude)



## Effect on Penetration, Deposition Rate, and Travel Speed from Balance



## Multi-Arc Submerged Arc Welding Power Wave® AC/DC 1000®



### CUSTOMER ASSISTANCE POLICY

The business of The Lincoln Electric Company® is manufacturing and selling high quality welding equipment, consumables, and cutting equipment. Our challenge is to meet the needs of our customers and to exceed their expectations. On occasion, purchasers may ask Lincoln Electric for information or advice about their use of our products. Our employees respond to inquiries to the best of their ability based on information provided to them by the customers and the knowledge they may have concerning the application. Our employees, however, are not in a position to verify the information provided or to evaluate the engineering requirements for the particular weldment. Accordingly, Lincoln Electric does not warrant or guarantee or assume any liability with respect to such information or advice. Moreover, the provision of such information or advice does not create, expand, or alter any warranty on our products. Any express or implied warranty that might arise from the information or advice, including any implied warranty of merchantability or any warranty of fitness for any customers' particular purpose is specifically disclaimed.

Lincoln Electric is a responsive manufacturer, but the selection and use of specific products sold by Lincoln Electric is solely within the control of, and remains the sole responsibility of the customer. Many variables beyond the control of Lincoln Electric affect the results obtained in applying these types of fabrication methods and service requirements.

Subject to Change – This information is accurate to the best of our knowledge at the time of printing. Please refer to [www.lincolnelectric.com](http://www.lincolnelectric.com) for any updated information.



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