

# Power Wave® 655 Robotic



## For Tough Automation Jobs

The Power Wave® 655 Robotic is a high-performance, digitally controlled inverter power source capable of complex, high-speed waveform control. The Power Wave® 655 Robotic provides additional output for those heavy-duty automation jobs. This Power Wave® connects seamlessly to robot controllers and hard automation PLCs to create a highly integrated and flexible welding cell. The Power Wave® 655 Robotic is built just like our Power Wave® 455M Robotic, a proven and reliable inverter platform for various hard automation and robotic applications. The Power Wave® 655 Robotic works exclusively with the Power Feed™ 10R wire feeder.



### Output



### Input



### Processes

MIG, Pulsed, Flux-Cored

## Advantage Lincoln

- Program your own waveform or choose from over 60 standard welding waveform programs that optimize output for a broad range of electrode size, type and shielding gas combinations to give you optimal appearance, penetration, beadshape and travel speed for each application.
- Utilizes ArcLink® - the leading digital communication protocol for welding, making it the best choice for seamless, time-critical integration to the power source and networked equipment.
- Software-based controls can be upgraded as new features become available.
- Process and production monitoring with access to real-time (500Hz) feedback such as current, voltage and wire feed speed. Access to internal data acquisition (10 KHz) and access to real-time machine status, such as fault/alarm conditions and arc time.
- A Power Wave® inverter operates at a high efficiency (88-90%) with a 95% minimum power factor<sup>(1)</sup>.
- Excellent power source for heavy-duty Tandem MIG® applications.
- Standard Ethernet/DeviceNet capabilities.

### 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® 655 Robotic	K1519-2 <sup>(2)</sup>	460/575/3/60	650A / 44V / 100% (815A / 44V / 60%)	41A / 33A (53A / 42A)	20 - 880A	26.1 x 19.9 x 32.9 (663 x 505 x 835)	306 (139)
		400/3/50/60	550A / 44V / 100% (650A / 44V / 60%)	40A (51A)			

(1) At rated output.

(2) External filter is required to meet CE conducted emission requirements. The K2444-2 must be used with the K1519-2.

**PERFORMANCE**

- The Power Waves® contain a large library of welding programs or “weld modes.” Each weld mode is a specific software program that defines the output characteristics of the power source, like Synergic MIG (GMAW) and Pulsed MIG (GMAW-P). Weld modes were developed to handle a broad range of applications. They may be tuned to a specific electrode type, electrode diameter, gas type or application.
- All Power Waves® share a common digital control platform to maximize interoperability, interchangeability and compatible software tools.

- Power Wave® Robotic Welding Systems feature weld mode selection, PRE-FLOW, RUN-IN, ARC CONTROL, BURNBACK, POST-FLOW and CRATER that provide the operators full control over the welding procedure and sequence.
- Synergic welding eliminates the need to independently set the wire feed speed and voltage. Synergic welding automatically sets both voltage and pulse characteristics based on the wire feed speed.

**Nextweld®**

Lincoln’s Power Wave® power sources are equipped with Nextweld® innovations that offer seamless system integration, high efficiency and reliability, and outstanding arc control. Here are just a few of Nextweld’s® technologies and processes that are standard with this machine.

- Waveform Control Technology® controls and shapes the output waveform. Optimizes metal transfer to reduce spatter and improve stability. Simplifies process selection and controls heat input.
- Digital Communications offers fabricators a fast, reliable, inexpensive way to integrate equipment. Large amounts of data transmit reliably and accurately, and wiring costs are relatively low, especially when the number of devices on the network increase.
- State-of-the-art inverter technology provides high power efficiency, excellent welding performance and a lightweight, compact design. Rigorous environmental, mechanical and weld testing ensures ruggedness and reliability.

**WHAT IS NEXTWELD®?**



Nextweld® incorporates Lincoln’s technologies, processes and products to create a technologically advanced arc welding platform. Waveform Control Technology®, power electronics and digital communications provide the foundation for Nextweld® innovations, including Surface Tension Transfer®, Pulse-On-Pulse®, Chopper Technology®, ArcLink® and many more. Try Nextweld® products for ultimate arc control, high efficiency/reliability, and seamless system integration.

**FEATURES**

- When connected to a FANUC robot, welding software is accessible via the Robot’s teach pendant or a computer via the RS232 serial port.
- Welding software is upgradable via the RS232 serial port or via a network using the optional Ethernet module.
- Add, customize or replace Lincoln updated welding waveforms for every application using a laptop and Lincoln’s Wave Designer™ 2000 Software.

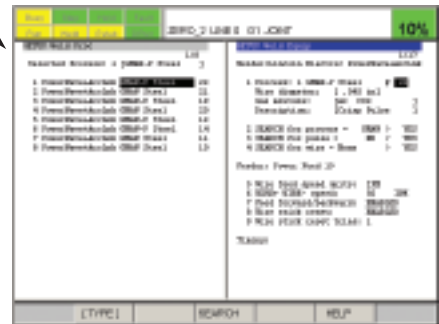
- Simple, reliable input voltage changeover.
- Auto device recognition simplifies accessory cable connections.
- Individual status light for each system component.
- DeviceNet™ or Ethernet modules can be field installed.

**Robot Teach Pendant**

- Select from over 60 standard welding procedures in the power source library from the robot’s Teach Pendant.
- Search by process and wire type.
- Full access to all power source details, including: control loop gains, machine calibration, arc statistics, unfiltered feedback signals.
- Access to power source diagnostic such as fault/alarm status/details.
- ArcLink® is a leading digital communications protocol for sharing information between intelligent components in an arc welding system.
- Individual status light for each system component.



FANUC Robot Teach Pendant



Welding Software

**QUALITY AND RELIABILITY**

**Design**

Safety, reliability and serviceability are built into Lincoln's inverter design.

- Open construction for preventative maintenance and diagnostics.
- Thermostatically protected.
- Electronic output over-current protection and electronic input over-voltage protection.
- Operating Temperature Range: -20°C to +40°C.
- Storage Temperature Range: -40°C to +40°C.
- Double insulation and varnish on main transformer.
- Shielded heavy-duty input contactor in tightly sealed environmental enclosure.
- Electrical connections coated with insulating compound for long term reliability in harsh environments.
- Automotive grade sleeves protect leads from abrasion.
- Tough PC boards - tray mounted, completely encapsulated, double locked harness connectors, environmentally protected connectors, electrical silicone grease, high current rating.
- Efficient cooling system with industrial motor with sealed bearings and metal fan blade.
- Fan-As-Needed™ - reduces power consumption and the amount of dust that gets drawn into the machine by shutting the fan down when it is not needed.



*Open Construction*



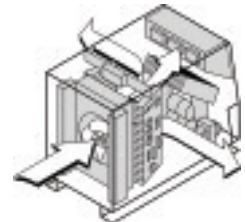
*Coated Electrical Connections*



*Automotive Grade Sleeves*



*Trayed and Potted PC Board*



*Cooling System*

**Testing and Reliability**

All Lincoln inverters are fully tested for reliability before and after assembly.

- Each machine undergoes a functional weld test to ensure performance.
- Lincoln inverters are operated in an environmental chamber under extreme conditions of temperature and humidity.
- Mechanical testing including vibration and drop testing is performed.
- Extensive temperature testing is performed to ensure that all components are running within allowable range.
- Three year warranty on parts and labor.
- Manufactured under a quality system certified to ISO 9001 requirements.
- Designed to the IEC EN 60974-1 standard.
- Standards - IEC EN 60974-1, NEMA EW 1, CSA NRTL/C.
- Environmental rating IP21S.



*Environmental Chamber*



*Manufacturing & Testing*

**WHAT IS POWER ELECTRONICS?**



Power electronics innovations like lightweight inverters and high-speed choppers are common, but Nextweld's® power electronics provide fabricators with a highly efficient system that is reliable and can adapt easily to new operations. State-of-the-art inverter technology provides high power efficiency, excellent welding performance and a lightweight, compact design. Lincoln inverters undergo rigorous environmental, mechanical and weld testing in the design/production process to ensure ruggedness and reliability.

**INTERFACE OPTIONS**



- ArcLink® is a digital communication protocol designed specifically for the arc welding industry. It integrates welding systems and networked components to create a flexible welding cell.
- ArcLink® is a Controlled Area Network (CAN) with a 40V supply.
- ArcLink® is used to connect welding equipment such as the power supply and wire feeder together where reliable, priority-based operation is essential.



*ArcLink® Cable Connector*

**DeviceNet™**

- DeviceNet™ is a network that provides connections between simple industrial devices (such as sensors and actuators) and higher-level devices (Programmable Logic Controllers [PLC]). The Power Wave® 655 Robotic can be interfaced with DeviceNet™ using the Ethernet/DeviceNet™ gateway board inside the unit.



*DeviceNet™ Cables*



- Data is transmitted through a wide area network (10 baseT, IEEE 802.3 Compliant). Monitor/control all equipment from a single interfaced desktop computer. The Power Wave® 655 Robotic can be interfaced with Ethernet using the Ethernet/DeviceNet™ gateway board inside the unit.
- Also includes full DeviceNet™ capability.



*Ethernet Cables*

**Hard Automation - DeviceNet™**

- Standardized PLC connections enable engineers to connect welding systems to other automation devices. Sample application templates make it easy to implement typical control features. The Power Wave® 655 Robotic comes standard with the Ethernet/DeviceNet™ gateway board.

**Serial**

- All Lincoln digital equipment is configured with a serial interface.
- All software services are accessible for maintenance.
- RS-232 serial interfaces are inexpensive and easy to use and understand.

**Analog**

- This module provides Analog and Discrete Inputs/Outputs (I/O) for trigger controls plus feedbacks.



*Allen-Bradley Panelview 600*



*RS-232 Cable*



*RS-232 Port on the front lower panel of the machine.*

**WHAT IS DIGITAL COMMUNICATIONS?**



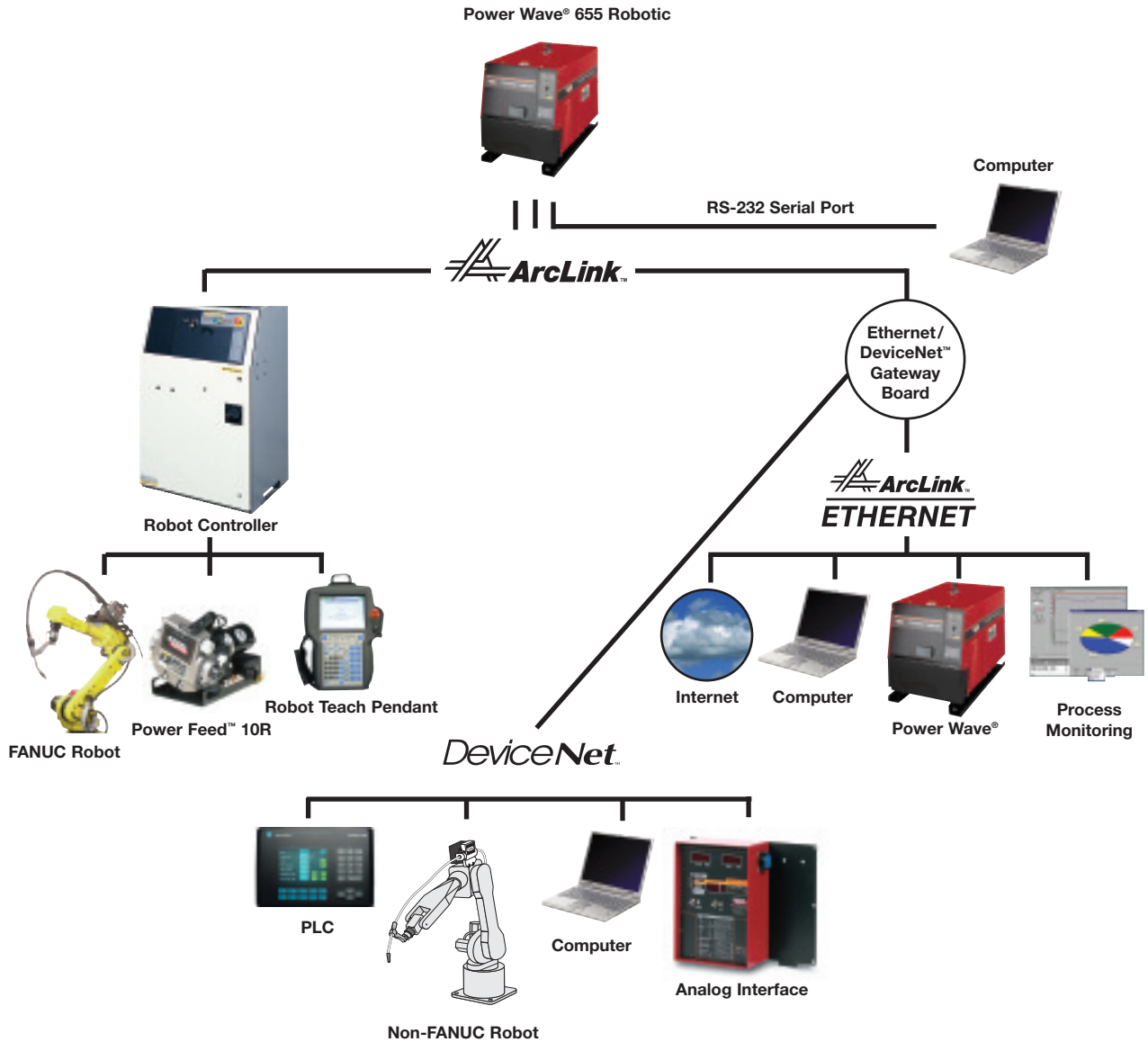
Nextweld's® digital communications offers fabricators a fast, reliable, inexpensive way to integrate and operate equipment. Large amounts of data transmit reliably and accurately, and wiring costs are relatively low, especially when the number of devices on the network increase.



*Analog Interface*

**Seamless Integration**

- Power Wave® power sources are compatible with Ethernet and DeviceNet™ systems for seamless integration and efficiency. The Power Wave® 655 Robotic has standard Ethernet and DeviceNet™ capabilities.
- ArcLink® allows welding systems and networked equipment to communicate with each other for high-speed data transfer and full integration of systems.



**RECOMMENDED OPTIONS**

**GENERAL OPTIONS**



**Analog Interface Module**  
This module provides Analogs and Discrete Inputs/Outputs (I/O) for trigger controls plus feedbacks.  
**Contact Lincoln Automation at 216.383.2667 for information.**



**Dual Cylinder Platform Undercarriage**  
Platform undercarriage for mounting two gas cylinders at rear of welder.  
**Order K1570-1**



**Cool-Arc® 40 Water Cooler**  
Energy-efficient long life cooler for water-cooled welding applications.  
**Order K1813-1 for 115V**  
**Order K2187-1 for 230V**



**Power Wave® CE Filter Module**  
The K2444-2 Power Wave® CE Module is a high power filter that enable the K1519-2 Power Wave® 655 Robotic “CE Ready” machine to conform to the EMC standards of Europe and Australia. The filter provides high differential and common mode attenuation to reduce conducted emissions on the power line.  
**Order K2444-2**

**WIRE FEEDER OPTION**



**Power Feed™ 10R**  
The Power Feed™ 10R is a high performance, digitally controlled wire feeder designed to be a part of a modular, multi-process welding system. It is specifically designed to mount to a robot arm or to use in hard automation applications.  
**Order K1780-2**

**POWER WAVE® 655 ROBOTIC ORDER FORM**

PRODUCT DESCRIPTION	ORDER NUMBER	QUANTITY	PRICE
<b>POWER WAVE® 655 ROBOTIC</b>	<b>K1519-2</b>		
<b>RECOMMENDED GENERAL OPTIONS</b>			
Analog Interface Module	Contact Lincoln Automation at 216.383.2667		
Dual Cylinder Platform Undercarriage	K1570-1		
Cool-Arc® 40 Water Cooler - 115V	K1813-1		
Cool-Arc® 40 Water Cooler - 230V	K2187-1		
Power Wave® CE Filter Module	K2444-2		
<b>RECOMMENDED WIRE FEEDER</b>			
Power Feed™ 10R	K1780-2		
	<b>TOTAL:</b>		

**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.