

# POWER WAVE<sup>®</sup> ADVANCED MODULE

## ADVANCED PROCESS WELDERS



Shown  
K3685-1

### EXPAND YOUR WELDING CAPABILITIES

The Power Wave<sup>®</sup> Advanced Module increases flexibility by expanding your welding capabilities. The module has alternating current (AC) welding capability to run aluminum processes. With the module, you'll have the ability to perform several welding processes with AC advanced waveform control - shielded metal arc, metal inert gas (MIG), pulsed MIG, tungsten electrode inert gas (TIG) and Surface Tension Transfer<sup>®</sup> (STT).

#### Processes »

GMAW-STT<sup>®</sup>, SMAW, GMAW,  
GMAW-P, GTAW

#### Applications »

Automotive, Pipe Fabrication, Heavy  
Equipment, Pressure Vessels,  
Shipbuilding, Trailer Manufacturing

#### Output »



#### Input »



#### Product Numbers »

K3685-1 Advanced Module

## WHAT'S INCLUDED

- » Power Source Output Pigtail Adapter Cable (Tweco-style)
- » 25 ft. (7.6 m) Remote Voltage Sense Lead
- » ArcLink Output Receptacle
- » Differential Input and Output (Sync Tandem Output)
- » Shielding Gas Input

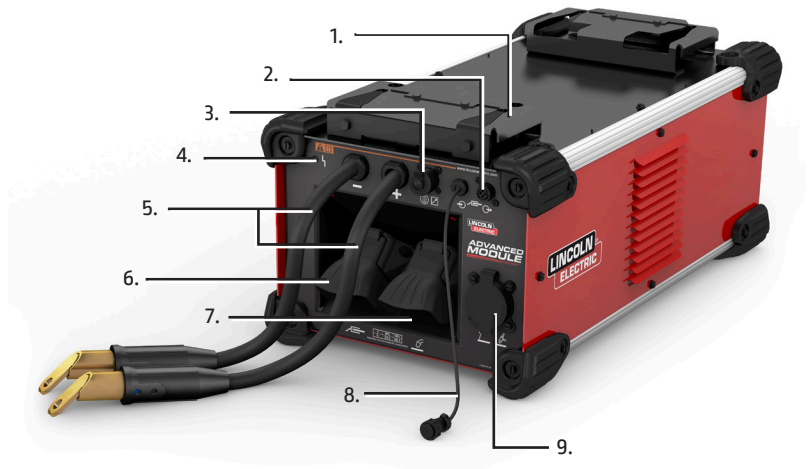
## FEATURES

- **The Power Wave Advanced Module** – Provides multi-process reverse polarity (DC+), straight polarity (DC-), AC, high frequency TIG and STT functionality.
- **Integrated Control Cables** – Provides easy connection to compatible Power Wave models.
- **Quick Lock Mounting System** – Provides a way to safely secure the module to the power source.
- **Ingress Protection (IP23) Safety** – Provides use in outdoor applications.
  - Protects against the entry of medium-sized foreign bodies greater than 12 millimeters in diameter, along with spray water from any direction up to 60 degrees from the vertical.
- **ArcLink® Digital Communications** – Trades status and identification information while receiving high-speed, synchronized switching command from the power source.
- **Intelligent Protection** – Prevents potential damage caused by misconnection and voltage transients.
- **Fan** – Synchronizes operation with the host power source.

## KEY CONTROLS

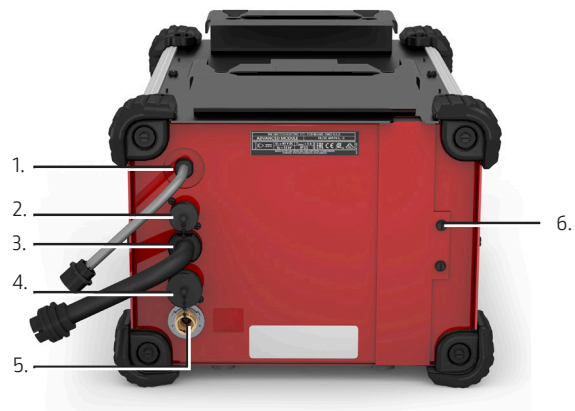
### CASE FRONT DESCRIPTIONS

1. Power source mounting bracket
2. Sense lead output connects to work piece and provides voltage feedback
3. 12-pin remote connection
4. Status light-emitting diode (LED) provides ArcLink status of module
5. Power source connections for negative and positive input
6. Connects to workpiece, regardless of process
7. Connects to feeder for MIG welding, regardless of process
8. Sense lead input provides voltage feedback to the power source from the module.
9. TIG electrode connects internally to MIG electrode, and provides high frequency capability for TIG starting



### CASE BACK DESCRIPTIONS

1. Differential input and output pigtail connects to the differential input and output receptacle on the rear of the power source.
2. Differential input and output (sync tandem) output supports synchronized MIG welding with compatible power sources.
3. ArcLink pigtail connects to the ArcLink output receptacle on the rear of the power source.
4. ArcLink (output) provides a pass through connection for all compatible wire feeders.
5. Gas input provides a solenoid controlled gas feed to TIG on case front.
6. Removable cover; a channel for cable management.



*NOTE: For operation with the K2823-3 Power Wave S350 power source or K2862-3 Power Wave S350 Ready-Pak® models with code numbers prior to 11600, the S28481 retrofit kit is required. Contact the customer service team in Cleveland, Ohio to order a kit at no charge to assure proper connection to the Advanced Module.*

The Advanced Module adds three important capabilities to Lincoln Electric's mid-sized modular, multi-process S-Series Power Wave power sources, which include the following:

- 1 AC polarity welding capability for aluminum MIG and TIG welding.
- 2 High frequency starting use when necessary to aid arc initiation.
- 3 STT welding is great for root pass welding on pipe or thin sheet metal applications.

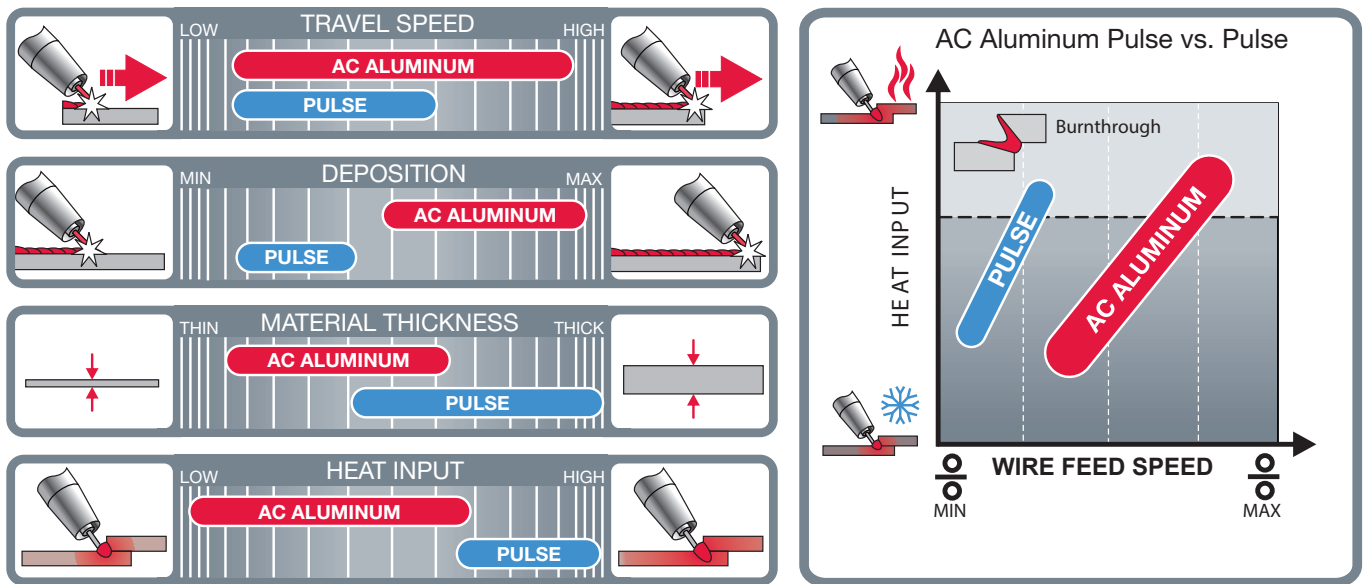
## 1 AC POLARITY WELDING CAPABILITY

Adding the Advanced Module to your Power Wave augments the inverter-based DC welding architecture of the Power Wave with AC welding. Use AC for cleaning action on aluminum when MIG or TIG welding, or use it for stick welding to help combat arc blow problems.

**Benefits:**

- Increases wire feed speed
- Reduces burn-through with improved heat control
- Increases cleaning

**Compares to conventional pulse processes**



## 2 HIGH FREQUENCY STARTING

When welding in DC- on steel or AC polarity mode on aluminum, it's helpful to have a high frequency current to improve arc starting performance. While the use of continuous high frequency can interfere with surrounding shop equipment, instantaneous bursts designed to aid arc starting have little or no effect. The Advanced Module incorporates a high frequency starting mode that can be controlled at the wire feeder or power source user interface. The careful use of high frequency starting can improve the appearance of TIG welding arc starts and helps to reduce contamination caused by scratch starts.

### 3 STT

STT is a controlled MIG short circuit transfer process that uses current controls to adjust the heat independent of wire feed speed, resulting in superior arc performance, good penetration, low heat input control and reduced spatter and fumes.

For more information see Nextweld® Document NX-220

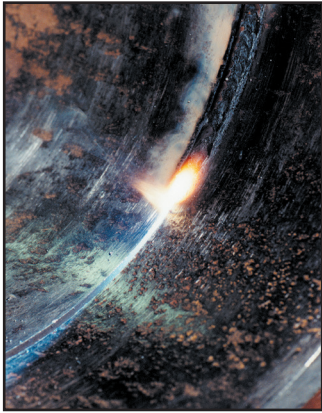


Conventional CV short circuit transfer using carbon dioxide (CO<sub>2</sub>) and 0.045 in. solid wire.



STT using CO<sub>2</sub> and 0.045 in. solid wire. (Note reduced spatter and fume).

## STT APPLICATION



Inside of an 8 in. x 0.375 in. wall API 5L-X52 pipe, welded in 5G position.

### Advantages of STT

- Reduces lack of fusion
- Increases puddle control
- Capable of producing consistent X-ray quality welds
- Reduces training time
- Lowers fume generation and spatter
- Uses various compositions of shielding gas
- Uses 100 percent CO<sub>2</sub> on mild steel
- Functions four times faster than MIG
- Uses vertical down welding
- Shields gas using various compositions
- Welds stainless, nickel alloys and mild steel
- Provides consistent x-ray quality welds

### Using STT

STT is the process of choice for low heat input welds and is ideal for the following:

- Open root – pipe and plate
- Thin gauge material – automotive
- Stainless steel and nickel alloy – petrochemical utility and food industry
- Silicon bronze – automotive
- Galvanized steel
- Semiautomatic and robotic applications

## PRODUCT SPECIFICATION

Product Name	Product Number	Input Power	Rated Output Capacity <sup>(1)</sup> Current/Voltage/Duty Cycle	H x W x D inches (mm)	Net Weight lbs. (kg)
Power Wave® Advanced Module	K3685-1	40 V DC	100% Duty Cycle: 300A@32V 40% Duty Cycle: 350A@34V Peak [Max.]: 600A	11.5 x 14 x 25 (292.1 x 355.6 x 635)	70.5 (32)

(1) Host welding power source will be limited to these outputs.

For best welding results with Lincoln Electric equipment, always use Lincoln Electric consumables. Visit [www.lincolnelectric.com](http://www.lincolnelectric.com) for more details.

Manufactured at a facility with certified ISO Quality and Environmental Management Systems.

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