Invertec® STT® II

Processes
GMAW-STT®

Product Number
K1525-1 208/230/460/3/60
K1526-1 200-208/220-230/380-415/440-460/3/50/60
K1526-2 200/208/380/400/415/3/50/60
K1527-1 200/220/380/415/440/3/50/60
K1527-2 200/208/380/400/415/3/50/60
K1560-2 STT®-10 Wire Feeder

See back for complete specs

FEATURES
- Controlled penetration and outstanding heat input control - Ideal for welding joints with open root, gaps, or on thin material with no burnthrough.
- Reduced spatter and fumes - Current is controlled to achieve optimal metal transfer.
- Various shielding gases - STT® may be used with various gas blends including 100% CO₂ and Argon or Helium blends. Larger diameter wires can typically be used.
- Good bead control and faster travel speeds - Can replace TIG (GTAW) in many applications without sacrificing appearance or quality.
- Background and Tailout Current - Accurately control fine and coarse heat input for reduced distortion and burnthrough as well as proper penetration.
- Adjustable Hot Start - controls the heat at the start of the weld.

APPLICATIONS
- Sheet Metal Fabrication
- Pipe Root Pass Welding

WHAT’S INCLUDED
K1525-1 Includes:
- Sense Lead Kit, 25 ft. (7.6 m)

Input Power
208/230/460/3/60

Input Current at Rated Output
32/30/16A

Rated Output Current/Voltage/Duty Cycle
225A/29V/60%

Output Range
Peak Current: 0-450A

Weight/Dimensions (H x W x D)
117 lbs. (53 kg)

23.2 x 13.2 x 24.4 in.
(589 x 336 x 620 mm)
WHAT IS STT® (SURFACE TENSION TRANSFER®)?

STT® (Surface Tension Transfer®) is a controlled GMAW 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-2.20

The STT® Process

A. STT® produces a uniform molten ball and maintains it until the “ball” shorts to the puddle.

B. When the “ball” shorts to the puddle, the current is reduced to a low level allowing the molten ball to wet into the puddle.

C. Automatically, a precision PINCH CURRENT waveform is applied to the short. During this time, special circuitry determines when the short is about to break and reduces the current to avoid the spatter producing “explosion”.

D. STT® circuitry re-establishes the welding arc at a low current level.

E. STT® circuitry senses that the arc is re-established, and automatically applies PEAK CURRENT, which sets the proper arc length. Following PEAK CURRENT, internal circuitry automatically switches to the BACKGROUND CURRENT, which serves as a fine heat control. Additionally, the TAILOUT ramp speed is controlled to provide a coarse heat control, returning the arc to the starting point (A).

A. STT® produces a uniform molten ball and maintains it until the “ball” shorts to the puddle.
Using STT® for Open Root welding

Open root welding is used for pipe and single-sided plate welding in situations that preclude welding from both sides of the material. This type of welding is common in the petrochemical and process piping industries.

Advantages of STT® Open Root

- **Penetration Control**
  - Provides reliable root pass and complete back bead. Ensures excellent sidewall fusion.
- **Cost Reduction**
  - Uses 100% CO₂, the lowest cost gas, when welding carbon steel.
- **Flexibility**
  - Provides the capability of welding stainless steel, nickel alloys, and mild or high strength steels without compromising weld quality.
  - Capable of welding out of position.
- **Low Heat Input**
  - Reduces burnthrough and distortion.
- **Low Hydrogen Weld Metal Deposit**
- **Speed**
  - High quality open root welds at faster travel speeds than GTAW.
- **Current Control Independent of Wire Feed Speed**
  - Allows operator to control the heat input to the weld puddle.
- **Ease of Operator Use**
  - More forgiving process than conventional short arc welding with CV machines.

Comparing STT® to conventional processes

**Advantages of STT® replacing short-arc GMAW:**
- Significantly reduces lack of fusion
- Good puddle control
- Capable of producing consistent X-ray quality welds
- Reduced training time
- Lower fume generation and spatter
- Can use various compositions of shielding gas
  - 100% CO₂ (on mild steel)

**Advantages of STT® replacing GTAW:**
- Four times faster than GTAW
- Vertical down welding
- Reduced training time
- Can use various compositions of shielding gas
  - 100% CO₂ (on mild steel)
- Welds stainless, nickel alloys and mild steel
- Consistent x-ray quality welds

**WHEN to use STT®**

STT® is the process of choice for low heat input welds.

STT® is also ideal for:
- 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
KEY CONTROLS

**STT-II**

1. Tailout Control
2. Hot Start Control
3. Peak Current LED Display
4. Peak Current Control Knob
5. 10 Pin Remote Control for Peak and Background Current
6. 14 Pin Wire Feeder Control with 42V/115V Auxiliary Power
7. Sense Lead Connection, [K940-25, 25 ft. (7.6 m) Sense Lead Kit included]
8. Twist Mate™ Output Connectors
9. 42V/115V Circuit Breakers
10. Power Switch
11. Background Current Control Knob
12. Background Current LED Display
13. Wire Mode Switch
14. Wire Diameter Switch

**STT®-10 Control Box**

1. Adjust WIRE FEED SPEED to control the deposition rate
2. Current Control
3. Dual Procedure Controls
4. Large, Easy To Read Digital Meters
5. Adjustable Cold Wire Feed
6. Adjust PEAK CURRENT to control the arc length
   Adjust BACKGROUND CURRENT to control heat input (fine)
7. Trigger Mode Selections
8. Adjust TAILOUT to control heat input (coarse)
   Adjust HOT START to control the heat input at the start of the weld.
Bench System

Invertec® STT® II Power Source/STT® 10 Wire Feeder
Top wire feeder user interface and added traction with four roll drive system.

- Invertec® STT® II (K1525-1)
- STT®-10 Wire Feeder (K1560-2)
- Power Source to Feeder Cable (K1758-10)
- Drive Roll Kit [KP1505-035S for .035 in. (0.9 mm) wire or KP1505-045S for .040–.045 in. (1.0–1.1 mm) wire]
- Magnum® PRO Curve™ 200 Ready-Pak®, 15 ft. (3 m), .035–.045 in. (0.9–1.1 mm) wire diameter with K466-10 Gun Connector Kit
- Work Cable and Work Clamp
- Optional K940 Sense Leads

Portable System

Invertec® STT® II Power Source/LN-25 PRO Dual Power Wire Feeder
Rugged enclosed feeder - a great system for construction or shipbuilding.

- Invertec® STT® II (K1525-1)
- LN-25 PRO Dual Power Model (K2614-6)
- Control Cable (K1797-10)
- Drive Roll Kit [KP1696-035S for 0.35 in. (0.9 mm) wire or KP1696-045S for .040–.045 in. (1.0–1.1 mm) wire]
- Magnum® PRO Curve™ 200 Ready-Pak®, 15 ft. (3 m), .035–.045 in. (0.9–1.1 mm) wire diameter with K466-10 Gun Connector Kit
- Work Cable and Work Clamp

For more information on the LN-25 PRO Dual Power Wire Feeder refer to Lincoln publication E8.101.
Invertec® STT® II Power Source


STT®-10 Wire Feeder

Coaxial Cable
Recommended for STT® and pulse welding when using long distances between feeder and power source. Lug to lug connection.

Order K1796-25
25 ft. (7.6 m), 1/0 dia. 350 amps @ 60% duty cycle
Order K1796-50
50 ft. (15.2 m), 1/0 dia. 350 amps @ 60% duty cycle
Order K1796-75
75 ft. (23 m), 1/0 dia. 300 amps @ 60% duty cycle
Order K1796-100
100 ft. (30 m), 1/0 dia. 300 amps @ 60% duty cycle
Order K2593-100
100 ft. (30 m), 1/4 dia. 250 amps @ 100% duty cycle

Twist Mate™ Cable Plug
For connecting welding cable to output terminal receptacles. For 1/0-2/0 (50-70 mm²) cable.

Order K852-70
50 ft. (15.2 m), 2/0-3/0 (70-95 mm²) cable
Order K852-95
75 ft. (23 m), 2/0-3/0 (70-95 mm²) cable

Twist Mate™ Cable Receptacle
For connecting welding cable to Twist Mate™ cable plug. For 1/0-2/0 (50-70 mm²) cable.

Order K1796-75
50 ft. (15.2 m), 2/0-3/0 (70-95 mm²) cable
Order K1796-100
75 ft. (23 m), 2/0-3/0 (70-95 mm²) cable
Order K1759-50
50 ft. (15.2 m), 2/0-3/0 (70-95 mm²) cable
Order K1759-70
75 ft. (23 m), 2/0-3/0 (70-95 mm²) cable

Twist Mate™ to Lug Adapter
For connection of lugged cable to Twist Mate™ connectors, 18 in. (457 mm) long.

Order K2176-1

WIRE FEEDER OPTIONS

STT®-10 Wire Feeder
The STT®-10 wire feeder is a sophisticated STT®-10 Process Controller designed specifically to work with the revolutionary STT® II power source. Microprocessor controls make it easy to develop optimal procedures and set the range of operator adjustments. Dual procedure control can increase or decrease the energy in the arc without changing the wire feed speed.

Order K2164-1

LN-25 PRO Dual Power Wire Feeder
The LN-25 PRO Dual Power wire feeder is ideal for field construction and fabrication, shipyards, and rental companies. It features a voltage control knob for superior arc control, digital meters for increased monitoring, MIG-STT® capability, and can be powered with either a control cable or across-the-arc.

Order K2614-6
See Publication E12.09

Magnun® PRO Guns
Choose Barrel or Curve™ semiautomatic GMAW 200-550 amp guns.

Order K466-10

Magnun® Connector Kit
Used for connecting Magnun® gun and cable assembly to feeder.

Order K2176-1


CUSTOMER ASSISTANCE POLICY

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