### Automatic Welding Systems

**NA-5**

Designed for Multiple Process CV Operation... Innershield®, Submerged arc and other Open Arc Processes. A complete automatic welding control which may be used with available procedure and control interface options for remote operating versatility.

A proven concept in automatic welding - "set-it-and-forget-it" automatic welding equipment. The arc voltage and wire feed speed can be preset on digital meters before the arc is struck. This procedure remains precisely set day in and day out.

**Processes**

- MIG, Flux-Cored, Submerged Arc

### Advantage Lincoln

- **Solid-State Controls**
  - Precise control of welding procedures, striking characteristics, start and stop, bead size and shape, and arc stability facilitates economical welding to the most exact requirements.

- **High Productivity**
  - Automatic welding systems deposit more metal at faster travel speeds than semiautomatics to increase production, eliminate bottlenecks and cut costs.

- **Low Cost Repetitive Welds**
  - Electrode position adjustments lock tight for pushbutton production welding with consistent quality.

- **Operating Versatility**
  - Easily adjusted for a wide range of processes, feed speeds, wire sizes, procedures and methods.

- **Easy Installation**
  - Compact units with excellent flexibility fits into simple fixtures or the most complex automated production lines.

- **Manufactured under a quality system certified to ISO 9001 requirements and ISO 14001 environmental standards.**

- **Three-year warranty on parts and labor.**

### TECHNICAL SPECIFICATIONS

<table>
<thead>
<tr>
<th>Product Name</th>
<th>Product Number</th>
<th>Input Power</th>
<th>Wire Feed Speed Range</th>
<th>H x W x D</th>
<th>Weight lbs. (kg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>NA-5 Control</td>
<td>K356-2</td>
<td>115 VAC</td>
<td>25-775 (0.6-16.5)</td>
<td>12.75 x 18.5 x 22.25</td>
<td>41 (18.6)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>50/60 Hz</td>
<td></td>
<td></td>
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</table>

**NA-5S AND NA-5SF**

<table>
<thead>
<tr>
<th>Product Name</th>
<th>Product Number</th>
<th>Wire Sizes in. (mm)</th>
<th>Gear Ratio</th>
<th>Wire Feed Speed ipm (m/min.)</th>
<th>Max. Solid Wire Size (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>NA-5S</td>
<td>K346A</td>
<td>3/32-7/32 (2.4-5.6)</td>
<td>142:1</td>
<td>15-290 (0.4-7.4)</td>
<td>15/8 (3.2)</td>
</tr>
<tr>
<td>NA-5S</td>
<td>K346B</td>
<td>1/16-3/32 (1.6-2.4)</td>
<td>95:1</td>
<td>22-425 (0.6-10.8)</td>
<td>1/8 (3.2)</td>
</tr>
<tr>
<td>NA-5SF</td>
<td>K347A</td>
<td>3/32-7/32 (2.4-5.6)</td>
<td>142:1</td>
<td>15-290 (0.4-7.4)</td>
<td>15/8 (3.2)</td>
</tr>
<tr>
<td>NA-5SF</td>
<td>K347B (1)</td>
<td>1/16-3/32 (1.6-2.4)</td>
<td>95:1</td>
<td>22-425 (0.6-10.8)</td>
<td>1/8 (3.2)</td>
</tr>
</tbody>
</table>

(1) For the K347 Head, order the K338 extension.
(2) For gear ratios shown.

### NA-5N

<table>
<thead>
<tr>
<th>Product Name</th>
<th>Product Number</th>
<th>Wire Sizes in. (mm)</th>
<th>Gear Ratio</th>
<th>Wire Feed Speed ipm (m/min.)</th>
<th>Weight lbs. (kg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>NA-5N</td>
<td>K331A (1)</td>
<td>3/32-1/8 (2.4-3.2)</td>
<td>95:1</td>
<td>322-425 (0.6-10.8)</td>
<td>22-425</td>
</tr>
<tr>
<td>NA-5N</td>
<td>K331B (1)</td>
<td>1/16-3/32 (1.6-2.4)</td>
<td>95:1</td>
<td>16-322 (1.6-2.4)</td>
<td>38-760</td>
</tr>
<tr>
<td>NA-5N</td>
<td>K331C (1)</td>
<td>.035-.052 (0.9-1.3)</td>
<td>95:1</td>
<td>—</td>
<td>40-775</td>
</tr>
</tbody>
</table>

(1) Includes flux-cored wire straightener.
(2) Includes small wire spring guide.
(3) Order T13724D Drive Roll Kit for .045-.052" (.2-1.3 mm) core wire
A CLOSER LOOK

AVAILABLE MODELS

FOR MIG AND FLUX-CORED

**NA-5N HEAD**
Includes wire feed head with straightener for cored wire (K331A and B only) and head mounting. Also includes electrode cables from control box to wire contact assembly, and cross seam adjuster. Does not include control box or wire reel, brake and mounting.

Order K331A, K331B, K331C

**FOR SUBMERGED ARC WELDING**

**NA-5S HEAD**
Includes wire feed head with straightener for solid wire, flux hopper with automatic valve and head mounting. Also includes electrode cables from control box to wire contact assembly, and cross seam adjuster. Does not include control box or wire reel, brake and mounting.

Order K346A, K346B

**NA-5SF HEAD**
Includes wire feed head with straightener for solid wire. Does not include control box or wire reel, brake and mounting, flux hopper with automatic valve and head mounting, cross seam adjuster, head mounting parts or electrode cable from control box to wire contact assembly.

Order K347A, K347B

Convenient Operator Controls

- Switch to allow presetting the different sets of controls using one set of meters (function lights to indicate which set of controls are functioning).

Controls of Unparalleled Versatility adjusts procedures and travel sequence for best arc striking, welding and crater filling for all suitable processes and applications.

- Striking inch speed adjusts for best arc starting independently of welding wire speed.
- Striking voltage can be set for optimum arc starting.
- Arc starting by the ‘hot start” or “cold start” methods (“hot start” only when using the CV-655 or DC-655 without diode option).
- Travel can be selected to start either when the start button is pressed or when the arc strikes.
- Wire feed speed and arc voltage can be ‘SET’ before or during welding and the ‘ACTUAL’ values can be read during welding.
- Travel stops either when the stop button is pressed, when the arc stops, or at end of crater fill or burnback time (as selected by the user).
- Adjustable delay times controls burnback of electrode from the puddle at the end of the weld to prevent crater sticking. The circuit can be set to retard the electrode from the crater for easy fixture unloading or to remove a slag ball from the end of the electrode for better starting when using Lincl-Fill™ procedures.
- Available interface options for remote control of inch up/down, start/stop, and weld procedures.
- Automatic shutdown should the voltage deviate from the preset value.

Wide Performance Range lets you choose the best process and procedures for today’s needs. Can be adapted in minutes for new processes and major procedural changes without large expense or long equipment delivery delays.

- Use open arc or submerged arc welding as desired.
- Heads available for feeding .035” (0.9 mm) thru 7/32” (5.6 mm) electrode using three gearbox ratios – 57:1, 95:1, and 142:1. Install parts to convert for different wire sizes and ratios in minutes.
- Feeds wire from 50 to 60 lb. (22.7 to 27.2 kg) coils or 300 to 1000 lb. (136 to 453.6 kg) Speed-Feed® reels and drums.

These Worry-Free, Hard-Working Wire Feeders minimize equipment downtime and lost production. Simple routine service keeps maintenance costs low.

- Rugged construction needs only simple routine service for continuous performance.
- Function light built into the printed circuit boards speeds repairs.
- Plug-in components are quickly replaced.

Easy Installation into simple fixtures or automated systems makes the benefits of automatic welding available to large or small fabricators and rebuilders.

- Simple head mounting with versatile positioning minimizes fixture requirements and speeds installation.
- One compact box containing all controls mounts almost anywhere for maximum operating efficiency. Remote controls can be located in a fixture console with the use of available interface options.
- Standard 4 ft. (1.2 m) head to control leads plug into the control box. Optional head to control extension cables up to 30 ft. (9 m) long. Plug in at both ends.
- Quickly reconnect stop and start sequence as desired for new applications using dip switches on the logic board.

Versatile Head Positioning adjusts quickly to new applications with different processes yet locks tight for repetitive welding.

- Adjustment of the face plate around the drive roll.
- A 360° rotational adjustment of the gearbox within its mounting saddle.
- True left and right head mounting.
- Cross seam adjuster (standard on NA-5N and -5S) lets the operator track along irregular joints while welding.
- Optional vertical and horizontal head adjusters make quick handcrank setups (other than bolt-head side adjustments) where frequent job changes occur.
- Ability to drive the wire in either direction through the face plate.
• Control power switch turns wire feeder input power on and off. Also serves as an emergency stop switch.

• Pilot light to show when the electrode is “hot”.

• Inch pushbuttons feed electrode up and down when not welding.

• Start and stop pushbuttons control welding cycles.

• Means for having the meters read either the preset values or the actual values.

• Timer control for burnback and/or wire react time.

• Optional crater module (with preset feature) controls procedure for an adjustable period of time to regulate bead size or fill craters at the end of the weld. (Optional)

• Optional weld timer which eliminates the need to press stop button. (Optional)

• Lockable cover over procedure setting controls.

• Digital display of both wire feed speed and voltage on separate meters.

• Optional start module (with preset features) controls penetration, bead size, or other factors for an adjustable time at the start of the weld. (Optional)

• Controls for presetting of wire feed speed and voltage prior to and during welding. These controls eliminate returning to the power source for routine procedure changes.

• Travel switch controls the travel mechanism for automatic starting and stopping when welding, travel without welding during setup and travel off.
A CLOSER LOOK

REQUIRED POWER SOURCES

The Idealarc® DC-600, DC-655, DC-1000, or DC-1500 are the recommended power sources for use with the NA-5. They are solid-state SCR controlled welders which provide two modes of constant voltage output—one for submerged arc, and one for Innershield® and other open arc processes.

The CV-655 can be used with the NA-5.

OPTIONAL CONTACT ASSEMBLIES

SINGLE ELECTRODE

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.
Order
K231 - 5/64
K231 - 3/32
K231 - 1/8
K231 - 5/32
K231 - 3/16

Narrow Gap Deep Groove Nozzle
Water-cooled submerged arc nozzle for welding in a 5/8" (15.9 mm) minimum gap up to 10" (245.0 mm) deep. Includes flux delivery tube, flux hose and racks to permit nozzle rotation, and two contact tips.
Order K386

TWINARC®

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

Tiny Twinarc®
Feeds two 1/16, 5/64, or 3/32" (1.6, 2.0, or 2.4 mm) electrodes for high speed submerged arc welds on thin gauge (1.89 mm) to heavy plate.
Order
K129 - 1/16
K129 - 5/64
K129 - 3/32

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

GENERAL OPTIONS

Concentric Flux Cone Assembly
For use with K148, K148 with a K149, or K129 nozzles. Gives concentric flux coverage around the electrode.
Order K285
RECOMMENDED OPTIONS

GENERAL OPTIONS, CONT.

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

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

Solid State Spreadarc
Oscillate the head across the line of travel. For hardfacing build-up using a Twinarc® or single arc nozzle. Calibrated dwell time and oscillation speed controls permit the Spreadarc to cover large areas quickly with smooth beads of minimum admixture. Flux-cored electrode, open arc and submerged arc procedures can be used.
Order K278-1

TC-3 Self–Propelled Travel Carriage
Carries head and controls in either direction on a beam of suitable length. It operates either automatically with the weld controls or manually. The speed ranges, set with a continuous, calibrated speed control without gear changes, for the two available models are (S) 5-75 ipm (0.1-1.9 m/min) and (F) 15-270 ipm (0.4-6.9 m/min). Plugs into the 115 (110) volt AC, 60 or 50 hertz travel receptacle of the Automatic Control Box.
Order K325HCS (5-75 ipm)

Mounting Kit
For use if the NA-5 control box is to be mounted on the carriage.
Order T14469

GENERAL OPTIONS, CONT.

Magnetic Separator
Removes magnetic particles from recirculated submerged arc fluxes to reduce porosity caused by a build-up of mill scale.
Order K58

Screen
Removes large particles from recirculated submerged arc fluxes. Designed to fit the top of either the standard fill funnel or a continuous flux feed system or a K58 magnetic separator. The unit has a steel screen with .065 to .075” (1.7 to 1.9 mm) openings and an air vibrator attached to the frame. The vibrator can be used with air line pressures ranging from 20 thru 100 psi (137.9 thru 689.4 kpa).
Order K310

Solenoid Assembly
Valve to automatically control water flow when using K239 or cooling attachment on K148 contact assemblies. Can also be used to control gas.
Order K223

Flux Hopper
With electric flux valve for submerged arc welding. (Standard on NA-5S).
Order K219

Wire Reel Assembly
Includes wire reel for 50-60 lb. (22.7-27.2 kg) coils, wire reel mounting and brake.
Order K299

Starting or Crater Module
Permits additional settings of wire feed speed and voltage for an adjustable period of time (10 seconds max). Can be used for either a starting procedure or a crater fill procedure. If both are required, two assemblies must be ordered.
Order K334
RECOMMENDED OPTIONS

GENERAL OPTIONS CONT.

Remote Interface Module
Permits remote operation of the NA-5 Inch Up, Inch Down, Start and Stop Functions by either of the following user-supplied external signals and provides electrical isolation of the NA-5 control circuitry from these signals:

Order K336
- **Switches**
  Momentary closure of contacts rated for 24 volts, 5 milliamperes, DC.
- **24 Volt Signals**
  Momentary application of 24 volt ±10% AC or DC signal capable of 5 milliamperes steady state (.15 amp peak capacitive in rush) per input.

This module can be used with all codes of NA-5 Controls and replaces the earlier K336 Remote Pushbutton Interface Module, which provided for only external switch closure signals.

Weld Timer Module
Available in choice of 10 second (K337-10) and 100 second (K337-100) units. Permits setting of weld time for an adjustable period of time. Eliminates need to press stop button. The timer units are adjustable over the following ranges.

Order K337-10
For 0.00 – 9.99 seconds
Order K337-100
For 00.0 – 99.9 seconds

Multi-Procedure Kit
Designed to mount and connect to NA-5 controls above code 8400 only. Provides three additional weld mode procedure settings of wire feed speed and voltage, allowing the choice of four NA-5 Weld Mode procedures selectable by the kits panel switch or customer-furnished remote switch or 24 volt signals.

Order K349

Analog Interface Procedure Control
Designed to mount and connect to NA-5 Automatic controls (above Code 8400) and the NA-5R. The control provides circuit isolated interference for remote, user-provided, 0 to 20 volt DC analog signal levels to linearly set the NA-5 Weld Mode procedures between 0 and 100% of the rated range of wire feed speed and arc voltage. The kit also provides ±5% procedure override controls under a lockable security panel, and a selector switch to permit the choice of procedure setting control using remote analog signals or the standard NA-5 Weld Mode controls.

Order K373

Control To Head Extension Cable Assembly
The standard head is equipped with cables which permit the head to be mounted up to four feet from the controls. "F" models, however, do not include electrode cables.

When the head is mounted further away from the control, extension cable assemblies must be purchased. For the NA-5S head. Includes motor, tachometer, and flux valve lead extensions with polarized plugs and electrode. 26 ft. length.

Order K335-26
For the NA-5N, and SF heads, it is the same as the K335 without the flux valve lead extension. Available in 5, 11, 26, and 46 ft. lengths.

Order K338-5 (5 ft.)
K338-11 (11 ft.)
K338-26 (26 ft.)
K338-46 (46 ft.)

Wire Size Conversion Kits
To convert wire feeder for different sized electrodes. Includes drive rolls and guide tubes. Four kits are available.

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**DRIVE ROLL/GUIDE TUBE KITS**

<table>
<thead>
<tr>
<th>Gear Ratio</th>
<th>Wire Size in. (mm)</th>
<th>KP Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Head</td>
<td></td>
<td></td>
</tr>
<tr>
<td>142:1 and 95:1</td>
<td>3/32 – 7/32 (2.4 – 5.6)</td>
<td>KP1899-1</td>
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<tr>
<td></td>
<td>1/16, 5/64, 3/32 (1.6, 2.0, 2.4)</td>
<td>KP1899-2</td>
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<tr>
<td>57:1</td>
<td>1/16, 5/64, 3/32 (1.6, 2.0, 2.4)</td>
<td>KP1899-9</td>
</tr>
<tr>
<td></td>
<td>.035, .045, .052 (0.9, 1.1, 1.3)</td>
<td>KP1899-3</td>
</tr>
<tr>
<td></td>
<td>.045 – .052 Cond (1.1 – 1.3)</td>
<td>KP1899-4</td>
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</tbody>
</table>

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**WIRE SIZE CONVERSION KITS**

<table>
<thead>
<tr>
<th>Gearbox</th>
<th>Wire Size in. (mm)</th>
<th>Kit No.</th>
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</thead>
<tbody>
<tr>
<td>142:1</td>
<td>3/32 – 7/32 (2.4 – 5.6)</td>
<td>T13724A</td>
</tr>
<tr>
<td></td>
<td>1/16 – 3/32 (1.6 – 2.4)</td>
<td>T13724B</td>
</tr>
<tr>
<td>95:1</td>
<td>3/32 – 5/32 (2.4 – 4.0)</td>
<td>T13724A</td>
</tr>
<tr>
<td></td>
<td>1/16 – 5/32 (1.6 – 2.4)</td>
<td>T13724B</td>
</tr>
<tr>
<td>57:1</td>
<td>1/16 – 3/32 (1.6 – 2.4)</td>
<td>T13724B</td>
</tr>
<tr>
<td></td>
<td>.035 – .052 (0.9 – 1.3)</td>
<td>T13724C</td>
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<tr>
<td></td>
<td>.045 – .052 (1.1 – 1.3) Cond</td>
<td>T13724D</td>
</tr>
</tbody>
</table>
AC Input Power required for all models is 115 (110) volts, 60 or 50 hertz of 350 volt-amperes capacity for the head and controls. An additional 250 volt-amperes is required for the Lincoln® travel carriage and more may be needed for other travel mechanisms. This power can be obtained from the Lincoln® power source.

**NA-5N**

**DC Power Source** – Constant Voltage type with on-off control of power source output (see page 4).

- K299 Reel and Mounting – Order separately.
- Cored Wire Straightener(1) or Spring Guide(2)
- 4’ (1.2 m) Motor Cord – Included with K331.
- 4’ (1.2 m) Electrode Cables – Included with K331.
- NA-5 Control
  - K356-2
- Work Cable – Two or more 4/0.

**K338 Extension** – Motor cord and electrode cables. Optional when more than 4’ (1.2 m) is required. Specify distance from head to controls [30’ (9.1 m) is maximum length available].

**NA-5S and NA-5SF**

*For Submerged Arc Welding*

**DC Power Source** – Constant Voltage type with on-off control of power source output (see page 4).

- K335-26 Extension – Motor, Flux hopper and Electrode cables. Optional when more than 4’ (1.2 m) is required.
- 4’ (1.2 m) Motor Cord – Included with K346 and K347.
- 4’ (1.2 m) Flux Hopper Cord – Included with K346.
- 4’ (1.2 m) Electrode Cables – Included with K331.
- NA-5 Control
  - K356-2
- Work Cable – Two or more 4/0

**K299 Reel and Mounting** – Order separately.

- Solid Wire Straightener
- Flux Hopper – Included with K346.
- Contact Nozzle (optional)

(1) Includes flux-cored wire straightener.
(2) Includes small wire spring guide.
### NA-5 ORDER FORM

<table>
<thead>
<tr>
<th>PRODUCT DESCRIPTION</th>
<th>ORDER NUMBER</th>
<th>QUANTITY</th>
<th>PRICE</th>
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<tbody>
<tr>
<td>NA-5 Control</td>
<td>K356-2</td>
<td></td>
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<tr>
<td>NA-5S</td>
<td>K346A</td>
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<td></td>
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<tr>
<td>NA-5S</td>
<td>K346B</td>
<td></td>
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</tr>
<tr>
<td>NA-5SF</td>
<td>K347A</td>
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<td></td>
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<tr>
<td>NA-5SF</td>
<td>K347B</td>
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<tr>
<td>NA-5N</td>
<td>K331A</td>
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<tr>
<td>NA-5N</td>
<td>K331B</td>
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<tr>
<td>NA-5N</td>
<td>K331C</td>
<td></td>
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</tbody>
</table>

#### OPTIONAL CONTACT ASSEMBLIES

- Single Electrode
  - Submerged Arc Contact Nozzle Assembly: K231
  - Narrow Gap Deep Groove Nozzle: K386
  - Contact Assembly: K226R

- Twinarc®
  - Tiny Twinarc® Wire Straightener: K281
  - Tiny Twinarc®: K129
  - Large Wire Twinarc®: K225

#### GENERAL OPTIONS

- Concentric Flux Cone Assembly: K285
- Horizontal Head Adjuster: K96
- Vertical Lift Adjuster: K29
- Solid State Spreadarc: K278-1
- TC-3 Self-Propelled Travel Carriage (5-75 ipm): K325HCS
- Mounting Kit: T14469
- Magnetic Separator: K38
- Screen: K310
- Solenoid Assembly: K223
- Flux Hopper: K219
- Wire Reel Assembly: K299
- Starting or Crater Module: K334
- Remote Interface Module: K336
- Weld Timer Module (0.00 – 9.99 seconds): K337-10
- Weld Timer Module (0.00 – 99.9 seconds): K337-100
- Multi-Procedure Kit: K349
- Analog Interface Procedure Control: K373
- Control To Head Extension Cable Assembly
  - For NA-5s (26 ft. length): K335-26
  - For NA-5N, NF and SF (5, 11, 26, 46 ft. lengths): K338-5, -11, -26, -46

### 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 for any updated information.