

# NA-5

## Automatic Welding Systems

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.



NA-5N

Output



Input



### Processes

MIG, Flux-Cored, Submerged Arc



NA5-S Head

### 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

Product Name	Product Number	Input Power	Wire Feed Speed Range ipm (m/min)	H x W x D inches (mm)	Weight lbs. (kg)
NA-5 Control	K356-2	115 VAC 50/60 Hz	25-775 (0.6-16.5)	12.75 x 18.5 x 22.25 (324 x 470 x 565)	41 (18.6)

### NA-5S AND NA-5SF

Product Name	Product Number	Wire Size in. (mm)	Gear Ratio	Wire Feed Speed ipm (m/min.)	Max. Solid Wire Size <sup>(2)</sup> in. (mm)
NA-5S	K346A	3/32-7/32 (2.4-5.6)	142:1	15-290 (0.4-7.4)	7/32 (5.6)
NA-5S	K346B	1/16-3/32 (1.6-2.4)	95:1	22-425 (0.6-10.8)	1/8 (3.2)
NA-5SF	K347A <sup>(1)</sup>	3/32-7/32 (2.4-5.6)	142:1	15-290 (0.4-7.4)	7/32 (5.6)
NA-5SF	K347B <sup>(1)</sup>	1/16-3/32 (1.6-2.4)	95:1	22-425 (0.6-10.8)	1/8 (3.2)

<sup>(1)</sup> For the K347 Head, order the K338 extension.

<sup>(2)</sup> For gear ratios shown.

### NA-5N

Product Name	Product Number	Wire Sizes in. (mm)		Gear Ratio	Wire Feed Speed ipm (m/min.)
		Solid	Flux Cored		
NA-5N	K331A <sup>(1)</sup>	3/32-1/8 (2.4-3.2)	3/32-5/32 (2.4-4.0)	95:1	22-425 (0.6-10.8)
NA-5N	K331B <sup>(1)</sup>	1/16-3/32 (1.6-2.4)	1/16-3/32 (1.6-2.4) <sup>(3)</sup>	57:1	38-760 (1.0-19.3)
NA-5N	K331C <sup>(2)</sup>	.035-.052 (0.9-1.3)	—	57:1	40-775 (1.0-19.7)

<sup>(1)</sup> Includes flux-cored wire straightener.

<sup>(2)</sup> Includes small wire spring guide.

<sup>(3)</sup> Order T13724D Drive Roll Kit for .045-.052" (1.2-1.3 mm) cored wire

**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 retract 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 Linc-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.

- Adjustable brake on reel for 50/60 lb. (22.7/27.2 kg) coils prevents reel overrun.

**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.

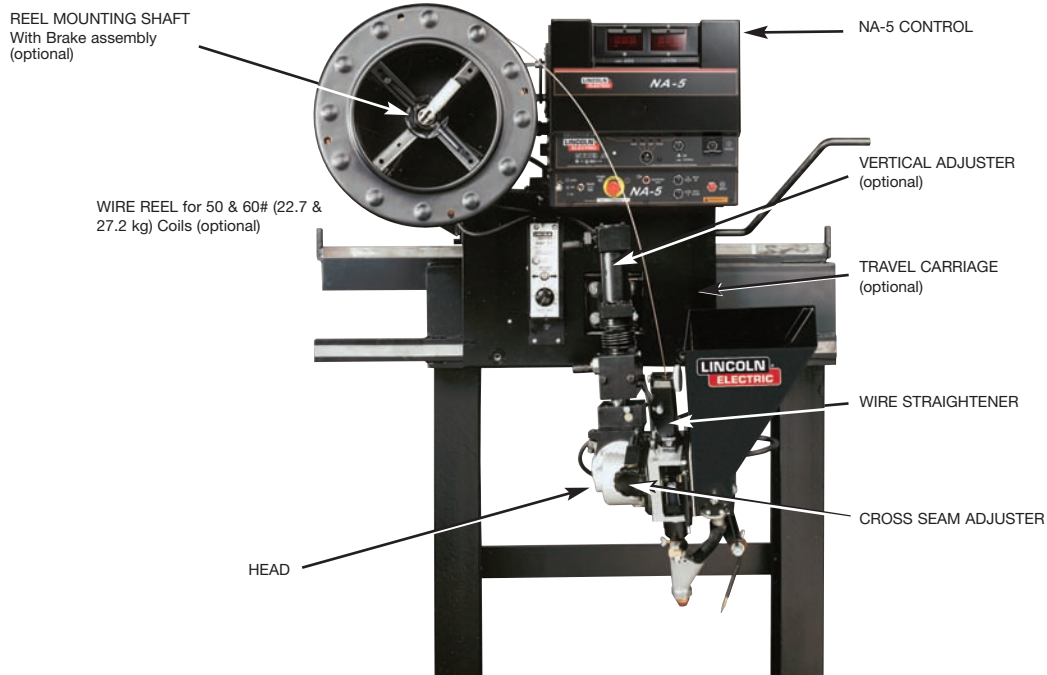
**Versatile Head Positioning** adjusts quickly to new applications with different processes yet locks tight for repetitive welding.

- 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.

**CONTROLS**



- (A) • Control power switch turns wire feeder input power on and off. Also serves as an emergency stop switch.
- (B) • Pilot light to show when the electrode is "hot".
- (C) • Inch pushbuttons feed electrode up and down when not welding.
- (D) • Start and stop pushbuttons control welding cycles.
- (E) • Means for having the meters read either the preset values or the actual values.
- (F) • Timer control for burnback and/or wire react time.
- (G) • 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)*
- (H) • Optional weld timer which eliminates the need to press stop button. *(Optional)*
- (I) • Lockable cover over procedure setting controls.
- (J) • Digital display of both wire feed speed and voltage on separate meters.
- (K) • Optional start module (with preset features) controls penetration, bead size, or other factors for an adjustable time at the start of the weld. *(Optional)*
- (L) • 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.
- (M) • Travel switch controls the travel mechanism for automatic starting and stopping when welding, travel without welding during setup and travel off.



**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



**Contact Assembly**

Rugged contact jaws for maximum life at currents over 600A. 1/8 thru 7/32" (3.2 thru 5.6 mm) wire.

Order K226R



**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



**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**



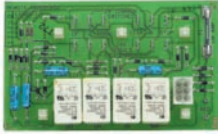
**Starting or Crater Module**

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**



**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  $\pm 10\%$  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**

**GENERAL OPTIONS CONT.**

**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  $\pm 5\%$  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.

**DRIVE ROLL/GUIDE TUBE KITS**

Gear Ratio Head	Wire Size in. (mm)	KP Number
142:1 and 95:1	3/32 – 7/32 (2.4 – 5.6)	KP1899-1
	1/16, 5/64, 3/32 (1.6, 2.0, 2.4)	KP1899-2
57:1	1/16, 5/64, 3/32 (1.6, 2.0, 2.4)	KP1899-2
	.035, .045, .052 (0.9, 1.1, 1.3)	KP1899-3
	.045 – .052 Cored (1.1 – 1.3)	KP1899-4

**WIRE SIZE CONVERSION KITS**

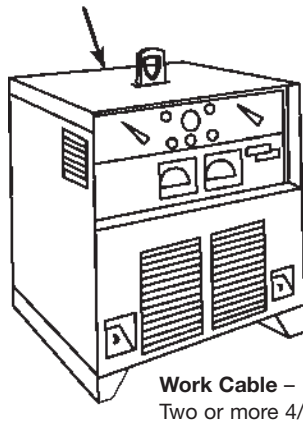
Gearbox	Wire Size in. (mm)	Kit No.
142:1	3/32 – 7/32 (2.4 – 5.6)	T13724A
	1/16 – 3/32 (1.6 – 2.4)	T13724B
95:1	3/32 – 5/32 (2.4 – 4.0)	T13724A
	1/16 – 3/32 (1.6 – 2.4)	T13724B
57:1	1/16 – 3/32 (1.6 – 2.4)	T13724B
	.035 – .052 (0.9 – 1.3)	T13724C
	.045 – .052 (1.1 – 1.3) Cored	T13724D

## REQUIRED EQUIPMENT

**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

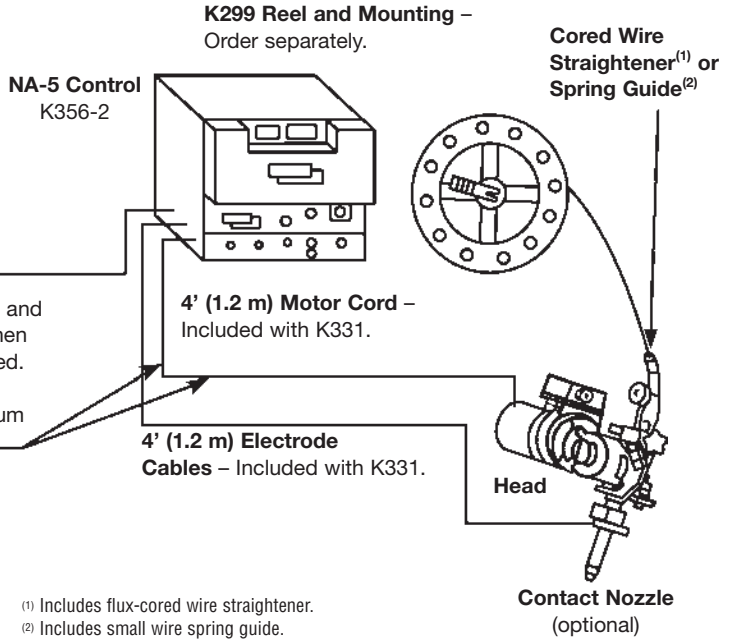
**DC Power Source –**  
Constant Voltage type with on-off control of power source output (see page 4).



**Work Cable –**  
Two or more 4/0.

Two 4/0 electrode cables and the multi-conductor control cable.

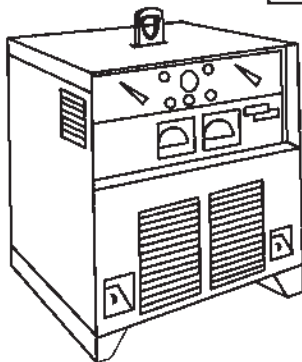
**K338 Extension –** Motor cord and electrode cables. Optional when more than 4' (1.2 m) is required. Specify distance from head to controls [30' (9.1 m) is maximum length available].



### NA-5S and NA-5SF

**For Submerged Arc Welding**

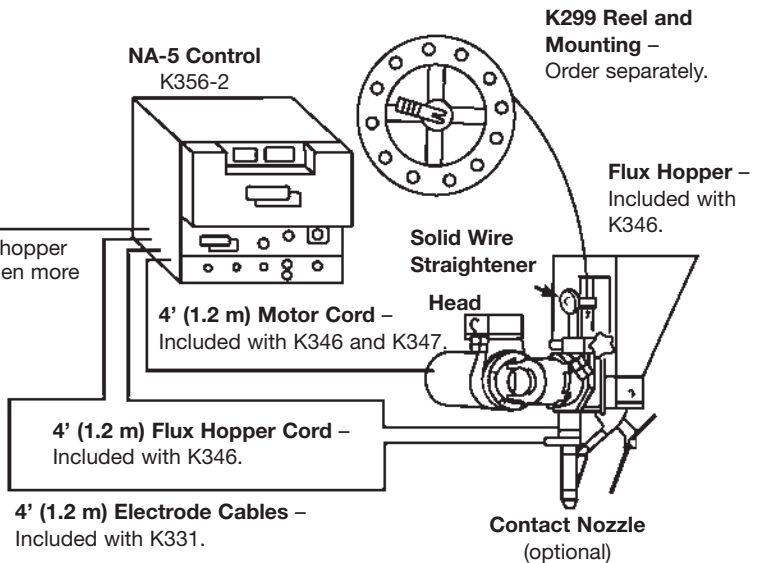
**DC Power Source –**  
Constant Voltage type with on-off control of power source output (see page 4).



**Work Cable –**  
Two or more 4/0

Two 4/0 electrode cables and the multi-conductor control cable.

**K335-26 Extension –** Motor, Flux hopper and Electrode cables. Optional when more than 4' (1.2 m) is required.



**NA-5 ORDER FORM**

PRODUCT DESCRIPTION	ORDER NUMBER	QUANTITY	PRICE
NA-5 Control	K356-2		
NA-5S	K346A		
NA-5S	K346B		
NA-5SF	K347A		
NA-5SF	K347B		
NA-5N	K331A		
NA-5N	K331B		
NA-5N	K331C		
<b>OPTIONAL CONTACT ASSEMBLIES</b>			
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		
<b>GENERAL OPTIONS</b>			
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	K58		
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		
	<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.

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