

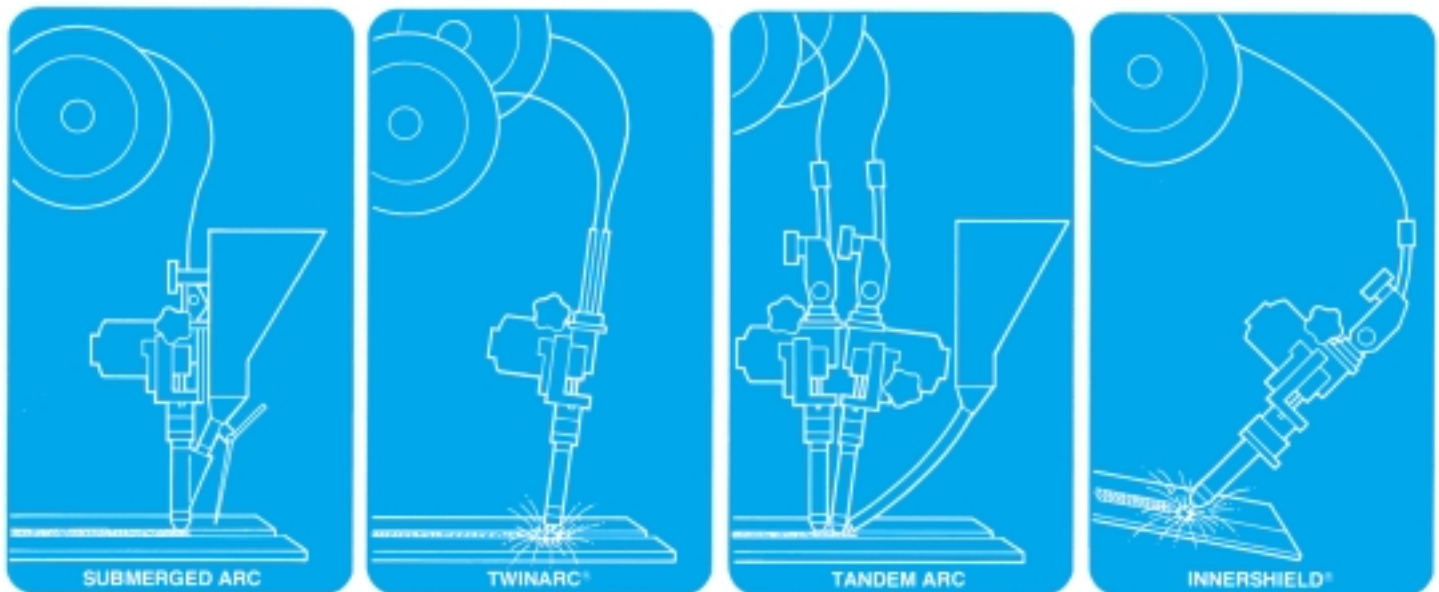
LINCOLN[®]
WELDERS

NA-3 and NA-4

Automatic Welding Systems *with **SOLID STATE** controls*



UNDERWRITERS LABORATORIES LISTED



Models: NA-3N, NA-3NF, NA-3S, NA-3SF, NA-4, NA-4F

Six Benefits From LINCOLN Automatics:

Solid State Controls — The precise control of welding procedures, striking characteristics, start and stop bead size and shape and arc stability facilitates economical welding to the most exacting requirements.

High Productivity — Automatics 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 as needed.

Easy Installation — Compact units with excellent flexibility fit into simple fixtures or the most complex automated production lines.

Worry-Free Operation — Solid state controls and rugged construction minimize downtime and maintenance costs.

Choice Of Models To

MODEL

NA-3N

Constant Wire Feed Speed Control with Hot Starting For Use with Constant Voltage DC Power Sources:

Applications Include:

- Innershield Self-Shielded Flux-Cored Welding
- Other Open Arc Processes GMAW (MIG) and Metal Core
- Single Electrode Submerged Arc at High Current Densities
- Small Wire Twinarc Submerged Arc



OPTIONAL K299 REEL FOR 50 AND 60 POUND COILS — Includes adjustable brake, mounting shaft, hardware and insulation.



COMPLETE CONTROLS in a single box Type K214

4' (1.2m) MOTOR CORD

HEAD MOUNTING with hardware and insulation

WIRE STRAIGHTENER for flux-cored electrodes

HEAD TYPE K212 A, B, or C

CROSS SEAM ADJUSTER

WIRE FEED MOTOR

GEAR BOX

CONTACT NOZZLE (Optional)

4' (1.2m) **ELECTRODE CABLES**

MODEL

NA-3NF

(For Machinery and Fixture Builders)

Identical to the NA-3N except the following parts are not included:

Head Mounting
Electrode Cables
Cross Seam Adjuster



HEAD TYPE K213 A, B, or C

MODEL

NA-4

Arc Sensing Control with Hot or Cold Starting For Use with Constant Current AC Power Sources for Submerged Arc Welding Applications Include:

Control Type

K388

Head Type

K208 or K209

- AC-AC tandem arc and AC-AC-AC triple arc systems*
- Single electrode submerged arc when arc blow limits the DC welding current and travel speeds
- Identical to NA-3S controls except for meters, current sensor and wiring

*Lincoln offers full equipment support for both tandem arc systems (K387) and triple arc systems (K394)

Meet Your Needs

MODEL NA-3S

Arc Sensing or Constant Wire Feed Speed Control with Hot or Cold Starting For Use with Either Constant Current or Constant Voltage DC Power Sources:

Applications Include:

- Single and multiple electrode submerged arc
- Innershield flux-cored welding and Outershield®
- Other Open Arc Processes GMAW (MIG) and Metal Core



OPTIONAL K299 REEL FOR 50 AND 60 POUND COILS — Includes adjustable brake, mounting shaft, hardware and insulation.

4' (1.2m) MOTOR CORD



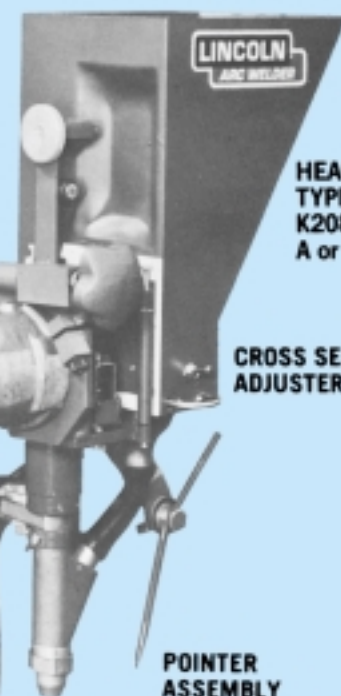
COMPLETE CONTROLS including variable voltage P.C. board Type K210

4' (1.2m) FLUX HOPPER CORD

HEAD MOUNTING with hardware and insulation

WIRE STRAIGHTENER for solid electrodes

FLUX HOPPER with electric flux valve



HEAD TYPE K208 A or B

CROSS SEAM ADJUSTER

WIRE FEED MOTOR

GEAR BOX

4' (1.2m) ELECTRODE CABLES

POINTER ASSEMBLY

CONTACT NOZZLE (Optional)

MODEL NA-3SF

(For Machinery and Fixture Builders)

Identical to the NA-3S except the following parts are not included:

Head Mounting
Electrode Cables
Cross Seam Adjuster
Flux Hopper and Pointer



HEAD TYPE K209 A or B

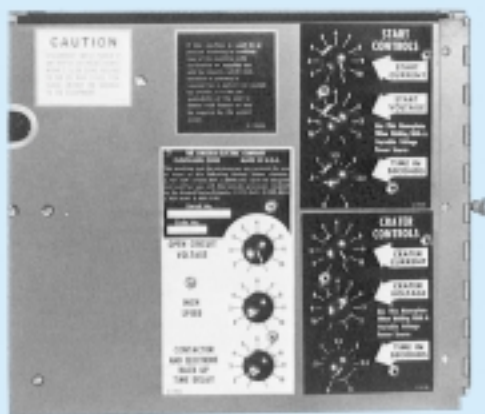
The NA-5 and NA-5R

When the application, quality control or welding procedures require presetting and monitoring of both wire feed speed and voltage, the NA-5 digital automatic welding system is recommended. (See E815)

The NA-5R is recommended for remote controlled interface to automated or programmable controllers and computer controlled welding robots. This new system combines the accuracy and reliability of the NA-5 automatic control, the maneuverability of a gun cable wire feed unit, and the process control versatility to "communicate" with remote control equipment through electrically isolated input and output signals. Contact your Lincoln Technical Representative for complete details. (See E816)



The control boxes for all models have the same operator controls.



**EASILY ACCESSABLE
INSIDE CONTROL PANEL**
(Shown with optional
start and crater controls.)

Convenient Operator Controls located in one place for production welding efficiency:

- Current and voltage controls eliminate returning to the power source for routine procedure changes.
- Start and stop pushbuttons control welding and travel cycles.
- Inch pushbuttons feed electrode up and down when not welding.
- Meters indicate welding current and voltage.
- Control power switch turns wire feeder input power on and off.
- Travel switch controls the travel mechanism for automatic starting and stopping when welding, travel without welding during setup, and travel off.

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

- Inch speed adjusts for best arc striking independently of welding wire feed speed.
- Travel can start either when the start button is pressed or the arc strikes.
- Open circuit voltage control sets OCV on some Lincoln power sources for optimum striking.
- Optional start P.C. board controls penetration, bead size or other factors for an adjustable time at the start of the weld.
- Solid state circuits compensate for input voltage and electrode drag fluctuations minimizing unexpected procedure changes while welding.
- Travel stops when the stop button is pressed, the arc stops, or at end of crater fill time to control bead size at the end of the weld.
- Optional crater P.C. board controls procedures for an adjustable time to regulate bead size or fill craters at the end of the weld.
- Adjustable delay timer 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.
- Adjustable brake on reel for 50/60# (22.7/27.2kg) coils prevents reel overrun.
- A CV-VV toggle switch, located on the variable voltage P. C. board in the NA-3S control box, permits use with a constant current or constant voltage power source.

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.
- Feeds .035 thru 7/32" solid electrodes or .045 thru 5/32" flux-cored electrodes. Shipped with one of four wire size kits and gear box ratios (see back page). Install parts to convert for different wire sizes and ratios in minutes.
- Two position adjustable drive roll pressure develops the right force to feed all electrode types.
- Feeds wire from 50/60# (22.7/27.2kg) coils or 300 to 1000 pound (136 to 454kg) Speed-Feed™ reels and drums.

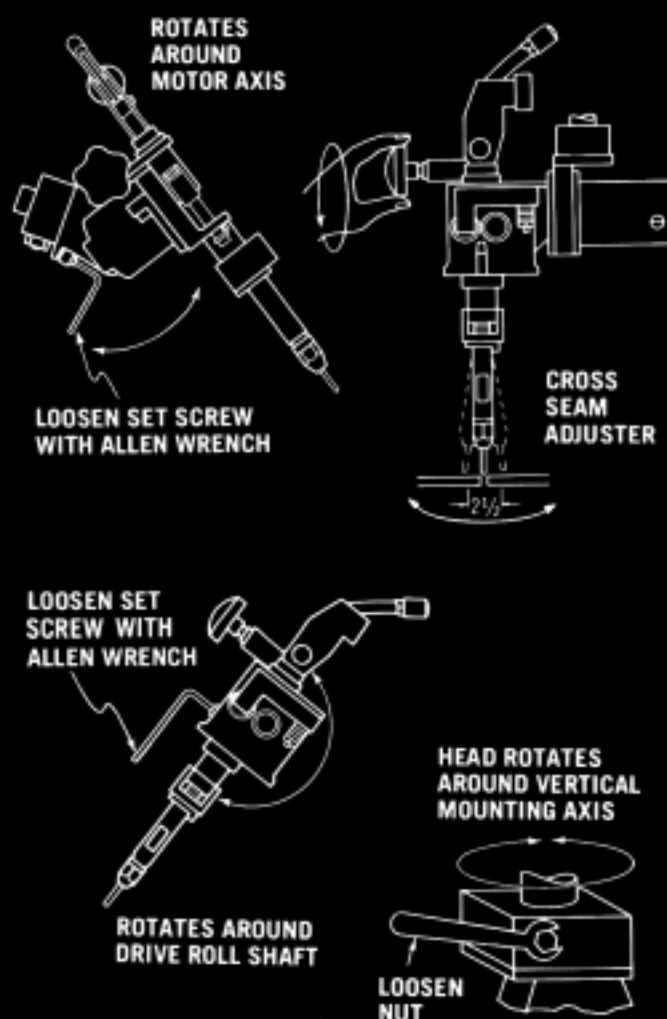
Versatile Head Positioning adjusts quickly to new applications with different processes yet lock tight for repetitive welding.

- Heads rotate in three different planes as shown in the sketches.
- True left and right head mounting.
- Cross seam adjuster lets the operator track along irregular joints while welding.
- Optional vertical and horizontal head adjusters make quick hand-crank set-ups (rather than bolt-held slide adjustments) where frequent job changes occur.
- Gear box operates in any position. Non-fluid grease can't leak.
- High efficiency spur gear box results in a smaller head with no sacrifice in feeding ability.

Easy Installation into simple fixtures or fully 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. Start, stop and inch pushbuttons can be relocated into a fixture console when desired.
- Power source to control box cables up to 100 ft. (30m) long plug into the control box.
- Standard head to control leads plug into the control box. Optional head to control extension cables up to 75 ft. (22.5m) long plug in at both ends.
- Use 115 volt, 60 or 50 Hertz power.
- Hinged panels provide easy access to components inside the control box.
- Quickly reconnect stop and start sequence as desired for new applications using plugs and pins on the logic board. No soldering, bolted connections or taping needed.

HEAD POSITION ADJUSTMENTS



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

- Solid state controls give worry-free operation.
- Rugged construction needs only simple routine service for continuous performance.
- Function lights built into the printed circuit boards along with a comprehensive trouble shooting guide speed repairs.
- Plug-in components are quickly replaced.

CONTACT ASSEMBLIES



Innershield and Submerged Arc K148 — For .062 (1.6mm) thru 3/16" (4.8mm) wire at high currents. Optional water cooling attachment (T12928) recommended when Innershield welding over 600 amps.

K149 — Linc-Fill™ Long Stickout [2-5" (5.1-12.7cm)] Extension.



Submerged Arc K231 — for 5/64" (2.0mm) thru 7/32" (5.6mm) electrodes at currents generally below 600 amps. Outer flux cone gives full flux coverage with minimum consumption.



Submerged Arc K218 Horizontal Fillet & Lap Guide — with the head free to pivot, the guide rollers riding in the joint maintain wire alignment to eliminate the need for difficult fixturing.



Single Electrode

Submerged Arc K233 — for .035 (.89mm) thru 3/32" (2.4mm) wire at currents under 600 amps.

Submerged Arc K226R [1/8" (3.2mm) thru 7/32" (5.6mm) wire]

K226T [3/32" (2.4mm) or 1/8" (3.2mm) wire] Rugged contact jaws for maximum life at currents over 600 amps.

Submerged Arc K285 Concentric Flux Cone — for use with K148, K148 with a K149, K391 or K129 nozzles. Gives concentric flux coverage around the electrode.



Submerged Arc K391 High Capacity Nozzle — for 1/8" (3.2mm) thru 7/32" (5.6mm) diameter solid wire for use with the NA-3, NA-4 & NA-5 Automatic Wire Drives.



Submerged Arc K386 Narrow Gap Nozzle — for 3/32" (2.4mm) diameter wire welding on thick walled steel plate with nearly parallel-sided, narrow gap joint preparations. (See S615)



Innershield K397 Automatic Gun & Cable — for .062" (1.6mm) thru 3/32" (2.4mm) diam. Innershield electrode with flexibility and maneuverability for robotic or automated fixture applications. (See E816.2) Requires adapter for automatic heads.



Innershield K405 Automatic Innershield Nozzle — for .062" (1.6mm) thru .120" (3.0mm) wire at currents up to 600 amps for use with NA-3 or NA-5 Automatic Heads.

TWINARC

Twinarc kits include contact nozzle, wire guides, wire feed rolls and guides, and a second wire reel and mounting bracket.



Tiny Twinarc K129 — Feeds two .045 (1.1mm), 1/16 (1.6mm), 5/64 (2.0mm) or 3/32" (2.4mm) solid electrodes for high speed submerged arc welds on 14 gauge to heavy plate.



Tiny Twinarc Wire Straightener K281 — Straightens wire diameters .045" (1.1mm) thru 3/32" (2.4mm). Particularly valuable on longer electrical stickout procedures.

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

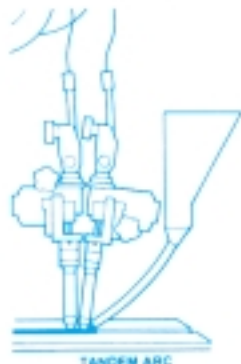


Innershield Twinarc K239 — Feeds two 3/32" (2.4mm) Innershield wires for high speed welds on 12 gauge to thick steel. Includes water cooling tubes. Particularly suited for roundabout fillet and lap welds when one member is thicker than 1/4" (6.4mm).

MULTIPLE WIRE SUBMERGED ARC FOR

High Deposit Rates

Most applications that can be successfully welded with single wire automatic equipment can be more economically welded with multiple wire methods. The reason is simple. Two electrodes feeding into the same



Multiple Arc utilizes separate heads and power sources making one weld. Twinarc can be used to feed additional electrodes for exceptionally high deposit rates on "Fast-Fill" type joints.

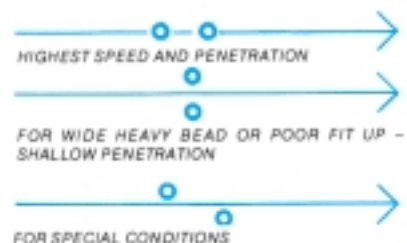
Fast Travel Speeds

weld carry total higher current than a single wire. Higher total current increases deposit rates and/or speeds and reduces welding costs. Also high travel speeds minimize distortion.



Twinarc feeds two electrodes thru one head. Wires can be placed in line with the joint for highest speed or across the joint for a wider bead and less penetration.

Minimum Distortion



OPTIONAL FEATURES

Horizontal Head Adjuster — (K96) provides crank adjustment of head position. Has 2" (50.8mm) horizontal travel.

Vertical Lift Adjuster — (K29) provides 4" (101.6mm) hand crank adjustment of vertical head position. It also includes a 3/4" (95.2mm) in-and-out adjustment with stops that can be preset for simple repetition of the same adjustment.

Solid State Spreadarc™ (K278) — For use with the NA-3 or NA-4 head and control. 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.



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 speed control without gear changes, for the two available models are (S) 5-75 ipm (.1-1.9m/min) and (F) 15-270 ipm (.4-6.9m/min). Requires 115 volt AC, 60 or 50 hertz power available from Lincoln power sources.

Order Standard Carriage (K325) for single electrode and Twinarc (2 wires fed through 1 head) installations.

Order High Capacity Carriage (K325HC) for tandem arc (2 or 3 heads) and Twinarc-tandem arc (up to 4 wires) installations.



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

K310 Flux Screen — Designed to fit the top of either the standard fill funnel of a continuous flux feed system or a K58 magnetic separator. The unit has a steel screen with .065 (1.6mm) to .075 (1.9mm) openings and an air vibrator attached to the frame. The vibrator can be used with air line pressures ranging from 20-100 psi (138-689kPa).

Wire Reel Assembly (K299) to accommodate 50 lb. (22.7kg) or 60 lb. (27.2kg) coils of wire on automatic wire feeders. The unit includes a wire reel mounting spindle and braking system. To obtain the reel only order L4604.

High Frequency Unit (K238) supplies high frequency power to the welding leads for more positive starting on some jobs. Operates on 115 volt 50 or 60 hertz. Handles up to 750 amps welding current. Cannot be used with Linc-Fill Starting Relay option or Spreadarc. Requires special head, flux hopper, and wire reel insulation.



High Frequency Insulation (HF) must be factory installed on new heads used for high frequency starting.

Linc-Fill Starting Relay (K237) for optimum arc starting when using K149 long stickout extensions. It cannot be used with high frequency starting.

Solenoid Assembly (K223) with valve automatically controls water flow when using K239 or cooling attachment on K148 contact assemblies.

Full Automatic Smoke Exhaust Attachment (K348) — For use with a K148 nozzle and K184 Linconditioner. Includes an intake tube and brackets for mounting tube on nozzle. Also includes 15 ft. (4.5m) of 1 1/4 I.D. exhaust hose to connect intake tube to exhaust unit.

Flux Hopper (K219) with electric flux valve for submerged arc welding. (Standard on NA-3S and NA-4.)



Flux Control Kit (T14861)

Start Controls P.C. Board (K221) — Adjusts starting current and voltage higher or lower than welding procedures for an adjustable period of time as needed to control penetration, bead size or other factors at the start.

Crater Controls P.C. Board (K245) — Adjusts the finishing current and voltage higher or lower than welding procedures for an adjustable period of time as needed to control bead size or fill craters at the end of the weld.

Electronic Voltmeter (K263) Replaces the standard analog voltmeter shipped with NA-3's. Includes red lights to indicate high or low voltage and a green light to show when the arc voltage is within either 1/2 or 1 volt of the desired voltage pre-set on the dial.



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

Wire Size	Kit No.
3/32 - 7/32" (2.4 - 5.6mm)	T13724A
1/16 - 3/32" (1.6 - 2.4mm)	T13724B
.035 - .052" (0.9 - 1.3mm)	T13724C
.045 - .052" (1.2 - 1.3mm)	T13724D

Equipment for Multiple Arc Systems

Tandem Arc (see bulletin S612)

Triple Arc (see bulletin S613)

Double Tandem (see bulletin S614)

Two Way Tandem (see bulletin S624)

NA-3N and NA-3NF

AC Input Power required for all models is 115 volts, 60 or 50 hertz of 360 volt-amperes capacity for the head and controls. An additional 250 volt-amperes is required for the Lincoln travel carriage. This power should be obtained from the Lincoln power source to turn the wire feeder on and off with the power source.

DC Power Source — Constant Voltage Type with on-off control of power source output.

K215 Input Cable (Specify Length) — Includes two 4/0 electrode cables and the multi-conductor control cable.

4' (1.2m) Motor Cord — Included with K212 and K213.

K234 Extension — Motor Cord and Electrode cables. Optional when more than 4' is required. Specify distance from head to controls.

Two or More 4/0.

Controls — K214. Order Separately.

4' (1.2m) Electrode Cables — Included with K212.

Reel and Mounting — K299 or K299HF. Order separately.

Wire Straightener (a) or **Spring Guide** (b)

Head Order Separately.

Contact Nozzle (Optional, see page 6)

Head Model	Head Type (a)	Wire Size Kit	Gear Ratio	Wire Feed Speed Range	Max. Cored Wire Size (b)
NA-3N	K212A (1)	3/32-5/32" (2.4-4.0mm)	95/1	25-400	5/32" (4.0mm)
NA-3N	K212B (1)	1/16-3/32" (1.6-2.4mm)	55/1	40-650	.120" (3.0mm)
NA-3N	K212C (2)	.035-.052" (.9-1.3mm) (c)	55/1	40-650	.120" (3.0mm)
NA-3NF	K213A (1)	3/32-5/32" (2.4-4.0mm)	95/1	25-400	5/32" (4.0mm)
NA-3NF	K213B (1)	1/16-3/32" (1.6-2.4mm)	55/1	40-650	.120" (3.0mm)
NA-3NF	K213C (2)	.035-.052" (.9-1.3mm) (c)	55/1	40-650	.120" (3.0mm)

(1) Includes Flux-Cored Wire Straightener

(2) Includes Small Wire Spring Guide

(a) For Gear Ratios Shown

(b) Add -HF for high frequency applications

(c) Order T13724D Drive Roll Kit for

.045-.052" (1.2-1.4mm) cored wire

NA-3S and NA-3SF

AC Input Power: Same as NA-3N.

DC Power Source — Constant Current type with on-off control of power source output. Also operates with Constant Voltage type.

K215 Input Cable (Specify Length) — Includes two 4/0 electrode cables and the multi-conductor control cable.

K235 Extension — Motor, Flux hopper and Electrode cables. Optional when more than 4' (1.2m) is required. Specify distance from head to controls.

4' (1.2m) Hopper Cord — Included with K208.

4' (1.2m) Motor Cord — Included with K208 and K209.

Controls — K210. Order Separately.

4' (1.2m) Electrode Cables — Included with K208.

Reel and Mounting — K299 or K299HF. Order separately.

Wire Straightener (a)

Head Order Separately.

Flux Hopper — Included with K208.

Contact Nozzle (Optional, see page 6)

Head Model	Head Type (a)	Wire Size Kit	Gear Ratio	Feed Speed Range	Max. Solid Wire Size (b)
NA-3S or NA-4	K208A	3/32-7/32" (2.4-5.6mm)	142/1	(c)	7/32" (5.6mm)
NA-3S or NA-4	K208B	1/16-3/32" (1.6-2.4mm)	95/1	(c)	1/8" (3.2mm)
NA-3SF or NA-4F	K209A	3/32-7/32" (2.4-5.6mm)	142/1	(c)	7/32" (5.6mm)
NA-3SF or NA-4F	K209B	1/16-3/32" (1.6-2.4mm)	95/1	(c)	1/8" (3.2mm)

(1) For Gear Ratios Shown

(2) Depends on Arc Voltage Used

(c) Add -HF for high frequency applications

(b) Solid Wire Straightener included

*Same controls previously included with K248.



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