



**NS-40 Standard Duty
Floating Lift
Welding Guns**

**Instruction and
Maintenance Manual**

729-110-036
Revision 1.14
August 2013

NS-40 STANDARD DUTY FLOATING LIFT WELD GUN

LIMITED WARRANTY

Nelson's only warranty is that goods being sold will be free from defects in workmanship and material. This warranty is expressly in lieu of other warranties, expressed or implied and whether statutory or otherwise, including any implied warranty of merchantability or fitness for a particular purpose.

Nelson's liability for breach of warranty shall arise only upon return of the defective goods at Buyer's expense after notice to Nelson of the claimed breach, and shall be limited to furnishing a like quantity of such goods free from such defects or, at Nelson's option, to refunding the purchase price, provided, however, that Nelson will not accept receipt of equipment returned unless buyer has previously afforded Nelson's personnel a reasonable opportunity to inspect and repair said equipment at buyer's facility or such other location as is mutually agreeable. Notice to Nelson of claimed defects must be given within 30 days of such defect or failure and within (90) days from the date the equipment was delivered. No compensation or reimbursement for transportation costs of any kind will be allowed.

Please note that this warranty does not extend beyond the original registered purchaser, and does not warrant equipment that has been modified by any party other than Nelson, or equipment that not been properly installed, improperly operated, or misused based upon industry standards, or equipment which has not had reasonable and necessary maintenance, or equipment which has been used for operation outside of specifications for the equipment. Nelson shall never be liable for consequential damages.

Nelson reserves the right to make engineering and/or part changes, at any time without notice, as a result of our commitment to continuous improvement.

MANUAL CONTENTS

| | Gun Part Number | | | |
|--------------------------------|-----------------|-------------|-------------|-------------|
| | 751-585-000 | 751-585-100 | 751-585-500 | 751-692-000 |
| Control Cable Connector | Cannon | R&S | Hubbell | Hubbell |
| Weld Cable Connector | CamLok | CamLok | CamLok | Dinse |

Optional features available for field installation

| Part No. | Description |
|-------------|---|
| 512-241-000 | Tranquil-Arc® Plunge Dampener Kit -Steel |
| 512-241-100 | Tranquil-Arc® Plunge Dampener Kit -Aluminum |

TABLE OF CONTENTS

| | |
|--|----|
| MANUAL CONTENTS..... | 1 |
| GUN SETUP FOR WELDING STEEL STUDS | 2 |
| GUN SETUP FOR WELDING ALUMINUM STUDS | 2 |
| LIFT AND LIFT ADJUSTMENTS | 3 |
| WELD INSPECTION | 4 |
| SEQUENCE OF OPERATIONS | 6 |
| MAINTENANCE INSTRUCTIONS | 7 |
| INSTALLATION INSTRUCTIONS..... | 12 |

GUN SETUP FOR WELDING STEEL STUDS

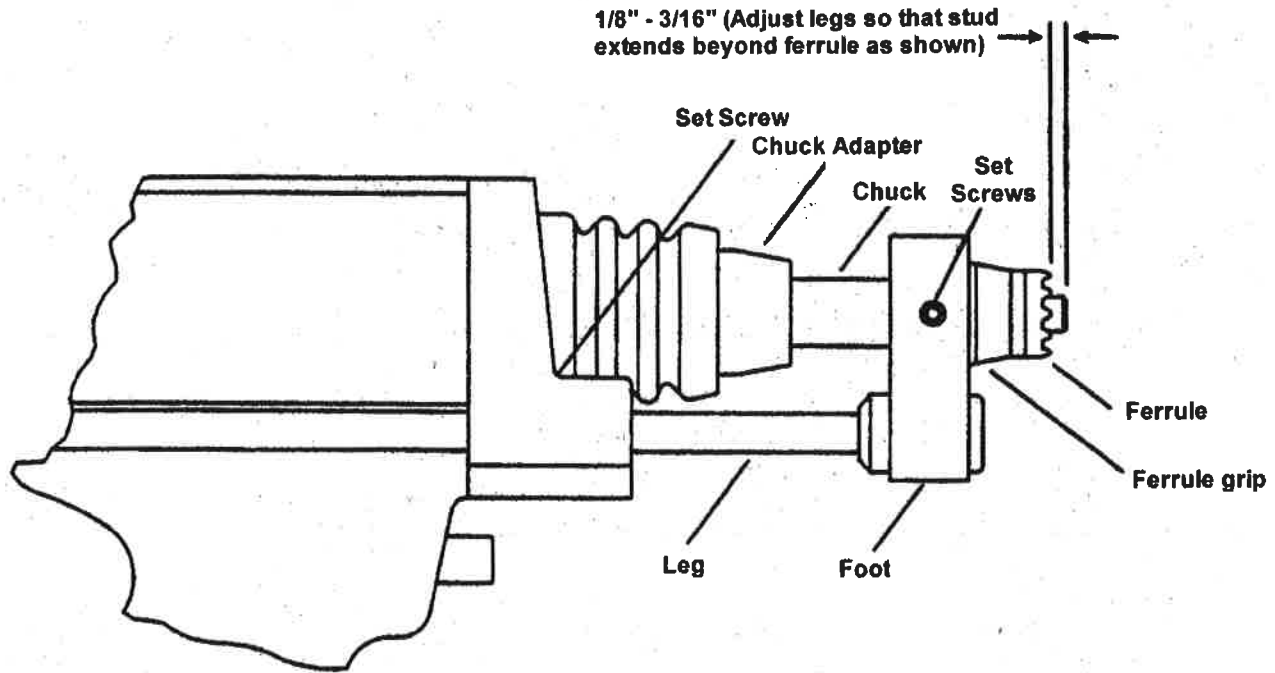


Figure 1

Installation of Accessories

Note: For welding studs larger than 5/16" diameter, Nelson recommends installing the Tranquil-Arc® Plunge Dampener (#512-241-000) for better flash control. (see page 12 for installation instructions)

1. Insert chuck in the chuck adaptor. While holding the gun by the chuck adaptor, lightly tap the chuck with a hammer until it is seated and held firmly in the taper of the chuck adaptor (See Figure 1).

Note: A different Chuck is required for each stud diameter.

2. Insert Ferrule Grip into Foot and secure with set screws provided (See Figure 1).
3. Insert stud in Chuck and Ferrule in Ferrule Grip.

4. Loosen the leg screws holding the foot and adjust the foot so that stud is centered in the ferrule. **This is important** because improper welds will result if there is any binding or friction between the stud and ferrule.

Adjustment of Plunge

1. Adjust the leg and foot assembly so that the stud extends from 1/8" to 3/16" beyond the end of the ferrule (See Figure 1).
2. When stud is so positioned, tighten the leg screws so that the Foot Assembly cannot move.

Note: It is necessary to adjust plunge when changing stud lengths.

Caution: When using large diameter or special shaped chucks, (i.e. 500-001-085) with a gun equipped with a Tranquil-Arc® Plunge Dampener, position the chuck so that no part of the chuck

comes in contact with plunge dampener clamp or the legs.

GUN SETUP FOR WELDING ALUMINUM STUDS

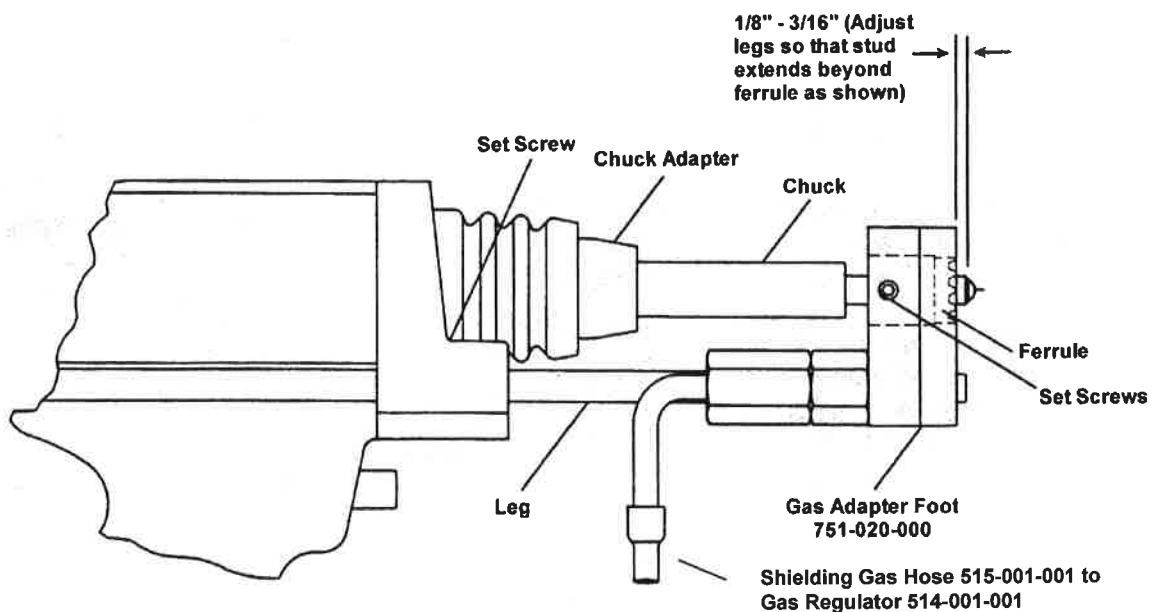


Figure 2

1. If gun is not equipped with Tranquil-Arc[®], install the 512-241-100 Plunge Dampener Kit for aluminum stud welding on the Standard Hand Gun.

Note: Long length style chuck required with Tranquil-Arc[®] for aluminum stud welding.

2. Insert chuck in the chuck adaptor. While holding the gun by the chuck adaptor, lightly tap the chuck with a hammer until it is seated and held firmly in the taper of the chuck adaptor (See Figure 2).

Note: A different Chuck is required for each stud diameter.

3. Fasten the Gas Adaptor Foot Assembly (751-020-000) to the legs with screws and washers provided. Insert legs into gun body and lock in place.

Note: The Gas Adaptor Foot Assembly is a combination gas adaptor, valve, foot and ferrule grip. Gas flows only when foot is in the ready to weld position.

When welding 3/16, 1/4, and 5/16-inch diameter studs, use the insert grip included with adaptor (See Figure 2). Remove insert grip when welding 3/8, 7/16, and 1/2-inch diameter studs.

4. Insert stud in Chuck and ferrule in Gas Adaptor Foot Assembly.

5. Loosen screws holding Gas Adaptor Foot Assembly and adjust adaptor so that stud is centered in the ferrule. This is important because improper welds will result if there is any binding or friction between the stud and ferrule.

Adjustment of Plunge

1. Loosen leg set screws and adjust the legs so that the stud extends 1/8" to 3/16" beyond the Gas Adaptor Foot Assembly. Measure from edge of chamfer on stud as shown in Figure 2.

Do not attempt to control weld appearance by changing the plunge. Inadequate plunge will result in weld failures.

2. When stud is so positioned, tighten leg screws so that the Gas Adaptor Foot Assembly cannot move.

Note: It is necessary to adjust plunge when changing stud lengths.

Adjustment of Lift

Aluminum stud welding requires that the lift be set at 3/32". See page 3 for adjustment procedure.

LIFT AND LIFT ADJUSTMENTS

To Adjust Lift:

Remove rear cap on gun, adjust the slotted adjustable core screw as required (See Figure 3). Each "click" changes lift by .010".

To increase lift, turn adjustable core counter-clockwise.

To decrease lift, turn adjustable core clockwise.

After proper lift is obtained, replace rear cap on gun.

Recommended Lift Settings for Steel Studs

1/16" For welding 1/2" diameter studs or less

3/32" For welding 5/8".

Recommended Lift Settings for Aluminum Studs

3/32" For welding 1/2" diameter studs or less.

Electric Arc

The circuitry used in the Nelson Units/Systems permits checking lift (the amount of movement or "lift" of the gun mechanism during the welding cycle) without the gun being grounded. Compressing the gun is recommended since triggering in the open air will give more retract than in the compressed condition. The welding condition should be duplicated when adjusting the "lift". To check lift, the gun spring must be compressed so that the lift mechanism will operate in the same position as when welding. To do this:

1. Load a stud and ferrule into the gun.
2. Press the gun against an insulated or ungrounded block.
3. Trigger the gun to start a simulated weld cycle. This will allow the actual functional lift to be measured and adjusted as needed.

Note: For Nelson Nelweld power sources, refer to the *Nelweld Operations and Service Manual* for instructions on initiating the lift check mode of operation.

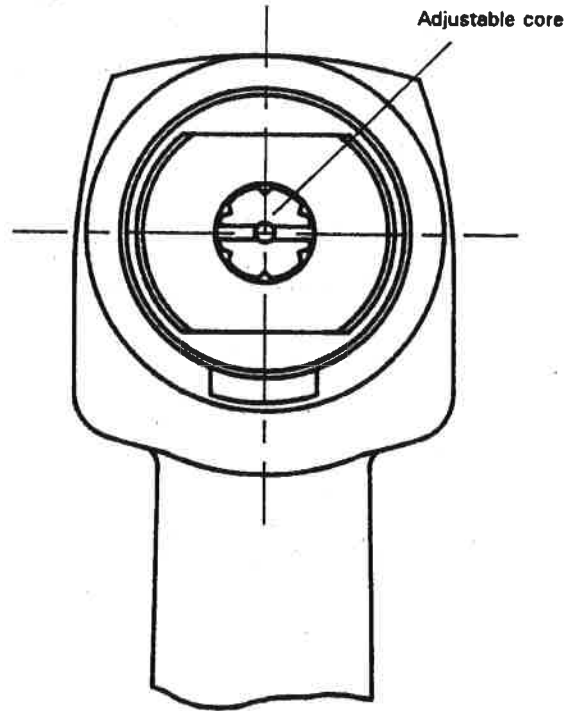


Figure 3

WELD INSPECTION

Steel

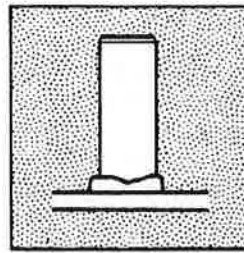
Visual Inspection

Visual inspection is dependent upon the interpretation of the appearance of the welded end of the stud. To assist you, Figure 4 shows examples of various welds with proper interpretation.

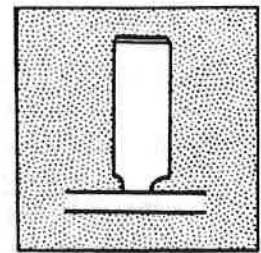
Physical Inspection

If, after visually inspecting the welds, a questionable weld is evident, the weld should be physically tested. Initial weld setups should also be physically tested. Suggested physical tests are as follows:

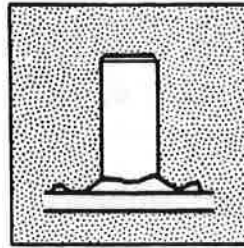
1. Bend Test - Stud to be tested shall be bent away from its vertical axis 90° or until failure. Failure should occur in the stud proper, or, on thin plate, a full stud diameter plug of base metal should be torn out.
2. Torque Test - Stud shall be torqued until a pre-specified loading is attained or until the stud fails or, on thin plate, a plug of the base material should tear out.



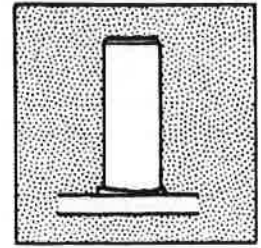
Normal Stud Weld



Stud hangup. Check setup of gun. Refer to page 2.



Hot weld. Check weld setup. Refer to page 2.



Cold weld. Check weld setup. Refer to page 2.

Figure 4

Aluminum

Visual Inspection

Visual inspection of aluminum stud welds is not conclusive since the appearance of the weld fillet is not necessarily an indication of a good or bad weld.

Visual inspection of aluminum stud welds is recommended only to determine complete fusion and absence of undercut around the periphery of the weld.

Physical Inspection

Physical test procedures for inspecting (magnesium-) aluminum alloy studs are:

1. Bend Test -The stud to be tested shall be bent, using a bending tool as shown in Figure 5, approximately 15° away from its vertical axis before the stud breaks in the weld shank or the base material fails.

Note: Do not bend aluminum studs by striking with a hammer; always use a bending tool as shown.

2. Torque Test -The stud to be tested shall be torqued in the conventional manner by applying torque until the stud fails or a predetermined torque load is reached.

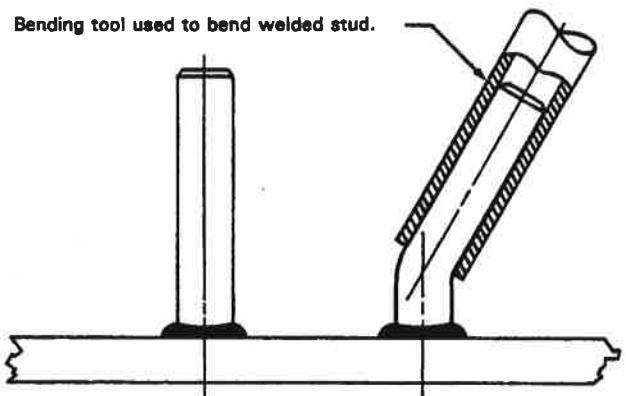


Figure 5

Recommendations

Before starting any stud welding operation, or after the equipment has remained idle for a period of time, trial or test studs should be welded to a plate for testing. Testing should continue until there is no failure of a test stud.

SEQUENCE OF OPERATIONS

Welding Gun

1. Mainspring (1) is partially compressed and lifting rod (5) slides through lifting ring (4) as the gun is placed in weld position.
2. Pressing gun trigger button energizes gun coil (2).
3. The gun coil (2) pulls the movable core assembly (3), causing the lifting hook of the movable core assembly to cock the lifting ring (4) on the lifting rod (5).
4. At the same time, the lifting ring spring (6) and core spring (7) are compressed.
5. The cocked ring locks on the lifting rod, and the movable core assembly "lifts" or pulls back the entire assembly, including the stud (see Figure 7).
6. When the stud is "lifted" from the work, an arc is initiated.
7. The assembly remains "lifted" for a preset time period.
8. At the end of this time period, the gun coil (2) is de-energized.
9. The movable core assembly (3) is returned to normal position by the core spring (7).
10. The lifting ring (4) is uncocked by the lifting hook and lifting ring spring (6).
11. The mainspring (1) returns the assembly to normal position, and this action "plunges" the molten end of the stud into a pool of molten metal on the base plate, thus completing the weld.

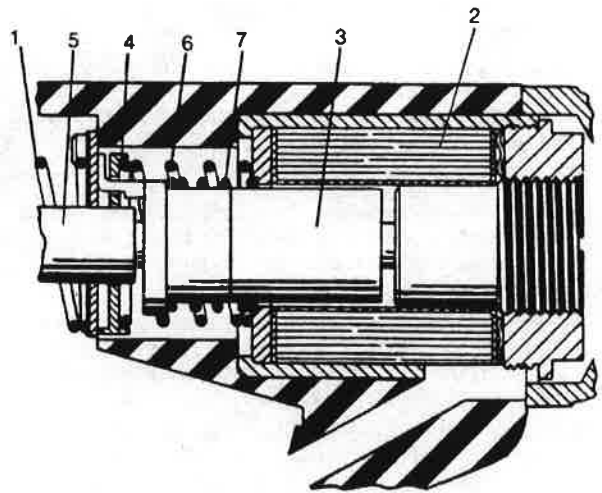


Figure 6: Gun mechanism in normal position

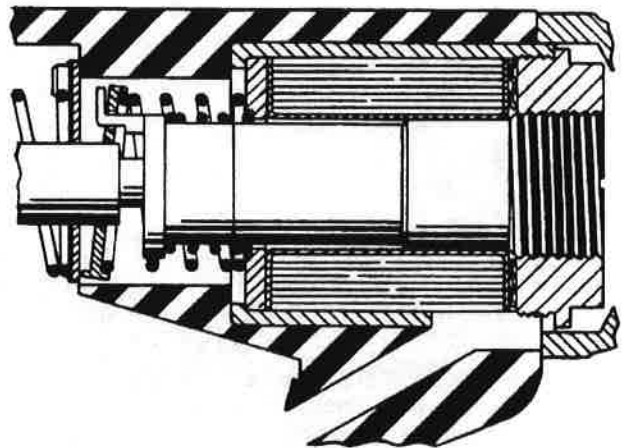


Figure 7: Gun mechanism in lifted position

MAINTENANCE INSTRUCTIONS

Gun Maintenance

If gun motion becomes sluggish or erratic, the gun should be disassembled and cleaned.

Disassembly of Gun

1. Remove foot and leg assembly. Remove chuck with drift pin.
2. Remove chuck adaptor (24) and dust bellows (21).
3. Remove two screws (35) and front cover insert and leg support assembly (13).
4. Disconnect weld cable extension by removing screw (31) and lockwasher (46). Remove any remaining thread locking compound residue. Remove lifting rod and cable connector assembly (5) and mainspring (17).
5. Remove four screws (30), lifting mechanism stop assembly (6), lifting ring (7), moveable core assembly (8), core spring (18) and lifting ring spring (19).

Cleaning

Blow or wipe the gun body and parts clean, the inside diameter of the lifting ring (7) and the mating outer diameter of the lifting rod should be carefully examined. If these surfaces reveal any signs of dirt or a dull reddish brown stain, clean and polish with a fine (600 grit or finer) abrasive paper. Lifting rod must be re-lubricated after cleaning gun. See "Reassembly of Gun".

Reassembly of Gun

1. Assemble lifting ring (7) with moveable core assembly (8) and lifting ring and core springs (18) and (19). Install in gun body.
2. Install lifting mechanism stop assembly (6) using four screws (30). Make certain that insulated side is facing outward.
3. Lubricate lifting rod in area indicated with a thin coat of high temperature bearing grease Lubrico M-24-M (#523-001-013) or equivalent.
4. Install lifting rod and cable connector assembly (5) and mainspring (17).
5. Connect weld cable extension (15) to lifting rod and cable connector with screw (31) and lockwasher (46). Screw should have a light coating of thread locking compound (47) and should be tightened to 37 to 40 in*lbs. Hook must remain square.
6. Install front cover insert and leg support assembly (13), screws (35), dust bellows (21), and chuck adaptor (24).
7. Install foot and leg assembly and chuck.

Control Cable Color Coding

Cannon Connector

| Pin | Description |
|-----|----------------------------|
| 1 | No Connection |
| 2 | Red (To Red Coil Lead) |
| 3 | White (To Trigger) |
| 4 | Black (To Trigger) |
| 5 | Green (To Green Coil Lead) |
| 6 | No Connection |

R & S Connector

| Pin | Description |
|-----------|----------------------------|
| X | No Connection |
| Y | Green (To Green Coil Lead) |
| Z | Black (To Trigger) |
| Small Pin | White (To Trigger) |

Hubbell Connector

| Pin | Description |
|--------|---------------|
| Silver | White |
| Brass | Black |
| Center | No Connection |

MAINTENANCE INSTRUCTIONS

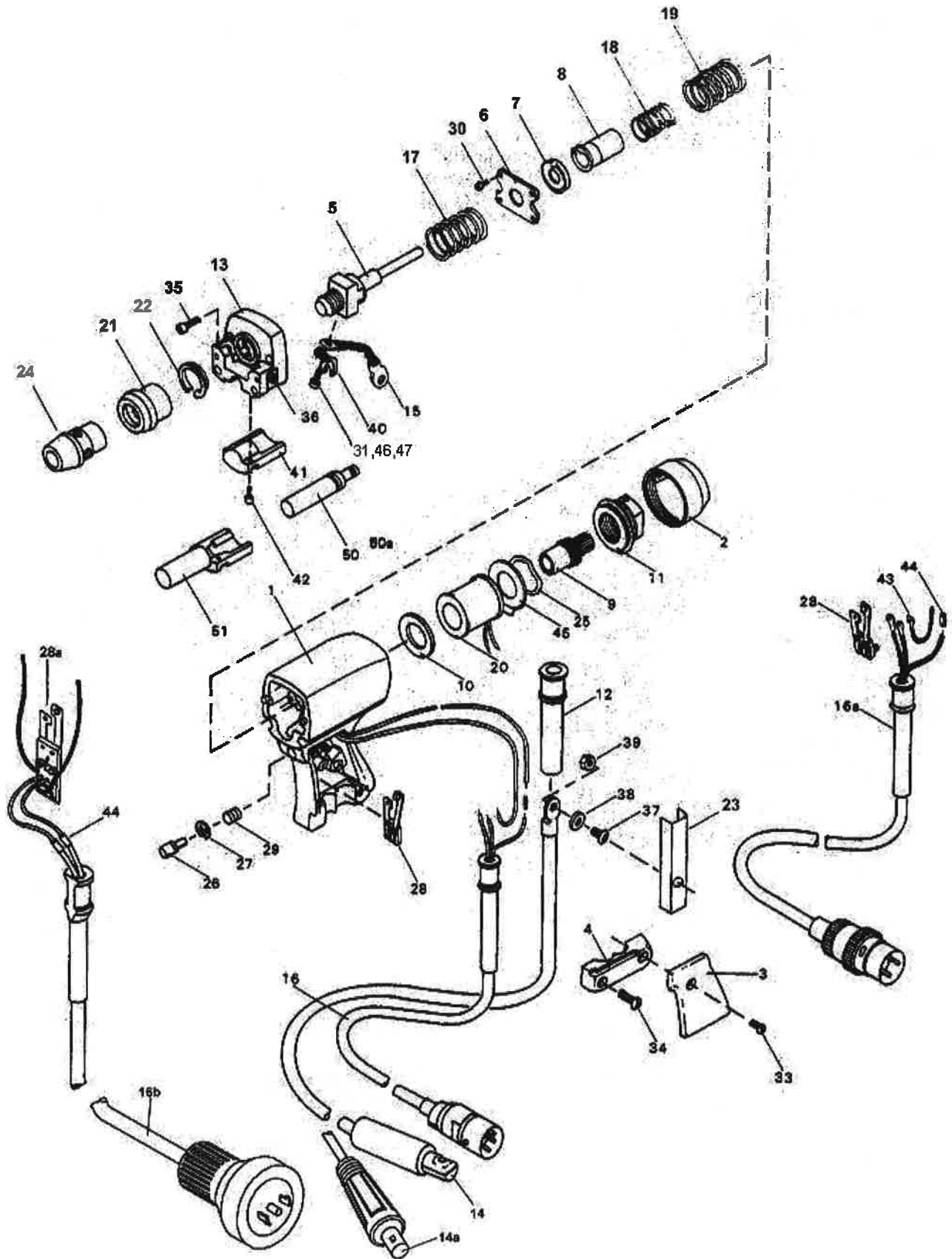


Figure 8

MAINTENANCE INSTRUCTIONS

| 751-585-000 Item # | 751-585-100 Item # | 751-585-500 Item # | 751-692-000 Item # | Description | Part No. | Qty. Req'd. |
|-----------------------|-----------------------|-----------------------|-----------------------|------------------------------------|-------------|----------------|
| 1 | 1 | 1 | 1 | Gun Body | 92-06-88 | 1 |
| 2 | 2 | 2 | 2 | Rear Cap | 92-02-13 | 1 |
| 3 | 3 | 3 | 3 | Handle Cover | 92-06-95 | 1 |
| 4 | 4 | 4 | 4 | Grommet Clamp | 92-06-91 | 1 |
| 5 | 5 | 5 | 5 | Lifting Rod & Cable Connector Asm. | 35-29-04 | 1 |
| 6 | 6 | 6 | 6 | Lifting Mechanism Stop | 751-458-035 | 1 |
| 7 | 7 | 7 | 7 | Lifting Ring | 751-458-016 | 1 |
| 8 | 8 | 8 | 8 | Moveable Core Asm. | 751-458-017 | 1 |
| 9 | 9 | 9 | 9 | Adjustable Core Asm. | 92-04-85 | 1 |
| 10 | 10 | 10 | 10 | Front Coil Yoke | 751-458-023 | 1 |
| 11 | 11 | 11 | 11 | Rear Coil Yoke | 92-01-92 | 1 |
| 12 | 12 | 12 | 12 | Cable Grommet | 751-585-004 | 1 |
| 13 | 13 | 13 | 13 | Front Cover & Leg Support Asm. | 751-458-057 | 1 |
| 14 | 14 | 14 | | Weld Cable Asm. -Camlok | 720-440-000 | 1 |
| | | | 14a | Weld Cable Asm. -Dinse | 720-541-000 | 1 |
| 15 | 15 | 15 | 15 | Weld Cable Extension | 86-51-31 | 1 |
| 16 | | | | Control Cable Asm. -Cannon 4 Wire | 721-194-004 | 1 |
| | 16a | | | Control Cable Asm. -R & S 3 Wire | 721-194-005 | 1 |
| | | 16b | 16b | Control Cable Asm. -Hubbell | 721-215-002 | 1 |
| 17 | 17 | 17 | 17 | Main Spring | 526-001-156 | 1 |
| 18 | 18 | 18 | 18 | Core Spring | 526-001-157 | 1 |
| 19 | 19 | 19 | 19 | Lifting Ring Spring | 526-001-158 | 1 |
| 20 | 20 | 20 | 20 | Gun Coil | 716-010-000 | 1 |
| 21 | 21 | 21 | 21 | Dust Bellows | 92-03-05 | 1 |
| 22 | 22 | 22 | 22 | Front Bearing | 751-000-013 | 1 |
| 23 | 23 | 23 | 23 | Weld Cable Insulator | 751-585-031 | 1 |
| 24 | 24 | 24 | 24 | Chuck Adaptor | 92-01-84 | 1 |
| 25 | 25 | 25 | 25 | Wave Washer | 717-844-001 | 1 |
| 26 | 26 | 26 | 26 | Trigger Button | 92-02-35 | 1 |
| 27 | 27 | 27 | 27 | E-Ring | 751-585-021 | 1 |
| 28 | 28 | | | Trigger Switch | 709-028-100 | 1 |
| | | 28a | 28a | Trigger Switch | 709-028-200 | 1 |
| 29 | 29 | 29 | 29 | Trigger Spring | 87-05-22 | 1 |
| 30 | 30 | 30 | 30 | M3.5 x 8 Pan Hd. Screw | 524-005-113 | 4 |
| 31 | 31 | 31 | 31 | M4 x 12 Low Hd. Cap Screw | 524-005-117 | 1 |
| 33 | 33 | 33 | 33 | M 5 x 10 Oval Hd. Screw | 524-005-019 | 1 |
| 34 | 34 | 34 | 34 | M5 x 25 Oval Hd. Screw | 524-005-005 | 2 |
| 35 | 35 | 35 | 35 | M5 x 16 Soc. Hd. Cap Screw | 524-005-006 | 2 |
| 36 | 36 | 36 | 36 | M8 x 8 Soc. Set Screw | 524-005-007 | 2 |
| 37 | 37 | 37 | 37 | M6 x 14 low Hd. Soc. Screw | 524-005-002 | 1 |
| 38 | 38 | 38 | 38 | Cone Washer | 717-654-001 | 1 |
| 39 | 39 | 39 | 39 | M6 Hex Nut | 524-005-024 | 1 |
| 40 | 40 | 40 | 40 | Plunge Dampener Hook | 751-458-054 | 1 |

| 751-585-000 Item # | 751-585-100 Item # | 751-585-500 Item # | 751-692-000 Item # | Description | Part No. | Qty. Req'd. |
|-----------------------|-----------------------|-----------------------|-----------------------|------------------------------------|-------------|----------------|
| 41 | 41 | 41 | 41 | Blank Cover | 35-30-01 | 1 |
| 42 | 42 | 42 | 42 | M4 x 10 Soc. Hd. Cap Screw | 524-005-008 | 2 |
| 43 | 43 | 43 | 43 | Sta-Kon | 713-013-000 | 1 |
| 44 | 44 | 44 | 44 | Wire Splice | 713-032-000 | 4 |
| 45 | 45 | 45 | 45 | Insulating Washer (No longer used) | | 0 |
| 46 | 46 | 46 | 46 | #8 Lock Washer | 524-002-006 | 1 |
| 47 | 47 | 47 | 47 | Vibratite (med- removable) | 103-477-008 | 1 |
| * | * | * | * | Leg | 504-000-050 | 2 |
| * | * | * | * | Foot | 502-001-137 | 1 |
| * | * | * | * | Leg Washer | 751-650-008 | 2 |
| * | * | * | * | M5 x 35 Flat Soc. Hd. Screw | 524-005-036 | 2 |

**512-241-000 Tranquil-Arc® Plunge Dampener Kit -
Steel**

| | | | | | | |
|----|----|----|----|------------------------------|-------------|---|
| 50 | 50 | 50 | 50 | Plunge Dampener Asm. (Steel) | 751-458-060 | 1 |
| 51 | 51 | 51 | 51 | Plunge Dampener Clamp | 751-585-007 | 1 |

**512-241-100 Tranquil-Arc® Plunge Dampener Kit -
Aluminum**

| | | | | | | |
|-----|-----|-----|-----|---------------------------------|-------------|---|
| 50a | 50a | 50a | 50a | Plunge Dampener Asm. (Aluminum) | 751-458-061 | 1 |
| 51 | 51 | 51 | 51 | Plunge Dampener Clamp | 751-585-007 | 1 |

* Not Shown

MAINTENANCE INSTRUCTIONS

BEFORE PROCEEDING, PLEASE READ STUD WELDING SAFETY PRECAUTIONS

Installing New Weld Cables -All Guns

1. Remove handle cover screw (33). Lift off handle cover (3).
2. Remove grommet clamp screws (34) and grommet clamp (4).
3. Remove insulator (23), screw (37), washer (38), grommet (12), and weld cable assembly (14 or 14a).
4. Slip grommet (12) off weld cable assembly (14 or 14a).
5. Slip grommet over new weld cable assembly and install in gun handle.
6. Install screw (37), washer (38), insulator (23) and tighten securely.
7. Replace grommet clamp and handle cover.

Installing New Control Cables -Welding Gun #751-585-000

1. Remove handle cover screw (33). Lift off handle cover (3).
2. Remove grommet clamp screws (34) and grommet clamp (4).
3. Lift out switch (28) and disconnect black and white control cable leads.
4. Clip green and red control cable leads. (Upon reassembly these two leads are soldered and taped.) Remove control cable.
5. Clip green and red coil leads as close to wire splice as possible.
6. Connect black and white leads on new control cable assembly to switch (28).
7. Connect green control cable lead to green coil lead.
8. Connect red control cable lead to red coil lead.
9. Install switch and control cable assembly in gun body.
10. Replace grommet clamp and handle cover.

Installing New Control Cables -Welding Gun #751-585-100

1. Remove handle cover screw (33). Lift off handle cover (3).
2. Remove grommet clamp screws (34) and grommet clamp (4).
3. Lift out switch (28) and disconnect black and white control cable leads and red coil lead.
4. Clip green control cable lead. Upon reassembly this lead is soldered and taped. Remove control cable.
5. Clip green coil lead as close to wire splice as possible.
6. Connect black lead on new control cable and red coil lead to one switch terminal (28).
7. Connect white control cable lead to other switch terminal (28).
8. Connect green control cable lead to green coil lead.
9. Install switch and control cable assembly in gun body.
10. Replace grommet clamp and handle cover.

Installing New Control Cables -Welding Gun #751-585-500 & #751-692-000

1. Remove handle cover screw (33). Lift off handle cover (3).
2. Remove grommet clamp screws (34) and grommet clamp (4).
3. Clip white and black leads from trigger switch (28a) as close to the wire splice as possible. Remove control cable.
4. Reconnect new control cable using insulated wire splice (29). Connect white control lead to white trigger lead, black control lead to black trigger lead.
5. Install switch and control cable assembly in gun body.
6. Replace grommet clamp and handle cover.

INSTALLATION INSTRUCTIONS

Tranquil-Arc® Accessory

Plunge Dampener Kit (Steel 512-241-000) (Aluminum 512-241-100)

Nelson® Plunge Dampener Kits -Steel and Aluminum on Standard Hand Guns #751-525-000/#751-525-100

1. Remove blank cover from standard gun assembly.
2. Insert plunge Dampener into Dampener clamp.
3. Install onto gun assembly. Align ring on plunge Dampener with groove in front cover and Dampener hook in the groove of shaft collar. Fasten to gun with two (2) socket head cap screws.

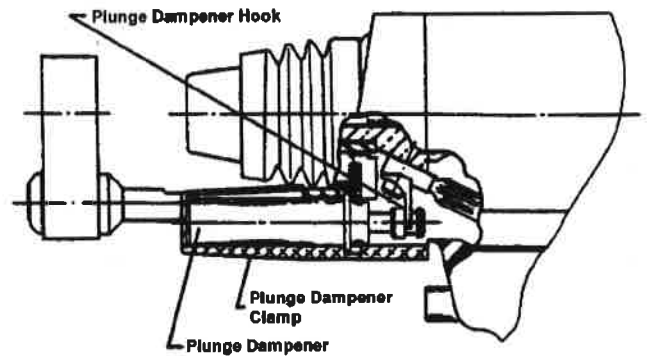


Figure 9

INSTALLATION INSTRUCTIONS

Dimensions & Specifications

Standard Welding Gun - Semi-automatic, pistol shaped. Welds studs of any desired length and diameters of 1/8" through 5/8".

Length:
(less accessories) **7.88 inches**

Weight:
(typical working weight of gun - includes standard legs and foot plus four (4) feet of cable from gun handle. **Note:** Four (4) foot length of cable is normally supported by the operator when in working position.) **5 lbs. 2 oz.**

(shipping weight of tool - includes standard legs and foot 8'1" to 8'3" cable normally supplied with welding gun and all connectors.) **6 lbs. 14 oz.**

Width:
(total)..... **2.63 inches**

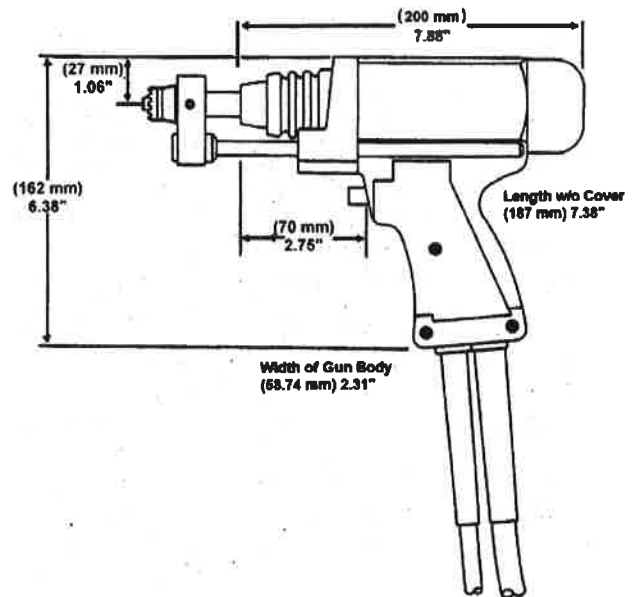


Figure 10

STUD WELDING SAFETY PRECAUTIONS

General: To avoid serious risk of injury or death, disconnect the welding unit from any power source then unplug all cables from the welding source to the gun itself before performing any maintenance at all. Stud welding, as with any welding process, can be dangerous if the equipment is not properly installed and maintained or if the operator does not use the process with proper safety precautions. The operator should read and understand these precautions and be trained or experienced in the installation, operation, and maintenance procedures provided in this Nelson manual.

Electrical: Remember, electric shock can kill! Properly install and use stud welding systems in accordance with the National Electrical Code NFPA-70 and local codes. Take the following safety precautions:

- Do not touch live electrical parts: be sure you are insulated from same
- Be certain that the equipment is properly grounded and that all weld cables and connectors are in good condition. Inspect the cables, connections, etc. regularly for frays, broken insulation, insulators or other electrical hazards and repair or replace them at once.
- Do not work in wet areas or weld when you are wet.
- Wear proper clothing at all times and when gloves are necessary due to welding position, be sure that they are dry, insulated, and have no holes.

Fire Protection: Remove all combustible or volatile materials from the work area. Although weld spatter or berries resulting from stud welding are minimal, proper precautions should be taken when welding near or through combustible materials to be sure that sparks or berries cannot reach and ignite them. Store and restrain gas cylinders properly. Be sure that they never become a part of an electrical circuit and are isolated from excessive heat or welding spatter and berries. Always have fire suppression equipment available for immediate use and know how to use it.

Vision Protection: It is recommended that eye protection be worn by the operator at all times when welding. Eye glasses with spectacle frames equipped with Shade No. 3 absorption and filter lenses and side shields are suggested. Helpers or workers within five (5) feet of a welding operation should wear clear safety glasses with side shields. For additional information consult ANSI Standard Z87.1.

Hearing Protection: It is recommended that proper ear protection be used when operating or working within five (5) feet of all capacitor discharge stud welding systems. Other stud welding operations in confined environments should be evaluated for noise level and hearing protection need. Consult OSHA standard 29 CFR, Part 1910, Subpart Q, "Welding, Cutting, and Brazing" for additional information.

Protective Clothing: The use of protective clothing is recommended. The type of protection will vary with the stud welding process, application, weld position and stud size being welded, but flame resistant clothing, including high boots, gloves, apron, leather leggings, etc., should be considered to protect the operator from welding spatter, arc flash and berries if required. In all cases during welding do not wear clothing made from flammable, synthetic fabrics. For information see ANSI/AWS Z49.1, "Safety in Welding and Cutting".

Ventilation: Continuous welding in a closed area or welding and cleaning materials with paint, epoxy, galvanizing or other coatings, can produce fumes that are unhealthy. Natural or forced ventilation in the welding area should be provided as necessary to prevent fume accumulation. Material Safety Data Sheets (MSDS) should be supplied by the material suppliers for materials used in the welding process and evaluated for dangerous contents that would produce toxic fumes or gasses.

Other: Keep hands, clothing, tools, feet, etc. away from the weld stud, chuck and other moving parts during the weld cycle to avoid pinch points or electric shock.

Maintenance: Warning - Use extreme caution when servicing or troubleshooting any electrical component of the stud welding system. If possible, turn off all power and disconnect all electrical cables and follow the manufacturer's maintenance and service procedures. Capacitor Discharge (CD) stud welding equipment may retain a very high electrical charge in the capacitor bank even after being shut off. Follow the manufacturer's instructions for discharging or draining the capacitor bank before servicing CD equipment.

References

- AWS pamphlet "Arc Welding Safety"
- ANSI/AWS Standard Z49.1 "Safety in Welding and Cutting"
- ANSI Standard Z87.1 "Safe Practice for Occupation and Educational Eye and Face Protection"
- ANSI/AWS C5.4 "Recommended Practices for Stud Welding"
Available from:
American National Standards Institute American Welding Society
1430 Broadway -or- 550 N W LeJeune Road
New York, NY 10018 Miami, FL 33135
- OSHA Standard 29CFR, Part 1910, Subpart Q "Welding, Cutting, and Brazing"
Available from:
Superintendent of Documents
U.S. Government Printing Office
Washington, D.C. 20402
- CSA Standard W117.2 "Code for Safety in Welding and Cutting"
Available from:
Canadian Standards Association
178 Rexdale Blvd.
Rexdale, Ontario M9W-1R3
- NFPA -70 National Electrical Code
Available from:
National Fire Protection Association
Batterymarch Park
Quincy, Ma. 2269