



# NS20A & NS20N Heavy Duty Floating Lift Welding Guns

## Instruction and Maintenance Manual

Version 1.30  
December 2008

Manual Part Number 729-110-024

NS20A and NS20N HEAVY 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 (less reasonable depreciation based on actual use); 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 must be given within 30 days of such defect or failure and within ninety (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 has been improperly 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			
	751-535-000	751-535-100	751-535-500	751-693-000
Control Cable Connector	Cannon	R&S	Hubbell	Hubbell
Weld Cable Connector	CamLok	CamLok	CamLok	Dinse

**Note:** All these guns are equipped with a steel Tranquil-Arc<sup>®</sup> Plunge Dampener

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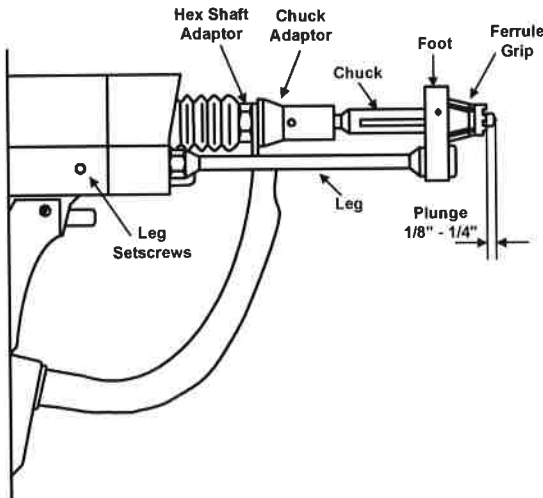
# GUN SETUP FOR WELDING STEEL STUDS

## Accessory Installation

1. Insert chuck for 1" or smaller studs into 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 (*Figure 1*). Chucks for studs larger than 1" diameter screw onto the 1/2-20 thread of the hex shaft adaptor.

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

2. Insert Ferrule Grip into Foot and secure with setscrews provided (*Figure 1*).
3. Insert stud in Chuck and Ferrule in Ferrule Grip or Ferrule Holder.
4. Loosen the screws holding the foot to the leg and adjust the foot so that stud is centered in the ferrule. *This is important* because improper welds will result if there is binding or friction between the stud and ferrule. Tighten the screws and recheck the centering.



**Figure 1: Gun assembly**

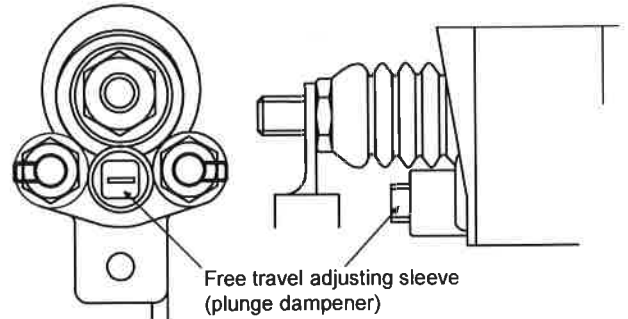
## Plunge Adjustment

1. Adjust the leg and foot assembly so that the stud extends 1/8" to 1/4" beyond the end of the ferrule (*Figure 1*).
2. When plunge is adjusted, tighten the leg screws so that the Foot Assembly cannot move.

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

## Free Travel Adjustment

With the free travel adjustment sleeve screwed fully in, (clockwise) there will be 1/16" of free travel. To increase the free travel, back out (counter-clockwise) the free travel adjustment sleeve. Each complete full turn provides .071" of additional free travel (*Figure 2*).



*Front of gun has been removed for clarity*

**Figure 2: Location of free travel sleeve**

**Note:** A 1/2" open-end wrench is the proper tool for adjusting the free travel.

For studs with a weld base of 1/2" diameter or under:	1/8 turn
For studs with a weld base of 5/8" to 3/4" diameter:	1/2 - 3/4 turns
Larger diameter studs can tolerate increased free travel.	

These recommendations are for normal stud welding applications. For special applications such as Weld-Thru Deck, obtain appropriate application sheet.

## LIFT AND LIFT ADJUSTMENT

### Lift Adjustment

The gun lift can be checked without welding a stud. The recommended procedure for checking the lift is under a simulated welding condition as described below for:

Nelweld Power Sources
Series 6000 (TR-2400)
Series 5000 (TR-1600)
Series 4800
Series 3000 (NS-20A HD)

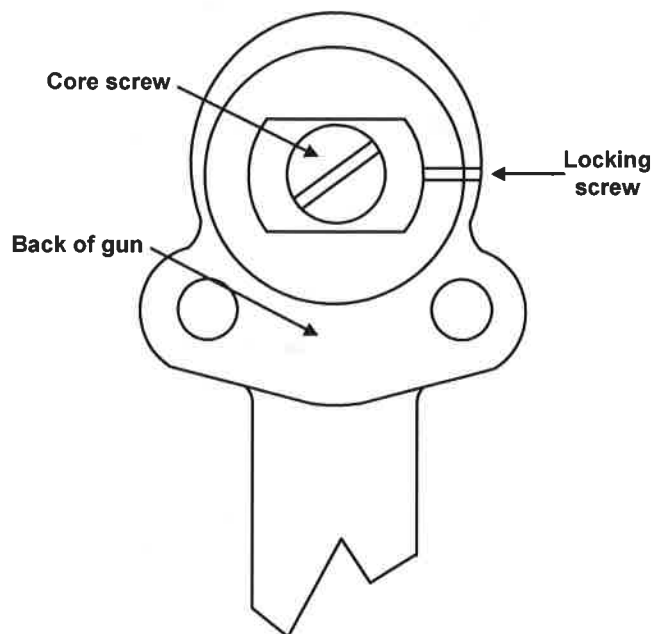


Figure 3: Rear view of gun

### Nelweld Power Sources

1. Load stud and ferrule into gun with proper plunge setting for welding.
2. Trigger the gun in the air away from the work surface and continue pressing the gun trigger. After the gun lifts and plunges, place the gun in normal welding position on a piece of wood or other insulated type surface or on the work surface and continue holding the gun trigger. After a short delay (the default setting is two seconds – refer to the Nelweld Manual for instructions on how to change this time, if desired), the gun will lift a second time without an arc being established. The gun will stay lifted for a short time (the default setting is two seconds – refer to the Nelweld Manual for instructions on how to change this time, if desired).
3. Measure the inward movement of the shaft extension. This is the actual lift that will occur under the welding condition.

**Note:** Triggering the gun in the air away from the work surface will cause the gun to lift. The lift in open air will be greater than when the gun is in the actual or simulated weld condition.

#### **To Change Lift:**

Remove rear cap on gun, loosen lock screw and position the adjustable core as required (*Figure 3*).

**To Increase Lift,** screw out (counter-clockwise) the adjustable core.

**To Decrease Lift,** screw in (clockwise) the adjustable core.

After proper lift is obtained, lock adjustable core in position by tightening lock screw. Replace rear cap on gun.

#### **Recommended Lift Settings for Steel Studs**

##### **When welding:**

1/2" diameter studs or less.....	1/16"
5/8" and 3/4" diameter studs .....	3/32"
7/8" diameter studs and over .....	7/64" to 1/8"

## LIFT AND LIFT ADJUSTMENTS

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### Series 4800 & Series 5000 (TR-1600)

1. Load stud and ferrule into gun with proper plunge setting for welding.
2. Set weld time at approximately ½ second. Turn “Lift Check” feature ON.
3. Place gun in normal welding position on a piece of wood or other insulated type surface.
4. Depress trigger button as if to weld.
5. Measure the inward movement of the shaft extension. This is the actual lift under the welding condition. Turn “Lift Check” feature OFF.

**Note:** Triggering the gun in the air away from the work surface will cause the gun to lift. The lift in open air will be greater than when the gun is in the actual or simulated weld condition.

#### **To Change Lift:**

Remove rear cap on gun, loosen lock screw and position the adjustable core as required (See Figure 3).

**To Increase Lift,** screw out (counter-clockwise) the adjustable core.

**To Decrease Lift,** screw in (clockwise) the adjustable core.

After proper lift is obtained, lock adjustable core in position by tightening lock screw. Replace rear cap on gun. Adjust for proper weld time.

#### **Recommended Lift Settings for Steel Studs**

##### **For welding:**

½” diameter studs or less.....1/16”  
⅝” and ¾” diameter studs .....3/32”

### Series 6000 (TR-2400)

1. Load stud and ferrule into gun with proper plunge setting for welding.
2. Set weld time at approximately ½ second.
3. Place gun in normal welding position on a piece of wood or other insulated type surface.
4. Depress trigger button as if to weld.
6. Measure the inward movement of the shaft extension. This is the actual lift under the welding condition.

**Note:** Triggering the gun in the air away from the work surface will cause the gun to lift. The lift in open air will be greater than when the gun is in the actual or simulated weld condition.

#### **To Change Lift:**

Remove rear cap on gun, loosen lock screw and position the adjustable core as required (See Figure 3).

**To Increase Lift,** screw out (counter-clockwise) the adjustable core.

**To Decrease Lift,** screw in (clockwise) the adjustable core.

After proper lift is obtained, lock adjustable core in position by tightening lock screw. Replace rear cap on gun. Adjust for proper weld time.

#### **Recommended Lift Settings for Steel Studs**

##### **For welding:**

½” diameter studs or less.....1/16”  
⅝” and ¾” diameter studs .....3/32”  
⅞” diameter studs and over .....7/64” to 1/8”

## LIFT AND LIFT ADJUSTMENTS

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### Series 3000 (NS-20A HD)

1. Load stud and ferrule into gun with proper plunge setting for welding.
2. Set weld time at approximately ½ second. If control unit is equipped with a Weld Monitor Module, set 3-position switch in the "Lift Check" position.
3. Place gun in normal welding position on a piece of wood or other insulated type surface.
4. Depress trigger button as if to weld.
5. Measure the inward movement of the shaft extension. This is the actual lift under the welding condition.

**Note:** Triggering the gun in the air away from the work surface will cause the gun to lift. The lift in open air will be greater than when the gun is in the actual or simulated weld condition.

**Caution:** Erratic lift can be caused by low voltage; therefore, it is suggested that a minimum of 65 volts open circuit voltage be used when checking lift or operating the stud welding equipment.

### **To Change Lift:**

Remove rear cap on gun, loosen lock screw and position the adjustable core as required (See Figure 3).

**To Increase Lift,** screw out (counter-clockwise) the adjustable core.

**To Decrease Lift,** screw in (clockwise) the adjustable core.

After proper lift is obtained, lock adjustable core in position by tightening lock screw. Replace rear cap on gun. Adjust for proper weld time.

### **Recommended Lift Settings for Steel Studs**

#### **For welding:**

½" diameter studs or less.....1/16"  
5/8" and ¾" diameter studs .....3/32"  
¾" diameter studs and over .....7/64" to 1/8"

# WELD INSPECTION

## Visual Inspection

A proper relationship between the Lift, Plunge, Time, and Amperage is needed to obtain good weld results. The length reduction or burn-off and the weld fillet appearance are determined by the weld settings. Visual weld inspection consists of interpreting the appearance of the weld fillet and is normally very accurate if certain guidelines are followed.

A good weld is characterized by:

- Even fillet formation.
- A shiny, bluish hue to the fillet surface.
- A slight flow or blend of filler metal into the base material.
- Good fillet height.
- Normal length reduction or burn-off

A cold weld, which requires more time and/or amperage, is indicated by:

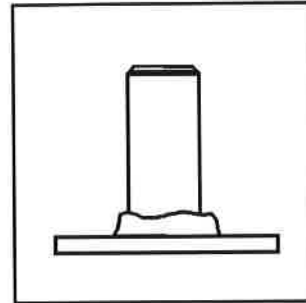
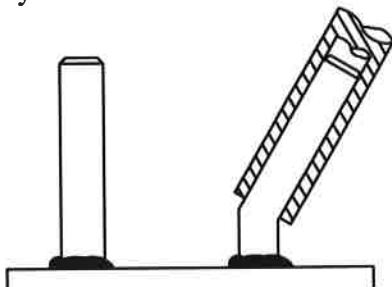
- Low fillet height.
- Incomplete fillet formation.
- A dull gray cast to the fillet surface.
- Stringers of fillet metal forming spider legs.
- Inadequate length reduction or burn-off.
- Fillet sits on top of the base material.

A hot weld made with too much time and/or amperage is distinguished by:

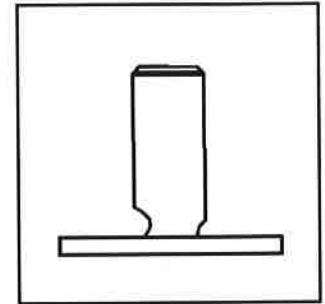
- Excessive spatter.
- A washed-out fillet.
- Undercutting of the stud.
- Burn through the base material.

## Physical Inspection

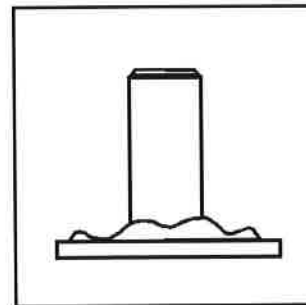
If, after visually inspecting the welds, a questionable weld is evident, the weld should be physically tested. Initial weld setups should also be physically tested. Suggested physical tests are as follows:



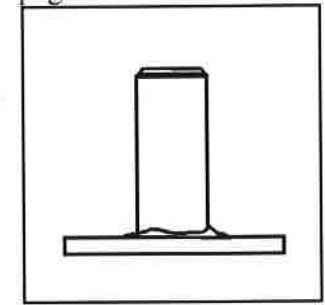
Normal Stud Weld



Stud hang-up. 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: Weld inspection diagrams

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.



## SEQUENCE OF OPERATIONS

### Welding Gun

1. Mainspring (1) is partially compressed and lifting rod (5) slides through lifting ring (4) when the gun is placed in weld position as the plunge is taken up.
2. Pressing gun trigger button energizes gun coil (2).
3. The gun coil (2) pulls back the movable core assembly (3), causing the lifting hook of the movable core assembly to lock 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 chuck and stud (*Figure 6*).
6. When the stud is "lifted" from the work, an arc is initiated.
7. The assembly remains "lifted" for a preset weld time.
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.

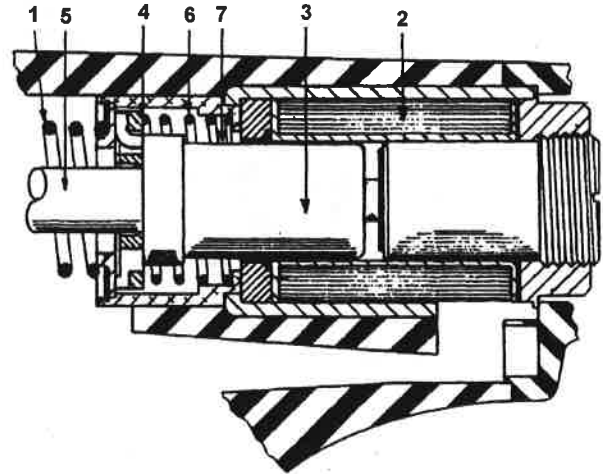


Figure 5: Gun mechanism in normal position

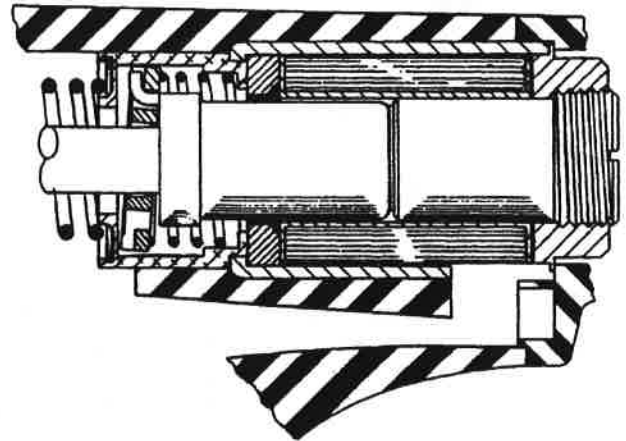


Figure 6: Gun mechanism in lifted position

# MAINTENANCE INSTRUCTIONS

Exploded View

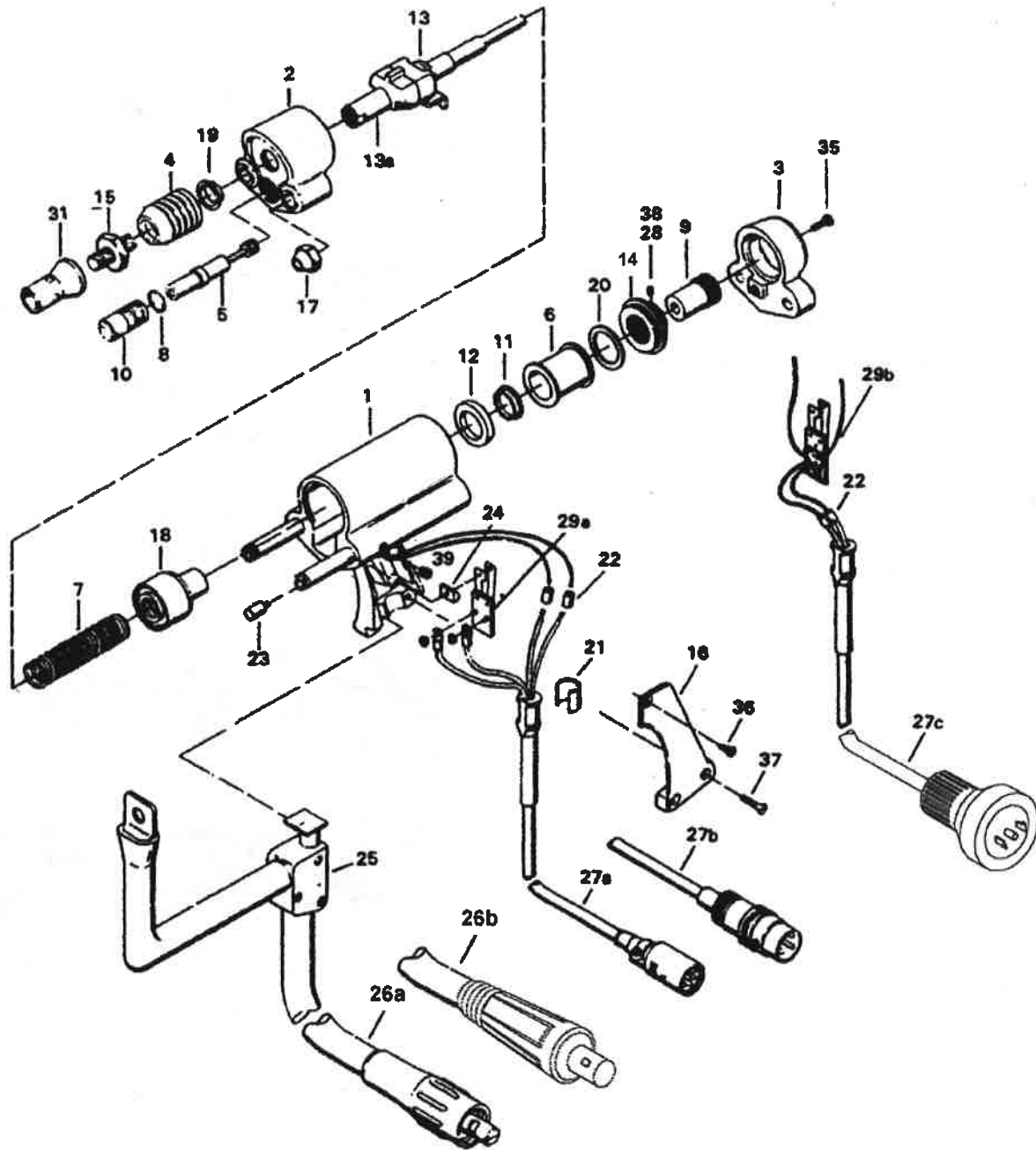


Figure 7

# MAINTENANCE INSTRUCTIONS

## Parts List

751-535-000 Item #	751-535-100 Item #	751-535-500 Item #	751-693-000 Item #	Description	Part No.	Qty. Required
1	1	1	1	Gun Body	751-535-002	1
2	2	2	2	Front Cover	751-535-006	1
3	3	3	3	Rear Cover	751-535-007	1
4	4	4	4	Dust Seal Bellows	751-535-008	1
5	5	5	5	Plunge Dampener Assembly	751-535-010	1
6	6	6	6	Gun Coil	716-041-000	1
7	7	7	7	Main Spring	526-001-191	1
8	8	8	8	O Ring	717-306-000	1
9	9	9	9	Adjustable Core	751-535-029	1
10	10	10	10	Free Travel Adjustment Sleeve	751-535-012	1
11	11	11	11	Front Coil Yoke Sleeve	751-535-013	1
12	12	12	12	Front Coil Yoke	751-535-014	1
13	13	13	13	Lifting Rod Assembly	751-535-015	1
*13a	*13a	*13a	*13a	Shaft Extension	751-535-011	1
14	14	14	14	Rear Coil Yoke	751-535-030	1
15	15	15	15	Threaded Hex Shaft Adaptor	751-004-028	1
16	16	16	16	Handle Cover	751-535-034	1
17	17	17	17	Cover Nut	751-333-023	2
18	18	18	18	Lifting Module Assembly	751-535-025	1
18a	18a	18a	18a	Lift Mech. Housing	751-535-024	1
18b	18b	18b	18b	Ring-Core Spring	526-001-192	1
18c	18c	18c	18c	Lifting Hook & Movable Core Assy	751-535-026	1
18d	18d	18d	18d	Lifting Ring	751-535-022	1
18e	18e	18e	18e	Lifting Mech. Stop	751-535-023	1
18f	18f	18f	18f	Retaining Springs	717-881-003	1
19	19	19	19	Front Bearing	751-000-013	1
20	20	20	20	Wave Washer	717-844-001	1
21	21	21	21	Cable Spacer	751-004-007	1
22	22	22	22	Wire Splice	713-032-000	4
23	23	23	23	Trigger Button	751-148-016	1
24	24	24	24	Trigger Switch Actuator	751-535-038	1
25	25	25	25	Cable Support Assembly	751-535-032	1
26a	26a	26a		Weld Cable Asm. -Camlok	720-075-000	1
			26b	Weld Cable Asm. -Dinse	720-543-000	1
27a				Control Cable Asm. - Cannon 4 Wire	721-194-000	1
	27b			Control Cable Asm. - R & S 3 Wire	721-194-001	1
		27c	27c	Control Cable Asm. -Hubbell	721-215-000	1
28	28	28	28	Locking Ball	751-000-051	1
29a	29a			Trigger Switch Assembly	709-028-100	1
		29b	29b	Trigger Switch Assembly	709-028-200	1
31	31	31	31	Chuck Adaptor	751-004-029	1
35	35	35	35	10-32 x 1/2 Binding Hd. Screw	524-001-163	1
36	36	36	36	10-32 x 3/8 Oval Hd. Screw	524-001-215	1
37	37	37	37	10-32 x 7/8 Oval Hd. Screw	524-001-216	2
38	38	38	38	8-32 x 1/4 Flat Pt. Soc. Set Screw	524-002-005	1
39	39	39	39	5/16-18 x 3/8 Flat Pt. Soc. Set Screw	524-002-011	2

\* 13a is normally part of 13 but can be purchased separately.

# MAINTENANCE INSTRUCTIONS

## Part Number Designation

The Nelson Heavy Duty handgun has been designed for use with various Nelson Stud Welding Systems. The basic construction of the gun remains the same - only the control cable and trigger switch assembly change for proper interconnection with the control unit. The correct gun number may be determined per the following table:

<b>Heavy Duty Gun Part Number</b>	751-535-000	751-535-100	751-535-500	751-693-000																																								
<b>For Use With</b>	Series 6000 (TR-2400) Series 5000 (TR-1600) with 4 wire control	Series 3000 (NS-20AHD) with 3 wire control	Series 6000 (TR-2400) Series 5000 (TR-1600) with 2 wire control	Nelweld Power Sources with 2 wire Control																																								
<b>Control Cable Description</b>	6 pin – 4 wire	4 pin – 3 wire	3 Pin 2-Wire	3 Pin 2-Wire																																								
<b>Control Cable Part Number</b>	721-194-000	721-194-001	721-215-000	721-215-000																																								
<b>Control Connector Type</b>	Cannon	R & S	Hubbell	Hubbell																																								
<b>Control Connector Part Number</b>	714-083-002	714-061-000	714-174-000	714-174-000																																								
<b>Control Connector Boot</b>	N/A	N/A	714-174-002	714-174-002																																								
<b>Trigger Switch Assembly</b>	709-028-100	709-028-100	709-028-200	709-028-200																																								
<b>Connector Pin-out</b>	<table border="1"> <thead> <tr> <th>Pin</th> <th>Description</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>No Connection</td> </tr> <tr> <td>2</td> <td>Red (To Red Coil Lead)</td> </tr> <tr> <td>3</td> <td>White (To Trigger)</td> </tr> <tr> <td>4</td> <td>Black (To Trigger)</td> </tr> <tr> <td>5</td> <td>Green (To Green Coil Lead)</td> </tr> <tr> <td>6</td> <td>No Connection</td> </tr> </tbody> </table>	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	<table border="1"> <thead> <tr> <th>Pin</th> <th>Description</th> </tr> </thead> <tbody> <tr> <td>X</td> <td>No Connection</td> </tr> <tr> <td>Y</td> <td>Green (To Green Coil Lead)</td> </tr> <tr> <td>Z</td> <td>Black (To Trigger)</td> </tr> <tr> <td>Small Pin</td> <td>White (To Trigger)</td> </tr> </tbody> </table>	Pin	Description	X	No Connection	Y	Green (To Green Coil Lead)	Z	Black (To Trigger)	Small Pin	White (To Trigger)	<table border="1"> <thead> <tr> <th>Pin</th> <th>Description</th> </tr> </thead> <tbody> <tr> <td>Silver</td> <td>White</td> </tr> <tr> <td>Brass</td> <td>Black</td> </tr> <tr> <td>Center</td> <td>No Connection</td> </tr> </tbody> </table>	Pin	Description	Silver	White	Brass	Black	Center	No Connection	<table border="1"> <thead> <tr> <th>Pin</th> <th>Description</th> </tr> </thead> <tbody> <tr> <td>Silver</td> <td>White</td> </tr> <tr> <td>Brass</td> <td>Black</td> </tr> <tr> <td>Center</td> <td>No Connection</td> </tr> </tbody> </table>	Pin	Description	Silver	White	Brass	Black	Center	No Connection
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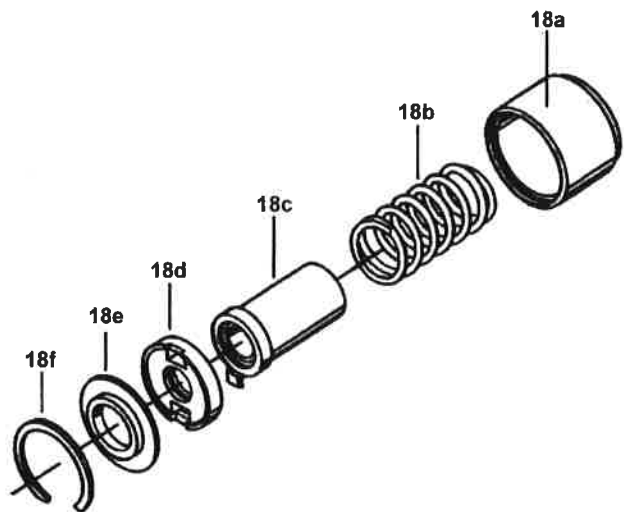
## MAINTENANCE INSTRUCTIONS

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

### Disassembly of Gun

#### A. Step By Step Gun Disassembly - Refer to exploded view

1. Loosen leg set screws (39), remove foot and leg assembly, and unscrew chuck adaptor (31).
2. Remove cable (26) from threaded hex shaft adaptor (15), unscrew shaft extension (13a) from lifting rod assembly (13), and remove dust seal bellows (4).
3. Unscrew front cover nuts (17), remove front cover (2), plunge dampener assembly (5), and balance of lifting rod assembly (13) as a unit.
4. Unscrew free travel adjustment sleeve (10), extend the piston rod of the plunge dampener assembly (5), disengage the spool shaped dampener rod end from hook of lifting rod assembly (13) and remove the plunge dampener assembly thru the front cover (2).
5. Remove the main spring (7) and lifting module assembly (18) from the gun body (1).
6. Remove screw (35) and rear cover (3). Loosen setscrew (38) and unscrew adjustable core (9). Do not unscrew, loosen or remove rear coil yoke (14) or gun coil (6).
7. Disassembly of the lifting module assembly (18) is not routinely required. If further disassembly is necessary, consult *Figure 8*. In order to disassemble the lifting module, the internal retaining ring (18f) must be removed from the lifting module housing (18a). When doing this, maintain thumb pressure on the lifting mechanism stop (18e) to resist internal spring pressure and then release retaining ring (18f). Slowly release thumb pressure and note position of the lifting mechanism stop (18e), lifting ring (18d), lifting hook and movable core assembly (18c) and ring-core spring (18b) as they are removed from the lift mechanism housing (18a).



**Figure 8: Explosion diagram of Lifting Module**

Item #	Description	Part Number
18a	Lifting Module Housing	751-535-024
18b	Ring Core Spring	526-001-192
18c	Lifting Hook & Movable Core Assembly	751-535-026
18d	Lifting Ring	751-535-022
18e	Lifting Module Stop	751-535-023
18f	Internal Retaining Ring	717-881-003

# MAINTENANCE INSTRUCTIONS

## Examination and Cleaning of Gun Parts

- A. The inside diameters of adjustable core screw (9), the lifting ring (18d) and mating diameters on the lifting rod should be carefully examined for wear or rust. Although the lubrication should prevent any oxidation on these surfaces, if they reveal signs of dirt or a dull reddish brown stain, clean and polish with a fine (600 grit or finer) abrasive paper.

Disassembly of the lifting module should not be necessary to inspect or clean the lifting ring, item (18d). However, if the lifting ring shows signs of wear or excessive dirt the module may be disassembled as described in the Gun Disassembly Procedure (Step 7). Mark the position of the lifting ring. When reassembling, consult Figure 8. The lifting ring should be rotated 180° so the lifting hook engages the unused hole or "window" in the lifting ring to distribute the wear evenly. This will maximize the life of the gun.

- B. Lubricate lifting rod and cable clamp assembly (13) surfaces with a thin coat of high temperature bearing grease, Lubrico M-24-M (#523-001-013) or equivalent.

**NOTE:** Do not over-lubricate.

## Reassembly of Gun

- A. Step-By-Step reassembly of gun - refer to exploded view.

1. Reassembly of lifting module assembly (*Figure 8*)

Insert ring core spring (18b) into lifting module housing (18a). Install the lifting ring (18d) onto the lifting hook and movable core assembly (18c) by inserting the hook through a "window" of the lifting ring (18d) with the flat side of the ring towards the lifting hook and movable core assembly.

**NOTE:** The lifting ring should be reinstalled, rotated 180° from the position it was in when removed, to distribute the wear evenly.

Insert the assembled lifting ring and lifting hook and movable core assembly into the lifting module housing (18a). Place lifting module stop (18e) in position, flat side towards lifting ring and apply thumb pressure depressing the lifting mechanism into the lifting module housing. Complete the assembly by reinstalling the internal retaining ring (18f).

2. Replace the lifting module assembly (18) and the main spring (7) in the gun body.
3. Reinstall the plunge dampener assembly (5) by extending the piston rod of the plunge dampener. Insert the plunge dampener into front cover (2). Inspect the O-Ring (8) on the free travel adjustment sleeve (10) and replace if necessary. Screw the free travel adjustment sleeve in place.
4. Inspect and replace if necessary front bearing (19) in front cover. Install lifting rod (13) through rear of front cover. Engage the hook of lifting rod on the spool of plunge dampener.
5. Reinstall the front cover (2) and lifting rod (13) into gun inserting the lifting rod through main spring (7) and lifting module assembly (18). Secure front cover with cover nuts (17).
6. Install dust seal bellows (4) over lifting rod and screw shaft extension (13a) into lifting rod. Torque to 20-25 ft. lbs. Install cable onto shaft extension and secure with chuck adaptor (31).
7. Reinstall foot and leg assembly. Adjust the plunge, free travel, and lift.
8. Replace rear cover (3) and secure with screw (35).

## MAINTENANCE INSTRUCTIONS

### Installing New Control Cables -Welding Gun #751-535-000

1. Remove handle cover screws (36) and (37).  
Lift off handle cover (16).
2. Lift out switch assembly (29).
3. Disconnect control cable wire (27a), cut red and green coil lead as close as possible to the wire splice.
4. Remove cable spacer (21) from old control cable and install on new control cable.
5. Connect new cable as follows:
  - Black lead to one terminal on switch.
  - White lead to the other terminal on switch.
  - Green lead to green gun coil lead.
  - Red lead to red gun coil lead.

**Note:** Connect green coil lead with insulated wire splice (22) or solder and tape coil lead to new control cable lead.

6. Replace switch assembly (29a) after all connections are made. Install cable into gun handle. Reinstall handle cover (16) and secure with screws (36) and (37).

### Installing New Control Cables -Welding Gun #751-535-100

1. Remove handle cover screws (36) and (37).  
Lift off handle cover (16).
2. Lift out switch assembly (29).
3. Disconnect control cable wire (27b), cut red and green coil lead as close as possible to the wire splice.
4. Remove cable spacer (21) from old control cable and install on new control cable.
5. Connect new cable as follows:
  - Black lead to Red gun coil lead using splice #713-006-000 to one terminal on switch.
  - White lead to the other terminal on switch.
  - Green lead to green gun coil lead.

**Note:** Connect green coil lead with insulated wire splice (22) or solder and tape coil lead to new control cable lead.

6. Replace switch assembly (29a) after all connections are made. Install cable into gun handle. Reinstall handle cover (16) and secure with screws (36) and (37).

### Installing New Control Cables -Welding Gun #751-535-500 & #751-693-000

1. Remove handle cover screws (36) and (37).  
Lift off handle cover (16).
2. Lift out switch assembly (29b).
3. Disconnect control cable wire (27c). Cut the trigger lead as close as possible to the wire splice.
4. Remove cable spacer (21) from old control cable and install on new control cable.

5. Connect new cable as follows:
  - Black trigger lead to Black cable lead using insulated splice (22).
  - White trigger lead to White cable lead using insulated splice (22).
6. Replace switch assembly (29b) after all connections are made. Install cable into gun handle. Reinstall handle cover (16) and secure with screws (36) and (37).

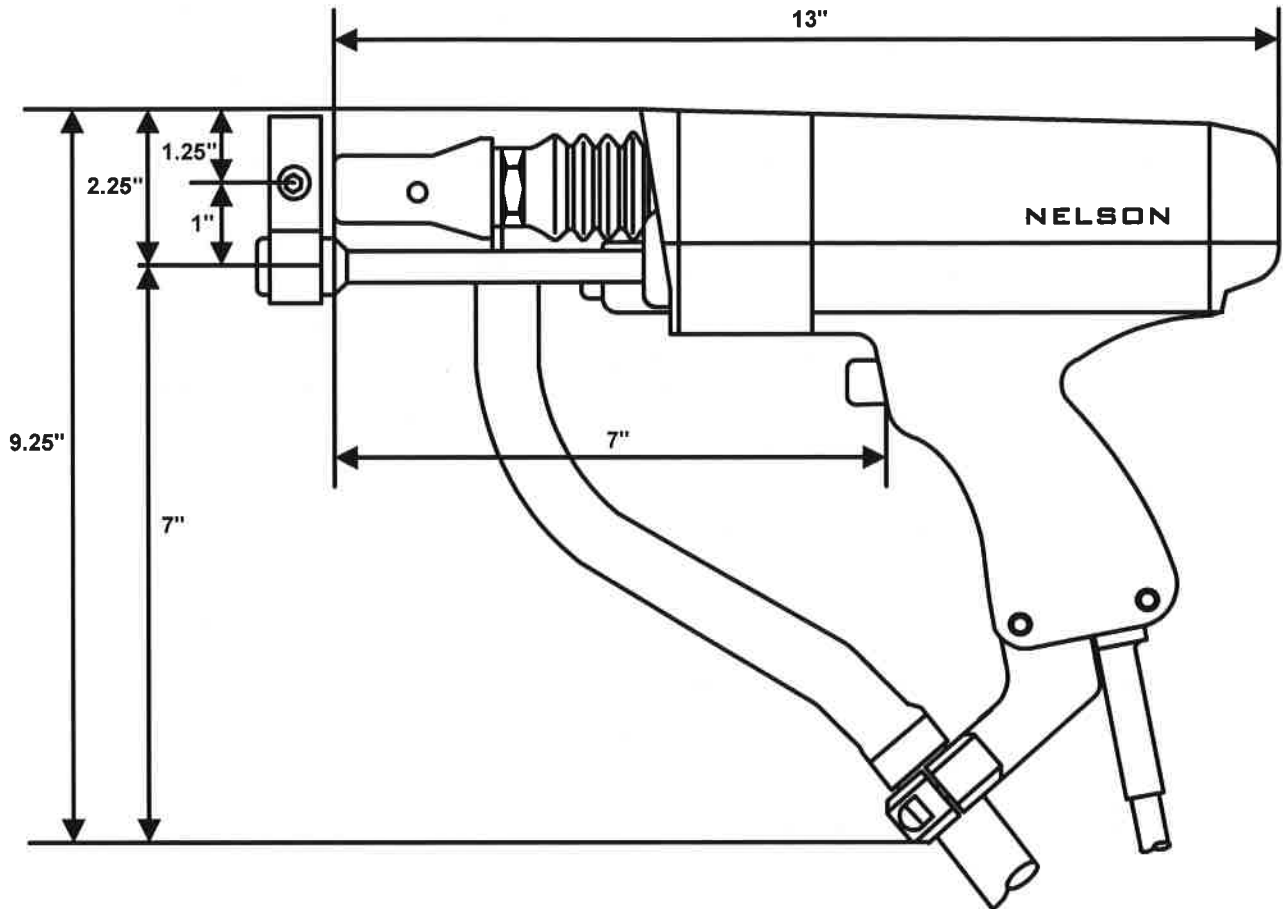
## **MAINTENANCE INSTRUCTIONS**

### **Installing New Weld Cables -All Guns**

1. Loosen leg screws (39), remove foot and leg assembly, and unscrew chuck adapter (31). Remove cable (26) from threaded hex shaft adapter (15).
2. Remove handle cover screws 36 & 37. Lift off handle cover (16).
3. Remove cable (26) and cable support assembly (25). Disassemble cable support assembly (25) and remove cable.
4. Install new cable into cable support assembly allowing 12 inches of cable to extend forward from the front face of the cable support to the centerline of the cable lug. The end of the Neoprene tubing is to be flush with the cable support. Reassemble the cable support.
5. Install cable and cable support into gun handle. Reinstall handle cover (16) and secure with screws (36) and (37).
6. Reattach cable to threaded hex shaft adapter (15) and secure with chuck adaptor (31).
7. Reinstall foot and leg assembly and adjust the plunge as described in on page 2.



**DIMENSIONS AND SPECIFICATIONS**



**Length:**  
 (less accessories) ..... 13”

**Basic Weight:**  
 Includes standard legs and foot plus cable loop to cable spud ..... 7 lbs. 8 oz.

**Working Weight:**  
 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)..... 10 lbs. 8 oz.

**Shipping Weight:**  
 Includes standard legs and foot plus approximately 7 feet of cable with  
 connectors normally supplied with gun..... 14 lbs. 8 oz

## STUD WELDING SAFETY PRECAUTIONS

**General:** 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. 02269