

Operating Instructions



Revised 2023

Serial Number _____

IWT Stud Welding
2650 Egg Harbor Road
Lindenwold, NJ 08021

(856) 435-8004 phone

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We certify that the contents of this pamphlet correspond to the hard and software described. Deviations, however, cannot be excluded, so that we cannot warrant for absolute compliance. The data in this documentation, however, have been verified regularly and necessary corrections will be incorporated in future impressions. We appreciate any suggestions for improvement.

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Subject to technical alterations

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1 General

1.1 Introduction to Stud Welding

Your new stud welding equipment is constructed using the finest components and materials available. Used properly, this equipment will give you years of efficient service.

The system incorporates the latest in engineering advances, for completely reliable arc stud welding of mild steel, stainless steel, aluminum, and other weldable fasteners depending on application requirements.

Carefully reading this manual will enable you to understand how the welder operates to ensure proper performance.

You have purchased a product which:

- Complies to machinery directives 2006/42/EC
- Complies IEC 60974 for ARC welding equipment
- Complies to IPC-A-610-Class II
- RoHS Compliant 2002/95/EC

Before putting the stud welder into operation, always observe the following:

- Store the operating instructions in a place accessible to every operator.
- Ensure that the respective operator has read and understood the operating instructions prior to installation. Each operator should confirm this by signature
- Prevent the stud welder from being operated by unauthorized persons
- Only trained personnel must operate the stud welder.



MORTAL DANGER

Persons with pacemakers must not operate the stud welder and must not stay in the vicinity of the stud welder while it is running. Ensure that the stud welder is not operated near electronically sensitive life-supporting equipment, such as in intensive care units in hospitals.

WARNING

Keep sufficient distance from electronic devices. When stud welding, highly intensive electromagnetic fields are created which may permanently damage these devices (e.g., television sets and laptop computers).

- Observe the safety instructions in Section 3.
- Call a 911 or Emergency Response in case of an accident.

1.2 Application

The *LYNX Fusion and Fusion 600* models are a micro-controlled arc stud welding system capable of welding fasteners up ½" diameter (*3/8" for Fusion 600*) with ferrules or inert gas.

If you need consultation or assistance in solving technical problems, please contact either IWT or one of our field engineers.

1.3 Product Information

Manufacturer:

IWT Stud Welding
2650 Egg Harbor Road
Lindenwold, NJ 08021

Tel: 856-435-8004
www.iwtmarketplace.com

Product Designation:

LYNX Fusion ARC Stud Welding System

Country of Origin:

USA

1.4 Serial Plate

The serial plate is located on the rear side of the stud welder. It contains information regarding the manufacturer's name, address, country of origin, product designation, method of welding, date of manufactured, production number and main connection values.

1.5 Documentation

The following operating instructions are supplied with the LYNX Fusion ARC stud welder:

- *Operating instructions for the LYNX Fusion ARC Stud Welding System*
- *1,2,3 Quick Setup Guide*
- *Bill of Materials/parts list*

1.5.1 Operating Instructions

The contents of these operating instructions are neither part of any former or existing arrangement, pledge or legal relationship nor are designed for modifying the latter. All obligations of INTERNATIONAL WELDING TECHNOLOGIES, INC. result from the respective contract of sale (invoice), which also comprises the complete and generally valid warranties. These contractual warranty terms are neither extended nor restricted by the implementation of these operating instructions.



WARNING

Do not carry out any activities on the stud welding system without specifically knowing the operating instructions or the respective part. Ensure that only qualified personnel familiar with the operating instructions and the necessary technical activities (training) operate the system.

1.5.2 In Case of Malfunction

If malfunctions occur, first try to detect, and eliminate the causes according to the list in Section 8 “Troubleshooting”. In all other cases, contact our service department.

If you require service, please make sure that you supply the following information:

- Customer number
- Product designation
- Serial number
- Year of construction
- Options
- Material of stud and work piece
- Stud dimensions

This information will help us both to save time and unnecessary costs, e.g., caused by delivering the wrong spare parts.

1.6 Contacts & Service Address

If you have any questions regarding the operation of the stud welding system, retrofits or if you require service, please contact your responsible service office or the following address:

IWT Stud Welding

Attention: Technical Support/Repairs
2650 Egg Harbor Road
Lindenwold, NJ 08021

Tel: 856-435-8004

www.iwtmarketplace.com

2 Description of Stud Welder

2.1 Arc Stud Welding Technology

The *LYNX Fusion ARC Stud Welding System (and Fusion 600)* operates according to the principle of arc stud welding as defined in the American Welding Society Welding Handbook. This system creates an electric arc generated by a D.C. transformer-rectifier to heat metal, creating a molten weld pool. This molten pool is shielded with either a ceramic ferrule or inert gas while a “stud” is placed into the molten weld pool via a welding gun.

What happens during an arc weld?

In an arc stud welding system, a fastener is initially set against the part to be welded. When the gun’s trigger is depressed, a small amount of current (approximately 30 amps) flows through the fastener to the work surface. At the same time, an electro-mechanical solenoid lifts the fastener away from the surface. This action causes an arc to initiate between the fastener and the surface. This arc is called the “pilot arc”. After a time delay, the “main current” is initiated which melts the work surface and the fastener. The solenoid then de-energizes and the fastener is plunged into a molten pool by spring pressure.

The LYNX Fusion has an adjustable pilot arc time of 100, 200, and 300 milliseconds (mSec).

The LYNX Fusion also has a finely adjustable main welding current time within a range of 1ms to 600mSec. This is also referred to as “WELD” time. At the end of the “WELD” time the fastener is returned to its original position, usually melting from 1/16” to 1/8” from the original fastener length.

Typically, a ceramic shield called a “ferrule” or “arc shield” is used to retain the molten pool. This ferrule is vented to allow gases to escape and serves to create a fillet, upon solidification of the molten material. Ferrules are single use, disposable components which are broken away from the welded fastener.

An alternative to ferrules is the use of an inert gas such as Argon or Argon/Carbon dioxide mixture. A solenoid valve within the LYNX Fusion is used to meter the gas prior to drawing the pilot arc. The time before drawing an arc and the cycle initiation is called the “GAS” purge time and it is variable 0-1500mSec. The gas purge is used to create a non-oxidative atmosphere at the weld location. The LYNX Fusion is programmed to maintain the gas flow throughout the weld cycle.

2.2 Dimensions

The *LYNX Fusion ARC Stud Welding System* is a powerful yet portable system that can be used on a bench top or carried into the workplace by two people. The base unit weighs 120 lbs. or 90lbs. for the Fusion 600. Their dimensions are:

14" Wide x 16.5" Long x 10" High



2.3 Technical Data

Description	LYNX Fusion ARC Stud Welding System
Welding range	Up to ½" fully threaded (3/8" for Fusion 600)
Material	Steel, Stainless Steel, and Aluminum,
Welding Method	Arc
Standard Gun(s)	IWT-A2 arc gun, IWT-A3 clutch lift arc gun
Transformer Rating	4KVA transformer (2.4KVA for Fusion 600)
Output	800amps @ 48 volts (600amps for Fusion 600)
Welding Time	1 – 600 m seconds
Duty Cycle	5%
Mains Supply	3~210/430/575, internally switchable
Welding Cable	#2 highly flexible weld cable
Ground Cables	Two, #2 highly flexible weld cables
Weight	120 lbs. (90lbs. for Fusion 600)
Color	Blue
Subject to technical change without notice.	

3 Safety Instructions

This operating manual contains basic instructions that must be complied with during installation and/or operation. It is therefore necessary that the operator and/or welding supervisor read these operating instructions prior to set-up and welding

Not only the general "safety instructions" listed under this main item, but also the special safety instructions e.g., for high temperatures, voltages, etc. listed under the other main items must be complied with.

3.1 Symbols in the Operating Instructions

The non-observance of safety instructions can cause damage to the operator and observers. The safety instructions of this manual are marked with the general symbol for danger safety symbol in compliance with DIN IOS 4844-W9



Warning of electrical voltage is specifically marked with the safety symbol in compliance with DIN 488-W8.



In addition to these symbols, the words "DANGER TO HEALTH" or "MORTAL DANGER" refer to the degree of a possible danger.

Safety instructions the non-observance of which may endanger the machine and its functions are marked with the terms

"CAUTION" or "WARNING".

General instructions are marked with the hand symbol.



3.2 Staff Qualification & Training

The staff responsible for operation, maintenance, inspection, and assembly must have the respective qualification for carrying out these duties. Field of responsibility, competence and the supervision of staff must be exactly regulated by the user. If your personnel do not have the necessary knowledge they must be trained and instructed. If necessary, this can be done by the manufacturer/supplier on behalf of the welding equipment user. Furthermore, the user must ensure that the contents of the operating instructions are fully understood by the staff.

As outlined in ISO (International Organization for Standardization) 14732:2013, only qualified personnel can operate the system.

3.3 Non-Compliance with Safety Instructions

The non-compliance with safety instructions may not only endanger persons, but also the welding system and its environment. Any non-compliance with safety instructions may result in a complete loss of damage claims.

Non-compliance with safety instructions may have the following consequences:

- Failure of important system functions
- Failure of prescribed methods for maintenance
- Danger to persons through electric, mechanic, thermal and acoustic influences

3.4 Safety-Conscious Working

The safety instructions listed in this manual, existing national accident prevention regulations and possible international working, operating and safety regulations of the user must be complied with.

3.5 Safety Instructions for the Operator

When stud welding, danger may result from

- electric current
- optical radiation (e.g., arc flash)
- harmful substances (e.g., smoke)
- acoustic shock
- spraying sparks

The operator is obliged to restrict the dangers to an inevitable degree and to point these dangers out to the operator and other persons involved.



MORTAL DANGER

People with pacemakers must not operate the stud welder or be within 36 inches of the unit.

3.6 Before Starting the System

Pay attention to the following information:

- Do not touch live electrical parts.
- Juveniles under the age of 18 years must not operate the stud welding system.
- Read all operating instructions before starting the system.
- Prevent unauthorized use of the system by children or unqualified personnel.
- Wear non-combustible, closed working clothes.
- Wear a leather apron to protect your clothes from welding splatters that are generated during the welding process.
- Wear head protection when carrying out welding work above your head
- Wear gauntlet gloves made of leather.
- Never wear rings, watches, or electrically conductive jewelry.
- Wear protective goggles to protect your eyes from welding splatter and flashes of light that are generated during the process.
- Wear ear protection.
- Disconnect input power before installing or servicing this equipment according to OSHA 29 CFR 1910.147
- Turn off all equipment when not in use.
- Do not use worn, damaged, undersized, or poorly spliced cables.
- Do not drape cables over your body.
- Welding on closed containers, such as tanks, drums, or pipes can cause them to blow up. Sparks can fly off from the welding arc. The flying sparks, hot work pieces, and hot equipment can cause fires.

3.7 Before Starting to Weld

- Check the state of all cables.
- Immediately replace defective cables and cable connections.
- Ensure that the air apertures/louvers of the housing are not covered. Heat accumulation may damage the stud welder.
- Look around for potential safety or fire hazards.

3.8 Safety Precautions at Installation Site

- When placing the stud welder on tables or similar workshop furniture, ensure that the stud welding system stands firmly and that the table can bear its weight.
- Make sure mains socket and stud welder are properly grounded.
- According to American National Standards Institute (ANSI) Z49.1, "Safety in Welding, Cutting and Allied Processes," the workpiece or the metal table that the workpiece rests on must be grounded. You must connect the workpiece or worktable to a suitable ground, such as a metal building frame. The ground connection should be independent of or separate from the welding circuit connection.
- Comply with fire prevention regulations and do not weld in hazardous locations.
- Make sure the room is well ventilated or extract welding fumes, if necessary.



DANGER TO HEALTH

When welding, fumes and suspended matters may be generated. Beware of fumes detrimental to health, particularly when using surface-treated materials. If possible, only weld in well ventilated rooms that are higher than 10 ft.

Special regulations are applicable for confined spaces, see ANSI Z117.1, OSHA 1926.353, ISO 15011-6:2012 and VBG 15.

3.9 Working with the Stud Welder

Comply with all accident prevention regulations which apply to the operation of your stud welder. If an accident happens, switch off the stud welder or disconnect it from the power supply and call 911 or Emergency Response.



Accident prevention regulations applicable for stud welders are ANSI Z49.1:2012, ISO 17846:2004 and VBG15 "Safety in Welding, Cutting and Allied Processes". For more information, contact the Employer's Liability Insurance Association.



DANGER TO HEALTH

When welding, do not wear clothes soiled with easily combustible substances such as oil, grease, and paraffin oil, etc.

3.10 Safety Instructions for Maintenance & Inspection

The user must ensure that all maintenance, inspection, and assembly work is carried out by authorized and qualified technical personnel.

Only carry out maintenance when the stud welder has been switched off and unplugged—follow lockout/tagout procedures.

It is necessary to comply with the procedure for stopping the stud welding system described in the operating instructions (chapter 3.13).

Immediately after having completed your work, re-install and activate all safety and protective devices.

3.11 Unauthorized Retrofit & Spare Parts

The system should never be retrofitted or modified. Only genuine spare parts and accessories authorized by the manufacturer guarantee safety. The use of other parts will result in the cancellation of warranty.

3.12 Proper Operating Methods

Safe operation of the stud welding can only be guaranteed when it is used in accordance with its purpose. The limit values indicated in the chapter "Technical Data" must never be exceeded.

3.13 Storing the Stud Welder

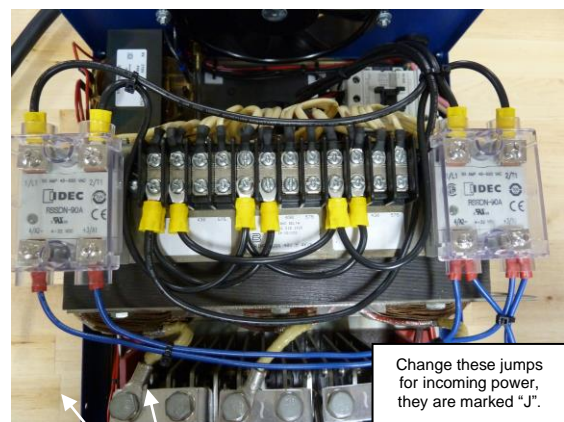
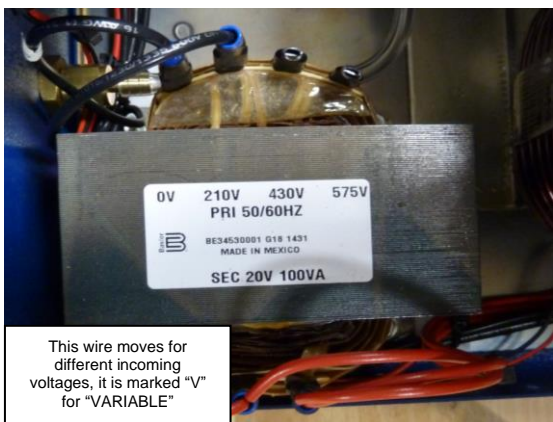
- Switch off the power (chapter 5.1.1, item 1) located on the stud welder's front panel.
- Disconnect the mains plug from the breaker.
- Disconnect:
 - Ground cables (chapter 5.1.1, item 6)
 - Control cable (chapter 5.1.1, item 5)
 - Gun cable (chapter 5.1.1, item 5)
 - Gas lines (chapter 5.1.1, item 7) from the stud welder.
- Roll up the cables and gas lines without buckling them
- Make sure stud welder cannot be used by unauthorized persons.
- Check the welding cable and connections of the stud welder for damage such as arcing, mechanical wear etc. and have damaged parts replaced by IWT or an authorized distributor.

4 Installation of Stud Welder

- Only install the stud welder on an even surface. The five anti-vibration pads located on the bottom of the stud welder guarantee its anti-skid position and serve as vibration dampers.
- Although the stud welder is resistant to environmental influences, it should be protected against dampness and dust. **Under no circumstance should the unit be placed next to a grinding station.** Metallic particles will be drawn into the enclosure through the fan.
- **The stud welder should not be placed near any high frequency welding equipment, share a common ground and/or common power supply.** Doing so could damage sensitive electronics and will void the stud welder's warranty.
- Please pay particular attention to the bearing strength of the workshop furniture and ensure a safe and stable position capable of handling at least 120lbs.
- Make sure there is sufficient free space around the louvers.
- Install the stud welder close to the welding location.
- **Ensure machine is wired correctly to mains voltage.**
- The electrical connecting cable used for mains operation is of adequate length. Additional extension cables cause a voltage drop, possibly leading to unit disturbances.
- Ensure sufficient ventilation of the working room when operating the system.
- **Never hoist or suspend the machine by its carrying handle.**

5 Electrical Requirements

The LYNX Fusion has been designed to operate from 208-230v, 400-480v, or 575-600v three phase 50/60 hertz AC power by switching **BOTH** auxiliary and main transformer tapping's on the inside of the machine. Prior to leaving the factory each machine is tapped based on the customer's specification and is marked on both the cord and front of the machine. **NOTE: All electrical installations should be performed by a qualified electrician.**



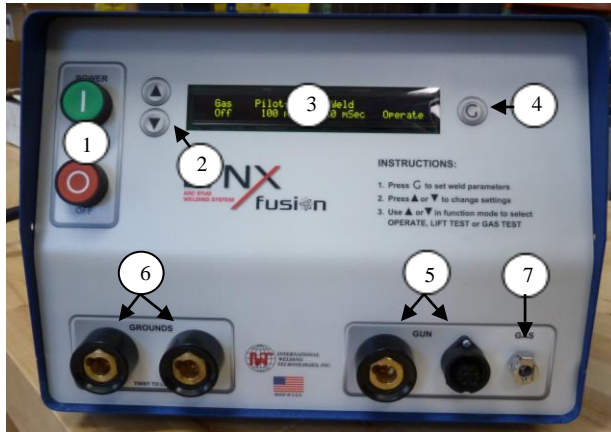
Once the machine is wired for the correct operating voltage, the unit should then be installed on a separately fused circuit breaker. (Section 5.7)

Input ratings are as follows:

- 3 phase 208-230VAC 50/60hertz, 60amps
- 3 phase 400-480VAC 50/60hertz, 40amps
- 3 phase 575VAC 50/60hertz, 30amps

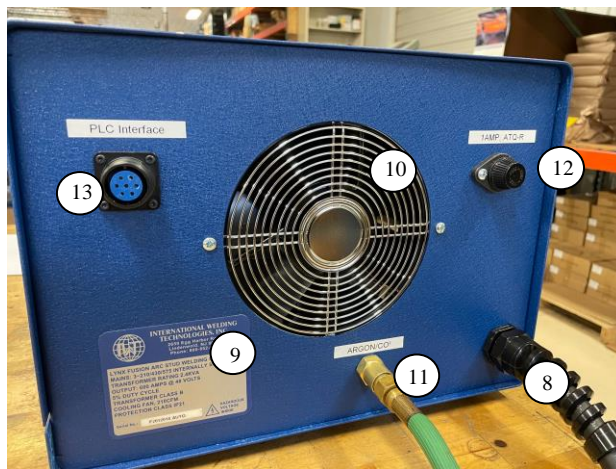
5.1 Exterior Components

5.1.1 Front View



Item	Description
1	Power
2	Up & Down Arrows Keys
3	OLED Display
4	Mode Key
5	Gun Connectors
6	Ground Connectors
7	Gas Connector

5.1.2 Rear View



Item	Description
8	Power Cord
9	Serial Plate
10	Cooling Fan
11	Gas Fitting
12	1 Amp Fuse (AUX TX2)
13	Interface Port (if equipped)



The housing of the LYNX Fusion corresponds to safety class IP 21, IEC 60974-1. Please observe that this system of protection is not suitable for being operated or transported in the rain.

5.2 Operating Elements

ON/OFF Buttons (Section 5.1.1., Item 1)

The power button is located at the front of the stud welding unit and serves to switch the stud welder on and off.

OLED Display and Push Buttons (Section 5.1.1., Items 2,3 and 4)

The LYNX Fusion is equipped with a two-row, alpha-numeric OLED and three embossed tactile buttons (UP, DOWN, and MODE), located on the front of the stud welder. This simple user interface allows an operator to easily adjust welding parameters, such as gas flow, pilot arc and weld time. The LYNX Fusion also can enter a function mode where gas purge and lift can be checked and adjusted. The OLED also displays useful feedback such as “stud on work”, “trigger”, “weld complete” and welding errors. (Section 5.8)

Settings chart (Section 5.8)

A “settings chart” located on the top lid of the stud welder provides the approximate welding parameters for standard arc fasteners. These numbers are approximate starting values, and the actual settings may need to be adjusted either up or down for your application or incoming power.

5.3 Connection Elements

Ground cable connectors (Section 5.1.1., Item 6)

There are two ground cable connectors on the front to the *LYNX Fusion Stud Welding System*. Insert each cable connector into the ground socket and twist in a clockwise direction to tighten. **Ensure these connectors are tight.** These cables provide the return path for the welding current. For good grounding, attach each ground cable to the work piece. When possible, weld between the ground cables to minimize the effects of “arc blow” on weld quality.

Weld cable connector (Section 5.1.1., Item 5)

The welding pistol weld cable connector attaches to the front of the unit in the gun connector socket. Insert the connector into the socket and twist in a clockwise direction to tighten. **Ensure this connector is tight.**

Control cable connector (Section 5.1.1., Item 6)

The welding pistol control cable connector attaches to a four-pin connector on the front of the stud welder. This connector provides the gun trigger signal (black and white) and 24VDC (red and green) to energize the gun solenoid.

Gas Connection (Section 5.1.1, Item 7 and Section 5.1.2, Item 11)

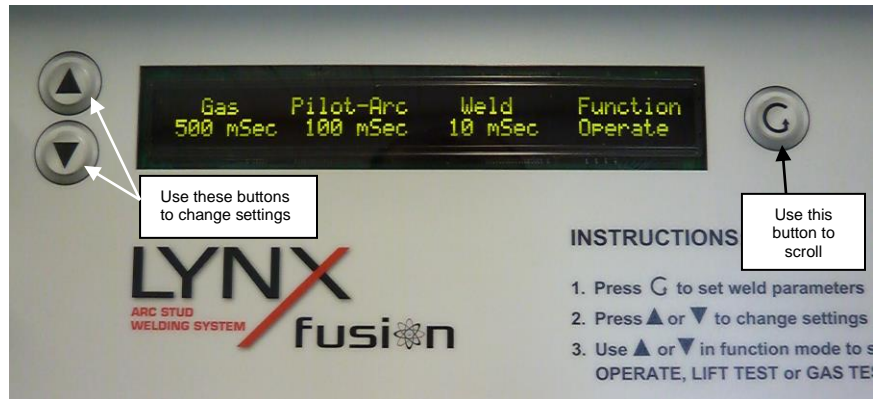
When welding with gas, an inert gas supply can be connected into the rear of the machine using the 5/8-18 inert gas fitting. Depending on your application; 10-20 psi of inert gas produces the optimal weld fillet. The maximum gas pressure should never exceed 30 psi. The gas connection for the gun is located on the front panel of the machine via a quick release coupler. This gas line attaches to the gun foot piece and supplies the inert gas to the welding area.

Mains connection (Section 5.1.2., Item 8)

A four conductor, 12 gage power cable is located in the rear of the stud welder. Use the mains cable supplied to connect the stud welder to a three-phase power supply. See section 5.5 for voltage and fusing requirements.

5.4 Display elements

The *LYNX Fusion Stud Welding System* is equipped with OLED display and a simple three button user interface to adjust welding parameters in milliseconds (mSec):



Gas time

This is the length of time inert shielding gas flows prior to pilot-arc and after a weld is complete. “**Gas**” time is adjustable from OFF, 500, 1000, and 1500 milliseconds. Select “OFF” when ferrules are being used.

Pilot Arc time

This is the length of time where approximately 30 amps of current is being supplied between the plate and fastener, drawing the initial welding arc. “**Pilot-Arc**” time can be adjusted from 100, 200, and 300 milliseconds, depending on the application.

Weld time

This is the length of time that the main welding current is on. “**Weld**” time is finely adjustable between 1-600 milliseconds based on stud diameter.

Function

In the “Function” mode the operator can scroll between “Gas purge”, “Lift check” and “Operate”. This is a useful option during the initial set up of the gun. (Section 5.7)

5.5 Power & Mains

The *LYNX Fusion System* is protected with both software safety shutdowns and a contactor featuring a mechanically fused 24volt interlock. To facilitate lockout/tagout, this unit should be connected to a lockable breaker box with appropriate fusing.

Input ratings are as follows:

3 phase 208-230VAC 50/60hertz, 60amps

3 phase 400-480VAC 50/60hertz, 40amps

3 phase 575VAC 50/60hertz, 30amps



MORTAL DANGER

Always connect LYNX Fusion to the appropriate mains and correct fusing.

Always disconnect the stud welder from the mains power supply when servicing the stud welder.

5.6 Preparing to Weld

Connect the stud welding gun and the ground cables to the stud welder as indicated in Section 5.2.1

5.6.1 Ground Connections

- Connect the ground cables into the indicated ground sockets.
- Turn the connectors clockwise until they stop.
- Connect the quick clamps to the work piece.

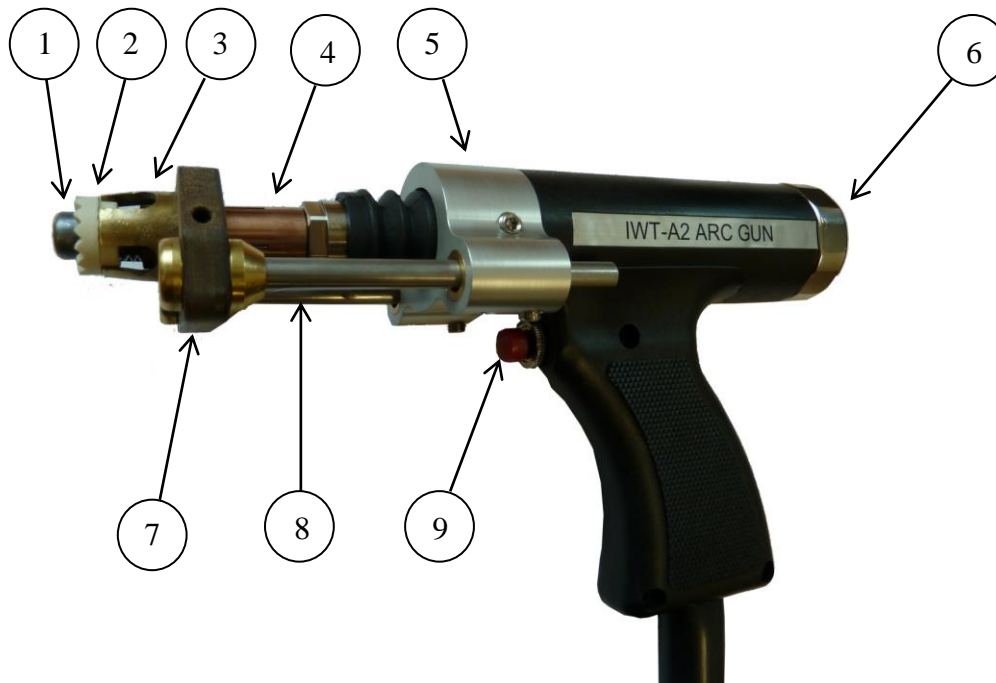


Ensure optimum contact with work piece.

5.6.2 Gun Connections

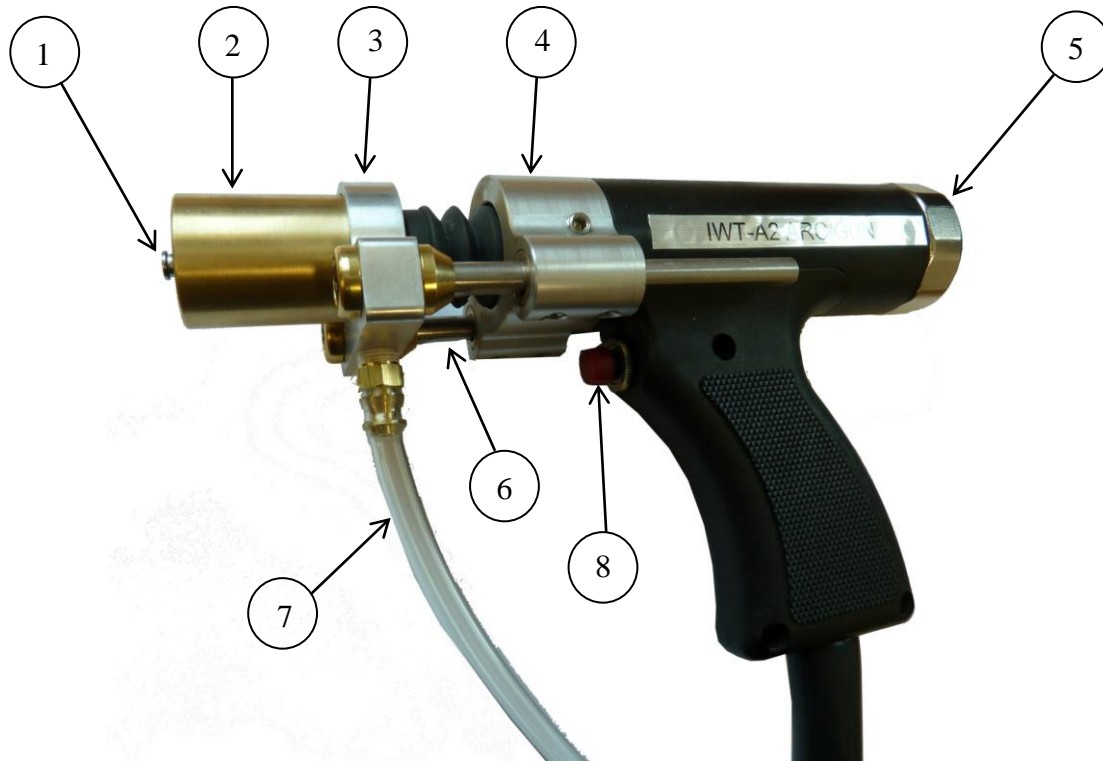
- Connect the welding cable of the stud welding gun into the indicated socket.
- Turn the connector clockwise until it stops.
- Connect the control cable connector into the four-pin socket.
- Turn the screw connector on the outside of the plug to secure the plug to the socket.
- Connect gas lines if needed.

5.7 Gun Setup - Ferrules



A-2 ARC GUN SET FOR CERAMIC FERRULES

ITEM	DESCRIPTION
1	Arc Fastener – protrusion should be approximately 1/8” beyond the arc shield
2	Arc Shield – selected for the size and type of fastener
3	Arc Shield Grip – selected for the size of the arc shield
4	IWT Arc Chuck – stud holder specific for the size of fastener
5	Face Plate – front of the gun, accepts adjustable leg set, 4 set screws lock legs in place.
6	Lift Adjustment – pull back and turn to set lift. Each “click” is 0.005-inch adjustment. See page 31 of the manual for additional information and settings.
7	Arc Shield Foot – holds the arc shield grip. Set screw locks grip in place.
8	Legs – two legs support the foot piece. Loosen the screws at the end of the legs to center the foot and grip allowing the fastener to move freely.
9	Trigger – starts the weld cycle.



A-2 ARC GUN SET FOR INERT GAS SHORT CYCLE

ITEM	DESCRIPTION
1	Short Cycle Fastener – protrusion should be approximately 1/32” beyond the gas shroud
2	Gas Shroud – used to contain the inert gas during a weld cycle
3	Gas Shroud Foot – provides inlet port for inert gas
4	Face Plate – front of the gun, accepts adjustable leg set, 4 set screws lock legs in place.
5	Lift Adjustment – pull back and turn to set lift. Each “click” is 0.005-inch adjustment. See page 31 of the manual.
6	Legs – two legs support the foot piece. Loosen the screws at the end of the legs to center the foot and grip around the fastener.
7	Gas line – PVC tubing carries gas from the Fusion to the gas shroud foot
8	Trigger – starts the weld cycle.

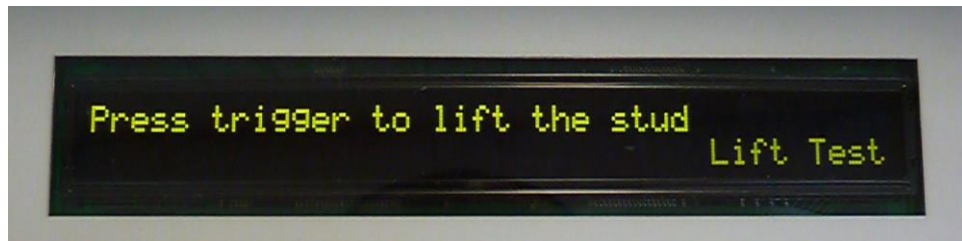
5.8 Operation

Switch “ON” the green power button. The unit will power up and run a quick diagnostic check. The OLED will illuminate indicating the current firmware that the system is running.



Once a diagnostic check is complete the system will enter “operate mode”. The settings displayed were the last setting used. The setting may need to be adjusted based on your facilities power. Section 5.9 lists estimated settings.

A “Lift Check” should be performed. The correct lift is critical to successful arc stud welding and is often the cause of poor welds. Press the mode button on the right-hand side of the machine until “Function” is illuminated and flashing. Using the “up” or “down” arrow keys select “Lift check”. With the gun pressed against the work surface, press the trigger, and observe that the stud lifts from the surface. **See Table in Section 5.10 Welding Parameters for lift distances.**



The LYNX will show the above display.



The above screen ends the lift check. **Note:** a weld cannot be made during a lift check. If the gun fails to lift the OLED display read “gun did not lift”.

To make a weld, use the “up” and “down” arrow keys until “Operate” is flashing. Position the weld pistol, with a fastener in the gun, on the work piece. The OLED will display “stud on work”. Once the trigger is pressed a weld cycle will start.



During a weld cycle, the OLED display will provide feedback in real time.

The weld sequence is shown below:

First the gas will flow...



Then the stud will lift and start the pilot arc...



Then the main current will turn on...



After a stud is welded, "weld complete" will be displayed on the OLED. Remove the gun from the stud by pulling the gun away perpendicular to the work surface. The LYNX Fusion is equipped with chuck saver technology, and prevents damage caused by double trigger.



5.9 Welding Parameters

The table below provides standard values for welding different size fasteners. These are estimated settings for when the machine is wired to operator on 208VAC power. Results will vary based on incoming power. **Note that weld timers are in milliseconds and plunge and lift distances are measured in thousandths.**

Diameter	Gas	Pilot-Arc	Weld	Plunge	Lift
1/4"	1000	100	75	.125"	.060"
5/16"	1000	100	125	.125"	.080"
3/8"	1000	100	280	.125"	.100"
1/2"	1000	100	450	.125"	.120"

(The above settings were achieved using 208VAC incoming power)

In the above chart, "*Plunge*" refers to the amount of stud sticking out past the ferrule. "*Lift*" indicates the distance the stud moves during lift check.

6 Quality Control

The *American Welding Handbook* and the *0905 DVS Guideline*, contain specifications regards to quality assurance of stud weld joints. The tests described in this section are chosen from these publications. These tests should be carried out prior to and during welding.

6.1 Demands on the Company

The company is encouraged to employ a technical supervisor / engineer responsible for welding matters as well as qualified operating personnel for stud welding (see *AWS Welding Handbook* or *DVS Guideline 0905, part 2, section 4*).

In the case of components for which documentation must be provided (or stud welding as per DIN 4100, DIN 4113), the company must submit a certificate of competence or a proof of qualification (see *DVS Guideline 0905, part 2, sections 4.1 and 4.2*).

The proof of qualification applies to safety regulations for the fastening of structural components. When being used in the building industry, only approved base and stud materials may be used (for example, see *AWS D1. 1/D1. 1M Structural Welding Code* or *DIN 4100. section 2.1, certificate of approval for stainless steel BT; DIN 4113, part 2*).

6.2 Weld Qualification

Provided that the IWT stud welding system is used properly, and the materials are appropriately selected, the strength of the welding joint (welding zone) will typically be stronger than that of the stud or base material. The best method of quality control for stud welding is to destructively test samples that have been welded to the same base material as used in actual production

6.3 Type and scope of test

Provided that the IWT stud welding system is used properly, and the materials are appropriately selected, the strength of the welding joint (welding zone) will always be stronger than that of the stud or base material. The best method of quality control for stud welding is to destructively test studs that have been welded to the same base material to be used in actual production.

6.3.1 Standard Test

Standard work tests must be carried out by the user before welding to the production parts. The number of welds required is agreed upon with the customer or engineer.

The standard work test is restricted to the stud diameter, base material and type of equipment used. It comprises the following tests:

- Visual inspection (all samples)
- Tensile test
- Torque test
- Bend test

In case of doubt, the test scope should be extended in compliance *AWS Welding Handbook* or with DVS Guideline 0905, part 2, section 5.1.1.

6.3.2 Simplified Test

Simplified work tests serve to check the correct setting and function of the equipment. They are carried out at the beginning of every working shift and after several hours of interruption.

- Simplified work tests include:
- Visual inspection (all samples)

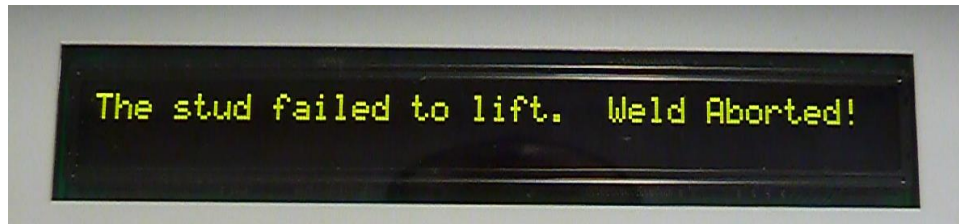
6.4 Production of Samples

The studs for the work test are welded on a sheet metal using the same welding positions and edge distances as on the component to be welded later. If it is possible and sensible from an economical point of view, use parts that are identical to those used in later production. The uniformity of a weld should always be visually assessed to check for major defects. When in doubt, tensile and bend tests should be carried out.

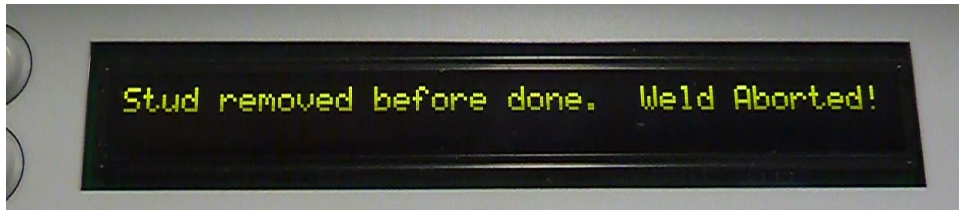
6.5 Weld Monitoring

The LYNX Fusion can identify welding problems and/or poor welds:

GUN DID NOT TO LIFT, CHECK AND ADJUST LIFT...CONFIRM WITH LIFT CHECK!!



OPERATOR HAS REMOVED GUN DURING WELDING...WAIT UNTIL THE WELD IS COMPLETE BEFORE MOVING THE GUN!!



GUN WAS HUNG UP, CHECK FOR BINDING IN THE GUN OR THE FERRULE!!



7 Maintenance

7.1 Stud Welder

The stud welder is constructed in such a way that only a minimum of maintenance is required. The interior of the stud welder should, however, be cleaned at regular intervals depending on the environmental conditions at the location of use. Clean the unit with dry compressed air only.

7.2 Replacement of Components

Defective components may only be replaced by trained IWT technicians. A perfectly functioning stud welder can only be warranted when genuine IWT spare parts are used.

7.3 Fuses

The LYNX Fusion printed circuit board is protected by the following fuses:

Solenoid Lifting fuse:	8A 250V (F1)
SCR Gate fuse:	1A 250V (F4)
Fan fuse:	1A 250V (F3)



MORTAL DANGER

Always replace fuses with the correct replacement value. Do not use oversized fuses that may damage the unit.

Always disconnect the stud welder from the mains power supply when replacing fuses or servicing the stud welder.

7.4 **Electronic Waste (WEEE), Directive 2002/96/EC:**

Please help minimize the effects we have on the environment by not disposing electronic waste (e-waste) with household trash. Please follow your local instructions for disposal and/or recycling of electronic equipment and batteries.



8 Trouble Shooting

8.1 Trouble Shooting the LYNXFusion

There are a few basic rules to follow when trouble shooting any arc welding system. They are as follows:

When approaching a weld, if the studs "aren't sticking," stand back and look at the entire situation. Often the problem will be something simple, such as incorrect polarity, poor grounding, or improper lift.

After you have determined that the setup is correct, examine the cables. This is the part of the welder that receives the most wear and naturally is most subjected to failure. If possible, switch the cables and use a set that you are certain is good.

Only after you are certain that the trouble is with the stud welder, unplug the ground and gun cables before proceeding. It is possible for a defective cable to keep the unit from triggering or producing a bad weld.

Another point to be aware of before actually trouble shooting the system is that it is a common misconception that whenever the welds are inconsistent, it is the fault of a defective control unit. This is rarely the case -- if the welder is defective, it will very seldom fire at all.

Usually when inconsistency occurs, it means that the set-up is marginal, or there may be a problem in the parent metal. This would account for the differences in the welds. Review Section 8.2 below.

If the problem cannot be corrected by adjustments on the control, look at the gun. Is there enough engagement of the stud within the collet or chuck, and is it tight? If nothing is apparent on the outside of the gun, check it internally. Is it able to move back and forth freely in the bearing? Very seldom is the problem in the control.

If, after observing all the preliminary pointers, it is obvious there is a defect within the system, **follow lockout/tag instructions and contact an authorized IWT service center for information on servicing your system.**

8.2 Causes of Poor or Erratic Welds

- Loose collet. The collet does not grip the stud tightly.
Solution: *Change or adjust collet*
- Faulty or poor ground connection
Solution: *Repair or tighten ground connectors*
- Poor surface condition
Solution: *Grind the surface to be welded. Grind through paint, heavy oxidation, or anodizing.*
- Broken or loose cables
Solution: *Repair cables*
- Dirt in gun/gun binding
Solution: *Clean gun with compressed air, soft cloth, and WD-40™*
- Incorrect Polarity
- **Solution:** *Change cable hookup as described in Section 5.9.*
- Cables coiled
Solution: *Uncoil cables*
- Arc Blow (incomplete fillet around the base of the welded fastener)
Solution: *The principle cause of arc blow is a magnetic field induced by current flow during the weld. It occurs most often in long, narrow strips of metal or near edges of sheets or plates. In some cases, a change in grounding position will correct the problem. Always try to weld between the two ground cables provided.*
- Incorrect fastener plunge
Solution: *Adjust the backstop and/or foot piece so that approximately 1/8" of the fastener sticks beyond the ferrule. When welding short cycle adjust the fastener so that 1/32" of the stud is sticking past the foot gas piece*
- Incorrect Lift/No Lift
Solution: *Perform a lift check and adjust lift for the type of stud being welded. See Table in Section 5.10 Welding Parameters*
- Poor stud quality
Solution: *Use only IWT's pre-cleaned fasteners to assure quality.*

8.3 Trouble Shooting Poor Welds

1. Weld too hot

- Decrease "Weld" time
- Set protrusion as indicated in Section 5.7
- Reduce gun lift

2. Weld too cold

- Increase "Weld" time
- Set protrusion as indicated in Section 5.7
- Increase gun lift
- Clean worksurface
- Worksurface temperature is too cold
- Poor stud quality

3. Arc blow

- Use double ground cables
- Change ground cable position
- Dirty studs

4. No Weld or Hang up (See Section 6.5)

- Check foot piece for stud rubbing against ferrule
- Check gun shaft and bearing are not binding
- Check that face plate set screws are not too tight
- Perform lift check to ensure stud is lifting and returning to work surface

9 WARRANTY

IWT's mechanical components are warranted against manufacturer's defects in material and workmanship for a period of one (1) year from the time of shipment from IWT's facility. IWT's electrical components are similarly warranted for a period of one (1) year from the time of shipment from IWT's facility. IWT's sole obligation under this warranty is limited to repairing the product or, at its option, replacing the product without additional charge, provided the item is properly returned to IWT for repair as described below. The provisions of this warranty shall not apply to any product that has been subjected to tampering, abuse, improper setup or operating conditions, misuse, lack of proper maintenance, or unauthorized user adjustment. IWT makes no warranty that its products are fit for any use or purpose to which they may be put by the customer, whether or not such use or purpose has been disclosed to IWT in specifications or drawings previously or subsequently provided, and whether or not IWT's products are specifically designed and/or manufactured for such a purpose.

THIS WARRANTY IS IN LIEU OF ALL OTHER WARRANTIES EXPRESSED OR IMPLIED. ALL OTHER WARRANTIES, INCLUDING, BUT NOT LIMITED TO, ANY WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE, WHETHER EXPRESSED, IMPLIED, OR ARISING BY OPERATION OF LAW, TRADE USAGE, OR COURSE OF DEALING, ARE HEREBY DISCLAIMED. THERE ARE NO WARRANTIES THAT EXTEND BEYOND THE DESCRIPTION ON THE FACE HEREOF.

LIMITATION OF REMEDY

In no event shall IWT be liable for any incidental, consequential, or special damages of any kind or nature whatsoever. IWT is in no way liable for any lost profits arising from or connected to this agreement or items sold under this agreement, whether alleged to arise from breach of contract, expressed or implied warranty, or in tort, including, without limitation, negligence, failure to warn, or strict liability.

RETURN PROCEDURE

Before returning any equipment in or out of warranty, the customer must first obtain a return authorization number and packing instructions from IWT. No claim will be allowed nor credit given for products returned without such authorization. Proper packaging and insurance for transportation is solely the customer's responsibility. After approval from IWT, the product should be returned with a statement of the problem and transportation prepaid. If, upon examination, warranted defects exist, the product will be repaired or replaced at no charge, and shipped prepaid back to the customer. Return shipment will be by common carrier (i.e., UPS). If rapid delivery is requested by customer, then such transport is at the customer's expense. If an out-of-warranty situation exists, the customer will be notified of the repair costs immediately. At such time, the customer must issue a purchase order to cover the cost of the repair or authorize the product to be shipped back as is, at the customer's expense. In any case, a restocking charge of 20% will be charged on all items returned to stock.

FIELD SERVICE

Repairs are ordinarily done at IWT's, Lindenwold, New Jersey facility where all necessary tools are available. Field service is only supplied at IWT's discretion. If field service is required and is performed at IWT's sole discretion, all relevant expenses, including transportation, travel time, subsistence costs, and the prevailing cost per hour (eight hour minimum) are the responsibility of the customer.

UNFORESEEN CIRCUMSTANCES

IWT is not liable for delay or failure to perform any obligations hereunder by reason of circumstances beyond its reasonable control. These circumstances include, but are not limited to, accidents, acts of God, strikes or labor disputes, laws, rules, or regulations of any government or government agency, fires, floods, delays or failures in delivery of carriers or suppliers, shortages of materials, and any other event beyond IWT's control.

ENTIRE AGREEMENT/GOVERNING LAW

The terms and conditions contained herein shall constitute the entire agreement concerning the terms and conditions for the limited warranty described hereunder. No oral or other representations are in effect. This Agreement shall be governed in all respects by the laws of State of New Jersey. No legal action may be taken by any party more than one (1) year after the date of purchase.