

Operating Instructions



Serial Number

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Revision 1.01



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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 carefully constructed of 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.

A careful study of this manual will enable you to understand how the welder operates to insure proper performance under all operating conditions.

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 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 lifesupporting 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 devises (e.g. television sets).

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

1.2 Application

The LYNX Fusion is a micro-controlled arc stud welding system capable of welding fasteners up $\frac{1}{2}$ " diameter with ferrules or inert gas.

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

1.3 Information on the product

Manufacturer: INTERNATIONAL WELDING TECHNOLOGIES, INC. 2650 Egg Harbor Road Lindenwold, NJ 08021

> Tel: 856-435-8004 Fax: 856-435-4004

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 manufacture, production number and main connection values.

1.5 Information on 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 Information on 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 not restricted by the implementation of these operating instructions.



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 Conduct in the case of malfunctions

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 and 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:

INTERNATIONAL WELDING TECHNOLOGIES, INC. 2650 Egg Harbor Road Lindenwold, NJ 08021

Tel: 856-435-8004 Fax: 856-435-4004

www.internationalwelding.com



2 Description of stud welder

2.1 Arc stud welding technology

The LYNX Fusion ARC Stud Welding System 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 actually 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 use on a bench top or carried into the work place by two people. The base unit weighs 120 lbs. The dimensions are:

14" Wide x 20" Long x 10" High



2.3 Technical Data

Description	LYNX Fusion ARC Stud Welding System
Welding range	Up to $\frac{1}{2}$ " fully threaded
Material	Steel, Stainless Steel, and Aluminum,
Welding Method	Arc
Standard Pistol(s)	IWT-A2 arc gun
Transformer Rating	4KVA transformer
Output	800amps @ 48 volts
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.
Color	Blue
Subject to technical chai	nge without notice.



3 Safety instructions

These operating instructions contain basic instructions that have to be complied with during installation and/or operation. It is therefore absolutely necessary that the operator and responsible specialist staff read these operating instructions prior to assembly and initiation. They must always be available at the installation site.

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 have to be complied with.

3.1 Description of reference signs 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 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 and training

The staff responsible for operation, maintenance, inspection and assembly must have the respective qualification for carrying out these works. Field of responsibility, competence and the supervision of staff has to 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.

3.3 Dangers in the case of 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 noncompliance 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/user

When stud welding, danger may result from

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

You are therefore obliged to restrict the dangers to an inevitable degree and to point these dangers out to the operator and other persons involved.



Persons with pacemakers must neither operate the stud welder nor stay near it.

3.6 The following should be observed before starting the system...

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 of the operating instructions before starting the system.
- Only qualified personnel are allowed to operate 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 spatters that are generated during the welding process.
- Wear head protection when carrying out welding work above your head



MORTAL DANGER

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



- 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 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.
- Comply with fire prevention regulations and do not weld in hazardous locations.
- Make sure 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 rooms that are higher than 10 ft. As per VBG 15, special regulations are applicable for narrow rooms.

3.9 Working with the stud welder

 Comply with all accident prevention regulations which apply to the operation of your stud welder



One of the accident prevention regulations applicable for stud welders is VBG15 "Welding, cutting and similar working methods". 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.

If an accident happens,

- switch off the stud welder and disconnect it from the mains supply
- call 911 or Emergency Response



3.10 Safety instructions for maintenance, inspection and assembly works

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

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

Only work on the system when it has been switched off and after having disconnected it from the mains supply. 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 and spare parts production

The system may only be retrofitted and modified after consultation with the manufacturer. Original spare parts and accessories authorized by the manufacturer guarantee safety. The use of other parts may result in the cancellation of warranty for any consequences thus caused.

3.12 Inadmissible operating methods

Limit values

Working safety of the stud welding system supplied can only be guaranteed when the stud welder 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, item1) 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 though the fan.
- The stud welder should not be place in close proximity to 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 with 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.



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 Initiation

5.1 Electrical Requirements

The LYNX Fusion has been designed to operate from 208-230v, 400-480v, or 575v 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.

AUXILIARY TRANSFORMER, TAPPED FOR 208-230V



MAIN TRANSFORMER, TAPPED FOR 208-230V



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

NOTE: All electrical installations should be performed by a qualified electrician.



5.2 Exterior components

5.2.1 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

5.2.2 Rear View



Item	Description
8	Power Cord
9	Serial Plate
10	Cooling Fan
11	Gas Fitting



5.3 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 were 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 <u>approximate</u> 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 particular application or incoming power.

5.4 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 grounds cables to minimize the affects 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.



5.5 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 500 mSec	Pilot-Arc 100 mSec	Weld 10 mSec	Function Operate	G
AR	Use these button to change setting	s Y fusi@	n	INSTRUCTIONS 1. Press G to set we 2. Press ▲ or ▼ to cl 3. Use ▲ or ▼ in fund- OPERATE, LIFT TE	Use this button to scroll Id parameters hange settings ction mode to s EST or GAS TE

"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)



5.6 Power and 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



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.



5.7 Preparation for initiation

Connect the stud welding pistol and the ground cables to the stud welder as indicated in Section 5.3.

5.7.1 Ground connection

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



5.7.2 Connect stud welding pistol

- Connect welding cable of the stud welding pistol 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.



5.8 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 – Masterkleer™ PVC tubing carries gas from the Fusion to the gas shroud foot
8	Trigger – starts the weld cycle.



5.9 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. You may need to adjust your settings 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.





5.10 Welding parameters

The table on the top the LYNX Fusion Stud Welding System provides standard values for welding different size fasteners. These are estimated settings and results may 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

6.1 General

The American Welding Handbook and the 0905 DVS Guideline, part 2, of April 1979 is applicable with regards to quality assurance of stud weld joints. The tests described in this section are written in simplified terms, following above regulation. They refer to work tests that are carried out and supervised by the user prior to and during welding.

6.2 Demands on the company

The company must employ a technical supervisor 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).

6.3 Proof of qualification

In the case of components which documentation must be provided for, or stud welding works which as per DIN 4100, DIN 4113 are subject to acceptance, the processing company must submit a certificate of competence or a proof of qualification for working with stud welding



equipment (see DVS Guideline 0905, part 2, sections 4.1 and 4.2). The proof of qualification applies in particular to the fastening of structures that are relevant in terms of safety regulations. When being used in the building industry, only approved base and stud materials may be used (for example, see DIN 4100. section 2.1, certificate of approval for stainless steel ifBT; DIN 4113, part 2).

6.4 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.

6.4.1 Standard work test

Generally, standard work tests have to be carried out and supervised by the user before welding at a structure and after a certain number of welds has been made. The number of welds after which a standard work test is required is agreed upon with the customer.

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.



6.4.2 Simplified work 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)

6.5 Test execution

6.5.1 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.



6.6 Weld Function Monitoring

The LYNX Fusion is capable of identifying welding problems and/or poor welds:

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



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

	A REAL PROPERTY AND INCOMENTAL OF	1	Charles and a		-
Stud	removed	before	done.	Weld	Hoorted

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 compressed air only.

7.2 Replacement of components

Defective components may only be replaced by trained IWT servicemen. Perfect function of your stud welder can only be guaranteed when original IWT spare parts are used.

7.3 Fuses

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

Solenoid fuse: SCR Firing fuse: Fuse for Fan:

8A 250V slow blow (F1) 1A 250V slow blow (F4) 1A 250V slow blow (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 *LYNX* Fusion

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

- When approaching a welder, if the studs "aren't sticking," stand back and look at the entire situation. More often than not 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's 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 of 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

- 1. Loose collet. The collet does not grip the stud tightly. Solution: Change or adjust collet
- Faulty or loose 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.

- 4. Broken or loose cables Solution: Repair cables
- 5. Dirt in gun/gun binding Solution: Clean gun with compressed air, soft cloth and WD-40[™]
- 6. Incorrect Polarity Solution: Change cable hookup as described in Section 5.9.
- 7. Cables coiled Solution: Uncoil cables
- 8. 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.

- **9.** 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
- 10. 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
- 3. Arc blow
 - Use double ground cables
 - Change ground cable position
- 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.