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Specifications subject to change without notice.

This user’s manual documents product features, hardware, and controls software available at the time this user’s manual was published.

Dukane Part Number: 403-618-01

Dukane ultrasonic equipment is manufactured under one or more U.S. Patents.
Find the list of all the Ultrasonic Equipment Patents on our website below:
https://www.dukane.com/patents/
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SECTION 1

Introduction
Introduction

Press System Overview

The Infinity Series Servo Ultrasonic Press System is used for welding thermoplastics. A typical Infinity™ ultrasonic welding system is shipped completely with a press (thruster, base, and column), generator, an ultrasonic stack (transducer, booster, horn), fixturing, cables, and a HMI (with the IQ Explorer 3 software installed) for application setup and data acquisition.

General User Information

This Quick Start Guide provides information to set up and operate Dukane’s Infinity™ ultrasonic servo welder. Please read it before using the system to become familiar with the equipment to ensure correct and safe operation.

Figure 1-1  Typical Press System
Drawings and Tables

The figures and tables are identified by the section number followed by a sequence number. The sequence number begins with one in each section. The figures and tables are numbered separately.

Notes, Cautions and Warnings

Throughout this Quick Start Guide, CAUTION and WARNING statements are used. These statements help you to identify and avoid hazards and recognize the consequences. CAUTION statements identify conditions or practices that could result in damage to the equipment or other property. WARNING statements point out conditions or practices that could result in personal injury or loss of life.

NOTE
Note statements provide additional information or highlight procedures.

CAUTION
Caution statements identify conditions or practices that could result in damage to the equipment or other property.

WARNING
Warning statements point out conditions or practices that could result in personal injury or loss of life.

Condition or Practice  Electrical Hazard  Hearing Protection
SECTION 2

Health and Safety
Health and Safety

General Considerations

Safe Operation

Please observe these health and safety recommendations for safe, efficient, and injury-free operation of your equipment.

Proper Installation - Operate system components only after they are properly installed.

No Unauthorized Modifications - Do not modify your system in any way unless authorized to do so by Dukane. Unauthorized modifications could cause equipment damage and/or injury to the operator. In addition, unauthorized modifications will void equipment warranty.

Keep the Cover On - Do not remove any equipment covers unless directed to do so by Dukane. Hazardous electrical voltages are present which could cause injury.

Grounded Electrical Power - Operate this equipment only with a grounded electrical connection.

See Electrical Safety for grounding instructions, Page 7.

Comply with Regulations - You may be required to add accessories to bring the system into compliance with applicable regulations (OSHA in the USA) for machine guarding and noise exposure.

Use Eye Protection - Wear ANSI approved safety impact goggles.

Acoustic Stack Hazard - When an acoustic stack (transducer, booster, horn and tip) is energized by the ultrasound signal, it presents a potential hazard. Stay clear of an energized stack.

System Abort Switch - Install a system abort switch at each operator station when ultrasonic plastic assembly equipment is used with automatic material handling equipment in an automated system.

Foot Switch - Using a foot switch in place of the optical touch finger switches (operate switches) violates OSHA regulations.

System Electrical Cabling - Electrical power must be off when connecting or disconnecting electrical cables.

WARNING

Never operate the generator with the cover off. This is an unsafe practice and may cause injury.

WARNING

Any fixture manufactured by a third party must comply with all OSHA and ANSI requirements. All fixtures must be guarded as necessary. Dukane does not assume any responsibility or liability for fixtures manufactured by the customer or any third party manufacturer.

NOTE

These recommendations apply to the welding system. System in this guide refers to a complete group of components associated with the welding of parts, also known as an ultrasonic assembly system.

CAUTION

At some time you may be asked to remove equipment covers by the Dukane Aftermarket Service Group personnel. Before doing so, disconnect the system electrically from the incoming line AC power, including the generator and press.
Parts being joined ultrasonically will at times vibrate at audible frequencies. Wear ear protectors to reduce annoying or uncomfortable sounds. In addition, ultrasound baffles, sound enclosures, or materials that absorb sound may be located to surround the system. Ultrasound pressure level could exceed 90dBA.

When making cable connections to system equipment or disconnecting cables from system equipment, make sure electrical power to the system is turned off and the AC power cords are removed from their receptacles. After the cables have been securely connected and the connections and cable routing checked a final time, the power may be restored.

Parts being joined ultrasonically will at times vibrate at audible frequencies. Wear ear protectors to reduce annoying or uncomfortable sounds. In addition, ultrasound baffles, sound enclosures, or materials that absorb sound may be located to surround the system.

Keep head, hands, limbs and body at least six inches (152 mm) away from an operating press/thruster. A vibrating, descending horn can cause burns and/or crushing injuries.
Electrical Safety

The Infinity™ Series Servo Ultrasonic Press Systems has several electrically powered components including:

- Infinity™ Generator
- Infinity™ Servo Press
- Dukane HMI

Each of these components must be grounded, including power grounding and RFI suppression grounding.

North American Power Grounding

For safety, the power cords used with your system have three-wire, grounding-type power cords. Figure 2-1 illustrates the appropriate electrical outlet to use with the power cords that are included with systems shipped within North America.

International Power Grounding

Power cables normally provided for international use are compatible with the power outlet used in many Continental European countries (Refer to Figure 2-2). However, if your application requires another type of power cord, check with your equipment supplier, and follow local regulations concerning proper wiring and grounding.

CAUTION

If you have a two-prong electrical receptacle, we strongly recommend that you replace it with a properly grounded three-prong type. Have a qualified electrician replace it following the National Electric Code and any local codes and ordinances that apply.

If there is any question about the grounding of your receptacle, have it checked by a qualified electrician. Do not cut off the power cord grounding prong or alter the plug in any way. If an extension cord is needed, use a three-wire cord that is in good condition. The cord should have an adequate power rating to do the job safely. It must be plugged into a grounded receptacle. Do not use a two-wire extension cord with this product.
Grounding for RFI Suppression

In addition to the safety considerations, proper grounding is essential for the effective suppression of RFI (Radio Frequency Interference). For instance, every generator contains an RFI filter which blocks noise on the AC power line from entering the generator control circuitry. This filter also prevents ultrasonic RFI from being fed back into the AC power line.

Grounding wires are shipped with each system component (green/yellow; 5 meters long; Dukane part number 200-1557). It is important to connect each of these wires to the nearest grounded metal pipe or equivalent earth ground by means of a ground clamp. Note that the wires are connected using a ‘star’ configuration. Do not ‘daisy chain’ the wires.

Operate Switches

The optical operate switches on the press base comply with OSHA safety regulations. Using a foot switch in place of these switches violates OSHA regulations.

STO Safety Modes

There are two modes of operation. The STO mode can be activated via a rear panel key switch located behind a cover panel on the press.

1. **STO Mode**: The servo is in STO (safe torque off) when the E-STOP switch is activated or the safety switches on the base are inactive. This means the safety switches must remain active the entire weld cycle.

2. **STO Override Mode**: The servo is in STO when the E-STOP switch is activated but not when the safety switches are inactive. This means the safety switches can be released when trigger occurs.

**NOTE** - When used in automation it’s recommended that the controlling signals be connected to a safety PLC instead of the safety switches.
Regulatory Agency Compliance

FCC
The Infinity™ generator complies with the following Federal Communications Commission regulations.


CE Marking
This mark on your equipment certifies that it meets the requirements of the EU (European Union) concerning interference causing equipment regulations. CE stands for Conformité Européene (European Conformity). The equipment complies with the following CE requirements.

- The EMC Directive 2014/30/EU for Heavy Industrial —
  EN 61000-6-4:
  EN 55011
  EN 61000-6-2:
  EN61000–4–2
  EN61000–4–3
  EN61000–4–4
  EN61000–4–5
  EN61000–4–6
  EN61000–4–8
  EN61000–4–11
- The Low Voltage Directive 2014/35/EU.
- EN ISO 12100: Safety of Machinery - General principles of design, risk assessment, and risk reduction.

IP Rating
The Infinity™ generator has an IP (International Protection) rating from the IEC (International Electrotechnical Commission).

The rating is IP2X, in compliance with finger-safe industry standards.

The Infinity™ generator complies with these standards as verified by TÜV Rheinland.

UL
Tested to Underwriters Laboratories:
UL 61010–1, IEC 61010-1

CAN/CSA
National Standards of Canada: CAN/CSA C22.2 No. 61010–1–12

CAUTION
Do NOT make any modifications to the generator or associated cables as the changes may result in violating one or more regulations under which this equipment is manufactured.
SECTION 3

Installation
Before Installation

As you plan for the installation of your system, including generator and press, please consider these important subjects as listed below:

- When to use lockout / tagout devices
- AC power requirements
- Lifting the equipment safely
- Placement

When to Use Lockout / Tagout Devices

The typical kind of lockout/tagout (LOTO) device is a clam shell type device (with lockout capability). The LOTO device is placed over the plug end of the generator and press electrical cords. This effectively prevents access to the energy isolation points. See the locked/unlocked example of one such device in Fig. 3-1 and Fig. 3-2.

**WARNING**

Electrical safety hazards exist inside the generator, press, and remote controller units. Before making any internal adjustments to these components, apply a lockout/tagout (LOTO) device to each component.

![Figure 3-1](image)  
**Figure 3-1** Lockout Device In Open Position, Unlocked

![Figure 3-2](image)  
**Figure 3-2** Bottom Lockout Device In Closed Position, Locked
AC Power Requirements

The AC line voltage and current needed depends on which generator and press has been chosen for the system. See Tables 3-1 and 3-2.

Generators

<table>
<thead>
<tr>
<th>Operating Frequency</th>
<th>Generator Model Number</th>
<th>Overload Power Ratings (Watts)</th>
<th>Input AC Power Requirements Nominal AC Volt at Maximum RMS Current</th>
<th>North America/ Japan AC Outlet Rating</th>
<th>Output Voltage (Nominal)</th>
<th>Output Current (Max)</th>
</tr>
</thead>
<tbody>
<tr>
<td>15kHz</td>
<td>15HS360-2Y-C0-S-N0</td>
<td>3600</td>
<td>200-240V 50/60 Hz @ 19 Amps</td>
<td>20A or 30A</td>
<td>1100</td>
<td>3.6</td>
</tr>
<tr>
<td>15kHz</td>
<td>15HS500-2Y-C0-S-N0</td>
<td>5000</td>
<td>200-240V 50/60 Hz @ 26 Amps</td>
<td>30A</td>
<td>1100</td>
<td>5.0</td>
</tr>
<tr>
<td>15kHz</td>
<td>15HS360-4Y-C0-S-N0</td>
<td>3600</td>
<td>380-480V 50/60 Hz @ 8 Amps</td>
<td>20A or 30A (3 Phase)</td>
<td>1100</td>
<td>3.6</td>
</tr>
<tr>
<td>15kHz</td>
<td>15HS500-4Y-C0-S-N0</td>
<td>5000</td>
<td>380-480V 50/60 Hz @ 10 Amps</td>
<td>20A or 30A (3 Phase)</td>
<td>1100</td>
<td>5.0</td>
</tr>
<tr>
<td>20kHz</td>
<td>20HS120-UY-C0-S-N0</td>
<td>1200</td>
<td>100-240V 50/60 Hz @ 15 Amp</td>
<td>15A</td>
<td>1300</td>
<td>1.0</td>
</tr>
<tr>
<td>20kHz</td>
<td>20HS180-2Y-C0-S-N0</td>
<td>1800</td>
<td>200-240V 50/60 Hz @ 10 Amp</td>
<td>15A</td>
<td>1300</td>
<td>1.5</td>
</tr>
<tr>
<td>20kHz</td>
<td>20HS260-2Y-C0-S-N0</td>
<td>2600</td>
<td>200-240V 50/60 Hz @ 15 Amp</td>
<td>15A</td>
<td>1300</td>
<td>2.2</td>
</tr>
<tr>
<td>20kHz</td>
<td>20HS360-2Y-C0-S-N0</td>
<td>3600</td>
<td>200-240V 50/60 Hz @ 19 Amp</td>
<td>20A or 30A (3 Phase)</td>
<td>1300</td>
<td>3.0</td>
</tr>
<tr>
<td>20kHz</td>
<td>20HS500-2Y-C0-S-N0</td>
<td>5000</td>
<td>200-240V 50/60 Hz @ 26 Amp</td>
<td>30A</td>
<td>1100</td>
<td>5.0</td>
</tr>
<tr>
<td>20kHz</td>
<td>20HS360-4Y-C0-S-N0</td>
<td>3600</td>
<td>380-480V 50/60 Hz @ 8 Amp</td>
<td>20A or 30A (3 Phase)</td>
<td>1300</td>
<td>3.0</td>
</tr>
<tr>
<td>20kHz</td>
<td>20HS500-4Y-C0-S-N0</td>
<td>5000</td>
<td>380-480V 50/60 Hz @ 10 Amp</td>
<td>20A or 30A (3 Phase)</td>
<td>1100</td>
<td>5.0</td>
</tr>
<tr>
<td>25kHz</td>
<td>25HS120-UP-C0-S-N0</td>
<td>1200</td>
<td>100-240V 50/60 Hz @ 15 Amp</td>
<td>15A</td>
<td>1000</td>
<td>1.3</td>
</tr>
<tr>
<td>25kHz</td>
<td>25HS200-2P-C0-S-N0</td>
<td>2000</td>
<td>200-240V 50/60 Hz @ 11 Amp</td>
<td>15A</td>
<td>1000</td>
<td>2.2</td>
</tr>
<tr>
<td>30kHz</td>
<td>30HS120-UP-C0-S-N0</td>
<td>1200</td>
<td>100-240V 50/60 Hz @ 15 Amp</td>
<td>15A</td>
<td>850</td>
<td>1.6</td>
</tr>
<tr>
<td>30kHz</td>
<td>30HS180-2P-C0-S-N0</td>
<td>1800</td>
<td>200-240V 50/60 Hz @ 10 Amp</td>
<td>15A</td>
<td>850</td>
<td>2.3</td>
</tr>
<tr>
<td>35kHz</td>
<td>35HS120-UP-C0-S-N0</td>
<td>1200</td>
<td>100-240V 50/60 Hz @ 15 Amp</td>
<td>15A</td>
<td>850</td>
<td>1.6</td>
</tr>
<tr>
<td>40kHz</td>
<td>40HS120-UP-C0-S-N0</td>
<td>1200</td>
<td>100-240V 50/60 Hz @ 15 Amp</td>
<td>15A</td>
<td>750</td>
<td>1.8</td>
</tr>
<tr>
<td>50kHz</td>
<td>50HS060-UP-C0-S-N0</td>
<td>600</td>
<td>100-240V 50/60 Hz @ 8 Amp</td>
<td>15A</td>
<td>850</td>
<td>0.8</td>
</tr>
</tbody>
</table>

Table 3-1 Generator AC Power Requirements

1. Maximum line current requirement is specified at the minimum nominal AC line voltage and the rated power level.
2. For the 2600 watt model, if the input line voltage is between 180-190V, the output is reduced to 2400 watts.
3. For 380-480 VAC generators, the external +24V power supply that is connected to the +24V generator input shall be listed or labeled with 3rd party North America marking (UL, CSA, TUV, etc).

Presses

<table>
<thead>
<tr>
<th>Model Number</th>
<th>Input AC Power Requirements Nominal AC Voltage @ Maximum RMS Current</th>
<th>North America/ Japan AC Outlet Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>43NSLA</td>
<td>90-240V 50/60 Hz @ 15 Amp</td>
<td>15 Amp</td>
</tr>
<tr>
<td>43NSME</td>
<td>90-240V 50/60 Hz @ 10 Amp</td>
<td>15 Amp</td>
</tr>
</tbody>
</table>

Table 3-2 Press AC Power Requirements

Dukane HMI

AC line voltage - 90-260 VAC
AC line current - 1 Amp
Unpacking the System

The system has been assembled and packaged at the factory for shipment. Depending on the system, components may be packaged in multiple crates or boxes.

The press is secured to a wooden pallet and covered with a wooden crate. Components inside the crate are secured with screws, metal bands, and additional packing materials to give reinforcement where needed. Before unpacking the press, use mechanical assistance to move it close to the location where it will be installed.

To unpack the press:

1. Carefully remove the wooden crate from the pallet to expose the contents.
2. Remove the packing material, and temporarily set aside any other system components, leaving the press on the pallet.
3. Inspect the assembly for any damage before placing it in position.

Placement on Workbench

Do not lift the press by hand. Use mechanical means to put the press into place.

The workbench onto which the press will be placed must be capable of supporting the weight of the system. The table below lists the weights of various press models, excluding the horn. It is recommended that the load rating of the workbench be at least 50% larger than the weight of the system.

<table>
<thead>
<tr>
<th>Model</th>
<th>Description</th>
<th>Weight (Excludes horn and generator)</th>
</tr>
</thead>
<tbody>
<tr>
<td>43NTLA on 43NSLA</td>
<td>15K Infinity™ System (press and HMI)</td>
<td>433 lbs, 197 kg</td>
</tr>
<tr>
<td>43NTME on 43NSME</td>
<td>20K Infinity™ System (press and HMI)</td>
<td>400 lbs, 182 kg</td>
</tr>
<tr>
<td>43NTLA</td>
<td>15K Infinity™ Thruster only (without base, column, or HMI)</td>
<td>156 lbs, 71 kg</td>
</tr>
<tr>
<td>43NTME</td>
<td>20K Infinity™ Thruster only (without base, column, or HMI)</td>
<td>125 lbs, 57 kg</td>
</tr>
</tbody>
</table>

Table 3-3 Model Weights
The workbench should be sturdy enough to handle more than the weight of the press system. To place the press on the work area, first lift it using the lifting eye bolt shown in Fig. 3-3 below or a pallet lift platform as shown in Fig. 3-4. Raise the assembly until the bottom edge of the base is even or slightly above the top of the work area. Then, carefully slide the press system on to the work area. It is recommended that the press base be secured to the workbench using the (4) holes indicated in Fig. 3-5.
Cable Connections

Typical system components are:

- Ultrasonic Generator
- Press
- HMI

Make cable connections in the following order, referring to the Fig 3-6 and Table 3-5 on the next page:

1. Connect cables 1-5. Cables 3 and 4 are to be connected to an effectively grounded rod.
2. Connect cable 9 if optional automation equipment is used with the system.
3. Connect power cords 6-8.
4. Arrange cables as desired, but do not bundle the power cords (6-8) with any other cables.

CAUTION

Before connecting or disconnecting cables: Put power switches for the generator, press, and any user-supplied automation equipment in the OFF position. Turn off electrical power. Remove AC power cords from their receptacles.

**DO NOT** operate the generator unless the ultrasound coaxial cable is connected, and the transducer is installed in the thruster. Otherwise, an overload condition could occur, with possible damage to the generator.
### Figure 3-6  Cable Connections

<table>
<thead>
<tr>
<th>Cable Number</th>
<th>Cable Description</th>
<th>Standard Length (Meters)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Ultrasound</td>
<td>2</td>
</tr>
<tr>
<td>2</td>
<td>Press Interface</td>
<td>2</td>
</tr>
<tr>
<td>3</td>
<td>Press Grounding</td>
<td>5</td>
</tr>
<tr>
<td>4</td>
<td>Generator Grounding</td>
<td>5</td>
</tr>
<tr>
<td>5</td>
<td>HMI Communications (CAT 5 / RJ45 Ethernet cable)</td>
<td>3</td>
</tr>
<tr>
<td>6</td>
<td>Press Power Cord (line voltage: 90-240 VAC, 50/60 Hz, 10 A)</td>
<td>2</td>
</tr>
<tr>
<td>7</td>
<td>Generator Power Cord (line voltage depends on generator model)</td>
<td>2.5</td>
</tr>
<tr>
<td>8</td>
<td>HMI Power Cord (line voltage: 90-240 VAC, 50/60 Hz, 10 A)</td>
<td>2.5</td>
</tr>
<tr>
<td>9</td>
<td>Automation I/O (optional)</td>
<td>3</td>
</tr>
</tbody>
</table>

**Table 3-5  Cable Connections**
SECTION 4

Tooling Setup
Before operating the welder, the tooling must be installed, and the thruster properly positioned on the support column.

---

**WARNING**

Any fixture manufactured by a third party must comply with all OSHA and ANSI requirements. All fixtures must be guarded as necessary. Dukane does not assume any responsibility or liability for fixtures manufactured by the customer or any third party manufacturer.

---

### Attaching the Fixture on the Base

If the fixture is not mounted to the base, follow these instructions, referring to the illustration below:

1. Place the fixture on the base.
2. Initially align the two slots in the fixture over two of the eight mounting holes on the base.
3. Install the two fixture hold-down bolts with hardened washers, as shown in Fig. 4-1, but leave the bolts loose at least 1 turn.

![Figure 4-1 Placing the Fixture on the Plate](image-url)
Installing the Ultrasonic Stack Module

For model 43NTME (20 kHz):

If the ultrasonic stack module is not installed in the press, follow the instructions below, depending on the model.

1. Activate the E-STOP (Abort) switch on the front of the press base shown in Fig. 4-2 below.
2. Turn off power to the generator by placing the AC switch in the “0” position.
3. Push the button on the bottom of the transducer door as shown in Fig. 4-3 by the arrow labeled 1. The door latch should release.
4. Grip the transducer door on both sides and pull down and out as shown in Fig. 4-3 by arrows 2 and 3. Set the door aside.

Figure 4-2  E-Stop Button (Abort)

Figure 4-3  Door Release Button
5. Unlock the handle shown in Fig. 4-4 by rotating it until it stops.
6. Pull the handle shown in Fig. 4-5 to rotate the transducer clamp open until it stops.
7. Place the ultrasonic stack module into the press by sliding it in as shown in Fig. 4-6. Push it all the way in so that the booster mounting block is inserted onto the pins in the press.

8. Rotate the two handles to secure the stack in place, one at a time, as shown in Fig. 4-7 until the handles are tight (approximately 7 turns).
9. Close the transducer clamp as shown in Fig. 4-8.
10. Latch the clamp as shown in Fig. 4-9.
11. The handles must be oriented approximately as shown in Fig. 4-10. Once tightened, the handle orientations can be changed as follows:
   a. Pull the handle straight out.
   b. Turn the handle in either direction as needed.
   c. Release the handle to let it spring back into place.

12. Take the transducer door removed earlier, align the pins on the door with the bottom of the slots on the press as shown in Fig. 4-11, and push the door against the press.

13. Slide the door up as shown in Fig. 4-12 until a click is heard, which indicates it is latched.
Installing the Ultrasonic Stack Module

For model 43NTLA (15 kHz):

If the ultrasonic stack module is not installed in the press, follow the instructions below, depending on the model.

1. Activate the E-STOP (Abort) switch on the front of the press base shown in Fig. 4-13 below.
2. Turn off power to the generator by placing the AC switch in the “0” position.
3. Push the button on the bottom of the transducer door as shown in Fig. 4-14 by the arrow labeled 1. The door latch should release.
4. Grip the transducer door on both sides and pull down and out as shown in Fig. 4-14 by arrows 2 and 3. Set the door aside.

Figure 4-13  E-Stop Button (Abort)
Figure 4-14  Door Release Button
5. Remove the 6 mm hex wrench, Dukane part number 809-721-0013, stored on the inside of the door as shown in Fig 4-15, then set the door aside.

6. Use the wrench to loosen the (2) screws shown in Fig 4-16.

7. Pull the transducer clamp bar straight out as shown in Fig 4-17 by arrow 1, then rotate it 180 degrees counterclockwise and push it back in as shown by arrows 2 and 3. The clamp should rest as shown in Fig 4-18.
8. Place the ultrasonic stack module into the press by sliding it in as shown in Fig 4-19. Push it all the way in so that the booster mounting block is inserted onto the pins in the press.

9. Tighten the (4) screws shown in Fig 4-20.

10. Pull transducer clamp bar straight out as shown in Fig 4-21 by arrow 1, then rotate it 180 degrees clockwise, and push it back in as shown by arrows 2 and 3.

11. Tighten the (2) clamp bar screws shown in Fig 4-22.

12. Take the transducer door removed earlier, place the hex wrench inside as shown in Fig 4-23.

13. Align the pins on the door with the bottom of the slots on the press as shown in Fig 4-23, then push the door against the press.

14. Slide the door up as shown in Fig 4-24 until a click is heard, which indicates it is latched.
Removing the Ultrasonic Stack Module

For model 43NTME (20 kHz):

Perform the following steps, depending on the model. The first two steps are necessary to ensure that no power will be accidentally applied while removing the stack.

1. Activate the E-STOP (Abort) switch on the front of the press base shown in Fig. 4-25.
2. Power down the generator by placing the AC switch in the “0” position.
3. Push the button on the bottom of the transducer door as shown in Fig. 4-26 by the arrow labeled 1. The door latch should release.
4. Grip the transducer door on both sides and pull down and out as shown in Fig. 4-26 by arrows 2 and 3.
5. Unlock the handle as shown in Fig. 4-27, on the next page, by rotating it until it stops.
6. Pull the handle shown in Fig. 4-28 to rotate the transducer clamp until it stops.
7. Rotate the two handles that secure the stack in place, one at a time, as shown in Fig. 4-29 until the handle threads disengage from the press (approximately 7 turns).
8. Pull the stack out of the press using the fixed handle as shown in Fig. 4-30.

Figure 4-25  E-Stop Button (Abort)

Figure 4-26  Door Release Button
Figure 4-27 Unlocking Clamp
Figure 4-28 Opening Clamp
Figure 4-29 Unlocking Clamp
Figure 4-30 Removing Stack Module
Removing the Ultrasonic Stack Module

For model 43NTLA (15 kHz):

Perform the following steps, depending on the model. The first two steps are necessary to ensure that no power will be accidentally applied while removing the stack.

1. Activate the E-STOP (Abort) switch on the front of the press base shown in Fig. 4-31.
2. Power down the generator by placing the AC switch in the “0” position.
3. Push the button on the bottom of the transducer door as shown in Fig. 4-32 by the arrow labeled 1. The door latch should release.
4. Grip the transducer door on both sides and pull down and out as shown in Fig. 4-32 by arrows 2 and 3.
5. Remove the 6 mm hex wrench, Dukane part number 809-721-0013, stored on the inside of the door as shown in Fig. 4-33, then set the door aside.
6. Use the wrench to loosen the (2) screws shown in Fig. 4-34.
7. Pull the transducer clamp bar straight out as shown in Fig. 4-35 by arrow 1, then rotate it 180 degrees counterclockwise and push it back in as shown by arrows 2 and 3. The clamp should rest as shown in Fig. 4-36.
8. Pull the stack out of the press using the fixed handle.

Figure 4-31  E-Stop Button (Abort)

Figure 4-32  Door Release Button
Figure 4-33  Wrench Storage Location

Figure 4-34  Loosening Clamp

Figure 4-35  Removing Clamp

Figure 4-36  Clamp Resting Position
Removing the Module Block from the Stack

Before separating stack components, observe the following:

- To maintain structural integrity, **NEVER** hold a transducer by the housing or the booster by the mounting rings while separating components. Doing so will result in damage to the unit.

- Use only the tools recommended by Dukane. **NEVER** clamp a horn, booster, or transducer in a vise or use tools such as pliers, vise grips, etc. Doing so will result in scratches and/or gouges, resulting in stress areas on the surface. This condition will affect the stack operation and could lead to failure of each stack component.

To separate the stack components, follow the instructions below:

1. Remove the (4) screws from the bottom of the booster clamp block as shown in Fig. 4-37 below, then remove the U-shaped block.

2. Remove the booster block by sliding the block back over the transducer to the left as shown in Fig. 4-38.

![Figure 4-37 Booster Clamp](image)

![Figure 4-38 Booster Block](image)
Adjusting the Thruster Position

1. Before unlocking the handles, hold the adjustment wheel tightly to prevent it from rotating. Unlock all the handles (2 or 3, depending on the model) shown in Fig. 4-39 below by turning them counter-clockwise until they stop (approximately 1/2 turn).

2. Turn the crank wheel clockwise to raise the thruster, or counter-clockwise to lower as shown in Fig. 4-40. A scale is provided on the column as shown in Fig. 4-41 to indicate the thruster position.
3. Lock all the handles tightly by turning them clockwise as shown in Fig. 4-42.

4. If desired, the orientation of the handles can be changed once they are locked. Referring to Fig. 4-43, pull the handle straight out (1), rotate it in either direction (2), then release it (3).

Figure 4-42  Tightening Lock Handles

Figure 4-43  Handle Orientation

Aligning the Fixture

The fixture must be properly aligned and leveled to the horn to ensure consistent, evenly distributed welds. To safely align the fixture under the horn, use the following procedure.

1. Place unwelded parts into the fixture.

2. Ensure the E-STOP is released, then start up the system normally.

3. Perform the following steps in IQ Explorer 3 software:
   a. For Trigger Type, select Force
   b. Press Teach next to Sensing Start Position

4. Hold the two operate switches to lower the horn. Before the horn makes contact with the parts, change the Speed to Medium, then hold the switches again to lower the horn further.

5. When the horn is close to the parts, approximately 0.025", move the fixture to align the parts to the horn. If necessary, the press may be moved down to slightly compress the parts to aid in alignment.
6. Change the Speed to Low, then move the press down until a light amount of pressure is applied to the parts (approximately 10-20 lbs. [40-90 N]).

7. Turn the four jack screws as shown in Fig. 4-44 clockwise until a slight resistance is felt.

8. Change the Jog Direction to Up, then activate the operate switches to move the horn up until there is no force on the parts.

9. Using carbon paper or a feeler gauge, determined which side of the fixture must be raised to make the part level with the horn, then turn the corresponding jack screw(s) clockwise. If needed, move the horn up or down to aid in this step.

10. Tighten the hold-down cap screws by turning them clockwise until firm resistance is felt.

11. Return the press to the home position as follows:
   a. Select Exit.
   b. Press No when asked to set the position.
   c. Follow the instructions on the screen.

![Figure 4-44  Fixture Leveling Screws](image)
SECTION 5

Controls and Indicators
Controls and Indicators

Control and Indicators Overview

This section contains information about the visual indicators, manual switches and adjustments of the components in a typical IQ Infinity™ system. The press, generator, and HMI will be discussed.

Press System

Figure 5-1 shows the controls and indicators for the press, generator, and HMI.

Figure 5-1  Typical Press System
Press Controls and Display

Figure 5-2  Press Controls and Display
Operating Safety Switch Detail

Figure 5-3 Operating Safety Switch

E-Stop Switch Detail

Figure 5-4 E-Stop (ABORT) Switch
HMI Connections

Figure 5-5  HMI Connections
SECTION 6

Operation
IQ Explorer 3 Overview

The IQ Explorer 3 software comes standard on a Dukane HMI. This program connects with the Infinity™ generator/press through a user interface and is used for configuration and setup.

Key Features

IQ Explorer 3 User Interface

- **Windows 10 operating system** - Familiar file folder menu structure, requiring no special training.
- **Touch screen input** - Makes programming easier. All welder setup parameters are programmed from one menu page. (Applies to the HMI or PCs with touch screen, such as tablets.)
- **Ethernet connectivity** - For communications to the Infinity™ welder.
- **Control** - Control feature for locking out system controls that complies with FDA 21 CFR Part 11.
- **Remote connectivity** - Dukane hotline is available for system diagnostics and troubleshooting 24-hours a day. (VPN access to the welder’s network is required. Consult with your IT staff about availability.)
- **One screen operations page** - Most recent weld cycle and graph data with ability to modify commonly used process settings.
- **F1 Help command** - Instantly displays explanation of function.
- **IQ Explorer 3 User Interface** - It is a peripheral device. Operation is independent of the generator, and removal or malfunction of the IQ Explorer 3 does not affect machine functionality.
- **Eight user-selectable graph parameters** - Velocity, energy, power, distance, amplitude, frequency, force and pressure for viewing and storage of each weld.
- **Production analysis screen** - Displays eight-hour shift production statistics: good, bad, suspect quantities and percentages.
- **Advanced stack diagnostics** - Includes power and frequency graphs for stack (horn) documentation and future reference for troubleshooting.
- **Tool identification** - Uses barcode system to identify tooling.
- **Work cell** - A Dukane Lean Work Cell can be integrated with basic PLC managed operations.
- **Data Analysis for SPC** - Feature that aggregates and charts large quantities of cycle data results.
- **Barcodes** - Feature that allows scanned barcodes from parts to be attributed to cycle data.
Getting Started Using IQ Explorer 3

STEP 1 - Getting Started

Ensure that a proper connection of the *IQ Explorer 3* software and the servo press has been made. See Figure 6-8 below.

Names of active welders in the network appear when Show Welders tab is clicked.

![Connected Welder](image)

**Figure 6-8** Connected Welder

STEP 2 - Select Unused Setup

Click on the Hardware tab. Click on the Setup File Name drop down box and select an unused setup as shown in Figure 6-9.

![Setup File Selection](image)

**Figure 6-9** Setup File Selection
STEP 3 - Set the Cycle Initiation Mode

Click on the Process Settings tab. Select Manual from the pull down menu as shown in Figure 6-10.

![Process Settings tab](image)

**Figure 6-10** Initiate Mode

NOTE:
This Initiate Mode selection assumes there is a stand-alone, benchtop system with manual operate switches.

STEP 4 - Specify the Trigger Settings

Select Force from the TRIGGER type drop down box. Then, program the desired amount of force the press is to apply before ultrasound is activated. Next, enter the Max Trigger Time. This provides a measure of safety insuring the welder will terminate if the welder never achieves the programmed trigger force as shown in Figure 6-11.

![Trigger Force Settings](image)

**Figure 6-11** Trigger Force Settings
**STEP 5 - Program the Sensing Speed**

The Sensing Speed is the speed (inches/millimeters per second) at which the horn will move during the approach just before reaching the trigger position. A typical starting value for Sensing Speed is 1.0 mm/s (0.040 in/s). The Sensing Speed can be set higher for shorter cycle times, or lower for greater trigger force detection accuracy.

**STEP 6 - Program the Sensing Start Position**

The Sensing Start Position is the actual position in the machine travel where the system begins to sense for the trigger force to be achieved. By the time the horn reaches the Sensing Start Position, it is already moving at the programmed Sensing Speed. It is critical to program the Sensing Start Position so that the horn is never in contact with the part at this position, taking into account the height variability of unwelded parts. Failure to do so may result in equipment damage. If you do not know the position where this contact is made, select the Teach button as shown in Figure 6-12.

**Note:**
The Sensing Start Position must be set such that the expected sensing distance, weld distance and hold distance do not exceed the Travel Limit.
The Travel Limit must be set to allow the full weld cycle to occur while also preventing the horn from contacting the fixture.

**STEP 7 - Teach the Sensing Start Position**

After clicking Teach, you will see a window similar to the one shown in Figure 6-13. Place an unwelded part into the fixture. Press both operate switches to jog the horn down to within 0.254 - 0.762 mm (0.010 - 0.030 inches) above the part. The stroke position of the thruster will be shown in the Current Position box. Once you are at the desired position, press Set to program that distance. Select Exit, and follow instructions to home the machine.
**STEP 8 - Program Weld Characteristics**

**Primary Method**

On the Process Settings tab, find Weld > Primary Method, and select Distance.

Distance - This is the distance the welder advances once the programmed trigger force is reached. Usually this distance is the height of the energy director, or shear joint of the part being welded.

Max Time is a component of the weld method intended to offer a measure of safety. If the programmed weld method parameter is not achieved within this time window (2 seconds as shown in the example of Figure 6-14), the system will fault.

![Figure 6-14 Primary Method](image)

**Secondary Method**

Continue programming weld characteristics by selecting one of the Secondary Methods available: Position, Energy, Peak Power, Force Change, and Force Rate.

The purpose of the secondary method is to end the weld phase if the selected method parameter value is reached. If Disabled is chosen, there would be no secondary weld method.

![Figure 6-15 Secondary Weld Method](image)
**STEP 9 - Enable Melt Detect™**

This patented feature is found only on Dukane’s servo press systems. If the feature is selected, the system will stop motion once the desired Trigger Force is achieved. The ultrasound will be initiated at this moment. Once the programmed Melt-Detect™ force drop occurs, which indicates material softening or melting has begun, the motion will continue. This is the basis for Dukane’s exclusive Melt-Detect™ technology.

The value of the Melt-Detect™ Force Drop parameter is used to designate how much the force is to decrease relative to the Trigger Force before the horn will resume the programmed weld motion. For example, for a Trigger Force of 180 N and a value of 5% for Melt-Detect™ Force Drop, the press would stop once the Trigger Force is achieved, and resume motion after the force drops by 9 N (5% of 180 N) below the Trigger Force, or 171 N. A starting value of Melt-Detect™ is typically in the 5-10% range. The benefit of this option is significantly less stress on the parts and stronger weld bonds.

![Enable Melt-Match](image)

**Figure 6-16** Enable Melt-Match

**STEP 10 - Specify Weld Profile**

Immediately after Trigger (or Melt-Detect™) occurs, the press changes the speed of motion to the Weld Speed. Enter the selections described below as shown in Figure 6-17.

- **Weld Profile** - Select Segmented.
- Click the Speed Profile button - Enter the desired weld profile speeds for segments 1 through 10.

![Weld Profile and Speeds](image)

**Figure 6-17** Weld Profile and Speeds
**STEP 11 - Set Ultrasound Amplitude**

A typical initial ultrasound weld amplitude setting is 100%. The default amplitude setting is 90% as shown below in Figure 6-18. The range for this feature is between 20% and 100%.

![Weld Amplitude: 90 %](image)

*Figure 6-18  Default Weld Amplitude Setting*

**STEP 12 - Post Weld Settings**

The post weld phase of the process is sometimes overlooked; however, it is important in achieving desired weld results. The Infinity™ servo welder has several exclusive post weld control parameters that can improve weld bond strength and process repeatability.

**Hold Methods**

There are two types of hold - Dynamic Hold and Static Hold. These types can be used together or separately.

**Dynamic Hold Method**

During Dynamic Hold, which occurs immediately after the weld phase, the press will continue to travel at the programmed hold speed with the ultrasound turned off.

This feature provides the ability to collapse the molten plastic after the ultrasonic signal is turned off, before material solidification. This feature can be beneficial in producing superior weld strength and appearance.

To program Dynamic Hold, find Post Weld > Dynamic Hold Method, and select Distance. Then enter the desired Hold Distance, Speed, and Max Time. The Max Time parameter is used to terminate the machine cycle if the dynamic hold distance is not reached within the allowable time window. See Figure 6-19.

![Dynamic Hold Methods](image)

*Figure 6-19  Dynamic Hold Methods*
Static Hold Method

After the completion of dynamic hold, if enabled, the press motion stops for a specified amount of time to allow for molten plastic to solidify. This phase is called static hold.

To program static hold, set the Static Hold Method to Time, and enter the desired Hold Time. Once the static hold phase is complete, the press retracts back to the Top-of-Stroke position.

This unique feature allows for superior consistency on overall part height. This is unlike a pneumatic press that continues to compress the part during the hold phase. In addition, Static Hold can contribute to stronger weld bonds. See Figure 6-20 below.

![Figure 6-20 Static Hold Method](image1)

STEP 13 - Specify Process Limits Behavior

For each limit that is important to your application, use the drop down menu, and select Display. See Figure 6-21.

These parameters will be displayed on the Cycle Data screen, and may be important for subsequent analysis of the weld process.

Once the process settings are fully developed for the application, the Process Limits can be set to Suspect and/or Bad to identify part assemblies of inferior weld quality.

![Figure 6-21 Process Limits Tab](image2)
STEP 14 - Run Weld Cycle
After all the parameters have been programmed, initiate the weld cycle.

STEP 15 - View Weld Results
View the results at the Cycle Data tab to insure all parameters have been achieved. See the example shown below in Figure 6-22. Detailed performance graphs for select parameters may also be reviewed by selecting the Graph tab.

Figure 6-22  Cycle Data Tab
SECTION 7

Specifications
Press Specifications

<table>
<thead>
<tr>
<th>Thruster Model</th>
<th>Stroke</th>
<th>Maximum Weld Force</th>
<th>Maximum Rapid Speed</th>
<th>Linear Encoder Resolution</th>
<th>Maximum Horn Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>in</td>
<td>mm</td>
<td>lbs</td>
<td>in/s</td>
<td>mm/s</td>
</tr>
<tr>
<td>43NTME</td>
<td>5.0</td>
<td>127</td>
<td>550</td>
<td>4</td>
<td>102</td>
</tr>
<tr>
<td>43NTLA</td>
<td>5.0</td>
<td>127</td>
<td>1000</td>
<td>6</td>
<td>152</td>
</tr>
</tbody>
</table>

Table 7-1  Press Specifications

Operating Environment

Operate the equipment within these guidelines:

Temperature: 40°F to 100°F (+5°C to +38°C)

Air Particulates: Keep the equipment dry. Minimize exposure to moisture, dust, dirt, smoke and mold.

Humidity: 5% to 95% Non-condensing @ +5°C to +30°C

Non-operating storage guidelines:

Temperature: -4°F to 158°F (-20°C to +70°C)

Air Particulates: Keep the equipment dry. Minimize exposure to moisture, dust, dirt, smoke and mold.

Humidity: 5% to 95% Non-condensing @ 0°C to +30°C
## Model Outline Drawings

<table>
<thead>
<tr>
<th>Model Number</th>
<th>Description</th>
<th>Drawing Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>□□□□.□y.C□-S01.L.□S</td>
<td>Large Infinity™ System (typically 15 kHz)</td>
<td>400-2685</td>
</tr>
<tr>
<td>43NTLA</td>
<td>Large Infinity™ Thruster Only (typically 15 kHz)</td>
<td>400-2686</td>
</tr>
<tr>
<td>□□□□.□y.C□-S01.M.□S</td>
<td>Medium Infinity™ System (typically 20 kHz)</td>
<td>400-2680</td>
</tr>
<tr>
<td>43NTME</td>
<td>Medium Infinity™ Thruster Only (typically 20 kHz)</td>
<td>400-2681</td>
</tr>
<tr>
<td>□□□□.□y.C□-S01.S.□S</td>
<td>Mini Infinity™ System (typically &gt;20 kHz)</td>
<td>400-2704</td>
</tr>
<tr>
<td>43NTMN</td>
<td>Mini Infinity™ Thruster Only (typically &gt;20 kHz)</td>
<td>400-2705</td>
</tr>
<tr>
<td>15HS360-2Y-C0-S-N0</td>
<td>15K 3600W Infinity™ Generator (Single Phase)</td>
<td>400-2698</td>
</tr>
<tr>
<td>15HS500-2Y-C0-S-N0</td>
<td>15K 5000W Infinity™ Generator (Single Phase)</td>
<td>400-2700</td>
</tr>
<tr>
<td>15HS360-4Y-C0-S-N0</td>
<td>15K 3600W Infinity™ Generator (Three Phase)</td>
<td>400-2700</td>
</tr>
<tr>
<td>15HS500-4Y-C0-S-N0</td>
<td>15K 5000W Infinity Generator (Three Phase)</td>
<td>400-2700</td>
</tr>
<tr>
<td>20HS120-UY-C0-S-N0</td>
<td>20K 1200W Infinity™ Generator (Single Phase)</td>
<td>400-2678</td>
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<tr>
<td>20HS180-2Y-C0-S-N0</td>
<td>20K 1800W Infinity™ Generator (Single Phase)</td>
<td>400-2678</td>
</tr>
<tr>
<td>20HS260-2Y-C0-S-N0</td>
<td>20K 2600W Infinity™ Generator (Single Phase)</td>
<td>400-2678</td>
</tr>
<tr>
<td>20HS360-2Y-C0-S-N0</td>
<td>20K 3600W Infinity™ Generator (Single Phase)</td>
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<td>20HS500-2Y-C0-S-N0</td>
<td>20K 5000W Infinity™ Generator (Single Phase)</td>
<td>400-2700</td>
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<td>20K 3600W Infinity™ Generator (Three Phase)</td>
<td>400-2700</td>
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<td>20HS500-4Y-C0-S-N0</td>
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<td>25HS120-UY-C0-S-N0</td>
<td>25K 1200W Infinity™ Generator (Single Phase)</td>
<td>400-2678</td>
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<td>25HS200-UY-C0-S-N0</td>
<td>25K 2000W Infinity™ Generator (Single Phase)</td>
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<td>35K 1200W Infinity™ Generator (Single Phase)</td>
<td>400-2678</td>
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<td>30HS180-2Y-C0-S-N0</td>
<td>30K 1800W Infinity™ Generator (Single Phase)</td>
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<tr>
<td>35HS120-UY-C0-S-N0</td>
<td>35K 1200W Infinity™ Generator (Single Phase)</td>
<td>400-2678</td>
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<tr>
<td>40HS120-UY-C0-S-N0</td>
<td>40K 1200W Infinity™ Generator (Single Phase)</td>
<td>400-2678</td>
</tr>
<tr>
<td>50HS060-UY-C0-S-N0</td>
<td>40K 600W Infinity™ Generator (Single Phase)</td>
<td>400-2678</td>
</tr>
</tbody>
</table>

Table 7-2 Model Outline Drawings

**NOTE:**

For more specific system number information, see table 7-3.
A rigid support and a 220/240 VAC line cord.

**System Assembly Detailed Description:**

2026.7C-80.3-AB  
Example System Number Shown Above:

### Table 7-3: Infinity™ System Number Guide

<table>
<thead>
<tr>
<th>Character</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>P90</td>
<td>Infinity™ equipped with load cell</td>
</tr>
<tr>
<td>P60</td>
<td>Infinity™ equipped with disturbance load cell</td>
</tr>
<tr>
<td>P50</td>
<td>Infinity™ equipped with disturbance and line cord</td>
</tr>
<tr>
<td>P0T</td>
<td>Infinity™ combi</td>
</tr>
<tr>
<td>00T</td>
<td>Infinity™ servo</td>
</tr>
</tbody>
</table>

### Press Type

- **Press Size:**
  - 20 kHz
  - 2600 Watt

- **Press Options:**
  - 220/240 VAC line cord
  - PrOFINET communications module

- **System Assembly Detailed Description:**
  - A 20 kHz 2600 Watt Infinity™ equipped with a 220/240 VAC line cord and PrOFINET communications module, a medium-sized Infinity servo press on a rigid support and a 220/240 VAC line cord.
SECTION 8

Alarm Messages
The following lists of alarms, on pages 53-56, that may appear on the servo press systems containing a generator with a color front panel display or IQ Explorer 3 software.

Information on particular alarms may also be obtained on the Dukane ‘“Easy Alarm” web page below:

https://support.dukane.com/EasyAlarm

<table>
<thead>
<tr>
<th>Alarm Code</th>
<th>Alarm Message</th>
<th>Explanation</th>
<th>Solution</th>
</tr>
</thead>
<tbody>
<tr>
<td>U100</td>
<td>Configuration Fault</td>
<td>Default Setup corrupted, Model Number incorrect, Serial Number incorrect, Feedback Scaling incorrect, etc.</td>
<td>This is a disabling condition for the generator; contact Dukane.</td>
</tr>
<tr>
<td>U101</td>
<td>Bad Parameter Alarm</td>
<td>Internal generator fault.</td>
<td>Contact Dukane.</td>
</tr>
<tr>
<td>U102</td>
<td>Watchdog Reset Alarm</td>
<td>Internal generator fault.</td>
<td>Contact Dukane.</td>
</tr>
<tr>
<td>U103</td>
<td>Hardware Fault</td>
<td>Hardware configuration or options were changed since last generator power up.</td>
<td>This is a disabling condition for the generator; contact Dukane.</td>
</tr>
<tr>
<td>U104</td>
<td>Frequency Overload Fault 1 (PLL Lock Fail)</td>
<td>The generator did not obtain a frequency lock by the end of ramp up period.</td>
<td>Press Test button on the power supply. Verify that the ultrasonic stack will operate in a test condition. Verify that the stack is operating at proper Frequency and Power draw. Reduce trigger pressure, force, and/or down speed. If stack will not operate in test perform stack care and maintenance. Follow this link to stack care and maintenance procedure. If Stack will not operate in test condition, remove horn and re-inspect. Enable “Advanced Process Settings” to adjust free run frequency to the “in air” operating frequency that results from a test. Enabling a pre-trigger source that allows for full ramp-up time to elapse still “in air” before contacting the part should eliminate all “Frequency Overload Fault 1” occurrences for a properly maintained stack. If the above steps do not resolve problem, contact Dukane.</td>
</tr>
<tr>
<td>U106</td>
<td>POS Peak Overload Fault</td>
<td>Generator ultrasound overload.</td>
<td>Check if one of the stack components is defective. Check if one of the stack components is loose. Check if the IQ generator's system frequency settings are set correctly.</td>
</tr>
<tr>
<td>U107</td>
<td>NEG Peak Overload Fault</td>
<td>Generator ultrasound overload.</td>
<td>Check if one of the stack components is defective. Check if one of the stack components is loose. Check if the IQ generator's system frequency settings are set correctly.</td>
</tr>
<tr>
<td>U108</td>
<td>Average Overload Fault</td>
<td>Generator ultrasound overload.</td>
<td>Reduce the force being applied to the part (on a pneumatic press) or reduce the weld speed (on a servo press).</td>
</tr>
<tr>
<td>U109</td>
<td>Bad Current Loop Fault</td>
<td>4-20 mA current loop is not connected to the remote amplitude card, or 4-20 mA current loop is defective (poor electrical).</td>
<td>Check for proper connection to remote amplitude card. Check for damage to wiring. This is a disabling condition for the generator; contact Dukane.</td>
</tr>
<tr>
<td>Alarm Code</td>
<td>Alarm Message</td>
<td>Explanation</td>
<td>Solution</td>
</tr>
<tr>
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</tr>
<tr>
<td>U110</td>
<td>Power not OK Fault</td>
<td>Problem with incoming AC line voltage.</td>
<td>Verify that the incoming AC Line voltage supplied to the generator is within the range specified for the generator. Consult the manual for your generator.</td>
</tr>
<tr>
<td>U111</td>
<td>Overtemperature Fault</td>
<td>Generator has exceeded its temperature limit.</td>
<td>Check for blockage of air vents on the sides of the generator, restricting air flow to the inside of the generator. Check if the internal fan is defective.</td>
</tr>
<tr>
<td>U112</td>
<td>Frequency Overload Fault 3 (PLL Limit Exceeded)</td>
<td>The operating frequency was artificially bounded by the system frequency limits for 25 consecutive milliseconds. This is usually due to excessive operating frequency drift (operating frequency is “far” from free run frequency) due to heating of the stack.</td>
<td>Execute the following steps to alleviate the problem: Observe the last operating frequency from a test graph. Enable “Advanced Process Settings”. Change “System Frequency Limits” to “Manual” and adjust the offending upper/lower frequency limit to an acceptably safe value for your horn/stack/application. Often as a horn/stack heats up, it may begin to have trouble starting (Frequency Overload Fault 1) because the operating frequency is drifting away from the generator’s Free Run Frequency setting. Adjusting the Free Run Frequency may also be advisable. A sudden shift in frequency (as observed on the graph) immediately before a Frequency Overload Fault 3, as opposed to a general frequency drift, indicates stack/horn coupling to the part during the weld or another abrupt change in stack resonance. This does not imply an operating frequency drift issue, but a weld application setup issue.</td>
</tr>
<tr>
<td>U200</td>
<td>Servo Controller Fault</td>
<td>One of several possible problems detected on servo controller.</td>
<td>Cycle power on the generator. If alarm persists, contact Dukane.</td>
</tr>
<tr>
<td>U201</td>
<td>Force Duration Exceeded</td>
<td>Large amount of force was applied for an excessive amount of time while jogging.</td>
<td>Cycle power on the generator. Do not apply large force for long periods of time while in jog mode.</td>
</tr>
<tr>
<td>U202</td>
<td>Position Error Limit Exceeded</td>
<td>Servo press was not able to complete the programmed motion due to reaching its maximum force capability.</td>
<td>Decrease trigger force, weld and/or hold speed(s). Use alternate press model with larger force capacity.</td>
</tr>
<tr>
<td>U203</td>
<td>Amplifier Error</td>
<td>Indicates a problem with the servo amplifier.</td>
<td>Cycle power on the generator. If alarm persists, contact Dukane.</td>
</tr>
<tr>
<td>U204</td>
<td>Command Error</td>
<td>Servo controller program error.</td>
<td>Cycle power on the generator. If alarm persists, contact Dukane.</td>
</tr>
<tr>
<td>U205</td>
<td>Checksum Error</td>
<td>Internal servo controller error.</td>
<td>Cycle power on the generator. If alarm persists, contact Dukane.</td>
</tr>
<tr>
<td>U208</td>
<td>Lower Limit Switch Activated</td>
<td>Lower travel limit switch was activated on press.</td>
<td>Jog the press up to avoid contact with the limit switch.</td>
</tr>
<tr>
<td>U209</td>
<td>Upper Limit Switch Activated</td>
<td>Upper travel limit switch was activated on press.</td>
<td>Jog the press down to avoid contact with the limit switch.</td>
</tr>
<tr>
<td>U210</td>
<td>Servo HW Test Failed</td>
<td>A failure has been detected during the servo hardware test, which is performed at system startup or reset.</td>
<td>Press any key on generator color display for additional failure details. Check that servo AC breaker is on and the servo power LED on the press is lit. Check that all cables are connected securely. Check for any damage to connector pins. If alarm persists, contact Dukane.</td>
</tr>
<tr>
<td>U211</td>
<td>Servo Overtemperature Fault</td>
<td>The servo actuator temperature has exceeded 100° C.</td>
<td>Turn servo press off, wait for actuator to cool down, then resume operation. Increase time between cycles to prevent excessive heating.</td>
</tr>
<tr>
<td>Alarm Code</td>
<td>Alarm Message</td>
<td>Explanation</td>
<td>Solution</td>
</tr>
<tr>
<td>-----------</td>
<td>----------------------------------------</td>
<td>-----------------------------------------------------------------------------</td>
<td>--------------------------------------------------------------------------</td>
</tr>
<tr>
<td>U212</td>
<td>Servo Travel Limit Exceeded</td>
<td>Servo press has reached the defined maximum travel limit.</td>
<td>Increase the maximum travel limit position. Adjust weld parameters to reduce the distance traveled during the weld and hold.</td>
</tr>
<tr>
<td>U213</td>
<td>Servo Communication Error</td>
<td>Communication between the servo controller and the motherboard has been compromised.</td>
<td>Contact Dukane.</td>
</tr>
<tr>
<td>U214</td>
<td>Obstruction at Top of Stroke</td>
<td>The press is unable to reach the Top-of-Stroke position.</td>
<td>Remove obstruction detected at Top of Stroke. Adjust Top of Stroke position to be defined higher than obstruction.</td>
</tr>
<tr>
<td>U216</td>
<td>Excessive Force at Idle</td>
<td>The press system senses an excessive amount of force when idle.</td>
<td>This alarm can occur when an ultrasonic stack is removed from the press when power is on. Be sure to turn system power off when disassembling and reassembling the stack. If alarm appears when not changing stacks, contact Dukane.</td>
</tr>
<tr>
<td>U217</td>
<td>Excessive Deviation from TOS</td>
<td>The press position deviated excessively from the defined Top-of-Stroke position when idle.</td>
<td>Contact Dukane.</td>
</tr>
<tr>
<td>U218</td>
<td>Servo Encoder Failure</td>
<td>The press system detected a problem with the linear position encoder.</td>
<td>Contact Dukane.</td>
</tr>
<tr>
<td>U228</td>
<td>Temporary Servo Controller Over Voltage</td>
<td>The servo controller experienced a temporary over voltage condition likely due excessive deceleration. The braking shunt hardware may be damaged.</td>
<td>Most likely too aggressive deceleration settings. Possible failure of the braking shunt or power supply.</td>
</tr>
<tr>
<td>U229</td>
<td>Abnormal Safe Torque Off Inputs</td>
<td>An implausible comination of the ESTOP inputs was detected.</td>
<td>The NO and NC E-STOP inputs remained at the same logic level for too long. Must cycle power on the thruster.</td>
</tr>
<tr>
<td>U230</td>
<td>Servo Under Temp</td>
<td>The servo controller temperature is below safe operating conditions.</td>
<td>Possible failure of servo controller.</td>
</tr>
<tr>
<td>U231</td>
<td>Hall Input Sequence Error</td>
<td>An implausible motor hall sensor transition was detected.</td>
<td>Check servo motor feedback wiring.</td>
</tr>
<tr>
<td>U232</td>
<td>Digital Linear Encoder Error</td>
<td>The press system detected a problem with the linear position encoder tested against motor hall sensors.</td>
<td>Check servo motor feedback wiring.</td>
</tr>
<tr>
<td>U233</td>
<td>Abnormal Operate Switch 1 Inputs</td>
<td>An implausible combination of the Operate Switch 1 inputs was detected.</td>
<td>Check Operate Switch 2 wiring.</td>
</tr>
<tr>
<td>U234</td>
<td>Abnormal Operate Switch 2 Inputs</td>
<td>An implausible combination of the Operate Switch 2 inputs was detected.</td>
<td>Check Operate Switch 1 wiring.</td>
</tr>
<tr>
<td>U235</td>
<td>Transducer Door Fault</td>
<td>The press system detected a problem with the transducer door wiring.</td>
<td></td>
</tr>
<tr>
<td>U300</td>
<td>Operate Switch 1 Pressed before Cycle Start</td>
<td>Check door switch and wiring.</td>
<td>Release Switch 1 before pressing both activation switches to start a cycle. Verify wiring of both switches.</td>
</tr>
<tr>
<td>U301</td>
<td>Operate Switch 2 Pressed before Cycle Start</td>
<td>Operate Switch 2 Pressed before Cycle Start</td>
<td>Release Switch 2 before pressing both activation switches to start a cycle. Verify wiring of both operating switches.</td>
</tr>
<tr>
<td>U302</td>
<td>Auto In Switch closed at End of Cycle</td>
<td>Auto In Switch closed at End of Cycle</td>
<td>Remove active Auto-In signal. Verify wiring to Auto-In signal.</td>
</tr>
<tr>
<td>U308</td>
<td>Generator or Press Not Ready</td>
<td>Generator or Press Not Ready</td>
<td>Wait for initialization process to complete. Cycle power on IQ generator. If alarm persists, contact Dukane.</td>
</tr>
<tr>
<td>U400</td>
<td>Weld Limits enabled for continuous operation</td>
<td>Weld Limits enabled for continuous operation</td>
<td>Change Weld Mode from Automation. Disable Weld Method.</td>
</tr>
<tr>
<td>Alarm Code</td>
<td>Alarm Message</td>
<td>Explanation</td>
<td>Solution</td>
</tr>
<tr>
<td>------------</td>
<td>--------------------------------</td>
<td>-----------------------------------------------------------------------------</td>
<td>--------------------------------------------------------------------------</td>
</tr>
<tr>
<td>U401</td>
<td>Weld Time set to Zero</td>
<td>Adjust weld time to be greater than zero.</td>
<td></td>
</tr>
<tr>
<td>U402</td>
<td>Weld Power set to Zero</td>
<td>Adjust weld peak power to be greater than zero.</td>
<td></td>
</tr>
<tr>
<td>U403</td>
<td>Weld Energy set to Zero</td>
<td>Adjust weld energy to be greater than zero.</td>
<td></td>
</tr>
<tr>
<td>U404</td>
<td>Weld Distance set to Zero</td>
<td>Adjust weld distance to be greater than zero.</td>
<td></td>
</tr>
<tr>
<td>U405</td>
<td>Weld Position set to Zero</td>
<td>Adjust weld position to be greater than zero.</td>
<td></td>
</tr>
<tr>
<td>U406</td>
<td>Max Trigger Time set to Zero</td>
<td>Adjust maximum trigger time to be greater than zero.</td>
<td></td>
</tr>
<tr>
<td>U407</td>
<td>Forced Shutdown Alarm</td>
<td>External command was received by generator to end weld cycle.</td>
<td>This alarm is for information only.</td>
</tr>
<tr>
<td>U410</td>
<td>Pre-trigger Overtravel Alarm</td>
<td>Press travel exceeded fixed distance limit while ultrasound was active.</td>
<td>For servo press the distance from pre-trigger to position of trigger is required to be less than 0.25 inches or 6.35 millimeters. For pneumatic press the distance from pre-trigger to position of trigger is required to be less than 0.75 inches or 19.05 millimeters.</td>
</tr>
<tr>
<td>U411</td>
<td>Part Detected Too Early</td>
<td>Contact between the horn and part was detected before reaching the Sensing Start Position.</td>
<td>Adjust Sensing Start Position to be above contact with part. Account for variation of heights of unassembled parts. NOTE: Repeated occurrences of this alarm may result in costly damage to servo actuator.</td>
</tr>
<tr>
<td>U413</td>
<td>Max Trigger Time Exceeded</td>
<td>Trigger did not occur within the specified time limit.</td>
<td>Increase maximum trigger time. Start the weld process sooner.</td>
</tr>
<tr>
<td>U414</td>
<td>Max Trigger Delay Time Exceeded</td>
<td>Trigger delay distance was not reached within the specified time limit.</td>
<td>Increase maximum trigger delay time. Start the weld process sooner.</td>
</tr>
<tr>
<td>U500</td>
<td>Servo Must Be Homed</td>
<td>The servo press must complete the homing process before operation is allowed.</td>
<td>Home the servo press by activating both operating switches.</td>
</tr>
<tr>
<td>U501</td>
<td>End of Weld Signal Detected</td>
<td>When Auto-stop is enabled and set for End of Weld, this alarm indicates that the signal has been detected.</td>
<td>This alarm is for information only.</td>
</tr>
<tr>
<td>U502</td>
<td>End of Cycle Signal Detected</td>
<td>When Auto-stop is enabled and set for End of Cycle, this alarm indicates that the signal has been detected.</td>
<td>This alarm is for information only.</td>
</tr>
<tr>
<td>U505</td>
<td>Transducer Door Open</td>
<td>Sonics does not run when the transducer door is open.</td>
<td>Reinstall transducer door before running sonics.</td>
</tr>
</tbody>
</table>
SECTION 9

Maintenance
Sheet Metal Covers
The covers on the generator and press are formed to prevent access to internal components. Keep the covers on at all times due to the presence of high voltages and moving components, which could cause injury. The internal generator case also contains capacitors, which continue to hold a high electric charge even after the power is shut off.

Air Ventilation Slots
Ventilation intake and exhaust slots exist on the generator and press. Keep all ventilation slots free from obstructions. If excessive dust or dirt collects on the slots, wipe or vacuum them clean. Do not use compressed air to clean them as this may force the dirt inside the chassis.
Allow 5 inches (127 mm) of clearance outside each ventilation slot.

AC Power Cord
The AC power cords should be kept in good condition and free from any cuts. The AC plug should be straight with no bent prongs.

Six-Month Periodic Maintenance

1. Disconnect the generator AC power cord from the AC line receptacle and the AC power cord from the thruster. Then, remove the thruster left and right side covers.
2. Check if any fasteners are visibly loose. If so, contact Dukane for the proper tightening torque.
3. Wipe or blow away all dirt and grease in the thruster.
4. No air is required for the normal operation of a servo press. However, there may be a time when optional cooling accessories were added. This optional cooling could produce excess oil and dirt accumulation.
5. Ensure that all wire and cable connections are secure in the thruster and are not rubbing or showing wear. If they do show wear or rubbing then reroute to eliminate the problem.
6. Remount and secure the thruster covers and reconnect the generator and press AC power cords to the AC line receptacles.
Contacting Dukane

Identify Equipment

When contacting Dukane about a service–related problem, be prepared to give the following information:

- Model number, line voltage and serial number.
- Alarm/Fault indicators from the display.
- Software version (Press INFO. With selection indicators at System Information, press ENTER to get this data).
- Problem description and steps taken to resolve it.

Many problems can be solved over the telephone, so it is best to call from a telephone located near the equipment.

Mailing Address:

Dukane IAS
2900 Dukane Drive
St. Charles, IL 60174 USA

Phone: (630) 797–4900
E-mail: ussales@dukane.com
Fax: Main (630) 797–4949
Service & Parts (630) 584–0796

Website
The website has information about our products, processes, solutions, and technical data. Downloads are available for many kinds of literature.

This is the address for the main website:
www.dukane.com

Application Support
You can get application support at the following link below:
https://www.dukane.com/support/#application-support

Local Representative
You can locate your local representative at:
www.dukane.com/contact-us/
ISO CERTIFICATION

Dukane chose to become ISO certified in order to demonstrate to our customers our continuing commitment to being a quality vendor. By passing its audit, Dukane can assure you that we have in place a well-defined and systematic approach to quality design, manufacturing, delivery and service. This certificate reinforces Dukane’s status as a quality vendor of technology and products.

To achieve ISO certification, you must prove to one of the quality system registrar groups that you meet three requirements:

1. Leadership
2. Involvement

The ISO standards establish a minimum requirement for these requirements and starts transitioning the company from a traditional inspection-oriented quality system to one based on partnership for continuous improvement. This concept is key in that Dukane no longer focuses on inspection, but on individual processes.

Dukane's quality management system is based on the following three objectives:

1. Customer oriented quality. The aim is to improve customer satisfaction.
2. Quality is determined by people. The aim is to improve the internal organization and cooperation between staff members.
3. Quality is a continuous improvement. The aim is to continuously improve the internal organization and the competitive position.

View the Dukane ISO certificate of compliance at:

www.dukane.com/support/downloads/
Please refer to our website at:

www.dukane.com/contact-us
to locate your local representative.