iQ Series
ULTRASONIC GENERATOR/POWER SUPPLY
Auto-Plus MPC

User’s Manual
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Dukane
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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.

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Dukane ultrasonic equipment is manufactured under one or more of the following U.S. Patents:
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7,475,801,  7,819,158,  8,052,816,  and 10,710,310.
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<th>Revision Summary</th>
<th>Date</th>
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<td></td>
<td>Updated link to ISO certifications.</td>
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Contents

Section 1 - Installation ................................................. 1
   General User Information ........................................ 3
   Generator Overview ............................................... 4
   Key Generator Features .......................................... 4
   Thermal Considerations .......................................... 5

Section 2 - Health and Safety ........................................ 7
   General Considerations ......................................... 9
   Plastics Health Notice .......................................... 10
   Electrical Safety .................................................. 10

Section 3 - Installation ............................................... 13
   Unpacking .......................................................... 15
   Placement ............................................................ 15
   Power Grounding ................................................... 16
   Chassis Grounding Stud .......................................... 16
   Connecting Cables ................................................. 17

Section 4 - System Operation ........................................ 19
   Introduction ....................................................... 21
   iQ Auto-Plus MPC System Operational Test .................... 22
   LED Indication .................................................... 24

Section 5 - Options .................................................... 27
   Heat Sink ........................................................... 29
   Distance Option .................................................... 30
   ANYBUS Option ..................................................... 30

Section 6 - Automation Interface ................................. 31
   E-Stop Wiring and Automation System Safety Circuit ........... 33
   iQLinQ ............................................................... 34
   iQ Commander ..................................................... 34

Section 7 - Contacting Dukane ...................................... 37
## Contents

**Section 8 - Specifications** ................................. 41
- Generator Outline Drawing ................................ 43
- Weight, Operating Environment ......................... 44
- AC Power Requirements .................................... 45
- Interpreting the Model Number .......................... 46
- Regulatory Agency Compliance ............................ 47

**Section 9 - Appendices** ................................. 49
- Appendix A, List of Figures ............................... 51
- Appendix B, List of Tables ................................. 52

**Index** .......................................................... 53
SECTION 1
Introduction

General User Information
- Read The Manual First
- Notes, Cautions and Warnings
- Drawings and Tables

Generator Overview

Key Generator Features

Thermal Considerations
General User Information

Read This Manual First

Before operating your ultrasonic system, read this User’s Manual to become familiar with the equipment. This will ensure correct and safe operation. The manual is organized to allow you to learn how to safely operate this equipment. The examples given are chosen for their simplicity to illustrate basic operation concepts.

This manual provides information to set up, operate, and interface this generator/power supply.

Particular models are listed in Section 8 - Specifications.

Notes, Cautions and Warnings

Throughout this manual we use NOTES to provide information that is important for the successful application and understanding of the product. A NOTE block is shown to the right.

In addition, we use special notices to make you aware of safety considerations. These are the CAUTION and WARNING blocks as shown here. They represent increasing levels of important information. These statements help you to identify and avoid hazards and recognize the consequences. One of three different symbols also accompany the CAUTION and WARNING blocks to indicate whether the notice pertains to a condition or practice, an electrical safety issue or a operator protection issue.

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. The figures use Arabic sequence numbers (e.g. –1, –2, –3) while the tables use Roman sequence numerals (e.g. –I, –II, –III). As an example, Figure 3-2 would be the second illustration in section three while Table 3-II would be the second table in section three.
Generator Overview
This generator is designed for ultrasonic applications controlled by a Programmable Logic Controller (PLC). Using one of the supported industrial protocols, see iQLinQ™ section pg. 34, the generator can easily be integrated into a wide variety of automated systems.

The generator has a variety of status LED indicators, and built-in USB and EtherNet connectors.

The iQ Auto-Plus MPC combines an iQ Auto-Plus generator and Dukane’s patented Multi-Probe Controller in a single unit. This allows the generator to power multiple probes selected by an automated control system.

This product’s rugged internal ultrasonic generator circuitry ensures a continuous resonant frequency lock at the start of each weld. Users can modify generator performance to meet a wide variety of ultrasonic processing requirements if needed.

The generator’s compact size allows multiple units to be placed into an industrial equipment cabinet, and the generator will operate at the same international line voltage input specifications as the other generators of this product family. It also includes an RFI line filter that passes strict CE test specifications for global applications.

Key Generator Features
- **Compact Enclosure Size** requires a small footprint for either vertical or horizontal mounting into your equipment cabinet.

- **Pulse Width Modulation** incorporates patented circuitry giving the power supply the ability to efficiently change the output amplitude. This makes it possible to start large horns with reduced power. It also provides more power efficient switch-mode generator operation and increased reliability.

- **Linear Ramp Soft Start** circuitry allows the acoustic stack to ramp up to operating amplitude smoothly, minimizing the startup surges and abnormal stress to the stack and generator.

- **Automatic Tuning** tracks the resonant frequency of the acoustic stack (horn, booster, transducer) and adjusts the generator output frequency to match it. This is done for every weld cycle and eliminates the need to manually tune the generator.

- **Line Voltage Regulation** automatically maintains constant amplitude regardless of line voltage deviation. The available output power is maintained with any voltage input within the specified range. This provides consistent system performance regardless of line voltage fluctuations. It also eliminates the need for bulky, external constant–voltage transformers.

- **Load Regulation** provides constant amplitude automatically regardless of power draw. The ultrasonic output amplitude level is held to within ±1% to provide weld process consistency and reduced weld cycle times.

- **Power Factor Corrected Universal AC Power Source** means that standard 600 watt systems will operate worldwide at all industrial high line voltage levels, whether it is 100-200VAC @60Hz in Japan, 240VAC @50Hz in Europe or 100-240VAC @60Hz in the United States. There are no internal transformer taps to change for worldwide operation.

- **Amplitude Adjustment Control** allows the peak-to-peak excursion of the horn at its workface to be adjusted between 20% and 100% of the horn’s nominal amplitude.

- **Multiple Electronic Overload protection circuits** prevent instantaneous component failure in the event of extreme output overload conditions and rated overload power limit is based on the actual true RMS power output level.

- **Integrated MPC** allows sequencing up to eight ultrasonic probes. Each probe is independently controlled and monitored allowing different process settings and independent suspect or bad part alarms for each weld point.

- **Optional Weld by Distance Feature** to monitor up to eight analog 0-10 VDC encoders (requires customer supplied encoders).

- **CE Certification** means that the system meets the required European standards to be sold and used in Europe.

- **ISO Certified** means that this system has been manufactured to high quality standards and assures you of manufacturing excellence.

- **TUV Certification** - TÜV Rheinland certifies Dukane products comply with applicable UL (Underwriters Laboratories) and CSA (Canadian Standards Association) requirements.
Thermal Considerations

The thermal design of this generator is for applications that require 100% of rated power at no more than a 50% duty cycle.

**NOTE**
Add transducer cooling as necessary to keep front mass temperature to 110 °F or less.
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SECTION 2

Health and Safety

General Considerations .............................................. 9
Plastics Health Notice .................................................. 10
Electrical Safety .......................................................... 10

Power Grounding Connection ....................................... 11
General Considerations

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 cover unless directed to do so by Dukane. The generator produces hazardous electrical voltages which could cause injury.

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

See **Electrical Safety** for grounding instructions, Page 10.

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

**Foot Switch** - Do not use a foot switch. Using a foot switch in place of the optical touch finger switches (operate switches) violates OSHA regulations. Do not install a foot switch.

---

**NOTE**

These recommendations apply to the welding system. System in this manual refers to a complete group of components associated with the welding of parts, also known as an ultrasonic assembly system. A typical **iQ Series** system consists of the iQ generator, switches, controls, cables, transducer, booster, horn, and fixture.

---

**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.*

**WARNING**

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

**CAUTION**

*At some time you may be asked to remove equipment covers by the Dukane Service Dept. personnel. Before doing so, disconnect the unit electrically from the incoming AC power line.*
General Considerations

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

Do Not Wear Loose Clothing or Jewelry - They can become caught in moving parts.

Stay Alert - Watch what you are doing at all times. Use common sense. Do not operate the press when you are tired or distracted from the job at hand.

Do Not Operate the Equipment - Your judgement or reflexes could be impaired while taking prescription medications. If so, do not operate the equipment. Be familiar with warning labels and recommended activity restrictions that accompany your prescription medications. If you have any doubt, do not operate the equipment.

Plastics Health Notice

Certain plastic materials, when being processed, may emit fumes and/or gases that may be hazardous to the operator’s health. Proper ventilation of the work station should be provided where such materials are processed. Inquiries should be made to the U.S. Department of Labor concerning OSHA regulations for a particular plastic prior to processing with Dukane ultrasonic equipment.

Electrical Safety

The iQ Series generator provides the operating power and power returns. Make sure the generator is grounded properly.

In addition to the safety considerations, proper grounding is essential for the effective suppression of RFI (Radio Frequency Interference). Every generator contains a 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.

Always connect the included ground wire from the PE ground of the generator to the nearest grounded metal pipe or equivalent earth ground by means of a ground clamp.

CAUTION

See TUV test report number 31370614.003 for more detail on specific model numbers and frequencies.

WARNING

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.

CAUTION

When making cable connections to system equipment or disconnecting cables from system equipment, make sure electrical power to the system is turned off, and 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.
Electrical Safety

Power Grounding Connection

Figure 2–1 illustrates how the AC line is connected to the 
iQ
Auto-Plus MPC generator.

![Diagram of AC Line Connection]

<table>
<thead>
<tr>
<th>Terminal</th>
<th>Wire Color</th>
</tr>
</thead>
<tbody>
<tr>
<td>L (Live)</td>
<td>Black</td>
</tr>
<tr>
<td>G (Ground)</td>
<td>Green</td>
</tr>
<tr>
<td>N (Neutral)</td>
<td>White</td>
</tr>
<tr>
<td></td>
<td>North America</td>
</tr>
<tr>
<td></td>
<td>Europe</td>
</tr>
<tr>
<td>Black</td>
<td>Lt. Brown</td>
</tr>
<tr>
<td>Green</td>
<td>Green w/yellow</td>
</tr>
<tr>
<td></td>
<td>stripe</td>
</tr>
</tbody>
</table>

Table 2-I Conventional Wire Color Code

CAUTION

If there is any question about grounding of your equipment and/or its electrical power source, contact a qualified electrician.

CAUTION

For safe system operation: To avoid the risk of fire, electrical shock, serious injury or death, the power line safety ground must be securely connected to the center terminal on the (pluggable) AC line connector.
SECTION 3

Installation

Unpacking .................................................. 15
Placement .................................................. 15
Power Grounding ......................................... 16
Chassis Grounding Stud ............................... 16
Connecting Cables ....................................... 17
    Basic Connections ................................... 17
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Unpacking
Carefully open your shipping container, and make sure it contains the items shown on the shipping documents. Inspect all items, and report any missing items or damage immediately.

Placement
Make certain generator placement and cable routing do not interfere with normal operation. Maintain easy access to your equipment.

The operator should have unobstructed access to cables and wiring.

Two sets of removable mounting brackets are attached to the generator. See Figure 3-1, below. Use them to securely mount the unit vertically or horizontally in your equipment cabinet.

If the generator is installed inside an enclosure with a door, be sure there is adequate clearance for the system cables with the door closed.

NOTE
For equipment weights see Page 44, in Section 8, Specifications.

NOTE
Heat Dissipation - Provide enough air flow for heat dissipation. For best heat dissipation, mount the generator vertically as shown in Figure 5-1 on page 29.

Figure 3-1  Mounting Bracket - Rear

Placement in a Seismic Region
If the iQ generator is to be used in an active seismic region, secure the unit by rack-mounting it or by securing the unit to a benchtop.

Refer to Dukane’s website for more information about installation in a seismic zone. See Application Note AN511 - https://documents.dukane.com/AppNote/An511.pdf
Power Grounding

For safety, the **iQ** Auto-Plus MPC chassis must be properly grounded. The power line ground connection is located on the center screw terminal on the AC Power Inlet pluggable screw terminal connector.

This system ground connection must be attached to an earth ground potential at the electrical box that supplies power to the enclosure or cabinet in which the **iQ** Auto system is installed.

The ground connection should comply with all of the requirements specified by the National Electrical code and any other local codes or ordinances that are applicable.

Chassis Grounding Stud (PE)

Proper grounding for the generator chassis is essential for the effective suppression of electrical noise or RFI (Radio Frequency Interference). Every ultrasonic generator contains a RFI filter that blocks noise on the AC power line from entering the system control circuitry. This filter also prevents ultrasonic frequency noise from being fed back into the AC power line. For the RFI filter to operate effectively, it is necessary to correctly ground the system. The power line ground previously mentioned is mandatory.

Additionally, the included grounding wire must be connected from the grounding PE stud connection (see Figure 3-1) to the nearest grounded metal pipe or equivalent earth ground.

This will improve the chassis ground connection and may be needed in noisy industrial environments.

See **Connecting Cables** on the next page.
Connecting Cables
Basic Connections

Complete these basic connections for the standard configuration as shown below:

- AC Line Input
- *iQLinQ™*
- Ultrasound Outputs
- Grounding

Details about the various system connectors and their pin assignments are covered in the next section.

1. Wire the AC line connector, and attach it to the generator’s power inlet connector, matching the power source line, ground, and neutral with the generator’s line, ground, and neutral connector pins - A in Figure 3-4. (See Figure 2-1 also.)

2. Connect the appropriate cable from the PLC to the Ethernet/IP Modbus - B in Figure 3-2, or ANYBUS module port for *iQLinQ™* control of the generator.

3. Attach high-voltage coaxial ultrasound cables (from the ultrasonic probes), the ultrasound output connectors - C in Figure 3-2.

4. Connect the included ground wire from the grounding stud, D in Figure 3-2, to earth ground.

5. Connect the included E-STOP terminal block to a switch or jumper the two connections together (E in Figure 3-2). Plug the terminal block into the E-Stop port.

---

**NOTE**

**Connecting Cables**

Two-piece pluggable terminal block connectors are used for the System I/O connections and the AC Power Inlet connections. This type of connector allows the wiring to be attached to the spring loaded terminal connector, which plugs into the mating connector on the *iQ* Auto system front panel. In the event a field replacement unit is required, the screw terminal connectors with the wires can be easily detached and then plugged into the replacement unit.

**NOTE**

**AC Power Inlet**

The unit does not include a power switch, and is powered ON whenever the AC line power is live. The unit can be switched ON/OFF with a user-supplied AC circuit breaker wired to the AC power inlet connection.

---

*Figure 3-2 Generator Front View*
CAUTION

Ultrasound Output Connector

The ultrasound output connector used with all standard generators is a high voltage (5000V) coaxial style SHV-BNC connector. This connector provides superior shielding of electrical noise, compared to other types of connectors. The ultrasound output connector mates with fully shielded coaxial ultrasound cables that are secured with a simple and reliable quarter-turn bayonet style attachment mechanism.

The ultrasonic output from this connector (that drives the attached ultrasonic load) is a very high AC voltage. At high power levels this can exceed 2 amps of current and must be securely terminated via the ultrasound cable for safe operation. Use original equipment ultrasound cables for safe and reliable system operation. Improperly assembled ultrasound cables can result in high voltage arcing and will destroy the ultrasound connectors.

Do not use the generator if there is any evidence arcing (black carbon deposits) on either the ultrasound output connector or the ultrasonic cable connectors.
SECTION 4
System Operation

Introduction ............................................... 21
iQ Auto-Plus MPC System Operational Test ............ 22
LED Indication ............................................. 24
Introduction

The ultrasonic \textit{iQ} Auto-Plus MPC generator/power supply, is specifically designed to meet the machine builder’s requirements. This unit is automation ready and has the capability of controlling up to 8 probes.

The generator’s USB, Ethernet, and optional ANYBUS ports extend communication and control functions depending on the specifications of a particular generator model.

This section deals primarily with basic operational testing and troubleshooting.
**iQ Auto-Plus MPC System Operational Test**

1. Verify that the standard system installation is complete and all cables are connected. Refer to installation instructions included in Section 3, if needed.

2. After completing Step 1, activate line power to the *iQ* Auto-Plus system.

   **Normal Condition:**
   - GREEN - The POWER and STATUS LEDs on the *iQ* Auto-Plus panel should both light up GREEN.
   - The system is now ready to operate.

**Troubleshooting Abnormal *iQ* Auto-Plus System Conditions**

**POWER LED**
- RED - If this LED lights up RED, check line voltage level.
- GRAY - If this LED is a gray color (not lit), check line input.

3. After completing Step 2, test ultrasound output by using *iQLinQ™* or *iQ Commander™*

   **Normal Condition:**
   - The system is operating properly when power is delivered to the attached stack.

4. Check the operational Status LED

   An **Overload Fault** latches until the next time U/S is activated.

   Any **Fault** status activates when any fault is detected by the system. It latches until the start of the next cycle, unless it is activated due to Overtemperature or Power Not OK alarm.

   Five fault conditions are monitored by the *iQ* Auto-Plus system for Any Fault:
   - **Average Overload**
     (Automatically resets on next cycle)
   - **Peak Overload**
     (Resets same as Average Overload)
   - **Overtemperature**
     (Automatically resets on cool-down)
   - **Power Not OK**
     (AC line voltage under minimum voltage)
   - **Frequency Overload**
     (Automatically resets on next cycle)
   - **Over Voltage Overload**
     (Automatically resets on next cycle)

   **Continued**
5. Check MPC Channels

Check that all MPC channels can be selected and activated. The automation control system activates input selection bits.

Select a channel: PROBE SELECTION STATUS indicator illuminates GREEN when it is the selected channel.

Activate ultrasound: Activate the iq Auto-Plus ultrasound output. The PROBE SELECTION STATUS indicator on the selected channel should switch to RED (from GREEN).

The probe on the selected channel should deliver ultrasonic power.

Repeat this test for all MPC channels.
LED Indication

There are seven LEDs on the iQ Auto-Plus generator:

- POWER (1)
- ETHERNET (2)
- MOD (1)
- NET (1)
- STATUS (1)
- PROBE SELECTION (2, 4, 6, or 8)

Figure 4-2 shows LED location, and Table 4-1 shows their indications.

Figure 4-2   LED Locations
<table>
<thead>
<tr>
<th>LED</th>
<th>COLOR</th>
<th>INDICATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>POWER</td>
<td>Gray</td>
<td>OFF - No AC line voltage.</td>
</tr>
<tr>
<td></td>
<td>Green - Steady</td>
<td>Generator is Ready</td>
</tr>
<tr>
<td></td>
<td>Red - Steady</td>
<td>AC Voltage problem. Check AC Line Voltage level</td>
</tr>
<tr>
<td>ETHERNET</td>
<td>Amber - Steady</td>
<td>On - Operating as a 1000 Mbps connection</td>
</tr>
<tr>
<td>Left - Speed Indicator</td>
<td>Green - Steady</td>
<td>On - Operating as a 100 Mbps connection</td>
</tr>
<tr>
<td></td>
<td>Red - Blinking</td>
<td>Operating as a 10 Mbps connection</td>
</tr>
<tr>
<td>Right - Activity Indicator</td>
<td>Yellow - Blinking</td>
<td>There is communications activity.</td>
</tr>
<tr>
<td></td>
<td>Off</td>
<td>No activity.</td>
</tr>
<tr>
<td>MOD</td>
<td>Red - Steady</td>
<td>Unrecoverable Fault</td>
</tr>
<tr>
<td></td>
<td>Red - Blinking</td>
<td>Minor Fault</td>
</tr>
<tr>
<td></td>
<td>Green - Steady</td>
<td>Device is Operational</td>
</tr>
<tr>
<td></td>
<td>Green - Blinking</td>
<td>Standby</td>
</tr>
<tr>
<td></td>
<td>Gray</td>
<td>Off - No power.</td>
</tr>
<tr>
<td>NET</td>
<td>Red - Steady</td>
<td>Duplicate IP Address (Not Supported)</td>
</tr>
<tr>
<td></td>
<td>Red - Blinking</td>
<td>Connection Time Out</td>
</tr>
<tr>
<td></td>
<td>Green - Steady</td>
<td>Connection</td>
</tr>
<tr>
<td></td>
<td>Green - Blinking</td>
<td>No Connection</td>
</tr>
<tr>
<td>STATUS</td>
<td>Green - Steady</td>
<td>Ready</td>
</tr>
<tr>
<td></td>
<td>Yellow - Steady</td>
<td>E-STOP is Active</td>
</tr>
<tr>
<td></td>
<td>Orange - Steady</td>
<td>In Cycle</td>
</tr>
<tr>
<td></td>
<td>Red - Steady</td>
<td>Overload - Average</td>
</tr>
<tr>
<td></td>
<td>White - Steady</td>
<td>Over Temperature</td>
</tr>
<tr>
<td></td>
<td>Purple - Steady</td>
<td>Invalid Auto In</td>
</tr>
<tr>
<td></td>
<td>Red - Blinking</td>
<td>Overload - Peak</td>
</tr>
<tr>
<td></td>
<td>Orange - Blinking</td>
<td>Overload - Over Voltage (Transducer)</td>
</tr>
<tr>
<td></td>
<td>Blue - Steady</td>
<td>Overload - Frequency Lock Failed</td>
</tr>
<tr>
<td></td>
<td>Light Blue - Blinking</td>
<td>Overload - Frequency Lock Lost</td>
</tr>
<tr>
<td></td>
<td>Green to Purple - Blinking</td>
<td>Invalid MPC Probe Selection</td>
</tr>
<tr>
<td></td>
<td>Red to Green - Blinking</td>
<td>Reduce Power Mode (600W)</td>
</tr>
<tr>
<td></td>
<td>Red to Yellow - Blinking</td>
<td>Hardware/Configuration Fault</td>
</tr>
<tr>
<td></td>
<td>Yellow - Blinking</td>
<td>Power Not OK / Under AC Line Voltage</td>
</tr>
<tr>
<td></td>
<td>Purple - Blinking</td>
<td>Cycle Start Reject</td>
</tr>
<tr>
<td>PROBE STATUS</td>
<td>Gray</td>
<td>OFF - Not Selected</td>
</tr>
<tr>
<td></td>
<td>Green</td>
<td>ON - Selected</td>
</tr>
<tr>
<td></td>
<td>Red</td>
<td>Selected and Ultrasound Active</td>
</tr>
</tbody>
</table>

Table 4-I  LED Colors and Indication
SECTION 5

Options

Heat Sink ................................................................. 29
Distance Option ..................................................... 30
ANYBUS Option ...................................................... 30
**Heat Sink**

The thermal design of 600 watt generators is for applications that require a power of 600 watts or less at duty cycles less than 50%.

For applications that require higher duty cycles, an optional cooling package is available. The Dukane part number for the package is 438-1020.

The cooling package is standard on 1200 watt models and includes a heat sink that mounts to the generator as shown in Figure 5-1 below.

When operating an iQ Auto-Plus MPC generator with the optional heat sink, do so with the generator in the vertical position as shown in Figure 5-1. Air flow is enhanced, and the heat sink’s efficiency is maximized.

**CAUTION**

Operate the iQ Auto-Plus generator in the vertical position as shown in Figure 5-1. This allows for optimal air circulation enabling the heat sink to be most effective.
Distance Option
This option can monitor up to eight analog 0-10 VDC encoders. A maximum of one customer supplied encoder for each MPC channel.

See https://documents.dukane.com/AppNote/AN528.pdf for more information.

ANYBUS Option
This option is required for iQLinQ communication via mounts, Profinet, ProfiBus, PowerLink, EtherCat, or CC-Link.
SECTION 6

Automation Interface

Dedicated E-Stop Switch Wiring Diagram ............... 33
Automation System Safety Circuit Wiring Diagram .... 33
iQLinQ™ ................................................. 34
iQ Commander™ ...................................... 34
Dedicated E-Stop Switch Wiring Diagram

Automation System Safety Circuit Wiring Diagram

Figure 6-1  E-STOP Wiring and Automation System Safety Circuit
**iQLinQ™**

**iQLinQ™** communication options allow automated systems to monitor and change settings in *iQ* generators. These options provide machine builders the ability to integrate the generator into an electrical cabinet and to use the machine’s HMI to program or monitor weld settings.

All Dukane *iQ* Auto-Plus generators support **iQLinQ™** communication, but the available features vary based on the model. The supported protocols are EtherNet/IP, Profinet, ProfiBus, PowerLink, EtherCAT, and CC - Link. **iQLinQ™** provides a cost effective solution for adding the Weld by Energy feature that is only available in the more advanced *iQ* generators.

**iQLinQ™** solutions are available to provide complete ladder logic and HMI screens that can be dropped into Allen Bradley (RSLogix 5000) and Siemens (Step 7) PLC projects. Contact your local Dukane representative for more information about the **iQLinQ™** options.

### Control Parameters available via **iQLinQ™**

1. Set weld method to Time, Energy, Peak Power, Distance and/or Position. Set associated values in seconds, joules, watts, or millimeters/inches.
2. Set Amplitude, Ramp UP Time, and Ramp Down Time.
3. Enable and set Trigger by Power or Trigger by Position parameters.
4. Enable and set Hold time.
5. Enable and set Afterburst delay and duration.
6. Enable checking for Suspect Parts. Set maximum and minimum values for Time, Power Energy, Distance, and/or Position.
7. Enable checking for Bad Parts. Set maximum and minimum values for Time, Power, Energy, Distance, and/or Position.
8. Configure advanced hardware settings including Frequency Tracking, Free Run Frequency, Frequency Lock and Hold, and Frequency limits.

### Parameters that can be obtained via **iQLinQ™**

1. All parameters that are configured via **iQLinQ™**
2. Real time data which includes welder state (ultrasound active or not), frequency, power, amplitude, and position.
3. Weld cycle data from previous weld which includes:
   - Cycle count, Good, Bad, and Suspect Part information
   - Process Limit setting exceeded or not reached if Bad or Suspect Part checking is enabled
   - Weld Time & Weld Energy
   - Peak Power
   - Weld Distance
   - Weld End Position

For more information on how to control and/or monitor specific parameters, *iQ* Generator **iQLinQ™** Communication and Control documentation is available. Signing a non-disclosure agreement is required to obtain this documentation.

**iQ Commander™**

Using Dukane’s PC interface tool, the Windows PC based software, connected via a standard USB cable (Dukane part number 200-1906), can be used to configure and monitor the *iQ* Auto-Plus MPC generators. This tool allows the user to easily perform field firmware updates, product setup, parameter configuration, system diagnostics, and setting an IP address for a communications protocol.

Below is a link to download the **iQ Commander™** software:

[https://update.dukane.com](https://update.dukane.com)

### To install **iQ Commander™**

1. Download the installation file from (http://update.dukane.com/) and save to the desired location on the PC.
2. Double-click on the installation file.

3. Once prompted, click on “Next >” on the “Welcome to the InstallShield Wizard for the iQ Commander” page. The executable will start the installation process.

4. When the progress bar is nearly full, a new window will appear asking to install the FTDI CDM Drivers. This window may appear behind the iQ Commander™ installation window. If the FTDI CDM Driver window is not visible, move the iQ Commander™ installation window to the side to see the FTDI CDM Drivers installation window.

5. On the FTDI CDM Drivers installation window, click on “Extract”, “Next >”, accept the agreement, “Next >”, and then “Finish” to install the first set of FTDI Drivers installation window.

6. Another window will pop up asking to install another set of FTDI CDM Drivers. Repeat step 5 to install the second set of drivers.

7. Once the drivers are installed, Click on “Finish” to complete the process. The user can connect a USB cable from the PC to the Auto Plus generator and start the program.

---

**Operations that can be done via iQ Commander™**

1. Update the iQ Auto Plus generator firmware.
2. Test the ultrasonic stack.
3. Scan an ultrasonic stack to determine the optimal Free Run Frequency.
4. Weld a part.
5. Select a probe when an MPC module is connected.
6. Set weld method to Time, Energy, Peak Power, Distance, or Position and the associated value in seconds, joules, watts, or millimeters.
7. Configure custom I/O.
9. Enable and set Trigger by Power parameters.
10. Enable and set Hold Time.
11. Enable and set Afterburst delay and duration.
12. Enable checking for Suspect Parts. Set maximum and minimum values for Time, Power, Energy, Distance, and/or Position.
13. Enable checking for Bad Parts. Set maximum and minimum values for Time, Power, Energy, Distance, and/or Position.
14. Configure advanced hardware settings including, Free Run Frequency, Frequency Tracking, Frequency Lock and Hold, and Frequency Limits.

---

**Parameters that can be obtained via iQ Commander™.**

1. All parameters that are configured via iQ Commander™.
2. Real time data which includes welder state (ultrasound active or not), frequency, power, position, and amplitude.
3. Weld cycle data from previous weld which includes: Cycle Count; Good, Bad, and Suspect Part information; Process Limit setting exceeded or not reached if Bad or Suspect Part checking is enabled; Weld Time; Weld Energy; Peak Power; Weld Distance; Weld Position.
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SECTION 7

Contacting Dukane
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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
• Fault/error indicators from the Status LED and/or iQ Commander.
• Software version (Displayed in the “MAIN” tab in iQ Commander).
• 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
                   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.

Here is the address for the main website:

www.dukane.com

You can locate your local representative at:

www.dukane.com/contact-us/
SECTION 8

Specifications

Generator Outline Drawing ........................................ 43
Weight ................................................................. 44
Operating Environment ............................................. 44
AC Power Requirements ............................................. 45
Interpreting the Model Number ................................... 46
Regulatory Agency Compliance .................................... 47
This page intentionally left blank
## Weight

Standard Model: 16 pounds (7.26 kg)

Shipping: Add 5 pounds (2.3 kg) to unit weight for packing materials.

## Operating Environment

Operate the generator 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

Nonoperating 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
AC Power Requirements

<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 @ Maximum RMS Current</th>
</tr>
</thead>
<tbody>
<tr>
<td>20kHz</td>
<td>20AM060-UX-XX</td>
<td>600</td>
<td>100-240V 50/60 Hz @ 15 Amps Max</td>
</tr>
<tr>
<td>20kHz</td>
<td>20AM120-2X-XX</td>
<td>1200</td>
<td>200-240V 50/60 Hz @ 15 Amps Max</td>
</tr>
<tr>
<td>30kHz</td>
<td>30AM060-UX-XX</td>
<td>600</td>
<td>100-240V 50/60 Hz @ 15 Amps Max</td>
</tr>
<tr>
<td>30kHz</td>
<td>30AM120-2X-XX</td>
<td>1200</td>
<td>200-240V 50/60 Hz @ 15 Amps Max</td>
</tr>
<tr>
<td>35kHz</td>
<td>35AM060-UX-XX</td>
<td>600</td>
<td>100-240V 50/60 Hz @ 15 Amps Max</td>
</tr>
<tr>
<td>35kHz</td>
<td>35AM120-2X-XX</td>
<td>1200</td>
<td>200-240V 50/60 Hz @ 15 Amps Max</td>
</tr>
<tr>
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<td>600</td>
<td>100-240V 50/60 Hz @ 15 Amps Max</td>
</tr>
<tr>
<td>70kHz</td>
<td>70AM012-UX-XX</td>
<td>120</td>
<td>100-240V 50/60 Hz @ 15 Amps Max</td>
</tr>
</tbody>
</table>

*Table 8-I  AC Power Requirements*
Figure 8-2
Interpreting the Model Number

Example System Number shown above:
30 AM 120 - 2 F - C5 - 02

System Assembly Detailed Description:
30 kHz 1200 Watt System operates on 200-240V AC line with a POWERLINK communications module and two point MPC installed.

1200W is only available in 30k and 35k units.

AM = Auto Series With integrated MPC Panel Mount Chassis

Power Switch Configuration

- 012 = 120 Watts
- 060 = 600 Watts
- 120 = 1200 Watts

AC Line Input

- 2 = 200-240V
- U = 100-240V

System Process Control

- 0: No Additional Communication Options Installed
- F: Advanced Communication Support

- 2: 2 Probes
- 4: 4 Probes
- 6: 6 Probes
- 8: 8 Probes

Number of Probes

Options Slot #1

- 0 = Basic Style
- 1 = Power Supply Configuration
- 2 = System FSC PollyFast Controller Support
- 3 = Advanced Communication System Support
- 4 = POWERLINK Interface Module
- 5 = Ethernet Interface Module
- 6 = ProFINET Interface Module
- 7 = OtherCAT Interface Module
- 8 = Modbus TCP Interface
Regulatory Agency Compliance

FCC
The 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 Européenne (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.
- The Machinery Directive 2006/42/EC.
- EN ISO 12100: Safety of Machinery - General principles of design, risk assessment, and risk reduction.

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

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

UL
The iQ generator complies with these standards:

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

and

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

as verified by TÜV Rheinland.

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.
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Appendices

Appendix A, List of Figures ......................... 51
Appendix B, List of Tables .......................... 52
## Appendix A

### List of Figures

<table>
<thead>
<tr>
<th>No.</th>
<th>Description</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>2-1</td>
<td>AC Line Connection</td>
<td>11</td>
</tr>
<tr>
<td>3-1</td>
<td>Generator Mounting Bracket</td>
<td>15</td>
</tr>
<tr>
<td>3-2</td>
<td>Generator Front View</td>
<td>17</td>
</tr>
<tr>
<td>4-1</td>
<td>Generator POWER LED Detail</td>
<td>22</td>
</tr>
<tr>
<td>4-2</td>
<td>LED Locations</td>
<td>24</td>
</tr>
<tr>
<td>5-1</td>
<td>Generator with Heat Sink Option</td>
<td>29</td>
</tr>
<tr>
<td>6-1</td>
<td>E-STOP Wiring and Automation System Safety Circuit</td>
<td>33</td>
</tr>
<tr>
<td>8-1</td>
<td>Generator Outline Drawing</td>
<td>41</td>
</tr>
<tr>
<td>8-2</td>
<td>Interpreting the Model Number</td>
<td>44</td>
</tr>
</tbody>
</table>
## Appendix B

<table>
<thead>
<tr>
<th>No.</th>
<th>Description</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>2-I</td>
<td>Conventional Wire Color Code</td>
<td>11</td>
</tr>
<tr>
<td>4-I</td>
<td>LED Colors and Indication</td>
<td>25</td>
</tr>
<tr>
<td>8-I</td>
<td>AC Power Requirements</td>
<td>45</td>
</tr>
</tbody>
</table>
This page intentionally left blank
Index

A
Agency Compliance  47
CE Marking  47
FCC  47
IP (International Protection) Rating  47
Appendices  53
Appendix A - List of Figures  51
Appendix B - List of Tables  52
Automation Interface  31
ANYBUS Option 30

C
Chassis Grounding Stud  16
Connecting Cables  17

D
Dukane
  Email  39
  Phone  39
  Service and Parts  39
  www.dukane.com  39

E
Electrical Safety
  Power Grounding Connection  11

F
FCC  47

G
General User Information  3
Drawings and Tables  3
Notes, Cautions and Warnings  3
Read This Manual First  3
Generator
  Features  4
  Overview  4
  Thermal Considerations  5

H
Health and Safety
  Electrical Safety  10
  General Considerations  9
  Plastics Health Notice  10
  Recommendations  9
  Heat Sink  29

I
Installation
  Connecting Cables  17
  Placement  15
  Placement in a Seismic Region  15
  Power Grounding  16
  Unpacking  15
  Interpreting the Model Number  46
  IP (International Protection) Rating  51
  iQLinQ™  38
N
Notes, Cautions and Warnings  3

O
Options
  Distance Option  30
  Heat Sink  29
  ANYBUS Option 30

R
Regulatory Agency Compliance  47

S
Specifications
  AC Power Requirements  45
  Interpreting the Model Number  46
  Operating Environment  44
  Weight  44
System Operation
  Introduction  21
  iQ Auto-Plus MPC System Operational Test  22
  LED Indication  24

T
Thermal Considerations  5
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.

Dukane products are manufactured in ISO registered facilities.

View the Dukane ISO certificate of compliance at: https://www.dukane.com/support/downloads/
Please refer to our website at:

www.dukane.com/contact-us/

to locate your local representative.