

iQ Series

ULTRASONIC GENERATOR/POWER SUPPLY

Auto-Plus



HAND PROBE



AUTOMATED



PRESS

Best Installation Practices



Generator Mounting:	<ul style="list-style-type: none">Generators should be mounted in the vertical direction for flow through convection cooling (see page 3 for illustration).2" (51 mm) minimum clearance around vent holes, with 0.75" (19 mm) clearance on the bottom where the heat sink is exposed.In environments where ambient temperature will exceed 90°F (32°C), use generator models with a heatsink and cooling fans.
Generator Control:	<ul style="list-style-type: none">Implement Industrial Ethernet communication protocol. Compatible protocols are CC-Link, EtherCAT, EtherNet/IP, Modbus, PowerLink, Profibus, and Profinet.Use the DEMO source code from the CD to interface with the generator.Industrial Ethernet protocols only require the Enable signal to be hard wired. (See APP NOTE AN514 for PLC timing and additional info)
Process Control:	<ul style="list-style-type: none">Weld by Energy is recommended for most applications.Actuate each probe with individual pressure and flow controls.Initiate sonics (pretrigger) before the horn contacts the part, especially in staking or swaging applications.Implement patented Trigger by Power for precise indication of part contact and more consistent weld results. (See APP NOTE AN506)When using a MPC with a broad range of operating frequencies between horns, consult APP NOTE AN513 regarding the usage of the Frequency Tracking feature.
Probe Mounting:	<ul style="list-style-type: none">Whenever possible, the horn should be perpendicular to the part. Consult a Dukane Applications Engineer for horns that require face angles.Stack motion must be designed to prevent the horn from contacting metal at any time.The probe travel should be limited to prevent the horn from contacting the fixture if no part is in place.Dukane dual probe mounts are available. For 30 kHz, 35 kHz, and 40 kHz use document EX-8471-00. For Mini 20kHz use document EX-8474-00.
Probe Connections:	<ul style="list-style-type: none">Use Dukane ultrasound cables. Dukane cables are properly rated for the high voltage used to operate the ultrasonic probes.Strain relieve all cables, so no tension or movement is induced on the connector.The minimum cable bends for the ultrasound cable is 6" (152 mm) radius for a standard cable and 3" (76 mm) for a high flex cable.Route the ultrasound cables separate from the control cables.Do not coil the excess cabling.
Probe Cooling:	<ul style="list-style-type: none">While low power and low duty cycle applications may not need cooling, in a production environment cooling is recommended.No part of the probe or horn surface should exceed 110°F (43°C). If surface temperatures are approaching 110°F, implement cooling. Cooling ports are provided for this purpose.Cooling air entering the probe must be clean and dry (above the dew point), as it is blowing directly on electrical components.Use a manifold configuration, not a daisy chain, for cooling air plumbing.For sealed probes, it is acceptable to use the exhaust air from the probe to cool the horn surface.Vortex tube type cooling may be required for high duty cycle, high power applications such as horns mounted on robotic arms.

Benchmarking: Benchmark each stack (an assembly of probe, booster, and horn) for frequency and power while operating in free air. This provides reference information throughout the life cycle of each stack. This information can be used for comparison when troubleshooting wear and mating surface fatigue. See the table below for typical stack operating frequency ranges.

Probe Care: Always use the proper spanner wrenches when disassembling the ultrasonic stack assembly. It is preferred to use a bench vice and a torque wrench using 438-343 wrench tools. Stacks do require periodic maintenance. At minimum, once per year, the probe and horn should be separated, and the mating surfaces inspected. If there are signs of pitting or contamination on any surfaces, those surfaces should be cleaned and possibly lapped. Consult the Dukane tooling department for composite horn assembly maintenance.

Specific instructions regarding care of the probe and proper torque specifications can be found here: <https://www.dukane.com/reconditioning-the-ultrasonic-stack>.

More in-depth information can be found here: <https://documents.dukane.com/DesignGuides/Ultrasonic Probes.pdf>

Once assembled, the stack should be tested. Operate the stack in free air for approximately 20 seconds. Feel the probe and horn to detect any indication of localized warmth on the surface. A temperature difference as little as 10°F, when compared to the rest of the surface, may indicate a problem in the area where the warmth is felt. This test should be done with a stack that has had time to equalize to room temperature.

Probe Choices: The table below lists the probes most commonly used with the *iQ Auto-Plus* generators. Lower frequencies can be chosen when shorter weld times or a more robust solution is required.

(See App Note [AN522](#): Installation Guidelines for Dukane Probes Used in Automation for more information)

Typical Probes Used for Multi-Unit Applications				
Model	Frequency	Typical Operating Frequency Range @ 25°C	Maximum Wattage	Diameter
41A40XX **	40 kHz	+/- 100Hz	600	1.61" (41 mm)
41C28-XXX	40 kHz	+/- 100Hz	600	2.00" (51 mm)
41A35RXX	35 kHz	+/- 75Hz	1200*	1.875" (48 mm)
41A60-XXX	30 kHz	+/- 75Hz	1800*	2.00" (51 mm)
41Q20XX	20 kHz	+/- 50Hz	900*	2.00" (51 mm)

Notes:

* Consult an Applications Engineer for power ratings greater than 750 Watts.

** Probe to be with basic ultrasonic tooling when close probe spacing is necessary. Consult Dukane applications engineers when considering using this probe.

iQ Auto-Plus for Vertical Mount Configuration



Application notes are technical documents written by our engineering staff. These documents offer specific information regarding integrating our welders into automated systems. To access these documents, please visit our Application Notes webpage:

<https://www.dukane.com/support/downloads/>

Application notes referenced in the document are:

<https://documents.dukane.com/AppNote/An514.pdf>

<https://documents.dukane.com/AppNote/AN506.pdf>

<https://documents.dukane.com/AppNote/An513.pdf>

<https://www.dukane.com/reconditioning-the-ultrasonic-stack>

<https://documents.dukane.com/DesignGuides/Ultrasonic Probes.pdf>

<https://documents.dukane.com/AppNote/AN522.pdf>

iQ Auto Plus manual is on our webpage here:

<https://documents.dukane.com/Manuals/403-591.pdf>

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