

Dukane's Stack Scan Feature in *iQ Auto Plus, AiM, and Infinity Systems*

Introduction

Dukane's Stack Scan feature can be used to improve the consistency of starting an ultrasonic stack that is not near the nominal operating frequency of the generator. This feature scans the stack to determine the optimum starting frequency and provides a method for setting the start up frequency (Free Run Frequency) to this frequency. Starting the stack with the optimum Free Run Frequency (FRF) significantly reduces the chances that an alarm will occur during start up.

When the Stack Scan Feature Should Be Used:

1. If U106 Peak Overload or U104 Overload Frequency alarms occur at the beginning of a weld cycle.
2. If the Frequency of the stack running in free air is more than 100Hz from the default Free Run Frequency of the generator.

When the Stack Scan Feature Will Not Help:

1. If Peak Overloads occur after the amplitude ramp up is complete, especially if the overload occurs near the end of the weld cycle.

Background Information:

To better understand how the Stack Scan feature helps to start a stack, a brief description of the generator operation is required. Dukane *iQ* generators provide a feature referred to as Digi-Trac Tuning. This feature adjusts the generator output frequency to match the resonant frequency of the acoustic stack (horn, booster, and transducer). Digi-Trac operation can be broken down into two separate segments - acquiring the resonant frequency during cycle startup and maintaining the frequency during the remainder of the cycle. Setting the FRF to the frequency suggested by the scan considerably improves the chances of acquiring the frequency by making sure the starting frequency is close to the resonant frequency of the stack. This significantly reduces the chances that a peak or frequency overload alarm will occur. Either of these alarms will terminate the weld cycle.

Stack Scan Details:

This feature searches for the optimal Free Run Frequency in the range specified by the Frequency Limits setting. If one is found, the user is asked if they would like to set the Free Run Frequency to the optimal Free Run Frequency determined by the scan. Although the user is not required to set the Free Run Frequency to this frequency, Dukane recommends doing so to receive all the benefits of the Stack Scan feature. It should be noted that it is possible that the result of the scan is incorrect due to: a poorly assembled stack; the stack is not connected to the generator; the horn is in contact with something; or, the stack is damaged (cracked horn, etc.). If the result of the scan appears to be outside of normal operating range, do not change the Free Run Frequency.

Before Performing a Scan:

1. The stack must be properly assembled and connected to the iQ generator. For more information on stack care and maintenance download Ultrasonic Probes/Stacks – Understanding and Caring for the Heart of Your Ultrasonic System at the following link. [https://documents.dukane.com/DesignGuides/Ultrasonic Probes.pdf](https://documents.dukane.com/DesignGuides/Ultrasonic%20Probes.pdf)
2. The horn must be in free air (not touching anything).
3. The frequency limits setting must include the resonant frequency of the stack. The default frequency limits setting will include correctly tuned stacks but, it is possible that a badly worn or poorly tuned horn might be outside these limits.

If the instructions listed above are not followed, then the scan may not find a frequency or the frequency that is found might be the wrong value for correct operation.

Scan the Stack:

iQ ES Series (iQ Explorer II) / Infinity Series (IQ Explorer 3):

1. Enable Advanced Process Settings, if not already enabled: Select the Advanced Process Settings check box in the upper-right portion of the Process Settings tab of welder.
2. Run the scan: Click on the Advanced button and then click on the Scan Stack button in the pop-up screen. Follow the displayed instructions.

Front Panel Interface:

1. Enable Advanced Process Settings, if not already enabled: From the main menu select the Utilities/ Hardware soft key. In the Process Utilities screen select the Hardware Setup soft key. In the Hardware Setting screen scroll to Adv. Process Settings which is located near the bottom of the list, press the Enable soft key, and then the YES soft key in the next screen. Advanced process settings are now enabled.
2. Run the scan: Return to the Main Menu. Select the Process Setup soft key to display the Process Setup screen. Scroll to Adv. Process Settings in the list and select the Adv. Process Settings soft key. Scroll to Free Run Frequency in the displayed list and select the Scan Stack soft key. Follow the displayed instructions.

Using with Security:

If security is enabled in the Color Front Panel, *iQ Explorer II*, or *IQ Explorer 3*, the Operator and Setup Engineer security levels do not have the permission to scan the stack. These levels don't have the permissions required to change setup parameters, which is required for the scan operation. To perform a scan with security enabled, an Administrator or Process Engineer must log in since they have the required permissions.

Please note that *iQ Explorer II* and *IQ Explorer 3* has a custom security level that can be assigned to allow the user to run a scan of the horn, but still limit what parameters the user can modify.

iQ LE and LS-E Series

Front Panel Interface:

1. Navigate to the advanced Process settings menu by first pressing the INFO button then the ADVANCED SETTINGS soft key.
2. Scroll up to the FREE RUN FREQ on the ADV PROCESS CONTROL page and select the SCAN STACK soft-key. Follow the displayed instructions.

iQ AiM Series

Front Panel Interface:

1. Navigate to ADVANCED SETTINGS.
2. Press the ENTER button to enter the FREQUENCY CONTROL screen.
3. Press the ENTER button to start the SCAN STACK routine or choose CANCEL to abort it.
4. Press the ENTER button on the warning screen to continue the scan.
5. After the scan is complete, press the ENTER button to update the FRF to the scan result. If the scanned result value appears to be incorrect, press the CANCEL button to abort applying the result to the FRF setting.

Blank Panel:

Refer to the iQ Commander section on the next page.

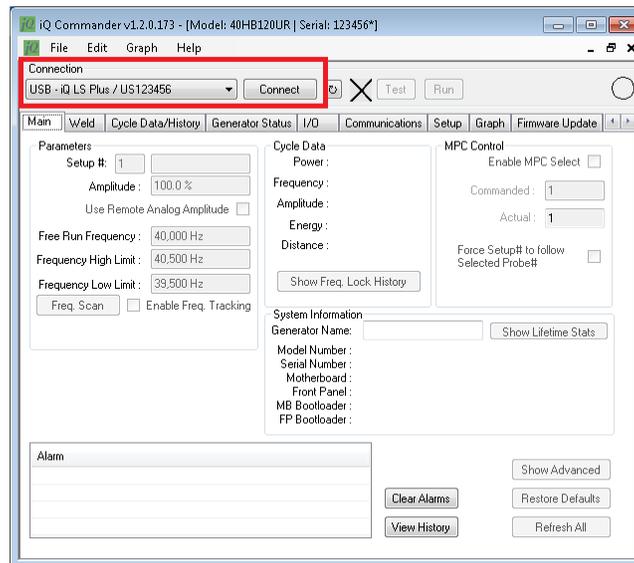
iQ Auto Plus / iQ Auto Plus with MPC Series

Refer to the iQ Commander section on the next page.

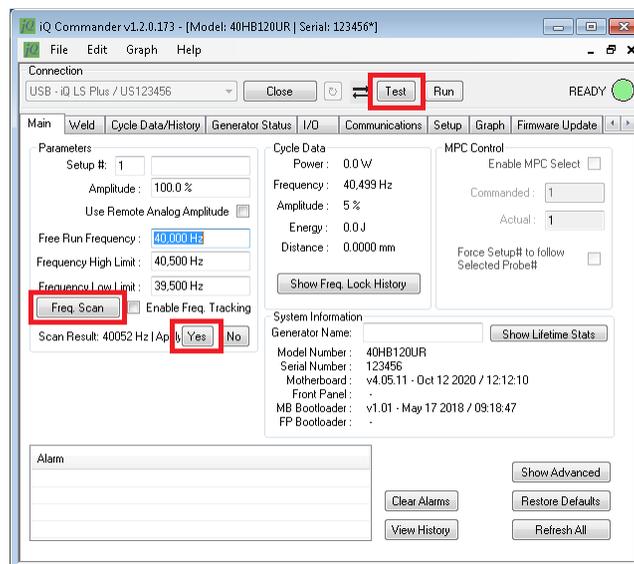
iQ Commander:

(This assumes that a PC has the iQ Commander software installed, the PC is connected via a USB cable to the *AiM* or *Auto Plus* series generator, and the generator is powered ON)

1. Open the iQ Commander software.
2. The software should self-connect to the generator. If not, select the generator series from the Connection drop down menu and press the CONNECT button.



3. Press the “Freq. Scan” button.
4. After the scan has completed, press the “Yes” button to apply the scan result to the FRF setting.
5. Press the “TEST” button to verify that the stack starts.



Compatible Software:

The following software versions and higher will support the Stack Scan feature:

AiM Front Panel: v4.03.01

Auto Plus / Auto Plus with MPC: v4.03.00

Infinity: v4.06.00

ES Color Front Panel: v1.11.00

LE/LS-E Front Panel: v1.03.01

Enhanced Motherboard: v3.11.02

iQ Explorer II: v1.05.346

IQ Explorer 3: v3.0.1.724

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