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Quantinuum H-Series Product Change Notification

Title of Change:	**H1 Native Gate Set Update**
Date of Change:	October 3, 2022
Contact Information:	QCSupport@quantinuum.com
Products Impacted:	H1 Quantum Computers, Emulators, Syntax Checkers
Changes to Product Data Sheet:	**NO ☐ YES ☒**
Changes to Subscription Contract:	**NO ☒ YES ☐**
Description and Purpose:	The purpose of this notification is to: 1) Notify customers that a new gate, the **arbitrary-angle ZZ gate**, will be added to the native gate set for the H1-1 and H1-2 quantum computers, the H1-1E and H1-2E emulators, and the H1-1SC and H1-2SC syntax checkers. See additional information below for more details.
Reason / Motivation for Change:	Update to native gate set for H1 quantum computers
Action Required by Customers:	None

Additional Information:

1) Notification of update to H1 quantum computers' native gate set

Effective October 3, the native gate set for the H1-1 and H1-2 quantum computers (targets: H1-1, H1-2) is updated to include the **arbitrary-angle ZZ gate**. All other native gates remain the same, the **arbitrary-angle ZZ gate** will be added to the gate set.

The Quantinuum System Model H1 Product Data Sheet will be updated October 3 to reflect this. The Product Data Sheet is posted [here].

2) Notification of update to H1 emulators' native gate set

The native gate set for the H1-1 and H1-2 emulators (targets: H1-1E, H1-2E) will be updated to include the arbitrary-angle ZZ gate following the error model of the H1-1 and H1-2 quantum computers, respectively. All other native gates remain the same, the arbitrary-angle ZZ gate has been added to the gate set.

The Quantinuum System Model H1 Emulator Product Data Sheet will be updated to reflect this. The Product Data Sheet is posted [here].

3) Notification of update to H1 syntax checkers' native gate set

The native gate set for the H1-1 and H1-2 syntax checkers (targets: H1-1SC, H1-2SC) will be updated to include the arbitrary-angle ZZ gate as reflected and handled by the H1 compilers.

In summary, the impact to customers of updating the H1 native gate set is:

- System Model H1 quantum computers have been updated to implement an additional native get, the arbitrary-angle ZZ gate.
- The Quantinuum System Model H1 Product Data Sheet and Quantinuum System Model H1 Emulator Product Data Sheets have been updated to reflect this update.
- Users should expect that directly using the arbitrary-angle ZZ gate instead of the sequence of fully entangling two-qubit gate + single-qubit rotation + fully entangling two-qubit gate will reduce the number of required two-qubit gates and thus reduce the required HQCs for running that job
- This new capability is included in your current access.