QUANTUM MACHINES

QBox

24-Channel Fully Shielded Fischer to BNC Breakout Box Specialized for Low-Noise and for Sample Protection

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Highlights

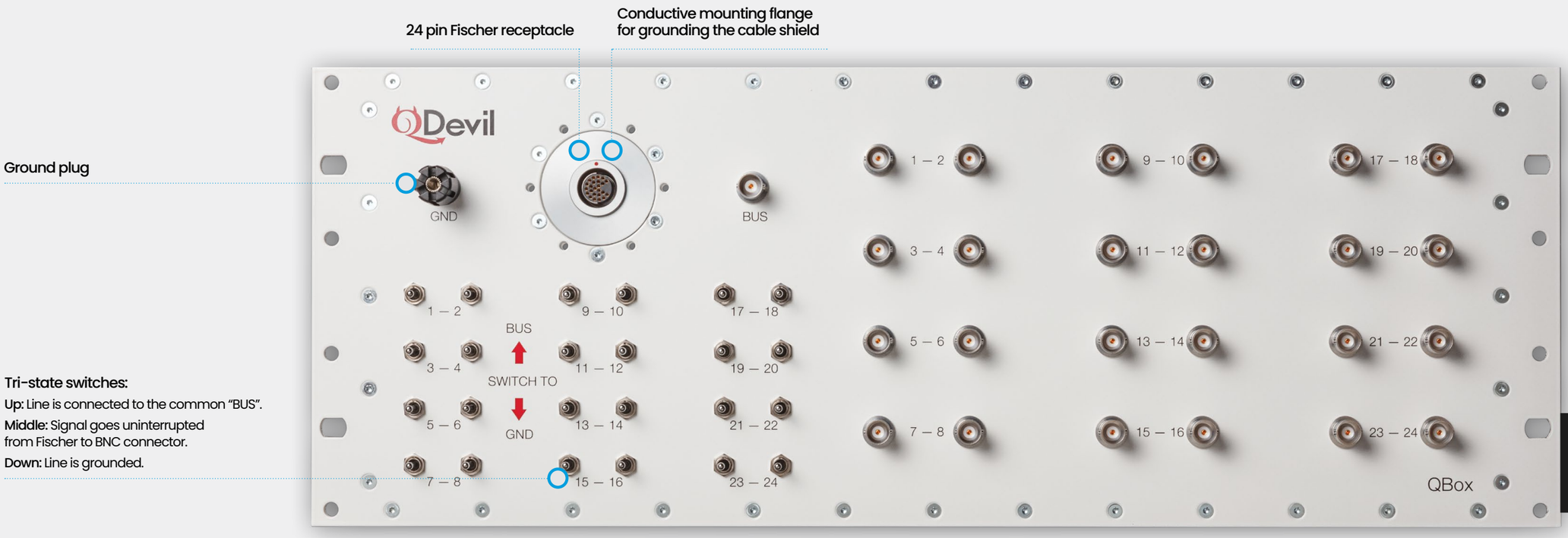
The QBox is a fully shielded breakout box specialized for electronics labs and low-temperature experiments. The QBox extends the Faraday cage of the cryostat going from a 24-pin Fischer connector to a convenient BNC connector panel. All wiring inside the QBox is in twisted pairs for best noise immunity. Switches allow each channel to connect directly to ground or to a common bus, which greatly simplifies the measurement of ESD sensitive multi-terminal devices

The QBox and the accompanying Fischer connector cable saves your workshop and students from spending valuable time on making what is already available as plug and play.

Grounding & Shielding

To ensure efficient continuation of the Faraday cage of the cryostat, the shielding braid of the Fischer connector cable is coupled to a bayonet made from passivated aluminum, which is fastened with screws to the mating conductive flange on the QBox. Experience has shown that the ground impedance provided by the cryostat's Fischer receptacle alone can deteriorate over the course of several years.

Therefore, for best results, QBox is delivered with cables with a grounding lug which can be connected to the cryostat. However, the ultimate solution is to add a grounding flange surrounding the Fischer receptacle of your cryostat, onto which a cable bayonet can be fastened. Drawings can be provided on request. Cables with bayonets on both ends can be delivered on request.

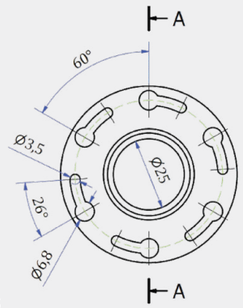


Tri-state switches:

Up: Line is connected to the common "BUS".

Middle: Signal goes uninterrupted from Fischer to BNC connector.

Down: Line is grounded.



Dimensions

The QBox fits in a standard 19" rack (occupying a height of 4U). To prevent ground loops, we recommend to use the provided insulation mounting hardware.

Width: 483 mm.
Height: 178 mm.
Depth: 45 mm.

The end of the cable with the QBox grounding bayonet surrounding the 24 pin Fischer connector is shown here.

Numbering & twisted pairs

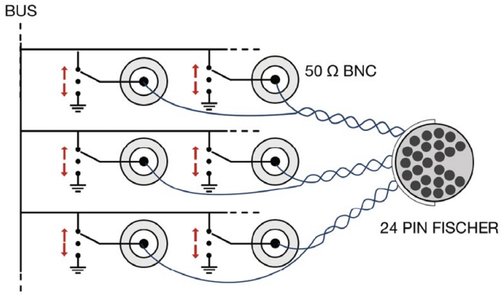
The QBox comes in two versions, with different print on the front panel:

- Channels numbered 1 to 24.
- Channels numbered 25 to 48.

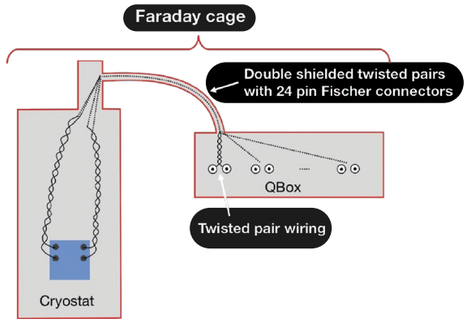
Inside the QBox, wires are twisted in pairs as 1-2, 3-4, ... , 23-24.
For the version with numbering 25-48 wires are twisted in pairs as 25-26, 27-28, ... , 47-48.

Double shielded low noise cable

The QBox The QBox is used with a flexible, low-noise cable assembly with 24-channel Fischer connectors (plugs) on each end. Inside the cable, the wires are configured as twisted pairs which are individually shielded. The cable comes with a braided metal shield which helps in reducing noise pickup further. The metal braid is covered by a protective plastic braid, so that accidental ground connections are avoided. Connected to the QBox in one end and to the cryostat in the other end it provides additional shielding and improved ground connection. The standard cable has a length of 3m. Other lengths are available upon request.



All BNC connectors are connected pair wise, using twisted leads, to the 24 pin Fischer receptacle. Each channel can be grounded or connected to a common bus (BUS).



Appropriate for low-noise electrical measurements, the QBox and the Fischer cable extend the Faraday cage of the cryostat to the BNC panel.

About Quantum Machines

Quantum Machines (QM) is driving the future of quantum computing through Hybrid Control, seamlessly integrating quantum and classical computing. Conventional controllers struggle with disjointed operations, creating friction that limits scalability. The Pulse Processing Unit (PPU), at the core of QM's innovation, is a special processor for quantum control, designed to eliminate this barrier by bringing classical computing closer to qubits, reducing latency and enabling real-time execution of quantum error correction, and other advanced algorithms. The hybrid development platform further streamlines development, empowering quantum computer builders to create efficient quantum-classical programs. OPX1000, QM's flagship controller, embodies this hybrid approach. It is a modular, high-density control platform with a cutting-edge quantum-led analog front end. OPX1000 is tailored for large-scale quantum computers, offering unparalleled performance, scalability, and ready HPC integration, including an ultra-fast interface to GPU/CPU accelerators for boosting quantum control. With hundreds of deployments worldwide, Quantum Machines' solutions are trusted by quantum computer builders, research labs, and HPC centers. For more information, visit **quantum-machines.co**.

** These specifications are given as-is and to the best of our knowledge. The full spec document, including relevant legal information and disclaimers is available upon request*

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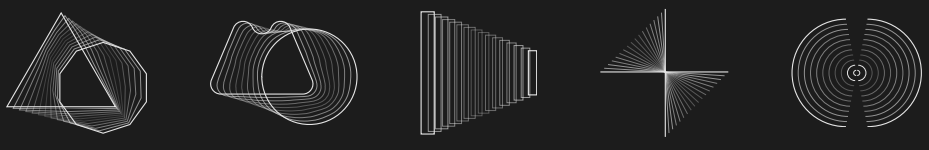

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Contact us: sales@quantum-machines.co | quantum-machines.co |

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