



Non-magnetic PPMS-type BeCu Diamond Anvil Cells (DAC)

Model DT-25/28-55-BeCu-DAC

The non-magnetic DT-25/28-55-BeCu DAC is designed for a variety of experiments at cryogenic conditions in confined spaces (28 mm min. diameter of the cryostat bore). The DAC is compatible with HMD 25 mm DAC (DAC-SRr-25-55) while has a lot of modifications to improve performance, stability, reliability, and ease of operations. With proper diamond anvil and seat selection the DAC can be routinely used to Megabar pressures.

All main parts of the DAC are made of non-magnetic Beryllium Copper C17200 alloy in full hard HT(TH04) temper. The DAC can be supplied in fully non-magnetic form if required. Non-magnetic screws, set screws, and diamond seats can be made either of the BeCu alloy or Ti5 (Ti-6AL-4V) alloy. We can also provide cBN seats. If magnetic properties are not critical – the DAC can be supplied with common alloy or stainless steel accessories / hardware and WC diamond seats.

The DAC has a rocker / spherical seat so that the tilt of one diamond anvil can be easily adjusted. The opposite / piston-side diamond anvil has lateral adjustments for diamond centering and proper positioning.

Unlike HMD DAC, the piston can be inserted into the DAC from the “back” eliminating the need to unscrew and remove the other diamond with the rocker assembly every time. This makes alignment and DAC loading significantly easier and faster. When the piston is moving along the axis – it does not rotate due to the piston rotation locking set screws (can use one or two).

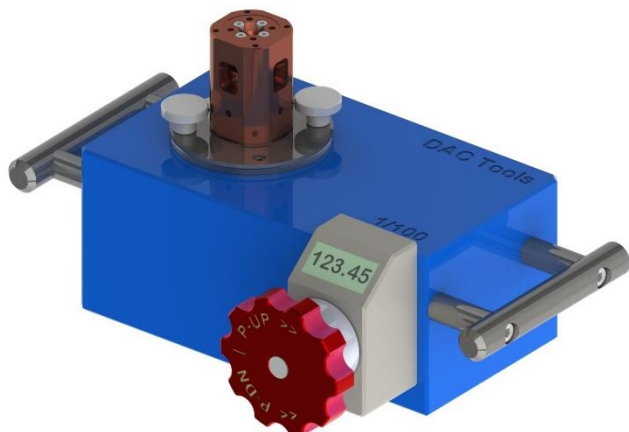
The pressure in the DAC is increased by rotating one pressurizing screw with integrated ceramic thrust ball bearings. The pressurizing screws has a pitch of 1 mm. The pressure in the DAC is typically increased with an optional 100X gearbox (which can provide piston / pressurizing screw advancement with 100 nm = 0.1 um resolution). Pressure in the DAC can be increased without the gearbox but with lower resolution unless the solid compression axis is replaced by spring washers. Alternatively the DAC can be integrated with a membrane pressure control system.

The pressure in the DAC can be increased in several modes:

1. Dry - when the screw is pushing the piston directly (normally required gearbox or membrane);
2. Semi-soft - when there is a delrin disk between the screw and the piston and this disk absorbs some of the load and allows more smooth pressure increase;

3. Spring mechanism – when there is a stack of Belleville spring washers or a single split tube spring which allows to increase DAC pressure in the DAC through spring action with controller force like in most of the room temperature DACs.

The DAC comes equipped with all relevant hardware (except diamond anvils) - Allen hex wrenches, keys for rotating the pressurizing screws and “front” anvil assembly, tools for handling (extracting and inserting) the piston, and spare parts (screws, set screws, diamond seats, parts of the bearing, etc.).





Specifications of DT-25/28-55-BeCu-DAC

Main DAC Specifications

Height: 55 mm

Diameter: 28 mm (25 mm square)

Working distance: ~10.0-10.5 mm

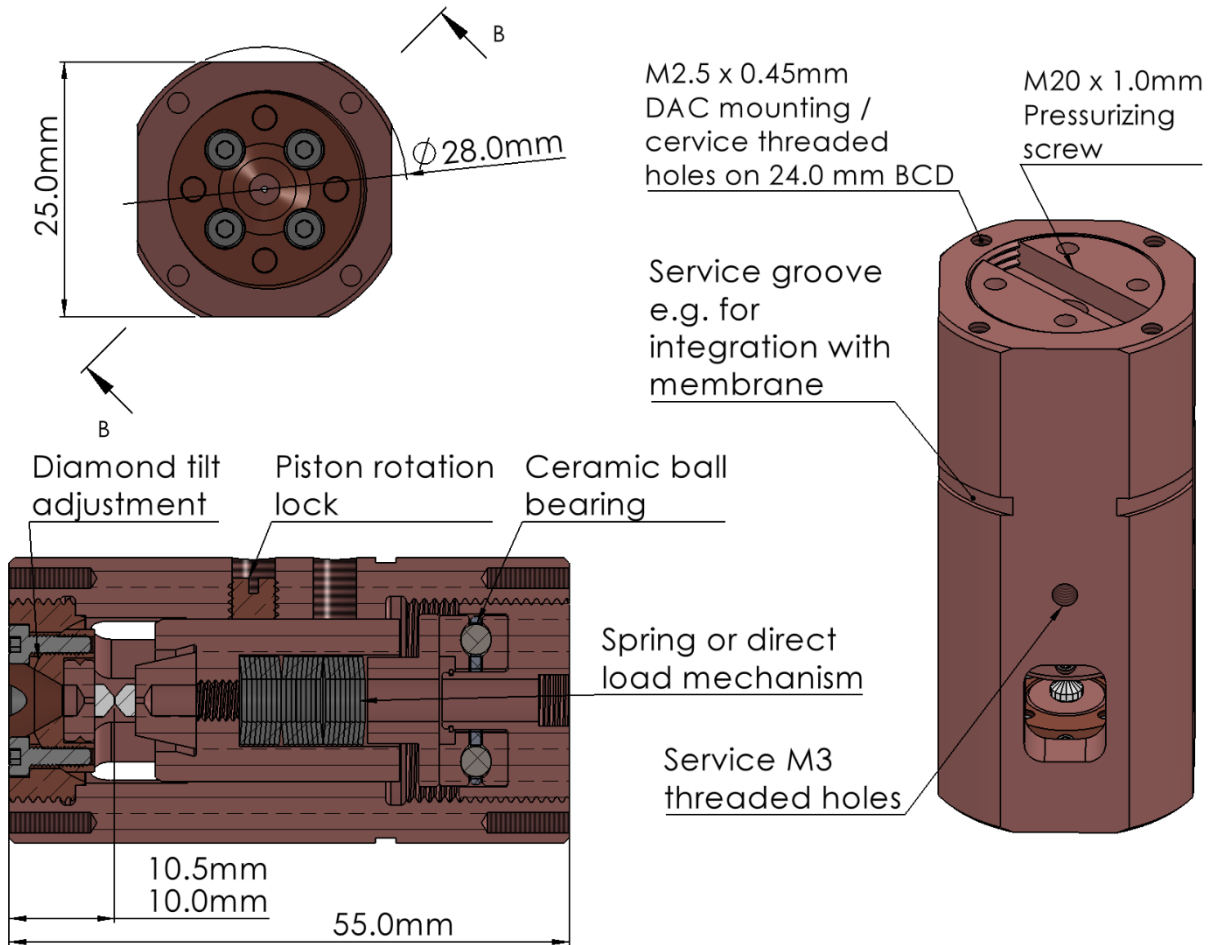
Mass: ~ 210 g

DAC material: BeCu C17200 in HT (TH04) temper

Seats: BeCu C17200; Opt. Ti5, WC, or cBN.

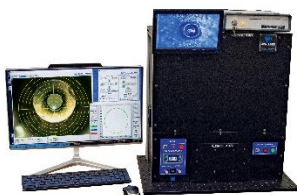
Screws: BeCu / Ti5; Opt. Alloy / St. steel

Maximum Pressure: >100 GPa

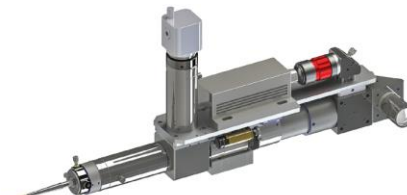


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For more information please visit <http://dactools.com/diamond-cells>



Dec. 2023