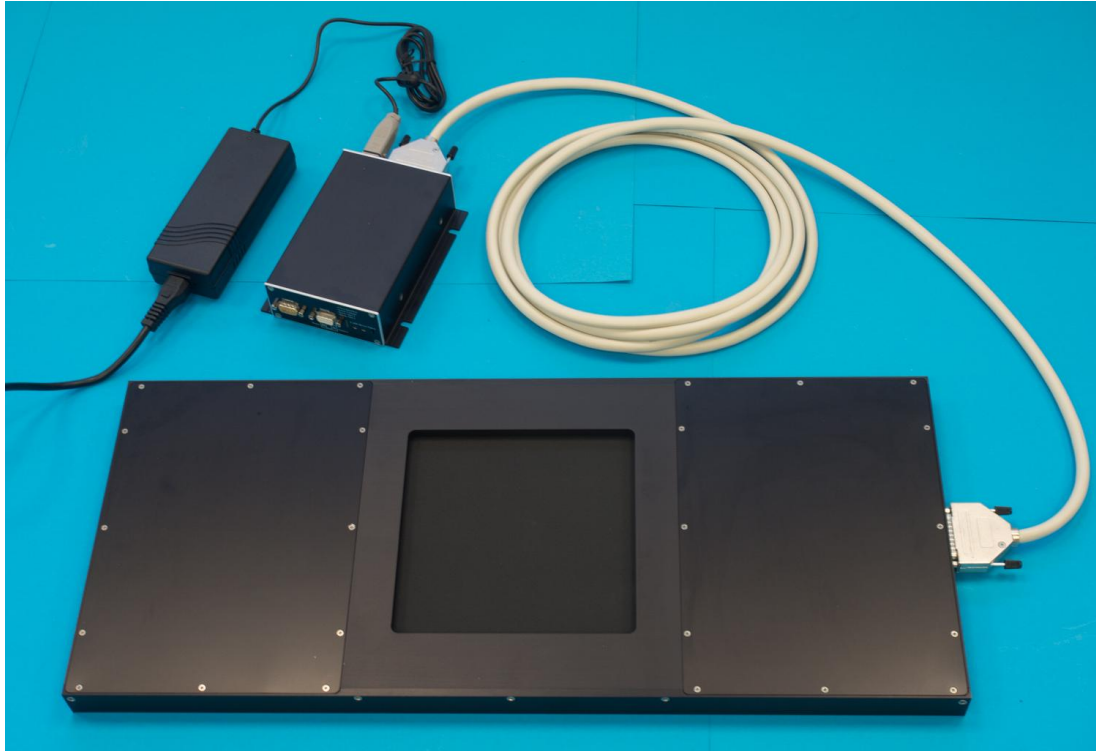


Bonn Shutter with 180mm x 180mm aperture



The Shutter system consists of:

- The mechanical shutter unit with cable.
- The shutter control unit with firmware and power supply.
- The shutter documentation.

Shutter specifications:

Mechanical Shutter Unit: General Specifications

Shutter type	Slit-type shutter with two independent blades driven by stepper motors.
Operation orientations	In all orientations without degradation.
Operation directions	In either direction without performance degradation

Mechanical Shutter Unit: Mechanics

Mass	ca. 5.0 kg
Aperture	The size of the free aperture is 180mm x 180mm.



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Managing directors:
Dr. Klaus Reif
Dipl. Phys. Philipp Müller

Blade material	The shutter blades are made of carbon fiber material. Low reflectivity is achieved by a stable, resistant, black paint.
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Mechanical Shutter Unit: Electrics

Connector	DB-25 female.
Power dissipation	About 240mW in static state ("open" or "close" position).

Mechanical Shutter Unit: Performance Specifications

Minimum exposure time	<10ms.
Exposure time error	<300µs.
Exposure non-uniformity	<1ms over the full field of view.
Repetition rate	Minimum time interval between start of consecutive exposures is (exposure time + 0.4sec (ca.)).
Blade travel time	<0.4sec (ca.). Time the blade needs to cross the full width of the aperture.

Shutter Control Unit: General Specifications

Status requests	Information about the status of the shutter (i.e. position of blades, open/close states, faults) are accessible through a standard RS232 communication line.
Shutter reset	A reset button at the Shutter Control Unit allows to reset the shutter at whatever time.
Status signal lines	3 TTL compatible status signal lines are provided. 1. "shutter closed" status, 2.+3. blade A/B in aperture (alternatively: blade A/B moving)

Shutter Control Unit: Mechanical Specifications (see pictures and drawings below)

Dimensions	about 230mm x 130mm x 45mm (connectors attached)
Mass	about 1 kg
Power supply	170mm x 65mm x 40mm, 0.6 kg

Shutter Control Unit: Electrical Specifications

Power dissipation	30-40 W.
Exposure control and Status connector	DB-9 male. All signals are low active TTL compatible.
Shutter Connector	DB-25 male.
RS232 Connector	DB-9 female.
Push buttons (3)	open/close, reset, auto-calibration
External power supply input	95 230VAC and 50 60Hz.

Cabling

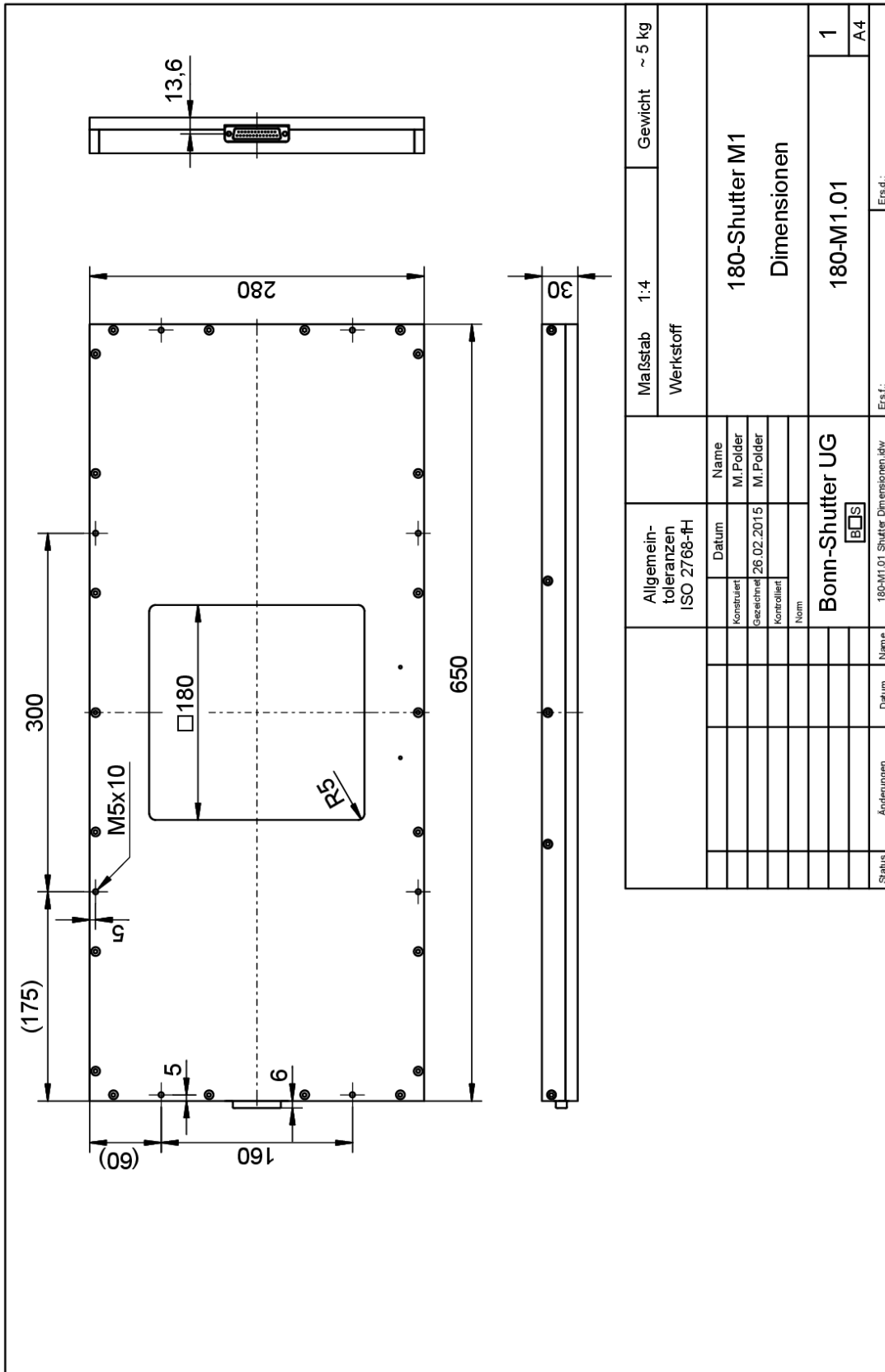
Shutter cable specs	Length: TBD, 8m maximum, Diameter: 10mm, Bending radius: 20mm, Connectors: 2 DB-25 (male/female)
Power cable	Standard 95-230VAC, 50-60Hz, length: 2m.

Documentation

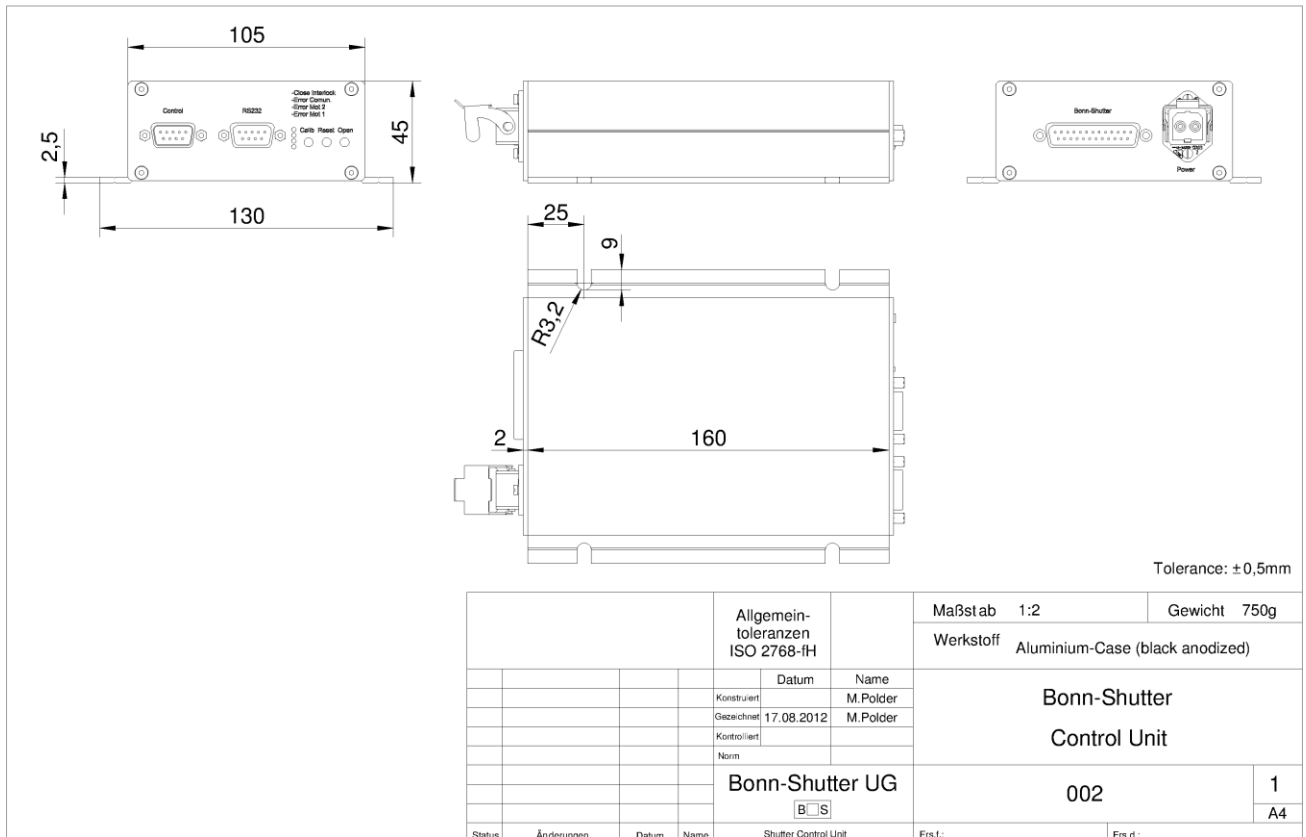
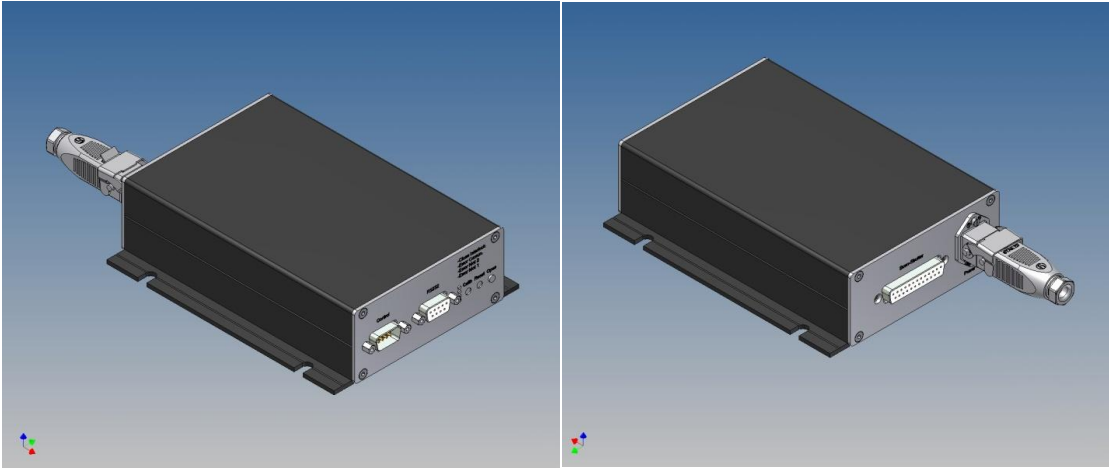
Installation and operations manual	Detailed description of the shutter and shutter controller, including instructions for installation, definitions of connector pin assignments, operation modes descriptions.
Software protocol description	Includes the set-up parameters of the data link, command listing, command syntax, parameter limits, default set-up parameters (velocity profile data, etc.).

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Shutter control unit

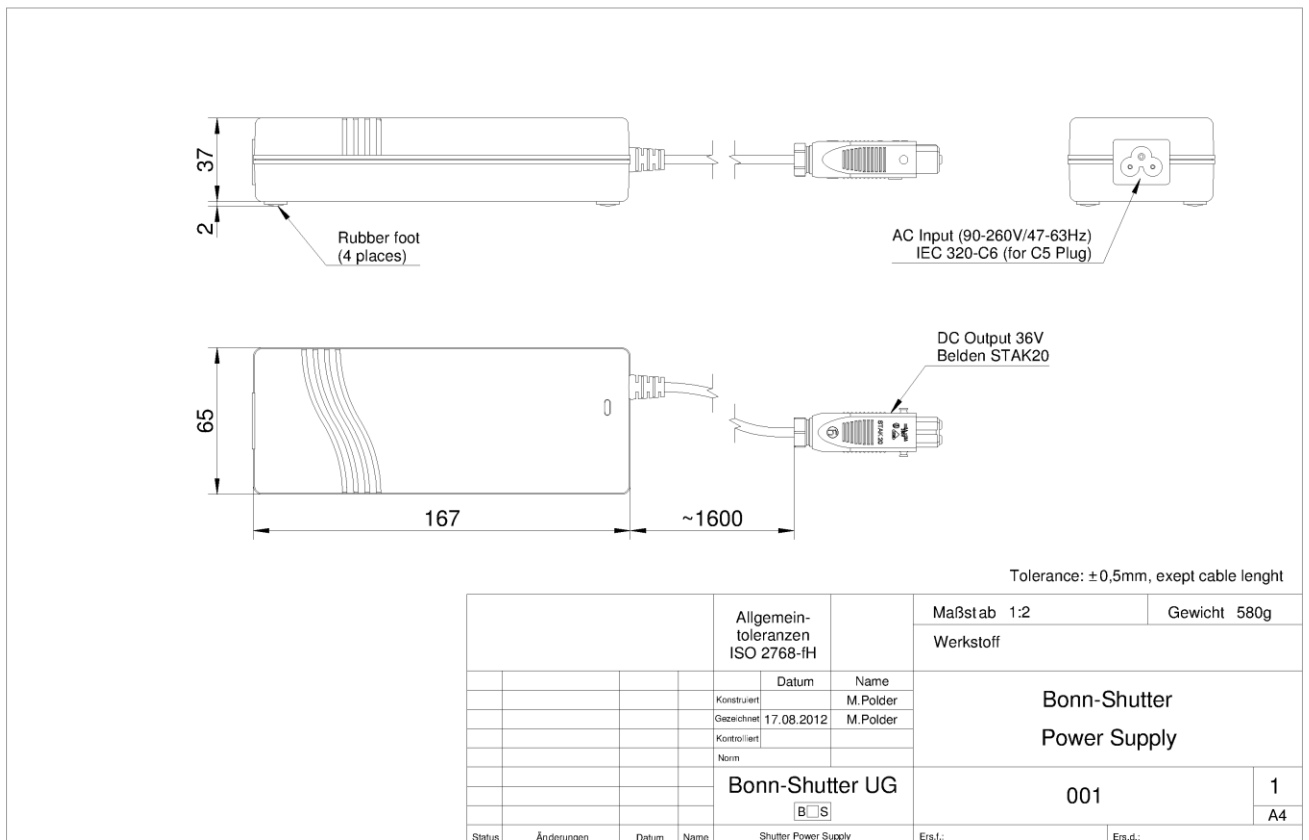
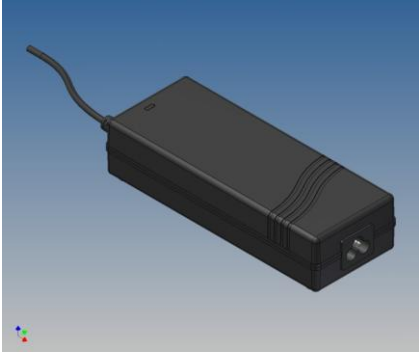




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Power Supply



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