Kindermann

Ceiling Mirror PRO

for data and video projectors

Ref. no. 7469 000 000

Installation instructions

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11.2016

⚠ Safety instructions and warnings

- Inspect the device for transport damage at once after receipt. Remove transport protection.
- The ceiling mirror is only suitable for use with projectors.
- **The ceiling mirror must only be installed or repaired by authorised and trained specialists.**

You should read this instruction/operating manual of the device under all circumstances and observe the safety notes precisely!

- Operation of the device is in any case subject to the local safety and accident prevention provisions and the country-specific provisions for training and conference rooms.
- The extended mirror must be outside of any danger area of persons.
- The ceiling construction must be able to bear at least 4 times the max. weight of the ceiling mirror and projector at the installation point. The attachment material used must be construction-technically approved.
- For any work at the ceiling mirror, it must be observed that no loose parts (e. g. tools) are left behind in the ceiling mirror that may fall down.
- Observe fire protection: There must be no flammable substances near the ceiling mirror.
  There must be sufficient openings for the entry and exit of cooling air of the projector.
  With the flap closed, the projector must be switched off!
- The ceiling mirror weighs about 18 kg. Provide the corresponding safety devices and working aids for installation on the ceiling (e. g. working platform, hoist, fall protection).
- The ceiling mirror works with a safety low voltage of 9-12 VDC, 20 W.
  A TÜV GS-tested plug-in mains adapter is enclosed for operation on the mains.
- Observe that movement of the flap cannot cause crushing of cables or persons.
- Please protect the scratch-sensitive surface of the two mirrors during installation and service and do not touch them with your fingers.
- Please keep the instructions accessible.

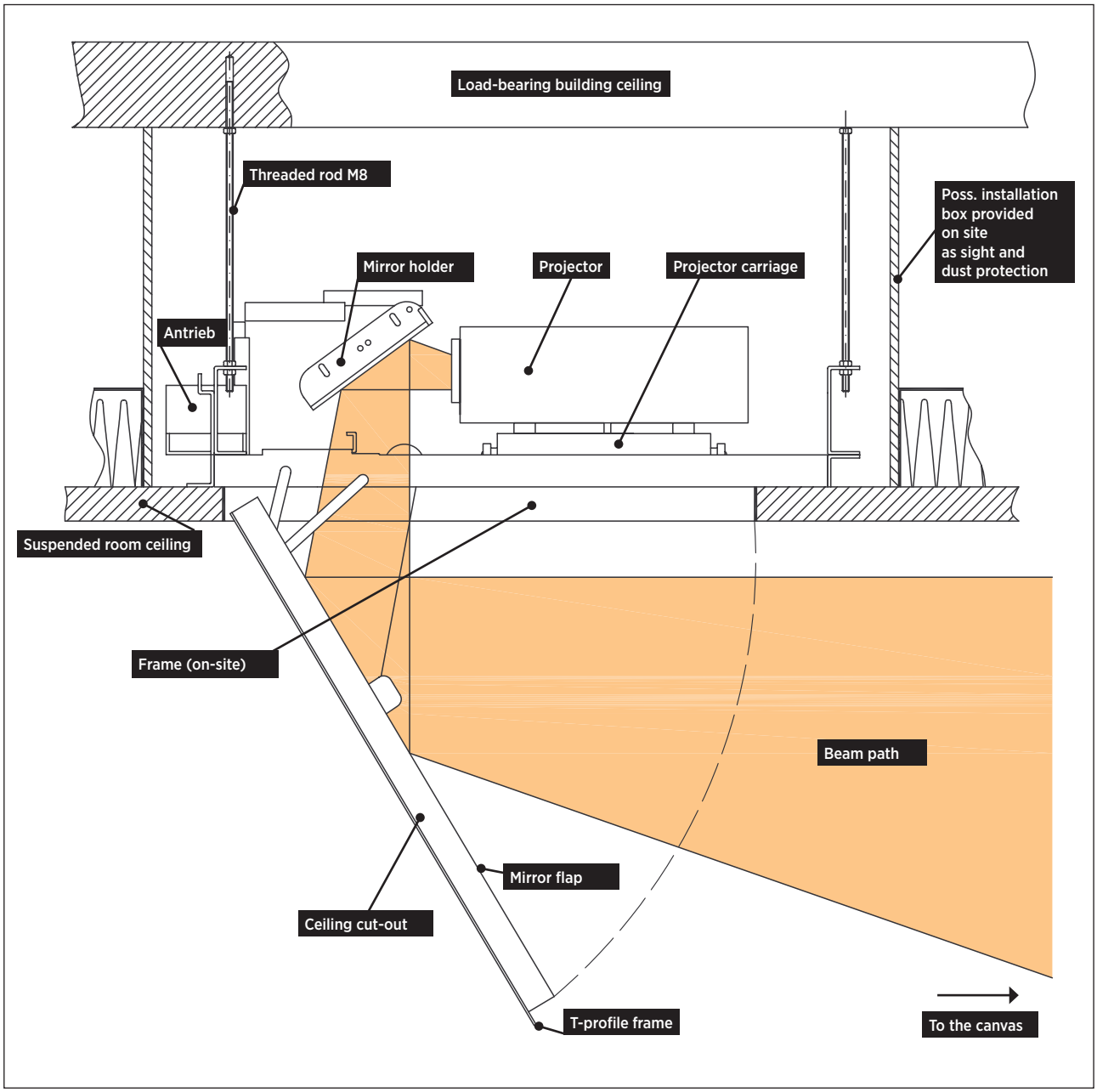
Table of Contents

1. General Description

Frame for holding a data/video projector for installation between the raw ceiling and the suspended ceiling of a closed room

The projection beam is pointed onto the display wall via two mirrors from the ceiling.
The first, smaller mirror can be adjusted in 3 axes. A second, movable mirror, is placed behind the ceiling flap and will guide the projection beam from the first mirror onto the display wall. The mirror flap can be covered with the ceiling cut-out on the bottom to „conceal“ the ceiling mirror visually.
The mirror flap is extended or closed by electromotor, e.g. via a dial switch/switch. Its end position is set precisely via a stop. This specifies the picture height. In case of electrical defect, the mirror flap can also be extended manually with a tool.

The projector is attached firmly to a universal projector holder standing in the frame structure.



Service and maintenance of the projector are possible through the large mirror flap that can be opened up to 85° for servicing, so that no additional revision opening is needed.

Installation in the ceiling will cover the IR-receivers of the projector. It is usually possible anyway to guide the IR beam via the mirror flap to the receiver and remote-control the projector.
However, the best solution is to use a media control, e.g. Kindermann PIXIE plus (no. 5698 000 001) and control via a relay (5698 000 004/6).

2. Device Description

2.1 Setup and Equipment

Metal construction, colour white RAL 9003; for installation in suspended ceilings or cut-out solid ceilings.

Outer dimensions: Frame structure: WxLxH: 535 x 630 x 180 mm (measured without attachment material)

Mirror flap: WxLxH: 507 x 525 x 27 mm (measured with insertion frame for ceiling cut-out)

Prerequisites to the projector: Max. dimensions: Width = 490 mm, length = 500 mm, height = variable; max. weight: 15 kg; three or four threaded sleeves (M3, M4, M5 or M6) on the bottom; attachment area between 100 and 480 mm.

Ceiling cut-out: WxD (B is in parallel to the canvas): 505 x 490 mm; the ceiling cut-out (up to 3 kg) can be put into the insertion frame of the mirror flap.

Space needed between the raw ceiling and the lower edge of the ceiling: 115 mm + projector height, but at least 200 mm

Ceiling thickness: max. 22 mm at the installation site

Mirror flap: Swivel area 0° to 60°; for service up to 85°, after disconnecting the wire ropes of the flap

Drive: Electrical spindle drive with gear motor 9-12 VDC, 20 W with adjustable end position deactivation; tolerance compensation from spring closure of the mirror flap

Runtime: Downwards approx. 30 seconds, upwards approx. 45 seconds

2.2 Delivery Scope

Check the packaging for complete contents:

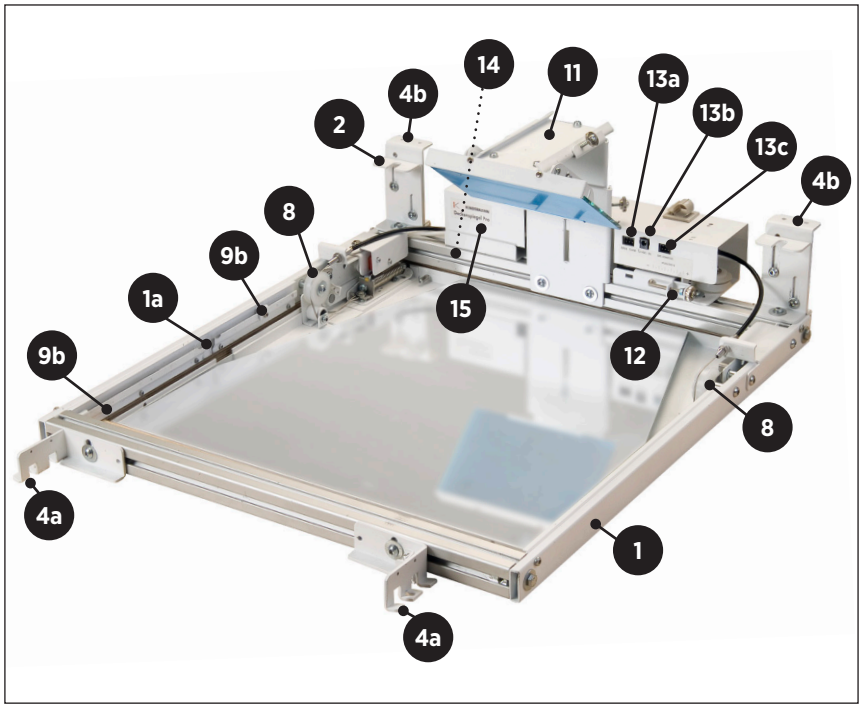
- Ceiling projection mirror with mirror flap and adjustable T-profile frame for integration of the ceiling cut-out
- Universal projector holder to attach the projector
  Socket wrench no. 4, 4 screw sets + washers M3, M4, M5, M6, 4 threaded spacer bolts
- Attachment material for all attachment types of the ceiling mirror: Raw ceiling or ceiling grid 60, 62 cm, suspended ceiling (14 diff. mounting angles in total).
- Plug-in mains adapter 100–240 VAC / 9 VDC, 2 A
- Power consumption: 15 W

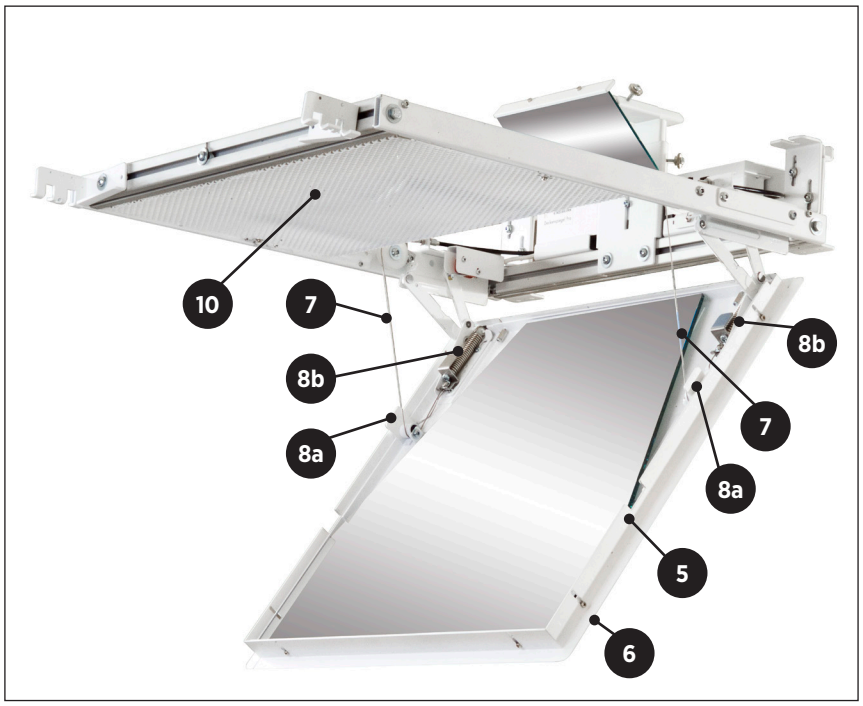
2.3 Accessories

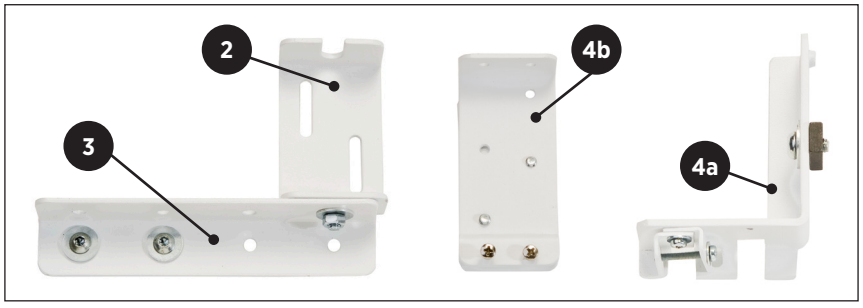
- Dial switch/button up/down (no. 5944 000 002)
- Key switch up/down (no. 5944 000 001)
- IR remote control* (no. 5699 000 021)
- Radio remote control* (no. 5699 000 020)
- *Control PCB for ceiling mirror PRO (no. 7469 000 010), is needed for connection of IR and radio remote control; a media control can control the ceiling mirror directly through 2 potential-free relay low-voltage contacts.
- Deactivation electronics of projector (no. 7465 000 016): automatic control of the projector (Kindermann, EPSON, SANYO, MITSUBISHI) via RS232 when opening and closing the mirror
- Set (no. 7469 000 014): 4 threaded rods, 1 metre, M8, as well as nuts, U-washers, spring rings; for attachment to the concrete or stone raw ceiling; (on-site metal dowels for the ceiling are not enclosed)

2. Device Description

2.4 Parts Designation and Explanation of Symbols







1 Metal frame with aluminium profile
1a Cut-out for installation or disassembly of the projector carriage
2 Holding angle 4 x
3 Extension angle 2 x
4a Attachment angle left/right for ceiling grid, 2 x front
4b Attachment angle for ceiling grid or fixed ceiling, 2 x rear
5 Mirror flap with plane mirror
6 T-profile frame
7 Wire ropes left, right
8 Deflector roll
8a Stop for closing the flap
8b Push-in spring for closing the flap
9 Projector carriage (page 14) with
9a Universal projector holder for attaching the projector (page 13)
9b Adjustable stops
10 Sight protection
11 Mirror holder, adjustable
12 Adjusting the opening angle for the mirror flap (determines upper edge of the image)
13 Electrical connections:
13a External control (switch, button, media control)
13b 9 – 12 VDC voltage supply
13c Automatically open/close mirror flap with PCB „Deactivation electronics projector“ (no. 7465 000 016)
14 Emergency opening for manual opening
15 Drive system

Necessary tools:
Hexagon screwdriver 4 mm,
Phillips-tip screwdriver

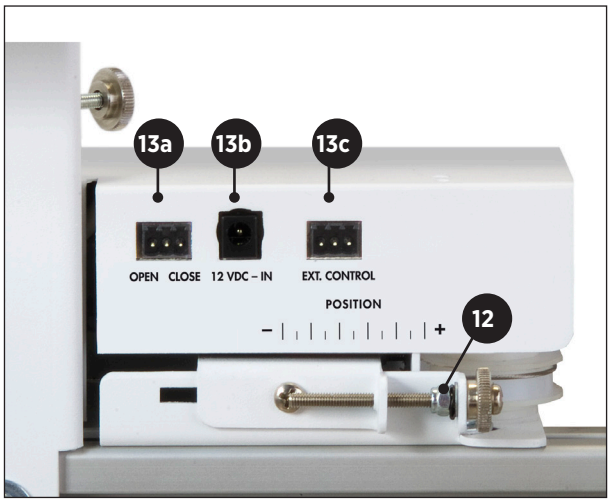
2. Device Description

2.4.1 Electrical Connection

Important: Never put 230 V or external voltage onto a connection!

Electrical connections:

13a. Mirror OPEN, middle contact, mirror CLOSE:
External control input with 2 inputs: OPEN and middle contact, CLOSE and middle; the contacts are protected against short circuits by mutual electrical locking.



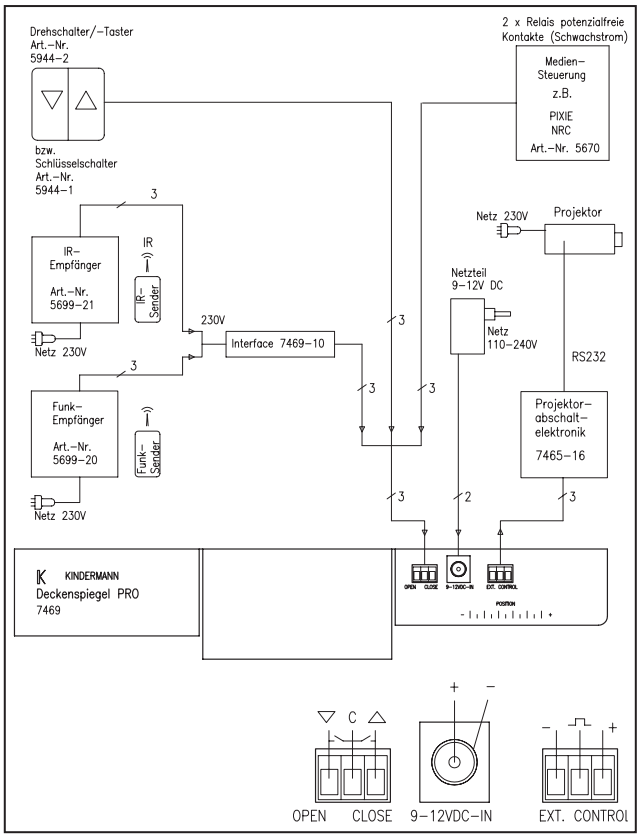
There are the following options as operating element:

- Dial switch/button up/down (no. 5944 000 002)
- Key switch up/down (no. 5944 000 001)
- Latching up/down-switch,
  as it is used for roller shutters, etc.
- Two potential-free low-voltage relay outputs of a media control may also be used as a bridge of the corresponding connections.

13b. 9-12 VDC-IN:
Voltage supply via enclosed plug-in mains adapter.

13c. EXT. CONTROL:
3p plug connection with the optional PCB, deactivation electronics projector (no. 7465 000 016): automatic control of the projector (Kindermann, EPSON, SANYO, MITSUBISHI) via RS232 when opening and closing the mirror.

The PIN connections 5 V (100 mA) and (GND) can be used as feedback for a media control
(e. g. LED display).



The PCB (no. 7469 000 010) for ceiling mirror PRO can also be used to connect:

- IR remote control* (no. 5699 000 021)
- Radio remote control* (no. 5699 000 020)

2.4.2 Adjusting the Opening Angle of the Mirror Flap (5)

The opening angle of the mirror flap determines the picture height of the projection. The angle can be set precisely by turning the knurled screw (12): turning clockwise opens the mirror flap farther; the projection image is moved downwards on the display wall. The angle should be approx. 45°.

Note: Before adjustment of the knurled screw for the desired end position, always extend the mirror flap a bit from the end position first.

For servicing, the mirror flap can be turned down entirely as well after disconnecting the wire ropes on the left and right (7) from the deflector roll (8), for this, open the mirror all the way first with the motor.

Attach the wire ropes again after servicing.

3. Mounting of the Ceiling Mirror

Read the entire instructions before installation.
Check the carrying capacity of the ceiling and the resilience after installation.
Remove all protective films of the mirrors after installation!

3.1 Site Issue

3.1.1. Distance from the Canvas

For the entire projection beam to hit the mirror surfaces, a distance ratio (ratio of distance to picture width) of at least 1.5 is needed. When the zoom objective is set to at least ratio 2.0 (direction tele range), beneficial specification of the projection to the first mirror also permits a 10% lower, distortion-free projection.

For calculation of the position of the cut-out in the ceiling, it is beneficial with the specified distance ratio of the projector to assume a suspended position of the projector directly below the ceiling. The front edge of the cut-out is then specified by an offset measured from the front edge of the mirror flap (5), of approx. 70 cm towards the canvas, i.e. closer to the canvas. Due to tolerances, it is recommended to include a small reserve that can be compensated with the projector zoom.

The middle axis of the frame structure must point to the middle of the canvas precisely at a right angle: otherwise, there will be a trapezoid distortion that cannot be compensated for any more.
A laser meter can, e.g., be used to comfortably measure right angles.

3.1.2. Up/down Ratio

The double mirror deflection does not change anything about the vertical Keystone angle of the projector visually. The ratios are as if the projector was suspended approx. 70 cm behind the front edge of the mirror section, below the ceiling. If a distortion-free projection with a larger distance of the upper image edge to the lower edge of the ceiling is desired, use of a projector with an up/down ratio of at least 9:1
(9 picture parts above, 1 picture part below the middle axis of the objective) are beneficial. Trapezoid distortions must be compensated with the electronic Keystone equalisation of the projector.
Observe that this will make the picture a little smaller, which you can compensate for with the zoom.

3.2. Integrated Installation in the Ceiling

The space required for the ceiling lift must be present in the ceiling. The required installation height must be at least 11.5 cm + projector height, but at least 20 cm.

The ceiling construction must be able to bear at least 4 times the max. weight of the lift and projector at the installation point. For this, the ceiling around the installation site may need to be reinforced or additionally held on the firm building ceiling with suitable suspensions.

The surface of the solid ceiling must be smooth and clean so that no particles can fall onto the ceiling mirror with projector in operation. Insulation materials must be sealed with PE film. It is also beneficial to produce a box around the installation site in the ceiling that protects from sight with the mirror open, and protects from dust.

At the installation position, a triple 230 VAC socket for projector mains unit of the ceiling mirror, and a possible additional device must be installed by an authorised specialist (according to VDE 100).
It is of benefit if this is connected so that it can be deactivated via a main switch. This has the benefit that the projector cannot be activated accidentally behind the ceiling.
All necessary VGA, audio and video cables, projector control cables, open/closed switches for mirrors also must be placed under observation of the common installation directives to avoid interference from mains lines on the signal lines.

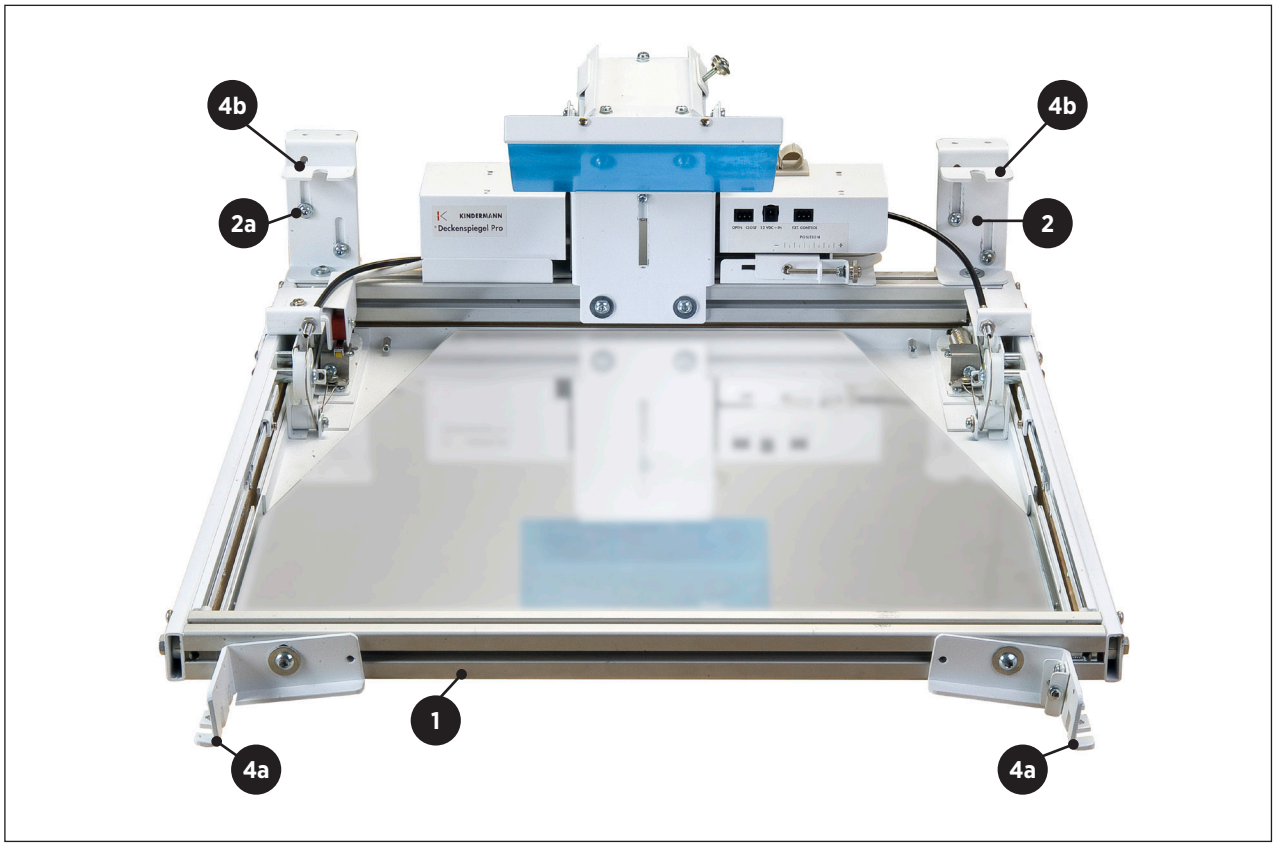
3.2.1. Preparation for Installation

When you unpack the ceiling mirror, remove any transport protection and check the delivery for completeness and damage.

The projector carriage and the T profile rails for the ceiling closure must be **installed later according to instruction**.

3.2.1.1 Mounting in Suspended Room Ceilings

The ceiling must be able to bear four times the maximum weight of the ceiling mirror and projector, if necessary with reinforcements.
First, install the enclosed angles to the metal frame (1): Install angle (4a) left/right front, angle (4b) to the angle (2) with the flat side down, rear.

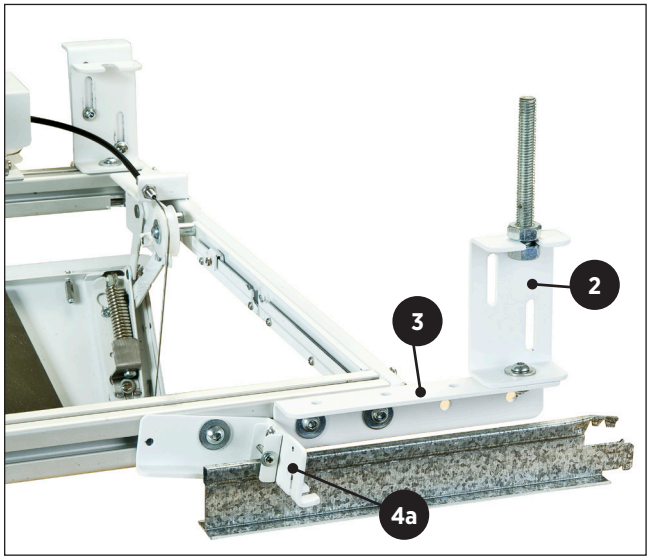


When the carrying capacity of the suspended ceiling for installation is not ensured, the ceiling mirror may also be attached directly to the solid ceiling above with the threaded rod set (no. 7469 000 014:
4 threaded rods M8, 1 m) and attachment material.

For this suspension, first install the enclosed angles to the metal frame (1):

Install angle (**fig. A** /4a, 3, 2) front and angle (**fig. B** /4b) with the flat sides down on angle (2), rear.

Angle (4a) can be used to fasten the suspended ceiling additionally.

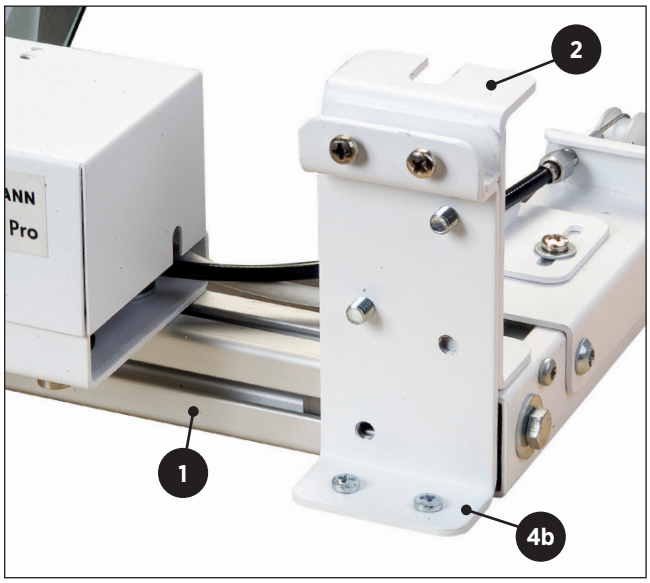


Ill. A

3.2.1.1 Mounting in Suspended Room Ceilings

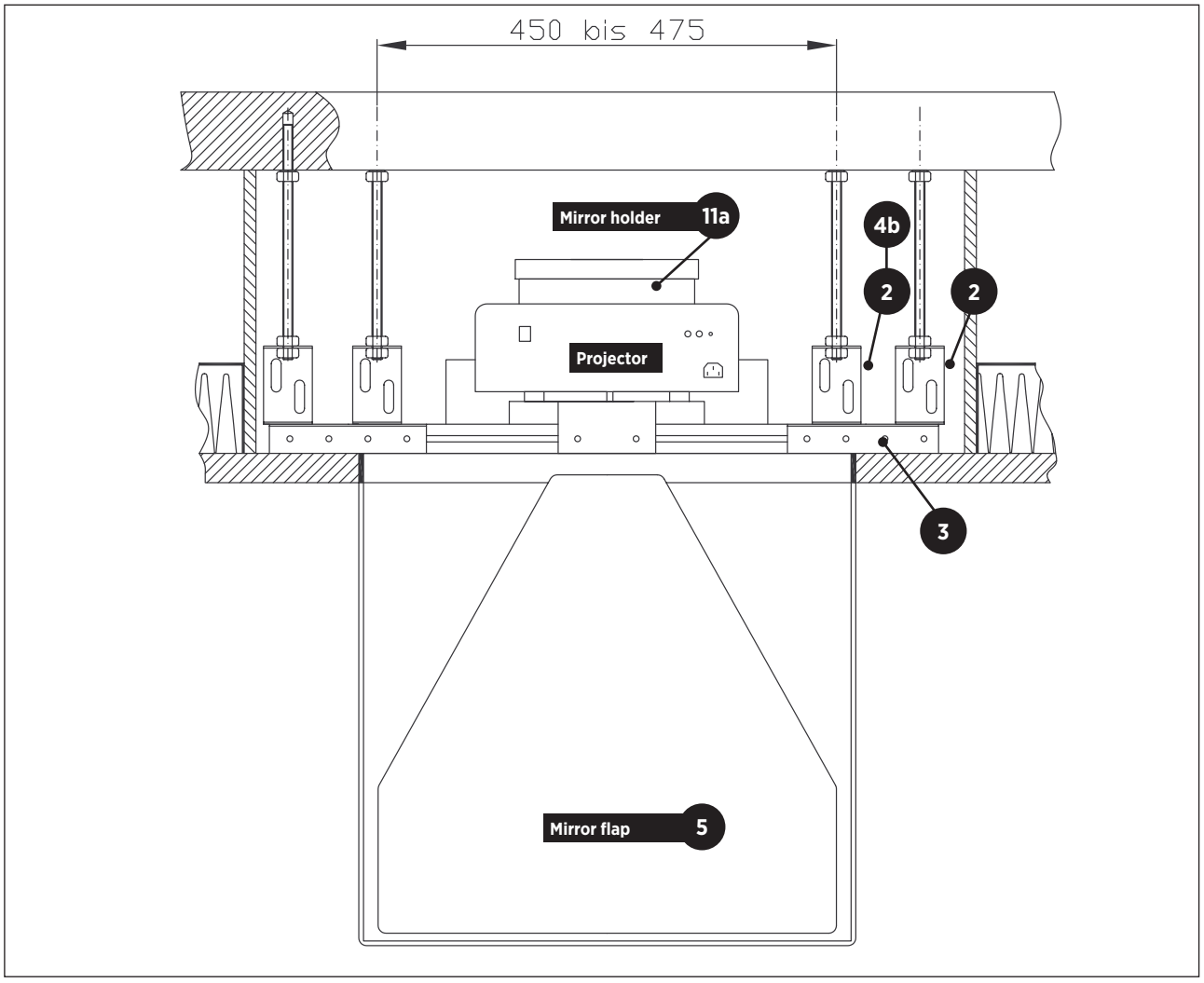
Attention: Observe installation provisions; only use suitable steel dowels to attach the threaded rods to the solid ceiling (not enclosed).

Reinforcement of the carrying capacity of the ceiling by installation of the corresponding suspension mounting system of the ceiling supplier to the solid floor ceiling is possible as well.



Ill. B

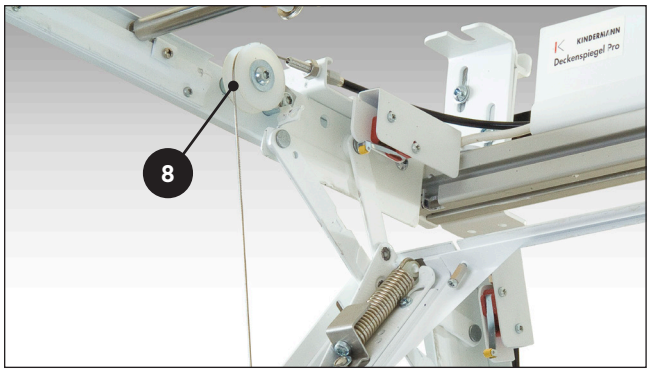
Mounting on threaded rods at the solid ceiling



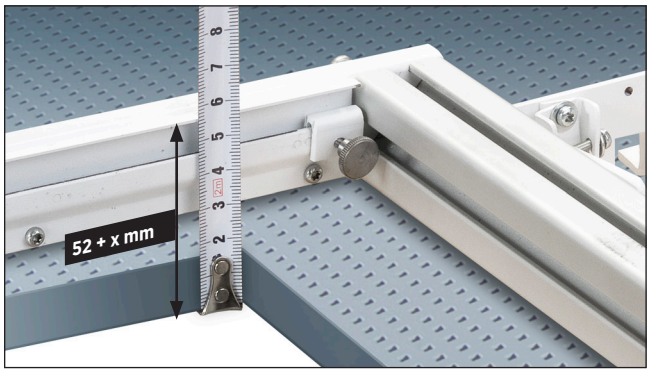
3.2.1.1 Mounting in Suspended Room Ceilings

Cut a section of BxD **(B in parallel to the canvas)**: 505 mm x 490 mm into the suspended ceiling (e. g. plasterboard, panels, wood, etc.) in a suitable location. The cut-out (or any other insertion part) can later be put into the mirror flap.

- Connect the mains unit 9 VDC to the socket (13b) and to the 230 V socket, wire the connections for the switch OPEN/CLOSE to the screw terminal OPEN/CLOSE socket (13a).
- Insert the ceiling mirror diagonally through the opening and position it so that the mirror flap will fit centred into the cut-out.
- Extend the mirror electrically with the OPEN/CLOSE switch.
- For the service position, disconnect the wire ropes on the left and right from the deflection roll (8); relieve the mirror flap with your hand.



- Set the height of the ceiling mirror at the four corners to 52+x mm with the adjustable, installed angles (in addition to the measured thickness of the ceiling cut-out insertion part x in the mirror flap) between the lower edge of the ceiling and the upper edge of the metal frame (1).



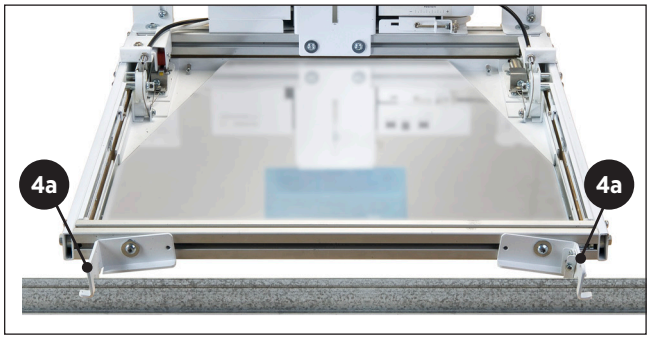
- Align the ceiling mirror and screw it to the angles previously installed in the ceiling with suitable screws.
- Manually lift the mirror flap and attach the wire ropes to the deflection roller (8) again on the left and right and close the mirror flap using the motor; the flap will run via the tensioning spring (8b) against the stops (8a) and stop as pre-set in the factory.
- Check if the mirror flap closes flush with the ceiling; if necessary, adjust with oblong holes in the assembly angle.
- Extend the mirror flap, disconnect the wire rope and attach T-profiles with or without ceiling cut-out, the surrounding T-profile frame will cover the ceiling gap; an inserted ceiling cut-out can visually conceal the ceiling mirror.

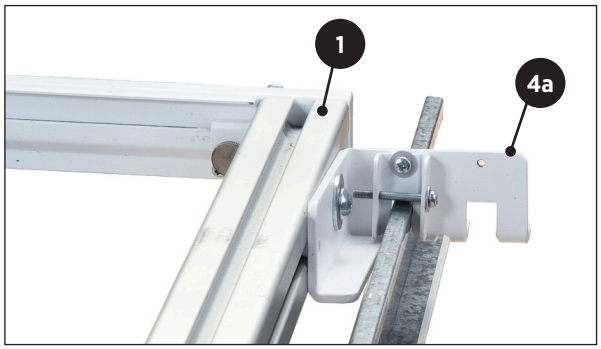
3.2.1.2 Mounting in Ceiling Grids 60 x 60 cm or 62.5 x 62.5 cm

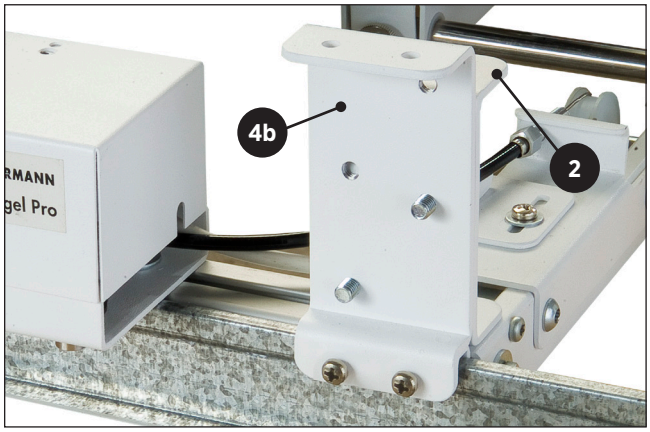
The ceiling mirror is installed in the ceiling instead of a panel.
The panel can be inserted into the mirror flap to visually conceal the used ceiling mirror.

Remove an element from the ceiling elsewhere.
The carrying construction of the ceiling grid must be able to bear four times the maximum weight of the ceiling mirror and projector at the installation site.

First, install the enclosed angles to the metal frame (1): Install angle (4a) front, angle (4b) to the angle (2) with the flat side up, rear.



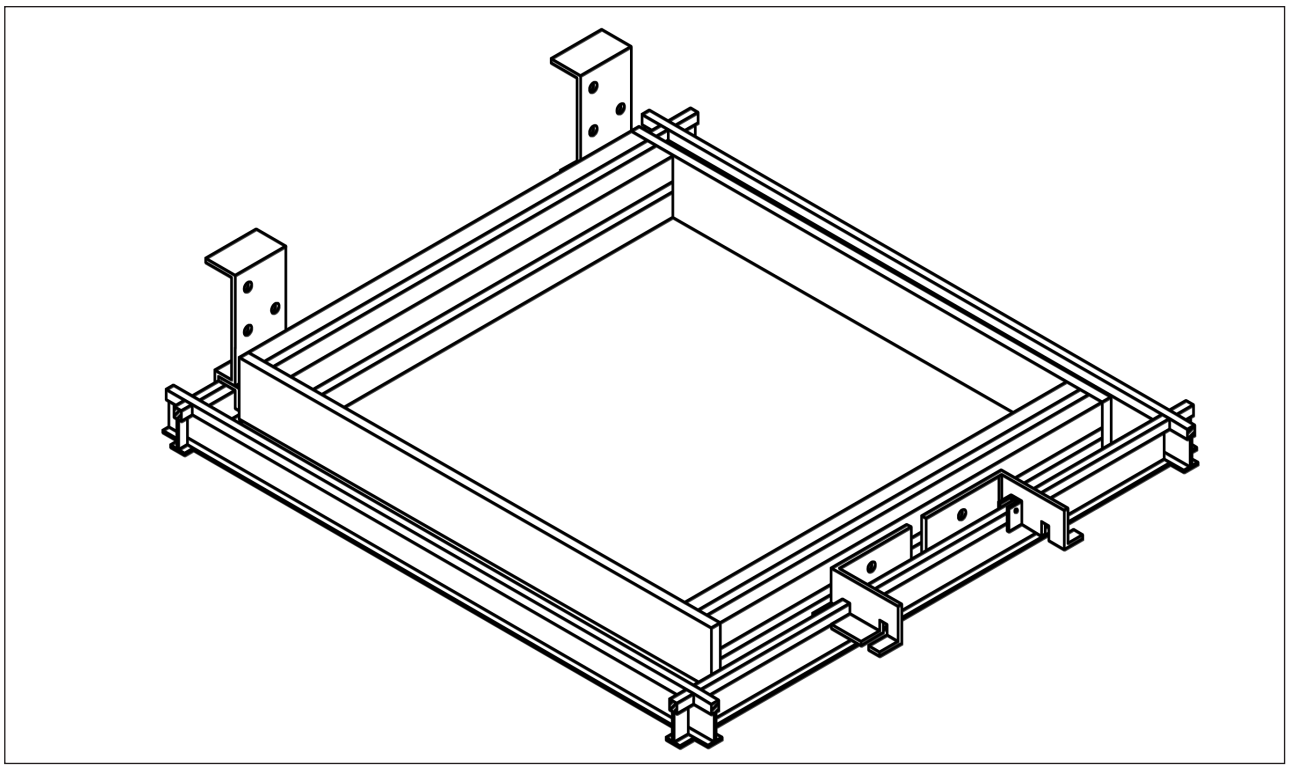




Installation with threaded rod set

If the carrying capacity of the ceiling for installation is not ensured, the ceiling mirror may also be attached directly to the solid ceiling above with the threaded rod set (7469 000 014: 4 threaded rods M8, 1 m) and attachment material. For this suspension, first install the enclosed angles to the metal frame (1): Install angles (2, 3, 4a) front, angle (4b) to the angle (2) with the flat side up, rear.

Inserting into the ceiling grid



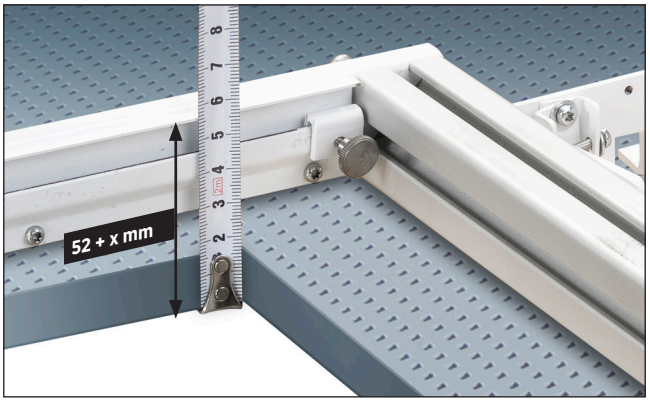
3.2.1.2 Mounting in Ceiling Grids 60 x 60 cm or 62.5 x 62.5 cm

➡ Connect the mains unit 9 VDC to the socket (13b) and to the 230 V socket, wire the connections for the switch OPEN/CLOSE to the screw terminal OPEN/CLOSE socket (13a).

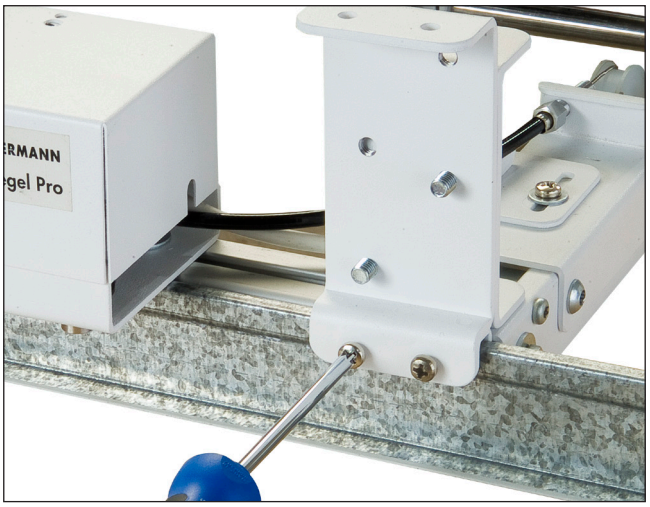
➡ Insert the ceiling mirror diagonally through the opening and place it on the carrying profile of the suspended ceiling grid, align centred.

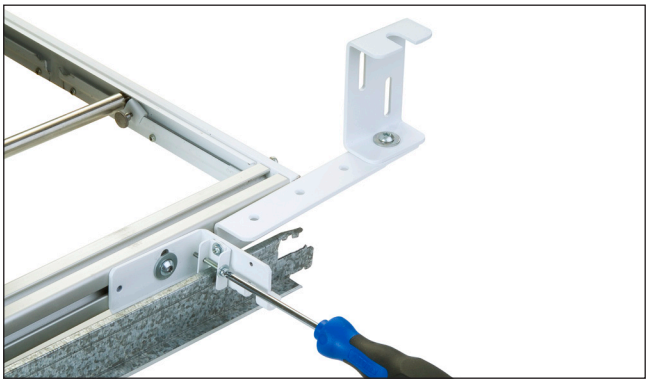
➡ Extend the mirror electrically with the OPEN/CLOSE switch; disconnect from the deflection roll (12).

➡ Set the height of the ceiling mirror at the four corners to 52+x mm with the adjustable, installed angles (in addition to the thickness of the ceiling cut-out insertion part x in the mirror flap) between the lower edge of the ceiling and the upper edge of the metal frame (1).



➡ Align the ceiling mirror and fasten it to the frame strut of the ceiling grid with the clamping screws of the previously installed angles.





➡ Attach the wire ropes to the deflection roller (12) again on the left and right and close the mirror flap using the motor; the flap will run via the tensioning spring (8b) against the stops (8a) and stop; these settings are preset in the factory.

➡ Check if the mirror flap ends flush with the ceiling; if necessary, correct it on the installed angles via oblong holes; the space from the mirror flap to the ceiling grid must be adjusted with ceiling cut-outs.

➡ Extend the mirror flap and attach T-profiles with or without ceiling cut-out, the surrounding T-profile frame will cover the ceiling gap; an inserted ceiling cut-out can visually conceal the ceiling mirror.

4. Mounting of the Projector

Prerequisites to the projector:
Max. dimensions B=490, L=500 mm, H=variable; max. weight: 15 kg; three or four threaded sleeves (M3, M4, M5 or M6) on the bottom; attachment area between 100 and 480 mm.

The attachment material is enclosed: 4 threaded spacer sleeves, 4 x screw set with the corresponding washers M3, M4, M5, M6; projector installation standing, the position setting in the projector menu is „Front“.

The projector holder is attached on a carriage. The projector can be moved laterally on the carriage after insertion into the ceiling mirror and pushed on the carriage length-wise on two guide rails. The position is defined by 4 adjustable stops (9b); also see page 5.
When removing the projector, these stops must be released first.

When the projector is turned out or in through the mirror flap opening, you need to move the projector to the middle position on the carriage and carefully turn out the carriage with the projector without touching the frame structure.
Use the cut-outs (1a) in the frame structure to remove the projector carriage.

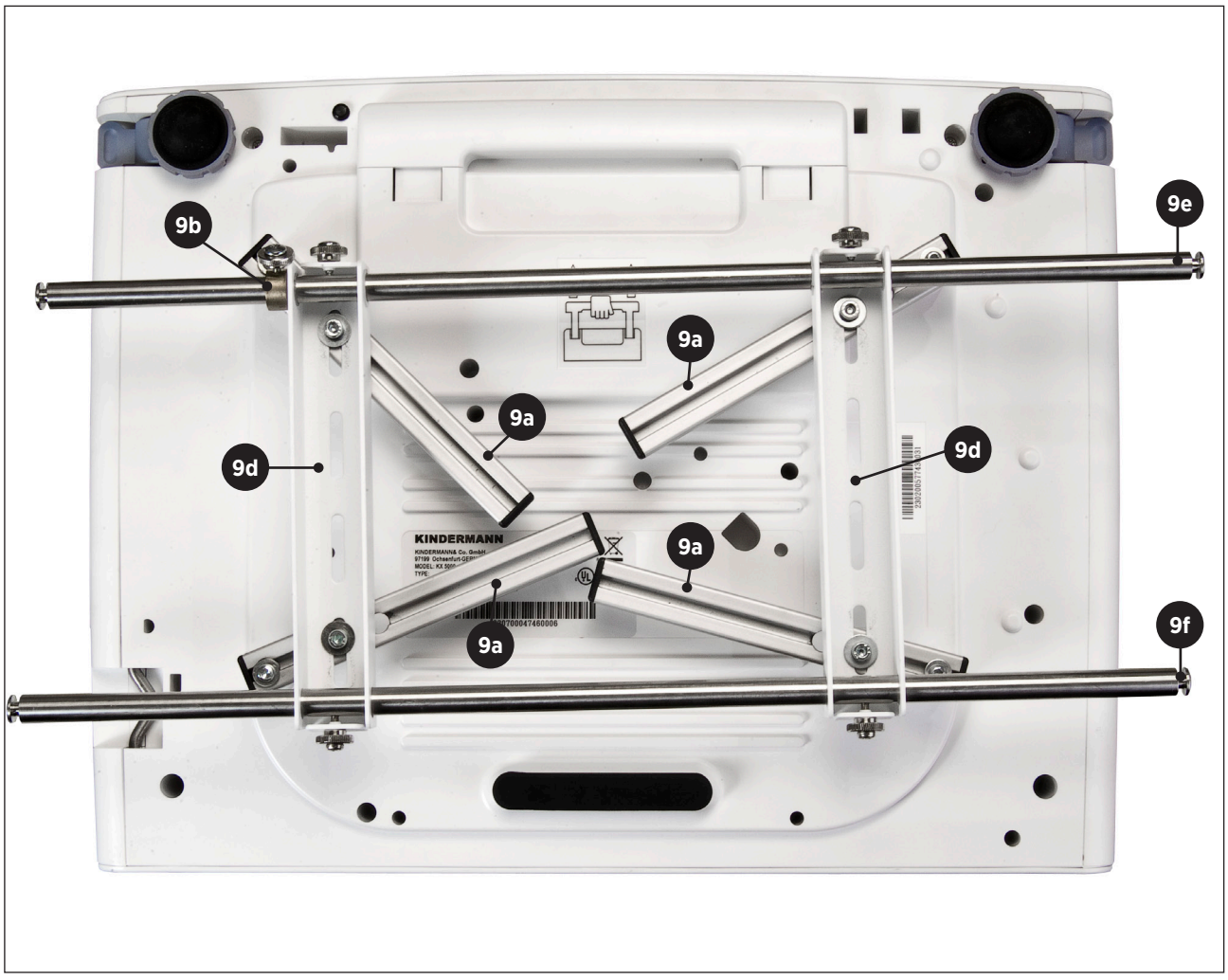
4.1 Attach the Universal-Projector Holder

The projector is attached on the projector carriage (9).

Place the projector (device bottom up) on a soft base. Loosen the variable arms of the projector holder with the hexagon screwdriver and move the carriers (9 d) outwards where possible.

Align the arms (9a) with the threaded sleeves of your projector, turn the threaded spacer sleeves into the arms and fasten them with the matching screw set.

Place washers on top of and under the threaded sleeves, align the two carriage axes in parallel with the projector front edge and tighten all screws.

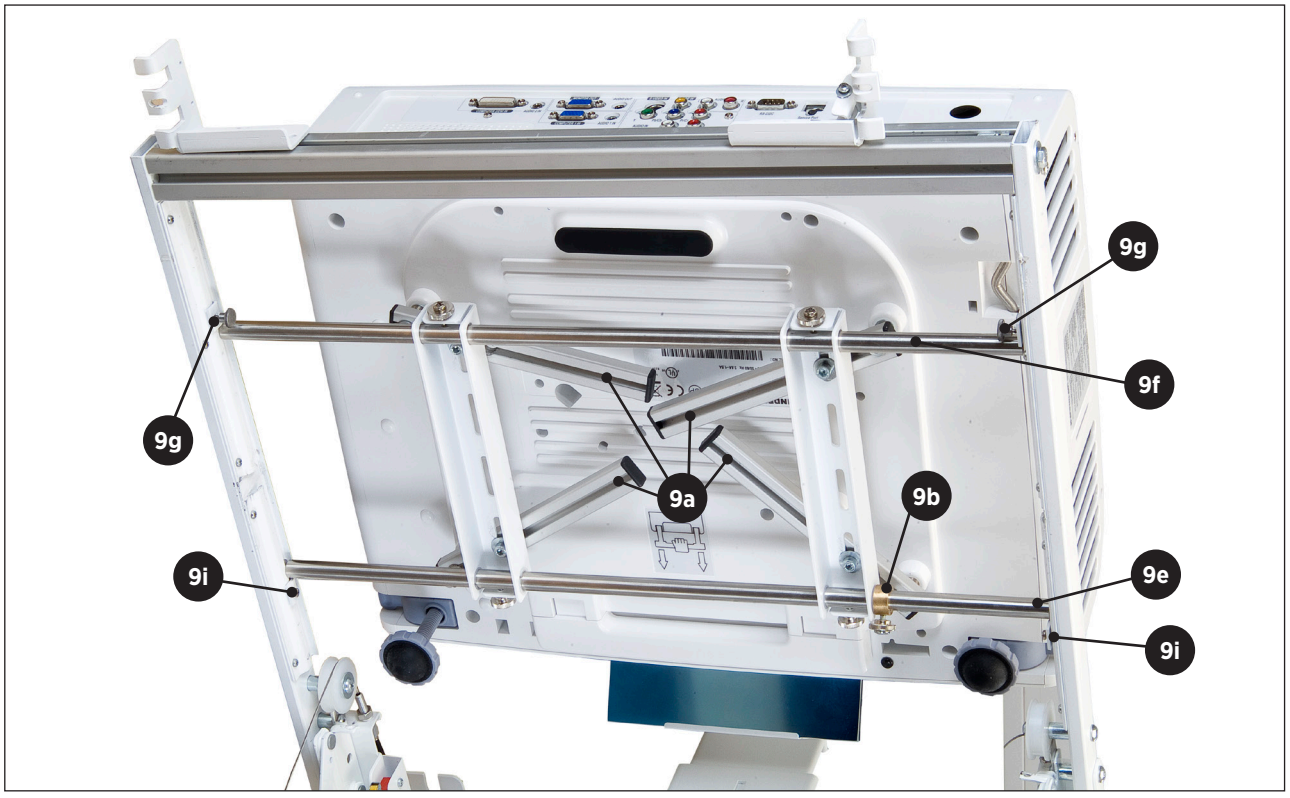


4.2 Positioning the Projector in the Ceiling Mirror

First insert the projector carriage into the cut-out (1a) in the frame structure with the rear carriage axis (9f), then push this axis in the guide first towards the canvas, then insert the front carriage axis (9e) and finally place the projector in the projection position.

Last, move the projector sideways so that the lens axis will be centred with the mirror (11).

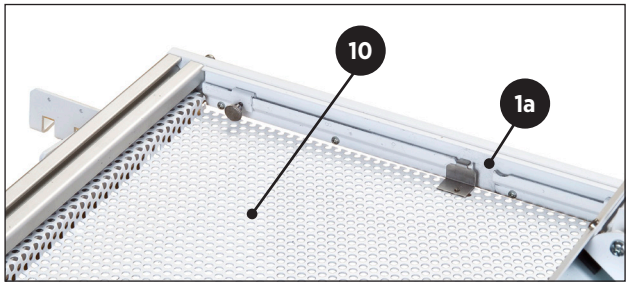
- The mirror holder (11) can be adjusted in 3 axes via different oblong holes: forward/back (putting the mirror close to the lens), up/down (projection beam is caught entirely by the deflection mirror (11)).
  The inclination angle should be 45°.
- Connect the mains line and all signal lines to the projector, switch on the projector.
- Optimise the projector position and setting of the mirror holder and opening angle of the mirror flap to produce the most undistorted, rectangular, evenly, sharp image in the projection area.
- After termination of the setting and adjustment processes, secure all positions and stops (9b, 9g, 9i) of the projector carriage with the corresponding clamping screws.



4.3 Installing the Sight Screen

The enclosed sight screen (10) is finally placed above the installation cut-out (1a) in the ceiling mirror with the mirror flap open.
The angled end is inserted into the groove of the aluminium profile.

We recommend installing a box in the ceiling instruction at the installation site as well to cover up dust collection and undesired views into the open ceiling.



4.4 Removing the Projector for Servicing

For the service position, the mirror flap should be opened and turned down entirely by disconnecting the ropes. **Release only** the clamping screws (9 i) to remove the projector, move the projector on the carriage axes (9 e, f), so that the projector can be turned out of the mirror flap opening without touching the frame. Perform the above steps of item 4.2 accordingly in the reverse order. The other stops that specify the projection positions make it easy to adjust the projector position again quickly without difficult subsequent adjustment after servicing.

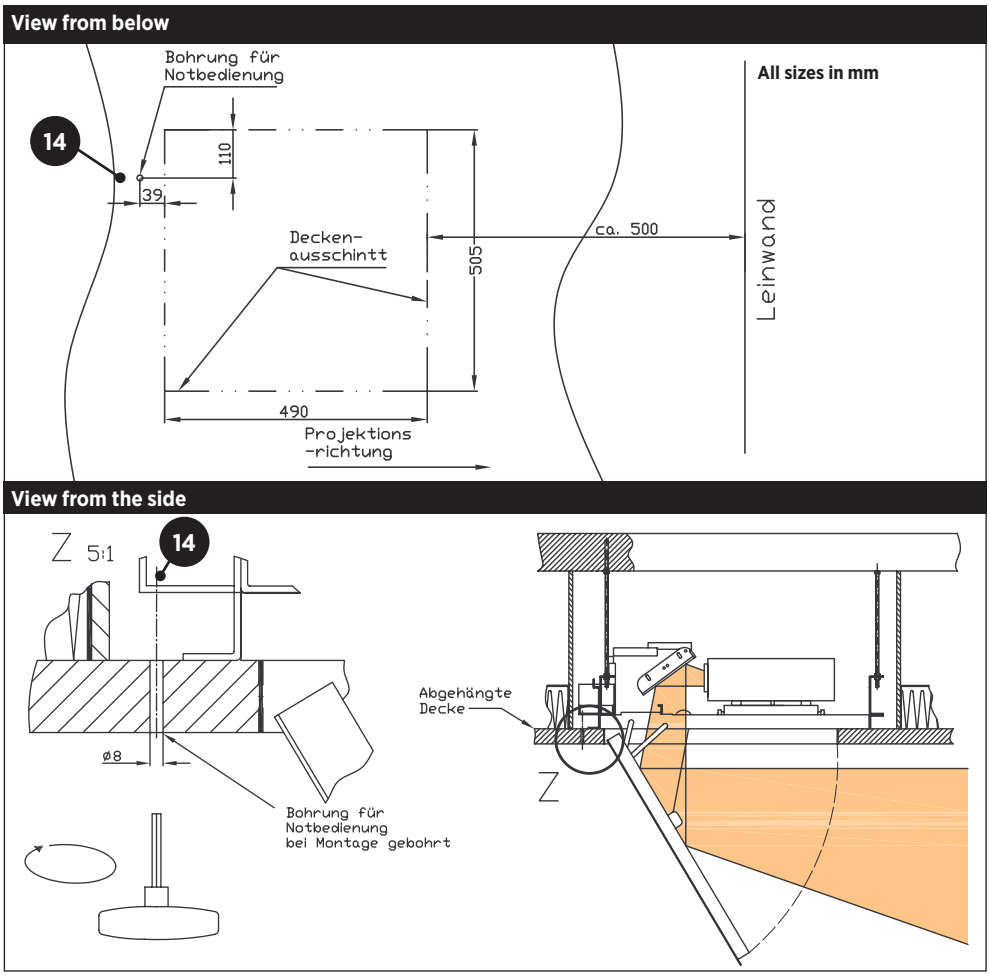
4.5 Manual Opening of the Mirror Flap in Emergency

At power outage or unforeseen errors, the mirror flap can also be opened manually in order to perform servicing.

The mirror flap can be opened manually at the displayed opening (14) with a hexagon screwdriver „4 mm“ or a cordless screwdriver with a 4 mm hexagon insert: A left-hand turn opens the flap (extremely slowly through transmission), a right-hand turn closes the flap.

Do not turn over the end positions!
Now further error analysis can be performed with the flap opened.

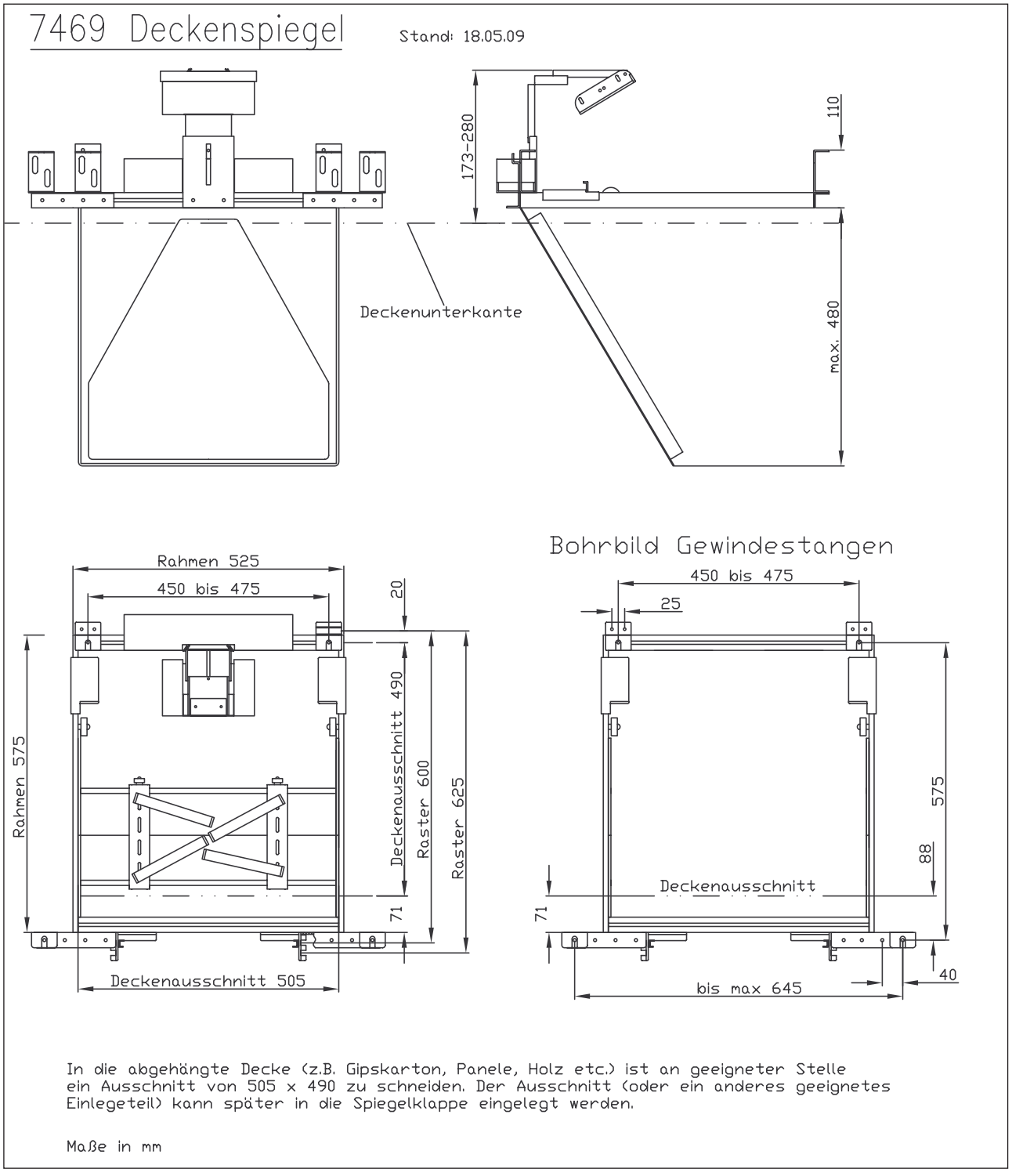
We recommend making an „emergency opening“ in the suspended ceiling when installing the ceiling mirror according to the following sketch and closing the hole with a cover flap.



5. Maintenance and Care

Once per year, the ceiling mirror should be inspected for safety and reliability, i.e.: Cable guide, steel cables, cable connections and attachment. Additionally, observe dust deposits or other flammable or obstructing materials, remove or clean them if necessary.

6. Dimensions and Dimension Sketch



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