

# Measuring Your Telescope System

For planning and sizing your observatory or your AstroCube

So that we can size the pier, the roof opening and the interior of your observatory correctly, we need a few measurements of your telescope system. This sheet guides you through the measuring. Pages 3 and 4 show where and how to measure each dimension.

## How to proceed

- 1 **Fully equip the telescope.** Camera, dew shield, finder, cables and counterweights mounted, just as you use it in operation.
- 2 **Measure A to P2 in millimeters.** Measure all distances B1 to D from the rotation center A.
- 3 **Calculate Ø and H.** The calculation is on page 4. The checklist on page 5 helps avoid the most common errors.
- 4 **Take two photos and send everything back.** One from the side, one from the front, each with a tape measure visible.

**Important:** All dimensions apply to the fully equipped telescope. Anything left out now is missing from the space calculation later. If your pier is not built yet, enter E, F and G if known, or leave them empty. We will set the pier height together.

## Your details

First and last name

Phone

Email

Observatory location (town)

## Your equipment

Mount (make, model)

Telescope (make, model, aperture, focal length)

Camera and accessories (filter wheel, finder, guide scope ...)

Counterweights (number, bar length)

Mount type

☐ Equatorial ☐ Fork ☐ Alt-azimuth ☐ Other

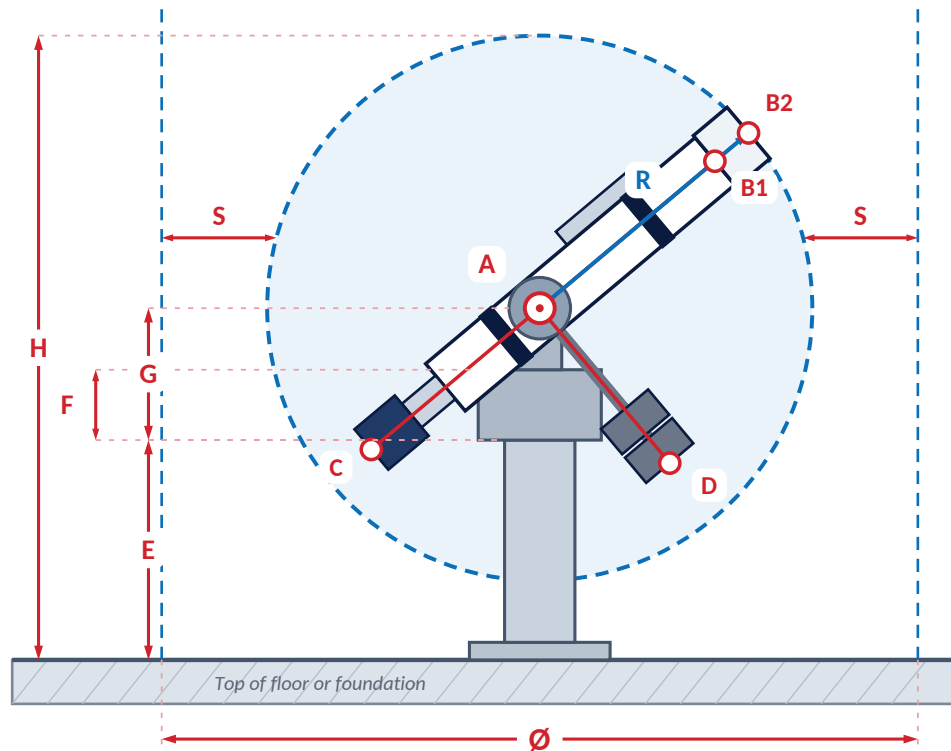
Telescopes on the mount

Total weight (kg)

Close the roof with the telescope in park position? (requires a park sensor)

☐ Yes ☐ No ☐ Undecided

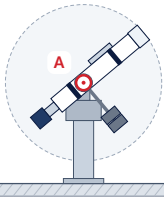
## Dimensions of the telescope system



| Key | Description                                                                 | Value [mm]           |
|-----|-----------------------------------------------------------------------------|----------------------|
| A   | Rotation center, intersection of the rotation axes (reference point)        | Reference point      |
| B1  | Front of the optics: distance from A to the front edge of the tube or lens  | <input type="text"/> |
| B2  | Outermost front point, e.g. dew shield or open flap: distance from A        | <input type="text"/> |
| C   | Rear and camera incl. accessories: distance from A                          | <input type="text"/> |
| D   | Counterweight: distance from A to the outermost point                       | <input type="text"/> |
| E   | Pier height: from top of floor to top of pier                               | <input type="text"/> |
| F   | Pier top to top of mount                                                    | <input type="text"/> |
| G   | Pier top to rotation center A                                               | <input type="text"/> |
| H   | Total height: from top of floor to the highest point                        | <input type="text"/> |
| S   | Safety clearance, applies on each side                                      | <input type="text"/> |
| Ø   | Required swing diameter = $2 \times R + 2 \times S$ (calculation on page 4) | <input type="text"/> |
| P1  | Park position: width of the telescope system (page 4)                       | <input type="text"/> |
| P2  | Park position: height from floor to the highest point (page 4)              | <input type="text"/> |

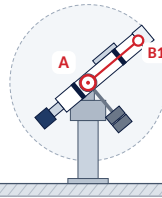
## Step-by-step measuring guide

**Tip for B1 to D:** Measure the straight line, i.e. the direct distance from A to the point. If the path is blocked by the tube or housing, measure the length along the tube axis and the offset between A and the tube axis, and note both values next to the field.



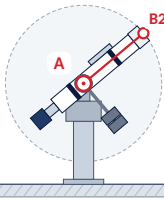
### A Rotation center

Reference point for all distances. On an equatorial mount, the intersection of the right ascension and declination axes. Mark it with a sticker before measuring. Fork and alt-azimuth mounts: intersection of the rotation axes.



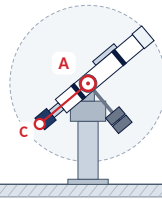
### B1 Front of optics

Distance from A to the foremost edge of the tube or lens, without dew shield. Measure straight from A to the point, not around the tube.



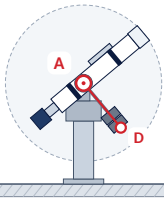
### B2 Outermost front point

Distance from A to the point furthest forward: dew shield, extended drawtube, open flap. B2 is always at least as large as B1.



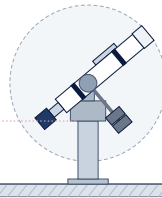
### C Rear and camera

Distance from A to the rearmost point: camera, filter wheel, focuser, protruding connectors and cable loops. Everything mounted as in operation.



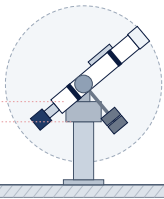
### D Counterweight

Distance from A to the outermost point of the weights or weight bar. Slide the weights as you use them in operation. Include the bar end and safety stop.



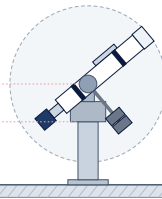
### E Pier height

Vertically from the top of the finished floor to the top of the pier. Use a plumb line or spirit level. Do not include the adapter plate, it counts toward F. Pier not built yet: leave empty.



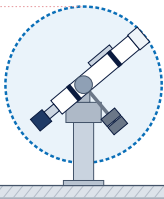
### F Pier to mount

Vertically from the top of the pier to the highest point of the mount head, without telescope and without weight bar. An adapter plate is included.



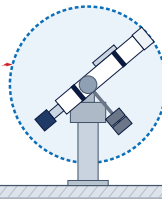
### G Pier to rotation center

Vertically from the top of the pier to point A.  $E + G$  gives the height of the rotation center above the floor.



### H Total height

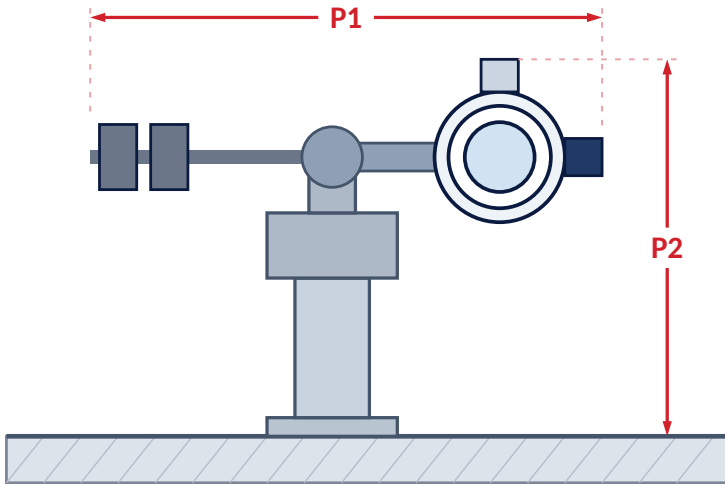
Vertically from the top of the floor to the highest point the telescope reaches while swinging. Check: H is close to  $E + G + R$  (calculation on page 4).



### S Safety clearance

Free clearance you want between the swing circle and wall, roof or fixtures. It applies on each side. Unsure? Leave the field empty, we will advise you.

## Park position and calculation



View from the front along the telescope axis, telescope in park position.

### P1 Width in park position

Horizontal distance from the outermost point on the left to the outermost point on the right, with all accessories. The telescope is in the position in which the roof is to close.

### P2 Height in park position

Vertically from the top of the floor to the highest point of the system in park position, including finder, cables and attachments.

**Option for AstroCube:** Closing in park position is possible. This requires a park sensor.

## Calculation of $\emptyset$ and H

❶  $R = \text{largest value of } B1, B2, C \text{ and } D$

 mm

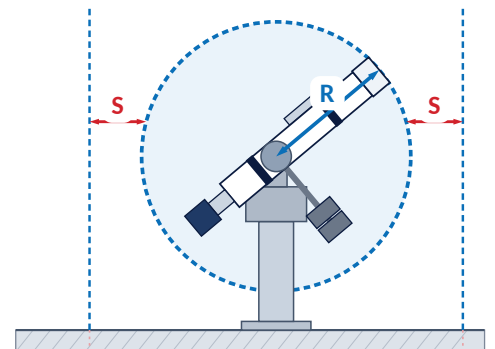
❷  $\emptyset = 2 \times R + 2 \times S$

 mm

❸ Height of rotation center =  $E + G$

 mm

❹  $H = E + G + R$  (check against measured H)

 mm


**Example:**  $B1 = 520, B2 = 620, C = 500, D = 460, S = 100, E = 500, G = 300$  (all in mm).

$R = 620$  (largest value).  $\emptyset = 2 \times 620 + 2 \times 100 = 1440 \text{ mm}$ .  $H = 500 + 300 + 620 = 1420 \text{ mm}$ .

$R$  is the radius of the swing circle around A.  $\emptyset$  is the minimum interior diameter the observatory must have at the height of the rotation center so that the telescope keeps the safety clearance  $S$  on each side.

## Checklist before sending

- ☐ All dimensions are in millimeters. Typical values have three or four digits, two-digit values are often centimeters.
- ☐ B1, B2, C and D are measured from A, not from the pier or the floor.
- ☐ B2 is not smaller than B1.
- ☐ The telescope was fully equipped: camera, dew shield, finder, cables, counterweights.
- ☐  $\emptyset$  is greater than  $2 \times R$ . The safety clearance S is included.
- ☐ H and E + G + R are close together. If H is clearly lower, a note says why (e.g. the mount does not swing up to the zenith).
- ☐ Photos from the side and from the front are attached.

## Common errors and how to avoid them

- **Measured from the pier instead of from A.** The distances B1 to D always start at the rotation center A.
- **Accessories missing while measuring.** Leave camera, cable loops, dew shield and counterweights mounted.
- **Counterweight is not in its operating position.** Slide the weights as you use them and measure the outermost end.
- **The tape sags or bends.** Pull it taut or use a laser distance meter.
- **Wrong floor reference.** Measure from the top of the finished floor. If a floor covering is still to come, state its thickness.
- **Dimensions estimated instead of measured.** An empty field is better than a guessed value. We will gladly follow up.

## Photos

**Photo 1:** Side view of the fully equipped telescope on the pier, tape measure or folding rule next to the pier.

**Photo 2:** View from the front, telescope in park position.

### **Return**

Send the completed sheet (as PDF or photo) with the two photos to:

**Stefan Reichmann** | [info@teleskop-schutzbauten.de](mailto:info@teleskop-schutzbauten.de) | Phone +49 1520 4057310