

# Cavitar Welding Camera C400

## Guide for working distance adjustment

This guide describes how to adjust the working distance of Cavitar C400 series Welding Cameras. The actual appearance of the C400 camera unit may vary (e.g. version differences, GigE/USB).

**IMPORTANT SAFETY NOTICE:**

PLEASE READ AND UNDERSTAND THESE INSTRUCTIONS BEFORE PERFORMING ANY ADJUSTMENT PROCEDURES TO PREVENT RISK OF INJURY TO THE USER AND TO AVOID DAMAGE TO THE CAMERA.

DO NOT STARE AT THE LASER OUTPUT UNDER ANY CIRCUMSTANCES (SEE CHAPTER 2 OF THE OPERATION MANUAL FOR MORE DETAILS).

ENSURE THERE IS NO RISK OF UNINTENDED EYE EXPOSURE TO THE LASER OUTPUT DURING THE WORKING DISTANCE ADJUSTMENT PROCEDURE (SEE CHAPTER 2 OF THE OPERATION MANUAL FOR MORE DETAILS).

Cavitar Welding Camera, C400 series

Guide for working distance adjustment, Revision 1.0.0

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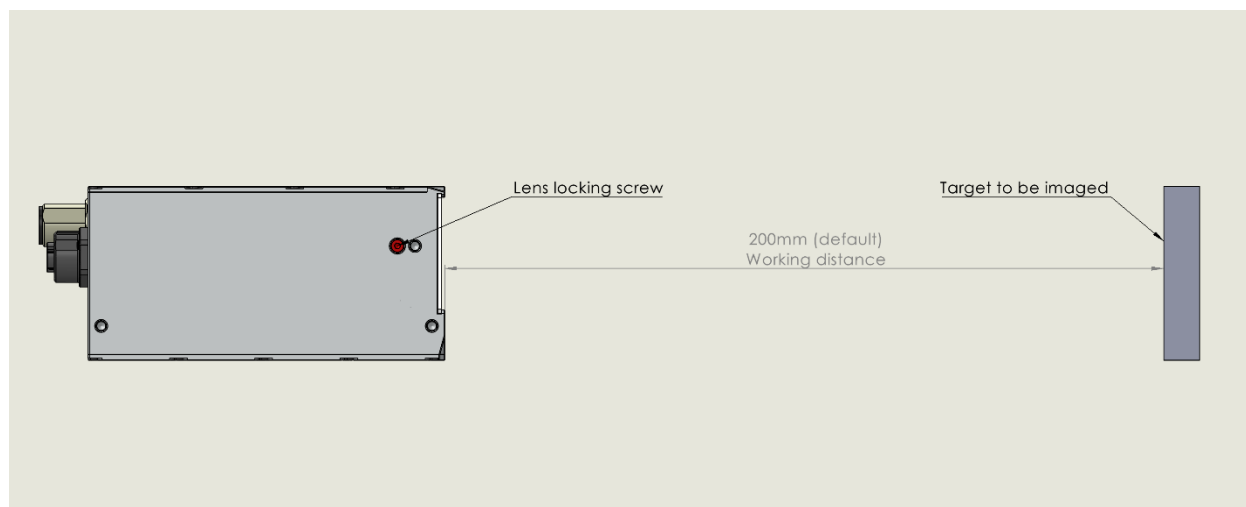


Fig. 1. Definition of working distance (WD).

- The working distance (WD) of the camera is measured from the frontmost surface of the camera unit body (see Fig. 1 above)
- By default the WD of a C400 series camera unit is set to 200 mm by Cavitar
- The adjustable WD range is specified to be at least 150...300 mm. However, this range may be somewhat wider in practice
- Decreasing the WD will increase the intensity of illumination and vice versa. Gain adjustment can be applied to compensate
- Decreasing the WD will reduce the field of view (FOV) and vice versa (see Table 1 below, all values are approximate)

Table 1. Dependence of FOV on WD.

WD (mm)	FOV (mm x mm) (vertical x horizontal)
150	22 x 29
200	31 x 41
250	39 x 52
300	48 x 63

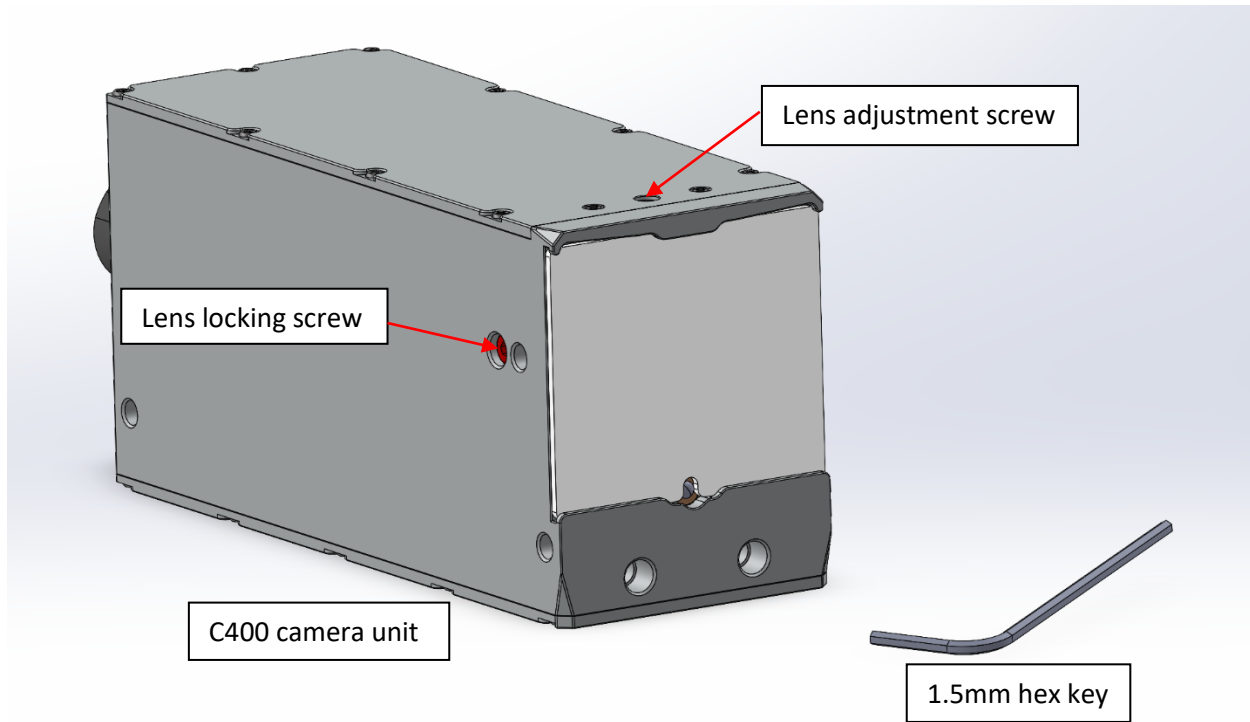


Fig. 2. Components related to WD adjustment.

The WD adjustment procedure typically consists of the following steps:

1. Positioning of the camera to the desired distance from the target to be imaged
2. Loosening of the lens locking screw (with 1.5mm hex key)
3. Turning of the lens adjustment screw until the target is in focus (with 1.5mm hex key)
4. Fastening of the lens locking screw (with 1.5mm hex key)

Each step is described in more detail below.

### **1. Positioning of the camera**

Position the camera to the desired location with respect to the target (see Fig. 1) in such a way that the lens locking screw and lens adjustment screw are accessible. By default the lens locking screw is attached to the right side of the camera (looking from back) but it can be moved to the left side if needed (see the following section for more detailed instructions).

## 2. Loosening of the lens locking screw

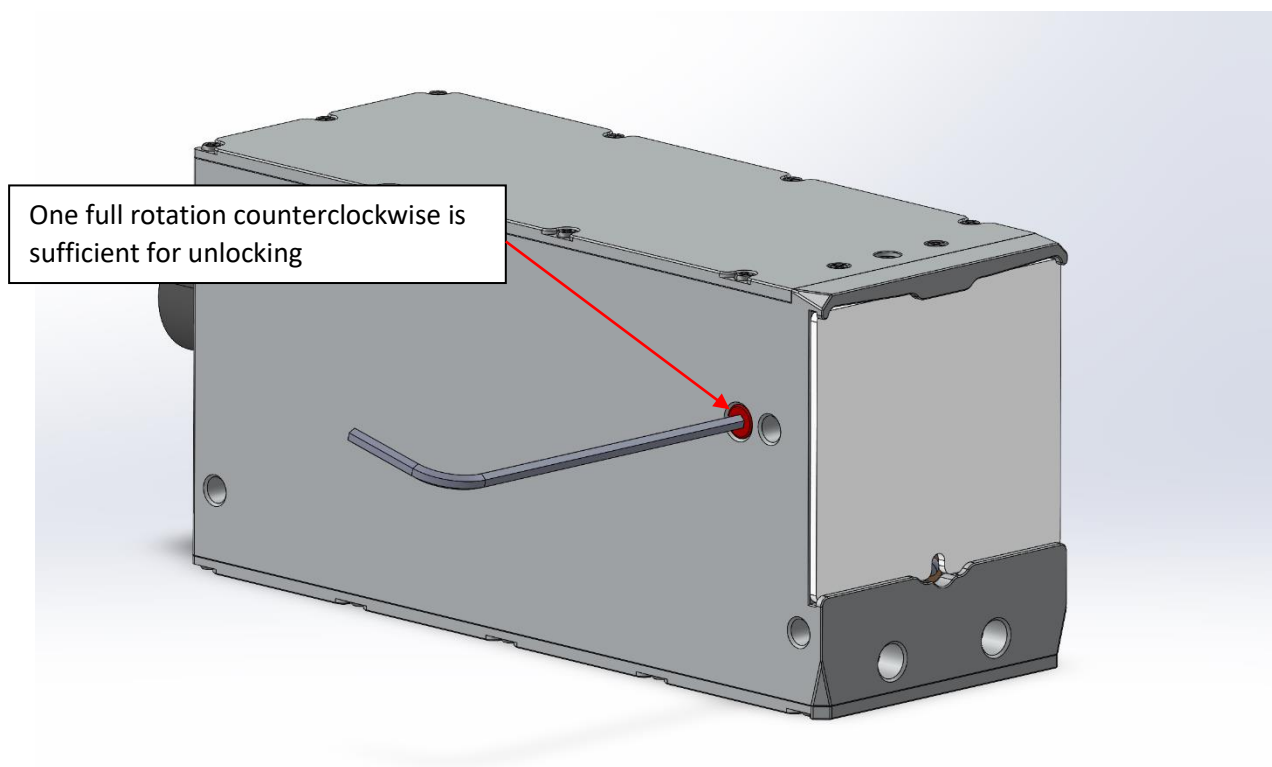


Fig. 3. Loosening the lens locking screw. Lens locking screw is colored red.

By default the lens locking screw (DIN912, M2 x 10mm, colored red) is located on the right side of the camera unit (looking from back).

In the same location on the opposite side of the camera unit there is another screw (DIN912, M2 x 8mm, not colored) which serves only as a protective plug to prevent impurities from getting to the lens.

You can move the lens locking screw to either side of the camera, whichever is more convenient. As an example, if the camera needs to be mounted from the right side it is good to move the locking screw to the left side so that WD can be adjusted later if needed (without the need to unmount the camera).

However, it is always necessary to also fasten the protective plug screw to the opposite side!

### 3. Adjustment of the WD

After loosening the lens locking screw there should be little or no resistance when turning the lens adjustment screw on top of the camera with the 1.5mm hex key (see Fig. 4). However, if there is noticeable resistance, do not turn the screw by force (this will damage the adjustment mechanism) but first check the following:

- ensure the lens locking screw (colored red) has been properly loosened
- ensure the lens hasn't already reached the limits of the adjustment range (in this case it is at first possible to turn the screw in one direction only, after which the screw can again be turned in both directions)

By turning the lens adjustment screw clockwise, the WD decreases.

By turning the lens adjustment screw counterclockwise, the WD increases.

When reaching the mechanical limit of the adjustment range, noticeable resistance will be felt. At this point the WD has reached either the minimum or maximum value. Do not continue turning the screw beyond this limit since this can damage the adjustment mechanism.

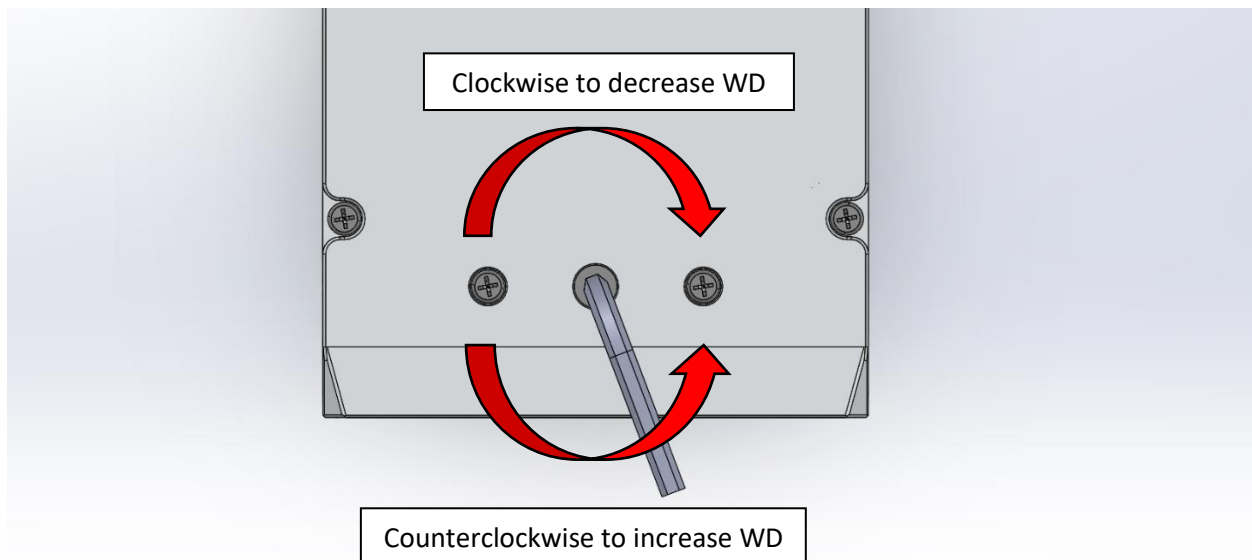


Fig. 4. Turning the lens adjustment screw until the target is in focus (view from top).

For optimal results the WD should be adjusted in such a way that the depth of view is centered around the target. One method is to adjust until the target becomes sharp. After this continue adjusting (in the same direction) until the target becomes blurry. Then adjust (in the other direction) half-way back. Increasing zoom and centering the image in the window can also be helpful.

#### **4. Fastening of the lens locking screw**

Use the length of the 1.5mm hex key to fasten the lens locking screw gently but firmly as shown in Fig. 5.

A torque of approximately 0,3 Nm is recommended.

If the lens locking screw has been moved from one side to another, ensure that the protective plug screw will also be fastened in the same way.

Once the lens locking screw is fastened, do not attempt to rotate the lens adjustment screw as it might damage the functionality of the mechanism!

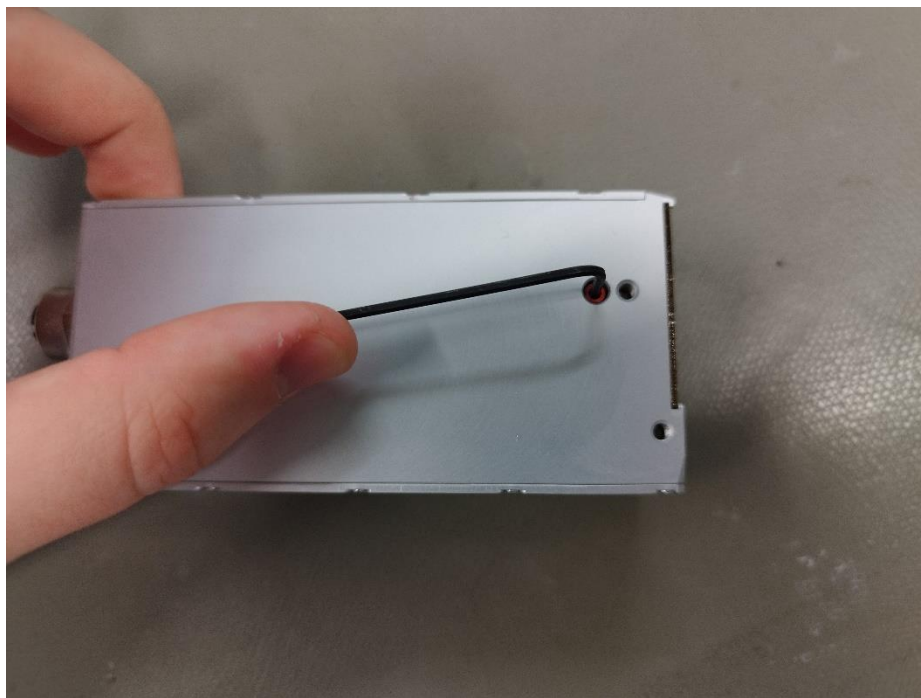


Fig. 5. Fastening of the lens locking screw.