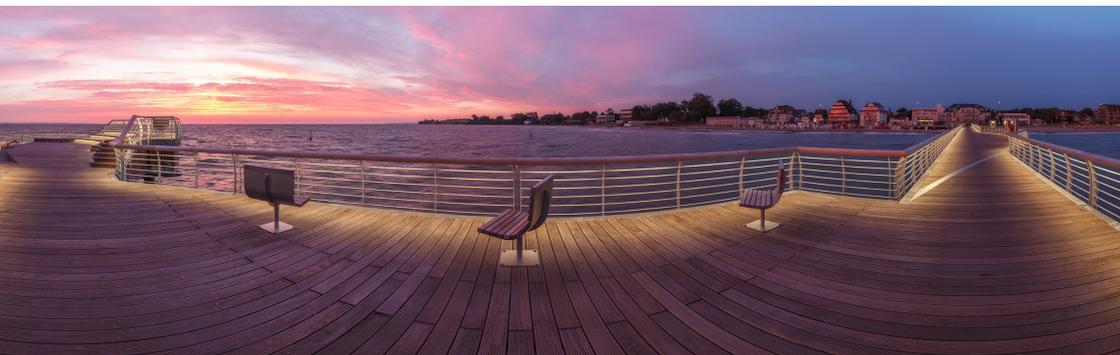


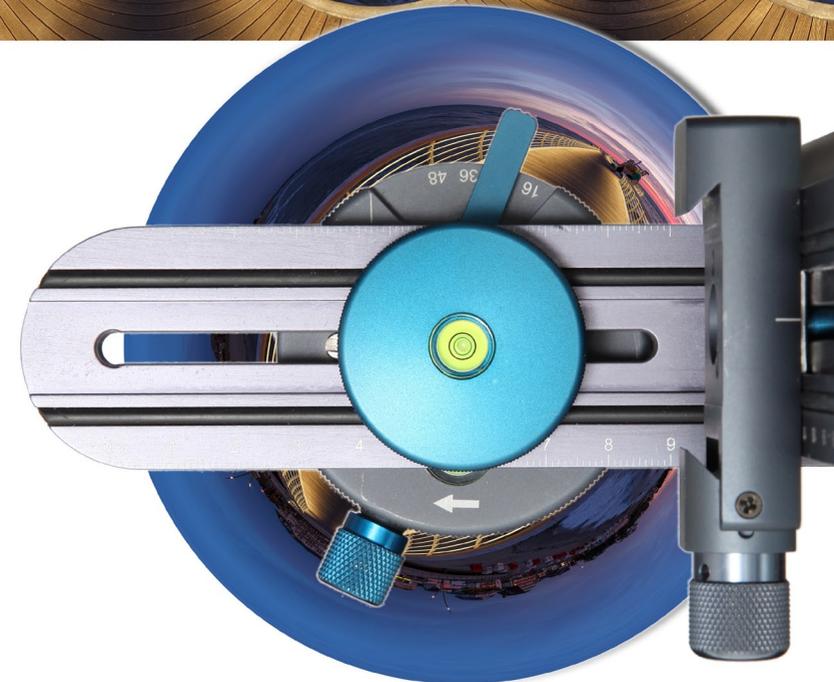
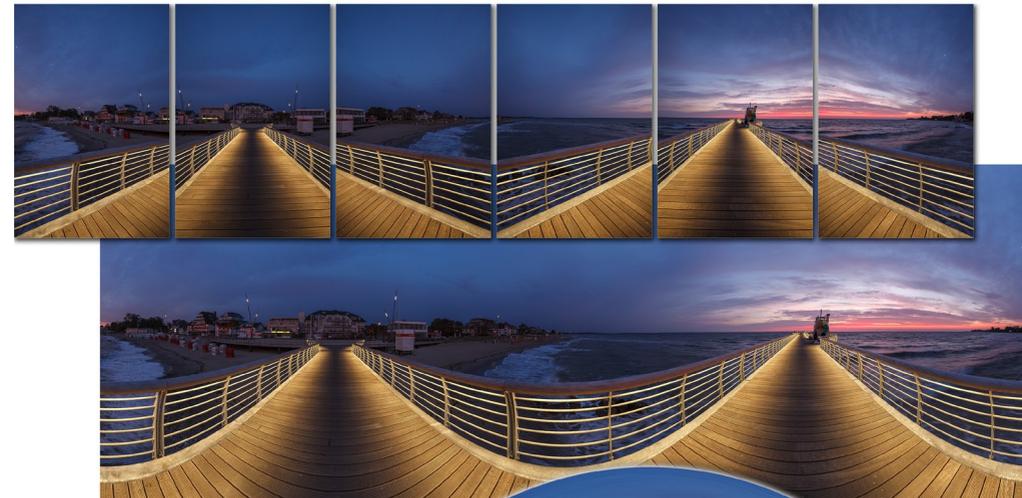
VR-SYSTEM SLIM

MANUAL

N
NOVOFLEX



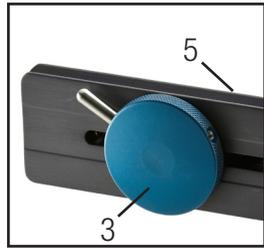
© Jan Röpenack



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Panorama VR-SYSTEM SLIM



Camera and lens not included



Backside

Backside



PANORAMA 48
(bottom)

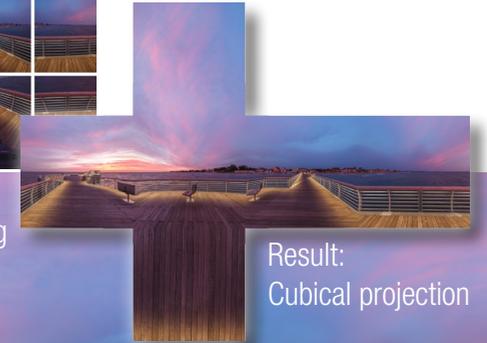
PANORAMA 48

Last checkup:

- System leveled to the horizon (verify with the spirit level on the lower locking screw)?
- Set panning angle (increment), depending on the focal length?
- Correct values on the lower and upper scale?
- Set fixed white balance (e.g. sunny)?
- Manual exposure mode?
- Correct exposure (f-stop in the middle range, corresponding exposure time)?
- Focused on the main subject of the scene?
- Auto focus system turned off?

Example

24 single shots, full-frame camera, 17 mm focal length,
horizontal increment 45°
(n=8, lever to 16, 2 clicks),
vertical increment 50°.



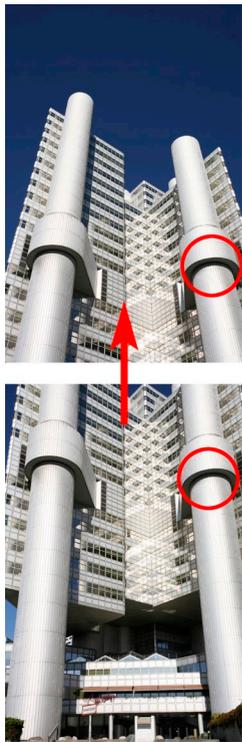
Result:
Cubical projection

Interactive presentation see
www.pixelmagazin.de/sonnenaufgang

Result: Spherical projection 360° x 180°



Result: Cylindrical projection



To estimate the distance between the rows, look through the viewfinder while tilting your system through the scene. The overlap of two rows should also be at least 20%. Always use a constant tilting angle between all rows. Characteristic values are 30° when using a 35 mm lens or 50° when using a 17 mm wide angle lens on a full-frame camera.

Tip:

Don't take large charts with you, when you go out for taking panoramas, but narrow them down to the information you really need on location: The values on the upper and lower scale on the L-bracket and the increments of your favorite lenses. It is very useful to write down this information on a little label and fix it to the angle bracket or tripod.

Step 7:

Camera settings:

- For best quality, standardize the exposure in each single frame, meaning choose manual exposure mode. When it is not possible, because the intensity of light varies between the single exposures strongly, consider the HDR technique using autobracketing with your camera.
- The optimal f-stop is located between f8 and f16. In this range you have enough depth of field and fewer problems with vignetting of the lens (dark corners).
- Place the focus on the main subject of the scene. Then turn off the auto focus system.
- Use a fixed white balance such as sunny, cloudy etc. (don't use automatic white balance, otherwise you will have frames with different colors). When taking the pictures in RAW format you can match the white-balance afterwards also.
- In the case of longer exposure time, we recommend using a remote cable and - if possible - the mirror lockup or live-view function of your SLR camera. Please refer to your cameras manual.

Parts identification and package contents:

The **VR SYSTEM SLIM** consists of the L-bracket with upper rotator (6), the upper horizontal arm (5) with quick release **Q=MOUNT Mini 90** (2), the camera-plate **QPL Slim 50** (4) and the lower rotator **PANORAMA 48** with 4 adjustable increments (click-stops) and the stepless operation. The complete panorama bracket including the quick release **Q=MOUNT Mini 90** is called **QPL-VR Slim**.

- 1 Quick release locking screw
- 2 Quick release **Q=MOUNT Mini 90**, can be mounted crosswise or lengthwise on the upper horizontal arm, see page 5 to 8)
- 3 Upper horizontal arm locking screw with lever
- 4 Camera-plate **QPL Slim 50** with engraved scaling
- 5 Upper horizontal arm (part of the L-bracket) with engraved scaling
- 6 Upper rotator with engraved markings (0°, 30°, 50° and 90°) and rotator stop screw
- 7 Long leg of the L-bracket
- 8 L-bracket screw (for easy disassembling and assembling in order to enable space-saving transport)
- 9 Angle locking screw (normally open)
- 10 Increment selector lever (the number left of the lever is showing the selected increment n = number of exposures per 360° turn)
- 11 Lower locking screw with spirit level
- 12 Mark, showing the scale value on the lower leg of the L-bracket
- 13 Alignment pin fitting into the slot on the lower leg of the L-bracket
- 14 Arrow showing the recommended rotational direction (clockwise)
- 15 1/4" thread hole for the lower locking screw with spirit level (11). On the other side of the **PANORAMA 48** there is a 3/8" thread hole with adapter to 1/4" for mounting a leveling device, a 3-way head, ball head or tripod.

Recommended accessories:

- A digital compact-, mirrorless- or SLR-camera, focal lengths between 8 mm and 160 mm (full-frame camera equivalent) and fisheye lenses.
- A stable tripod (recommendation: Novoflex **TrioPod** or **QuadroPod**)
- A leveling device (recommendation: Novoflex **MagicBalance**) or a ball head (recommendation: Novoflex **ClassicBall** or **MagicBall**).
- A current computer with a lot of ram and a large hard disk.
- A stitching software, that can process multirow panoramas and can deal with fisheye lenses if necessary such as **PTgui** or **PanoramaStudio PRO**.

Safety references:

- Before starting up, **read these safety references** carefully. Pay attention to warnings and advices in this instruction. When selling or passing on your Panorama VR-System Slim, please include the manual also by all means.
- **Never move** your Panorama VR-System Slim **with mounted camera**. The assembly of the camera is always the last step in the set-up.
- When working on the upper quick release (2), **always hold the camera in one hand**, while making adjustments with the other hand. The upper quick release (2) has a safety pin, to prevent inadvertent dropping of the equipment. However, this only works when the locking screw (1) is open less than a half turn. When sliding the camera plate (4) (e.g. to set up nodal point adjustments) don't open the locking screws (1) completely, **but only a 1/4 turn**. This is enough for a comfortable and safety handling.
- Never open any screw, while not **holding the camera with the other hand!**
- When installing a camera-plate (4) pay attention, that **both clamps** of the quick release (2) are **grabbing at the profile of the plate**. The easiest way to check this, is to exert pressure on the camera slightly, while verifying if the camera moves.
- The lower angle locking screw (9) should be open any time, except you are working in the stepless position of the increment selector lever (10) and want to fix the current position e.g. when taking long exposures. **Never turn the system by force when the angle locking screw is tightened**. This could damage your Panorama VR-System Slim!



Tip:

When using a camera, whose sensor size is not listed in the table, convert the focal length into the full-frame value using the cameras „crop factor“. After that, use the column for full-frame sensor in the table.

The following chart shows the possible increments using „multi-clicks“. On this basis, you can create your own finely tuned table for your lenses.

Lever	2x click	3x click	4x click	5x click
16 (22.5°)	8 (45°)		4 (90°)	
30 (12°)	15 (24°)	10 (36°)		6 (60°)
36 (10°)	18 (20°)	12 (30°)	9 (40°)	
48 (7.5°)	24 (15°)	16 (22.5°)		

Experimental increments determination

Not having your increments table at hand in front of the scene, you can determine the horizontal panning angle by trial and error visually.



Search for a remarkable object in the right area of the view-finder. Pan the system clockwise to the next click-stop. When you see the object now in the left area of the view-finder, the selected increment was right. If you don't see the object, the increment was too large, select a smaller one (greater number n) and try again.

Try „multi-clicks“ as well. When using too small increments, the object will appear not in the left, but rather in the middle area after panning clockwise. Try a larger one (smaller number n).

Define a vertical tilting angle

When taking a multi-row panorama you tilt the camera around a specific vertical angle between the single rows, using the upper rotator (6). This joint has stops every 10°. The most common tilting angles, 30°, 50° and 90° are marked with lines.



More increments by counting the “clicks“

When taking the pictures not at any snap in, but at every second, third or fourth “click-stop“, you have notable more selectable increments available. Here’s an example: The increment of $n=8$ (45°) can be achieved by selecting $n=16$ ($22,5^\circ$) with the increment selector lever and taking the pictures at every second stop.

Although your *PANORAMA 48* panning base has only 4 selectable increments (due to small dimensions and low weight) you can use all required increments by counting the clicks up to a focal length of 160 mm (on full-frame camera).

The table below is based on an overlap of 20-50% between two single shots and shows the recommended adjustment of the increment selector lever (10) as a function of the camera (full-frame or APS-C sensor size) and the focal length of the lens in mm.

Example: You are using a full-frame camera and a 28 mm lens (corresponds roughly to a camera with APS-C sensor size and 18 mm lens). According to the table you set up the value 36 with the lever and take the pictures at every third click-stop.

Recommended horizontal increment and adjustment at lever (10)

focal length full-frame sensor	focal length sensor APS-C size	increment in °	exposures per 360° turn n	adjustment at lever
Fisheye 8-12 mm	Fisheye 4-7 mm	90	4	16 (4 clicks)
Fisheye 13-16 mm	Fisheye 8-10 mm	60	6	30 (5 clicks)
14-21 mm	8-14 mm	45	8	16 (2 clicks)
22-25 mm	15-16 mm	36	10	30 (3 clicks)
26-30 mm	17-19 mm	30	12	36 (3 clicks)
31-34 mm	20-22 mm	24	15	30 (2 clicks)
35-44 mm	23-28 mm	22,5	16	16 (1 click)
45-54 mm	29-34 mm	20	18	36 (2 clicks)
55-65 mm	35-41 mm	15	24	48 (2 clicks)
66-89 mm	42-56 mm	12	30	30 (1 click)
90-105 mm	57-66 mm	10	36	36 (1 click)
106-160 mm	67-100 mm	7,5	48	48 (1 click)

Basic assembly:

Before doing precise adjustments, first assemble all of the parts of your system. See also the illustration on page 1.

Assembling the L-bracket



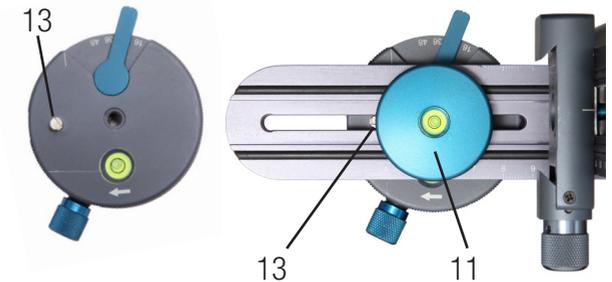
The legs of the L-bracket are mounted with the L-bracket screw (8). Use this screw also for disassembling and space-saving transport.

Advice:

It is not recommended to disassemble the stabilization-triangle.

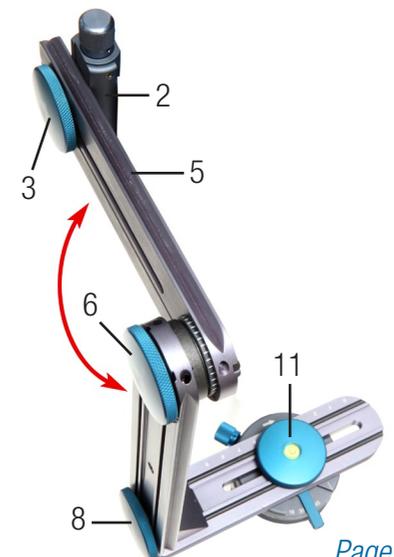
Mounting the L-bracket on the panning base

Place the lower (shorter) leg of the L-bracket on the panning base and position the alignment pin (13) into the slot of the leg. Place it in the center, slide the lower locking screw (11) up to the 1/4" mounting hole of the panning base and tighten the screw.



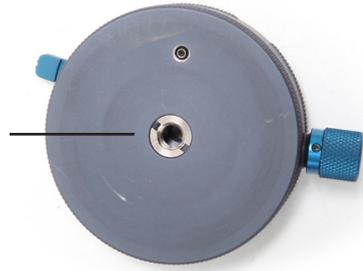
Folding out the upper horizontal arm

In order to bring the upper horizontal arm (5) to the 90° position, open the rotator stop screw (6) slightly, move the arm upwards and tighten the screw in the 90° position. You will notice, that the rotator slightly stops every 10° . With the help of these stops and the marking lines at 0° , 30° , 50° and 90° on the rotator, you can move quickly to specific vertical angles.



Installation on a tripod

Next mount the system on a stable tripod (recommendation: Novoflex **TrioPod** or **QuadroPod**). For this purpose there is a 3/8" mounting hole in the center of the panning base on the bottom. The 1/4" adapter can be unscrewed if required.

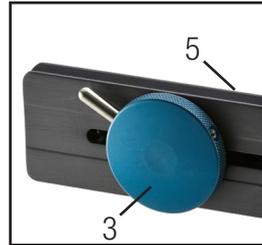


Tip:

When using a ball head (such as Novoflex **ClassicBall 3 II**) or a leveling device (recommendation: Novoflex **MagicBalance**, see illustration on the left), the complete panorama head can be leveled very quickly and easily with the help of the above mentioned devices and the spirit level on the lower locking screw (11).

Lengthwise or crosswise quick release installation on the upper arm

The quick release (2) can be mounted lengthwise or crosswise on the upper horizontal arm (5). Loosen the locking screw (3), turn the quick release 90° and tighten the screw again.



Lengthwise installation is recommended when the tripod socket has an offset compared to the optical axis (see illustration below on the right).



crosswise



lengthwise



Tripod socket offset compared to the optical axis (lengthwise installation recommended)

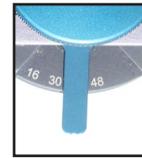
Step 6:

Define the horizontal and vertical panning angle "increment":

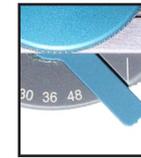
In each row you rotate the system horizontally with the lower panorama base around a specific angle. This angle depends on the wanted overlap, the camera you use (crop factor) and the focal length of the lens. For optimal performance the software needs an overlap of 20-50%. Between each exposure use a fixed panning angle. To estimate the increments, look through the viewfinder while panning your system through the scene. This works fine, but it's much easier to orientate yourself with the chart on page 15. The numbers of shots for a complete 360° turn can be selected directly at the increment selector lever (10). Between two exposures, pan the system to the next click-stop, where you take the picture.

Selected increment:

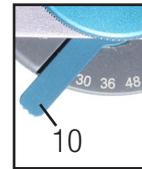
The number left of the lever is showing the selected increment $n = \text{number of exposures per } 360^\circ \text{ turn}$.



Example: Here **30** was selected, this is equivalent to a panning angle of $360^\circ/30 = 12^\circ$



Example: Here **48** was selected, this is equivalent to a panning angle of $360^\circ/48 = 7,5^\circ$



When the lever is on the left end, „**stepless**“ is selected. This means panning will be done without stops. In this case you can set up the wanted angle with the help of the side angle scale and fix the current position with the angle locking screw (9).



Advice:

Please keep in mind, that the angle locking screw (9) is open when using click-stops.

Tip:

In order to simplify your complete workflow, we recommend to work with only a few lenses for a start and to try out your settings with the help of test panoramas in the forefront. With an approved operating sequence and a bit practice you will make fewer mistakes at the scene.

The setup in front of the scene is done as described on page 4 „Basic assembly“. However, don't insert your camera into the quick release for now. This should always be the last step, after all adjustments are done.

Step 2:

Level the system with the horizon:

Watch the spirit level on the lower locking screw (11) and level the system by the ball head or the leveling device.

Step 3:

Bring the upper arm in the 90° position

Open the rotator stop screw (6) slightly, move the arm upwards and tighten up the screw in the 90° position (there is marking line on the rotator at this position).

Step 4:

Adjust your system

Now, setup the scale values you determined before, (see chapter "Preparatory steps"): The value on the lower leg is dependent on the camera: Use the lower locking screw (11) for setup. The value on the upper leg is dependent on the lens, respectively focal distance when using a zoom lens. Use the upper locking screw (3) for set up.



Step 5:

Insert the camera with pre-mounted camera-plate into the quick release:

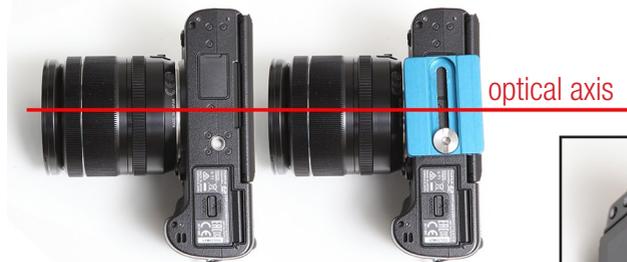
Open the quick release locking screw (1) and insert the camera-plate complete with camera. Slide to the prepared position (according to whether you use lengthwise or crosswise installation, see page 7 or 9) and retighten the screw. Before releasing your camera, check for secure connection to the quick release.

Advice:

Please keep in mind when using lengthwise installation: The camera-plate insertion into the quick release should be done only at the far end of the upper arm (see page 6). After that, slide the camera including quick release to prepared position (step 4).



Installing the camera-plate QPL Slim 50

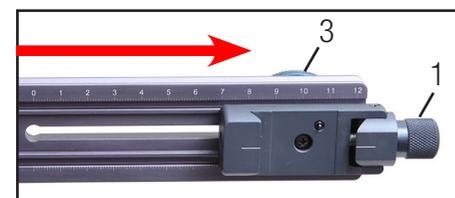


When mounting the quick release lengthwise on the upper leg, the camera-plate is mounted crosswise comparing to the optical axis (see illustration above).

Align the plate precise parallel to the camera's bottom edge, 90° to the optical axis. The center of the camera-plate should be roughly at the level of the optical axis.

The plates scale should be seen from behind, otherwise mount the plate the other way around.

Insert the camera-plate unit into the quick release



First open the locking screw (3) a bit and slide the complete quick release to the far end of the upper arm. Now tighten up the locking screw (3) again.

Advice:

The camera's plate insertion into the quick release should be done principally at the far end of the upper arm, because only at this position do you have unrestricted access to the quick release locking screw (1).

Open the quick release locking screw (1) and slide the camera-plate unit into the quick release from above. At the middle position tighten the locking screw (1) again. The precise adjustment will be done afterwards.

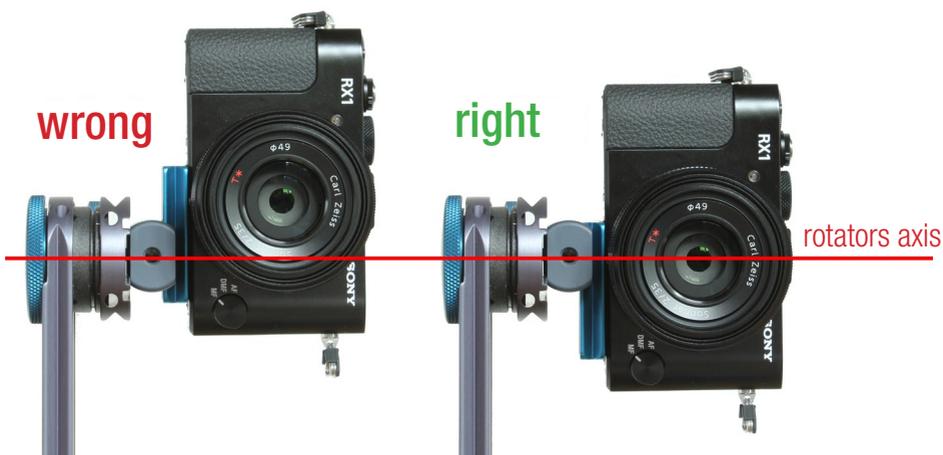
Before releasing your camera, check for a secure connection with the quick release (see safety references on page 3).



Precise level adjustment



Observe the system from the front and move the camera up or down until the optical axis has reached the height of the rotators axis. For better assessment it's a good idea to use a ruler and hold it horizontally.



When doing this adjustment, you have to observe the system from the front and operate the locking screw (1) on the reverse side. For safety reasons we recommend the help of a second person at this working step.

Changing the height is done as follows: During this procedure hold your camera in one hand. Open the quick release locking screw (1) slightly, move the camera up or down and tighten the locking screw when the optical axis has reached the height of the rotators axis. Before releasing your camera, check for a secure connection with the quick release.

Read off the scale value on the camera-plate (see illustration right) and write it down in order to set it up again at the scene.



- Repeat the procedure until the vertical lines don't move (see fig. 3+4). Now the whole system is panning around the entrance pupil of the lens.
- Write down these settings for future exposures with this camera-lens-combination. For this purpose read off the values given by the indicator scale at the upper horizontal arm (5).



Tip:

When installing the quick release crosswise on the upper leg (right illustration), the quick release edge can be used to indicate the scale value.

Advice:

Repeat this test for all lenses, you want to use for your panoramas. When using a zoom lens, you have to find out the position of the entrance pupil for each focal length separately.

Field use:

Step 1:

Transport:

The system can be moved with minimum space requirements and stowed in any photo bag instantly. It can be disassembled and set up at the scene very quickly.

For disassembling open the upper rotator stop screw (6) and bring the upper leg in the lower position, open the L-bracket screw (8) completely and use the quick release (2) to fix the lower leg including panning base for transport. The camera plate (4) remains on the camera.



Tip:

It also makes sense to leave the panning base on the tripod's head.

Preparatory step 3:

Forward-Backward Adjustment:

1. Now bring the camera to a precise vertical position. For this purpose use the rotator stop screw (6) and the 90° marking.
2. Mount the lens, whose entrance pupil position you want to find, to the camera body. When using a zoom lens, set the required focal length. In the following, you need a one-time set-up for testing. This set-up, should have vertical lines in the foreground as well as in the background.



fig. 1



fig. 2



fig. 3

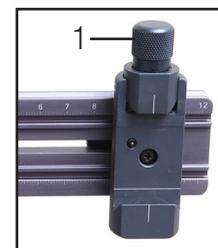


fig. 4

3. Look through the viewfinder. Find a vertical edge or line, such as a floor lamp, which is located in the foreground and bring it in line with a vertical object in the background e.g. a door frame (fig. 1).
4. Now pan the camera from right to left and back while looking through the viewfinder. Observe if the objects move to each other (see fig. 1+2) or stay together (see fig. 3+4).
5. Here: When panned the camera to right, the floor lamp moved to left in relation to the door frame (fig. 2). This is an indication of rotating outside the entrance pupil.

6. Now set another distance on the upper arm. Open the locking screw (3) a bit, move the quick release at the upper arm a few mm forward or backward and tighten up the screw. When panning again you will notice that the movement of the lines will either be stronger or weaker. In the last case you shifted the quick release in the right direction.

Crosswise quick release installation on the upper arm (Alternative to lengthwise installation)



Crosswise installation

Only when using a camera, whose tripod socket is in line with the optical axis, the crosswise installation is useful (see illustration below).

Big advantages are: You have fast and easy access to the quick release locking screw (1) from above, the possibility to extend the available adjustment range (e.g. with a longer camera-plate) and it's not necessary to adjust the height (compared to lengthwise installation).



Left illustration: The tripod socket is in line with the optical axis. Usually the case with bigger mirrorless- or DSLR-cameras.

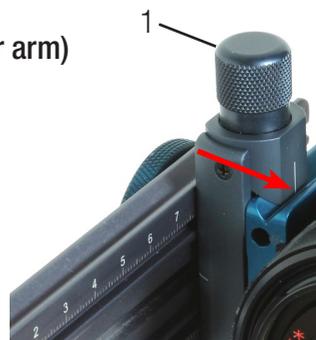
When using such a camera, the already discussed lengthwise installation is possible just like the **crosswise quick release installation** on the upper arm. In the last case you have to mount the camera-plate parallel to the optical axis, meaning perpendicular to the camera's bottom edge.

By installing the camera-plate as far as possible forward or backward, you can extend the available adjustment range. However, this is only needed in very rare cases, e.g. when using especially long zoom lenses with very big cameras or very short lenses on very small cameras.

When installing the plate on the camera bottom, please note that the engraved scale is aligned to the top, so that you can easily see it later from above.

How to insert the camera into the quick release (crosswise quick release installation on the upper arm)

Open the quick release locking screw (1) and slide the camera-plate into the quick release from behind. At the middle position tighten the locking screw (1) again. Before releasing your camera, check for secure connection with the quick release (see safety references on page 3).



Advice:

In order to mount the plate repeatedly into the quick release, you should stop always at the same position. Therefore use a fixed scale value (Illustration above: red arrow) or the bottom end stop*.

- * Slide the camera-plate unit within the quick release backwards while the locking screw (1) is open only 1/4 turn. The quick release safety pin will stop this movement at the bottom end stop.

This panorama head enables the rotation of the system around the center of the entrance pupil of the lens, also called the “nodal point” or “optical center”. By doing this, shifting of the foreground in relation to the background is avoided which is of vital importance for the stitching of the individual images.

Preparatory steps - finding the nodal point:

The position of the entrance pupil “nodal point” is dependent on the camera-lens-combination and - when using a zoom lens - on the focal length you use. Therefore you should try to find the position of the nodal point of all lenses that you will use and write them down. When taking the pictures later, you only have to transfer the values to the scales on the L-bracket, before you start shooting.

Preparatory step 1:

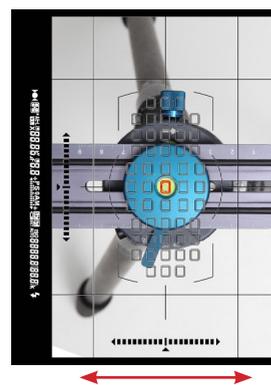
Assemble all components of your system and level it with the horizon

Use the method depicted in the last chapter. Set up your tripod securely. You don't have to align the tripod. While watching the crossed spirit level on the lower locking screw (11) level the system with a ball head or a leveling device beneath. Now insert your camera: Open the quick release locking screw (1) and slide the camera-plate unit into the quick release. Tighten the locking screw.

Preparatory step 2:

Side-to-side adjustment: Move the camera into the pivot axis of the panning base

- Turn your camera in the position shown on the right, while paying attention to the safety references. Align the camera properly to the bottom. For this purpose open and tighten the rotator stop screw (6).
- Now, look through the viewfinder of your camera, open the lower locking screw (11) a bit and slide the L-bracket back and forth until the center autofocus point is aimed at the spirit level on the lower locking screw (that is the mark for the rotation axis).

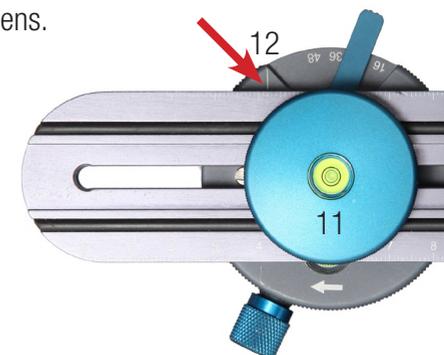


Tip:

Many cameras with electronic viewfinder are able to show center markings within the viewfinder image. Use such assistance tools in order to position the optical axis accurately within the pivot axis. Please refer to your camera's manual.

If the viewfinder image is out of focus, slide the camera to the upper stop, close the aperture or use a wide angle lens.

- After that, tighten the lower locking screw (11) and write down the value given by the indicator scale at the lower leg for future exposures with this camera body. For this purpose use the marking line (12) on the panning base.



Tip:

The found value on the lower leg of the L-bracket is only dependent on the camera you are using - not on the lens. For this test, another lens of your choice can be used, when not changing the camera.