



Keywords: Golden Gate™, Mirrors, Lenses, Alignment, Realignment

Realignment of a Golden Gate™ ATR Accessory

The ZnSe or KRS-5 lenses of a Golden Gate™ ATR Accessory focus the beam of a light signal to pass through the small aperture of the diamond crystal assembly. As such a correctly aligned beam of light has to arrive at the lens before the beam is focussed to pass through the diamond crystal. If there is no registered signal whilst in a spectrometer system, even though a ZnSe or KRS-5 lens assembly has been replaced after it has been removed, alignment of the mirrors in the optical unit will need to be checked.

The best way to do this is by use of a visible light source. Specac has a specific Laser Alignment Accessory P/N GS24500 to help in this procedure. If this is not available, to use a discrete spot of light from a laser pointer is ideal, but if this is also not available then use a bright white light source.

First remove the ATR top plate and the front cover plate from the Golden Gate™ optical unit to gain access to the mirrors. In a darkened environment, ensure that the bright light source is shone through the aperture port on one side of the optical unit. Start with the input side - before light reaches the diamond - of the optical unit as it would be in your spectrometer system. Ensure that the light image falls onto the centre of the first fixed mirror. It is also crucial that the light source is at the centre of the aperture port so the light will pass in a parallel line in relation to the base of the optical unit towards the first fixed mirror. (For a parallel centralised light beam, the Laser Alignment Accessory P/N GS24500 is the best tool to use.) The light will be reflected from this first mirror onto the second movable mirror at its centre point, if the initial light source is correctly positioned.

The second mirror may then need to be adjusted for both its rotation and tilt so that the beam of light passes centrally through the first ZnSe or KRS-5 lens assembly. If the source of light is bright enough (and this is where a laser pointer light is preferred) the spot of light should be in the centre of the lens as it emerges from the top. There is no need to try and focus the lenses at this stage as it is more important to establish a correct beam path by alignment of the mirrors.

Now, move the light source to the other side of the optical unit (the output side - after light has passed through the diamond) and repeat the process for mirror alignment to get a beam of light centrally in the second ZnSe or KRS-5 lens assembly.

Once this condition has been achieved, replace the top plate onto the optical unit and place the accessory in the spectrometer system. Hopefully, the optical unit will now be roughly aligned to register some signal throughput by the spectrometers detector. At this stage start "fine tuning" the mirrors and the ZnSe or KRS-5 lenses for focus to get the optimum signal for the Golden Gate™ on your specific spectrometer system. Ensure that in any change of an optical component that you concentrate on one mirror or lens at a time, otherwise if the signal is lost you will need to start the alignment procedure from a visible light source again.