

Note: All Power Switch Diagonals Feature The New Sleek Design*



The Denkmeier 2" Power x Switch Diagonals



The Denkmeier IVB Power x Switch Star Diagonals™

Denkmeier Optical, Inc. presents a new breed of patent pending IVB Power x Switch Star Diagonals. The diagonal mirrors have 99% Reflective Dielectric Coatings and a Quartz Substrate. The mirrors are 10mm thick and flat to 1/10th wave or better. All versions of our Power x Switch Diagonals feature brass compression ring style gripping in the 2" eyepiece holder and the 1.25" adapter. All S2 Power Switch Star Diagonals include the IVB (Interlocking Visual Back) system. The visual back threads to your SCT Tube Assembly Male Threads. There are three small set screws that allow you to lock the back onto your tube assembly at an ideal angle. See the Youtube Video ("IVB Star Diagonal") for more information.

Optical Quality

All optics are custom designed and feature our high efficiency broadband coatings, which are applied to all air-to-glass optical surfaces. All optical components contained in the Power x Switch assemblies have a clear aperture of 37mm and allow maximum illumination of even the most demanding 1.25" eyepieces used in a Denkmeier Binoviewer. All Diagonal Mirrors are laser-collimated for a perfect 90 degree setting during assembly.

Which Power Switch Star Diagonal To Choose?

There are several versions of the Power x Switch Diagonals available. The information provided below should allow the proper diagonal to be selected. We also produce an IVB Star Diagonal with no Power x Switch priced at \$249 (Contact us for more information). Magnification factors were derived during testing with a C8 SCT and a Takahashi FS102 Refractor utilizing single eyepieces or a Denkmeier Binoviewer. These magnification factors may change with use of other binoviewer brands. Information indicating the amount of focuser travel for #R1 and #R2 is provided. This data will allow the refractor owner to select the diagonal that will work best in their telescope. Generally, #R1 should focus in all three magnification ranges when used with a binoviewer in almost all refractors. #R2 requires a larger range of focuser movement to cover the 6 magnification modes that are possible with a binoviewer. Weight may also be a consideration when choosing between #R1 and #R2 and such specifications are provided in this manual. Diagonals #S2, #R1 and #R2 include the Dovetail Connector. Information on the Dovetail Connector is also provided in this manual.

*The appearance of the diagonal Side Plates have changed since this manual was created.

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Quick Reference For Choosing Proper Power Switch Diagonal

Diagonal #S2 Primarily For SCTs Using Binoviewers

Designed for use with binoviewers in an SCT and will operate with single eyepieces as well. #S2 allows 3 magnifications with your binoviewer and three magnifications with any single eyepiece. #S2 will not allow binoviewer use in refractors. Choose #R1 or #R2 for that purpose. For some SCTs, the Dovetail Connector (included) has been designed to connect The Binotron 27 directly to the Power x Switch mechanism and may be needed in order to reach focus in reduction mode. See the Dovetail Connector section for more details. See Youtube "Dovetail Connector" for more information.

Diagonal #R1 Primarily For Refractors With Typical Focus Travel Capabilities

#R1 has been designed to allow the Denk Binoviewer to reach low, mid, and high magnifications with a single pair of eyepieces. Single eyepieces also have a multi-magnification function. This diagonal includes our OCS A37 that threads directly into the telescope-side diagonal housing or on the end of the included 2" Nosepiece. This allows the eyepiece-side Power x Switch to function when using The Binotron 27. The Dovetail Connector is included and will allow the user to change the focusing range to suit a particular refractor when using The Binotron 27.

Diagonal #R2 Primarily For Refractors Using Single Eyepieces or Binoviewers

#R2 provides excellent versatility allowing a binoviewer to move through up to 6 different magnifications with a low 1.3X power factor to a high power of 3.4X and 4 magnifications in between. This is because it includes two Power x Switches: one on each side of the diagonal housing. Slide out the binoviewer and slide in a single eyepiece and move through 7 magnifications ranging from .75X reduction to 2.3X multiplication. This diagonal can also be used for F/10 SCTs allowing focal reduction normal and 2X with binoviewers and single eyepieces. The total range of focuser movement required is greater than that of #R1. See the focus-travel specifications showing the additional in-travel and out-travel required in comparison to using a single eyepiece with a 2" star diagonal in a refractor. Dovetail Connector is included.

The Dovetail Connector

After measuring the amount of in-travel remaining in your refractor when a single eyepiece has been brought to focus (using a typical 2" star diagonal + 1.25" adapter), the amounts of additional in/out travel required when using the various magnification modes of #R1 and #R2 are listed in the magnification charts. When used, the Dovetail Connector changes the focus position but may reduce edge illumination in refractors depending on eyepiece designs. Experimentation is encouraged. The Dovetail Connector allows the 2" eyepiece holder to be removed on the eyepiece-side and a Denk Binoviewer can then be attached in seconds. No tools are required. This not only creates additional back-focus for SCTs that might not reach focus in the reduction mode when using #S2, but also allows the telescope focus position to be adjusted when using Refractors. While some other brands of binoviewers can be used with Denkmeier Power x Switch Star Diagonals, the Dovetail Connector is designed to fit our Binotron 27 only. Without use of the Dovetail Connector, some SCTs (C9.25") will not achieve focal reduction with a binoviewer. With some refractors, use of the Dovetail Connector is important if all magnification modes are to be accommodated by the travel range of the focuser mechanism. There is a section in this manual devoted to using the Dovetail Connector.

See Youtube: Search on Youtube "Denkmeier" and "Dovetail Connector"

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Diagonal #R1 For Refractors \$599 + S/H USA

Allows any Denkmeier Binoviewer to be loaded into the eyepiece receptacle for 3 magnifications with a single pair of eyepieces. The OCS A37 Cell included with this diagonal must be threaded into the Power x Switch Diagonal housing or Diagonal Nosepiece on telescope-side for focus to be reached. Our Dovetail Connector is included and this allows The Binotron 27 to be quickly connected directly to the star diagonal housing eliminating the eyepiece holder. No tools are required and this exchange can be done in seconds. While a slight Barlow effect is possible with the B arm in with single eyepieces, #R1 is primarily designed for the purpose of allowing focus at three magnifications with a binoviewer while using one pair of eyepieces. The Dovetail Connector changes focus positions and primarily produces more back focus in the low power mode (less in-travel required when it is used).



#R1 With OCS A37 Cell

Important: In-Travel and out-Travel are in comparison to **to focus position of the same eyepiece used in a typical 2" star Diagonal with a normal profile 1.25" adapter.**

#R1 & Binoviewer (In Eyepiece Holder / OCS Cell In Housing)

1.3X	"A" IN	1 1/4" In-Travel
2X:	"A/B" OUT	1/4" Out-Travel
3X:	"B" IN	1 1/8" Out-Travel

#R1 & Binoviewer (Dovetail Connector / OCS Cell In Housing)

1.3X	"A" IN	5/8" In-Travel
1.9X	"A/B" OUT	1/2" Out-Travel

Nosepiece On Cell

2.8X	"B" IN	1 1/4" Out-travel
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OCS A37 In Housing



OCS A37 Cell In Nosepiece

#R1 & Binoviewer (In Eyepiece Holder / OCS Cell In Diagonal Nosepiece)

1.3X	"A" IN	1/2" In-Travel
2X	"A/B" OUT	7/8" Out-Travel
3X	"B" IN	1 1/2" Out-Travel

#R1 & Binoviewer (Dovetail Connector / OCS Cell In Diagonal Nosepiece)

1.3X	"A" IN"	1/8" Out-Travel
Nosepiece In Diag		
2X	"A/B" OUT	1 1/8" Out-Travel
3X	"B" IN	1 5/8" Out-Travel



#R1 With Single Eyepieces (No OCS Cell Used In Diagonal)

1X	"A/B" OUT	1" In-Travel
.77X	"A" IN	1 5/8" In-Travel
1.4X	"B" IN	1/4" In-Travel

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Diagonal #R2 For Refractors \$699 + S/H

Allows The Binotron 27 to be loaded into the eyepiece receptacle for 6 magnifications. No additional corrector is required. Load any single eyepiece into the diagonal and achieve 7 magnifications, instantly in many refractors. Focus requirements are indicated along with magnification factors. Other binoviewer brands may work though magnifications and focuser position will be different from the data provided in the charts.

Uses of Diagonal #R2

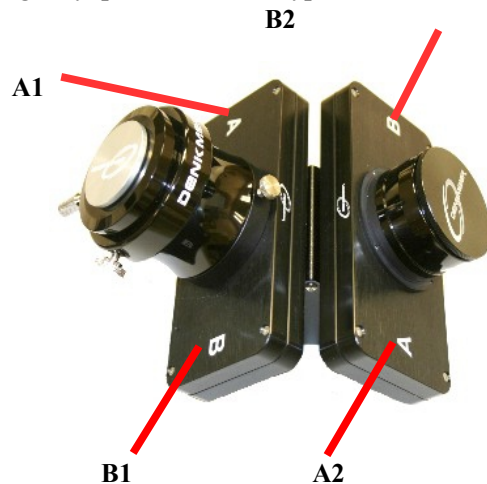
The R2 Diagonal has been designed to allow the use of The Binotron 27 or 1.25"/2" single eyepieces. The observer may change from Binoviewer to single eyepiece without removing the diagonal from the telescope. #R2 provides up to 7 varying magnifications when using a single eyepiece and 6 varying magnifications when using a binoviewer. The Binotron 27 can be loaded into the eyepiece tube of the star diagonal and no additional corrector system or Power x Switch needs to be used. Changing magnifications takes seconds. The change in focuser position is indicated to the right. This is in comparison to the same single eyepiece used in a typical 2" star diagonal with a 1.25" adapter of average profile.

Important: In-Travel and out-Travel are in comparison to to focus position of the same eyepiece used in a typical 2" star diagonal with a normal profile 1.25" adapter.

Using Single Eyepieces With #R2 In A Refractor

Load any 1.25" eyepiece or 2" eyepiece into the diagonal and obtain the following magnifications:

1X :	All OUT	1 5/8" In-Travel
.75X (reduction):	"A1" IN	2" In-Travel
1.3X:	"B1" IN	7/8" In-Travel
1.6X:	"A2" IN	3/4" Out-Travel
1.85X :	"B2" IN	1 1/4" Out-Travel
2.2X:	"B1" / "A2" IN	1 1/4" Out-Travel
2.3X:	"B1" / "B2" IN	1 3/8" Out-Travel



Using Binoviewers With #R2 In A Refractor Without The Dovetail Connector

The #R2 Power x Switch Diagonal has been designed to allow a Denkmeier Binoviewer and many other binoviewers to reach focus in 6 different magnification positions. No additional corrector is needed. Just load the binoviewer into the eyepiece receptacle of the diagonal and start Power x Switching. All magnification factors were measured in a Denkmeier Binoviewer and these may change depending on what brand of binoviewer is being used. Please check on our "Binoviewer Only" pricing to see how easy it is to own a Denkmeier.

1.3X:	"A1" / "A2" IN	1 3/4" In-Travel
1.6X :	"A2" / "B2" IN	7/8" In-Travel
2X:	"B1" IN	3/8" In-Travel
2.4X:	"B2" IN	3/8" Out-Travel
3X:	"B1" / "A2" IN	1/2 " Out-Travel
3.4X:	"B1" / "B2" IN	1 " Out-Travel

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Using Binoviewers With #R2 In A Refractor With The Dovetail Connector

Using the included Dovetail Connector requires no tools and takes seconds. This allows the Denk Binoviewer to be coupled directly to #R2, bypassing the eyepiece holder. Most importantly, use of this connector eliminates the need for 5/8" in-travel in the lowest power mode of the Power x Switch. The Dovetail Connector is made specifically for Denkmeier Binoviewer usage. Please check on our "Binoviewer Only" pricing to see how easy it is to own a Denkmeier.

1.3X:	"A1/A2" IN	1 1/8" In-Travel
1.6X :	"A1/B2" IN	1/4" In-Travel
1.9X:	"B1" IN	1/8" In-Travel
2.2X:	"B2" IN	1/2" Out-Travel
2.8X:	"B1/A2" IN	5/8" Out-Travel
3.X:	"B1/B2" IN	1 1/8" Out-Travel

Using #R2 With An SCT (As A Second Telescope)

While R2 has essentially been designed for use with Refractors, it certainly can be used with many SCTs. It will allow focal reduction when using a binoviewer as well as single eyepieces. R2 also allows normal and higher magnifications using both single eyepieces and binoviewers. Since some of the binoviewer magnification factors may be too great for practical use in an F/10 SCT, those using SCTs as their sole telescopes, should choose Diagonal #S1 when only single eyepieces are used, or #S2 when both single eyepieces and binoviewers will be used. The Dovetail Connector may be necessary for focal reduction to occur when using a Denk Binoviewer with #R2 in an SCT. Some SCTs may not have the capability of reaching focus in the reduction mode even when using the Dovetail Connector. This is because the amount of back-focus in SCTs can vary.

#R2 In An SCT With Single Eyepieces

.83X (Reduction):	"A1" IN
1X:	All OUT
1.25X:	"B1" IN
1.3X:	"A2" IN
1.5X:	"B2" IN
2.5X:	"B1/A2" IN
3X:	"B1/B2" IN



#R2 In An SCT With Binoviewers

.66X (Reduction):	"A1" IN
1.15X (Denk Binoviewers):	All OUT
2.5X:	"B1" IN
Relay 1.25X*:	"A1/A2" IN

*When using the Relay Setting, binoviewer focus position will be approximately par focal with single eyepiece focus position. This negates the need for extensive refocusing when changing from single eyepieces to binoviewers.

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Diagonal #S2 For SCTs \$499 + Shipping includes Dovetail Connector, IVB SCT Visual Back Adapter, 1.25" adapter. S2 is essentially the same as R1 except it does NOT include the OCS A37, required for R1. S2 Allows The Binotron 27 to be used in SCTs for reduction and multiplication factors. Single eyepieces can also be used for reduction and multiplication factors. **Note that S2 cannot be used in combination with a separate focal reducer. Typical Focal Reducers will NOT work with a binoviewer.**

#S2 in an SCT With Binoviewers

.59X* (Reduction): "A" IN
1.1X: "A / B" OUT
1.7X: "B" IN

*Reduction can be increased by withdrawing the Binoviewer from the eyepiece holder. This requires additional focuser turning and the amount available for the particular SCT will be the limiting factor in the amount of reduction obtainable. Also increases Multiplication when used.



Diagonal #S2

#S2 used with single eyepieces

.83X-.66X "A" IN (Moving the eyepiece outward from the diagonal makes reduction more extreme)
1X "A/B" OUT
1.5X-2X "B" IN (Moving eyepiece outward from the diagonal increases magnification factor.)

SCTs With Less Back-focus

Certain SCT tube assemblies have less back focus than others. What is back-focus? This term describes the location of the focal plane created by the telescope system. With a telescope having less back focus, the image formed by the telescope would be located closer in toward the telescope tube. Since the reduction mode of the Power x Switch requires *more* back-focus, some tube assemblies may fall short of allowing an in-focus image to occur when using the reduction mode of the Power x Switch Diagonal #S2. We have produced the Dovetail Connector that allows a Denkmeier Binoviewer to couple directly to #S2. The eyepiece holder of #S2 is quickly removed and the binoviewer can be attached in it's place, directly to the #S2 Power x Switch. This configuration requires less back focus and most SCTs should then reach focus in reduction mode. No tools are required and removing the eyepiece holder and adding the binoviewer takes only seconds. It should also be noted that individual SCT tube assemblies often vary in back-focus with specifications stated for some models as +/- 5" (10" spread!). The reduction factor is somewhat diminished when using the Dovetail Connector and F/6.6 should be expected. When testing on an 8" SCT, the Dovetail Connector provided 5 additional turns of the focuser knob.

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#R1 Magnification Chart

#R1 With Binoviewer (In Eyepiece Holder / OCS Cell In Housing)

1.3X	“A” “IN”	1 1/4” In-Travel
2X:	A/B “OUT”	1/4” Out-Travel
3X:	“B” “IN”	1 1/8” Out-Travel

#R1 With Binoviewer (Dovetail Connector / OCS Cell In Housing)

1.3X	“A” “IN”	5/8” In-Travel
1.9X	“A/B” “OUT”	1/2” Out-Travel
2.8X	“B” “IN”	1 1/4” Out-travel

#R1 With Binoviewer (In Eyepiece Holder / OCS Cell In Diagonal Nosepiece)

1.3X	“A” “IN”	1/2” In-Travel
2X	“A/B” “OUT”	7/8” Out-Travel
3X	“B” “IN”	1 1/2” Out-Travel

#R1 With Binoviewer (Dovetail Connector / OCS Cell In Diagonal Nosepiece)

1.3X	“A” “IN”	1/8” Out-Travel
2X	“A/B” “OUT”	1 1/8” Out-Travel
3X	“B” “IN”	1 5/8” Out-Travel

#R1 With Single Eyepieces (No OCS Cell Used In Diagonal)

1X	Both Arms “OUT”	1” In-Travel
.77X	“A” “IN”	1 5/8” In-Travel
1.4X	“B” “IN”	1/4” In-Travel

Important: In-Travel and Out-Travel are in comparison to to focus position of the same eyepiece used in a typical 2” Star Diagonal with a normal profile 1.25” adapter.

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#R2 Magnification Chart

#R2 In A Refractor With Single Eyepieces

1X :	All "OUT"	1 5/8" In-Travel
.75X (reduction):	"A1" "IN"	2" In-Travel
1.3X:	"B1" "IN"	7/8" In-Travel
1.6X:	"A2" "IN"	3/4" Out-Travel
1.85X :	"B2" "IN"	1 1/4" Out-Travel
2.2X:	"B1" / "A2" "IN"	1 1/4" Out-Travel
2.3X:	"B1" / "B2" "IN"	1 3/8" Out-Travel

Using Binoviewers With #R2 In A Refractor Without The Dovetail Connector

1.3X:	"A1" / "A2" "IN"	1 3/4" In-Travel
1.6X :	"A1" / "B2" "IN"	7/8" In-Travel
2X:	"A2" "IN"	3/8" In-Travel
2.4X:	"B2" "IN"	3/8" Out-Travel
3X:	"B1" / "A2" "IN"	1/2 " Out-Travel
3.4X:	"B1" / "B2" "IN"	1 " Out-Travel

Using Binoviewers With #R2 In A Refractor With The Dovetail Connector

1.3X:	"A1" / "A2" "IN"	1 1/8" In-Travel
1.6X :	"A1" / "B2" "IN"	1/4" In-Travel
1.9X:	"A2" "IN"	1/8" In-Travel
2.2X:	"B2" "IN"	1/2" Out-Travel
2.8X:	"B1" / "A2" "IN"	5/8" Out-Travel
3.X:	"B1" / "B2" "IN"	1 1/8" Out-Travel

#R2 In An SCT With Single Eyepieces

.83X (Reduction):	"A1" "IN"
1X:	All "OUT"
1.25X:	"B1" "IN"
1.3X:	"A2" "IN"
1.5X:	"B2" "IN"
2.5X:	"B1" / "A2" "IN"
3X:	"B1" / "B2" "IN"

#R2 In An SCT With Binoviewers

.66X (Reduction):	"A" "IN"
1.15X (Denk Binoviewers):	All "OUT"
2.5X:	"B1" "IN"
Relay 1.25X*:	"A1" / "A2" "IN"

*When using the Relay Setting, binoviewer focus position will be near par focal with single eyepiece focus position. This negates the need for extensive refocusing when changing from single eyepieces to binoviewers. **Important:** In-Travel and Out-Travel are in comparison to the focuser position of a refractor using the same eyepiece used in a typical 2" Star Diagonal with a normal profile 1.25" adapter.