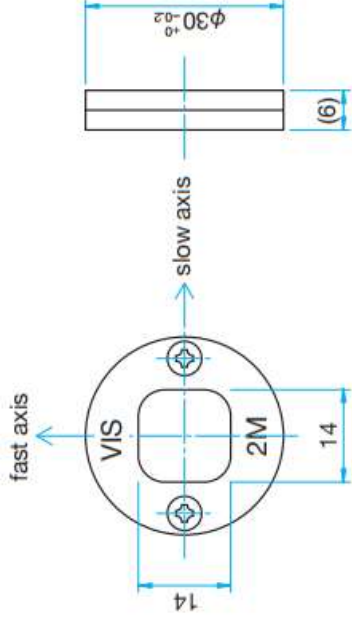
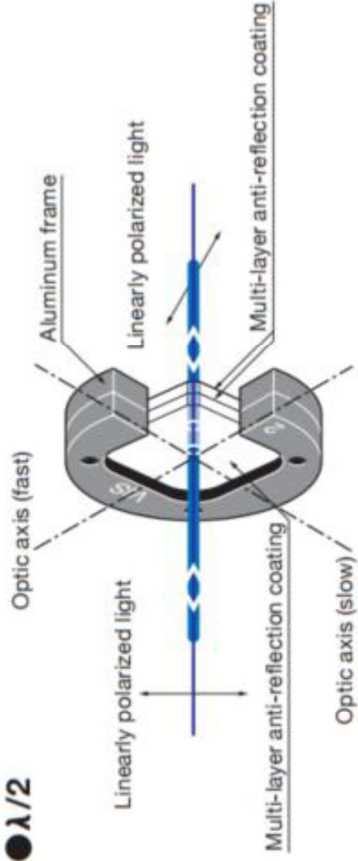


Broadband Quartz Waveplates

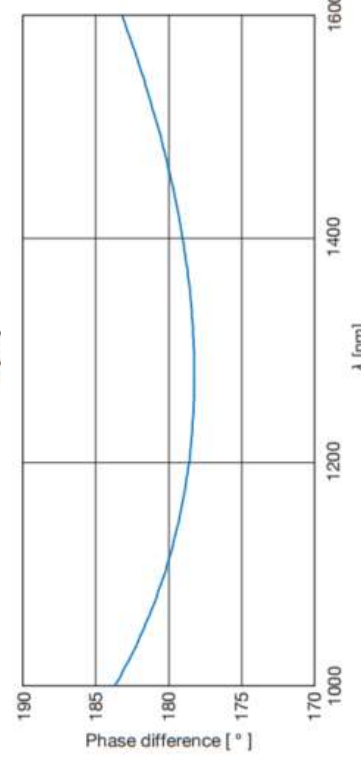
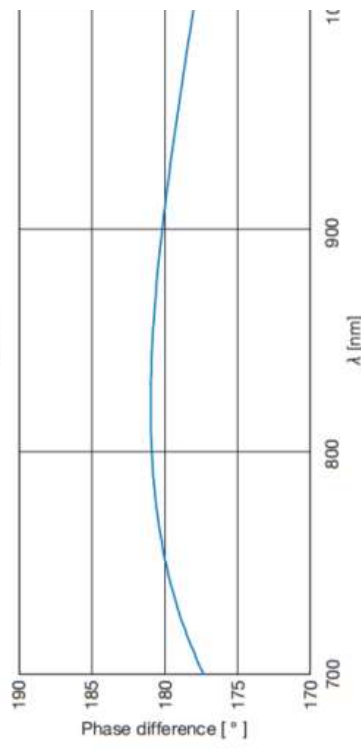
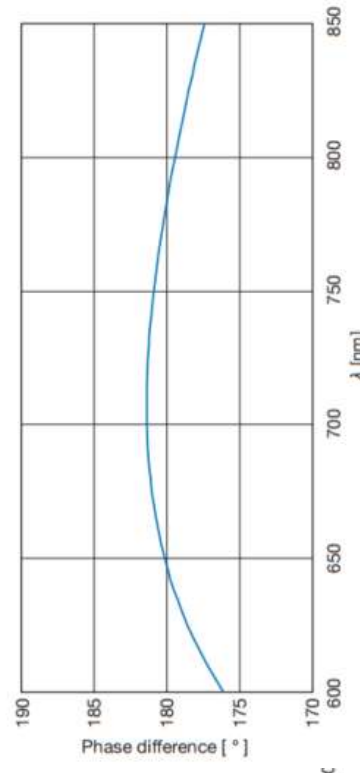
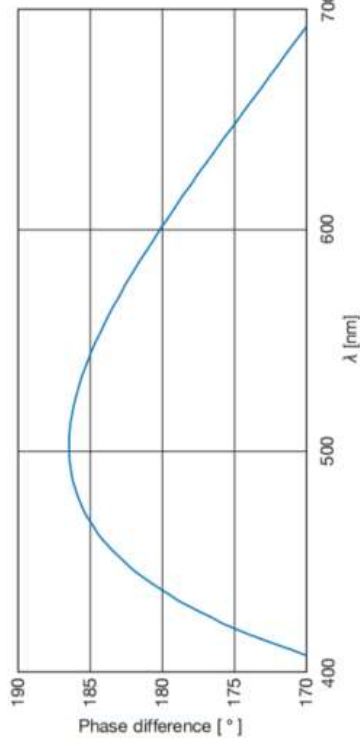
OP-P-WPW



● $\lambda/2$

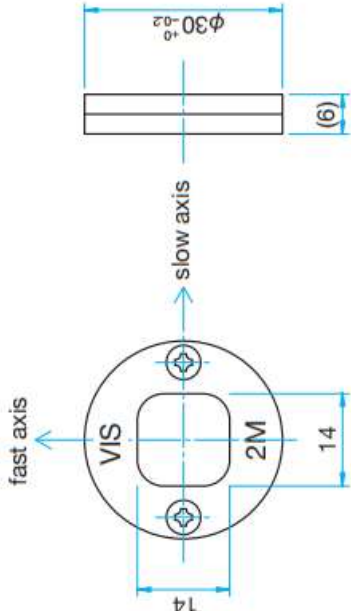
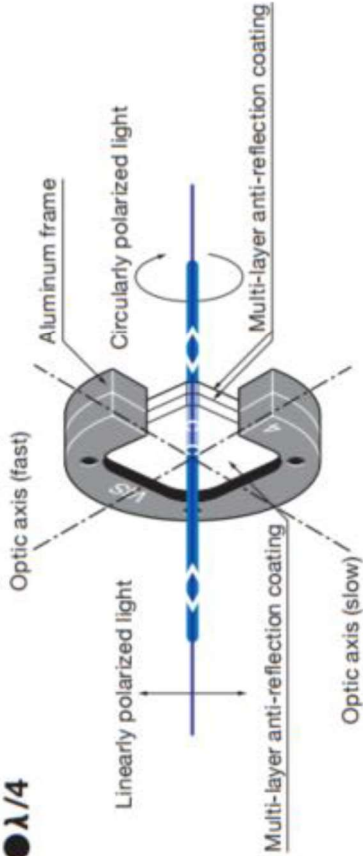


Material	Optical grade crystalline quartz, MgF_2
Material of frame	Aluminum Finishing: Black anodized
Clear aperture	14×14mm
Transmitted wavefront distortion	$\lambda/4$ (per one surface)
Angular deviation of beam	<5"
Coating	Both surfaces: Narrowband multi- layer anti-reflection coating (Four surfaces)
Transmittance	>Average 98%
Surface Quality (Scratch-Dig)	20-10

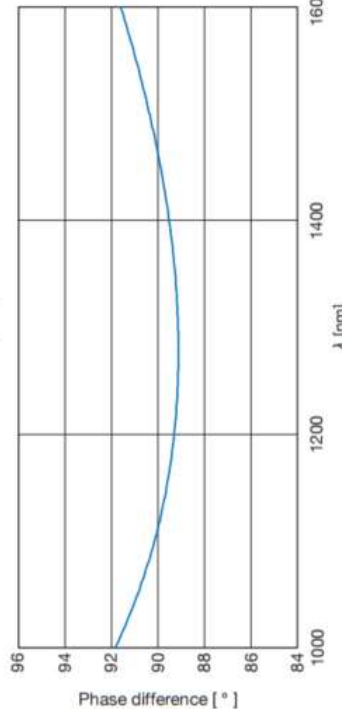
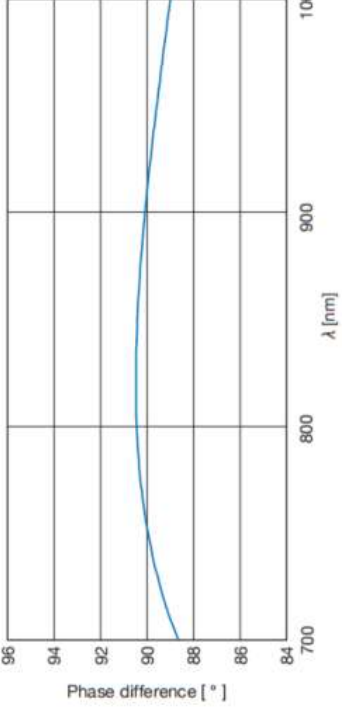
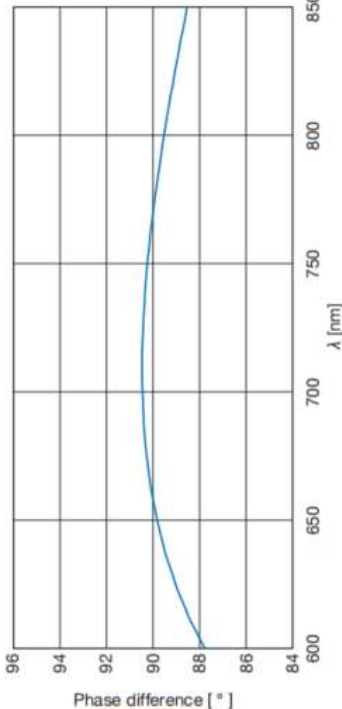
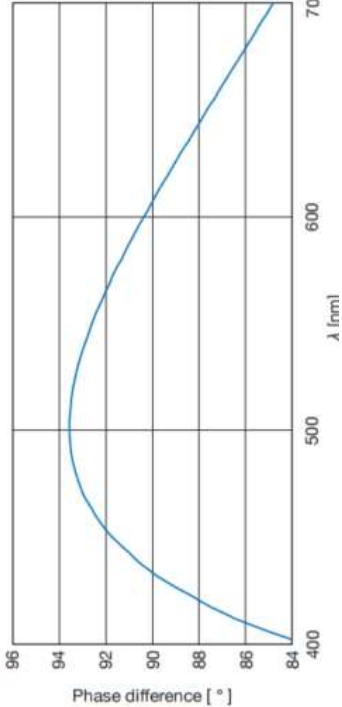




● $\lambda/4$

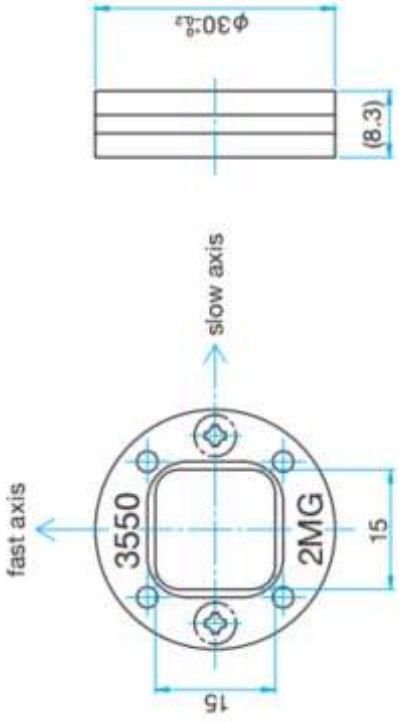
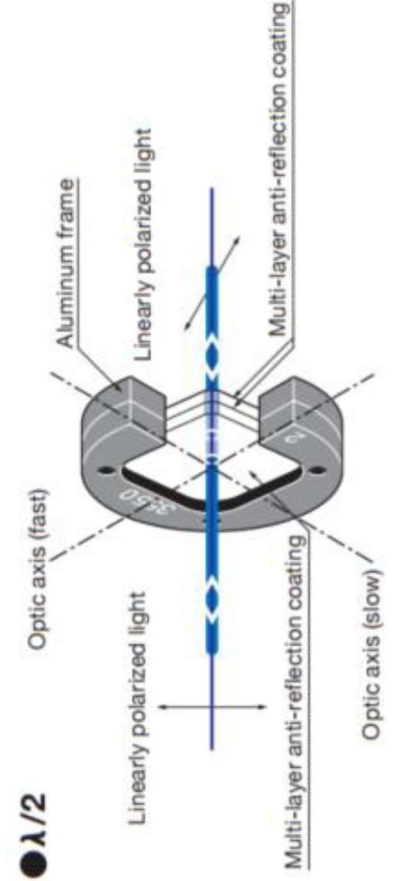


Material	Optical grade crystalline quarts, MgF_2		
Material of frame	Aluminum Finishing: Black anodized		
Clear aperture	14 × 14 mm		
Transmitted wavefront distortion	$\lambda/4$ (per one surface)		
Angular deviation of beam	< 5"		
Coating	Both surfaces: Narrowband multi-layer anti-reflection coating (Four surfaces)		
Transmittance	> Average 98%		
Surface Quality (Scratch-Dig)	20-10		



Air Gap Type Waveplates

OP-P-WPG



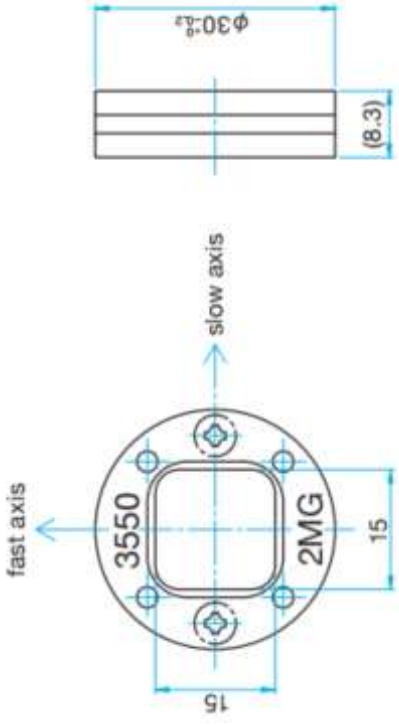
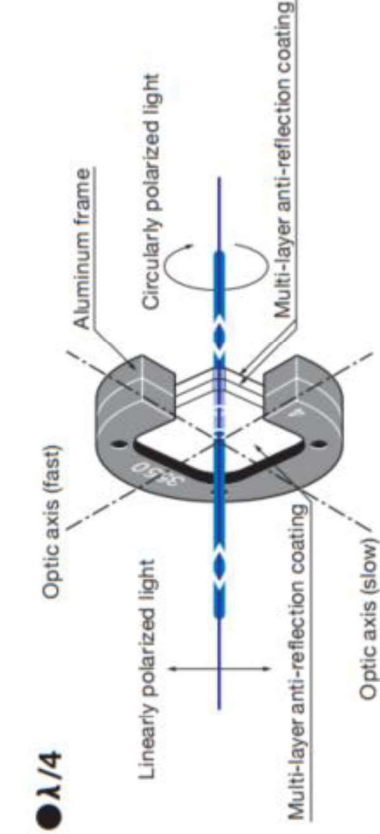
Material	Optical grade crystalline quarts		
Material of frame	Aluminum Finishing:Black anodized		
Clear aperture	15×15mm		
Surface flatness of substrate	λ/10		
Angular deviation of beam	<5"		
Coating	Both surfaces:Narrowband multi-layer anti-reflection coating(Four surfaces)		
Transmittance	>98%		
Surface Quality(Scratch-Dig)	20-10		

λ/2				
Part Number	Wavelength Range [nm]	Theoretical retardation [nm]	Retardation tolerance	Laser Damage Threshold* [J/cm²]
WPQG-2660-2M	266	133.0	<λ/50	1.4
WPQG-3550-2M	355	177.5	<λ/50	4
WPQG-5320-2M	532	266.0	λ/100- λ/200	4
WPQG-10640-2M	1064	532.0	λ/200- λ/500	7

*Laser pulse width 10ns,repitition frequency 20Hz

Air Gap Type Waveplates

OP-P-WPG

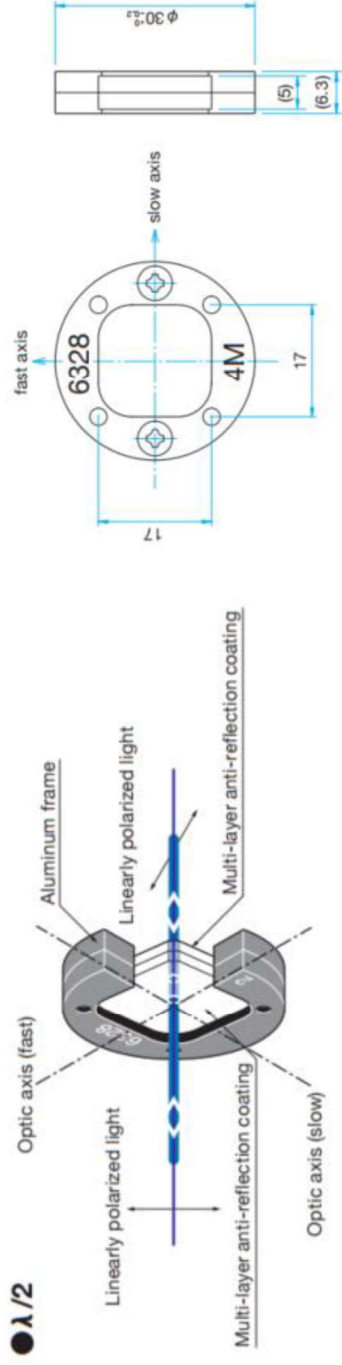


Material	Optical grade crystalline quarts		
Material of frame	Aluminum	Finishing: Black anodized	
Clear aperture	15×15mm		
Surface flatness of substrate	λ/10		
Angular deviation of beam	<5"		
Coating	Both surfaces: Narrowband multi-layer anti-reflection coating (Four surfaces)		
Transmittance	>98%		
Surface Quality (Scratch-Dig)	20-10		

λ/4				
Part Number	Wavelength Range [nm]	Theoretical retardation [nm]	Retardation tolerance	Laser Damage Threshold* [J/cm²]
WPQG-2660-4M	266	66.5	<λ/50	1.4
WPQG-3550-4M	355	88.8	<λ/50	4
WPQG-5320-4M	532	133.0	λ/100- λ/200	4
WPQG-10640-4M	1064	266.0	λ/200- λ/500	7

*Laser pulse width 10ns, repetition frequency 20Hz

Quartz Waveplates | OP-P-WPQ



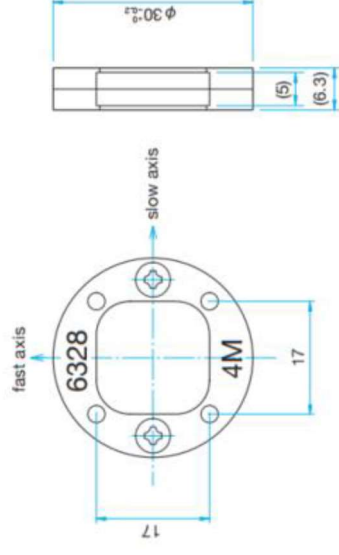
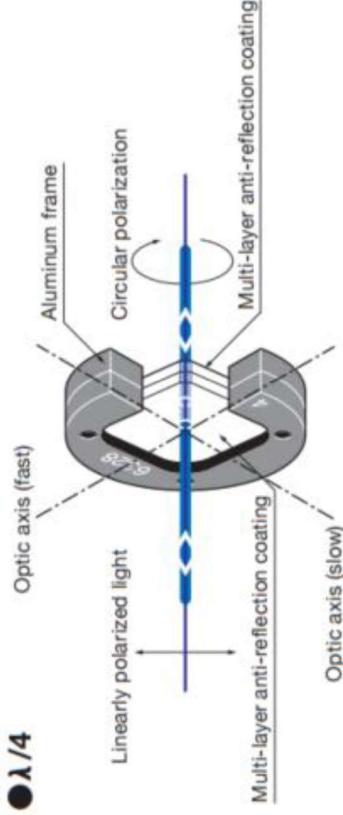
Material	Optical grade crystalline quartz	
Material of frame	Aluminum	Finishing: Black anodized
Clear aperture	17 × 17mm	
Surface flatness of substrate	$\lambda/10$	
Angular deviation of beam	<5"	
Coating	Both surfaces: Narrowband multi-layer anti-reflection coating	
Transmittance	>98.5%	
Laser Damage Threshold	1J/cm ² (Laser pulse width 10ns, repetition frequency 20Hz)	
Surface Quality (Scratch-Dig)	20-10	

Part Number	Wavelength Range [nm]	Theoretical retardation [nm]	Retardation tolerance
OPPWPQ-2660-2M	266	133.0	<N/50
OPPWPQ-3250-2M	325	162.5	<N/50
OPPWPQ-3550-2M	355	177.5	<N/50
OPPWPQ-4050-2M	405	202.5	$\lambda/100$ - $\lambda/200$
OPPWPQ-4100-2M	410	205.0	$\lambda/100$ - $\lambda/200$
OPPWPQ-4416-2M	441.6	220.8	$\lambda/100$ - $\lambda/200$
OPPWPQ-4579-2M	457.9	229.0	$\lambda/100$ - $\lambda/200$
OPPWPQ-4880-2M	488	244.0	$\lambda/100$ - $\lambda/200$
OPPWPQ-5145-2M	514.5	257.3	$\lambda/100$ - $\lambda/200$
OPPWPQ-5320-2M	532	266.0	$\lambda/100$ - $\lambda/200$
OPPWPQ-6328-2M	632.8	316.4	$\lambda/100$ - $\lambda/200$
OPPWPQ-6700-2M	670	335.0	$\lambda/100$ - $\lambda/200$
OPPWPQ-7800-2M	780	390.0	$\lambda/200$ - $\lambda/500$
OPPWPQ-8300-2M	830	415.0	$\lambda/200$ - $\lambda/500$
OPPWPQ-10640-2M	1064	532.0	$\lambda/200$ - $\lambda/500$
OPPWPQ-13000-2M	1300	650.0	$\lambda/200$ - $\lambda/500$
OPPWPQ-15500-2M	1550	775.0	$\lambda/200$ - $\lambda/500$

Quartz Waveplates | OP-P-WPQ



● $\lambda/4$

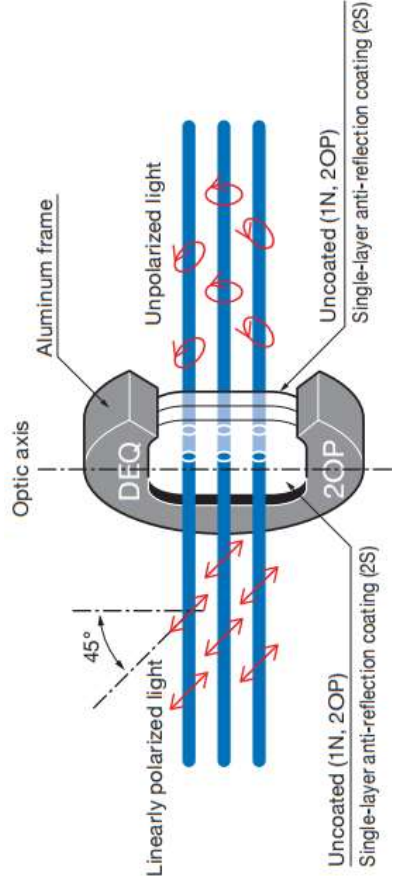


Material	Optical grade crystalline quartz
Material of frame	Aluminum Finishing:Black anodized
Clear aperture	17×17mm
Surface flatness of substrate	$\lambda/10$
Angular deviation of beam	$<5''$
Coating	Both surfaces:Narrowband multi-layer anti-reflection coating
Transmittance	$>98.5\%$
Laser Damage Threshold	$1\text{J}/\text{cm}^2$ (Laser pulse width 10ns, repetition frequency 20Hz)
Surface Quality (Scratch-Dig)	20-10

Part Number	Wavelength Range [nm]	Theoretical retardation [nm]	Retardation tolerance
WPQ-2660-4M	266	66.5	$<\lambda/50$
WPQ-3250-4M	325	81.3	$<\lambda/50$
WPQ-3550-4M	355	88.8	$<\lambda/50$
WPQ-4050-4M	405	101.3	$\lambda/100\text{-}\lambda/200$
WPQ-4100-4M	410	102.5	$\lambda/100\text{-}\lambda/200$
WPQ-4416-4M	441.6	110.4	$\lambda/100\text{-}\lambda/200$
WPQ-4579-4M	457.9	114.5	$\lambda/100\text{-}\lambda/200$
WPQ-4880-4M	488	122.0	$\lambda/100\text{-}\lambda/200$
WPQ-5145-4M	514.5	128.6	$\lambda/100\text{-}\lambda/200$
WPQ-5320-4M	532	133.0	$\lambda/100\text{-}\lambda/200$
WPQ-6328-4M	632.8	158.2	$\lambda/100\text{-}\lambda/200$
WPQ-6700-4M	670	167.5	$\lambda/100\text{-}\lambda/200$
WPQ-7800-4M	780	195.0	$\lambda/200\text{-}\lambda/500$
WPQ-8300-4M	830	207.5	$\lambda/200\text{-}\lambda/500$
WPQ-10640-4M	1064	266.0	$\lambda/200\text{-}\lambda/500$
WPQ-13000-4M	1300	325.0	$\lambda/200\text{-}\lambda/500$
WPQ-15500-4M	1550	387.5	$\lambda/200\text{-}\lambda/500$

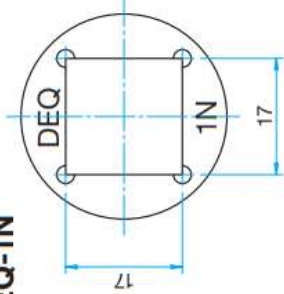
Quartz Waveplates OP-P-DEQ

Quartz depolarizers convert linearly polarized input beams into unpolarized beams and are used in front and behind of measurement equipment that must avoid polarization.

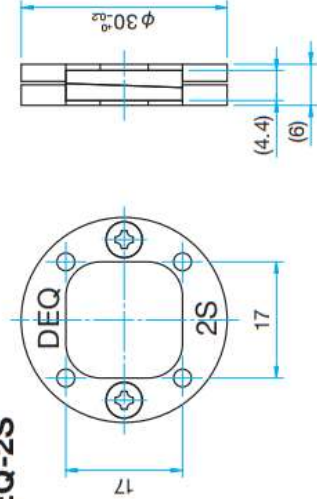


Material	Optical Grade Crystalline Quarts Synthetic fused silica
Material of frame	Aluminum Finishing:Black anodized
Surface Quality (Scratch-Dig)	40-20

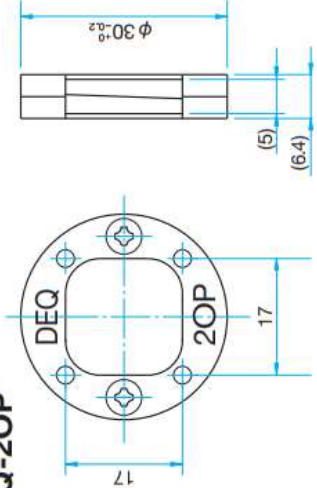
DEQ-1N



DEQ-2S



DEQ-2OP



Part Number	Wavelength Range [nm]	Material	Thickness of Optics [mm]	Laser Damage Threshold* [J/cm²]
DEQ-1N	180-3500	Optical Grade Crystalline Quarts	2.5(Maximum)	
DEQ-2S	350-2500	Optical Grade Crystalline Quarts Synthetic fused silica	4.4	0.3
DEQ-2OP	180-3500	Optical Grade Crystalline Quarts	5.0	1

*Laser pulse width 10ns, repetition frequency 20Hz

Fresnel Rhomb Waveplates

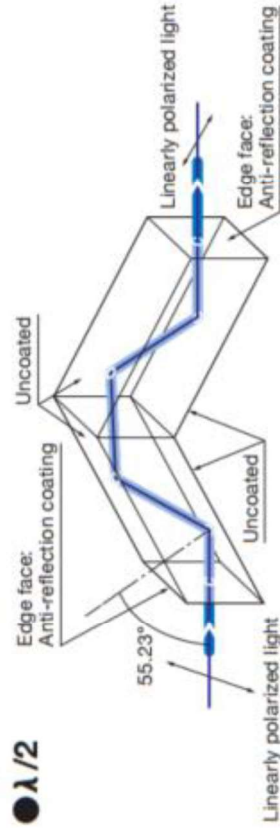
OP-P-FRB



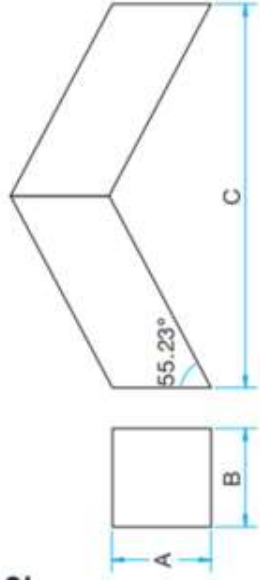
Material	BK7
Surface flatness of substrate	$\lambda/10$
Coating	Edge faces: Anti-reflection coating Side surfaces: Uncoated
Design wavelength	587.6nm
Incident angle	0°
Surface Quality (Scratch-Dig)	40-20

$\lambda/2$			
Part Number	A×B×C [mm]	optical axis shift [mm]	
FRB-1010-2	10×10×40	<0.5	
FRB-1515-2	15×15×58.6	<0.5	

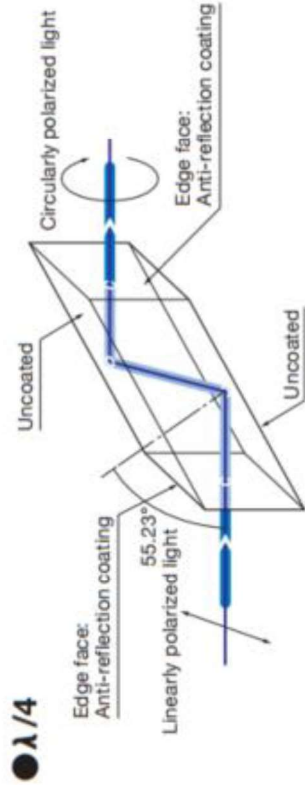
$\lambda/4$			
Part Number	A×B×C [mm]	optical axis shift [mm]	
FRB-1010-4	10×10×20	13.5	
FRB-1515-4	15×15×29.3	20.2	



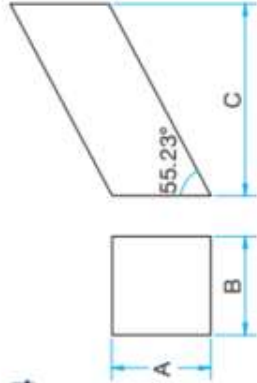
● $\lambda/2$



● Tolerance
A·B±0.1
C±0.2



● $\lambda/4$



● Tolerance
A·B±0.1
C±0.2