

Motorized  
Step Zoom  
Surveillance  
Lens



The Questar motorized StepZoom 180™ is a powerful 8 to 1 variable focal length lens with the longest focal length available in an optic of its size. Fully motorized with microprocessor control, the lens offers parfocal selection of five effective focal lengths, four selectable filters, and a four line backlit display of focal length, filter position, focus range, and operating status. Weatherized construction is featured throughout, with protective optical flats at each end of the lens system. Remote control is possible at a distance of 4000 feet from the hand terminal, PC or other RS-422 communication source, and the system is ready for integration with other related functions such as position and video control. Accessories include an integrated automatic light control filter.

**Performance:**

Working Range:	75 Meters (250 ft.) - infinity.
Resolution:	0.7 arc second. Resolution is defined as the measurable separation of a space between two bars on a resolution target each instrument is tested to meet these figures.
Format:	Diffraction limited field 18 mm at 2400 mm EFL.
Clear Aperture:	178 mm (7 inches).

**Optical:**

Design Type:	Maksutov Cassegrain Catadioptric.
Corrector:	BK7, magnesium fluoride AR coated, 178 mm (7 inches) diameter.
Primary Mirror:	Pyrex substrate, aluminum coated, SiO overcoat 194 mm (7.64 inches) diameter.
Secondary Mirror:	Aluminum coating on R2 surface of Corrector, 46 mm diameter.
Protective Flats:	BK7 plane/parallel, magnesium fluoride AR coated. Diameters: front 178 mm, rear 36 mm. Does not affect system performance of diffraction limited to 1/6 wave.
Baffling:	Helix in main baffle tube, all internal surfaces anti-reflection coated.
Image Sensor:	For use with video cameras of any type, C-mount standard.

Available effective focal lengths		
635 mm	f/3.6	T4.4
1000 mm	f/5.6	T6.9
1800 mm	f/10.1	T12.3
<b>2400 mm</b>	<b>f/13.5</b>	<b>T16.6*</b>
3600 mm	f/20	T24.3
4800 mm	f/27.0	T33.2
*System focal length, required		
Available filter selections:		
N.D. 0.1	full	
N.D. 0.3	wratten	
N.D. 0.8	series	
N.D. 1.0	available	
N.D. 1.5	(All ND filters	
N.D. 2.0	evaporated	
N.D. 2.5	chrome)	
(standard filters are bold)		
Special applications on request		

## SZ 180

### ***Electromechanical:***

---

Drive:	1.8 degree step motor open loop drive for all functions, with microprocessor control. Opto interrupter end of travel and home position sensing.
Control:	Motorola M6811C11 onboard microcontroller with remote hand terminal. Selection of focal length by direct access buttons or sequential up/down. Selection of filter by direct access. Bidirectional intelligent turret drives move in direction of shortest distance to next chosen focal length/filter position. Parfocalization software maintains focus for all focal length changes, selectable on/off (step zoom). Focus acceleration and velocity adjustable. Last position and motion parameters savable as power up defaults. All software in 128K EPROM. User configured functions and parameters stored in non-volatile EEPROM on microcontroller.
Terminal :	30 key hand control unit, with 4 X 20 character display; backlit supertwist type. Keypress audible beep, user switchable on/off. Communication RS-422 standard, 9600 baud. Maximum distance terminal to instrument 1220 meters (4000 feet). 6 wire connecting cable with modular end connectors 10 ft. coiled cable standard length, longer options available.
System Power:	12VDC operation. Auto-ranging switchmode desktop power supply: 90-250 VAC/47-63Hz is supplied to connect and convert A/C to 12 VDC. Power entry at instrument supplies instrument and hand terminal. 6 foot cord from supply to instrument. IEC power input for worldwide use.

### ***Mechanical:***

---

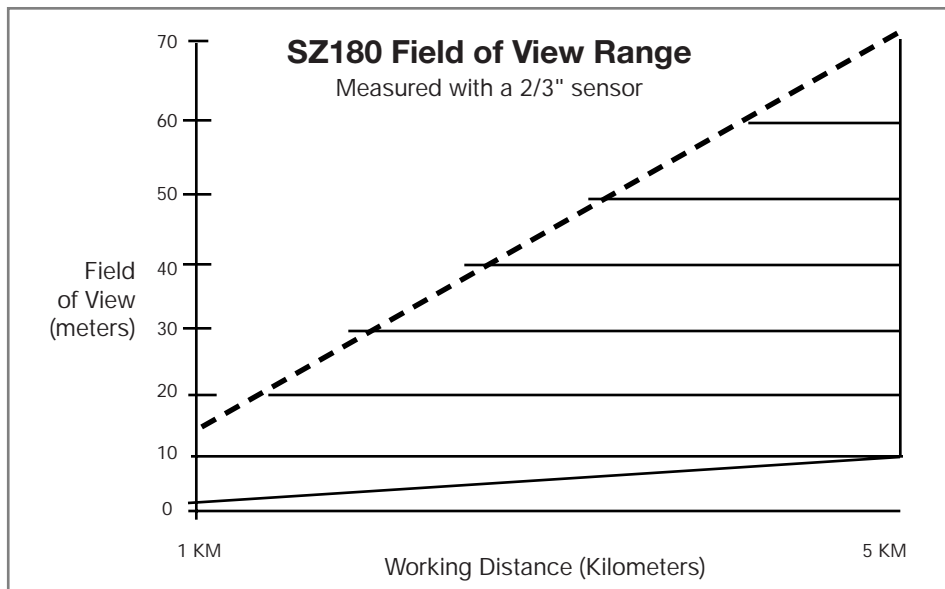
Barrel Section:	Machined from seamless aluminum tubing. Threaded corrector cell and back plate. Front protective flat in cell.		
Focus:	Transiting mirror design. Mirror nut with linear ball bearing slides on centerless ground stainless steel maintube. Precision lead screw mechanism. Variable speed step motor drive.		
Turret Section:	Modular design two piece aluminum housing and cover, machined. 'P' thread camera port with integrated protective flat; removable. Mating surfaces O-Ring sealed. Two turrets: lens/filter, aluminum, 140 mm (5.5 inch) diameter, direct tooth belt drive. Bronze bushing/roller thrust bearings on 3/4" stainless steel shaft. Five positions. Adjustable auxiliary lens cells. 25.4 mm (1") or 36 mm (1.42") filter cells. See optical section for selection of filters and focal lengths.		
Mirror Mounting:	Threaded mirror mounting flange with nut and support washers. Spring preloaded.		
Finish/Hardware:	All exterior surfaces polane paint finish; either black or white. Special colors by quotation. All hardware stainless steel. Includes hardshell case, lens covers, swivel coupling, C-mount adapter, cables, manuals.		
Mounting:	1/4" -20 and 3/8" - 16 mounting holes on bottom housing plate.		
Dimensions:	55 cm	(2.5")	long
	29.2 cm	(11.5")	tall
	26 cm	(10.25")	wide
Weights:	Instrument:	16 kg	(35 pounds)
	Terminal:	.4 kg	(1 pound)
	Power Supply:	.5 kg	(1.1 pound)

DIAGRAM AT  
90 %  
here

# SZ 180

## Specification Sheet

### Motorized Step Zoom Surveillance Lens



#### **OPTIONAL LINEAR WEDGE FILTER**

Modular design, .625" thick, mounts directly to telescope turret rear housing. Motorized control, either from hand terminal, or automatic light control with optional lens control unit.



Questar Corporation  
6204 Ingham Road  
New Hope, PA 18938 USA

Telephone: 215-862-5277  
Fax: 215-862-0512

email: [questar@erols.com](mailto:questar@erols.com)  
<http://www.questar-corp.com>

For further information on our domestic and international dealers, please call or fax us.