

**Motorized
Step Zoom
Surveillance
Lens**



The Questar motorized StepZoom 90™ is a surveillance lens for situations requiring a rugged, very compact and light weight long focal length optic. Questar StepZoom lenses offer a compactness and variation in focal lengths unavailable with continuous zoom lenses. The SZ 90 offers five effective focal lengths from 480 mm to 3100 mm in a 35 cm, 6 kilogram package. Included are selectable neutral density or spectral filters for optimized performance under varying conditions. Remote control is performed from a full function microprocessor hand terminal with four line display reporting the status of all lens functions. Focus, focal length and filter changes are quick with no refocus required throughout the focal length range. Automatic light level control is an integrated option. The lens is weatherized with seals and O-rings throughout and protective clear optical flats front and back. The optical performance of the SZ 90 is superb, capable of resolving on television a 7 mm feature at 1 kilometer.

Performance:

Working Range:	15 Meters (50 ft.) - infinity
Resolution:	1.0 per 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 1300 mm EFL.
Clear Aperture:	89 mm (3.5 inches).

Optical:

Design Type:	Maksutov Cassegrain Catadioptric.
Corrector:	BK7, Magnesium Fluoride AR coated, 89 mm (3.5 inches) diameter.
Primary Mirror:	Pyrex substrate, aluminum coated, SiO overcoat 96 mm (3.78 inches) diameter.
Secondary Mirror:	Aluminum coating on R2 surface of Corrector, 28.7 mm diameter.
Protective Flats:	BK7 plane/parallel, magnesium fluoride AR coated. Diameters: front 89 mm, rear 36 mm. Do not affect system performance of diffraction limited to 1/8 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		
480 mm	f/5.4	T6.6
660 mm	f/7.4	T9.1
820 mm	f/9.2	T11.3
955 mm	f/10.7	T13.1
1300 mm	f/14.6	T17.8*
2230 mm	f/25.0	T30.6
3100 mm	f/34.8	T42.6
*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 90

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 M68HC11 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 1200 meters (4000 feet). 6 wire connecting cable with modular end connectors 10 ft. coiled cable standard length, longer option 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:

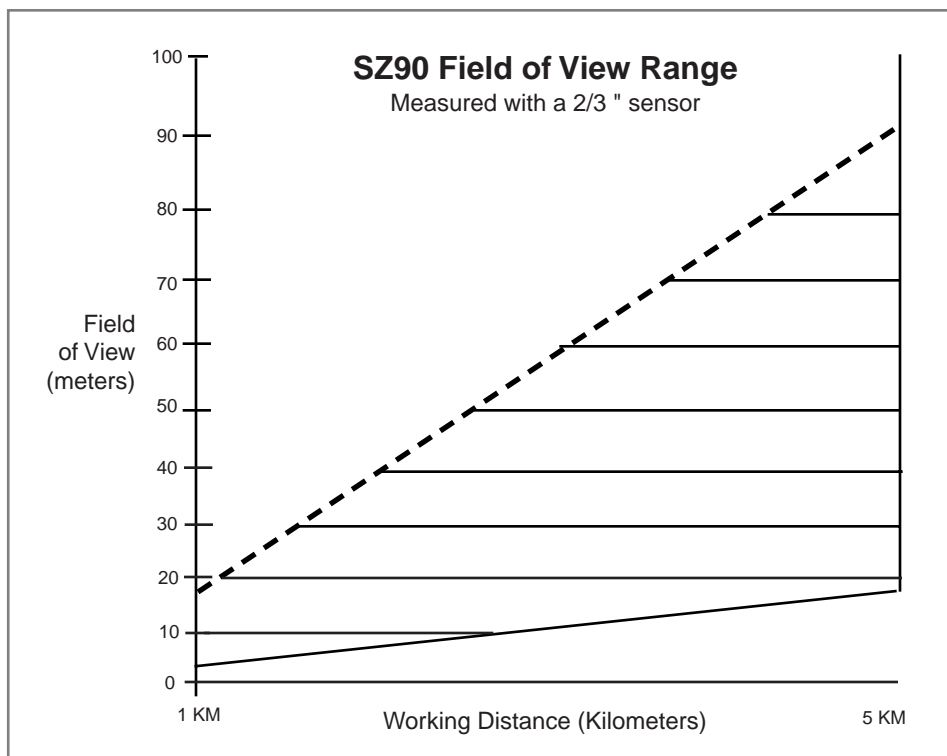
Barrel Section:	Modular design three piece plate aluminum construction. Sheet aluminum outer shell. Front protective flat in cell. All mating surfaces O-ring sealed.		
Focus:	Transiting corrector design, supported in 6 precision linear bearings on non-stressed rods. Precision lead screw mechanism. Variable 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. See optical section for selection of filters and focal lengths.		
Mirror Mounting:	Fixed mirror thimble/main baffle tube, stainless steel; adjustable centering.		
Finish/Hardware:	All aluminum parts black anodized. All exterior surfaces anodized. Special colors by quotation. All hardware stainless steel. Includes hardshell case, lens covers, swivel coupling, C-mount adapter, cables, manuals.		
Mounting:	1/4" -20 mounting holes on bottom housing plate.		
Dimensions:	35.5 cm	14"	long
	21.6 cm	8.5"	tall
	21 cm	8.3"	wide
Weights:	Instrument:	6 kg	13.2 pounds
	Terminal:	.4 kg	1 pound
	Power Supply:	.5 kg	1.1 pound

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SZ 90

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.



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