CARL ZEISS JENA

Explore and Understand Time and Space

Astronomical instruments and planetaria



CARL ZEISS JENA

Survey

ZEISS
ASTRONOMICAL ACCESSORIES



Survey

	MENISCAS 180	AMATEUR TELESCOPE 100	TELEMATOR	TELEMENTOR 2
Objectives				
C 50/540	O	O	O	O
C 63/840	O	O	L	L
C 80/500	O	O	O	O
AS 80/840	O	O	O	O
AS 80/1200	O	O	O	O
AS 100/1000	O	L	O	O
C 110/750	O	O	O	O
AS 110/1650	O	O	O	O
AS 150/2250	O	O	O	O
Telescope components				
Eyepiece extension tube	O	L	O	O
Focussing tube M 44	O	O	O	O
Focussing tube M 52	O	L	O	O
Change device M 44	O	O	X	X
Change device M 52	O	L	O	O
Change ring 45	O	L	X	X
Change ring 51	L	O	O	O
Adapter ring				
M 44/20	O	X	L	X
M 44/30	O	X	X	X
M 44/40	O	X	X	X
M 44/60	O	L	L	X
M 44/70	O	L	X	X
M 44/80	O	X	X	L
M 68/10	L	O	O	O
M 68/20	L	O	O	O
M 68/40	L	O	O	O
M 68/80	L	O	O	O
M 68/100	L	O	O	O
Adapter ring M 68/M 44	L	O	O	O
Adapter ring M 44/M 68	O	X	X	X
Adapter ring M 68/M 44-M 68	L	O	O	O
Barlow Lens 2×	L	X	X	X
Eyepiece sleeve	X	L	L	L
Finder telescopes				
F	O	L	O	O
C 44	O	O	L	X
C 54	O	O	O	O
Eyepieces				
H-16	X	L	X	X
H-25	X	X	L	L
O-4	X	X	O	O
O-6	X	X	X	X

	MENISCAS 180	AMATEUR TELESCOPE 100	TELEMATOR	TELEMENTOR 2
O-10	L	L	L	X
O-12.5	X	X	X	X
O-16	X	X	X	X
O-25	L	X	X	X
O-6 C	X	X	X	X
O-10 C	X	X	X	X
O-16 C	L	X	L	L
O-25 C	X	X	X	X
O-10 R	X	X	X	X
O-16 R	X	X	X	X
O-25 R	X	X	X	X
H-40 S	L	L	X	X
O-40 SC	X	X	X	X
O-6 SD	X	X	X	X
O-10 SD	X	X	X	X
O-16 SD	X	X	X	X
O-25 SD	X	X	X	X
W-31 S	X	X	X	X
Visual observation				
Set of neutral filters	X	X	X	X
Colour filters red, yellow, green, blue	X	X	X	X
Colour filter turret	X	X	X	X
Lunar filter bright, dark	X	X	X	X
Mars filter	X	X	X	X
Eyepiece spectroscope	X	X	X	X
Prism erecting set	X	X	X	X
Zenith prism	X	X	X	X
Quadruple eyepiece turret	X	X	X	X
Binocular eyepiece tube	X	X	X	X
Photography				
Amateur Astro-Camera 56/250	X	X	O	O
Camera holder	O	O	X	X
Camera adapters				
Praktica L	X	X	X	X
Exa	X	X	X	X
Six	X	X	X	X
T 2	X	X	X	X
T 2-mount				
Exa	X	X	X	X
Praktica L	X	X	X	X
Tube for eyepiece projection	X	X	X	X

	MENISCAS 180	AMATEUR TELESCOPE 100	TELEMATOR	TELEMENTOR 2
Sun observation				
Solar filters				
SFO 63/75	O	O	X	X
SFO 80/101	O	O	O	O
SFO 80/104	O	O	O	O
SFO 80/129	O	X	O	O
Sun projection screen				
V	O	X	O	O
F	O	O	X	X
Micrometer measurement				
Eyepiece screw micrometer	X	X	X	X
Dark-field illumination	X	X	X	X
Position circle	X	X	X	X
Ring micrometer	X	X	X	X
Equatorial mountings				
Equatorial mounting T	O	O	X	L
Equatorial mounting TM	O	O	L	X
Equatorial mounting Ib	L	L	X	X
Motor-driven hour axis	O	O	O	X
Balance weights				
2.0 kg	X	L	O	O
2.5 kg	O	O	L	L
6.3 kg	L	X	O	O
Stands				
Tripod	O	O	L	L
Column	L	L	X	X

Explanation of symbols
L: included in equipment supplied
X: recommendable
O: not advisable to be used or not usable at all

The components listed can also be used in conjunction with the Optics Kit for Amateur Telescope Makers.

Orthoscopic screw-in eyepieces with diopter setting are destined for use in conjunction with the eyepiece screw micrometer.
AMATEUR TELESCOPE 100, TELEMATOR and TELEMENTOR 2 permit the adapter for the Six Camera to be used in conjunction with the adapter ring M 44/M 68 only.

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ZEISS ASTRONOMICAL ACCESSORIES

Eyepieces



ASTRONOMICAL ACCESSORIES

Eyepieces

Huygens Eyepiece

- Two-element lens
- Apparent field of view: 43°
- Usable as projection eyepieces for solar observation
- Suited for the observation of large fields at low magnification

Orthoscopic Eyepiece

- Three-element cemented lens and plano-convex lens
- Apparent field of view: 40°
- Good spherical and chromatic correction
- Low distortion
- Suited for high magnifications and micrometer measurements (with cross-hair inset)
- Attention: never use an orthoscopic eyepiece for sun projection!

Wide-Angle Eyepiece

- Improved Erfle-type eyepiece
- Large apparent of view: 70°
- High image quality
- Suited for the scanning of major star fields

Cross-Hair Inset

- Graticule with slip-in mount for orthoscopic eyepieces O-6, O-10, O-16 and O-25

Ring Micrometer Inset

- Ring micrometer with slip-in mount for orthoscopic eyepieces O-10, O-16 and O-25

NOTE:

In the case of slip-in eyepieces the intermediate image plane coincides with the locating plane of the eyepiece.

SLIP-IN EYEPIECES

	Short form	Focal length in mm	Apparent field of view degrees	Internal diameter in mm	Con. thread in mm	MENISCAS 180	AMATEUR-TELESCOPE 100	TELEMATOR	TELEMENTOR 2
Huygens eyepieces	H-16	16	43	24.5	–	X	L	X	X
	H-25	25	43	24.5	–	X	X	L	L
Orthoscopic eyepieces	O-4	4	40	24.5	–	X	X		
	O-6	6	40	24.5	–	X	X	X	X
	O-10	10	40	24.5	–	L	L	L	X
	O-12.5	12.5	40	24.5	–	X	X	X	X
	O-16	16	40	24.5	–	X	X	X	X
	O-25	25	40	24.5	–	L	X	X	X
Orthoscopic eyepieces with cross-hair inset	O-6C	6	40	24.5	–	X	X	X	X
	O-10C	10	40	24.5	–	X	X	X	X
	O-16C	16	40	24.5	–	L	X	L	L
	O-25C	25	40	24.5	–	X	X	X	X
Orthoscopic eyepieces with ring micrometer inset	O-10R	10	40	24.5	–	X	X	X	X
	O-16R	16	40	24.5	–	X	X	X	X
	O-25R	25	40	24.5	–	X	X	X	X

SCREW-IN EYEPIECES

Huygens eyepiece	H-40S	40	43	–	M44×1	L	L	X	X
Orthoscopic eyepiece with cross-hair inset	O-40SC	40	40	–	M44×1	X	X	X	X
Orthoscopic eyepieces with dioptre setting	O-6SD	6	40	–	M34×0.75	M	M	M	M
	O-10SD	10	40	–	M34×0.75	M	M	M	M
	O-16SD	16	40	–	M34×0.75	M	M	M	M
	O-25SD	25	40	–	M34×0.75	M	M	M	M
Wide-angle eyepiece	W-31S	31	70	–	M44×1	X	X	X	X

H Huygens eyepiece
O orthoscopic eyepiece
W wide-angle eyepiece
S screw-in eyepiece
C eyepiece with cross-hair inset
D eyepiece with dioptre setting
R eyepiece with ring micrometer inset

L included in equipment supplied
X usable
M for eyepiece screw micrometer only

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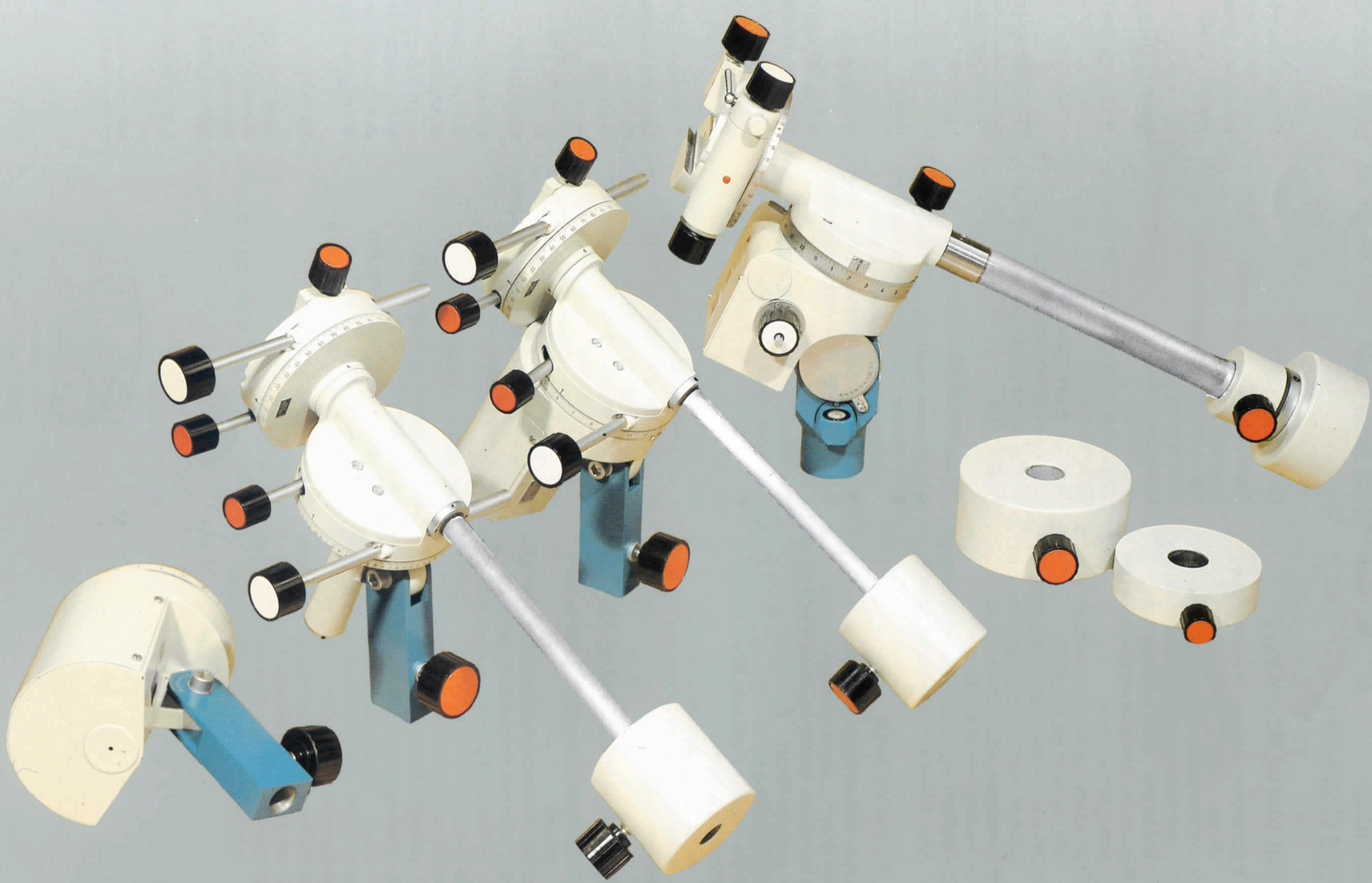
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Equatorial Mountings,
Tripods and Columns

ZEISS
ASTRONOMICAL ACCESSORIES



ASTRONOMICAL ACCESSORIES

Equatorial Mountings, Tripods and Columns

Equatorial Mounting T

- Equatorial and azimuthal telescope set-up
- Holds telescopes of up to 8 kg in weight
- Clampable dovetail guide for fastening and balancing the telescope tube
- Backlash-free slow-motion drives for setting to the object
- Graduated circles for coordinate reading and angular measurement
- Hour circle with second graduation for azimuth reading in the horizon system
- Clampable polar altitude setting
- Tracking period abt. 30 min
- Counterweight on elongated declination axis for balancing the telescope tube

TECHNICAL DATA

Declination circle/vertical circle
4× 0° to 90°, scale reading 1°
Hour circle 0 h to 24 h, scale reading 4 min
Parallel of altitude 0° to 360°,
scale reading 1°
Fine-motion range/polar axis 7.5°
(tracking ≙ 30 min)
Load carrying capacity up to 8 kg
Internal diameter for tripod pivot 20 mm
Weight 6 kg

Equatorial Mounting TM

- Equatorial and azimuthal telescope set-up
- Holds telescopes of up to 8 kg in weight
- Clampable dovetail guide for fastening and balancing the telescope tube
- Tracking motion by synchronous drive
- Backlash-free slow-motion drives for setting to the object
- Graduated circles for coordinate reading and angular measurement
- Sidereal time index as a setting aid
- Clampable polar altitude setting
- Setting to the object facilitated thanks to adjustable right ascension circle
- Counterweight on elongated declination axis for balancing the telescope tube

TECHNICAL DATA

Declination circle 4×0° to 90°,
scale reading 1°
Right ascension circle 0 h to 24 h,
scale reading 4 min
Mains connection
220 V/50 Hz
(220 V/60 Hz; 100 V, 110 V, 127 V, 240 V/
50 Hz/60 Hz)*
Power consumption 4.5 VA
Load carrying capacity up to 8 kg
Internal diameter for tripod pivot 20 mm
Weight 7 kg

Equatorial Mounting Ib

- Holds telescopes of up to 20 kg in weight
- Clampable dovetail guide for fastening and balancing the telescope tube
- Tracking motion by synchronous drive
- Backlash-free slow-motion drives for setting to the object
- Graduated circles for coordinate reading and angle measurement
- Sidereal time index as a setting aid
- Clampable polar altitude setting
- Object setting facilitated thanks to adjustable right ascension circle
- Counterweight on elongated declination axis for balancing the telescope tube (to be ordered according to accessories)
- M40×1.5 thread for connecting the Amateur Astro-Camera 56/250 and $^3/_8$" tripod bush for the connection of photographic cameras on elongated declination axis

TECHNICAL DATA

Declination circle 4×0° to 90°,
scale reading 1°
Right ascension circle 0 h to 24 h,
scale reading 5 min
Box level 2 mm bubble travel for 8′ tilt change
Mains connection
220 V/50 Hz
(220 V/60 Hz; 100 V, 110 V, 127 V, 240 V/
50 Hz/60 Hz)*
Power consumption 4.5 VA
Load carrying capacity up to 20 kg
Internal diameter for tripod pivot 20 mm
Weight 23 kg

Motor drive for polar axis

- Change-over unit (synchronous motor and right ascension circle) for Equatorial Mounting T – change-over to TM

Counterweights

Counterweights	2.0	2.5	6.3
Equatorial mounting	Ib	T and TM	Ib
Weight	2.0 kg	2.5 kg	6.3 kg

Tripod

- Stable, vertically adjustable
- Triangular sheet for stabilization and deposition of minor objects
- Pivot for taking up equatorial mountings
- Box level

TECHNICAL DATA

Maximum tripod height 1550 mm
Diameter of tripod pivot 20 mm
Box level 2 mm bubble travel for 8′ tilt change
Weight 5 kg

Column

- Heavy, stationary column
- Pivot for taking up equatorial mounting
- Adjustable locating pin for reproducible azimuth setting of the mounting
- High stability thanks to heavy base
- Adjustable feet
- Column and base dismountable

TECHNICAL DATA

Column height 1400 mm
Diameter of tripod pivot 20 mm
Diameter of column base 700 mm
Weight 73 kg

* to special order

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ZEISS ASTRONOMICAL ACCESSORIES

Finder
Telescopes



ASTRONOMICAL ACCESSORIES

Finder Telescopes

- Facilitation in finding the object to be observed
- Objective of 42 mm aperture and 150 mm focal length
- 7.5× magnification
- Permanently installed eyepiece with sighting mark and diopter setting
- Limiting magnitude $10^{m}.7$

Finder telescope	Connection
F	flange mounting: at the side of the telescope tube (48 mm dia.)
C 44	clamping: at the end of the telescope tube by clamping ring or adapter ring M 44
C 54	clamping: at the end of the telescope tube by focussing tube M 44

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Objectives

ZEISS ASTRONOMICAL ACCESSORIES



ASTRONOMICAL ACCESSORIES

Objectives

C-Objective

- Fraunhofer-type achromat
- Reflection-reduced two-element lens in mount
- Good chromatic and spherical correction
- Small secondary spectrum

AS-Objective

- Sonnefeld-type semi-apochromat
- Reflection-reduced two-lens element with narrow air gap in mount
- Outstanding chromatic and spherical correction
- Very small secondary spectrum
- Contrasty images

Objective		aperture in mm	focal length in mm	limiting magnitude
C	50/540	50	540	$11^{m}.0$
C	63/840	63	840	$11^{m}.5$
C	80/500*	80	500	$12^{m}.0$
AS	80/840	80	840	$12^{m}.0$
AS	80/1200	80	1200	$12^{m}.0$
AS	100/1000	100	1000	$12^{m}.6$
C	110/750	110	750	$12^{m}.7$
AS	110/1650	110	1650	$12^{m}.7$
AS	150/2250	150	2250	$13^{m}.2$

* optimized for a path in glass of 131 mm

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ASTRONOMICAL ACCESSORIES

Visual observation



ASTRONOMICAL ACCESSORIES

Visual observation

Set of neutral filters

- Adaptation of object brightness to the eye when observing the sun or moon
- Five neutral filters of 0.007, 0.022, 0.07, 0.22 and 0.70 transmittance
- To be pushed on the eyecup of the slip-in eyepieces
- Internal diameter 34 mm

Colour filters

- Enhancement of colour contrast when observing extended objects (planets, nebulae)
- Elimination of residual aberration
- Glass thickness 1.8 mm
- To be pushed on eyecup of slip-in eyepieces
- Internal diameter 34 mm

Filter	Glass
red	RG 2
yellow	GG 7
green	VG 9
blue	BG 12

Colour filter turret

- Enhancement of colour contrast when observing extended objects (planets, nebulae)
- Elimination of residual aberration
- Quick filter exchange
- Glass thickness 1.8 mm
- To be screwed on slip-in eyepieces instead of the eyecup (thread M 24×0.75)

Filter	Glass
neutral (0.12)	NG 4
red	RG 2
yellow	GG 7
green	VG 9
blue	BG 12

Lunar filter

- Neutral filter for the non-glare visual observation of the lunar surface
- To be screwed on slip-in eyepieces instead of the eyecup (thread M 24×0.75)

Filter	Transmittance
bright	0.30
dark	0.10

Mars filter

- Colour filter for the visual observation of the Mars
- Enhancement of contrast
- Filter glass: OG 5 (orange), thickness 2 mm
- To be screwed on slip-in eyepieces instead of the eyecup (thread M 24×0.75)

Eyepiece Spectroscope

- Observation of the spectra of bright stars
- Direct-vision prism for a wavelength of 486 nm
- 5.8° angular dispersion between blue (486 nm) and red (656 nm)
- −6 D cylindrical lens for broadening the spectral lines
- To be screwed on slip-in eyepieces instead of the eyecup (thread M 24×0.75)

Prism Erecting Set

- Terrestrial observations with astronomical telescopes
- Unreversed and erect image
- Effective optical length: 111 mm
- Connecting thread: M 44×1 on either side

Zenith Prism

- Observations near the zenith
- Effective optical length: 55 mm
- Connecting thread: M 44×1 on either side
- To be connected by means of change device and adapter ring for positional rotation

Quadruple Eyepiece Turret

- Quick-change device for three slip-in eyepieces and one screw-in eyepiece
- Unreversed and erect image
- Convenient observation thanks to positional rotation
- Effective optical length:
  103 mm (slip-in eyepieces)
  73 mm (screw-in eyepieces)
- Connection:
  telescope side: M 44×1 thread
  eyepiece side: 3 sleeves of 24.5 mm dia
  1 M 44×1 thread

Binocular Eyepiece Tube

- Binocular observation at an angle of 45° from the optical axis of the telescope tube
- 1.5× magnification of its own (Barlow lens)
- Diopter setting
- Interocular distance variable between 55 mm and 75 mm
- To be connected by means of change device and adapter ring for positional rotation
- Effective optical length: 87 mm
- Connection:
  telescope side: M 44×1 thread
  eyepiece side: sleeve of 24.5 mm dia.

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ZEISS ASTRONOMICAL ACCESSORIES

Telescope components



ASTRONOMICAL ACCESSORIES

Telescope components

Eyepiece extension tube

- Sliding sleeve, tube for focussing and change device
- Clampable sliding sleeve for adaptation to different effective optical lengths of the accessories (range 60 mm)
- Focussing tube M52 (focussing range 36 mm)
- Change device for quick exchange and positional rotation of accessories
- Connection:
  towards telescope: thread M74×1
  towards focus: socket for ring mount 45
- Effective optical length: 128 mm to 224 mm

Focussing tube

Focussing tube	M44	M52
Focussing range	35 mm	36 mm
Connecting thread		
towards telescope	M54×0.75	M62×0.75
towards focus	M44×1	M52×0.75
Effective optical length	56 mm to 91 mm	88 mm to 124 mm
Graduation	–	0 to 36 mm, scale reading 9 mm (axial) 0 to 9 mm, scale reading 0.1 mm (peripheral)

Change device

- Rapid exchange of accessories in conjunction with change ring 45
- Positional rotation of accessories

Change device	M44	M52
Connection:		
towards telescope	thread M44×1	thread M52×0.75
towards focus	socket for ring mount 45	socket for ring mount 45
Effective optical length	13 mm	13 mm

Change ring

- Connection of accessories to change device
- Positional rotation of accessories

Change ring	45	51
Connection:		
towards telescope	mount ring 45	mount ring 51
towards focus	thread M44×1	thread M68×1
Effective optical length	14 mm	10 mm

Adapter rings

- Rings for the adaptation to different effective optical lengths of the accessories

Adapter ring	M44	M68
Connecting thread on either side	M44×1	M68×1
Effective optical length	20 mm 30 mm 40 mm 60 mm 70 mm 80 mm	10 mm 20 mm 40 mm 80 mm 100 mm

Adapter ring M68/M44

- Effective optical length: 5 mm
- Connecting thread:
  towards telescope M68×1
  towards focus M44×1

Adapter ring M44/M68

- Effective optical length: 10 mm
- Connecting thread:
  towards telescope M44×1
  towards focus M68×1

Adapter ring M68/M44–M68

- For accessories with M44×1 thread (Barlow lens, eyepiece projection) while retaining the connecting thread M68×1
- Effective optical length:
  15 mm (up to eyepiece-side connecting thread M44×1)
  20 mm (up to eyepiece-side connecting thread M68×1)
- Connecting thread:
  towards telescope: M68×1
  towards focus: M44×1 and M68×1

Barlow lens

- Extension of objective focal lengths with an aperture ratio ≤1:10
- Increase in magnification
- Favourable magnification of the distance between eyecup and exit pupil in the case of short-focus eyepieces

Barlow lens	2×
Optimum magnification factor	2.0
Distance between connecting flange and image plane (without Barlow lens)	102.6 mm
Distance between connecting flange and image plane (with Barlow lens)*	190 mm
Connecting thread: on either side	M44×1

* The optimum magnification factor can only be attained when observing these values

Eyepiece sleeve

- Accepts slip-in eyepieces of 24.5 mm internal diameter
- Effective optical length: 43 mm
- Connecting thread (telescope-facing side): M44×1

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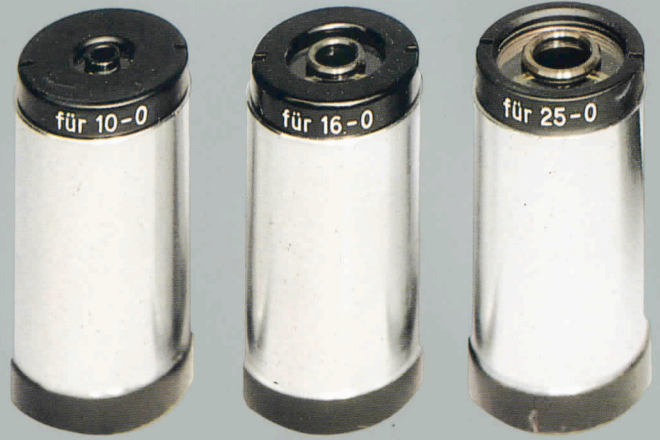
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ASTRONOMICAL ACCESSORIES

Micrometer measurement









ASTRONOMICAL ACCESSORIES

Micrometer measurement

Eyepiece screw micrometer

- Determination of minimum coordinate differences
- Fixed reticle with cross hairs
- Movable reticle with three parallel hairs
- Precision micrometer screw with graduation from 0 to 10 mm; scale reading 5 μm
- Eyepiece O-10 SD (with diopter setting)
- Effective optical length: 40 mm
- Connection thread:
  towards telescope: M 44×1
  towards eyepiece: M 34×0.75
- Further eyepieces deliverable: O-6 SD, O-16 SD and O-25 SD

Dark-field illumination

- Hair and cross-hairs illumination
- Brightness adjustable
- Seven dark-field stops for micrometer and orthoscopic slip-in eyepieces
- Effective optical length: 95 mm
- Connecting thread: M 44×1 on either side
- Operating voltage: 6 V a. c., d. c.

Position circle

- Position angle measurement with eyepiece screw micrometer or cross-hairs eyepiece
- Clampable ring with graduation: 0° to 360°, scale reading 1°
- Effective optical length: 18 mm
- Connecting thread: M 44×1 on either side

Ring micrometer

- Determination of coordinate differences with the telescope in fixed position (ascertainment of transit times)
- Micrometer ring (cemented into a slab glass) with mount for orthoscopic eyepieces O-10 C, O-16 C and O-25 C

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Photography

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ASTRONOMICAL ACCESSORIES



ASTRONOMICAL ACCESSORIES

Photo-graphy

Amateur Astro-Camera 56/250

- Photographs of sky fields and extended objects of observation
- Objective TESSAR 56/250 of high image quality
- Two cassettes
- Limiting magnitude $14^{m}.0$ with special astronomical plates exposed for one hour
- Connecting thread M77×0.75 for objective filter
- To be connected to the elongated declination axis of the equatorial mounting Ib instead of the camera balance weight

TECHNICAL DATA

Aperture	56 mm
Focal length	250 mm
Field of view	20°×27°
Plate size	9 cm×12 cm
Focussing range	20 mm
Connecting thread	M40×1.5
Weight	2.5 kg

Camera holder

- Accepts miniature camera for taking photographs of sky fields
- To be connected to the elongated declination axis of the equatorial mountings T and TM
- ¼″ tripod bush for connection of camera

Camera Adapters

- For taking photographs of astronomical and terrestrial objects of observation in the telescope focus

Adapter	Praktica L	Exa	Six	T2
Connecting thread towards telescope	M 44×1	M 44×1	M 68×1	M 44×1
Connection towards camera	thread M42×1	Exa bayonet mount	Pentacon-Six bayonet mount	T2-thread M42×0.75
Distance between telescope-side connection and image plane	54.3 mm	71.2 mm	90 mm	60 mm

T2-adapter for customary T2-mount according to camera type

T2-Mount

- For taking photographs of astronomical and terrestrial objects of observation in the telescope focus

T2-Mount	Exa	Praktica L
Connecting thread towards telescope	M42×0.75	M42×0.75
Connection towards camera	Exa bayonet mount	thread M42×1
Distance between telescope-side connection and image plane	55 mm	55 mm

Tube for eyepiece projection

- For taking photographs of astronomical objects of observation by means of eyepiece projection
- Magnified image scale
- Use of orthoscopic slip-in eyepieces as projection eyepieces
- Constructional length from connecting thread (M44×1) facing the telescope to eyepiece connection (internal diameter 24.5 mm): 30 mm
- Constructional length from connecting thread (M44×1) facing the telescope to connecting thread (M44×1) facing the focus: 20 mm

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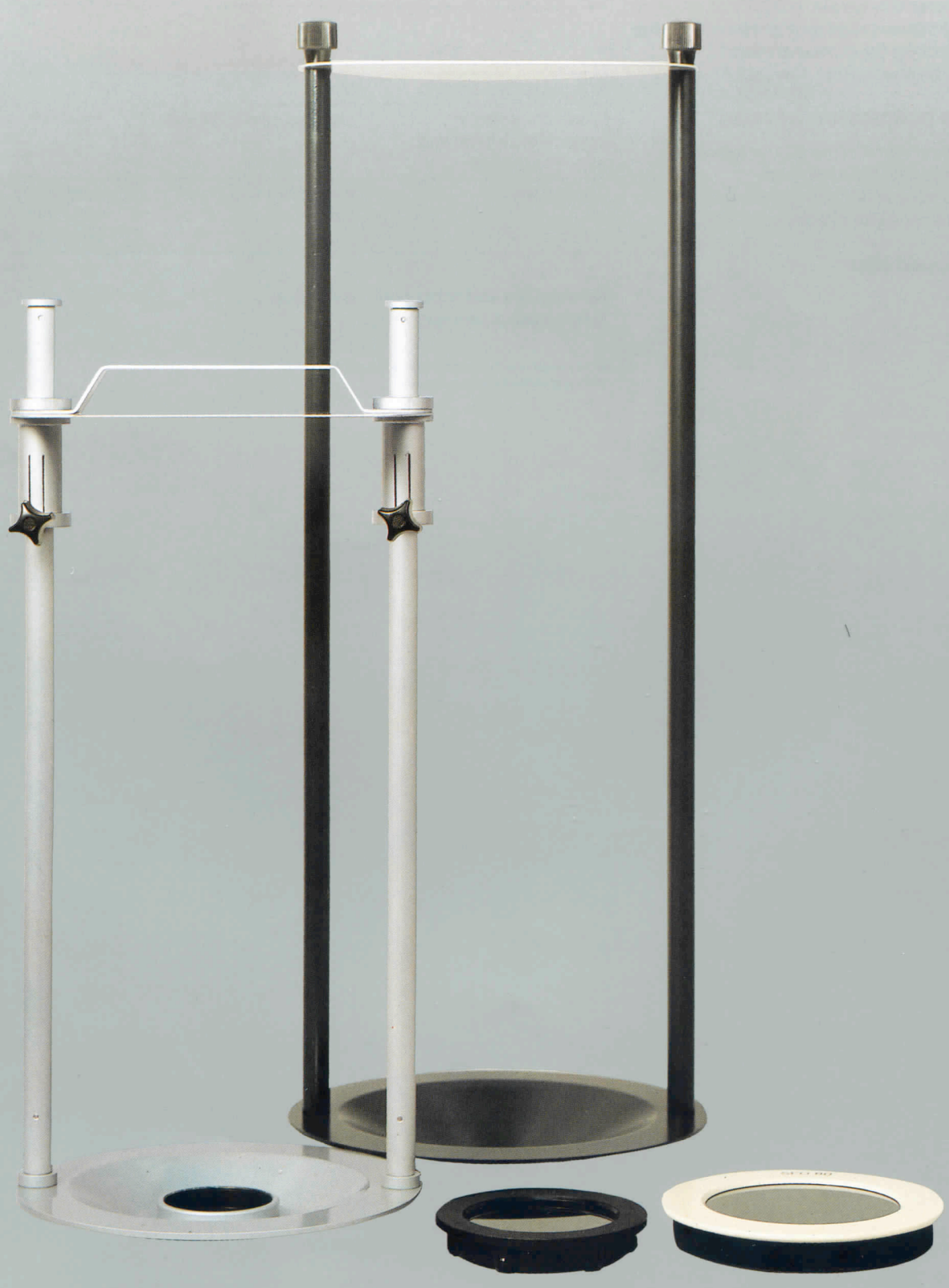
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Publication No.: 16-323-2
Ag. 29/009/86

CARL ZEISS JENA

ZEISS ASTRONOMICAL ACCESSORIES

Solar observation



ASTRONOMICAL ACCESSORIES

Solar observation

Objective solar filter

- High-quality plane-parallel plate of glass coated with a chromium layer
- Transmittance abt. 0.0001
- Additional brightness gradation with the aid of the set of neutral filters*
- To be pushed into dew cap

Sun projection screen

- Observation of the sun by eyepiece projection onto a screen
- Do not use orthoscopic (cemented) eyepieces for eyepiece projection!

* to special order

Solar filter	SFO 63/75	SFO 80/101	SFO 80/104	SFO 80/129
Free aperture	63 mm	80 mm	80 mm	80 mm
Internal diameter	75 mm	101 mm	104 mm	129 mm

Sun projection screen	V	F
Distance between projection surface and mounting flange	variable, up to 375 mm	fixed, 498 mm
Connection	thread M 44×1 on either side	clamping with adapter ring M 44, screw-in eyepiece or eyepiece sleeve

Never make solar observations without taking special precautions!

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Publication No.: 16-321-2
Ag. 29/009/86

CARL ZEISS JENA

ZEISS TELESCOPE KIT

Optical components
for a refractor
50/540



Optical components for a refractor 50/540

TELESCOPE KIT

A small telescope – made by yourself

- Telescope components for hobby astronomers, amateur telescope makers and schools
- Versatile astronomical observations
- Expandable with the aid of astronomical accessories

Optical components

- Achromatic objective 50/540 of adequate resolving power
- Two Huygenian eyepieces of 25 mm and 16 mm focal length
- Eyepiece sleeve with M 44×1 connecting thread

Suggested design

- Make a light-alloy or plastics telescope tube
- Provide inside of tube with a mat black finish
- Utilize foremost portion of tube as dew cap
- Make a focussing draw tube with M 44×1 thread for taking up the eyepiece sleeve
- Make a tube fixture with tripod bush
- Mount telescope to fixture on camera tripod with pan-and-tilt head
- Make an angle piece for the pan-and-tilt head as equatorial mounting

Technical data

Aperture	50 mm	
Focal length	540 mm	
Resolving power	2.3″	
Limiting magnitude	$11^{m}.0$	
Eyepiece focal length	16 mm	25 mm
Magnification	34×	22×
Field diameter	1°	1°47′
Diameter of exit pupil	1.5 mm	2.3 mm

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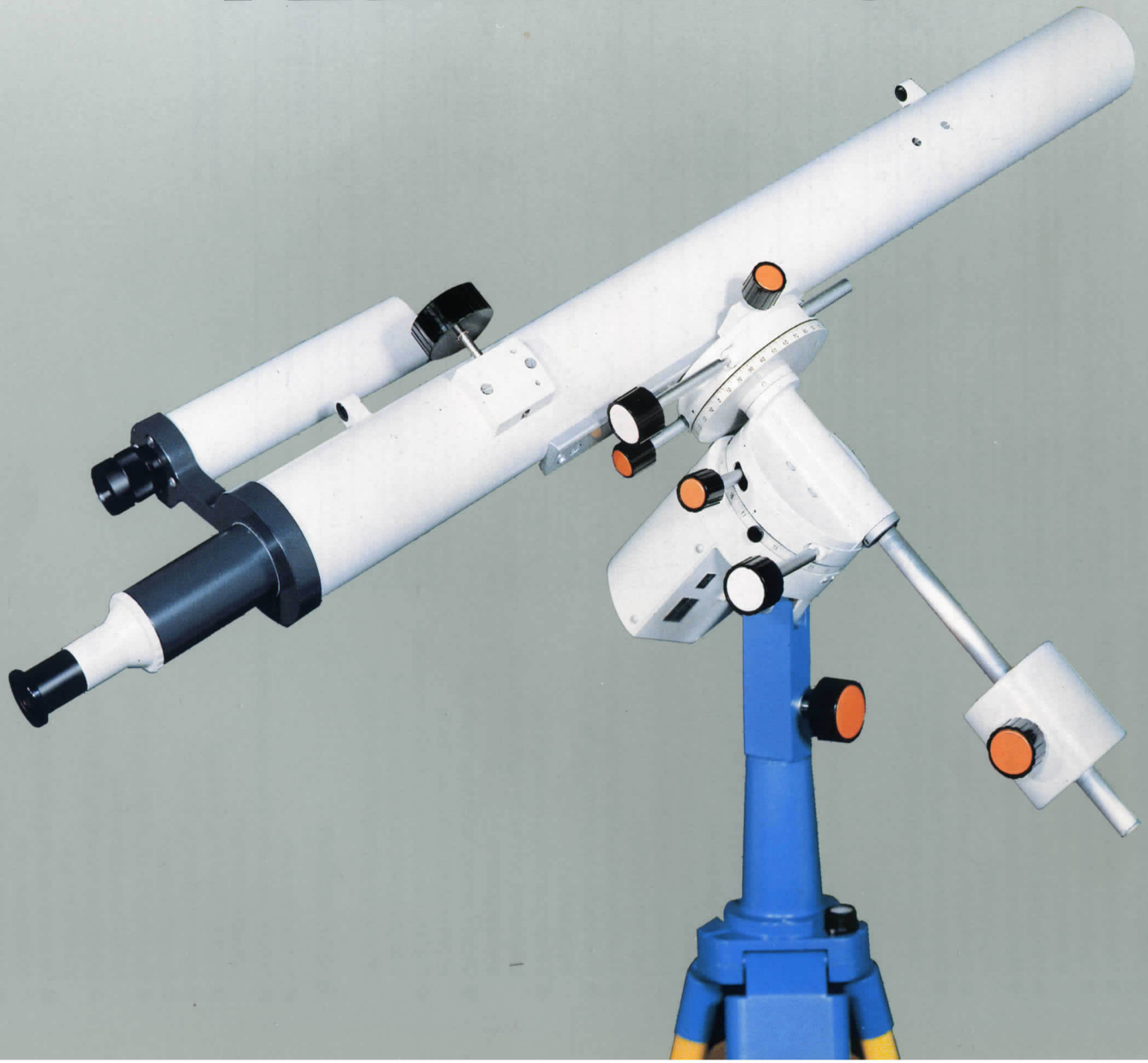
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Publication No.: 16-316-2
Ag. 29/009/86

CARL ZEISS JENA

ZEISS TELEMATOR

Refractor
63/840



Refractor
63/840

TELEMATOR

A high-performance telescope for higher demands

- Versatile with tracking motion by motor
- Telescope for schools, public observatories and amateurs
- Visual observation and photography
- Measurements in the field of spherical trigonometry
- Micrometer measurements
- Quick assembly and disassembly of telescope tube, mounting and tripod

Features

- Achromatic C-objective 63/840
- High resolving power and excellent image quality
- Internal focussing (focussing range 100 mm)
- Finder telescope
- Dovetail guide for fastening the telescope tube to the mounting and balancing it there
- Tracking motion by synchronous drive
- Fine motion for setting to the object of observation
- Exact coordinate reading from graduated circles for right ascension and declination
- Object setting facilitated thanks to variable right ascension circle
- Stable, vertically adjustable tripod with triangle sheet for stabilization and temporary deposit of minor objects

Specification

- Telescope tube
- Adjustable finder telescope, clampable in positional angle
- Intermediate ring M 44/20
- Intermediate ring M 44/60
- Eyepiece sleeve
- Eyepiece 0-10, H-25 and 0-16 C (with cross-hairs inset)
- Equatorial mounting TM with motorized tracking motion
- Balance weight on elongated declination axis
- Tripod with box level

Further accessories listed in Publication No. 16-317-2

Technical data

Telescope tube			
Aperture	63 mm		
Focal length	840 mm		
Resolving power	1.8″		
Limiting magnitude	$11^{m}.5$		
Eyepiece focal length	10 mm	16 mm	25 mm
Magnification	84×	53×	34×
Visual field	29′	48′	1°9′
Diameter of exit pupil	0.8 mm	1.2 mm	1.9 mm
Distance between mounting flange of telescope tube and image plane	40 mm to 140 mm		
Weight of telescope tube	3 kg		
Finder telescope			
Aperture	42 mm		
Focal length	150 mm		
Limiting magnitude	$10^{m}.7$		
Magnification	7.5×		
Equatorial mounting TM			
Graduated circle for declination	4× 0° to 90°, scale reading 1°		
Graduated circle for right ascension	0h to 24h, scale reading 4 min		
Mains connection	220 V/50 Hz (220 V/60 Hz; 100 V, 110 V, 127 V, 240 V/ 50 Hz/60 Hz)*		
Power consumption	4.5 VA		
Weight (with balance weight)	7 kg		
Tripod			
Maximum height	1550 mm		
Box level	2 mm bubble travel for 8′ tilt change		
Weight	5 kg		

* to special order

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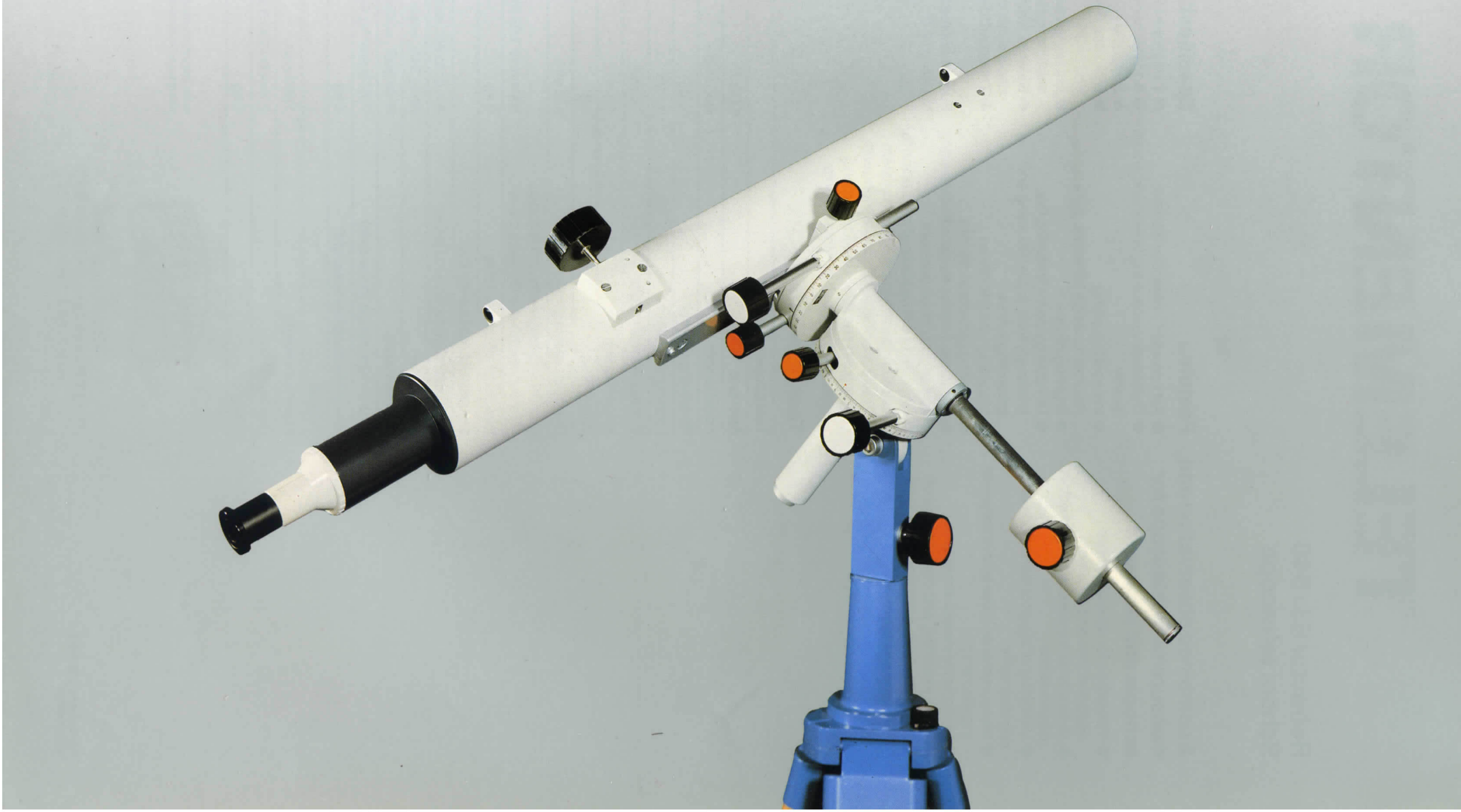
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Publication No.: 16-314-2
Ag. 29/009/86

CARL ZEISS JENA

ZEISS TELEMENTOR 2

Refractor 63/840
School telescope



TELEMENTOR 2

Refractor 63/840
School telescope

A combined observation and measurement telescope for schools and amateurs

- Telescope for schools, public observatories and amateurs
- Suited for astronomical and terrestrial observations
- Versatility of visual observations and photography
- Measurements in the field of spherical trigonometry
- Micrometer measurements
- Quick assembly and disassembly of telescope tube, mounting and tripod

Features

- Achromatic C-objective 63/840
- Outstanding resolving power and image quality
- Internal focussing (focussing range 100 mm)
- Sighting device
- Dovetail guide for fastening the telescope tube to the mounting and balancing it there
- Mounting with fine drives
- Tracking period abt. 30 min
- Graduated circles for coordinate setting and angular measurement
- Hour circle with additional graduation for azimuth reading in the horizon system
- Stable, vertically adjustable tripod with triangular sheet for stabilization and temporary deposit of minor objects

Specification

- Telescope tube
- Adapter ring M 44/80
- Eyepiece sleeve
- Eyepiece 0-16 C (with cross lines) and H-25
- Equatorial mounting T with manual tracking system
- Balance weight on elongated declination axis
- Tripod with box level

Further accessories listed in Publication No. 16-317-2

Technical data

Telescope tube		
Aperture	63 mm	
Focal length	840 mm	
Resolving power	1,8″	
Limiting magnitude	$11^{m}.5$	
Eyepiece focal length	16 mm	25 mm
Magnification	53×	34×
Visual field	48′	1°9′
Diameter of exit pupil	1.2 mm	1.9 mm
Distance between mounting flange of telescope tube and image plane	63 mm to 163 mm	
Weight of telescope tube	3 kg	
Equatorial mounting T		
Declination circle/vertical circle	4× 0° to 90°, scale reading 1°	
Hour circle	0h to 24h, scale reading 4 min	
Azimuth circle	0° to 360°, scale reading 1°	
Fine motion range (polar axis)	7,5° (tracking ≙ 30 min)	
Weight (with balance weight)	6 kg	
Tripod		
Maximum height	1550 mm	
Box level	2 mm bubble travel for 8′ tilt change	
Weight	5 kg	

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Publication No.: 16-315-2
Ag. 29/009/86

CARL ZEISS JENA

ZEISS AMATEUR TELESCOPE 100

Refractor
100/1000



AMATEUR TELESCOPE 100

Refractor 100/1000

A high-performance refractor with high-quality objective

- Telescope for schools, public observatories and advanced amateurs
- Versatility of visual observations and photography
- Observation of faint objects

Features

- Semi-apochromatic AS-objective 100/1000
- Outstanding resolving power and correction state
- Long range
- Finder telescope
- Photography with reflecting camera
- Dovetail guide for fastening the telescope tube to the mounting and balancing it there
- Tracking motion by synchronous drive
- Fine motion for setting to the object
- Exact coordinate reading from graduated circles for right ascension and declination
- Stable pillar

Specification

- Telescope tube
- Adjustable finder telescope
- Two-step eyepiece extension for focussing and adaptation of accessories
- Change device on eyepiece extension for the connection of accessories (ring mount – nominal size 45 mm)
- Change ring 45 (clampable in change device) for the connection of accessories with thread M 44×1
- Adapter rings M 44/60 and M 44/70
- Eyepiece sleeve
- Eyepiece 0-10, H-16, H-40 S (screw-in eyepiece)
- Equatorial mounting Ib with motorized tracking motion system
- Balance weights on elongated declination axis
- Mounting thread M 40×1.5 for connection of Amateur Astro-Camera and 3/8″ tripod bush for connection of photographic cameras on elongated declination axis
- Pillar

Further accessories listed in Publication No. 16-317-2

Technical data

Telescope tube			
Aperture	100 mm		
Focal length	1000 mm		
Resolving power	1.1″		
Limiting magnitude	$12^{m}.6$		
Eyepiece focal length	10 mm	16 mm	40 mm
Magnification	100×	62×	25×
Visual field	25′	33′	1°27′
Diameter of exit pupil	1.0 mm	1.7 mm	4 mm
Distance between mounting flange of changing device and image plane	36 mm to 132 mm		
Weight of telescope tube	8 kg		
Finder telescope			
Aperture	42 mm		
Focal length	150 mm		
Limiting magnitude	$10^{m}.7$		
Magnification	7.5×		
Equatorial mounting Ib			
Declination circle	4× 0° to 90°, scale reading 1°		
Right ascension circle	0h to 24h, scale reading 5 min		
Box level	2 mm bubble travel for 8′ tilt change		
Mains connection	220 V/50 Hz (220 V/60 Hz; 100 V, 110 V, 127 V, 240 V/ 50 Hz/60 Hz)*		
Power consumption	4.5 VA		
Weight (with balance weights)	20 kg		
Pillar			
Height	1400 mm		
Base diameter	740 mm		
Weight	75 kg		

* to special order

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Publication No.: 16-313-2
Ag. 29/009/86

CARL ZEISS JENA

ZEISS MENISCAS 180

Maksutov Reflecting Telescope 180/1800



Maksutov Reflecting Telescope 180/1800

MENISCAS 180

An all-round telescope of outstanding image quality

- Reflecting telescope for schools, universities and amateur study groups
- Suited for astronomical and terrestrial observations
- Usable for visual observations and photography, in particular of faint objects

Features

- Maksutov system (180 mm aperture and 1800 focal length)
- Diffraction-limited resolving power
- Large field of view, extremely low field curvature
- Secondary mirror ground to meniscus-shaped entrance lens
- Optimization of image quality by minimization of secondary mirror
- Temperature-independent image quality (main mirror of glass ceramic)
- Sensitive focussing (displacement of primary mirror)
- Finder telescope
- True-to-side, erect image (eyepiece turret with roof prism)
- Photographic observation with miniature camera and Amateur-Astro-Camera 56/250*
- Carrying handle on telescope tube
- Dovetail guide for fastening the telescope tube to the mounting and balancing it there
- Quick-change device for the rapid exchange of supplementaries
- Tracking motion by synchronous drive
- Fine motion for setting to the object
- Coordinates exactly readable from graduated circles for right ascension and declination
- Stable pillar

Specification

- Telescope tube
- Adjustable finder telescope
- Change device on telescope tube (ring mount – nominal size 51)
- Change ring 51
- Adapter rings M 68/10, M 68/20, M 68/40, M 68/80 und M 68/100
- Adapter ring M 68/M 44
- Adapter ring M 68/44-M 68
- Barlow lens 2×
- Quadruple eyepiece turret
- Orthoscopic eyepieces 0–10, 0–25, 0–16 C (with cross-lines grid)
- Huygens eyepiece H-40 S (screw-in eyepiece)
- Equatorial mounting Ib with motorized tracking motion system
- Balance weights for equatorial mounting
- Pillar

Further accessories listed in Publication No. 16-317-2

Technical data

Telescope tube				
Aperture	180 mm			
Focal length	1800 mm			
Tube length	545 mm			
Resolving power	0.64″			
Limiting magnitude	$13^{m}6$			
Field angle	1.27° (40 mm)			
Eyepiece focal length	10 mm	16 mm	25 mm	40 mm
Magnification	180×	112×	72×	45×
Visual field	13′	22′	34′	52′
Exit pupil	1.0 mm	1.6 mm	2.5 mm	4.0 mm
Distance between mounting flange of change device and image plane	20 mm to 180 mm			
Weight	15 kg			
Finder telescope				
Aperture	42 mm			
Focal length	150 mm			
Magnification	7.5×			
Equatorial mounting Ib				
Graduated circle for right ascension	0h to 24h, scale reading 5 min			
Graduated circle for declination	4× 0° to 90°, scale reading 1°			
Box level	2 mm bubble travel for 8′ tilt change			
Mains connection	220 V/50 Hz (220 V/60 Hz; 100 V, 110 V, 127 V, 240 V/ 50 Hz/60 Hz)*			
Power consumption	4.5 VA			
Weight (with balance weights)	28 kg			
Pillar				
Height	1400 mm			
Base diameter	700 mm			
Weight	75 kg			

* to special order

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Ag. 29/009/86

CARL ZEISS JENA

ZEISS 600 mm REFLECTING TELESCOPE

Cassegrain Reflecting Telescope 600/7500



600 mm REFLECTING TELESCOPE

Cassegrain Reflecting Telescope 600/7500

A classical reflecting telescope – solid and sturdy

- Basic telescope for universities, observatories and academy institutions
- Preferred for use in photometry and spectroscopy
- Excellent telescope for practical training
- Suited for site tests

Features

- Serrurier lattice tube on German mounting
- Cassegrain reflecting system 600/7500 (F/12.5)
- Primary mirror on axial, self-aligning three-point support with radial temperature compensation
- Tubular shields
- Motor-driven focussing system
- Tracking with correction via precision worm gearing with SYNFA 1 synchronous telescope drive
- Hand switch for correction of tracking, focussing and dome rotation
- Manual coarse and fine adjustment
- Coordinate reading from illuminated graduated circles (coarse division, index and fine division with vernier reading)
- Finder telescope 110/750
- Possibility of connecting supplementary equipment up to a weight of 50 kg at the telescope flange

Accessories:

- Eyepiece 0–10, 0–12.5, 0–16, 0–25, H–40 S (screw-in eyepiece)
- Quintuple eyepiece turret
- UAGS Universal Astronomical Grating Spectrograph*
- Position-angle rotating device*
- SYNFA control unit* for synchronous telescope drive with quartz-stabilized variable frequency

* to special order

Technical data

Optical system	
Free aperture	600 mm
Focal length of primary mirror	2400 mm
Equivalent focal length	7500 mm
Diameter of secondary mirror	183 mm
Visual field	20′
Finder telescope	
Free aperture	110 mm
Focal length	750 mm
Visual field	1.4°
Reading accuracy of coordinates	
Hour angle	2 s
Declination	1′
Minimum diameter of dome	5 m
Mains connection	220 V/50 Hz (60 Hz), 80 VA
Weight of telescope tube	600 kg
Total weight	2760 kg

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Publication No.: 16-301-2
Ag. 29/009/86

CARL ZEISS JENA

ZEISS SYNFA 1

Synchronous telescope drive



Synchronous telescope drive

SYNFA 1

Drive system for small and medium-sized telescopes

- Constant tracking motion
- Very sensitive motion for correction of tracking and fine setting to the object

Features

- Swivelling output head for adaptation to the desired driving point of the telescope
- To be set up on the northern or southern hemisphere (swivelling the output head by 180°)
- Tracking motion by synchronous motor
- Very sensitive motion by Ferraris motor
- Simultaneity of very sensitive motion and tracking motion
- Power supply and control relays for Ferraris motor
- Possibility of connecting hand switch

Accessories *

- Power pack for voltage supply (6 V a. c. and 24 V d. c.) with control relays for dome rotation
- Hand switch for controlling the very sensitive motion and dome rotation
- SYNFA control unit for the quartz-stabilized power supply of the synchronous motor with variable frequency for the observation of objects with proper motion

* to special order

Technical data

Speed at output shaft	
Tracking motion	10 min^{-1}
Very sensitive motion	10 min^{-1} ±3%/±7%/±10%
Dimensions	222 mm × 216 mm × 296 mm
Mains connection	220 V/50 Hz (60 Hz), 80 VA; 24 V d. c., 5 VA
Weight	15 kg

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CARL ZEISS JENA

ZEISS COUDE REFRACTOR

Coudé
Refractor
150/2250



COUDE REFRACTOR

Coudé Refractor 150/2250

A solid refractor with fixed observation tube

- Basic equipment for public observatories, universities and study groups
- Excellently suited for training and demonstration purposes for a major number of persons, also for amateurs
- Refractor for visual, photographic and photometric observations

Features

- Semiapochromatic AS-objektive of high image quality (150 mm aperture and 2250 mm focal length)
- Compact construction with Coudé system (two reflecting mirrors)
- Modified German mounting
- Observation convenient thanks to fixed focus
- Focussing through eyepiece extension at the lower end of the polar axis
- Coarse and fine setting by hand
- Tracking by SYNFA 1 synchronous telescope drive
- Motorized ultra-fine motion for correction of tracking and setting to the object
- Hand switch for the control of ultra-fine motion and dome rotation
- Coordinate reading from graduated circles for hour angle, right ascension and declination
- Quick-change device for the rapid exchange of accessories
- Astro-cameras for taking photographs of sun, moon and star fields

Specification

Basic equipment

- Tube mounting with AS-objective 150/2250
- Pillar mounting IV
- SYNFA-1 synchronous telescope drive with power pack
- Hand switch
- Intermediate piece, 40 mm
- Interchangeable rings
- Eyepiece sleeve
- Orthoscopic eyepieces O-6, O-25, O-16 C (with cross-lines inset)
- Huygens eyepiece H-40 S (screw-in eyepiece)

Extended equipment
includes basic equipment with:

- Attachment with inclined binocular tube
- Quintuple eyepiece turret
- Orthoscopic eyepieces O-10, O-40 S
- Huygens eyepiece H-63 S (screw-in eyepiece)
- Barlow lens 1.3×
- Solar filter SFO-150
- Set of neutral filters (5 steps)
- Sun projection screen C
- Astro-cameras 60/270 (plate format 6 cm × 9 cm) with holders and balance weights
- Camera for sun and moon photography (plate format 9 cm × 12 cm) with change ring
- Monitor eyepiece attachment

Technical data

Aperture	150 mm				
Focal length	2250 mm				
Diameters of plane mirrors	160 mm, 190 mm				
Resolving power	0.77″				
Limiting magnitude	$13^{m}.2$				
Eyepiece focal length	6 mm	10 mm	16 mm	25 mm	40 mm
Magnification	375×	225×	141×	90×	56×
Visual field	7′	11′	18′	28′	38′
Exit pupil	0.4 mm	0.7 mm	1.1 mm	1.7 mm	2.7 mm
Graduated circles for hour angle and right ascension	0h to 24h, scale reading 10 min				
Graduated circle for declination	4× 0° to 90°, scale reading 10′				
Mains connection	220 V/50 Hz (60 Hz), 80 VA				
Minimum dome diameter	3 m				
Weight	670 kg				

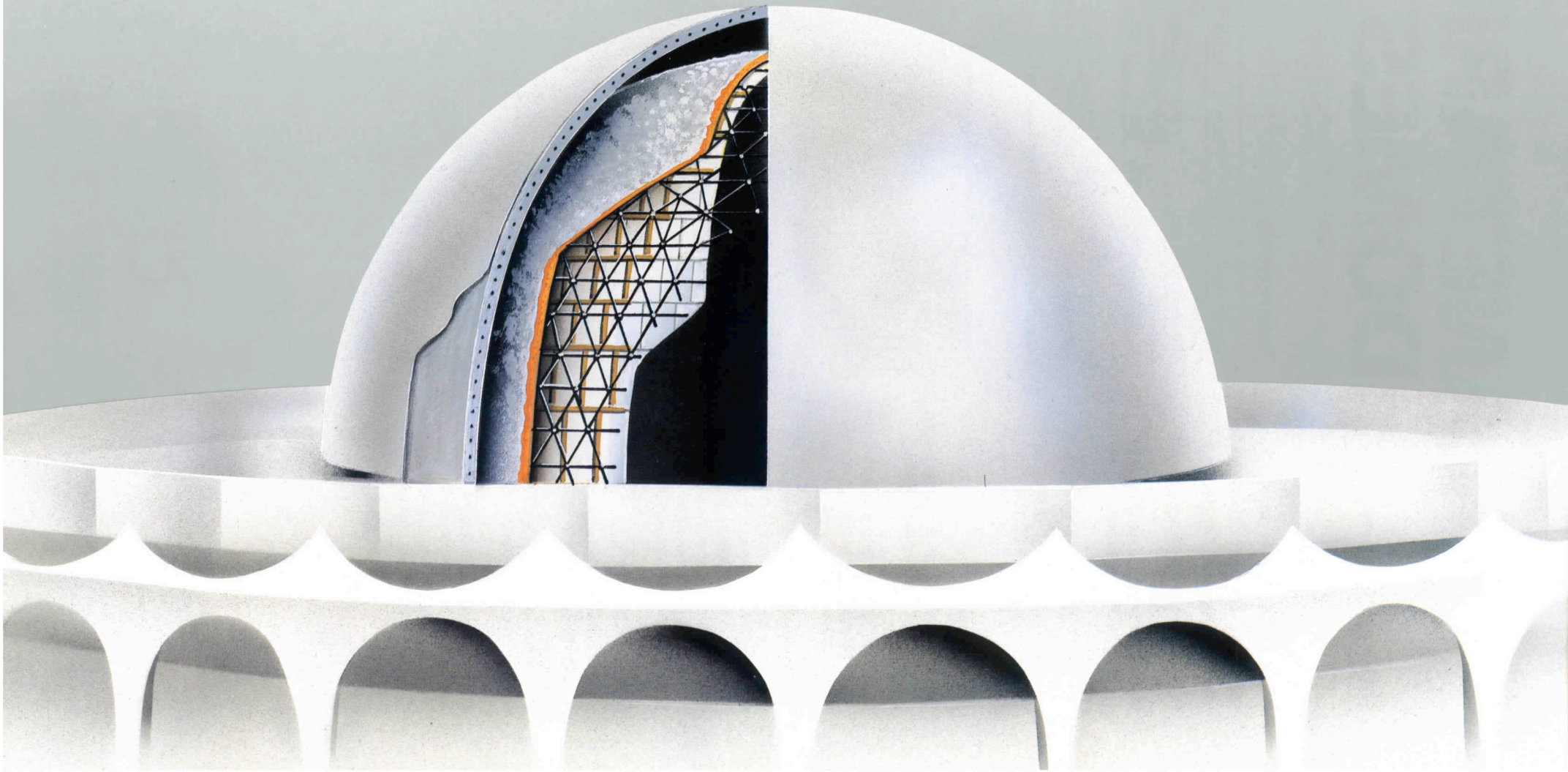
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CARL ZEISS JENA

ZEISS PLANETARIUM DOMES



PLANETARIUM DOMES

Projection domes

Geometrically true, semi-spherical domes for planetarium projections

- Installation into existing rooms of adequate size
- Central constructional body of a planetarium building to be newly erected

Rod-network domes

Self-supporting projection domes of 10 m, 12.5 m, 15 m, 17.5 m, 20 m or 23 m diameter.

Features

- Rod network as carrier for the projection surface and for sound-absorbing material
- Dull white, perforated pure aluminium sheets (hole diameter 1.6 mm, hole-to-hole spacing 3.2 mm) as projection surface
- Black jute fabric as light-absorbing surface on the outside of the network
- Highly-brilliant projections (dome reflection factor 80%)
- Adequate room acoustics (reverberation time <1 s)
- Firm location of dome on concrete ring

Specification

- Rod network (flat steel rods, rosettes)
- Supporting plates with welded holding devices
- Ledge holders of flat steel
- Wooden ledges as support for projection surface
- Black jute fabric, impregnated
- Projection surface (anodized, perforated aluminium sheets)
- Anti-corrosive paint, dull white latex paint

Technical data

Projection dome	10 m	12.5 m	15 m	17.5 m	20 m	23 m
Diameter of rod network (in mm)	10,300	12,800	15,300	17,800	20,478	23,550
Diameter of projection surface (in mm)	10,000	12,500	15,000	17,500	20,000	23,000
Weight without sound insulation (in kg)	3500	4550	6750	8700	9750	11,800
Seating capacity*	60 to 100	100 to 190	140 to 250	180 to 300	200 to 410	220 to 450

* Capacity depends on dimensions and arrangement of seats

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CARL ZEISS JENA

ZEISS SKYMASTER

ZKP-2
Small Planetarium



SKYMASTER

ZKP-2
Small Planetarium

of small size and high performance

- Excellent projection planetarium for popular-science performances in public observatories and museums as well as in tourist and recreation centres
- Highly efficient aid for training in astronomy and navigation
- Dome auditoriums with a seating capacity for 30 to 100 persons

Features

- Scientifically exact, true-to-nature and impressive representations
- Natural and brilliant starry sky
- Three-axis mounting
- High-quality optical systems
- Connection possibility for projectors producing special effects
- Easy operation from control desk set up separately
- Electromotive drives for all motions
- Automatic performances

MAIN MOTIONS
- Diurnal motion
- Annual motion
- Precessional motion
- Polar altitude motion
- Vertical circle motion

THE WORLD OF THE FIXED STARS
- 5800 fixed stars up to magnitude $6^{m}.0$
- Six star clusters and nebulae
- Milky Way
- Constellation figures (special projector required*)

OUR SOLAR SYSTEM
- Sun with aureole and gegenschein
- Moon with surface details and phase changes
- Mercury, Venus, Mars, Jupiter and Saturn
- Comet (special projector required*)

DIDACTIC PROJECTIONS
- System of astronomical auxiliary lines, scales and markings

EFFECTS
- Room and effect lighting
- Heliocentric solar system*
- Jupiter with its four brightest moons circling around*
- Shooting stars*
- Satellite*

* to special order

Technical data

Diameters of projection dome	6 m, 8 m (preferably), 10 m
Mains connection	
Operating voltage	220 V ±5%
Mains frequency	50 Hz (60 Hz)
Maximum power consumption	0.5 kVA
Installation requirements	
Room temperature	+15°C to +30°C
Relative air humidity	≤75%
Planetarium projector	
Diameter of basic ring	780 mm
Height of horizon above floor	2050 mm
Weight	150 kg
Control desk	
Height	700 mm
Width	1100 mm
Weight	100 kg

In the interest of technical progress we reserve the right to change specifications of our products.

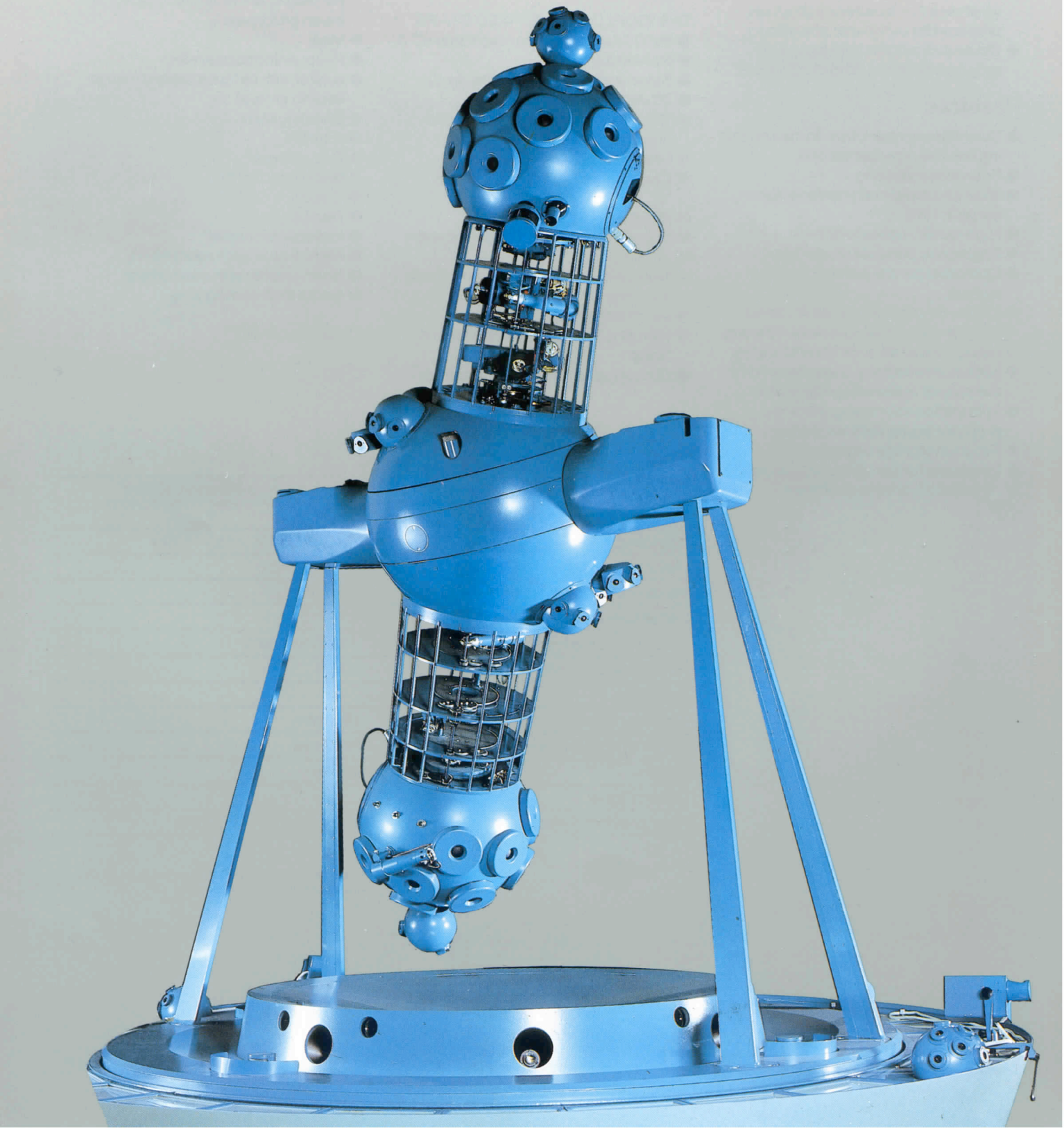
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CARL ZEISS JENA

ZEISS SPACEMASTER

RFP DP 3 Spaceflight Planetarium



SPACEMASTER

RFP DP 3 Spaceflight Planetarium

An attraction for your town

- Computer-controlled projection planetarium as popularized centre of education, entertainment and culture
- Versatile possibilities of application up to spaceflight training
- A maximum of operational comfort – whether a live lecture or a program prepared for automatic operation
- Dome auditoriums with a capacity ranging between 100 and 300 seats

Features

- Scientifically exact, true-to-nature and impressive representations
- Four-axis mounting
- Slow and rapid main motions (setting range 1:100)
- High-quality optical systems
- Ergonomic principle of operation
- Computer control with DP 3 control system
- Modes for manual operation, direct programming (real-time teach-in) and replay as well as override and mixing
- Maximum accuracy of reproduction in the case of automatic program run
- Information about program and projector equipment via display
- Program storage on diskettes
- Interfaces for peripheral equipment
- Application-oriented software

MAIN MOTIONS
- Diurnal motion
- Annual motion
- Precessional motion
- Polar altitude motion
- Azimuth motion
- Vertical circle motion

THE WORLD OF THE FIXED STARS
- 8900 fixed stars up to magnitude $6^{m}.5$
- Scintillation
- Sirius (special projector required)
- 20 star clusters and nebulae
- Variable stars and novae (special projector required)
- Milky Way
- Constellation figures

OUR SOLAR SYSTEM
- Sun with aureole and gegenschein
- Solar eclipses
- Moon with surface details and phase changes
- Lunar eclipses
- Mercury, Venus, Mars, Jupiter and Saturn
- Comet (special projector required)

DIDACTIC PROJECTIONS
- System of astronomical auxiliary lines, graduated networks, scales and markings

EFFECTS
- Panorama projection with town silhouette, antarctic landscape and moon panorama
- Map
- Heliocentric solar system
- Jupiter with its four brightest moons circling around
- Shooting stars
- Satellite
- Polar aurora
- Geocentric earth
- Clouds
- Rainbow*
- Heliocentric comet*
- Mars-Saturn with zoom effect*
- Earth-Jupiter with zoom effect*
- Dome and room lighting

* to special order

Technical data

Diametres of projection dome	12.5 m, 15 m (preferably), 17.5 m
Mains connection	
Operating voltage	3 × 220/380 V, +15 V/−10 V
Mains frequency	50 Hz (60 Hz)
Maximum power consumption	8.5 kVA
Installation requirements	
Room temperature	+15°C to +30°C
Relative air humidity	≤75%
Projector	
Diameter of substructure	1812 mm
Height of horizon above floor	2200 mm
Weight	900 kg
Control desk	
Floor space required	abt. 2800 mm × 1500 mm

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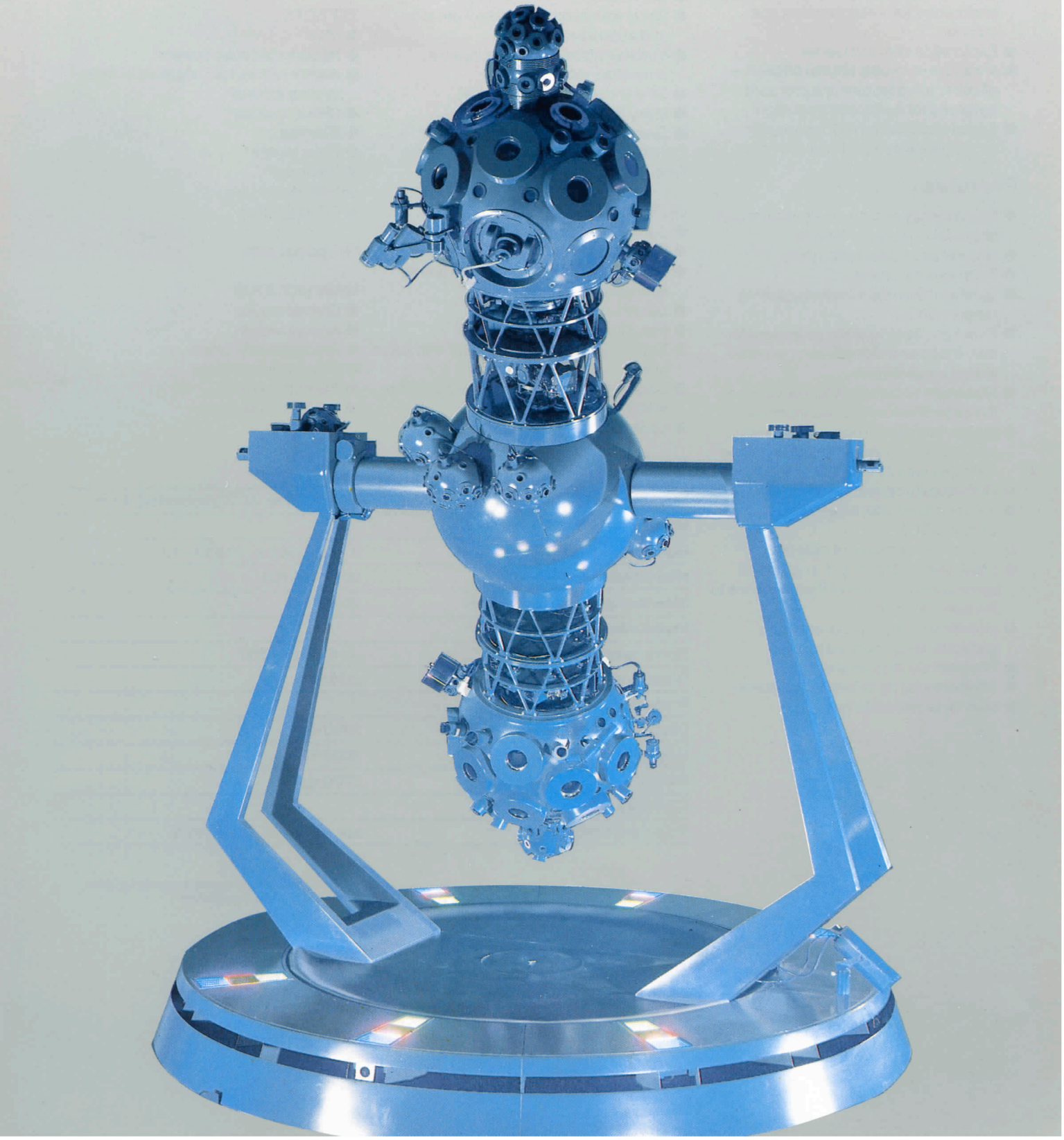
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CARL ZEISS JENA

ZEISS COSMORAMA

ZGP Large Planetarium



COSMORAMA

ZGP Large Planetarium

A travel through time and space

- Computer-controlled projection planetarium for centres of popularized performances, entertainment and culture
- Exploration of the universe
- A maximum of operational comfort – whether a live lecture or a program prepared for automatic operation
- Dome auditoriums with a capacity ranging between 220 and 450 seats

Features

- Scientifically exact, true-to-nature and impressive representations
- Natural and brilliant starry sky
- Four-axis mounting
- Slow and fast main motions (setting range 1:100)
- Exact positioning of the projectors for sun, moon and planets with patented planetary gear drive
- Maximum accuracy of reproduction in the case of automatic program run
- Modes for manual operation, direct programming (real-time teach-in) and replay as well as override and mixing
- High-quality optical systems
- Six-lens fixed-star projectors COSMOGON
- Ergonomic principle of operation
- Electronic brightness change of the planets as a function of their distance to the sun and earth
- Information about program and projector equipment via display
- Program storage on diskettes
- Interfaces for peripheral equipment
- User-oriented software

THE WORLD OF THE FIXED STARS

- 9110 fixed stars up to magnitude $6^{m}.6$
- 21 bright stars (special projectors required)
- Scintillation
- Sirius with demonstration of parallax and aberration motions
- Variable stars and novae (special projectors required)
- 28 star clusters and nebulae
- Milky Way
- Constellation figures: projectable individually, in groups or all at the same time

OUR SOLAR SYSTEM

- Sun with aureole and gegenschein
- Solar eclipses and Venus
- Moon with surface details and phase changes
- Lunar eclipses
- Mercury, Venus and Mars
- Earth and Jupiter (alternately) with zoom effect
- Saturn in two different views with zoom effect
- Comet

DIDACTIC PROJECTIONS

- System of astronomical auxiliary lines, graduated networks, scales and markings

EFFECTS

- Map
- Heliocentric solar system*
- Jupiter with its four brightest moons circling around*
- Shooting stars*
- Satellite
- Polar aurora*
- Rainbow*
- Heliocentric comet*
- Effect lighting

* to special order

MAIN MOTIONS

- Diurnal motion
- Annual motion
- Precessional motion
- Polar altitude motion
- Azimuth motion
- Vertical circle motion

Technical data

Diameters of projection dome	17.5 m, 20 m, 23 m (preferably), 25 m
Mains connection	
Operating voltage	3 × 220/380 V, +15 V/−10 V
Mains frequency	50 Hz (60 Hz)
Maximum power consumption	20 kVA
Installation requirements	
Room temperature	+15°C to +30°C
Relative air humidity	≤75%
Projector	
Diameter of substructure	3140 mm
Height of horizon above floor	3000 mm
Weight	2700 kg
Control desk	
Floor space required	abt. 2000 mm × 2100 mm

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CARL ZEISS JENA

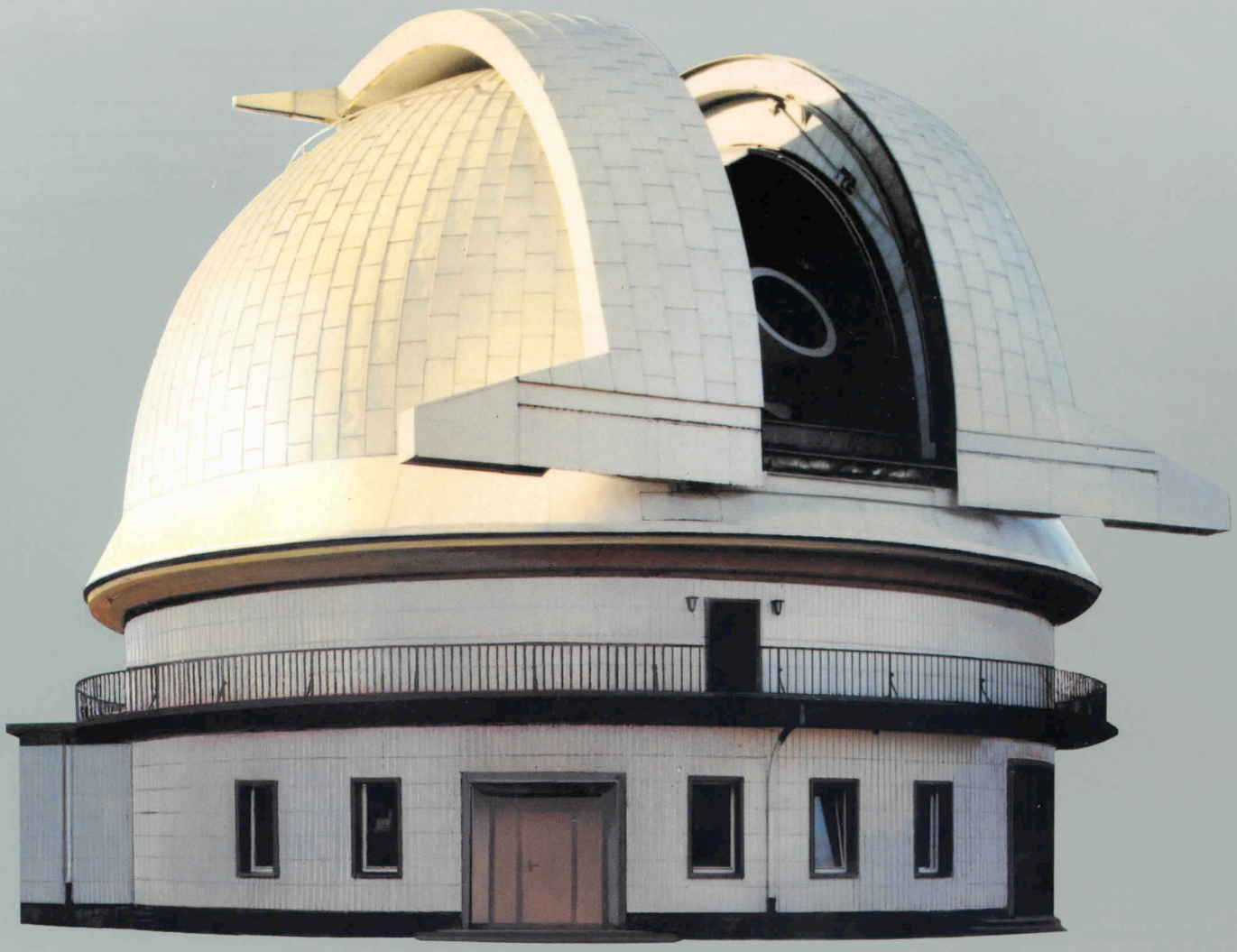
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CARL ZEISS JENA

ZEISS OBSERVATORY DOMES

Protective buildings for telescopes



OBSERVATORY DOMES

Protective buildings for telescopes

Rotary domes for the reliable protection of astronomical observation equipment against atmospheric influences

3-m observatory dome

for observation telescopes with a maximum tube length of 2 m

Features

- Wooden skeleton with wooden planking and aluminium covering, basic ring of steel
- Slit closure by two laterally movable slit shutters
- Easy-motion dome rotation (ball-bearing rollers on circular metal rail)
- Dome rotation and slit shutter motion by hand
- Labyrinth packing at dome slit
- Lightning protector

5-m observatory dome

for observation telescopes with a maximum tube length of 3 m

Features

- Wooden skeleton with wooden planking and aluminium covering, basic ring of steel
- Slit closure by two laterally movable slit shutters
- Easy-motion dome rotation (ball-bearing rollers on circular metal rail)
- Dome rotation in both directions by electromotive drive or handwheel
- Control of dome rotation through pushbuttons on switch box or through telescope hand switch
- Slit shutter motion by handwheel
- Labyrinth packing at dome slit
- Lightning protector

Technical data

	3-m dome	5-m dome
Inner diameter	3.00 m	5.00 m
Circular rail diameter	3.25 m	5.29 m
Inner slit width	1.00 m	2.00 m
Weight	700 kg	3200 kg
Mains connection	–	220/380 V three phases, 50 Hz
Power consumption	–	1 kVA

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