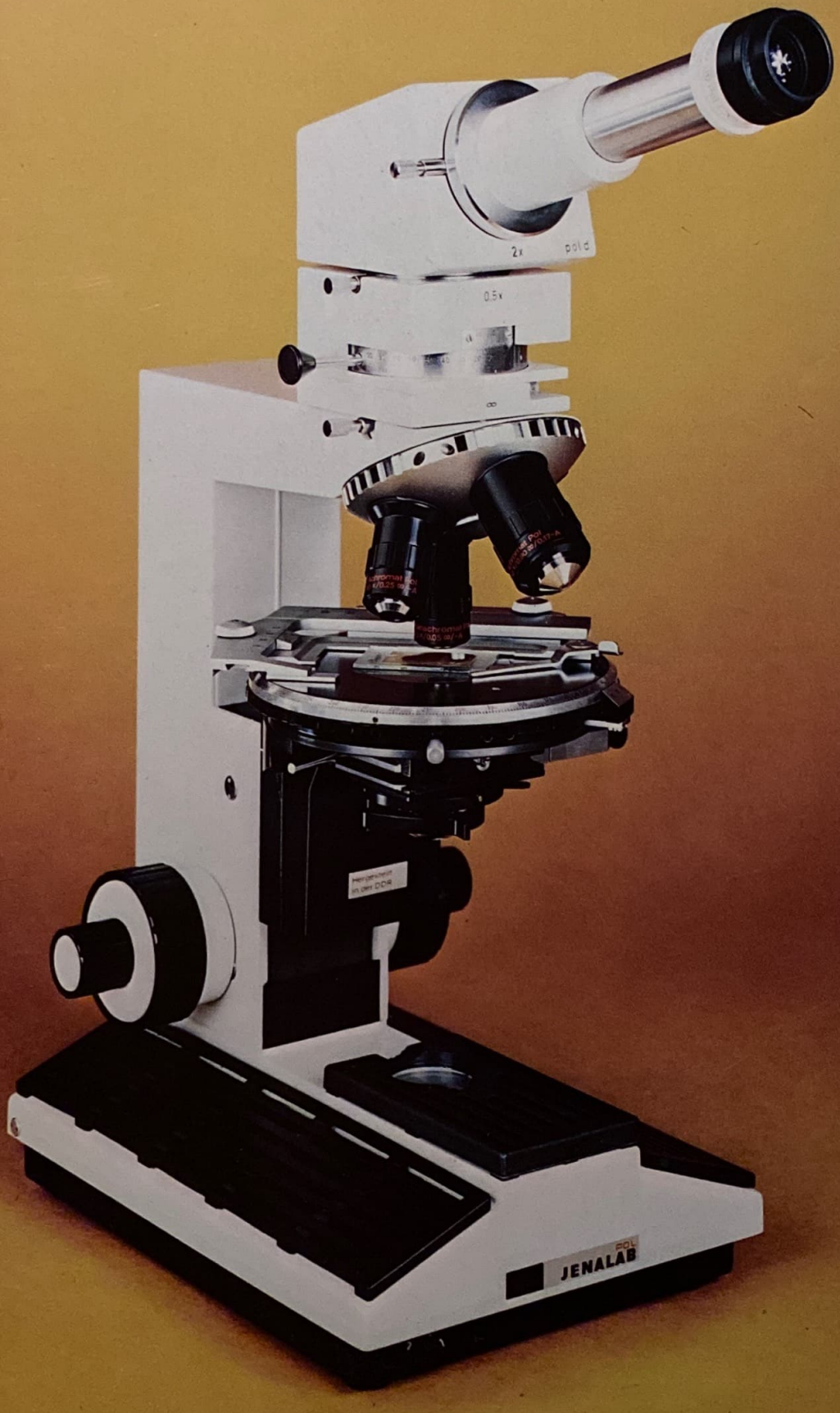
CARL ZEISS JENA

ZEISS JENALAB pol

Polarizing Microscopes

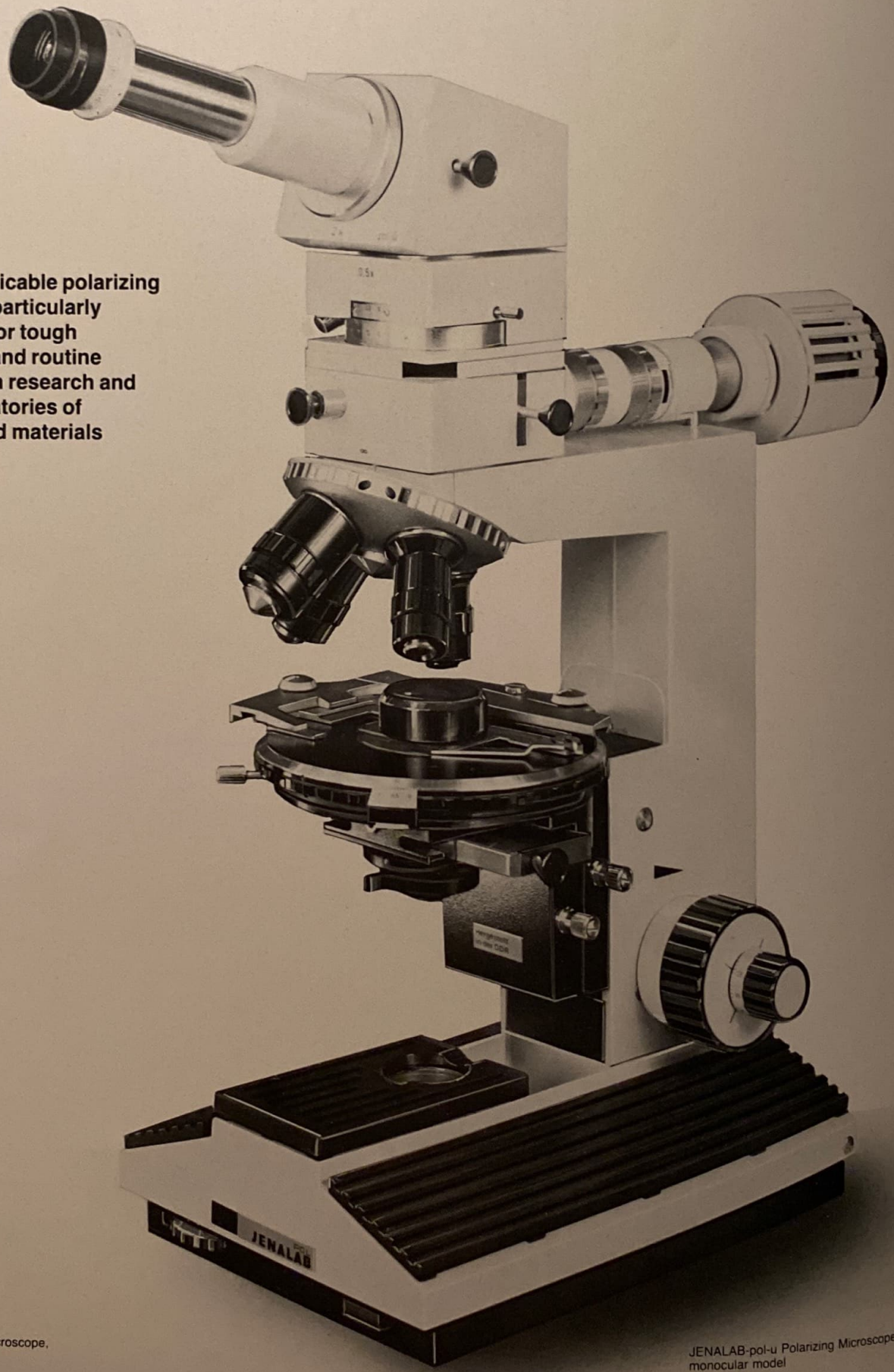


Polarizing microscopes of the new generation of JENA MICROSCOPES for education and routine

JENALAB pol u

monocular model for transmitted and incident light

Universally applicable polarizing microscopes – particularly recommended for tough classroom use and routine investigations in research and industrial laboratories of geosciences and materials sciences



JENALAB-pol-d Polarizing Microscope, monocular model

JENALAB-pol-u Polarizing Microscope, monocular model

Novel concept
Infinity corrected objectives – the basis of efficient standard outfits and versatile extensibility through accessories

Intermediate polarizing tubes for transmitted and incident light with measuring analyzer and fixed or rotary compensators arranged in the telecentric path of rays as well as improved incident light illumination after KOEHLER

Angular polarizing tubes
for ergonomic connection of monocular or binocular heads, firmly adjusted Bertrand lens

15° viewing angle for convenient posture of head and body; Bertrand lens with fixed stop for selecting small crystals in conoscopy and rotary conoscopy; photomicrography with special photo/viewing head

New optics
Achromats (A) and planachromats (PA) "pol" of the new generation of objectives with essentially improved performance; user friendly universal condenser

Standard outfits comprising PA 2.5×, A 10×, A 50× objectives and GF-P 10× (18) eyepiece(s)
Immersible N.A. 1.25 condenser "pol" with lowpower lens
Optional objectives:
PA 20× and oil immersion type A HI 100× for covered specimens in transmitted light

Incident light outfit
Coming as standard with outfits "u" (= universal, i.e. transmitted and incident light), microscope magnifications of up to 500×

KOEHLER illumination with 25W halogen lamp and incident light illuminator
Outfits "u" containing in addition A 50× objective for uncovered specimens
Optionally avaiable GF-PA VI 12.5×/0.33 objective for various immersion agents and oil immersion objectives PA HI 25×/0.65 and GF-PA HI 50×/1.0

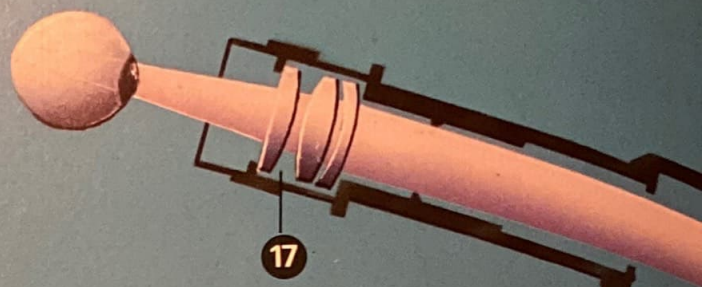
Accessories
Measuring compensator, crystal rotating device, UT-124 universal rotary stage, outfits for phase contrast, measuring and counting and photomicrography

Optionally available compensators:
0...4 λ wedge compensator,
0...6 λ and 0...130 λ tilt compensators,
λ/8 rotary compensator
Crystal rotating device with spindle stage, threeaxial universal stage, phase contrast equipment with 10× and 40× achromats

JENALAB-pol-d transmitted light outfits
Applications
– in the classical field of geosciences for the determination of minerals and rocks
– in technical petrography for the determination of minerals and textures
– in chemical industry, e. g. for monitoring of fertilizer production and in pharmaceutical chemistry
– in the growth of synthetic crystals for the determination of their optical properties
– in the field of environmental research for phase and quantity analysis of dust
– in plastography for the examination of thin sections, injection moulded plastics and high-polymeric fibres and films
– in specialized fields of medicine, e. g. in urology for the investigation of urinary calculi

JENALAB-pol-u transmitted/incident light outfits
Additional applications
– in the exploration of mineral deposits for the analysis of smeltable ore minerals
– in building materials industry, e. g. for the examination of cement clinker thin sections
– in coal petrography for the determination of organic and inorganic constituents
– in metallography for special investigations, e. g. of nonmetallic inclusions, or for contrasting

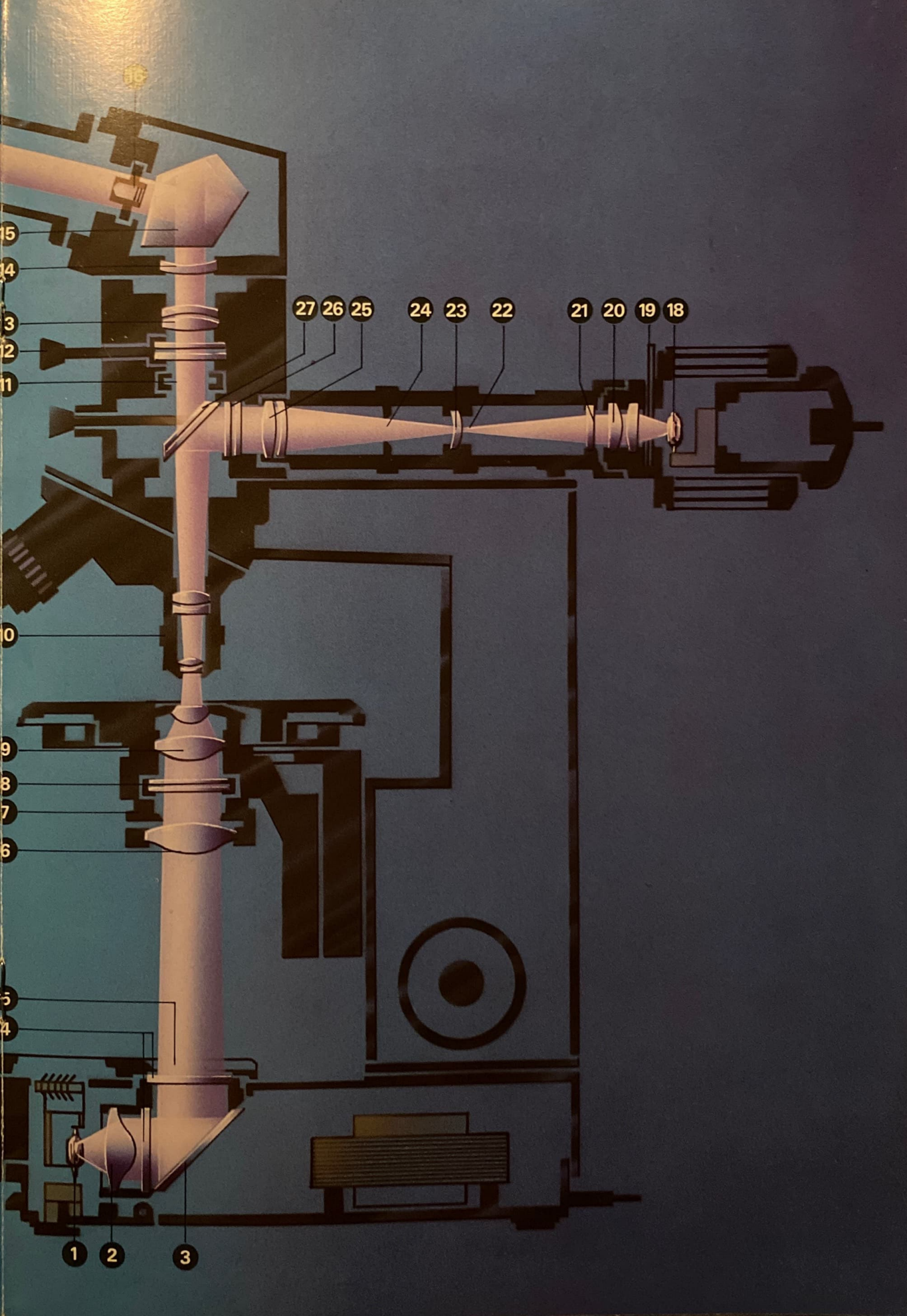
Schematic sectional view



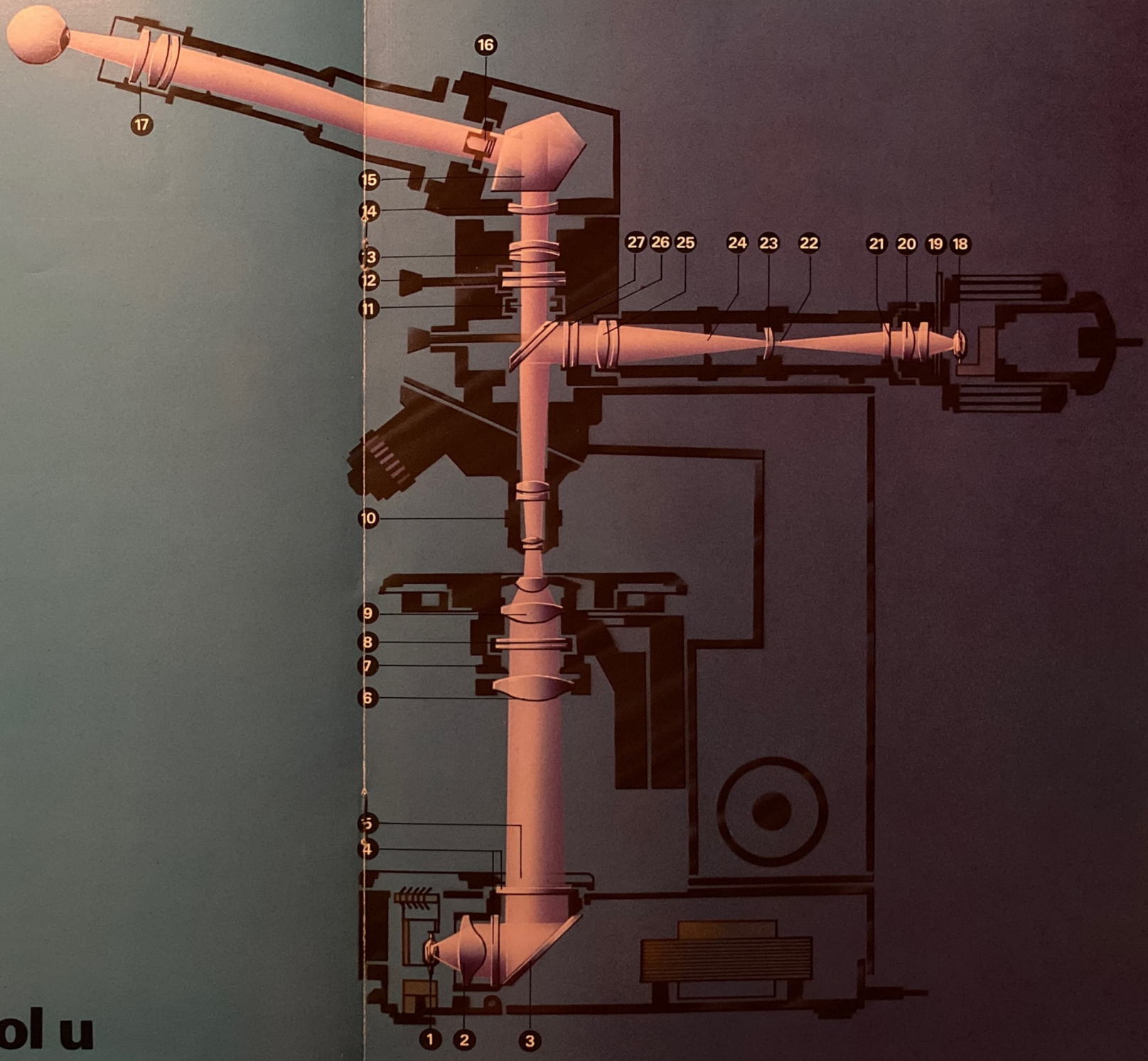
Transmitted light path 1...17
Incident light path 18...27 and 10...17

1 6V 20W halogen lamp
2 aspherical collector
3 reflecting mirror
4 diffusing screens (ground glasses)
5 filter mout, 32 mm dia.
6 swing-out low-power lens
7 aperture diaphragm
8 rotary polarizer slide or annular stop slide
9 N.A. 1.25 universal condenser "pol"
10 achromatic objective "pol" or "ph" for phase contrast
11 compensator slot
12 rotary analyzer slide
13 0.5× achromatic tube lens
14 2× tube length correction lens
15 15° pentaprism
16 Bertrand lens slide
17 standard eyepiece GF P 10× (18) pol
18 6V 25W halogen lamp
19 slot for ground glass
20 two-lens collector
21 filter mount for heat-absorbing and colour filter
22 aperture diaphragm
23 illumination lens
24 field diaphragm
25 achromat
26 fixed polarizer slide
27 incident light illuminator

JENALAB pol u


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Schematic sectional view



Transmitted light path 1...17
Incident light path 18...27 and 10...17

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22 aperture diaphragm
23 illumination lens
24 field diaphragm
25 achromat
26 fixed polarizer slide
27 incident light illuminator

JENALAB pol u

JENALAB-pol – versatilely extensible

Compensators
Compensators for the internationally used slot size of
20 mm × 6 mm
The simple full wave and quarter wave compensators for qualitative evaluation are standard; full wave and quarter wave compensators in sub-parallel position are optionally available

Wedge compensator
The 0...4 λ wedge compensator serves for the estimation for path differences and for the determination of optical properties in conoscopy.

Measuring compensators
As measuring compensators the 0..6 λ and 0..130 λ EHRINGHAUS tilting compensators and the λ/8 rotary compensator for small path differences are recommended for use in conjunction with the "1J" filter set (interference filters).
By using our RETARMET-2 Digital Compensator the work with the measuring compensators can be decisively rationalized, considerably improved ergonomically and extended to dynamic measurements (e. g. of temperature dependencies). When retrofitting this system the graduated drums are exchanged for the optoelectronic angle measuring device. Direct display or print-out of path difference averages – no tedious reading from scales and interpolation of tabulated values!



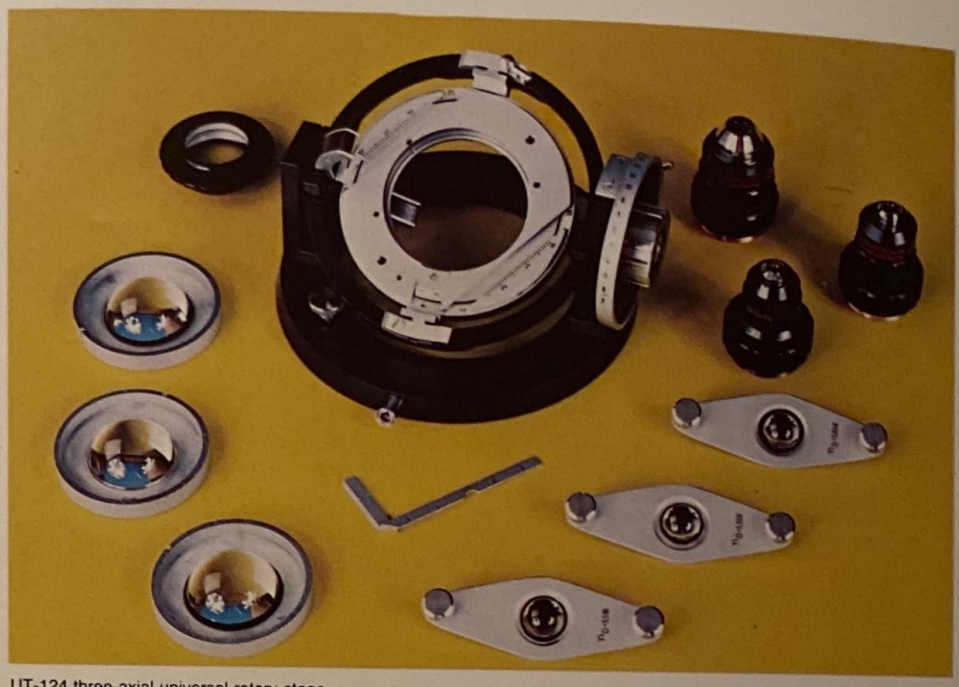
JENALAB-pol-d Polarizing Microscope
with RETARMET-2



Full wave compensator, subparallel
quarter wave compensator, subparallel
wedge compensator, 0...4 λ
λ/8 rotary compensator
tilting compensator 0...6 λ, after Ehringhaus

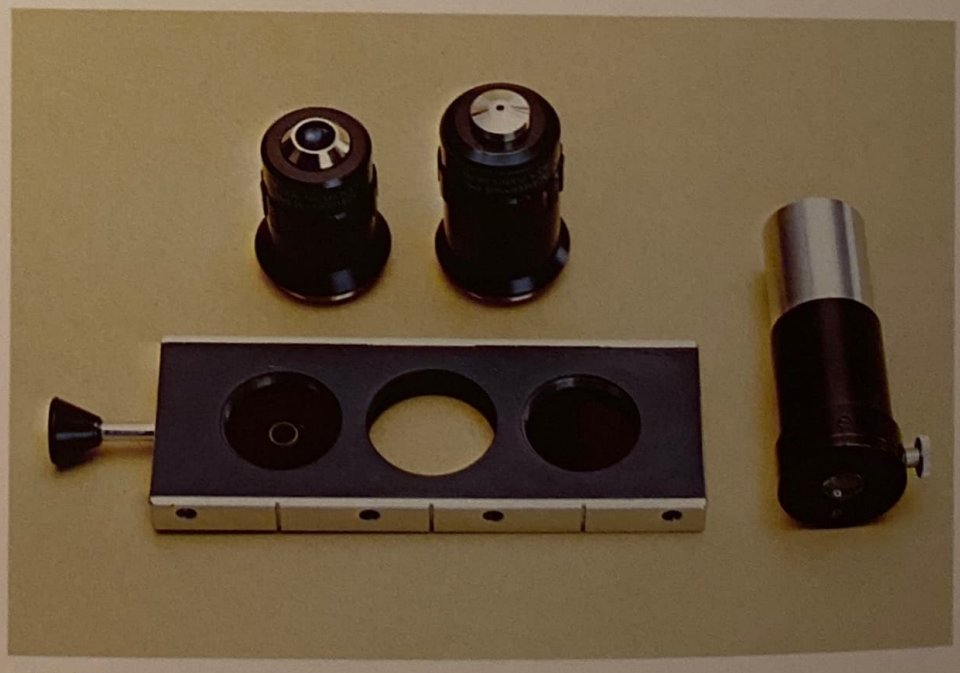
UT-124 Universal rotary stage
The use of the UT-124 three-axial universal rotary stage (in preparation) in special courses helps intensifying the training of mineralogists and geologists on polarizing microscopes. The UT-124 stage is suited also for routine use in structure analysis of rock thin sections and for the classical field of plagioclase determinations after Federow.

Crystal rotating device
The crystal rotating device with the UT-4 spindle stage is designed for the investigation of small crystals and crystal fractions. It can be used for refractive index determinations in cells by the immersion method and for orientation determinations by the extinction method.



UT-124 three-axial universal rotary stage, with accessories

Phase contrast equipment
The phase contrast equipment (in preparation) comprises two phase contrast objectives and a slide with centrable annular stops which is used in place of the polarizer slide in conjunction with the N. A. 1.25 standard condenser. In phase contrast, minor refractive index differences can be distinguished more easily than by the conventional method with the Becke line. Thus, the sophistication of the immersion method for refractive index determinations is a significant application in the field of geosciences.



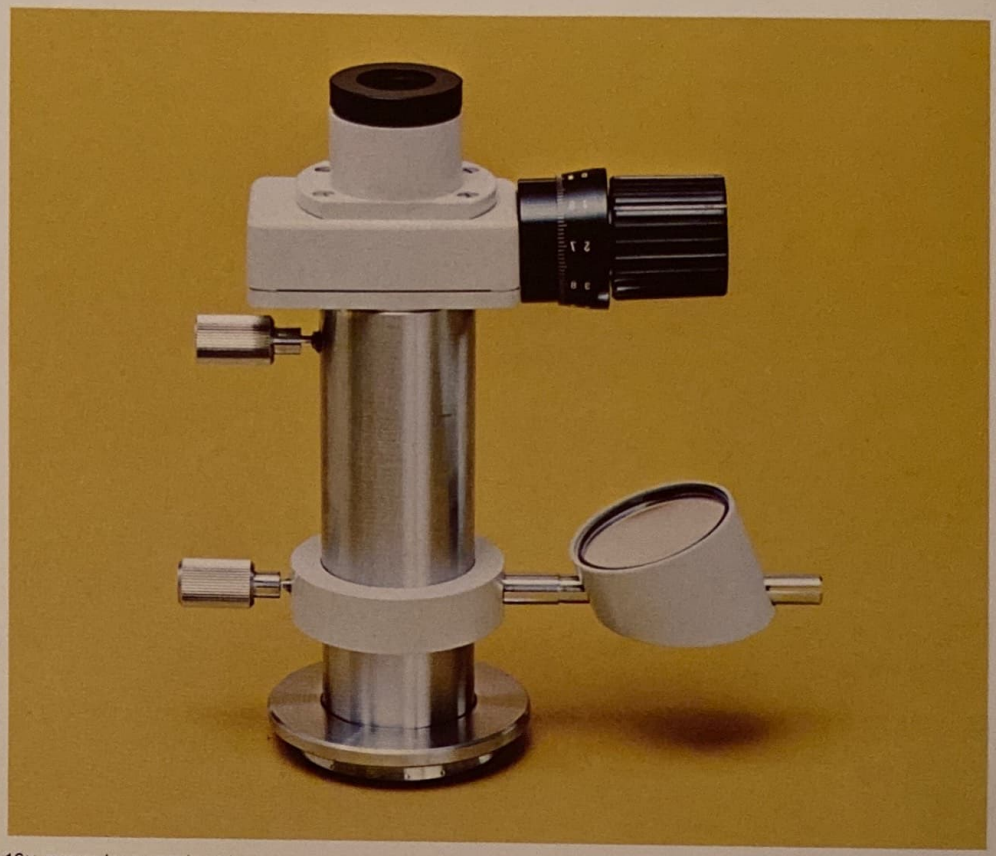
Model ph 10/40 phase contrast equipment

Measuring and counting

For conventional microscopic measuring and couting tasks we refer you to our assortment of stage micrometer slides and eyepiece micrometer discs which necessitate the use of the focusing eyepiece GF-P 10× (18). For higher accuracy measurements the monocular 16× measuring head with micrometer eyepiece is available which is attached in place of the monocular head "pol" or the binocular draw tube "pol".
When the binocular measuring equipment with micrometer eyepiece is used, evaluation, is optional via graduated drums or via an opto--electronic transducer in conjunction with the length measuring programs of the RETARMET-2.

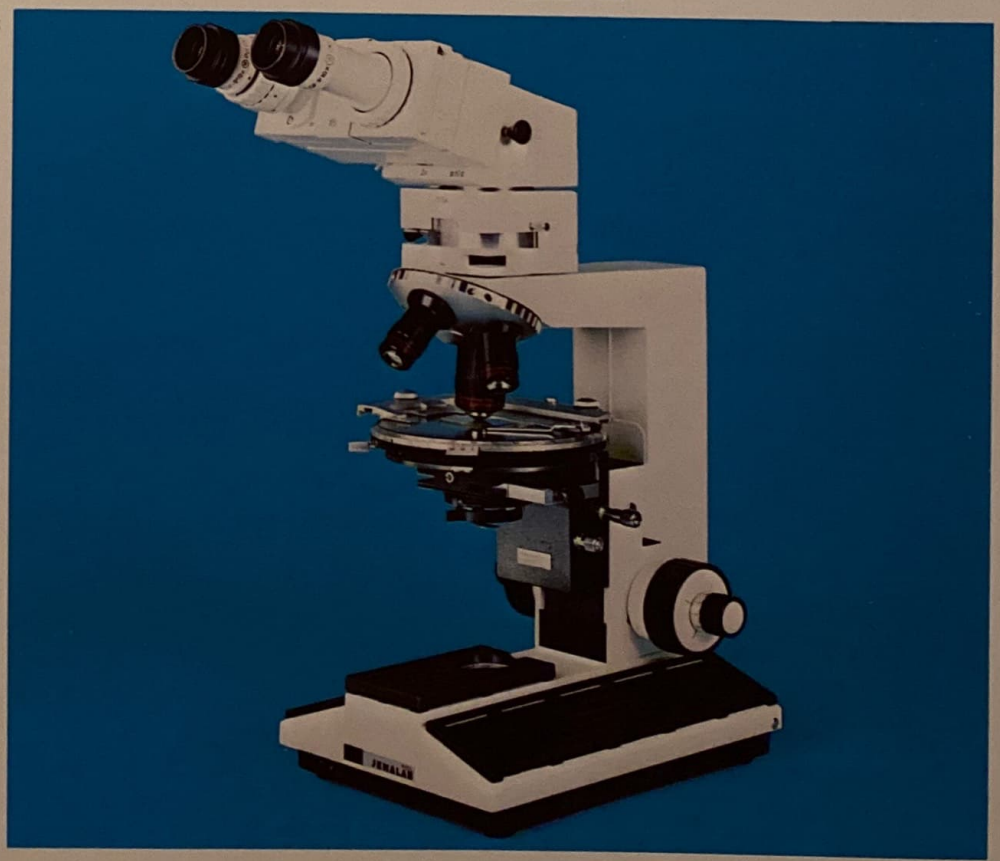
Photomicrography

With the 2×/15° pol photo/viewing tube (in preparation) and our MF-AKS photomicrographic system outfits for 35 mm photography are offered in various price ranges. They can be supplemented by camera attachments for medium-size and instant photography.

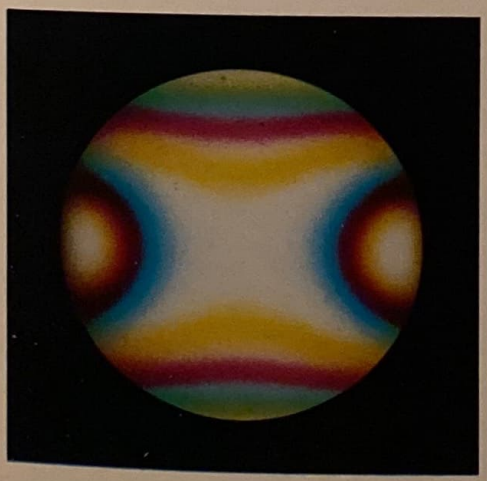


16× monocular measuring tube

JENALAB-pol-d Polarizing Microscope, binocular model



Interference figure of muscovite, optically biaxial, diagonal position, 90° polars, observation towards the acute bisectrix



Optical specification

"pol" objectives, low-strain, infinity corrected M 25 × 0.75 screw thread							**"pol" eyepieces**, focusing with cross lines			
							P 6.3× (18) pol △ option		GF-P 10× (19) pol ○ standard	
objective type A: achromat PA: planachromat	objective magnification	numerical aperture	cover glass thickness correction	used in d: transmitted light a: incident light	free working distance (mm)	supplied as ○ standard △ option	microscope magnification	object field diameter (mm)	microscope magnification	object field diameter (mm)
PA	2.5×	0.05	–	d+a	4.6	○	16×	7.6	25×	7.2
A	10×	0.25	–	d+a	9.2	○	63×	1.9	100×	1.8
A	50×	0.80	0.17	d	0.32	○	320×	0.38	500×	0.36
A	50×	0.80	0	a	0.32	○	320×	0.38	500×	0.36
PA	20×	0.40	0.17	d	2.1	△	125×	0.95	200×	0.90
A HI	100×	1.25	0.17	d	0.12	△	630×	0.19	1000×	0.18
PA	20×	0.40	0	a	2.6	△	125×	0.95	200×	0.90
GF-PA VI	12.5×	0.33	0	a	0.28	△	80×	1.52	125×	1.44
PA HI	25×	0.65	0	a	0.55	△	160×	0.76	250×	0.72
PA HI	50×	1.0	0	a	0.40	△	320×	0.38	500×	0.36
A	5×	0.10	S	d	6.0	⊗	32×	3.8	50×	3.6
A	16×	0.20	S	d	2.8	⊗	100×	1.2	160×	1.1
A	50×	0.60	S	d	2.0	△	320×	0.38	500×	0.36

GF: wide field;
S: segment for UT-124;
VI: variable immersion,
i. e. for water, oil or glycerine;
HI: homogeneous oil immersion
⊗: included in standard equipment of universal rotary stage

Alterations on account of technological improvement reserved.

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Ag 29/020/88

CARL ZEISS
JENA

Kombinat
VEB Carl Zeiss JENA
Carl-Zeiss-Str.1
Jena
DDR-6900

JENALAB pol

Order list

Item No.	Component/Assembly	JENALAB-pol-d	JENALAB-pol-u	JENALAB-pol-d binocular	JENALAB-pol-u binocular	Catalogue No.		Remarks
1	Stand JENALAB-pol-d, in container	○		○			①	○ Included in standard equipment
2	Stand JENALAB-pol-u, in container		○		○		②	△ Accessory usable in conjunction with standard equipment
3	Angular tube pol-d 15°/2×	○		○				+ Accessory usable with standard equipment only in conjunction with other components
4	Angular tube pol-u 15°/2×		○		○			
5	Monocular tube pol	○	○					① This includes: 1 stand JENALAB-pol-d, 2 square wrenches, 1 intermediate tube pol-d, 0.5×, 2 fuses, 250 mA slow-blow, 1 PE bag 100×200, 1 shipping box
6	Binocular draw tube pol			○	○			
7	Objective PA 2.5×/0.05 ∞/-A pol	○	○	○	○			
8	Objective A 10×/0.25 ∞/-A pol	○	○	○	○			
9	Objective A 50×/0.80 ∞/0.17 A pol	○	○	○	○			
10	Objective A 50×/0.80 ∞/0 A pol		○		○			
11	Eyepiece GF-P 10× (18) pol	○	○	○	○			
12	Eyepiece GF- 10× (18) pol, focusing			○	○			
13	Condenser, N.A. 1.25, pol	○	○	○	○			
14	Conversion filter C 311, Ø 32	○	○	○	○			
15	6V 20W halogen bulb HLW S 5	○[5]	○[5]	○[5]	○[5]			② This includes: 1 stand JENALAB-pol-u, 2 square wrenches, 1 intermediate tube pol-a, 2 fuses, 250 mA slow-blow, 1 PE bag 100×200, 1 shipping box
16	6V 25W halogen bulb HLW S 5A		○[5]		○[5]			
17	Attachable mechanical stage 20×40	○	○	○	○			
18	Compensator, full wave	○	○	○	○			
19	Compensator, quarter wave	○	○	○	○			
20	Centring plate 26×76	○	○	○	○			
21	Protective hood	○	○	○	○			
						→ 301026:280.20/1		③ Required in conjunction with Items No. 32...35. Item No. 33 can also be immersed with water or glycerine
						→ 301026:240.20/2		
						→ 301026:260.20/6		
						→ 301026:200.20/3		
	Optional optics							④ Usable in conjunction with Item No. 39
30	Objective PA 20×/0.40 ∞/0.17 A pol	△	△	△	△	302323:371.26/2		
31	Objective PA 20×/0.40 ∞/0 A pol		△		△	302314:372.26/4		⑤ Usable in conjunction with Item No. 38
32	Objective A HI 100×/1.25 ∞/0.17 A pol	△	△	△	△	302236:321.26/0		
33	Objective GF-PA VI 12.5×/0.33 ∞/0 A pol		△		△	302541:373.26/3		⑥ Usable in conjunction with Item No. 41 for converting a monocular model into a binocular one
34	Objective PA HI 25×/0.65 ∞/0 A pol		△		△	302542:373.26/8		
35	Objective GF-PA HI 50×/1.0 ∞/0 A pol		△		△	302523:373.26/5		
36	Immersion oil n_D=1.515	+	+	+	+	308721:020.24/2	⑨	
38	Eyepiece P 6.3× (19) pol	△	△	+	+	303355:021.24/4	④	⑦ Digitalization of data possible by purchasing Item No. 50. Additionally recommended: Item No. 48
39	Eyepiece P 6.3× (19)			+	+	303355:011.24/2	⑤	
40	Binocular draw tube pol	+	+			305047:111.24/2	⑥	
41	Eyepiece GF-P 10× (18), focusing	+	+			303357:033.24/6		
	Polarization-optical compensators							⑧ Recommended in conjunction with Items No. 45...47
42	Full wave compensator, subparallel	△	△	△	△	305952:031.26/1		
43	Quarter wave compensator, subparallel	△	△	△	△	305952:036.26/6		⑨ Complement to Items No. 45...47 and 65
44	0-4λ wedge compensator	△	△	△	△	305952:048.24/5		
45	0-6λ tilting compensator after Ehringhaus, in container	△	△	△	△	305952:511.26/8	⑦	⑩ Equipment intended for JENALAB-pol and JENAPOL. For exclusive use on JENALAB-pol, Items No. 55, 56 and 60 can be omitted
46	0-130λ tilting compensator after Ehringhaus, in container	△	△	△	△	305952:514.26/2	⑦	
47	λ/8 rotary compensator, in container	△	△	△	△	305952:516.26/4	⑦	
48	Filter set 1J (interference filters)	+	+	+	+	304791:051.26/5	⑧	
50	RETARMET-2	+	+	+	+	300471:502.21/2	⑨	⑪ This includes: 2 cells, 4 cover glasses 16×20, 2 wires 59.5 lg, 2 wires 54.5 lg, 1 box of slideway grease, 1 container
53	**Spindle stage (crystal rotating device)** comprising:					300468:205.21/6	⑩	
54	UT-4 spindle stage, compl.					305327:512.26/7	⑪	
55	0.5 N.A. LD condenser pol					304314:024.24/8		
56	Low-power condenser lens					304314:124.24/3		⑫ Its use requires eyepiece Item No. 41. See Publication No. 30-G0510 for further eyepiece micrometer discs for 20.5 mm dia
57	Objective A 5×/0.10 ∞/S A pol					302075:371.26/2		
58	Objective A 16×/0.20 ∞/S A pol					302076:371.26/1		
59	Objective A 50×/0.60 ∞/S A pol					302078:371.26/8		
60	Revolving nosepiece, triple 3×/25 EZ					305222:012.24/0		
61	Lancet					029755:001.28/1		
	Measuring and counting accessories							⑬ Additionally required: Stage micrometer d, Item No. 66, for objectives ∞/0.17 or stage micrometer a, Item No. 67, for incident or transmitted light with objectives ∞/0
63	Set of eyepiece micrometer discs Ø 20.5	+	+	△	△	300463:400.21/5	⑫	
64	Monocular 16× micrometer tube	+	+	+	+	305047:541.26/2	⑬	
65	Binocular measuring equipment pol	△	△	△	△	300463:361.21/5	⑭	
66	Stage micrometer d 1/0.01 for transmitted light	+	+	+	+	305743:502.26/7	⑮	⑭ For binocular standard outfits draw tube "pol", Cat. No. 305047:111.24/2, can be omitted
67	Stage micrometer a 1/0.01 for incident light		+		+	305743:501.26/6	⑮	
	Wear parts							⑮ Complement to Item No. 64
70	6V 20W halogen bulb HLW S5	△	△	△	△	688.00/3		
71	6V 20W halogen bulb HLW S5A		△		△	105.859/6		
72	Fuse, 250 mA slow-blow (220/240V)	△[2]	△[2]	△[2]	△[2]	343.51/1		
73	Fuse, 500 mA slow-blow (110/127V)	△[2]	△[2]	△[2]	△[2]	343.31/0		