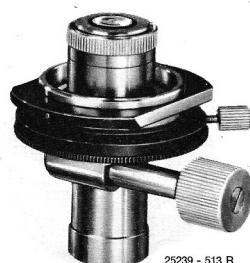


# Phase contrast condenser according to Heine

No.	Description	Aperture	Code No.
64	Phase contrast condenser with dovetail changer according to Heine, with screw -on immersion cap.	0.25-0.75 0.50-1.40	513125
63	dto., sleeve changer	0.25-0.75	513127



This condenser is recommended for the observation of very thin objects or if a continuous transition between phase contrast, brightfield, and darkground is required. It can be used only with the Pv phase contrast objectives specially developed for it. A top to be screwed on to the condenser is available for immersion objectives.

The condenser is available with a centring device and either dovetail – or sleeve changer.

## Phase Contrast Objectives Type n for Positive Phase Contrast

All objectives for positive phase contrast are supplied with a phase ring of normal absorption of  $75\% \pm 5\%$  (distinguished by the letter "n").

The objective **Pv 10/0.25 n** serves as a general survey objective. In the lowest position of the mirror component, it already shows a phase contrast image, and subsequently a dark field image. The immersion attachment for the lens is used, if simultaneous oil immersion work is required. The objective Pv 10/0.25 is then used as an oil immersion for selecting suitable sites in the preparation, and the immersion attachment gives the same working distance as that for which the oil immersion objectives are adjusted. It is thus possible to switch over directly between these objectives. When using the objective in bright field, it is necessary to slightly lower the condenser carrier.

The Objective **Pv 20/0.45 n** is particularly suitable for surveying preparations in the various types of illumination.

Objectives **Pv Apo L 40/0.70** and **Pv Apo L 63/0.70 n** are apochromatics which permit correction of the cover glass thickness by means of the correction mount. The large free working distance permits good observation also in instances where thick cover glasses are used, e. g. for tissue cultures. These objectives are therefore particularly popular for use in cytology, bacteriology and histology.

The Objective **Pv FI Oil 70/1.15 n** (immersion) is used primarily in cases where a long working distance is vital. In combination with the immersion cap for the phase contrast condenser, all types of illumination can be used (bright field, phase contrast, dark field). If the immersion cap is not used, it will not be possible to carry out observations in peripheral bright field or in dark field. At a distance of 7 mm above the stage plane, the phase contrast condenser will then still fill out the aperture of the phase ring. It is thus possible to carry out phase contrast observations in cells with an upper cover glass 7 mm above the level of the object stage, and in which the cultures grow on the lower surface of the upper cover glass. In the tropics, Pv FI Oil 70/1.15 only should always be used as the oil immersion objective.

The Objective **Pv Apo Oil 90/1.15 n** (oil immersion) is designed for the observation of finest structures, such as lattice fibre, chromosome structure, flagella, membranes, etc. With the immersion cap on the condenser at the upper stop, this objective also gives a dark field illumination which is of particular value for general survey work.

With the **water immersion objectives Pv WE 22/0.60 n, Pv WE 50/0.70 n and Pv WE 80/1.00 n** the distance between the front lens and the specimen is kept so small that any intervening floating particles are virtually incapable of disturbing the observation.

## Phase Contrast Objectives Type h for Intensified Positive Phase Contrast

All phase contrast objectives can be supplied with a phase ring of high absorption ( $88\% \pm 2\%$ ) on request, and are distinguished by the letter "h". These objectives should be used in instances where the difference in refractive index between the structure to be observed and the surrounding field is very small. For example, with living cultures it is not always possible to prepare a culture solution with the suitable difference in refractive index between the structure and the surrounding field. In such cases the objectives with a high absorption phase ring are particularly suitable. For example, when using objectives with normal absorption, the mitochondria in tissue cultures appear pale, although the resolution is good, whereas with high absorption objectives they stand out much more clearly.

If the contrast obtained with "n" or "h" objectives still does not meet the requirements, then the embedding material must be changed.

## Phase Contrast Objectives Type -h for Negative Phase Contrast

For examinations where negative phase contrast is desired, the following phase contrast objectives are supplied with a negative phase ring (distinguished by "–h"):

- Pv 20/0.45–h
- Pv Apo L 40/0.70–h
- Pv Apo L 63/0.70–h
- Pv FI Oil 70/1.15–h

These objectives also have a phase ring of high absorption, viz.  $88\% \pm 2\%$ . Through their higher contrast effect, the observer is given the subjective impression of a "more plastic" image.

## Phase Contrast Objectives

Type	Designation <sup>1)</sup>	Free working distance	Micrometer stand with eyepiece II (6)	Cover glass <sup>2)</sup> Correction	Type of eyepiece <sup>3)</sup>	Code word	Designed with absorption of		
							75 ± 5%	88 ± 2%	88 ± 2%
Dry system	Pv 10/0.25	5.8	15	DO	P	PHALZ	n	h	–
	Immersion attachment for Pv 10/0.25	0.3				PHAWK	–	–	–
Dry system	Pv 20/0.45	2.0	7.6	D	H (P)	PHANC	n	h	–h
Dry system with very long working distance	Pv Apo L 40/0.70 in correction mount with automatic focusing compensation	0.38	3.8	D I	P	PHASG-FE	n	h	–h
Dry system with very long working distance	Pv Apo L 63/0.70 in correction mount with automatic focusing compensation	0.35	2.4	D I	P	PHERG-FE	n	h	–h
Water dipping objective	Pv WE 22/0.60	0.05	6.5	O	P	PHESH	n	h	–
Water dipping objective	Pv WE 50/0.70	0.05	2.8	O	P	PHEWL	n	h	–
Water dipping objective	Pv WE 80/1.00	0.06	1.9	O	P	PHYEN	n	h	–
Oil immersion	Pv FI Oil 70/1.15	0.20	2.0	DO	P	PHELB-FE	n	h	–h
Oil immersion	Pv Apo Oil 90/1.15	0.12	1.6	DO	P	PHATH-FE	n	h	–

- <sup>1)</sup> The number before the oblique stroke gives the initial magnification, while the figure after the stroke gives the numerical aperture.
- <sup>2)</sup> D: with cover glass  $D = 0.17$  (cover glass thickness should be observed accurately to within  $\pm 0.05$  mm)  
O: without cover glass. DO: can be used with or without cover glass.  
DI: Cover glass thickness should be observed accurately to within  $\pm 0.01$  mm., or should be accurately set with the correction mount.
- <sup>3)</sup> H=use Huygens eyepieces; P=use Periplanatic eyepieces.

The phase contrast objectives are described in detail on pages 16/17. Unless otherwise ordered, they are supplied in the design "n". The prices for designs "n", "h" and "–h" are the same.



### Phase Contrast Equipment

- Heine Phase contrast condenser, with rack and pinion for vertical adjustment of the mirror component; with immersion cap to screw on the condenser . . . . . PHAKY
- Filter holder with daylight and photographic filters . . . . . PHAFT
- Auxiliary magnifier for centring the light ring . . . . . PHADS
- Case to hold the condenser and four objectives . . . . . PHAMB
- Phase contrast condenser No. 74 (for dovetail holder) . . . . . PFAHT
- Phase contrast condenser No. 75 (for cylindrical mount)\* . . . . . PFAGS

Condenser designed for dovetail holder	Condenser designed for cylindrical mount
PHAKY	PHARF*
PHAFT	PHAFT
PHADS	PHADS
PHAMB	PHAMB
PFAHT	
	PFAGS

\* Internal diameter of the sleeve 39.5 mm. For the stand "H" class microscope an extension piece for the mirror holder is necessary when using the phase contrast equipment.

\*\* Unless otherwise ordered, "n" phase contrast objectives will be supplied.