Vidicon Camera Chain KVA 75

The Vidicon Camera Chain KVA 75 has been developed in the first place for studio and reportage work. Construction, circuits and equipment are throughout of the same high quality as our studio equipments. In the studio the camera chain may find application in the transmission of announcers, of animated indications of intervals, or of captions with the normal studio lighting. With very good illumination (outdoor pickup) the camera chain is also satisfactory for reportage. The equipment is so carried out that it can be used, in association with appropriate projectors, for the transmission of films or slides.



Fig. 1: Vidicon Camera Chain KVA 75

Features:

1. Particularly small, light camera.
2. Built in transportable cabinets.
3. Immediately ready for use.
4. Simple, uncritical operation.
5. Built-in gamma control.
6. A reflex optical finder or a slide projector may be added to the camera.
7. May be used for film scanning if associated with an appropriate projector.

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Camera KKV 102

Optical Equipment

The camera is equipped to receive different objectives with focal lengths between 28 and 150 mm. A rapid-change mounting allows the lens to be readily removed.

The objectives are pre-adjusted in the rapid-change mountings, so that on inserting one in the camera it is automatically focused upon the photoconductive layer of the vidicon. The adjustment of the optical focus and the setting of the diaphragm aperture are effected by means of rotatable rings.

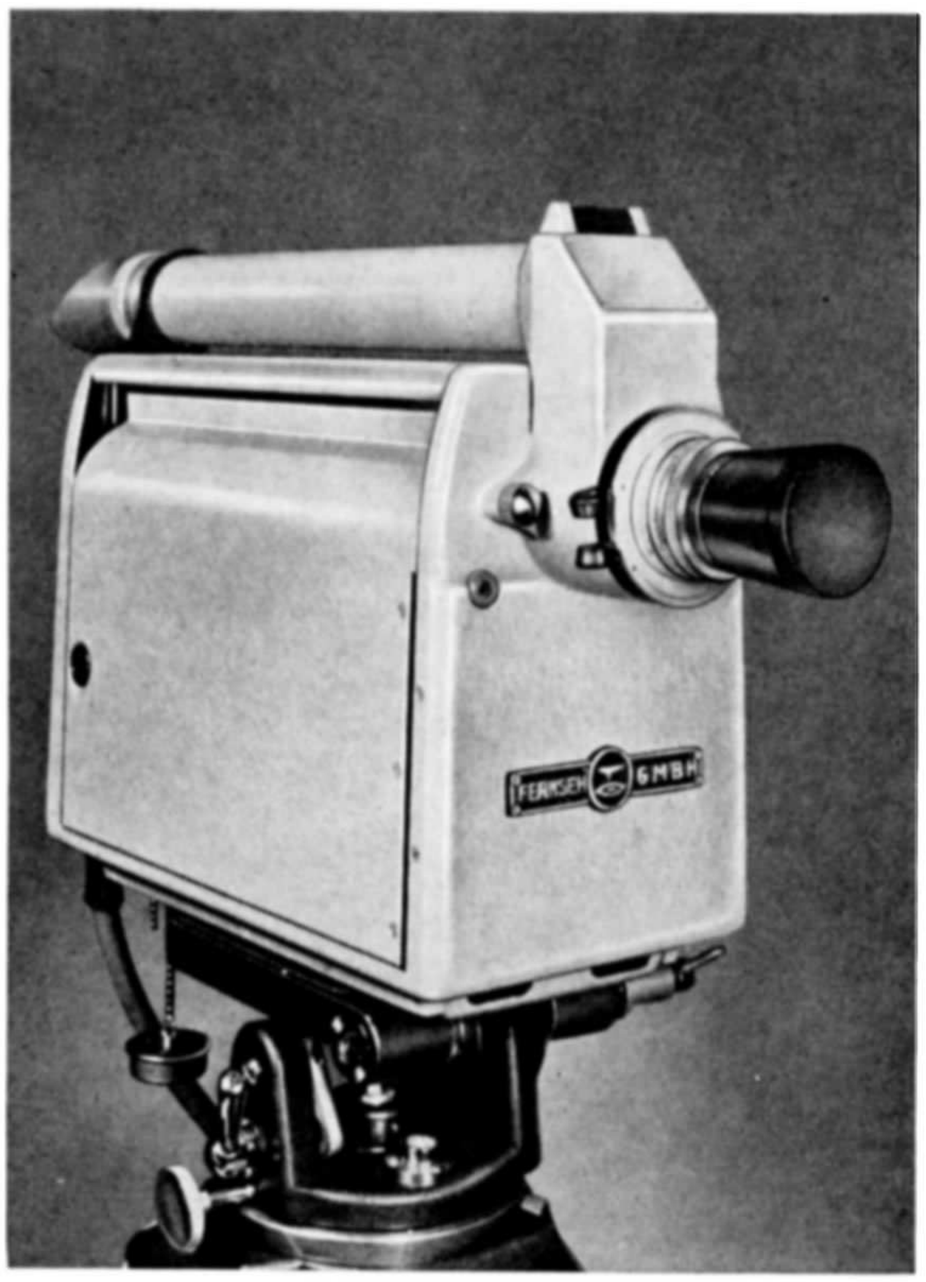


Fig. 2: Vidicon Camera Type KKV 102 with OSV 100/1
Finder added and lens in rapid-change mount

There are also available zoom lenses of various apertures and having focal lengths variable between 25 and 100 mm, which also are provided with rapid-change mounts.

Instead of the adaptor which serves for the reception of the lenses, either the OSV 100/1 Reflex Finder or the ODV 50 Slide Projector may be attached. Both accessories are likewise equipped for the reception of rapid-change lenses (see figures 2 and 3).

The **OSV 100/1 Reflex Finder** permits observation free from parallax of the image received by the camera lens, including the marginal parts which are not transmitted. By means of a semi-transparent mirror arranged obliquely in the optical path, a second image from the camera objective is projected upon a field lens, matted on one side, on which the margin between the picture field and the marginal field is traced. This lens is viewed by the eyepiece.

The television and finder images are alike focused by adjustment of the objective. The finder image appears upright and is not laterally inverted.

The finder is so adjusted that the size of the picture field on the matt screen (9.5 x 12.7 mm) corresponds to the size of the image scanned on the photoconductive layer, while the total area of the matt screen inclusive of margins is 13.5 x 16.7 mm.

The eyepiece is adjustable over a range of ± 1.5 diopters so that it may be matched to the operator's eye. In addition there is provided at the end of the eyepiece a mounting for the reception of a spectacle lens, so that the necessary correction for a spectacle-wearing operator may be provided.

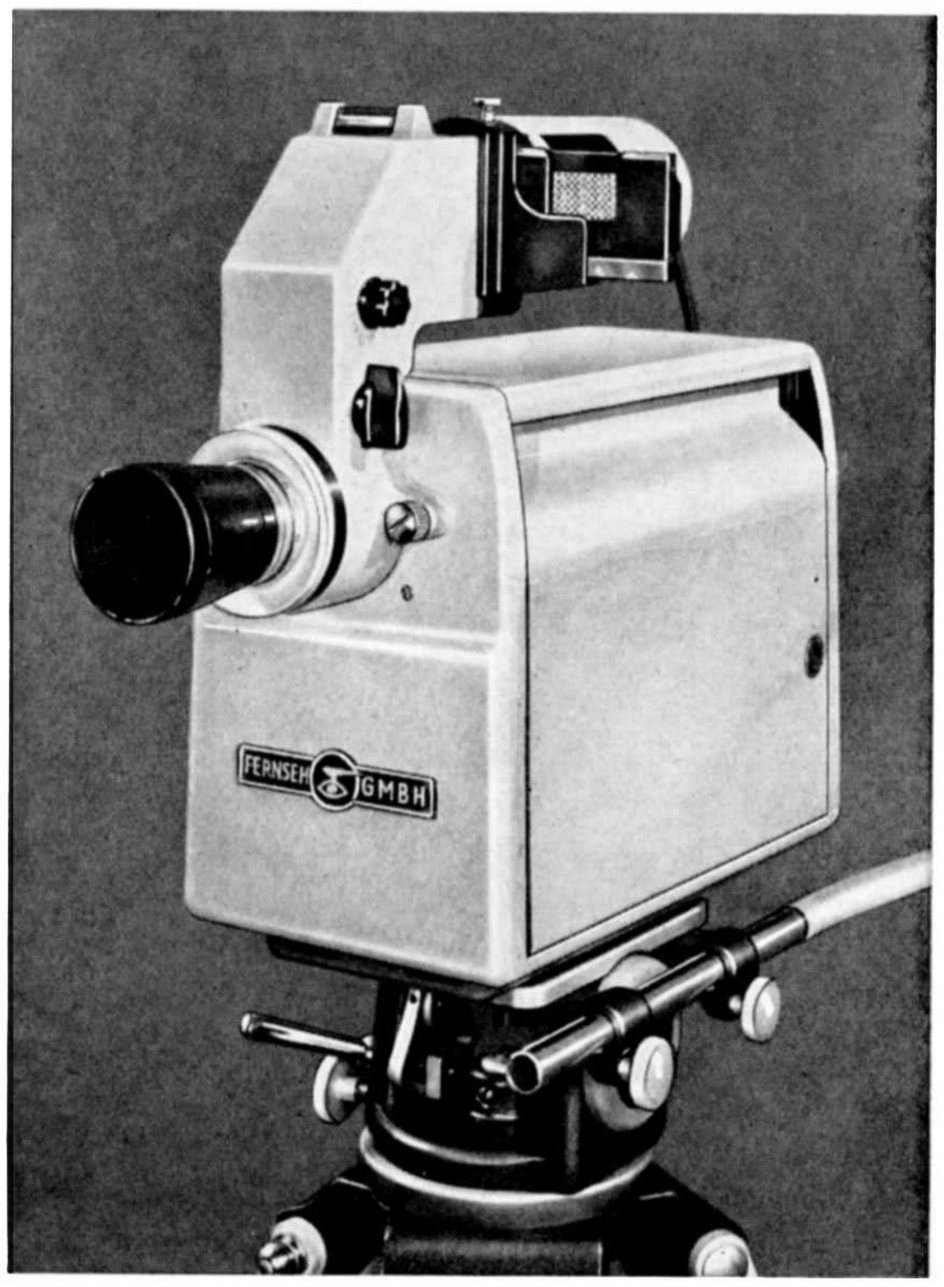


Fig. 3: Vidicon Camera Type KKV 102
with Slide Projector type ODV 50 added

The **ODV 50 Slide Projector,** which can be attached instead of the finder, allows the transmission of slides (50 x 50 mm), which can be faded in by means of a rotating mirror operated by a knob. An additional unit containing a transformer and control can be supplied for operating the projection lamp.

The **OPV 1 Test Projector** can be attached instead of the lens. It contains an interchangeable test-card. The operating voltage for the lamp is taken from a socket on the front of the camera.

The projector is used predominantly for correct lining up of the vidicon and may also be used for a rapid test of the whole camera chain.

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Construction and Operation

The Vidicon Camera KKV 102 includes the vidicon with its accompanying coil assemblies for the focusing and deflection of the scanning beam, the preamplifier, the line timebase, blanking stages for the scanning beam and a beam current cutoff. A transistor amplifier for the talk-back circuits is also fitted in the camera.

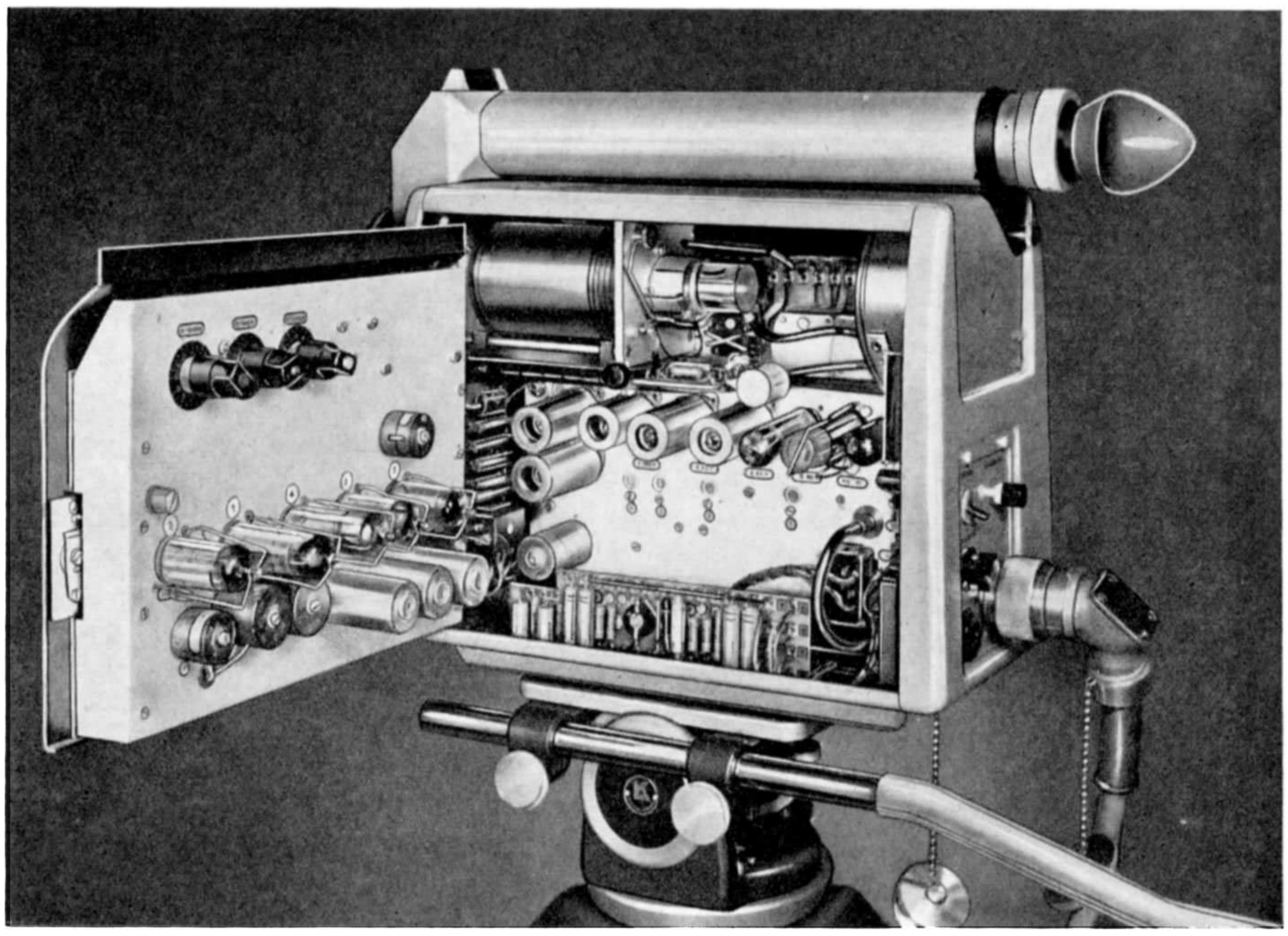


Fig. 4: Vidicon Camera Type KKV 102 with Optical Finder type OSV 100/1 added, left side opened

The amplitude and position of the line scan is adjustable, while the frame amplitude and shift may be adjusted in the Camera Control Unit.

To avoid microphonic interference the chassis of the preamplifier is mounted on springs in the camera housing. Connection to the camera circuit is effected through readily detachable plug connections, so that after loosening a few screws the preamplifier may be quickly removed.

The line timebase, the blanking stages for the scanning beam and the beam current cutoff are assembled on a second chassis which is secured to the hinged side panel of the camera housing. After loosening a knurled screw the chassis may be hinged away from the side panel and is thus readily accessible on both sides (see fig. 4).

At the top of the camera housing are placed longitudinal ventilating slots, which also serve as handgrips for transport. On the back panel are the connections for the camera cable and the operator's headset, as well as the necessary volume control and a green signal lamp which is combined with a push-button. The red signal lamp, directed towards the scene being scanned, is placed on the finder.

The camera baseplate is provided with a tripod mounting screw and two accurately located holes. When the camera is used for film scanning these serve to locate the camera correctly in relation to the optical axis of the film projector. A switch is provided in the camera to reverse the direction of frame scanning and thus provide the necessary inversion of the picture position for film scanning.

Two double-triodes, each with its electrodes connected in parallel, are used in a cascode circuit as the first stage of the preamplifier. As considerable negative-feedback is also used, it is thus ensured that the noise contributed by this stage is particularly low. The signal supplied by the vidicon is sufficiently amplified by the preamplifier that it can be transmitted to the main amplifier over a cable which may be 300 m long.

Line deflection is effected by means of a transformer-coupled timebase with energy recovery, which effects an effectively linear line deflection. The output stage is driven by a blocking oscillator to which the line pulses are fed through a buffer amplifier. Synchronization is independent of amplitude variations in the line pulses.

In order to prevent burning-in of the vidicon target with absolute certainty under all conditions, a safety circuit is provided which blocks the beam current unless both deflection currents are present.

Camera Control Unit KVsV 75

The Camera Control Unit includes the main amplifier, the pulse shaper, the frame timebase, the power pack and the control desk.

The two first-mentioned units are arranged on the hinged side chassis of the camera control unit. The power pack is mounted on the bottom of the unit. The control desk is hinged on the front of the case.

All the controls and meters necessary for the operation and monitoring of the camera chain are brought together on the **control desk.** These include two check meters as well as the controls for the focus, white level and black level, the fine control for the beam current and the gamma control.

Under normal conditions of operation the controls which are not necessary for normal operation of the equipment are covered by a lid. These are the coarse beam-current control, the change-over switch for black-level control (keyed or from darkest picture-point), the coarse control for the signal plate voltage and a knob for switching the calibrating level.

On the lower part of the front panel are the "Ready" and "Operate" mains switches and the mains fuses. In addition there are arranged on this panel the connections for the operator's headset, the volume control and the microphone switch. On the back panel of the unit are arranged the connecting sockets for the horizontal and vertical synchronizing pulses provided by the pulse generator and for the blanking and synchronizing signals. The connections are provided with filter inputs which allow looping of the cables without upsetting the matching.

Two output sockets are provided at which a BA (non-composite) signal may be withdrawn and one socket at which a BAS (composite) signal is available. All three outputs are matched to a 75-ohm-cable.

The **main amplifier** includes stages for correction, control, blanking and black-level control of the video signal.

The curved operating characteristic of the vidicon is compensated by a corrector stage, so that an approximately constant gamma of about 1, including the vidicon characteristic, is obtained at the output of the corrector stage.

To compensate the frequency-dependent attenuation characteristic of the camera cable the frequency characteristic of the main amplifier may be varied in six stages, corresponding to cable lengths up to 300 m.

The aperture corrector boosts the depth of modulation at 5 Mc/s to approximately 100 % by means of a cosine corrector. With low illumination of the object which is not fully sufficient to modulate the vidicon, the gain can be increased at constant target voltage. Signal-to-noise ratio is thereby decreased. This can, however, be compensated by adjusting the aperture corrector to a smaller rate.

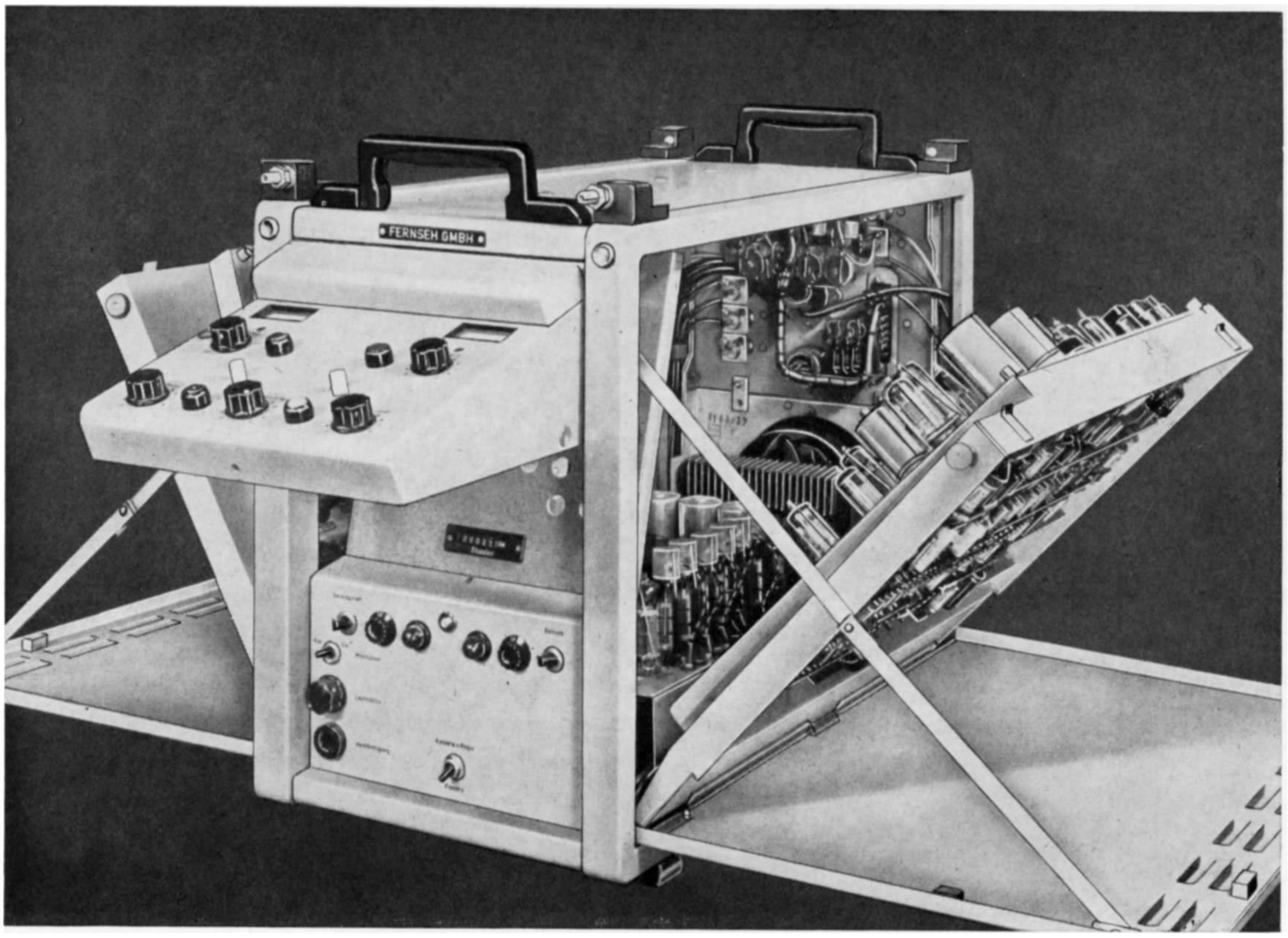


Fig. 5: KVsV 75 Camera Control Unit, control desk erected, side panels lowered and chassis partly hinged out

The gamma control allows a continuous alteration of the gamma value within the limits of approximately 0.4 to 1. This is done by dividing the picture signal between two paralle. paths. The signal passes the one path without altering its shape, in the other path the signal is operated on by a chain of diodes with different bias voltages to yield a gamma value of 0.4. The gamma control causes the signals provided by the two paths to be added in different proportions.

The output amplitude of the amplifier may be adjusted by means of the white-level control.

By means of the black level control the signal is adjusted so as to have the correct pedestal or lift. Control of the black level may be effected either from the darkest point in the picture or by arranging that a flyback potential in the picture signal is clamped to a constant level.

The whole amplifier may be lined up by means of a calibrating signal, which can be switched in by means of a push-button.

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From the output of the amplifier the blanked picture signal (BA signal) is available, as well as a complete picture signal with synchronizing pulses (BAS signal) for driving a monitor.

The **Pulse Shaper** generates all the synchronizing, blanking and clamp pulses necessary for operating the camera chain. Equalization of the time-delay of the camera cable is effected by means of a tapped delay-line.

The **Frame Timebase** generates the current for frame deflection of the scanning beam. This current is fed through the camera cable to the camera. The output stage of the timebase is driven by a blocking oscillator which is synchronized by the frame synchronizing pulse fed to it through a buffer stage which prevents unwanted feedback. Linearity of deflection is maintained for different lengths of cable by a switched resistance network, which is adjusted by the same control which adjusts the delay line for the line synchronizing pulses.

The **Power Pack** feeds the units in the camera control unit and in the camera with the necessary operating voltages and currents. Direct voltages are electronically stabilized. The focus current for the vidicon is also controlled by means of a valve.

The voltage drop in the camera cable is compensated by switching the applied voltage in several steps.

Monitor EOv 25/75*)

Monitor Type EOv 25/75 includes a high-quality picture monitor (picture size 140 x 190 mm) and a wide-band oscillograph for controlling the signal levels. The apparatus is provided with its own power supply so that it may be used at other places as a self-contained monitor unit. The monitor is arranged for connection to one or other of three picture signals through input filters which prevent mismatching.

The 50 mm high oscillogram allows the signal waveform to be clearly observed. The correct values for the different signal levels are indicated by a graticule which is illuminated by red light. The time-base may be operated at line or at frame frequency.

Talk-back and Signalling

A talk-back circuit is provided between camera and camera control unit. Similar connections are arranged for operator's headsets at both equipments. A second output is provided on the camera control unit for connection to the control desk.

When the camera chain is used for film scanning it is possible to use the telephones at the camera control unit for monitoring the sound signals (photographic or magnetic sound).

A Red-Green and a Yellow-Blue system is provided for signalling. The small green lamps on the back of the camera and the operating part of the camera control unit show that the camera is ready for use. The red lamps on the camera finder and on the camera control unit are lit when the camera is connected to the transmitter. Another red lamp is placed near the monitor picture. Additional signalling is possible by means of a flicker-key on the camera. The Blue-yellow system serves for signalling between camera control unit and mixer desk.

Camera Cable

A special, light cable of 14 mm diameter serves for connecting the camera to the camera control unit. Connection is made by means of multi-way plugs. The camera cable may have a maximum length of 300 m.

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*) For additional description and technical data see Prospectus E 23.

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Technical Data

Dimensions:

	Camera Type KKV 102 (without tripod)	Camera Control Unit KVsV 75	Monitor Type EOv 25/75
Height	230 mm	406 mm	406 mm
Width	170 mm	290 mm	290 mm
Depth	300 mm	590 mm	590 mm

Weight:

approx. 10 kg	approx. 53 kg	approx. 45 kg

Mains Supply:

220 V 50 c/s	about 3 A	about 2 A

Scanning:

CCIR standard

625 lines per picture
25 pictures per second
Single interlaced (50 frames/sec.)
Picture ratio 3 : 4

Lenses:

The following objectives are available:

Reference	Aperture	Focal length mm	Horizontal Picture Angle
Xenon	f : 2	28	24°
Xenon	f : 2	35	20°
Xenon	f : 2	50	15°
Xenon	f : 2	75	10°
Xenon	f : 2	100	7°
Tele-Xenar	f : 4.5	150	5°
Pan Cinor (Zoom lens)	f : 2.4	25 . . . 100	28° . . . 7°
Pan Cinor (Zoom lens)	f : 3.4	25 . . . 100	28° . . . 7°

All lenses with control of diaphragm and range, fitted in rapid-change mounts.

Illumination:

Stationary objects	min. 200 Lux at f : 2
Slowly moving objects	min. 2000 Lux at f : 2
Moving scenes (outdoors)	20 000 Lux at f : 2.8
Film scanning and slide scanning combined with film scanning (illumination in the highlights on the photoconductive layer)	1300 Lux
Slide scanning combined with direct transmission of slowly moving objects (illumination in the highlights on the photoconductive layer)	100 Lux

Contrast: 10 : 1 to 100 : 1

May be adapted to the contrast in the object by the gamma control.

Inputs:

Line pulse	(H)	−4 V_{pp} at 75 ohms
Frame pulse	(V)	
Blanking signal	(A)	
Sync. signal	(S)	

All inputs are taken through matching circuits which enables the cable to be looped in without disturbing the matching.

Outputs:

2 x Blanked picture signal (BA)	+1 V_{pp} at 75 ohms
1 x Composite signal (BAS)	+1.4 V_{pp} at 75 ohms

Characteristics of the Amplifier:

Preamplifier (in the camera)

Frequency range	5 Mc/s ± 0.5 dB
Overshoot	< 5 %
Overshoot frequency	> 6 Mc/s
(Rise time of test pulses 0.08 µs)	

Main Amplifier (in the camera control unit)

Frequency range	7 Mc/s ± 1 dB
Overshoot	< 5 %
Overshoot frequency	> 7.5 Mc/s
(Rise time of test pulses 0.08 µs)	

Overall Characteristic:

Depth of modulation when scanning a 5 Mc/s bar pattern, with aperture corrector, centre of picture	up to 100 %

Signal-to-Noise Ratio in picture signal:

Measured with gamma control at setting	$\gamma = 0.5$
Aperture correction for 80 % modulation at	5 Mc/s
Cutoff frequency 5 Mc/s	
Peak value of noise voltage, refered to the amplitude of the black/white transient	< 10 %
Signal-to-noise ratio, defined as the ratio of the amplitude of the black/white transient to the effective value of the noise voltage	about 36 dB
Visual signal to noise ratio, taking account of the noise spectrum (high frequency noise)	>42 ~~about 40~~ dB

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