



BROADCAST EQUIPMENT

PHILIPS

Colour Camera



Type LDK 25

Operational flexibility

Outstanding stability by monolithic design of optical and coil system and high gain/high feedback operational video amplifiers

New efficient colour splitter prism and linear matrixing for optimum colorimetry

One-inch Plumbicon tubes, with anticomet tail and bias light for minimum tailing and lag

Lightweight, low profile camera head of sturdy cast aluminium to withstand the most severe operational environments

Removable, rotatable, and tiltable viewfinder

Wide range of zoom lenses

Compatible with standard TV-81 or F&G multiconductor camera cables

Connection to CCU of portable camera LDK 15

Small CCU with simple interconnection

Compact control panel designed for ease of set-up and operation

Electronic colour temperature control

CLUE facility at both viewfinder and CCU

Automatic correction circuitry for iris, white balance and positioning

Varichrome variable matrix facility

Modular construction throughout

The LDK 25 television camera is one of a completely new Plumbicon colour camera family with the latest advances in camera technology.

Modern design techniques and modular construction have been used to achieve high stability, reliability and flexibility in operation. Its compact, low-silhouette design is based on experience gained in the development and refinement of more than 2000 three-Plumbicon colour cameras... plus the utilization of integrated circuit techniques that bring an entirely new dimension of positive performance and economy to colour television.

The majority of modules utilized in this new camera are common to the LDK 5 triaxial cable camera and the LDK 15 portable camera. The LDK 25 was designed with the intent of providing the user with the performance advantages of the proven LDK 5 triaxial camera design, but with standard multiconductor television camera cable for integration into existing or new installations where the additional sophistication of triaxial cable capability is not required.

A variable matrix unit is available to permit adjustment of colour rendition to achieve

special colorimetric results or to match unique signal sources.

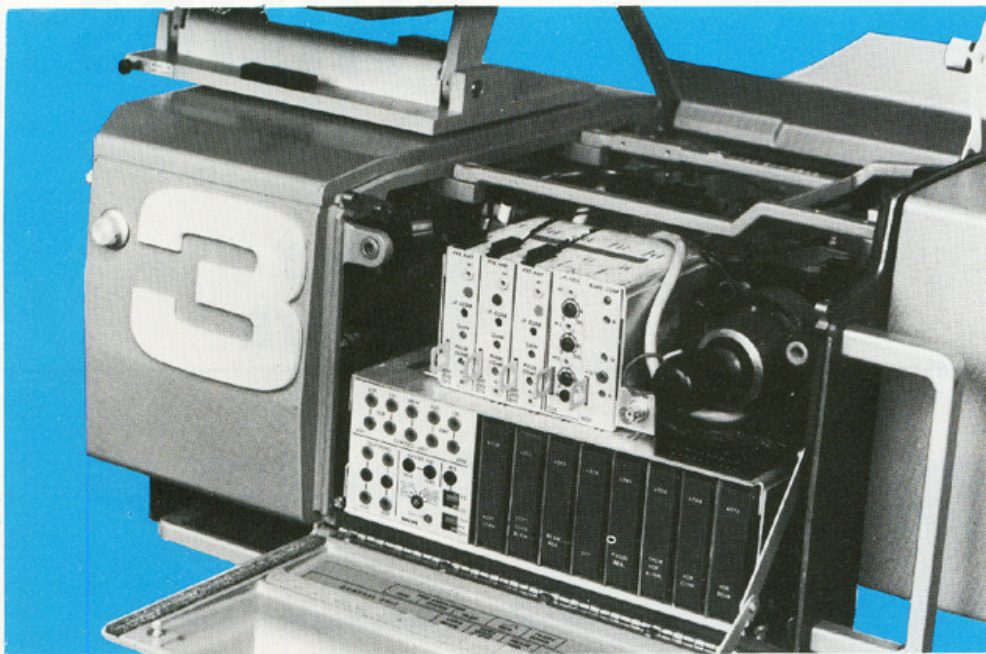
The LDK 25 also incorporates a CLUE (Colour Line Up Equipment) facility to permit rapid and highly accurate colour balance utilizing only the monochrome picture monitor and a standard grey scale chart.

As a supplement to the well-designed and extensive facilities included in the camera system to permit manual adjustments of picture quality, the camera also includes provisions for automatic control of several important parameters where manual adjustment for changing ambient conditions is not desired or practical.

Automatic circuitry is available to correct for changing light levels when the camera is unattended; and automatic white balance can be utilized to correct for conditions of changing colour temperature. An automatic centering feature is available to ensure that optimum registration is maintained even under extreme environmental conditions. Due to the exceptional stability of this camera, the automatic centering circuitry is kept in the stand-by mode under normal operational conditions.



PYE TVT



THE CAMERA

Camera and viewfinder have lightweight rugged cast aluminium housings. The viewfinder is tiltable, rotatable and removable. Hinged covers are provided for easy access to the fully modular interior components. A wide range of zoom lenses with servo-controlled iris and manually controlled zoom and focus as well as lenses with full servo capability are available to satisfy all operational requirements. The lens/camera interface is a quick connect/disconnect arrangement which can be readily handled by one man without assistance.

A key aspect of the mechanical design of the LDK 25 is the horizontal spider layout of the optical section. This section, which comprises the well known Philips patented colour beamsplitting prism and the deflection units with camera tubes, is incorporated in one machined, magnesium cast block. This block is mounted to the camera front, to which the lens is also clamped. Thus, the whole optical system forms one rigid structure ensuring maximum alignment precision and registration stability. A remotely controlled filter wheel and provisions for a supplemental dagger filter in the optical assembly accommodate an extraordinary range of lighting conditions.

The LDK 25 employs the 1-inch Plumbicon tube, type XQ-1080, in conjunction with deflection units of the utmost mechanical and electrical precision. These tubes of separate-mesh construction are fitted with a ceramic centering ring which reduces the tolerances in optical alignment and improves the fixing of the tube target with respect to the optical image.

The video circuitry has expanded dynamic range to allow full utilization of the high-light discharge capabilities of the XQ 1080 Anti-Comet-Tail (ACT) Plumbicon. This feature allows highlights of up to 32 times normal peak white level to be discharged without blooming or streaking affects. An

internal bias light conductor gives a uniform bias lighting of the tube target. The resultant artificial dark current further reduces the already minimum lag characteristics of the camera system. The Plumbicon tube is inserted into its deflection unit from the rear, so that the latter need not be removed from the camera for tube exchange. The deflection coil assembly has a mu-metal shielding in one piece, for optimum screening against external magnetic fields.

The first video preamplifier stage in each channel is mounted inside the shield of the deflection coil assembly as near as possible to the signal electrode for minimum capacitance and pickup of spurious signals. The low target capacity of the specially designed tube/yoke/preamplifier assembly provides a high signal-to-noise ratio and, together with the high transmittance prism, permits operation under conditions of severely limited light levels.

Computer-matched yoke triplets ensure the ultimate in registration accuracy. Deflection circuitry is highly stabilized and operates on the corrections-added principle. Master generators for line and field scanning provide identical waveforms to all three camera channels to assure maintenance of scanning accuracy under all conditions of operation.

The yokes can be easily removed for servicing and replaced with minimum need for camera realignment.

The pulse timing reference system at the electronics control unit compares the processed camera signal output to the studio timing reference to automatically correct for time coincidence of the camera output irrespective of the length of camera cable. Either two standard two-wire intercom channels for production and engineering use are provided, as well as a programme CUE channel, or a standard 4-wire system for engineering, production and programme. Camera and viewfinder operate on an automatically stabilized 100 V d.c. line voltage from the CCU.

CAMERA CABLE

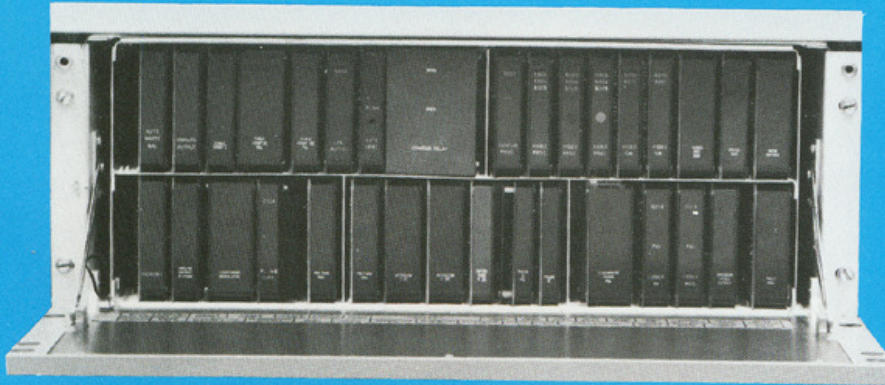
Camera cable connectors on the camera head and the CCU can be supplied for either the standard U.S. industry TV 81 type cable or the F&G cable commonly used in many other countries. This facilitates use of the LDK 25 with existing or new installations where standard camera cable interfaces are desired.



Electronic viewfinder

ELECTRONIC VIEWFINDER

In the LDK 25, the electronic viewfinder uses a high brightness 7" rectangular picture tube and provides a brilliant and sharply focused picture. It is tiltable, rotatable, and removable, and can be operated remotely from the camera head on an extension cable. All normally required individual or combination selections or R, G, B, -G, or Y and external video signals can be selected for display. An electronic zoom indicator is superimposed on the top of the picture. For monitoring, alignment and set up procedures, either R, G, B or -G can be selected with overlay combinations of RGB for registration. Moreover, signal combinations can be switched on in the CLUE mode (4 lines of G camera signal alternated with 4 lines of the R or B camera signal) for setting up signal levels, i.e. black balance, white balance and gamma tracking. The viewfinder also has a peaking on/off position to aid the cameraman in fine focusing. A tally light and call light are also provided.



Electronic control unit

ELECTRONIC CONTROL UNIT

All video and control electronic modules at the CCU are housed in a single-rack-width module holder of four rack units height. All modules are readily accessible behind a hinged front cover. Wiring connections to the camera system are made at the rear of the ECU module holder through plug-in connectors. Selection between NTSC/PAL and TV 81 or F&G cable is made by the substitution of appropriate camera cable connector and by selection of a minimum number of modules unique to the system standard.

The ECU contains circuitry for camera cable compensation, video processing, matrixing, contour processing, signal encoding and intercommunications, as well as circuitry for automatic control of positioning, white balance, and video switching. Cable compensation is provided to correct for up to 2000 feet (600M) of TV 81 (mini) or F&G 753-5 camera cable. Automatic circuitry assures that the system timing and voltages supplied to the camera head are accurately maintained irrespective of camera cable length.

Intercommunication system options permit operation on either the standard U.S. two-wire system or the four-wire system that is standard in many other countries. In both systems, provisions are made for two independent intercom channels with individual level controls as well as a programme audio CUE channel. Provisions are also made to switch the engineering intercom channel to an isolate position for local communications between camera head and control position.

Contour enhancement is comb-filtered and level-dependent to provide optimum picture enhancement with minimum added noise or distortion. The encoder contains a dark desaturation feature as well as contrast compression capability to maximize subjective signal-to-noise and provide a wide range of adjustment to achieve superior pictorial results under unusually demanding scene conditions. Colour bars can be



LDK 25 Control Panel and variable matrix

selected as either a standard EBU full field display or the standard EIA RS-189 split field pattern.

SETUP/CONTROL PANEL

The setup/control panel is 1/2 rack width and 4 rack units high. It is designed to accommodate in the adjoining space a control panel for a second camera chain, the variable matrix control unit, or other controls and switching facilities as may be required for specific installations. In addition to the normal operating controls of Iris, Master Pedestal and R, B, G Gain and Pedestal controls grouped at the lower edge of the panel, it contains a compact grouping of setup and operational assist controls of a unique nature to facilitate rapid setup and operational adjustment of the significant factors affecting picture quality under changing conditions. Switching facilities permit a variety of dis-

plays to be fed to the associated picture and waveform monitors including external or internally generated, highly accurate test signals for alignment and check of camera system performance. A CLUE (Colour Line Up Equipment) facility is included to aid in colour balance utilizing only the picture monitor and a gray scale chart. This system provides selectable red, blue or green signals against a reference of camera green or an external signal, and permits extremely quick adjustment of peak white and black level between colour channels to a very high order of accuracy.

To facilitate fast adjustment of operational camera characteristics under varying scene conditions, the panel also provides:

- 3-Position Contour Level Switching (Full range control at ECU).
- +6 and +12 dB Gain Switching.
- 2-Position Gamma Select (Other selections at ECU).

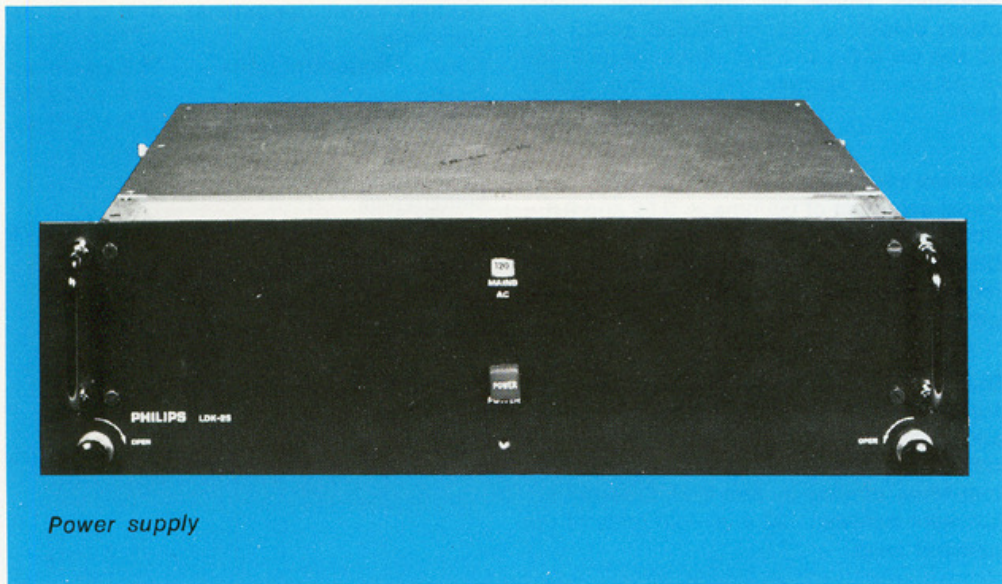
- Contrast Compression Switch to enable shadow detail of a high contrast scene to be resolved without losing highlight detail.
- Remote Filter Wheel Selector.
- Electronic Colour Temperature Control to permit instantaneous correction of colour balance over the full range of environmental colour temperatures likely to be encountered in studio or field pickups.
- Controls for the automatic facilities of Iris, White Balance and Centering.

VARIABLE MATRIX

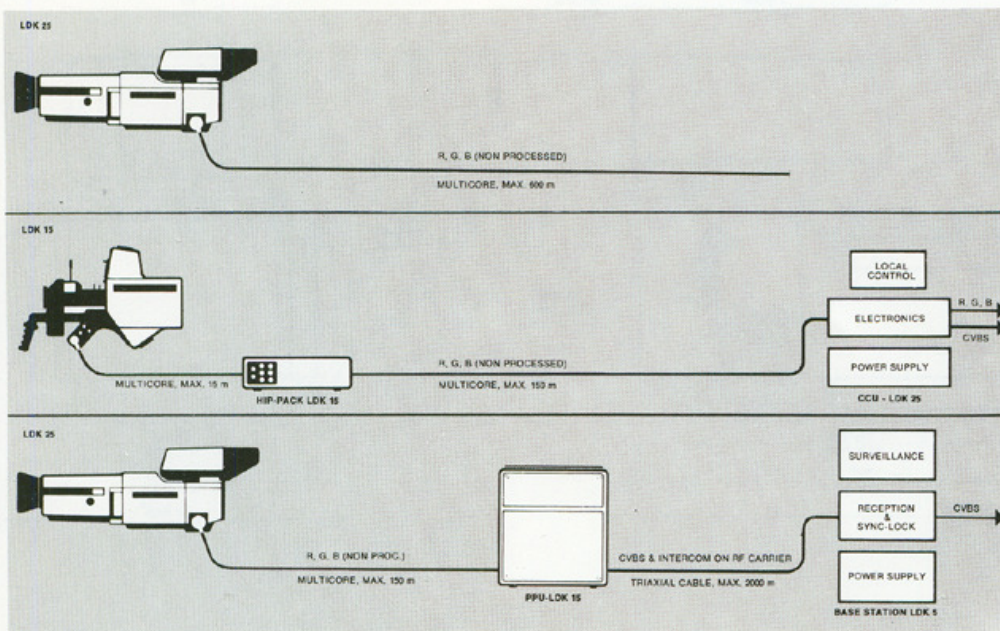
The Variable Matrix Unit provides continuously operational, as well as preset, controls of Hue and Saturation of six primary colours without affecting the gray scale.

POWER SUPPLY

The main power supply unit is full rack width and three rack units high. The power supply system contains automatic circuitry to protect the system against either open or short circuit conditions. It is internally switchable between 120 volt and 230 volts nominal A.C. mains supplies and will operate on 50/60 cycle sources without modification.



Power supply



MODES OF OPERATION

As shown in the figure, the LDK 25 equipment can be operated in different modes in conjunction with the other members of the LDK 5 camera family.

In the standard set-up of camera and CCU, the LDK 25 camera can be interchanged with an LDK 15 camera and hip-pack. This mode may be employed in outside broadcasting or in studio broadcasting for taking the special shots for drama inserts.

Alternatively, the LDK 25 camera can also be operated in conjunction with an LDK 15 portable processing unit (PPU) on a standard LDK 5 base station. This mode offers the advantage of a 2000 m camera cable length.

TECHNICAL DATA

Systems

NTSC - 525 Lines - 60 Fields/s
 PAL (B, G. H. I) - 625 Lines - 50 Fields/s
 PAL M - 525 Lines - 60 Fields/s
 SECAM - 625 Lines - 50 Fields/s

Power supply

100, 120, 220, 240 V +10%, -15%;
 47 to 63 Hz

Power consumption

Approximately 400 W (less monitoring)

Input signals

Sync and Blanking (0.75 - 4 V_{p-p})
 Subcarrier (0.5 - 2.0 V_{p-p})
 Burst Gate (0.75 - 4 V_{p-p}):
 NTSC - External or Internally Generated
 PAL - External
 PAL ident. pulse - external (square wave)
 or internally generated
 External Viewfinder Feed (1 V_{p-p} Comp.)
 Test Signal (1 V_{p-p} Comp.)
 (All signals loop through - 75 ohm)

Output signals

1 each Gamma Corrected R, B, G (0.7 V_{p-p} - 75 ohm)
 3 x Encoded Video Comp (1.0 V_{p-p} - 75 ohm)
 1 x PXM Video Comp (1.0 V_{p-p} - 75 ohm)
 1 x WFM Video Comp (1.0 V_{p-p} - 75 ohm)
 and Non Comp (0.7 V_{p-p} - 75 ohm)
 (Plus stairstep and relay key for sequential display)

Scene illumination

1000 lux (100 ft. cd.) for a signal-to-noise ratio of at least 45 dB in the Y-channel; lens iris f/2.8 (f/2.8 is about equivalent to f/4 with 1 1/4 inch Plumbicon tubes); reflection factor 60%; with linear matrixing; without contour correction; gamma = 0.5 with 5 MHz bandwidth filter; measured at 40% of peak white

Resolution

In the Y-channel, without contour correction; 40% modulation depth at 5 MHz in the picture center

Colour registration

Deviations of Red or Blue in any direction with respect to Green:
 In an ellipse with axes 0.9 of the picture height and width (Zone I), deviations will be no more than the distance equal to a horizontal scanning time of 25 nanoseconds. Within a circle of a diameter equal to the picture width (Zone II), deviations will be no more than 50 nanoseconds. Outside this circle (Zone III), deviations will be no more than 100 nanoseconds.

Geometry error

Maximum 0.5% of the picture height in Zone I. In Zones II and III, maximum 1%; Lens errors not taken into account

Gain control

Panel selector for 0 dB, +6 dB, +12 dB
 Individual Controls for ± 3 dB in each channel

Colour temperature control

5-step selector for: +1000, +2000, +3000, +4000 and +5000 °K, above the nominal colour temperature of 3200 °K
 4-position wheel for the optical filters; clear; colour no. 85; combined colour no. 85 and 0.9 N.D.; and Cap. Slide for insertion of additional dagger filters in the optical path.

Gamma correction

Panel selection of Gamma = 0.35 and 0.5
 Unity gamma select at ECU
 Differential Gamma tracking: In the white region better than 0.5%; in the black region better than 0.25%

Black level adjustment

Master control for adjustment between -65 and +35 units of the nominal white level; differential channel tracking within 0.3%. Individual control in Red and Blue for adjustment between -20 and +20 units of the nominal level.

Contour correction

Negative contour modulation; level-dependency and comb filter; noise slicer
 3-Position contour level switch at panel
 Full range control at ECU

Operational ambient temperature range

-20 °C to +45 °C

Warm up and stability

Picture quality will be acceptable after a 2-minute warm-up period. Full specifications are achieved after 30 minutes and maintained over a minimum temperature range of ± 10 °C from set up temperature

Viewfinder Type LDK 4306

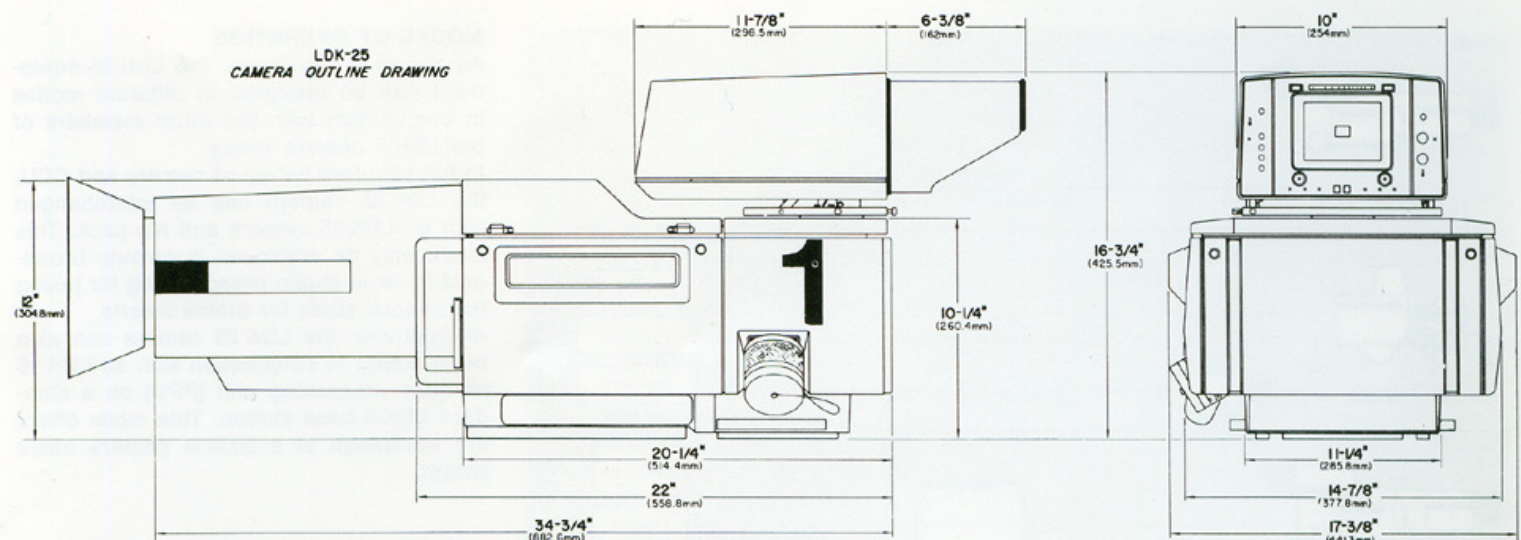
Screen Diagonal 7" (17 cm)
 Brightness - 250 ft. lamberts
 Resolution - 800 lines limiting
 Peaking Switch - +12 dB at 5 MHz
 X-ray radiation conforming to DHEW rules 21 CFR 278

Weights

Camera	
(without viewfinder or lens)	31.8 kg (70 lbs)
Viewfinder	9 kg (20 lbs)
Electronic Control Unit	13.2 kg (29 lbs)
Power Supply	26.8 kg (50 lbs)
Control Panel	2.3 kg (5 lbs)

Dimensions

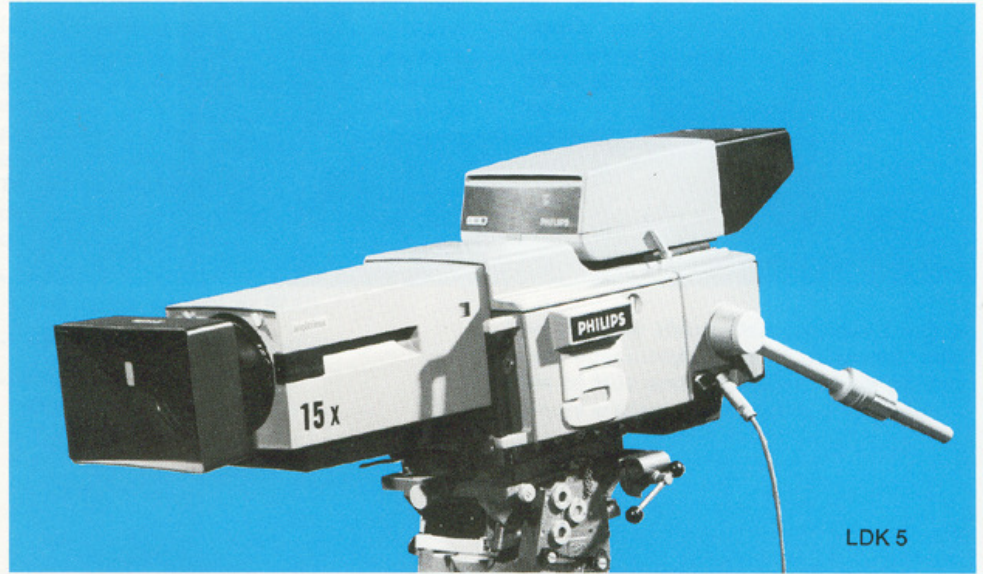
Camera: See dimensional drawings below
 Electronic Control Unit:
 178 mm H x 483 mm W x 330 mm D
 Power supply:
 133 mm H x 483 mm W x 432 mm D
 Control Panel:
 178 mm H x 218 mm W x 114 mm D
 Variable Matrix:
 178 mm H x 218 mm W x 140 mm D



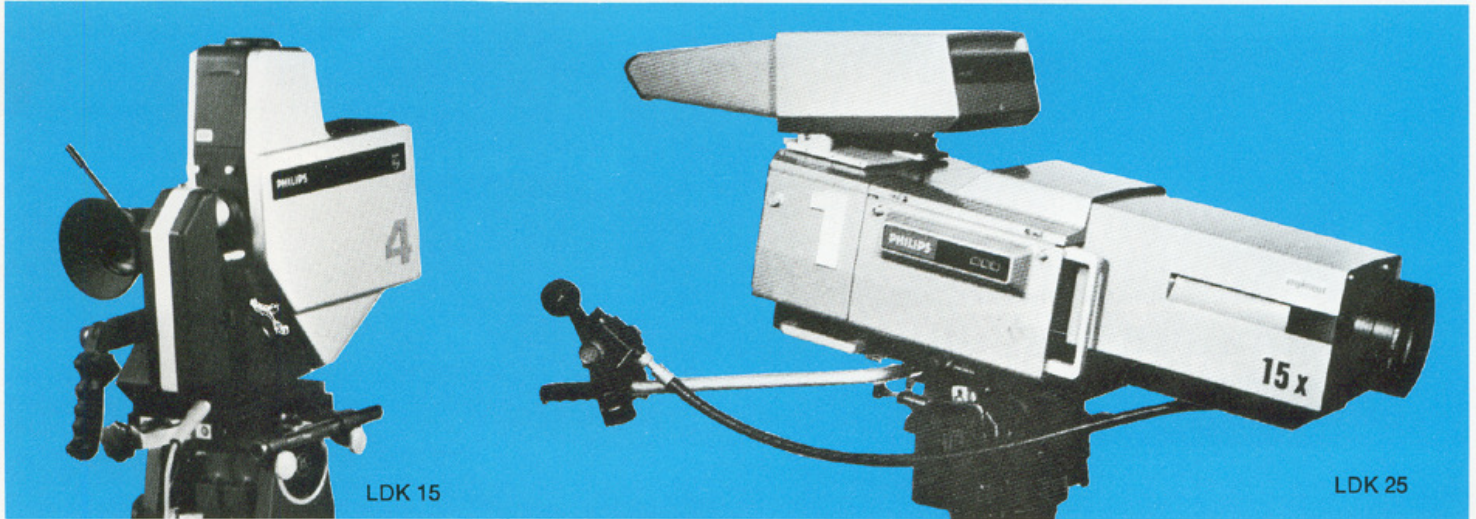
The LDK 5 Family of Colour Cameras

OPTIONS AND ACCESSORIES

LDK 4615/00	Variable matrix
LDK 4335/00	Set of automatics; iris, colourbalance and centering
XQ 1070/02	Rear loading Plumbicons
LDK 4612	Remote control for black and white painting
LDK 4613	Mono-knob control unit for iris and master black level
LDK 4614	Combined mono-knob and painting remote control
LDK 15	Portable camera head and hip-pack
LDK 4355	Portable Processing Unit for triaxial cable operation
LDK 5	Base-station for triaxial cable operation
LDK 6993/01	Camera rain and off-use cover
Spare module kits	
Camera cable:	NTSC - TV 81 type M or N or F and G 753-5
	PAL - F and G 753-5 standard
Intercom	TV 81 version, 2 wire standard
	F and G 753-5 version, 4 wire standard



LDK 5



LDK 15

LDK 25



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