PHILIPS

Multicore Production Camera

Type LDK 25-B



- Operational flexibility
- Low profile camera head
- Tiltable, rotatable viewfinder
- 1 inch Plumbicon* tubes; anti-comet tail; minimum lag
- New low-noise FET pre-amplifier
- Auto white balance
- Auto iris
- CLUE facility
- Contrast Compression
- Uses F & G 753–5 cable
- **Compatible with Philips LDK 5 and LDK 15 cameras**

*Registered trade mark for television tubes.

The LDK 25-B is a CCU version of the LDK 5-B providing most of the LDK 5's operational features while retaining identical picture quality. This camera is one of the Philips' family of broadcast cameras which includes the LDK 5-B and LDK 15L.

By replacing the LDK 5's digital and multiplex system required for triax operation, with conventional multicore cable techniques and by simplifying construction, considerable cost savings can be realised without sacrificing technical quality.

As a development within the Philips' family of colour cameras the LDK 25-B assures the broadcast station of maximum flexibility of programme coverage.

For example the LDK 25-B camera head has been designed to be compatible with the LDK 15L system. This means that LDK 15L and LDK 25-B heads can be interchanged i.e. an LDK 25-B head will connect with an LDK 15L portable processing unit whereas an LDK 15L head will connect with an LDK 25-B CCU.

With the LDK 25-B operating in conjunction with the LDK 15L portable processing unit, triax operation is possible and all LDK 5-B type operational configurations can be achieved.

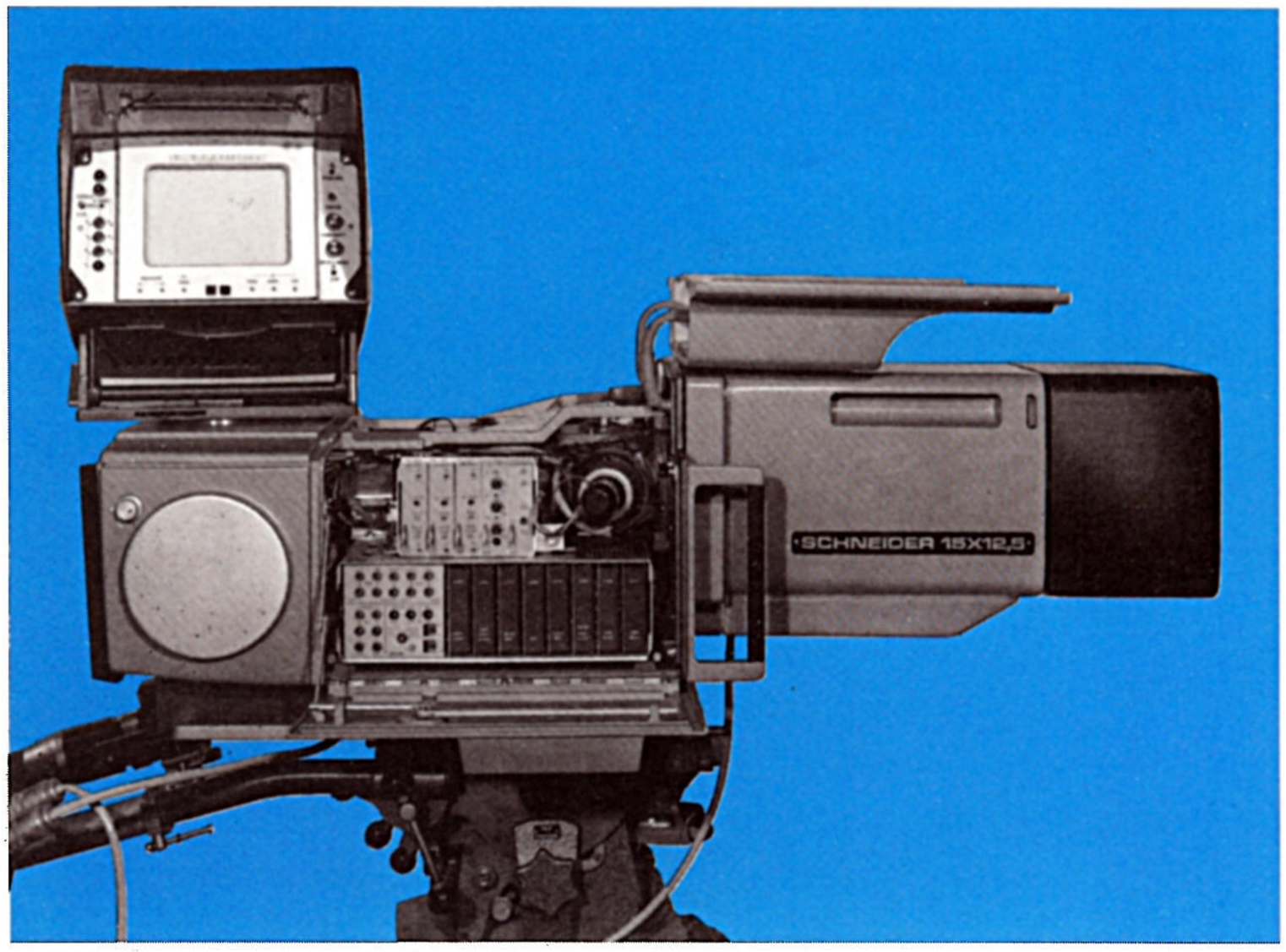
The LDK 25-B is designed to accept an extensive range of 1 inch Plumbicon tubes including XQ 1080/85 series XQ 1500 series and the XQ 2070 diode gun tube.

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The Broadcast Company of Philips

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Camera Head
Camera and viewfinder, are contained in light-weight aluminium cast housings. The removable viewfinder can also be rotated and tilted and is supplied with a detachable shade and hood for inside or outside use. Adjacent to the viewfinder are located the following controls: Brightness, Contrast, Peaking ON-OFF, Clue-Single-Overlay Selector, R-G-B-Y-E Selector, Focal Length Scale, Tally Light, and Call Light. Zoom Lenses for the LDK 25 are interchangeable with the LDK 5 and can be supplied with Manual controlled focus and zoom, as well as with full Servo control. The lens is fixed into position by means of a bayonet fitting. A key aspect of the mechanical design of the camera is the horizontal spider layout of the pick-up section. This section, which comprises the colour beamsplitting prism and the deflection units with camera tubes, is incorporated in one machined, magnesium cast block. This block is screwed to the camera front, to which the lens is also clamped. In this way, the whole optical part of the camera forms one rigid structure ensuring maximum alignment precision and registration stability.
The camera employs 1-inch Plumbicon tubes, in conjunction with deflection units of utmost mechanical and electrical precision. These tubes of separate mesh construction are fitted with a ceramic centring ring, which reduces the tolerances in optical alignment and improves the fixing of the tube target with respect to the optical image. 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 FET video pre-amplifier stage in each camera channel is mounted inside the mu-metal screen of the deflection coil assembly, as near as possible to the signal electrode, for minimum capacitance and pick-up of spurious signals.
The deflection circuitry operates on the corrections-added principle. Master generators for line and field deflection provide identical scanning waveforms for all three camera channels. Corrections of only a few per cent of the total scanning are added to the waveforms. With the exception of the horizontal and vertical fine shift controls, which have been automated, all registration and tube setting controls are presets located in the camera.

Video Processing
The LDK 25 is an RGB type of camera employing multicore cable to connect with the CCU. The camera head contains the electronic modules necessary for scanning, Plumbicon supplies and signal pre-amplification. All other circuitry is located in the CCU.
Video processing at the CCU includes cable compensation, contour correction, linear matrixing, gamma correction, contrast compression and automatic iris. Optional facilities include automatic white balance and variable matrixing. A Pal or split field NTSC colour bar is available and RGB outputs are available for chroma keying.
The LDK 25 includes a new contour processor of advanced design, providing in-band and edge-of-band contour correction. This unit may be adjusted to provide 100% resolution at 400 TV lines by setting the variable level of edge-of-band contours. In-band contours may be adjusted to provide the level of enhancement desired for transmission. Noise normally associated with contour correction is practically eliminated by including a comb filter and noise slicer. Negative contour modulation and level dependancy are also incorporated.

System Timing
All pulses required by the camera head are generated by the camera pulse module located in the head. This module generates horizontal pulses by means of a d.c. controlled oscillator. These pulses are added to the blue video channel and are sent to the CCU where they are compared in phase with a horizontal reference. Any phase difference causes a proportional d.c. error voltage to be generated and fed back to the camera pulse module oscillator to eliminate the error. This ensures that the internal system timing remains correct regardless of camera cable lengths. To avoid further timing problems all essential pulses are added to the very last stage of the CCU, making direct use of station pulses after cleaning and reshaping to standard amplitudes, widths and risetimes. Subcarrier timing control over 360 degrees is achieved at the CCU by means of a switch for coarse control and a potentiometer for fine control.

Communications
Circuits are provided to receive, mix and distribute throughout the camera system, intercom signals from three external inputs. Engineering, Production and Programme. In addition, a talkback output is provided to deliver. Production and Engineering microphone signals from the camera head to the external intercom network.
The intercom system also enables private communication between CCU operator and cameraman to be selected.

Camera Cables
The camera design is based on the use of a multiconductor camera cable, F & G type 753–5 (diam. = 13 mm.)
Cable lengths of up to 600 metres can be used.

CCU Equipment
The CCU Equipment consists of three main assemblies: the electronics unit, power supply and control panel.
a) Electronics Unit: This unit is designed for 480 mm (19 in) rack mounting and contains the circuitry necessary for processing the camera output signals and occupies four units of rack space.
b) Power Supply: This unit supplies power to the camera head and electronics unit. Designed for 480 mm (19 in) rack mounting, it occupies three units of rack space.
c) Control Panel: Required for operational control, this panel is designed to locate in a mounting frame accommodating two such panels in standard 480 mm (19 in) rack width.

Waveform Monitoring
The CCU electronics unit contains circuits to provide full video signal monitoring interface to an external waveform monitor. As well as the video output, WFM ramp voltage and relay keying signals are provided.
The following waveform monitor displays are available:
a) Sequential display of red, green, blue and encoded video.
b) Sequential display of red, green and blue video.
c) Encoded video with sync.
d) Superimposed display of red, green and blue video.
e) Red, green, blue or luminance video as determined by the picture monitor selector switches.
The order of display can readily be changed to red, blue and green.

Plumbicon Tubes
An extended range of 1-inch Plumbicon tubes is now available for use with the LDK 25. These include the XQ 1080/85 series developed by Philips as the first Anti-Comet Tail Plumbicon

tube and the most recent XQ 1500 series high resolution ACT tube. For even higher resolution the new XQ 2070 series diode gun tubes without ACT may be used. With these tubes provision has been made to optionally incorporate a Dynamic Beam Control (DBC) circuit which provides the XQ 2070 with a feature similar to ACT controlling highlights up to 4 lens stops over peak white.

Auto Iris (option)

The Auto Iris facility enables the camera exposure to be automatically adjusted. A non-additive mix of red, green and blue video provides the reference information for this circuit.

In the Auto Iris mode, peak or average exposure can be continuously selected using the Iris control.

An internal adjustment is provided to determine the speed of iris response.

Auto White Balance (option)

This automatic facility enables an accurate colour balance to be quickly achieved. The cameraman fills an engraved viewfinder graticule (approx. 15% of picture height and width) with a white reference. This allows the CCU operator to initiate the auto white balance circuit.

With the auto white switch in the OFF position, the auto white circuit is inhibited and the colour balance circuits are set to mid range – determined by the setting of the manual gain controls. To achieve balance, the operator places the auto white switch in the BAL position until the lamp goes out. This indicates that balance is complete. Before the camera is panned away from the white reference, the auto white switch should be placed in the HOLD position. This ensures that the auto white circuits memorise the settings made during balance.

To ensure that the camera video circuits operate within the limits of their normal signal levels, the amplitude of the green signal is checked to be within 80% and 120% of the uncorrected red and blue signals. This condition is necessary before automatic white balance can take place. When the auto white switch is initially placed in the BAL position the auto white lamp will light when this condition exists.

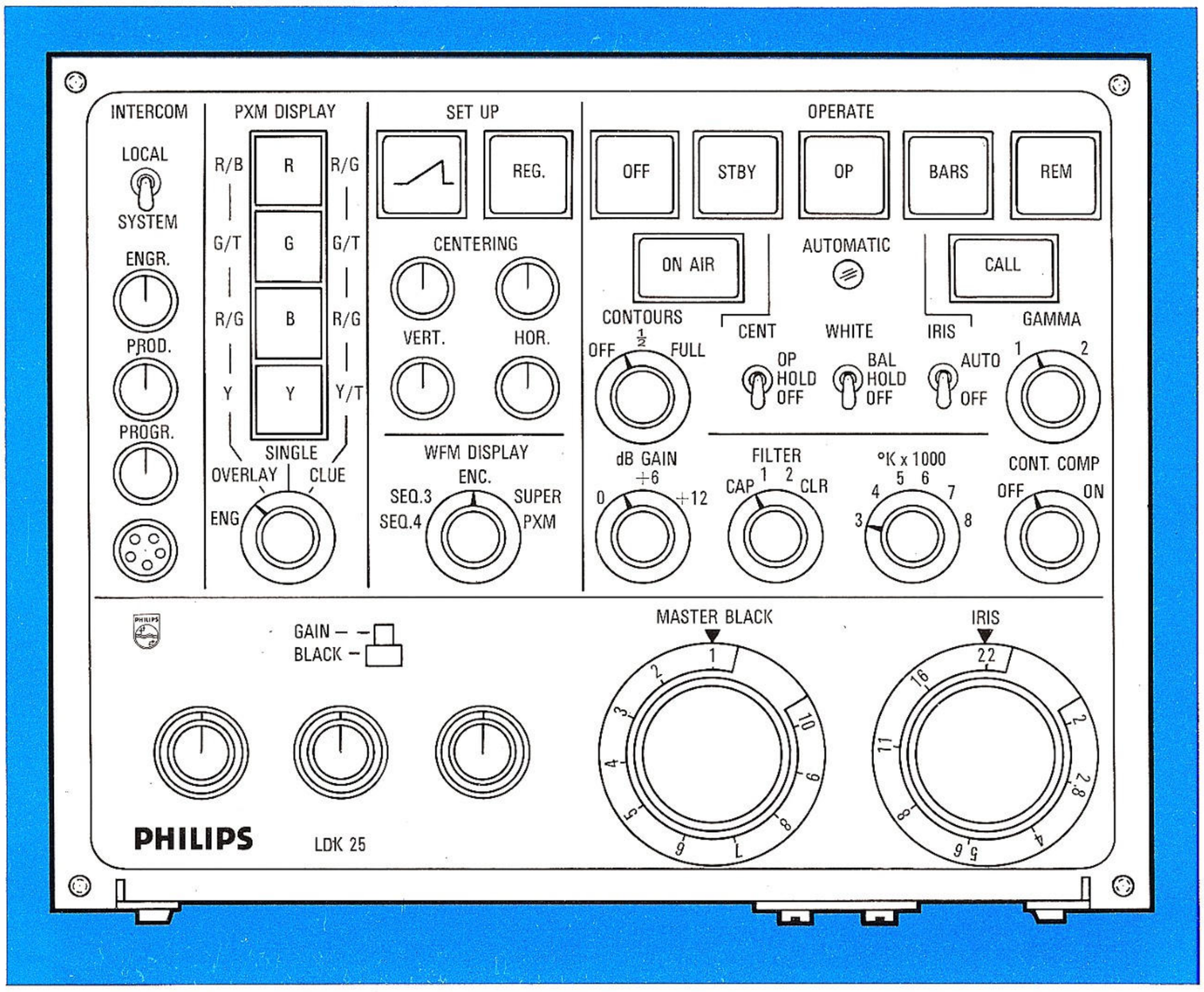
Contrast Compression

This feature enables the shadow detail of a high contrast scene to be resolved without over-exposing highlights. This is achieved by means of a contrast compression circuit in the luminance video channel only. By stretching the black areas and compressing the white areas of luminance video, scenes of extreme contrast can be viewed without changing the iris setting.

To eliminate excessive noise which could result from the increased amplification of the dark areas, a high frequency noise-stripping circuit is included. This is automatically switched on when contrast compression is selected.

Variable Matrix (option)

To allow the LDK 25 to match with other colour cameras or as a production aid where the enhancement or emphasis of a particular range of colour is desired, a variable matrix is available. This facility allows the hue and saturation of the primary and complementary colours or red, blue, green, magenta, yellow and cyan to be varied without affecting the black and white response.



CONTROL IDENTIFICATION	FUNCTION
INTERCOM SYSTEM/LOCAL	
	Switch permits private discussion between CCU operator.
ENGR., PROD., PROG.	
	Intercom volume controls.
PXM DISPLAY	
Enc	Encoded output
Overlay	Mixed R-G, B-G, T-G, Y
Single	Individual R, B, G, Y
Clue	R/G, B/G, T/G, T/Y
SET UP	Applies calibration sawtooth to pre-amplifier.
Reg	Registration set-up. Switches gamma and contours off for registration adjustments.
CENTRING	
Hor & Vert	Red and blue shift.
WFM DISPLAY	
	4 position: SEQ 4-RGBY; SEQ3-RGB; ENC – encoded output; SUPER-RGB superimposed; PXM – follows PXM single display.
OPERATE	
Off	Switches power supply off.
STBY	Switches system to standby position; CCU and camera power on, tube high voltage off.
OP	Operate – system ready for operation.
BARS	Colour bar selector.
REM	Switches master black, iris paint functions and master switched gain colour temperature and filter to remote panel: eg, joystick control.

CONTROL IDENTIFICATION	FUNCTION
On-Air	Illuminates when tally circuit is enabled.
Call	Illuminated by operating call switch on camera head.
Contours	3 positon; OFF, 1/2, FULL. Related to continuously variable amplitude available at the electronics unit.
AUTOMATIC	
White	Initiates auto-white balance circuit. Lamp indicates that video signal is between amplitude limits. It extinguishes after the short delay needed to complete balance.
Iris	Selects automatic or manual iris. In the automatic mode the IRIS control can be varied to obtain average or peak exposure.
Gamma	2 position: Linear & pre-set gamma.
Db Gain	3 position: 0 dB, +6 dB, and +12 dB.
Filter	Filter Wheel. 4 position including cap and clear.
°K × 1000	Colour Temperature. 6 position: calibration in degrees Kelvin.
Contr Comp	Contrast compression. 2 position: off/on.
Gain & Black	Red, green and blue; black level & gain.
Master Black	Control setting illuminated from rear.
Iris	Control setting illuminated from rear.

TECHNICAL DATA

Systems
PAL (B, G, H, I) 625 lines, 50 fields/sec.
or
PAL (M) 525 lines, 60 fields/sec.
or
NTSC 525 lines, 60 fields/sec.

Power Supply
100 to 120 V.
220 to 240 V.
+10% −15%.
47 to 63 Hz.

Input signals
Sync. Blanking, Burst gate, PAL ident. (optional)
Each −0·75 V to −4·0 V_{pp}.
Subcarrier 0·5 V to 2·0 V_{pp}.
Test Composite video 1 V_{pp}.
All inputs are provided with loop through connection Return loss when terminated in an external 75 Ω load = 40 dB @ 4·43 MHz.

Output signals
R, G, B, (one output of each) 0·7 V_{pp} non comp.
Monitor VBS (one output) 1·0 V_{pp} composite.
CVBS (three outputs) 1·0 V_{pp} composite.
Sending impedance 75 Ω, return loss −46 dB @ 1 MHz, −35 dB @ 5 MHz.

Scene illumination
750 lux (70 ft. cd.) for a signal-to-noise ratio of 50 dB in the Y-channel; lens iris T/2.8 (T2.8 is about equivalent to T/4 with $1\frac{1}{4}$-inch Plumbicon tubes): reflection factor 60% with linear matrixing: without contour correction: with 5 MHz bandpass filter; at 40% of peak white.

Contour Correction
Contour correction is applied both in-band and edge-of-band. The response can be adjusted to provide a modulation depth of 100% at 400 TV lines. Negative contour modulation; level dependancy and comb filter, together with a noise slicer are incorporated in the contour circuitry.

Colour registration
Deviations of Red or Blue in any direction with respect to Green:
In a circle of 0·8 of picture height (Zone 1), 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 2), deviations will be no more than 65 nanoseconds. Outside this circle (Zone 3), deviations will be no more than 125 nanoseconds.

Optional second order scan correction module
This module may be retrofitted to the LDK 25-B camera head to provide improved registration performance.
Zone 1 25 nS
Zone 2 55 nS
Zone 3 85 nS
Retrofit kit part numbers LDK 8550/18.

Geometry error
Maximum 0·5% of the picture height within an ellipse with axes 0·9 of picture height and width; In the remaining picture area, maximum 1%; Lens error not taken into account.

Gain control
Master selector for: 0 dB, +6 dB, and +12 dB
Individual controls for plus or minus 3 dB in Red, Blue and Green.

Colour temperature control
Six-step selector for 3000, 4000, 5000, 6000, 7000 and 8000°k four-position wheel for the optical filters; clear, colour no. 85; combined colour no. 85 and ND 0·9 and Cap. Slide for insertion of additional filter.

Gamma correction
Selector for linear operation and gamma = 0.5 or may be adjusted for 0·5 and 0·35.
Gamma tracking at Gamma = 0·5 better than 0·3%
at Gamma = 0·35 better than 0·5%

Black level adjustment
Master control for adjustment between −65% and +35% of the nominal white level.
Individual control in Red and Blue for adjustment between −20% and +20% of the nominal white level.

Lenses
A wide range of manually and servo-controlled zoom lenses is available.

Permissible ambient temperature range
−10 to +45°C.

Viewfinder
Picture tube, type M17–141W; screen diagonal 17 cm; high brightness 250 ft. lamberts X-ray radiation conforming to DHEW Rules 21 CFR 278 (USA performances standard).

Weights & dimensions

Camera (incl. VF):		
	length	560 mm
	width	430 mm
	height	420 mm
	weight	47.5 kg approx.
Camera Control Unit:		
	width	483 mm
	depth	276 mm
	height	178 mm
	weight	15·5 kg approx.
Power Supply:		
	width	483 mm
	depth	430 mm
	height	133 mm
	weight	22.5 kg approx.
Control Panel:		
	width	217 mm
	depth	113 mm
	height	173 mm
	weight	2·3 kg approx.

Specification details are subject to change without notice.

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