

Field Television Camera Equipment

TYPE TK-31B



FEATURES

- Short "set-up" time, fast, accurate focusing
- 7-inch aluminized Kinescope Viewfinder included as standard equipment
- Four lens positions on a rotatable turret
- Easy access to controls through wide opening hinged doors with knuckle stays
- Thermostatically controlled forced ventilation of coil and tubes
- Protection circuit for deflection failure
- "Overscan" switch for warm-up and rehearsal
- Plug-in blower, pre-amp, and yoke assemblies
- Focus Modulation for improved electrical focus
- Electro-magnetic orbiter to eliminate burn-in and prolong image orthicon life

USES

The TK-31B Field Camera Equipment is intended to be used in field television pick-ups of all kinds. The RCA 5820 image orthicon tube is especially suitable for use where the lighting conditions are poor, as is frequently the case at sporting events, in night clubs, and at other remote pick-up points. The minimum required incident illumination on the scene is .5 foot-candle. First grade results are obtained between 25 and 75 foot-candles illumination.

DESCRIPTION

The TK-31B Field Television Camera Equipment consists of the camera and viewfinder, which can be mounted on a lightweight tripod, crane type dolly or studio pedestal; and the field camera control and field power supply units—each contained in portable, easy to carry cases—which can be mounted on a horizontal table surface with all operating controls conveniently available for field use. The TK-31B design is centered around a single all-purpose camera which may be used for either field or studio applications.



Field Camera Control Unit in carrying case.

Field Camera Control, RCA MI-26066-A

The Field Camera Control for use in remote pick-ups is contained in a suitcase unit for easy carrying, and enables the video operator to monitor and control the quality of the picture signal produced by the field camera. On the front panel are located two cathode ray tubes which serve as picture quality indicators. A seven-inch aluminized kinescope is used as a picture monitor, and a three-inch CRO tube is used as a waveform monitor.

An improved feature of the Field Camera Control is the sub-assembly, plug-in, r-f type high voltage supply. It is a completely separate unit which receives only its B+ and filament voltages from the camera control, and in turn supplies the +1500 volt focus potential and 10 kv ultor voltage for the kinescope as well as the -1500 volt cathode potential for the CRO tube. This extremely compact, efficient, and well-shielded unit provides stable ultor and focus voltages and ensures constant focus and deflection on the kinescope screen.

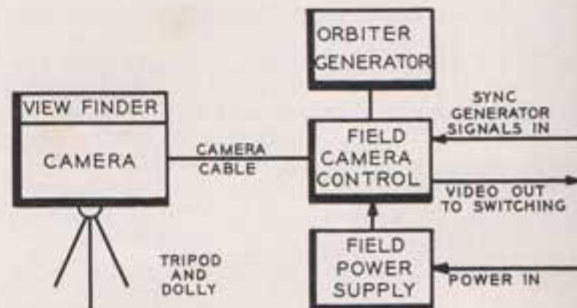
A seven-inch kinescope provides the cameraman an excellent monitor to evaluate his operation. Appropriate circuits

to obtain the maximum performance from this tube have been included. Its high contrast and brightness provide a picture which is easily observed under outdoor daylight conditions.

Improved circuitry assures a video-frequency response that in no way limits the system. New sine-wave clamping employed at three places effectively establishes black level and guarantees gray scale rendition without introducing high-frequency unbalance to damage the blanking waveform. A regenerative type blanking circuit stabilizes blanking insertion. Fixed blanking set-up adds a controlled amount of "blacker-than-black" blanking. Ability to "stretch" the whites or grays is sometimes helpful in improving inferior pictures or producing special effects in contrast. Two "black-white" stretch circuit switches permit selection of four different conditions of gray scale alteration while keeping overall video amplitude constant.

From the output stage of the video amplifier are available two identical isolated video outputs which operate at the standard level of one volt of picture signal. Monitoring is direct from the outgoing line. Sync can be mixed in the camera control and thus makes available a composite signal at each output.

The waveform monitor, or CRO, features a highly stable sweep circuit which operates at either one-half of horizontal scanning frequency or one-half of vertical scanning frequency at the operator's choice. Indirect edge lighting is used with a calibrated lucite scale over the face of the CRO tube for easy and accurate measurements. When sync is mixed in the field camera control, a complete presentation of the CRO is available which enables the operator to set the proper levels.



Field camera chain block diagram.



Field Power Supply, MI-26091.

The mechanical construction of the Field Camera Control has been designed to realize the benefits of sub-assembly construction as far as possible. A small blower provides forced cooling to the unit. Accessibility is excellent, thereby making servicing easy.

A "target-set" button is provided to automatically reduce the target potential by two volts as a means for rapidly setting the target two volts above cut-off. Both vertical and horizontal sawtooth shading signals of either polarity are available. Video response is compensated by a "3-position" switch for various cable lengths in common use.

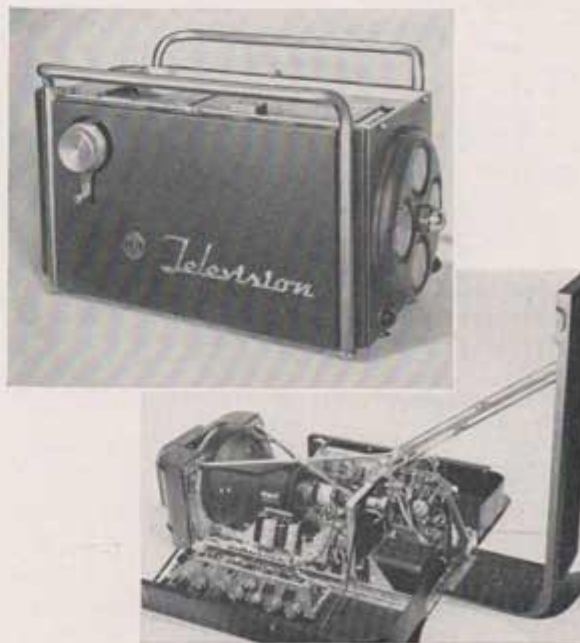
Circuitry is provided to allow use of the existing intercommunication lines in the camera cable to feed the driving currents to the electro-magnetic orbiter coil located in the camera, when the orbiting generator is plugged into the camera control. This does not affect nominal operation of the intercommunication circuits. A switch on the camera control is provided to stop the orbiting motion when a

perfectly stationary image is required, as in the case of superimpositions. A tally light provides a warning indication when the orbiter is turned off.

Field Power Supply, RCA MI-26091

The Field Power Supply, Type TY-31A, is a portable unit designed to supply all the d-c current required by the TK-31B Field Camera, Viewfinder, and Field Camera Control in one camera chain. A blower cooling system directs an air stream directly over the tubes. An important feature is the broad range of output current values at which regulated voltage may be obtained. The addition of a relay to withdraw a series regulator under light load provides a regulating range from 1.25a at 285 volts down to about 400 ma. The low end of the output range is especially useful when servicing only one unit of the camera chain, in which case the current drain is low.

TK-31B Field Camera, with viewfinder removed for easy transportation. Hinged doors allow easy servicing and maintenance.



Viewfinder Unit, which plugs into the top of the camera, features easy access to components through use of hinged doors fitted with knuckle-type stays.

SPECIFICATIONS

Performance Specifications

Type of Reproduction	Monochrome
Number of Scanning Lines	525
Odd Line Interlacing	2 to 1
Frame Repetition Rate	30 per sec.
Field Repetition Rate	60 per sec.
Line Repetition Rate	15,750 per sec.
Picture Signal Level	1.4 volts, peak to peak (1.0 volt is picture and blanking 0.4 volts is sync)
Picture Polarity at Output	Black negative
Impedance of Coaxial Transmission Line	75 ohms
Maximum Length of Camera Cable	1000 ft.
Illumination on Scene:	
(a) Incident Illumination (min.)	0.5 foot-candle
(b) Incident Illumination for Best Results	25 to 75 foot-candles (RCA 5820)

Note: Fig. for (a) above is based on use of f3.5 lens or faster.

Electrical Specifications

Power Requirements (one MI-26091):
 Field Power Supply is provided and has ratings as follows:

Primary	98-129 volts, rms, 50/60 cycle, single phase, 1350 watts, full load 14 watts, 117 volts
Output:	
Regulated	285 volts d-c, 1250 ma
Non-regulated	400 volts d-c, 90 ma
Focus Coil Current	60-90 ma

Mechanical Specifications

Camera (case only)	20 1/4" long, 12 1/8" wide, 12 1/8" high
Camera (overall)	27 1/2" long, 16" wide, 14 1/2" high
Viewfinder (case only)	22" long, 10 3/8" wide, 8 1/4" high
Viewfinder (overall)	23 1/2" long, 10 1/2" wide, 8 1/2" high
Field Camera Control (overall)	27 1/2" long, 8 1/2" wide, 17 1/2" high
Field Power Supply (overall)	26" long, 8 1/2" wide, 18 1/2" high
Weights:	
Camera (less lenses, including Viewfinder)	109 lbs.
Field Camera Control	67 lbs.
Field Power Supply	58 lbs.
Turret with 3 Lenses	4 1/4 lbs.
Camera Cable	0.4 lbs. per ft.

Total Included Angle of Lenses*	
a. 35mm, f3.3	48.5°
b. 50mm, f1.9	35.0°
c. 90mm, f3.5	20.0°
d. 135mm, f3.8	13.3°
e. 8 1/2", f3.9	8.4°
f. 13", f3.5	5.5°
g. 13", f5.0	5.5°
h. 15", f5.1	4.75°
i. 17", f5.0	4.17°
j. 25", f5.0	2.83°

* Calculated for nominal raster dimensions of .96" x 1.24".

Finish: All units are finished in two-tone umber gray wrinkle with chrome trim. Call letters are furnished in any color requested.

Tube Complement

TK-318 Camera:			
1-5820	3-12A7	3-12AU7	1-6BQ6-GT
1-6S4	1-6AQ5	1-1V2	1-6AS6
1-6X4	4-6AH6	1-6U8	1-5687
1-6CU6			
Viewfinder:			
1-6CL6	2-5763	2-12AU7	1-7TP4
4-12A7	1-6S4	1-6BQ6-GT	3-6AL5
2-1X2A	1-6AS7-G	1-OA2	
Field Camera Control:			
8-6AH6	5-6AL5	1-6CL6	10-12A7
6-12AU7	1-6AU5-GT	1-6S4	3-5763
2-6BQ6	1-7TP4	1-3KP1	2-991
1-6L6	4-1X2A	1-6BQ7A	

Field Power Supply:				
6-5R4GY	5-6AS7-G	1-6SL7-GT	2-OD3	
1-6Y6-G	1-6AC7			

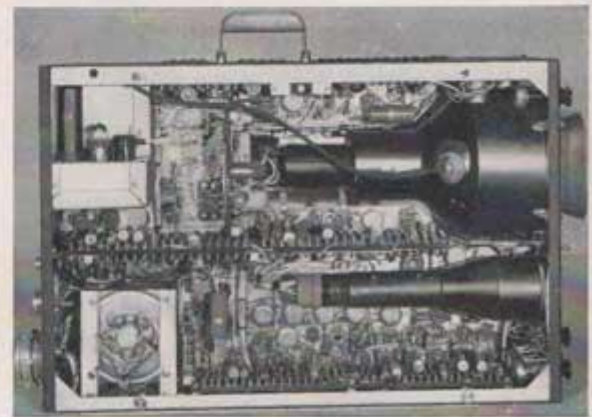
Equipment Supplied

TK-318 Field Television Camera Equipment including Equipment below plus miscellaneous fittings and instructions are supplied:

1 Camera	MI-26011-C
1 Camera Viewfinder	MI-26016-B
1 Metal Camera Tripod	MI-26046
1 Camera Control Unit	MI-26066-A
1 Power Supply	MI-26091
1 TV Friction Head	MI-26205-B
1 Set Interconnecting Cables	MI-26730
1 50 ft. Camera Cable	MI-26725-C5
1 100 ft. Camera Cable	MI-26725-C6
1 200 ft. Camera Cable	MI-26725-C7
1 Camera Lens f1.9, 50mm	MI-26550-1
1 Camera Lens f3.5, 90mm	MI-26550-2
1 Camera Lens f3.8, 135mm	MI-26550-3
2 Shock Mounts	MI-26511-A1
1 Shock Mount	MI-26511-3
1 3KP1 Cathode Ray	MI-26650
1 5820 Image Orthicon	MI-26656
1 7TP4 Kinescope	MI-26666
1 Set Call Letter Panels	MI-26546
1 Orbiting Generator	MI-26853

Accessories

Camera Lens 8.5", f3.9	MI-26550-4
Camera Lens 13", f5	MI-26590-8
Camera Lens 15", f5	MI-26590-9
Camera Lens 17", f5	MI-26590-12
Camera Lens 25", f5	MI-26550-8
Plate Current Meter	MI-21200-C1
Tripod Dolly	MI-26042-A
Cradle Type Pan and Tilt Head	MI-26203-A
Friction Type Pan and Tilt Head	MI-26205-B
Neutral Density Filter Holder	MI-26847
Protective Camera Cover	MI-26862-2
Orbiter Interconnecting Cable	MI-13333
Plastic Cover	MI-26862-1, -2



Field Camera Control Unit with side panel removed showing kinescope and CRO mounting, and circuit wiring.