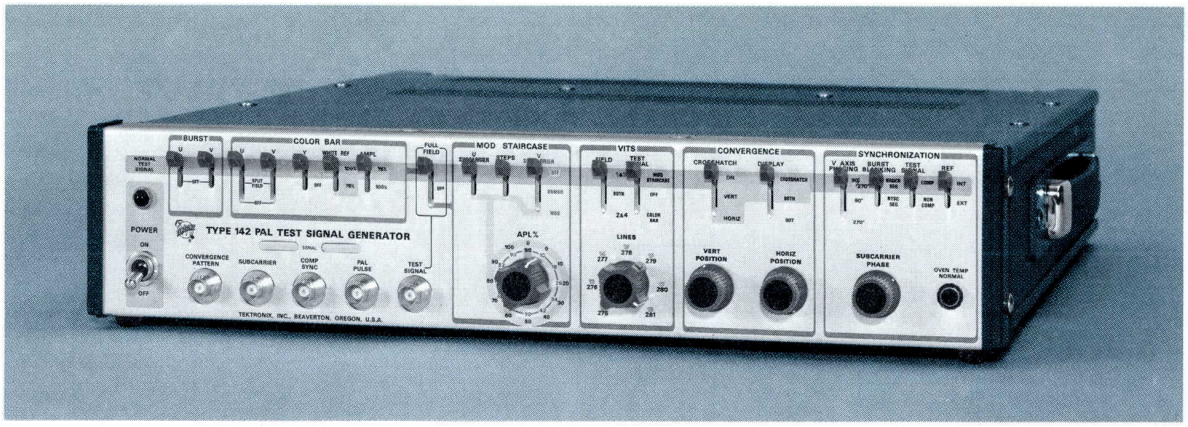
NEW

142 PAL TV Signal Generator R142



- ***525-LINE, 60-CYCLE FIELD, 3.575611 MHz SUBCARRIER***
- ***PAL COLOR BARS—FULL FIELD or SPLIT-FIELD EBU bars—75% amplitude, 100% saturated, 50 mV setup, 100% white reference (75% white reference alternatively selectable)***

  100% bars—100% amplitude, 100% saturated, 50 mV setup, 100% white reference
- ***MODULATED 5-STEP STAIRCASE Fixed or variable APL***
- ***VERTICAL INSERTION TEST SIGNAL Modulated staircase or color bars, lines 275 through 281 fields 2 and 4, lines 12 through 18 fields 1 and 3, or both pairs***
- ***CONVERGENCE CROSSHATCH For color picture monitor convergence adjustment For camera and picture monitor linearity, geometry, and aspect ratio measurements***
- ***PAL SYNC GENERATOR***

The Type 142 PAL Test Signal Generator is a source of high-quality television test signals for 525-line, 60-cycle field PAL color TV systems. The all solid-state Type 142 utilizes digital integrated circuits to achieve stability, accuracy and reliabity. The self-contained sync generator includes a temperature controlled color standard with excellent frequency stability.

Three operating modes provide PAL Color Bars, a 5-Step Staircase with fixed Average Picture Level (APL), Staircase with variable APL, with a convergence pattern on separate output. The standard color bar output is a full-field test signal appearing on every active line and consists of 75% or 100% amplitude color bars in descending luminance order with 50 mV step. With 75% amplitude the white reference can be selected for 75% or 100% levels. The combination of 75% amplitude bars and 100% white reference is known as EBU bars (European Broadcast Union). When the U and V switches are both in the SPLIT FIELD position, the chrominance signals are not present during the last 60 lines per field. Viewed on a color monitor, the color bar is a split field display, the bottom portion being in monochrome. Any component of the composite video signal may be turned off. This includes U, V, Y, the entire color bar signal, sync, burst (either U or V component or both).

The staircase signal is particularly useful with a Tektronix Type 522 Vectorscope to measure differential phase and differential gain. Luminance channel linearity may also be measured using the Tektronix video staircase differentiator part #015-0075-00 (the transient response of the staircase signal component is determined by a $\sin^2$ filter whose cut-off frequency limits the energy content in the region of the color subcarrier frequency).

The PAL subcarrier (140 mV P-P) is accurately phased at 0° (it lies along the +U PAL axis and is at the same phase on alternate lines). Subcarrier may be switched off when desired. The last step (at white level) is double width so it can be viewed with and without subcarrier to detect clipping in the white direction.

To provide VITS (Vertical Insertion Test Signal) information, the staircase or color bar signal is keyed on during a selected line of the vertical blanking interval in one or both pairs of fields, depending on the settings of the Field and Line switches.

Normal PAL color burst is provided on the staircase and color bar signals. The complex four-field burst blanking sequence during vertical interval is provided and may be switched off if desired.

The Type 142 can serve as a PAL sync generator. It provides composite blanking and composite sync outputs, line and field drive pulses and PAL V axis switching pulses. It may be synchronized with the following timing signals from another PAL sync generator: subcarrier CW, composite sync and PAL pulses. The Type 142 cannot be gen-locked by the PAL composite video signal.

The Type 142 is available in either rackmount (R142) or cabinet (142) styles.

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COLOR BARS

LUMINANCE AND CHROMINANCE AMPLITUDE ACCURACIES—(25°C reference). Absolute amplitudes of luminance signal, setup and sync are within 1% or 1.5 mV, whichever is greater. Absolute amplitudes of all subcarrier frequency components (chrominance, U and V) are within 3%. Relative amplitudes of all subcarrier frequency components, as referred to the red bar, are within 1% or 1.5 mV, whichever is greater.

BAR WIDTH—6.6 μs within 5%.

WHITE REFERENCE—100% amplitude (normal), 75% amplitude.

CHROMINANCE—Time difference between luminance and chrominance channels is 20 ns or less. Risetime is 375 ns within 15%. U, V quadrature error is 0.5° or less, V axis phase switcher error is 0.5° or less.

RESIDUAL SUBCARRIER—At least 52 dB below 1 V on white, or black.

ABERRATIONS—Within 4% of 1 V P-P.

SPURIOUS SUBCARRIER—At least 52 dB below 1 V when viewed on a Type 529 Waveform Monitor. Other spurious outputs are at least 52 dB below 1 V also.

MODULATED STAIRCASE

LUMINANCE COMPONENT—5-step amplitude is 700 mV within 1%. Single step amplitude is 140 mV within 1%. Step risetime is 260 ns within 15%. Step duration at blanking level is 13.3 μs within 5%. Intermediate step duration is 6.6 μs within 5%. Aberrations are within 2% of step amplitude.

CHROMINANCE COMPONENT—Amplitude is 140 mV P-P within 3%. Phase is 0°.

DIFFERENTIAL PHASE—0.1° or less.

DIFFERENTIAL GAIN—0.5% or less at 10%, 50%, 90% APL.

SUBCARRIER ENVELOPE—Risetime is 375 ns within 15% and duration is 39 μs within 5%.

APL 50%—When the 50% position for a normal test signal is selected, each active line carries the modulated staircase signal. APL is 50%. The V subcarrier switch is inactive in this position.

VARIABLE APL (STEPS switch ON)—Four out of five active lines carry the luminance pedestal. The staircase signal will appear on every fifth active line and any VIT line. Under these conditions the APL range is 10-90%. This is shown in red numbers in 8% increments. The V subcarrier switch is active.

VARIABLE APL (STEPS switch OFF)—With the U subcarrier switch OFF, the luminance pedestal is on every active line, and the VIT line when the VITS is the staircase signal. Under these conditions, the APL range is 0-100%. This is shown in black numbers in 10% increments. The V subcarrier switch is active.

SUBCARRIER COMPONENT (UNMOD)—30 mV within 1.5 mV during active line time of 52.3 μs.

SUBCARRIER COMPONENT (MOD)—30 mV within 1.5 mV for the first and last 13.1 μs of active line time, 300 mV within 3% for the second 13.1 μs, and 600 mV within 3% for the third 13.1 μs. Incidental phase errors between 30 mV, 300 mV, and 600 mV signals 0.5° or less. See Fig 9.

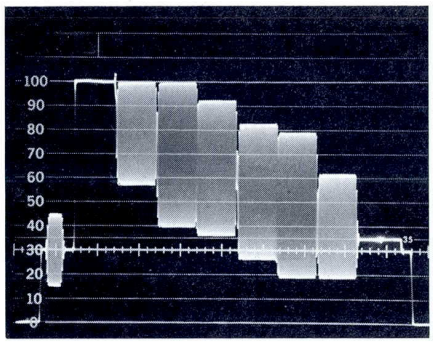

Fig 1: Full field color bars, 75% amplitude, 100% white reference.

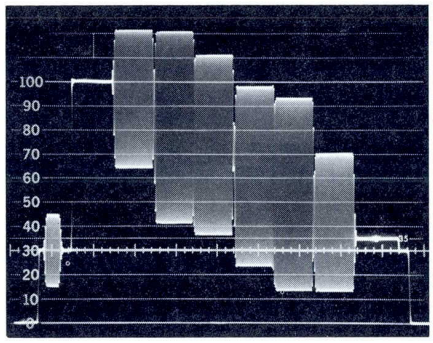

Fig 2: Full field color bars, 100% amplitude.

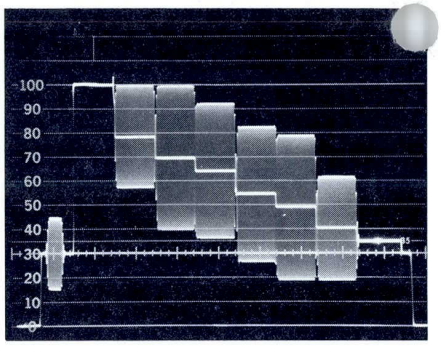

Fig 3: Split field color bars, 75% color bars at 100% saturation for ¾ of each field and luminance component only for last ¼. Useful for grey scale check of picture monitors.

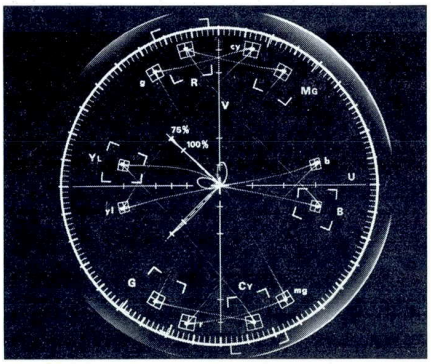

Fig 4: Vector PAL presentation of PAL color bar signal using Type 522 Vectorscope. Note clean vector transients.

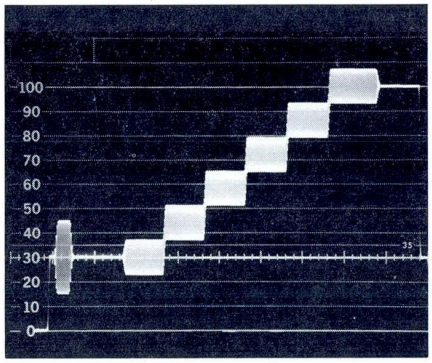

Fig 5: Modulated staircase test signal, subcarrier phased to U axis (peak white reference provided). APL is 50%.

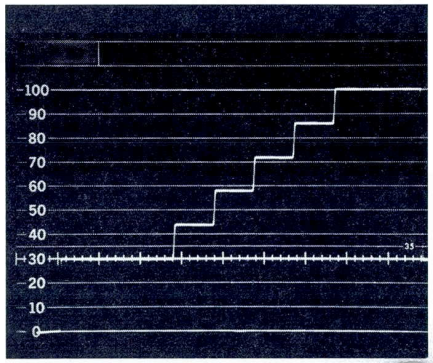

Fig 6: Staircase signal with luminance component. Identical transitions of 260 ns risetime may be differentiated to measure luminance channel amplitude linearity.

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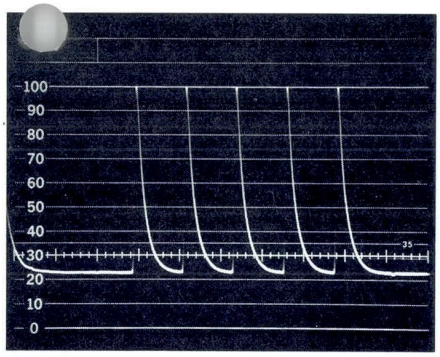

Fig 7: Staircase luminance signal differentiated by Tektronix Video Staircase Differentiator to measure amplitude non-linearity. Identical height of each pulse indicates lack of distortion in the test signal.

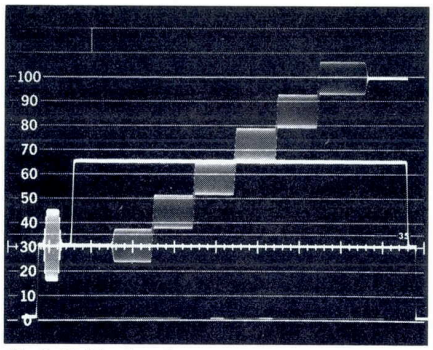

Fig 8: Modulated staircase signal with variable APL. Every fifth active line carries staircase, others have luminance pedestal variable from blanking to peak white.

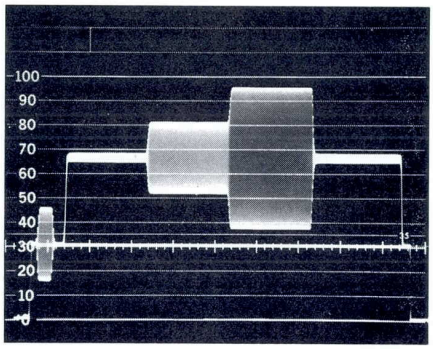

Fig 9: Luminance cross modulation may be measured with this component of the staircase test signal. Subcarrier is on the V axis, amplitudes are 30 mV, 300 mV and 600 mV.

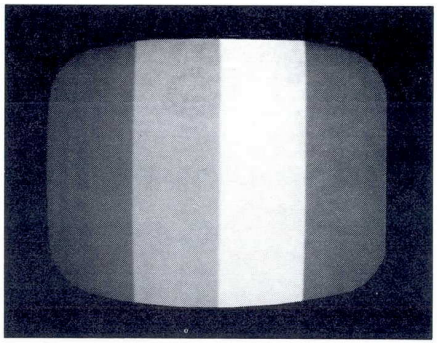

Fig 10: Picture monitor display of test signal shown in [illegible]. Luminance cross modulation causes changes in brightness on a monochrome monitor. When applied to a color monitor it can be used to phase decoders by observing the blue gun only.

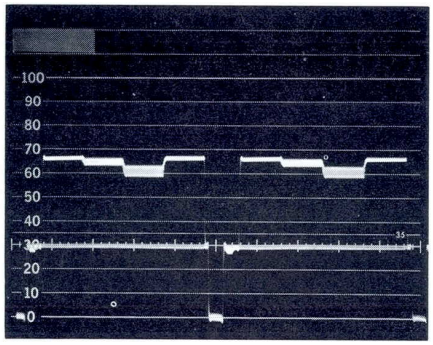

Fig 11: Luminance cross modulation occurring in a Nyquist type demodulator.

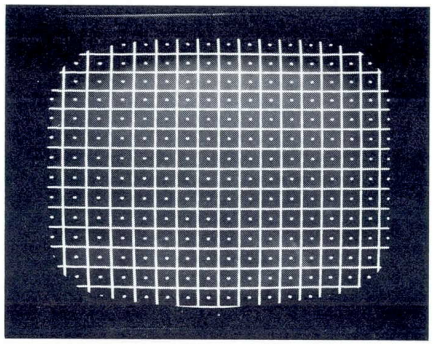

Fig 12: Convergence pattern, suitable for convergence, scanning linearity, and aspect ratio adjustments of monitors.

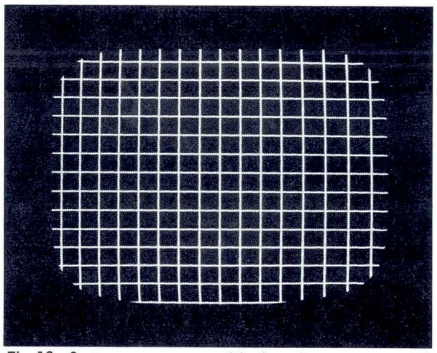

Fig 13: Convergence pattern with dots deleted. Pattern may be moved in both axes to simplify measurement of camera or monitor linearity using EIA Linearity Chart 1961.

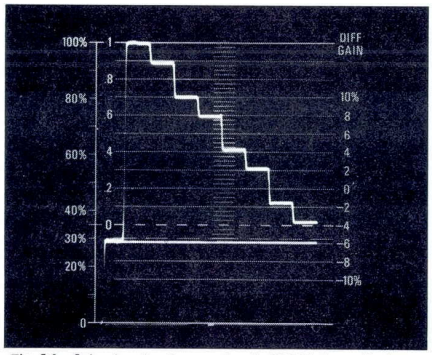

Fig 14: Color bar luminance signal, 100% bars displayed on Type 522 Vectorscope.

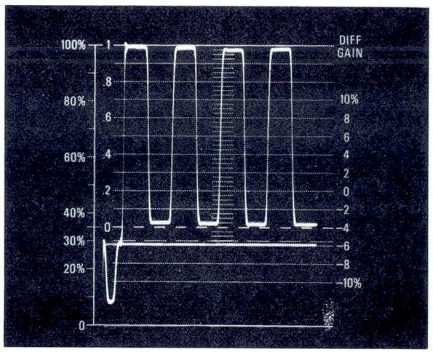

Fig 15: Decoded blue signal, 100% amplitude color bar displayed on Type 522 Vectorscope.

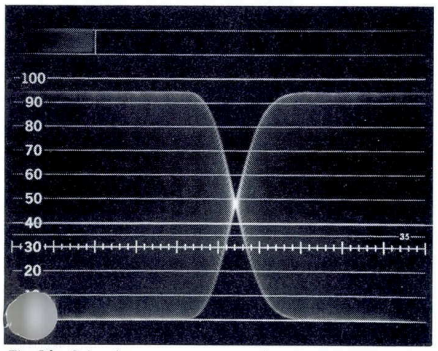

Fig 16: Color bar green-magenta chrominance transition showing excellent transient behavior of generated signal.

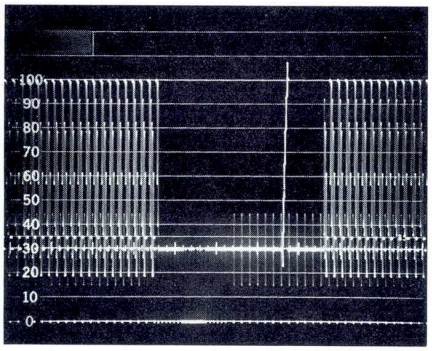

Fig 17: Either the staircase or the color bar signal may be inserted by the Type 142 on a selected line of the vertical blanking interval.

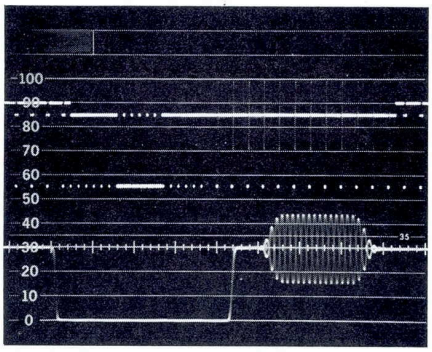

Fig 18: PAL sync signal. Standard broadcast quality sync, blanking, PAL burst blanking, and color burst as generated by the Type 142.

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VERTICAL INSERTION TEST SIGNAL

A provision is made for insertion of either the staircase or the color bar, as a vertical insertion test signal, on lines 275 through 281 fields 2 and 4, or on lines 12 through 18 fields 1 and 3, or on both pair of fields. The phase of the burst may be varied 360° with respect to the subcarrier frequency source (internal or external).

SYNC GENERATOR AND COLOR STANDARD

SUBCARRIER—Frequency is 3.575611 MHz within 5 Hz.
Outputs—2 outputs (BNC type connectors, 1 front and 1 rear panel). Output impedance is 75 Ω. Isolation is 40 dB and return loss is at least 30 dB. Output level is 2 V P-P within 0.2 V into 75 Ω.
*Input—Subcarrier input requires at least 1 V P-P. The return loss is at least 46 dB using loop-through input.

COMPOSITE SYNC
Output—A front-panel and a rear-panel output is provided. Output level is 4 V within 0.2 V. Return loss is at least 30 dB to 5 MHz. Isolation is at least 40 dB.
*Input—Required amplitude is at least 2 V P-P. Return loss is at least 46 dB using loop-through input.

PAL PULSE—Amplitude and phasing are internally selected and independent of front-panel V AXIS PHASING switch.
Output—A front-panel and a rear-panel output provide a negative pulse of 4 V within 0.2 V into 75 Ω. Duration is 4.7 μs within 0.2 μs, rise and falltime is 115 ns within 15%. Negative transition is coincident with leading edge of line sync pulse on lines with 135° or 225° (internally selected) burst phasing. Return loss is at least 30 dB, isolation is at least 40 dB.
*Input—Required amplitude is at least 2 V P-P. Return loss is at least 46 dB using loop-through input.

TEST SIGNAL—Two outputs are provided through BNC type connectors, one front panel and one rear panel. The test signal consists of composite sync and video test signals as selected by front-panel controls. Amplitude is 1 V P-P into 75 Ω. Return loss is at least 30 dB. Isolation is 40 dB.

COMPOSITE BLANKING—One rear-panel output is provided through a BNC type connector. Output level is 4 V within 0.2 V. Return loss is at least 30 dB. Risetime is 115 ns.

VERTICAL DRIVE—4 V within 0.2 V into 75 Ω, one rear panel output. Return loss is at least 30 dB. Risetime is 115 ns.

HORIZONTAL DRIVE—4 V within 0.2 V into 75 Ω, one rear panel output. Return loss is at least 30 dB. Risetime is 115 ns.

BURST FLAG—4 V within 0.2 V into 75 Ω. Duration is 2.3 μs within 5%, return loss is at least 30 dB. Delay from horizontal sync is 5.0 μs within 5%. Risetime is 115 ns.

CONVERGENCE PATTERN—One front panel and one rear panel output provide a 1 V composite video signal, consisting of composite sync and convergence pattern signals as selected by the front-panel controls. Return loss is 30 dB. Isolation is 40 dB.

*Inputs are optional and only required for synchronizing with another PAL sync generator.

LINE PERIOD—63.5 μs (digitally determined from 3.57[illegible] MHz).

BURST—Half amplitude duration of envelope is 2.22 to 2.61 μs (approximately 10 cycles). Breezeway is at least 379 ns. Burst component is 300 mV P-P within 3%. V Component is 212 mV P-P within 3%. U component is 212 mV P-P within 3%. Amplitude ratio of U/V is 1.00 within 1%. Amplitude on successive lines—smaller is between 97% and 100% of the larger. Phasing—135° within 1° and 225° within 1° on successive lines. Phasing between successive bursts is 90° within 1°.

LINE BLANKING—11.1 μs (digitally determined from 3.575611 MHz).

FRONT PORCH—1.54 μs within 0.05 μs measured at 10% from blanking.

LINE SYNC PULSE—Width is 4.71 μs within 0.05 μs, rise and falltime is 115 ns within 10%.

FIELD BLANKING—21 lines, 1334 μs (digitally determined from 3.575611 MHz).

EQUALIZATION PULSE SEQUENCE DURATION—First and second sequence 3H (6 pulses).

FIELD SYNC PULSE DURATION—27.3 μs within 0.2 μs.

INTERVAL BETWEEN FIELD SYNC PULSES—4.5 μs within 0.2 μs.

OTHER CHARACTERISTICS

POWER REQUIREMENTS
90 to 136 VAC or 180 to 272 VAC, 48 Hz to 66 Hz. 55 W max at 230 VAC, 50 Hz. A rear-panel selector provides accommodation for 6 line voltage ranges.

AMBIENT TEMPERATURE—Performance characteristics are valid over an ambient temperature range of 0°C to +50°C (except as noted).

DIMENSIONS AND WEIGHTS

Type 142	Height	3½ in	8.9 cm
	Width	16¾ in	42.6 cm
	Depth	18½ in	47.7 cm
	Net weight	17¾ lb	8.0 kg
Type R142	Height	3½ in	8.9 cm
	Width	19 in	48.3 cm
	Depth	18¼ in	47.7 cm
	Net weight	18½ lb	8.4 kg

INCLUDED STANDARD ACCESSORIES
75-Ω through-line termination (011-0103-02); 7½ foot 3-wire power cord (161-0036-00); 2 instruction manuals (070-1031-00). Type R142 also includes rackmounting hardware (351-0195-00).

TYPE 142 PAL TELEVISION TEST SIGNAL GENERATOR **$2000**

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U.S. Sales Prices FOB Beaverton, Oregon
Please refer to Terms and Shipment, General Information page.