SPECIFICATION

This section specifies the electrical, mechanical, and environmental performance requirements of the 371.

■Performance Conditions

The following electrical and environmental characteristics are valid for instruments operated at ambient temperature between +10°C to +40°C, after an initial warm-up period of 20 minutes and when previously calibrated at a temperature between +15°C to +25°C.

The performance of all stimulus outputs (Collector High Current, Collector High Voltage, Step Gen Current, Step Gen Voltage) should be verified on the Test Fixture Unit, which is provided as a standard accessory.

TABLE 1-4
Electrical Specification

Characteristic	Performance Requirement	Supplemental Information
COLLECTOR SUPPLY		
Collector Supply Polarity		Selected by the Collector Supply POLARITY button.
NPN -	Positive pulse for 300 W/3 kW Peak Power Watts. Positive rectified sine-squared wave for 30 W/3 W Peak Power Watts.	
PNP -	Negative pulse for 300 W/3 kW Peak Power Watts. Negative rectified sine-squared wave for 30 W/3 W Peak Power Watts.	

TABLE 1-4 (cont.)
Electrical Specification

Characteristic	Performance Requirement	Supplemental Information
COLLECTOR SUPPLY (cont.)		
Peak Power Watts Range	3 kW, 300 W, 30 W, 3 W	Selected by the PEAK POWER WATTS buttons. Derived from nominal peak open circuit collector voltages and nominal series resistance value.
Collector Peak Current		With a shorted load in the Test Fixture Unit.
3 kW range	400 A	Pulsed Collector Supply
300 W range	40 A	Pulsed Collector Supply
30 W range	40 mA, -20%, + 20%	Sine wave Collector Supply
3 W range	4 mA, -20%, - 20%	Sine wave Collector Supply
Maximum Peak Voltage	Peak open circuit voltage	At 100% Collector Supply VARIABLE.
3 kW range	30 V, + 10%, -5%	Pulsed Collector Supply

TABLE 1-4 (cont.)
Electrical Specification

Characteristic	Performance Requirement	Supplemental Information
COLLECTOR SUPPLY (cont.)		
300 W range	30 V, + 10%, -5%	Pulsed Collector Supply
30 W range	3 kV, + 10%, -0%	Rectified sine-squared wave Collector Supply
3 W range	3 kV, + 10%, -0%	Rectified sine-squared wave Collector Supply
Collector Supply Variable	0 to 100.0%.	% of maximum peak voltage value is displayed in the CRT readout area. Provides uncalibrated variable control of the collector supply amplitude from 0 to 100% in 0.1% increments.
Looping Compensation	Valid for High Voltage mode.	Cancels stray capacitance between the collector terminal and ground at Collector Supply PEAK POWER WATTS 30 W/3 W.
Sweep Start Voltage	Less than − 10%, -10% of peak volt.	Valid for High Voltage mode

TABLE 1-4 (cont.)
Electrical Specification

Characteristic	Performance Requirement	Supplemental Information
COLLECTOR SUPPLY (cont.)		
OUTPUTS Indicator		Lights when all outputs (COLLECTOR SUPPLY, STEP GENERATOR output terminals) are enabled.
Pulsed Collector Supply	Pulse amplitude is controlled by the Collector Supply VARIABLE.	Available in High Current mode (PEAK POWER WATTS 3 kW/300 W).
Repetition Rate	One-fourth (.25X) line frequency.	At 3 kW PEAK POWER WATTS.
	One-half (0.5X) line frequency	At 300 W PEAK POWER WATTS.
Pulse Width (Half Amplitude)	250 µs + 10%, -10%	More than 30% of the Collector Supply VARIABLE at open circuit.
	150 µs to 250 µs	5% to 30% of the Collector Supply VARIABLE at open circuit.
Rise Time/ Fall Time	40 µs to 120 µs	With Collector Supply VARIABLE at 50%.
Overshoot/ Undershoot	Less than 5% of the total output.	More than 5% of the Collector Supply VARIABLE at open circuit.

TABLE 1-4 (cont.)
Electrical Specification

Characteristic	Performance Requirement	Supplemental Information
STEP GENERATOR		
Accuracy (Current or Voltage Steps, including Offset)		
Incremental	Within 2% between any two steps.	Without STEP MULTI .1X enabled.
	Within 5% between any two steps.	With STEP MULTI .1X enabled.
Absolute	Within 2% of total output ± 3% of STEP/OFFSET AMPLITUDE setting − 10 nA or 2 mV	Without STEP MULTI .1X enabled
	Within 4% of total output ± 5% of STEP/OFFSET AMPLITUDE setting − 10 nA or 2 mV	With STEP MULTI .1X enabled
Offset Control Range	Variable, 0 to 5 times STEP/ OFFSET AMPLITUDE setting.	Same polarity as step signal. Control resolution is 1%.
Number of Steps	0 to 5	
Step Polarity	Positive, Negative.	Corresponds to the Collector Supply POLARITY when Step Generator INVERT is disabled.

TABLE 1-4 (cont.)
Electrical Specification

Characteristic	Performance Requirement	Supplemental Information
STEP GENERATOR (cont.)		
Step Rate	One-fourth (0.25X) the line frequency.	At 3 kW PEAK POWER WATTS.
	One-half (0.5X) the line frequency.	At 300 W PEAK POWER WATTS.
	Twice (2X) the line frequency.	At 30 W/3 W PEAK POWER WATTS.
Current Mode		Provides current staircase or pulsed current step.
Amplitude Range		Selected by the STEP/ OFFSET AMPLITUDE switch.
Normal Step	1 μA to 2 mA in a 1-2-5 sequence.	Collector Supply High Voltage mode (30 W/3 W)
Pulsed Step	1 mA to 2 A in a 1-2-5 sequence.	Collector Supply High Voltage mode (3 kW/300 W)
Maximum Current	10 times the step amplitude.	
Maximum Voltage	12 V, −20%, -20%	

TABLE 1-4 (cont.)
Electrical Specification

Characteristic	Performance Requirement	Supplemental Information
STEP GENERATOR (cont.)		
Ripple Plus Noise	Less than 1% of the step amplitude − 10 nA.	Checked with an oscilloscope with 20 MHz bandwidth.
Voltage Mode		Provides a voltage staircase step.
Step Amplitude Range	200 mV to 5 V in a 1-2-5 sequence.	Selected by the STEP/ OFFSET AMPLITUDE control.
Short Circuit Current Limiting	100 mA, +50%, -20%	
Maximum Voltage	10 times the STEP/ OFFSET AMPLITUDE setting.	
Ripple Plus Noise	Within 1% of the step amplitude − 10mV	Checked with an oscilloscope with 20 MHz bandwidth.

TABLE 1-4 (cont.)
Electrical Specification

Characteristic	Performance Requirement	Supplemental Information
STEP GENERATOR (cont.)		
Pulsed Current Steps		When pulsed Collector Supply (PEAK POWER WATTS 3 kW/300 W) is selected, the step current automatically becomes pulsed.
Pulse Width	500 µs, +10%, -10%.	With 1 kΩ load, 1 mA/step
Rise Time	Less than 40 µs	With 1 kΩ load, 1 mA/step
Fall Time	Less than 40 µs	With 1 kΩ load, 1 mA/step
Overshoot/ Undershoot	Less than 10%	With 1 kΩ load, 1 mA/step and zero COLLECTOR SUPPLY VARIABLE.

TABLE 1-4 (cont.)
Electrical Specification

Characteristic	Performance Requirement	Supplemental Information
VERTICAL DEFLECTION SYSTEM		
Collector Current (Ic)		
Range	1 A/DIV to 50 A/DIV	With PEAK POWER WATTS set to 3 kW
	500 mA/DIV to 5 A/DIV	With PEAK POWER WATTS set to 300 W
	100 µA/DIV to 5 mA/DIV	With PEAK POWER WATTS set to 30 W
	10 µA/DIV to 500 µA/DIV	With PEAK POWER WATTS set to 3 W
Accuracy	Within 0.1 division of the vertical graticule lines.	
Cursor Accuracy	Within 1.5% of the readout ± 0.1 division of the CURRENT/DIV setting.	In Store mode (use the DOT cursor).
HORIZONTAL DEFLECTION SYSTEM		
Collector Supply		
Range	Volts (V_{CE}): 100 mV/DIV to 5 V/DIV in a 1-2-5 sequence.	With PEAK POWER WATTS set to 3 kW/300 W
	50 V/DIV to 500 V/DIV in a 1-2-5 sequence.	With PEAK POWER WATTS set to 30 W/3 W

TABLE 1-4 (cont.)
Electrical Specification

Characteristic	Performance Requirement	Supplemental Information
HORIZONTAL DEFLECTION SYSTEM(cont.)		
Step Generator Volts (V_{BE})		
Range	100 mV/DIV to 5 V/DIV in a 1-2-5 sequence.	
Accuracy	Within 0.1 division.	
Cursor Accuracy	Within 1.5% of the readout – 0.1 division of the HORIZONTAL VOLTS/DIV setting.	Checked with the Dot cursor.
	At 100 mV/DIV COLLECTOR: Within 5% of the readout – 0.2 division of the HORIZONTAL VOLTS/DIV setting.	
CRT AND READOUT		
CRT		
Type	Electrostatic deflection	
Phosphor	P31	
Screen Size	7-inch diagonal, internal graticule and scale factor.	

TABLE 1-4 (cont.)
Electrical Specification

Characteristic	Performance Requirement	Supplemental Information
CRT (cont.)		
Orthogonality	90°, within 0.6°	
Trace Rotation	At least ±3°	
Geometry	0.5 minor division or less of tilt or bowing	
	0.75 minor division or less of keystone effect.	
TEXT DISPLAY		
Alphanumeric Character Set (1)	ASCII character set except double quote (") (u is recognized as μ)	GPIB-accessible with the TEXt command.
Alphanumeric Character Set (2)	space, A, B . . . Z, space, m, μ, n, p, ., 0, 1 . . . 9, -, /, *, (,), =	Accessible with the VERTICAL CURRENT/DIV and HORIZONTAL VOLTS/DIV controls.
Maximum Text String Length	24 characters.	
Character Size	Approximately 3 mm height, 2 mm width.	

TABLE 1-4 (cont.)
Electrical Specification

Characteristic	Performance Requirement		
POWER SOURCE			
Line Voltage Ranges		**Fuses**	
Nominal	**Range**	**Main**	**Collector**
240 V	216 V-250 V	250 V, 1 A, slow-blow	250 V, 2 A, slow-blow
200 V	180 V-220 V		
120 V	108 V-132 V	250 V, 2 A, slow-blow	250 V, 4 A, slow-blow
100 V	90 V-110 V		
Line Frequency	48 Hz-63 Hz		
Maximum Power	400 W, 4.5 A		

TABLE 1-5
Mechanical Specification

Characteristic	Specification
Weight	Approximately 79.3 lbs. (36 kg)
Height	Approximately 13.1 inches (333 mm)
	With feet and handles removed: Approximately 12.2 inches (310 mm)
Width	Approximately 16.9 inches (429 mm)
Depth	Approximately 24.1 inches (638 mm)

TABLE 1-6
Environmental Specification

Characteristic	Performance Requirement
Temperature	
Non-Operating	-40°C to +65°C.
Operating	−10°C to −40°C.
Altitude	
Non-Operating	to 50,000 feet
Operating	to 15,000 feet
	Maximum operating temperature decreases 1°C each 1,000 feet above 5,000 feet.
Humidity	
Non-operating/ Operating	MIL-T-28800D paragraph 4.5.5.1.1.2. (5 days humidity with temperature cycling)

TABLE 1-6 (cont.)
Environmental Specification

Characteristic	Performance Requirement
EMC[1] (Electromagnetic compatibility)	
Conducted	
Emissions	CE03 MIL-STD-461B Part 4, Curve 1 DIN 57871/VDE 0871/6.78 Class B
Susceptibility	CS06 MIL-STD-461B Part 5 plus additional requirements: CS01 MIL-STD-461B Part 7 CS02 MIL-STD-461B Part 4
Radiated	
Emissions	RE02 MIL-STD-461B Part 7 FCC Part 15, Subpart J, Class A DIN 5781/VDE 1871/6.78 Class B
Susceptibility	RS03 MIL-STD-461B PART 7 Limit to 1 GHz RS01 MIL-STD-461B Part 4 characterization only
Electrostatic Discharge	Mainframe: 15 kV Bubble Cassette: 5 kV Adapter Socket: 5 kV
Safety	UL1244[1] (Standard for electrical and electronic measuring and testing equipment) CSA Electrical Bulletin No. 556

[1]**Not applicable when the 371 is rackmounted.**

TABLE 1-6 (cont.)
Environmental Specification

Characteristic	Performance Requirement
Vibration (operating)	MIL-T-28800B Section 4.5.5.3.1
Shock (non-operating)	MIL-T-28800B Section 4.5.5.4.1
Bench Handling	MIL-T-28800B, Section 4.5.5.4.3.
Packaged Transportation Drop	ASTM D775-61 Method 1, Paragraph 5
Package Transportation Vibration	ASTM D999-75 Method A. Paragraph 7.1