S400UX

Parametric Test System

- **Open, expandable test environment simplifies development of test programs without coding**
- **Well suited for both novice and expert system users**
- **Simplifies migration from VAX/VMS environment to the UNIX environment**
- **Incorporate third-party software into the test environment, for expanded capabilities at minimal added cost**
- **Applications for every phase of device design, development and production**

The S400UX is an integrated package of hardware and software tools, offering semiconductor fabs the industry's most complete solution for automated parametric testing.

Wide Test Development Flexibility

There's no need to learn a high-level programming language—even novice users can create executable test sequences in minutes without ever writing a line of code. However, the software also includes tools that make it equally suitable for experienced test programmers, offering wide flexibility for those who prefer to write their own routines or modify those included in the package. The S400UX relies on the Keithley Test Environment (KTE) software interface for test development and execution.

Easy Migration from S425/S450

The S400UX is hardware compatible with its predecessors, the S425 and S450 systems, and offers a cost-effective software migration path for facilities planning to upgrade to a UNIX test environment.

Wide Range of Hardware Options

In addition to the standard source/measure instrumentation, the S400UX can be customized with a variety of options to tailor it for particular applications.

Capacitance Meters

The S400UX can be equipped with high speed, single-frequency capacitance meters operating at either 100kHz or 1MHz. These units can also measure conductance to correct for series resistance in capacitance measurements. If multi-frequency capacitance measurements are required, an Agilent 4284 LCR meter can be integrated into the system.

Microvoltmeter Option

If low voltage measurements are needed, a Keithley Model 2000 DMM can be added to provide microvolt-level measurement resolution.

Frequency Measurements

The optional Keithley Model 776 Frequency Counter allows the S400UX to measure devices such as ring oscillators.

High Voltage Option

For characterizing high voltage devices, the S400UX can be equipped with the Keithley Model 237 Source-Measure Unit and an external matrix to allow measurements up to 1100V.

Pulse Generator Option

The S400UX supports the Agilent 81110 pulse generator for applications such as flash memory testing.

Ordering Information

S400UX UNIX-Based Parametric Test System

This product is available with an Extended Warranty.

UNIX-based parametric test system

SEMICONDUCTOR

1.888.KEITHLEY (U.S. only)

www.keithley.com

KEITHLEY

A GREATER MEASURE OF CONFIDENCE

S400UX Parametric Test System

INSTRUMENTATION CONFIGURATION

Base System:

S425 and S450: 8 to 96 pins (installed in groups of 8).

S475: 12 to 48 pins (installed in groups of 12).

All pins Kelvin and guarded to probe needles.

2 to 8 VIMS.

System Reference Unit (for calibration)

Options:

High Speed 1MHz or 100kHz Capacitance Meter

Picoammeter

Microvoltmeter

Multifrequency Capacitance Meter

Pulse Generator (up to two, each single or dual channel)

Frequency Counter

High Current Pulsed Voltage Source (MIVS)

High Current SMU

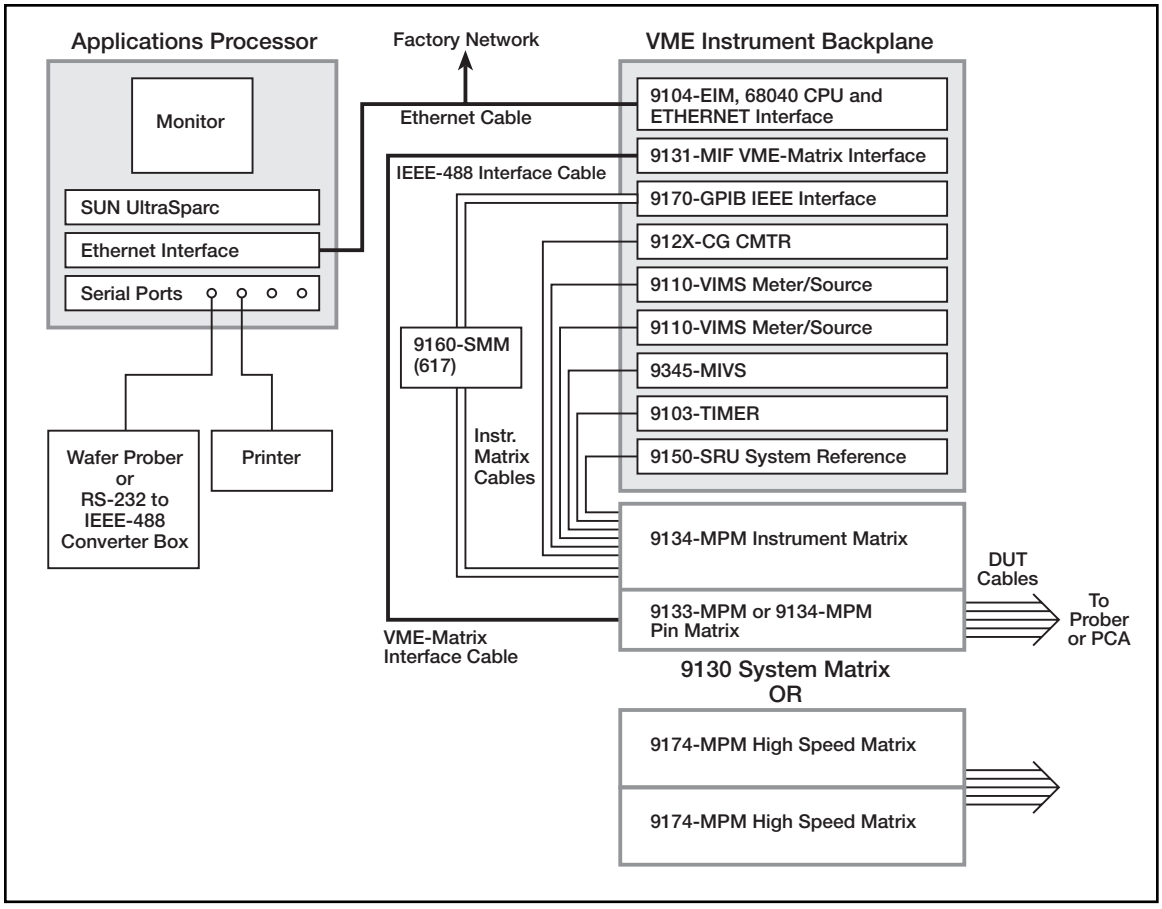
High Voltage SMU and Matrix

SYSTEM CONTROLLER: SUN UltraSPARC workstation with Solaris Operating System, Ethernet port, 19″ monitor and optional tape drive.

PROBER SUPPORT: All major semiconductor wafer probers are supported, including the EG1034X, EG4060/4080/4090, EG2001/2010/3010/4085, R&K 680, KLA 1007, TEL 19S/20S, TEL P-8, TSK 6000, TSK APM-90A, TSK UF190/200. To check if your particular prober is supported, contact your local sales representative.

PROBE CARDS: The optional Model 9139A-PCA provides a turn-key probe card interface that utilizes a ceramic blade card for guaranteed system performance.

S400 Series Instrumentation (Ethernet Version)



S400UX Parametric Test System

S400 Series Instrumentation

INTRODUCTION

All specifications given in this section apply over the temperature range 21° to 25°C, with a relative humidity between 30% and 50% non-condensing (conditions at system air intake).

All specifications apply to a complete system and represent performance to the end of a two-meter DUT cable, with the exceptions of items marked with an asterisk (*). These specifications apply only to the module being described and must be modified in a complete system to reflect the effects of the matrix.

RELAY MATRICES

S425 and S450 Matrix Electrical Specifications

The S425 and S450 relay matrices are a full Kelvin, driven guard and grounded shield, crosspoint matrix organization. There are 6 pathways, of which 2 have a 10× leakage improvement over the remaining 4, and up to 96 DUT pins and 24 instrument terminals. Each crosspoint consists of a 3-pole reed relay. Each pathway is an independent node which can be connected to any of the system instrument terminals plus any DUT pins.

Electrical specifications for the matrix are summarized in the following table (for a single card file, 48 pin matrix with 16 instrument terminals and 2 meter test station cables).

Parameter	Standard Pathway	High-Quality Pathway
Temperature	23°C ±2°C	23°C ±2°C
Humidity	50% R.H. (max.)	50% R.H. (max.)
Offset Voltage (Differential) (Constant Temperature):	± 55 μV	± 30 μV
Self-Generated Current (typical DC Current):	2.0 pA	1.0 pA
Leakage (DC leakage, pA/V):		
Path to Ground (Guard Driven):	2.0 pA/V	0.2 pA/V
Path to Path:	1.0 pA/V	0.1 pA/V
Capacitance:		
Path to Ground (Guard Driven):	≤ 100 pF	≤ 50 pF
Path to Path (typical):	12.0 pF	6.0 pF
Maximum Voltage from any pin to any other pin or ground (non-switched):	300 V	300 V
Maximum Carry Current (non-switched):	1.0 A	1.0 A

S475 MATRIX ELECTRICAL SPECIFICATIONS

The S475 relay matrix is a full Kelvin, driven guard and grounded shield, crosspoint matrix organization. There are 8 pathways, which provide high quality switching of I-V and C-V signals for up to 48 DUT pins and 24 instrument terminals. Each crosspoint consists of a 3-pole reed relay. Each pathway is an independent node, which can be connected to any of the system instrument terminals plus any DUT pins.

Electrical specifications for the matrix are summarized in the following list (for a single card file, 48 pin matrix with 16 instrument terminals and 2 meter test station cables).

TEMPERATURE: 23°C ±2°C.

HUMIDITY: 30–50% Relative Humidity (max.).

SELF-GENERATED CURRENT (typical DC Current): <0.3 pA.

LEAKAGE (DC leakage, pA/V): Path to Ground (Guard Driven): 30 fA/V. **Path to Path:** 15 fA/V.

CAPACITANCE: Path to Ground (Guard Driven): <30pF. **Path to Path (typical):** 3.0pF.

MAXIMUM VOLTAGE FROM ANY PIN TO ANY OTHER PIN OR GROUND (non-switched): 200 V.

MAXIMUM CARRY CURRENT (non-switched): 2.0A.

VOLTAGE & CURRENT FORCING & MEASURING (VIMS)

The Model 9110 Voltage/Current Measurement/Source Unit (VIMS) is an accurate, high-speed differential power source and measurement module. It incorporates into one module the functions that were previously performed by a series of instruments–voltmeter, current meter, voltage source and current source. It is capable of sourcing while simultaneously performing voltage and current measurements.

The VIMS uses 16 bit DACs providing resolutions of 13.5μV and 700fA on the lowest ranges.

The following apply to all VIMS modules:

TEMPERATURE: 21°C to 25°C.

CALIBRATION CYCLE: 30 days.

VOLTAGE SOURCING MODE

Range	Resolution	Accuracy ±(% reading + offset)
200 V	13.5 mV	±(0.05 % + 100 mV)
40 V	1.35 mV	±(0.05 % + 10 mV)
4 V	135 μV	±(0.05 % + 1 mV)
0.4 V	13.5 μV	±(0.075 % + 150 μV)

MAXIMUM CURRENT LIMIT: ±200mA (source or sink).

SENSING: Remote, at end of DUT cable.

SETTLING TIME: <300μs.

OUTPUT RESISTANCE: <50mΩ.

CURRENT SOURCING MODE

Range	Resolution	Accuracy ±(% reading + offset)
200 mA	7 μA	±(0.06 % + 100 μA)
20 mA	700 nA	±(0.06 % + 10 μA)
2 mA	70 nA	±(0.06 % + 1 μA)
200 μA	7 nA	±(0.06 % + 100 nA)
20 μA	700 pA	±(0.06 % + 10 nA)
2 μA	70 pA	±(0.06 % + 1 nA)
200 nA	7 pA	±(0.35 % + 120 pA)
20 nA	700 fA	±(0.50 % + 15 pA)

VOLTAGE LIMIT: ±200V.

OUTPUT RESISTANCE: >50TΩ.

Note: Current can be sourced from 0.1% to 100.0% of each range.

VOLTAGE MEASUREMENT MODE

Range	Resolution	Accuracy ±(% reading + offset)
200 V	13.5 mV	±(0.04 % + 100 mV)
40 V	1.35 mV	±(0.04 % + 10 mV)
4 V	135 μV	±(0.04 % + 1 mV)
0.4 V	13.5 μV	±(0.06 % + 150 μV)

CMRR: >100dB.

NMRR: >55dB.

INPUT CURRENT: 25pA (max.).

INPUT IMPEDANCE: Input HI: >50TΩ. Input LO: >1TΩ.

Note: Differential measurement is possible to 300 V, using the system matrix. Single ended measurements are restricted to 200 V.

SPECIFICATION RANGE: 1% to 100% of selected range.

CURRENT MEASUREMENT MODE

Range	Resolution	Accuracy ±(% reading + offset)
200 mA	7 μA	±(0.06 % + 100 μA)
20 mA	700 nA	±(0.06 % + 10 μA)
2 mA	70 nA	±(0.06 % + 1 μA)
200 μA	7 nA	±(0.06 % + 100 nA)
20 μA	700 pA	±(0.06 % + 10 nA)
2 μA	70 pA	±(0.06 % + 1 nA)
200 nA	7 pA	±(0.35 % + 120 pA)
20 nA	700 fA	±(0.50 % + 15 pA)

An additional error of ±0.2 pA/V on the high quality pathways and ±2pA/V on the standard pathways of the Model 9130 matrix must be added.

INPUT VOLTAGE DROP: <1.5 mV.

NMRR: >55dB with integrator.

GUARD SPECIFICATIONS

All signals are fully guarded to the DUT.

TRACKING ACCURACY: <0.2% of signal.

TRACKING SPEED: <15μs of Source/Measure value.

S400UX Parametric Test System

OPTIONAL SYSTEM INSTRUMENTATION

CAPACITANCE/ CONDUCTANCE METER (1MHz & 100kHz)

The Keithley Capacitance/Conductance (CG) meter is a module used to measure capacitance and/or series or parallel resistance (reciprocal of conductance) accurately. The CG meter is available in two forms: 100kHz with 45mV drive and 1MHz with 45mV drive. *(Note: Each form is a separate card in the VME sub-system; as such a user would need one of each if both frequencies are desired.)* One instrument incorporates the functions that were previously preformed by a series of instruments—a capacitance meter, external bias supply, and calibration and reference sources. The CG meter can perform flexible and sophisticated test routines on a wide variety of devices.

NOTE: Other capacitance measurement options including the HP 4284 are available. Please contact the factory for additional information.

Specifications apply to the end of the DUT 2-meter cable, and are measured through the matrix. All measurement functions will perform within the net accuracy specified after a probes up zero to remove residual probes, cables and matrix offsets.

MODEL 9126 1MHz CG METER SPECIFICATIONS (Typical Case)

Range	Resolution	Accuracy ±(% reading + offset)
C: 15 pF	0.006 pF	[0.3 + (3.0E+3 * Gm + 0.09)] pF
G: 100 µS	0.03 µS	[1.0 + (9.0E+10 * Cm + 0.2)] µS
NOISE: Capacitance ±2 Sigma:	0.02 pF	
Conductance ±2 Sigma:	0.2 µS	
C: 200 pF	0.06 pF	[0.45 + (4.5E+3 * Gm + 0.8)] pF
G: 2000 µS	0.3 µS	[0.25 + (6.0E+10 * Cm +15.0)] µS
NOISE: Capacitance ±2 Sigma:	0.2 pF	
Conductance ±2 Sigma:	1.5 µS	
C: 1000 pF	0.6 pF	[0.4 + (3.0E+3 * Gm + 4.0)] pF
G: 10 mS	3.0 µS	[0.5 + (3.0E+10 * Cm + 45)] µS
NOISE: Capacitance ±2 Sigma:	1.2 pF	
Conductance ±2 Sigma:	20 µS	

Cm: Measured Capacitance. Gm: Measured Conductance.

Accuracy is specified under following conditions:

1. Temperature 21°C to 25°C.
2. Calibration interval using on-board references ≤30 days.
3. Probe-up offset nulled.
4. Q > 1 for 15pF and 200pF ranges.
   Q > 10 for 1000pF range.
5. For single-point-measurement add noise specifications.
6. Matrix is no greater than 48 pins 2m DUT cables.
7. Measurements made with filter off.

TEST FREQUENCY: 1MHz ±0.1%.

SIGNAL DRIVE LEVEL: 45mV rms.

MODEL 9121 100kHz CG METER SPECIFICATIONS (Typical Case)

Range	Resolution	Accuracy ±(% reading + offset)
C: 20 pF	0.006 pF	[0.25 + (1.5E+5 * Gm + 0.2)] pF
G: 20 µS	0.003 µS	[0.75 + (3.0E+10 * Cm + 0.1)] µS
NOISE: Capacitance ±2 Sigma:	0.03 pF	
Conductance ±2 Sigma:	0.02 µS	
C: 200 pF	0.06 pF	[0.25 + (3.0E+4 * Gm + 0.8)] pF
G: 200 µS	0.03 µS	[0.25 + (5.0E+9 * Cm +1.0)] µS
NOISE: Capacitance ±2 Sigma:	0.15 pF	
Conductance ±2 Sigma:	0.02 µS	
C: 1000 pF	0.6 pF	[0.25 + (3.0E+4 * Gm + 3.5)] pF
G: 1 mS	0.3 µS	[0.5 + (3.0E+10 * Cm + 2.5)] µS
NOISE: Capacitance ±2 Sigma:	0.8 pF	
Conductance ±2 Sigma:	0.3 µS	

Cm: Measured Capacitance. Gm: Measured Conductance.

Accuracy is specified under following conditions:

1. Temperature 21°C to 25°C.
2. Calibration interval using on-board references ≤30 days.
3. Probe-up offset nulled.
4. Q > 1 for 20pF and 200pF ranges.
   Q > 10 for 1000pF range.
5. For single-point-measurement add noise specifications.
6. Matrix is no greater than 48 pins 2m DUT cables.
7. Measurements made with filter on.

TEST FREQUENCY: 100 kHz ±0.1%.

SIGNAL DRIVE LEVEL: 45mV rms.

OPTIONAL SYSTEM INSTRUMENTATION (continued)

MODEL 9162-PAU

The 9162-PAU is a VME based module which allows high speed picoamp- level measurements. It extends the system current measurement capabilities to 7.6fA resolution. This unit also features a flexible filtering system that provides measurements as fast as 1ms in bypass mode to a 200ms 5- pole Gaussian filter for low current measurements.

Range	Resolution	Accuracy ±(% reading + offset)
20 mA	0.763 µA	0.1% + 5 µA
2 mA	76.3 nA	0.1% + 500 nA
200 µA	7.63 nA	0.1% + 50 nA
20 µA	763 pA	0.1% + 5 nA
2 µA	76.3 pA	0.1% + 500 pA
200 nA	7.63 pA	0.2% + 50 pA
20 nA	763 fA	0.5% + 5 pA
2 nA	76.3 fA	0.8% + 2 pA
200 pA	7.63 fA	1.0% + 1 pA

INPUT BURDEN: 100 µV + 100µV * (I_{meas}/I_{fs}).

MAXIMUM COMMON MODE VOLTAGE: ±200 V.

NOTE: These specifications apply for a bias of 0.0V after proper zeroing. For bias values other than 0.0V, the typical matrix specification should be included.

MICROVOLTMETER MODULE

The Model 9321-VMTR microvoltmeter module consists of a Keithley 2000 Series Digital Multimeter, cables and software driver. The Model 9321-VMTR provides very high speed, low voltage measurement capability and augments the Model 9110 in measuring voltages from sub-microvolt to 300V. This instrument is useful in measuring structures, including van der Pauw structures, contact chains, metal resistors, and other devices where small voltages must be measured quickly and accurately.

Range	Resolution	Accuracy ±(% full scale + offset)
200 mV	10 nV	0.1% + 100 µV
2 V	100 nV	0.1% + 2 mV
20 V	1 µV	0.1% + 20 mV
200 V	10 µV	0.1% + 200 mV

TIMER MODULE

The Model 9195-ETM Timer Module is a VME-based timer board that is used to evaluate time-related phenomena. This card, with its associated software, allows the user to determine when an event occurs to a resolution of 8µs. For example, the WLR software routines use the Model 9195-ETM in measuring Time Dependent Dielectric Breakdown (TDDB). Other uses of the timer module include generation of C-T plots, or other measurements that require knowledge of when a measurement or event occurred.

RESOLUTION: 8.0µs.

RANGE: 8.0µs to 134.21s.

ACCURACY: ±(8.0µs + 0.01%).

FREQUENCY COUNTER MODULE

The Models 9350-FCM Frequency Counter Module provides an integrated instrument for measuring ring oscillators and other AC signals. With proper drive signals and cable terminations, signals as great as 30MHz can be measured through the switch matrix. Optionally, the frequency counter can be connected to the devices external to the matrix, with the entire frequency range of the meter possible.

MEDIUM CURRENT VOLTAGE SOURCE (MIVS)

The Medium Current Voltage Source (MIVS) is a pulsed voltage source that supplies up to 2A through the S400 switching matrix. It allows voltage and current to be measured simultaneously at the end of a programmed pulse width. This source is well suited for the measurement of active devices, where the power associated with a DC source leads to junction heating and a change in device characteristics. The MIVS generates pulses as short as 20µs in duration to ensure thermal effects are minimized. Typical applications include measurement of I_{dss} and Gm of GaAs MESFETS, I_{dsat} and I_{dmax} of Medium Power MOS devices, and I_{ce} and Beta of Bipolar transistors.

VOLTAGE

	Range	Resolution	Accuracy ±(% reading + offset)
Force:	±20 V	10 mV	±(0.25% + 20 mV)
Measure:	±20 V	1 mV	±(0.15% + 20 mV)

CURRENT RANGE: 200mA, 2A.

CURRENT LIMIT: 20% to 100% range +5%, –0%.

CURRENT

	Range	Resolution	Accuracy ±(% reading + offset)
Measure:	2 A	0.2 mA	±(0.25% + 0.5 mA)
	200 mA	0.02 mA	±(0.25% + 0.05 mA)

WIDTH: 15µs to 16ms*

ACCURACY: 1% + 500ns.

RESOLUTION: 250ns

RISE/FALL TIME: 15µs (10% to 90%).

SETTLING TIME: 35µs (0.2% of final value).

MINIMUM WIDTH: 15µs.

OVERSHOOT: <1%.

PULSE GENERATOR MODULE

The Models 9336-PGM and 9336-DPGM offer single or dual channel solutions. The Models 9336-PGM and 9336-DPGM consist of an HP 81110A pulse generator, cables and driver software. These instruments are controlled via the VME-IEEE-488 bus. These models are capable of delivering pulses of up to 20V in amplitude with pulse widths from 20ns to 998ms. The pulse generator option is useful in characterizing various programmable devices, including EPROMs, EEPROMs, Flash EPROMs, and PLAs.

Through Matrix:

Frequency Range (bandwidth): 1.00Hz–50MHz.

Transition Time: 20ns–200 ms.

Delay: 0–998ms.

Width: 100.0ns–998ms.

Width Accuracy: <±5%.

Amplitude (either polarity): 100mV–20V.

Amplitude Accuracy: <±2%.

Overshoot: <±5% of amplitude.

S400UX Parametric Test System

OPTIONAL SYSTEM INSTRUMENTATION (continued)

SYSTEM MEASUREMENT MODULE

The System Measurement Module (SMM) is an integrated Keithley Model 617 Electrometer, which extends the current measurement capabilities to 10fA resolution.

Range	Resolution	Accuracy ±(% reading + offset)
200 pA	10 fA	1.6 + 1
2 nA	100 fA	0.25 + 5
20 nA	1 pA	0.25 + 1
200 nA	10 pA	0.25 + 1
2 µA	100 pA	0.15 + 4
20 µA	1 nA	0.15 + 1
200 µA	10 nA	0.15 + 1
2 mA	100 nA	0.15 + 4
20 mA	1 µA	0.15 + 4

These are the basic instrument performance specifications. For system level performance, add matrix leakage (0.2pA/V for high quality pathways and 2.0pA/V for standard pathways) specification. No S400 system level specifications apply to the 2pA and 20pA ranges on the Model 617. The performance specifications that exist for this unit in a system environment are significantly better than can be verified by the system's diagnostics. Given the system leakage and offset specifications, a basic performance of approximately 3pA can be realized. The only method that can be used to verify this performance level is to provide an external source/reference back into the system and then measure this known reference with the 617. This will provide a confidence factor that the unit is performing to its internal specifications.

GENERAL INFORMATION

CABLES

Although sometimes overlooked, the test station cables and connectors are an important part of the test system. The Keithley S400 system uses high-quality four-wire Teflon cable to bring the signals from the test matrix to the probe card connector. By using this high-quality cable and a custom designed and manufactured connector, measurement accuracy is greatly improved over other test systems.

INSTALLATION INFORMATION

The S400 has four voltage options available: one for the U.S., two for Europe and one for Pacific Basin. Current consumption depends upon the system options and CPU and peripheral devices selected. All internal voltages required by the instruments are generated by power supplies included in the standard system.

POWER AND POWER LINE CONDITIONING

Keithley test systems require an instrument-quality power source with minimum voltage and frequency disturbances. In all cases, the power lines must be free of transient impulses, surges, sags, interruptions, and frequency variations. Fluctuations in line voltages can cause system errors and less than optimum performance, and power conditioning equipment may be required should the power source be below standard.

Installation of a dedicated power distribution panel for the system will prevent interference and disturbances from nearby equipment. Along with the need for an adequate supply to handle the present system, a power expansion factor to accommodate future system expansion should also be considered.

GROUNDING

Proper grounding is essential to keep electrical noise under control. A proper ground offers low impedance to earth for static discharge and induced electrical current. Grounding also prevents electric shock in the event of power fault.

Keithley recommends a single point earth reference and a separate circuit for all major system components. Each cabinet should be on a separate circuit with a dedicated neutral and safety ground conductor. These safety ground conductors must be insulated and should terminate at one point in the distribution panel. This termination point should be the only earth reference for the system.

The purpose of a single point grounding is to preserve signal integrity between elements of the system by providing a common system reference. Isolated ground receptacles are preferred as they assist in achieving a single point earth reference system and minimize the effect of ground noise.

SYSTEM REFERENCE UNIT (SRU)

The System Reference Unit (SRU) contains the NBS traceable components necessary to perform software calibration of the system. Designed into this module are 10 precision resistors and 4 precision voltage references. In addition to the reference units, the SRU provides the necessary circuitry for checking of driven guard shorts.

Verification of reference values can be done by the customer's calibration lab through the use of triax connections. This allows the customers to satisfy most special calibration requirements.

VOLTAGE REFERENCES

Voltage	Accuracy (1 yr.)
190.0 V	0.015%
38.0 V	0.010%
3.80 V	0.010%
0.380 V	0.010%

CALIBRATION REFERENCE RESISTORS

Resistance	Accuracy
10 Ω	0.015%
100 Ω	0.010%
1000 Ω	0.010%
10 kΩ	0.010%
100 kΩ	0.010%
1000 kΩ	0.0185%
10 MΩ	0.020%
100 MΩ	0.15%
1000 MΩ	0.3%
10 GΩ	0.6%

Resistors are measured using the four-wire Kelvin connections on the system.

TEMPERATURE: 23°C ±2°C.

S400UX Parametric Test System

GENERAL SPECIFICATIONS

System Voltage Requirements

U.S. VERSION SYSTEM VOLTAGE SPECIFICATION

INPUT VOLTAGE: 110 to 125VAC, single phase, 3-wire.
INPUT FREQUENCY: 50/60Hz.
MAXIMUM INPUT CURRENT: 20A continuous.
MAXIMUM INPUT POWER: 2.5kVA.
OUTPUT VOLTAGE:
Instrument Output: Main input voltage.
Computer Output: Main input voltage.
Fan Output: Main input voltage.
MAXIMUM CURRENT:
Instrument Output*: 12A.
Computer Output*: 12A.
Fan Output*: 1A.
*Total must not exceed 20A continuous.
INPUT PLUG: NEMA L5-30P, 125VAC, 30A.

JAPAN VERSION SYSTEM VOLTAGE SPECIFICATION

INPUT VOLTAGE: 96 to 108VAC, single phase, 3-wire.
INPUT FREQUENCY: 50/60Hz.
MAXIMUM INPUT CURRENT: 20A continuous.
MAXIMUM INPUT POWER: 2.2kVA.
OUTPUT VOLTAGE:
Instrument Output: 110 to 125VAC.
Computer Output: Main input voltage.
Fan Output: 110 to 125VAC.
MAXIMUM CURRENT:
Instrument Output*: 11A.
Computer Output*: 12A.
Fan Output*: 1A.
*Total must not exceed 20A continuous.
INPUT PLUG: NEMA L5-30P, 125VAC, 30A.

EUROPE 220 VAC VERSION SYSTEM VOLTAGE SPECIFICATION

INPUT VOLTAGE: 211 to 239VAC, single phase, 3-wire.
INPUT FREQUENCY: 50Hz.
MAXIMUM INPUT CURRENT: 10A continuous.
MAXIMUM INPUT POWER: 2.4kVA.
OUTPUT VOLTAGE:
Instrument Output: 110 to 125VAC.
Computer Output: Main input voltage.
Fan Output: 115 to 125VAC.
MAXIMUM CURRENT:
Instrument Output*: 10A Pri 5.5A.
Computer Output*: 6A.
Fan Output*: 1A Pri 0.6A.
* Total must not exceed 10A continuous.
INPUT PLUG: CEE 7/7 (Schuko), 220VAC, 16A.

EUROPE 240 VAC VERSION SYSTEM VOLTAGE SPECIFICATION

INPUT VOLTAGE: 230 to 250VAC, single phase, 3-wire.
INPUT FREQUENCY: 50Hz.
MAXIMUM INPUT CURRENT: 10A continuous.
MAXIMUM INPUT POWER: 2.5kVA.
OUTPUT VOLTAGE:
Instrument Output: 110 to 125VAC.
Computer Output: Main input voltage.
Fan Output: 110 to 125VAC.
MAXIMUM CURRENT:
Instrument Output*: 10A Pri 5.5A.
Computer Output*: 6A.
Fan Output*: 1A Pri 0.6A.
* Total must not exceed 10A continuous.
INPUT PLUG: CEE 7/7 (Schuko), 220VAC, 16A.

RECOMMENDED OPERATING ENVIRONMENT

The system area environment (temperature and humidity) has a substantial effect on the overall performance of a system, and control of the system environment is necessary for the most consistent system operation. A marginal system environment can produce marginal system performance.

An ideal clean room environment has an air distribution system which provides cool, well-filtered, humidified air, with air pressure kept higher than the pressure of adjacent areas to prevent dust infiltration. All windows and doors should be made weather tight, and the use of slow operating door closers should be avoided. Double glass is recommended for large window areas.

Keithley test systems are air cooled, with the air being circulated internally by blowers in each cabinet. Generally, air enters the unit through a filter and a blower located on or near the top of the cabinet and exits at the bottom. Since some equipment generates more heat than others, an efficient method for distributing and balancing the air conditioning is desirable. Other factors to consider are static electricity and electromagnetic interference, both of which, if not properly controlled, may affect system operation.

The system operating environment should be individually evaluated by a Keithley Field Service Engineer. For optimal system performance, Keithley recommends the following operating environment:

TEMPERATURE: 23°C ±2°C (70°F ±4°F).

RELATIVE HUMIDITY: 30% to 50%.

The system will operate outside of these specifications but with degraded performance. It should also be noted that environment stability can also be a problem. Large swings in any of these parameters can be detrimental to system performance. While rate of change is not typically specified and difficult to quantify, it is important. For example, if the temperature within a given environment changes radically, moisture will tend to form within the cabinet. This moisture can cause the leakage within the matrix to go up until the system has enough time to dry itself out again. The time will be dependent on the rate and range of change of the parameters specified above.

S400UX

Parametric Test System

SEMICONDUCTOR

KEITHLEY

Keithley Instruments, Inc.

28775 Aurora Road • Cleveland, Ohio 44139 • 440-248-0400 • Fax: 440-248-6168
1-888-KEITHLEY (534-8453) www.keithley.com

No. 2212
6021.5KGW