Wayne Kerr Electronics

6565 Series 10A DC Bias Unit

For use with 6500 Analyzers

Typical 120 MHz 40 A DC Bias Current System (using 65120B, 4 x 6565-120 and 1027 Fixture)

- No comparable system is currently available from other manufacturers
- Allows measurements up to 120 MHz to be made with 40 A DC Bias Current flowing through the Device Under Test
- Measurements up to 15 MHz can be made with 80 A DC Bias Current (for a maximum total of 10 minutes in any 60 minute period)
- 6500B analyzer allows measurements to be made while sweeping DC Bias Current
- Frequency swept measurements with different DC Bias Currents can be compared using the 6500B Reference Trace facility
- Wayne Kerr fixtures provide a safety interlock circuit and other protection circuits to protect both the operator and the equipment under fault conditions

6565 Technical Data Sheet

The 6565 HF DC Bias Unit is intended to be used with a Wayne Kerr 6500 analyzer, either the 6500B Precision Impedance Analyzer or the 6500P HF LCR Meter. Its function is to provide a source of DC bias current through the Device Under Test (DUT) while the analyzer is making AC measurements. Each 6565 unit can provide up to 10 A of DC current, and up to eight 6565 units can be connected in parallel to supply a maximum 80 A. The digital ammeter on the front panel allows the user to see the DC bias current value and an indicator LED shows when the bias current is enabled.

High current 50Ω coaxial cable is used to carry the DC bias current from the 6565 unit to the fixture. The measurement signal from the 6500 analyzer front panel is connected to the fixture using a dedicated cable, a control cable connects the rear panels of the 6500 and 6565, and a safety interlock cable is connected from the fixture to the rear panel of the 6565.

There are 3 models in the 6565 series. The models are defined by their frequency range as follows:

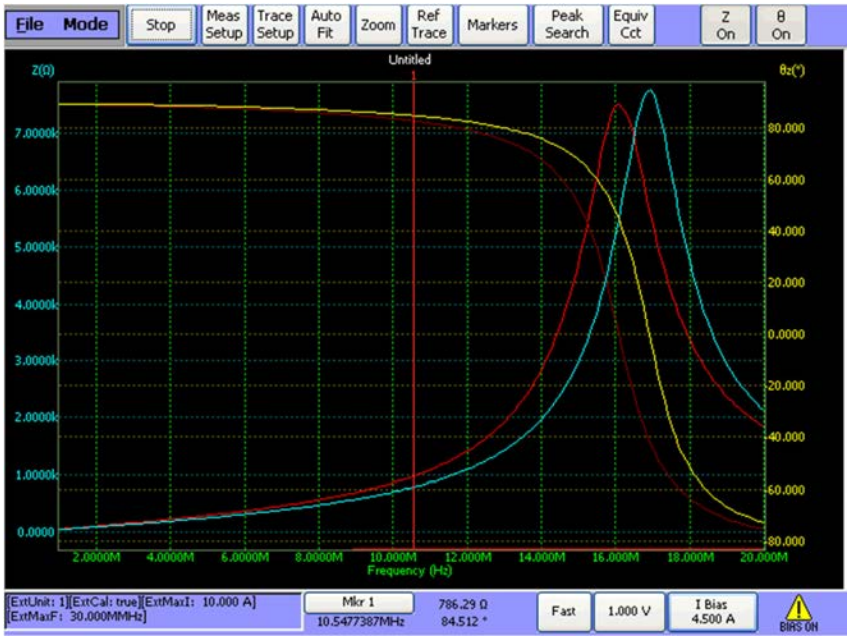
6565-05	20 Hz to 5 MHz
6565-30	20 Hz to 30 MHz
6565-120	20 Hz to 120 MHz

Any 6500 analyzer can be used with any 6565 unit. The maximum measurement frequency of the system will be determined by the instrument with the lower maximum frequency. For example, a 120 MHz 65120P used with a 5 MHz 6565-05 will have a maximum measurement frequency of 5 MHz

The 6500 analyzer controls the 6565 unit. The DC bias current is set as part of the 6500's measurement setup and the 6565's status and warning messages are shown on the 6500's display.

A common measurement of wound components with the 6500B/6565 system is to measure the value of inductance as the DC Bias Current through the DUT is swept from 0A to the DUT's rated maximum current.

Another common technique is to use the Reference Trace function on the 6500B Precision Component Analyzer. This allows frequencies sweeps performed at different DC bias current levels to be instantly displayed and compared on the 6500B's display, as shown in the example screenshot below.



Frequency sweeps for Impedance and Phase Angle for 0 A and 10 A DC Bias Current (using the Reference Trace function on 6500B Precision Impedance Analyzer)

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6565 Technical Data Sheet

TECHNICAL SPECIFICATION

6565 Models

Model	Frequency Range[1]
6565-05	20 Hz to 5 MHz
6565-30	20 Hz to 30 MHz[2]
6565-120	20 Hz to 120 MHz[2]

[1] Assuming the analyzer has the same (or higher) maximum measurement frequency.

[2] Maximum measurement frequency is automatically restricted to 15 MHz when 5 or more 6565 units are connected in parallel

Suitable Analyzer Models

6500B Precision Impedance Analyzer
6500P HF LCR Meter.

Suitable Fixture

As defined by the latest version of the 6565 Fixture Brochure.
Fixtures for conventional (leaded) body devices include 1026, 1027 and 1028 models.
Fixtures for surface mount devices include 10264, 10274 and 10284 models.

Analyzer Measurement Functions

All of the 6500 analyzer functions are still available except for internal DC Bias functions provided by D1 and D2 options.

Maximum DC Bias Current

Number of 6565 units in parallel	Maximum System DC Bias Current
1	10 A
2	20 A
3	30 A
4	40 A
5[1]	50 A
6[1]	60 A
7[1] [2]	70 A
8[1] [2]	80 A

(1) Maximum measurement frequency is automatically restricted to 15 MHz when 5 or more units are connected in parallel even if higher frequency units are used.

(2) DC Bias Current greater than 60 A must only be applied for a maximum total of 10 minutes in any 60 minute period due to heating constraints.

Single 6565 unit Step Size

Specification	Set Current
1 mA [1,000 levels]	0 A to 1 A
10 mA [1,000 levels]	1 A to 10 A

Single 6565 unit Setting Accuracy

Specification	Set Current
±1% ±1 mA	1 mA to 1 A
±1% ±10 mA	1.01 A to 10 A

For systems with multiple 6565 units in parallel the Step Size and Setting Accuracy specification should be multiplied by the number of 6565 units.

Ammeter Accuracy: ±1% ±1 digit

DC Bias Currents greater than 60 A

DC Bias Current greater than 60 A must only be applied for a maximum total of 10 minutes in any 60 minute period due to heating constraints. It is the responsibility of the user to ensure this.

DC Bias Current of 60 A or less can be applied indefinitely.

Compliance Voltage (AC + DC) peak

Maximum AC Drive Level	Maximum Compliance Voltage
1 V_{rms}	9 V
250 mV_{rms}	10 V

Measurement Basic Accuracy

± 1%
Varies with measurement speed, frequency and the impedance of the DUT

6565 Technical Data Sheet

Protection

Function	Description
Stored Energy	The 6565 will withstand an energy pulse of up to 10 J being discharged into it
Safety Interlock	All Wayne Kerr 6565 fixtures have a safety interlock circuit. An interlock switch in the fixture operates when the cover is opened. The 6565 Interlock Circuit immediately removes the DC bias current from the DUT to protect the user against a back emf hazard.
Overvoltage	A circuit will detect if the voltage across the DUT is in excess of the maximum compliance voltage.
Load Disconnect	A circuit will detect if the DUT has been disconnected while the DC bias current is flowing. It immediately removes the DC bias current from the DUT to protect the user against a back emf hazard.
Fixture Over-Temperature	A sensor will detect if there is an excessive temperature in the fixture. The 6565 removes the DC bias current from the DUT until the temperature has dropped to a safe level.

System Diagnostics

Function	Description
Fan Failure	The DC bias current will be turned off if one of the 6565's fans has failed.
Power Supply Failure	The DC bias current will be turned off if one of the 6565's power circuits has failed.
Current Balance	DC bias current will be turned off if the 6565's sink and source circuits are not balanced.
Unit Over-Temperature	DC bias current will be turned off if the 6565's internal ambient temperature exceeds a safe limit

Power supply

AC Input Voltage	85 to 265 V_{rms} auto-range
Frequency	47 to 63 Hz
Maximum Input Current	4.2 A_{rms}
Power factor	Meets EN61000-3-2

Unit powers up automatically when connected to a powered analyzer. Isolating switch on front panel

Connections

High Current Cable Pair between 6565 and Fixture
Measurement cable from Fixture to 6500
Control cable between 6565 and 6500
Safety Interlock Cable between Fixture and 6500

Temperature range

Storage	-40 °C to 70 °C
Operating	0 °C to 40 °C
Full accuracy	15 °C to 30 °C

Dimensions

Height	132 mm	5.2″
Width	435 mm	17.1″ 3U 19″ rack height
Depth	522 mm	20.6″
Weight	10.3 kg	23 lb

Cooling

Fan cooled. Intake front, exhaust rear.
Fan filter accessible on front panel.

Order codes and options

Description	*Order code*
5 MHz 6565 10A DC bias unit	**1J6565-05**
30 MHz 6565 10A DC bias unit	**1J6565-30**
120 MHz 6565 10A DC bias unit	**1J6565-120**

Each 6565 Bias Unit is shipped with a High Current Cable Pair (50Ω Coaxial), control cable, user manual and AC power cable.

A Wayne Kerr 6565-compatible fixture must be ordered at the same time as the 6565 is ordered.