6623A SERIES

DCC BRIDGE "HIGH CURRENT" RANGE EXTENDERS

World's First **Modular and Expandable** *Family of Range Extenders*

6623A-600 Ampere Complete Range Extender
One of over 64 available Current Outputs!

FEATURES

- Unique Guildline PATENTED Design
- Dual Design – Extender and Precision DC Source
- Design Includes Built-in Current Source with Electronic Polarity Switching
- Automatic Load Balancing
- NO External Power Supplies Required
- NO Need for any Mechanical Reversing Switches and Compressed Gas
- Advanced Modular Design, Over 64 Expandable Outputs in 150 A Increments to 10,000 Amperes, Investment Protection
- Linearity: ± 0.01 ppm of Full Scale
- Extended Low End Range Down to 0.1 μΩ
- Output Current Stability Typically < 10 ppm for 1000A and Higher - Best in the World!
- Programmed from 6622A Series Bridge
- Unique USB Programmable Controller (model 66259) Allows 6623A to be Used as Stand-Alone Precision DC Current Source
- Safety (Fault) Protections in Place
- Complete Shunt Measurement Systems Available

Guildline Instruments 6623A Series of High Current Range Extenders introduces new patented designs and the best in modularity of any Range Extender ever produced. The 6623A Series consists of a family of range extenders, with available current outputs from 3 ampere to 10,000 ampere.

THE 6623A SERIES PROVIDES THE WIDEST RANGE OF EXPANDABLE OUTPUT CURRENTS & ELIMINATES THE REQUIREMENTS FOR MECHANICAL SWITCHING, COMPRESSED GAS OR SEPARATE POWER SUPPLIES!

Designed to operate with our widely fielded 6622A series of ***One-Bridge*** Systems, these new Range Extenders provide customers with unique and individualized workload solutions. Real solutions that address not only existing and future workload requirements, but also deal with ever tightening budget constraints.

The 6623A series of high current range extenders increases the measurement range and test current output capability on the 6622A Bridges. The measurement specifications are now provided as a complete and inclusive specification when used with a 6622A Bridge.

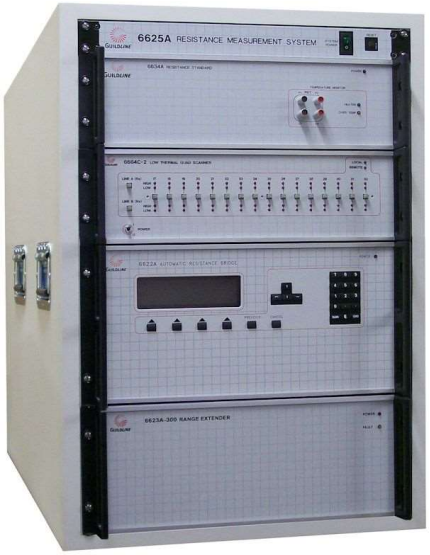
As with our 6622A Resistance Bridges, the 6623A Series modular design allows you to buy what is required today with existing budgets, and when current requirements change, expand your extender in 150 ampere increments to meet your future needs without any loss of your original investment!

Guildline's newly designed and innovative internal precision current source used in the 6623A Series eliminates the costly requirements for purchasing external power supplies, mechanical switches, use of compressed gas, and even the software programming pains associated with implementing these external components. A procedure developed for a 6623A-150 A Model will work the same as on our 300 A, 1000 A or even 10,000 A models or any increment in between.

6623A Series of DCC Range Extenders

Range Extenders allow DCC Bridges to measure lower resistance values or shunts at higher currents. Using patented technologies, Guildline engineers have again provided our customers with the most value and flexibility in expanding their **low resistance and shunt measurement** capability. Unlike competitive range extender products, the 6623A Series has been designed from the ground up. This has allowed Guildline to dramatically **improve measurement functionality**, size, power handling as well as addressing budget considerations. For example, the 6625A Measurement system shown on the left is capable of automated measurements from **1 µΩ at 300 ampere** all the way to **1 GΩ** at **1000 Volts**; all in a height *less than 35"* (<1 meter) and completely operational on a single standard **120 VAC, 15 A circuit!**

COMPLETE 6625A MEASUREMENT SYSTEM



Any 6623A Series Range Extender can be used with any of our 6622A Series ***One-Bridge*** solutions. The 6622A Bridge automatically configures the model 6623A you have connected, knows what current ranges are available, and warns you when currents beyond the limits of the attached range extender are requested. How's that for smart integration!

All 6623A Models are completely upgradeable with no loss of your initial investment. For example, if you started with the 300 ampere unit shown above, and now require 3000 ampere, don't worry! Simply send back your 300 A unit, pay the difference from what you spent on the 300 A unit with respect to the new unit you want, and Guildline will send back a new 3000 A unit. Plug it into your Bridge and you are ready to go! No need to rewrite already developed procedures, no need to provided additional training. The 3000 A unit operates exactly the same as the 300 A unit.

NEW PATENTED DESIGN AND TECHNOLOGY - To fully understand and appreciate how the 6623A Series is a completely new and innovative solution – Review the old competitive technology that is being replaced.

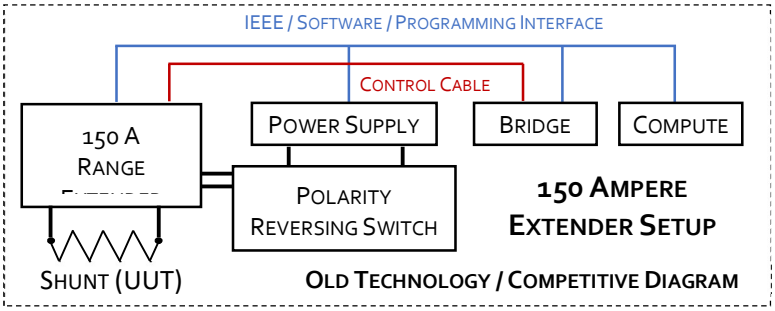
Older Guildline range extender systems, copied by competitors, had three components: range extender(s), power supply(s) and a mechanical polarity reversing switch. Depending on high current requirements you could have several extenders, several power supplies, and always required mechanical switching. In addition, for higher currents, compressed gas was required for the Polarity Reversing Switch. Custom Software Programs were also required to control the various standards from different vendors.

Range Extender(s) – are essentially current transformers which take the high currents (e.g. 300 A) generated by external third-party power supplies and ratio them down to the 10 µA to 150 mA range required for a DCC Bridge. For higher currents you typically need to cascade several extenders together to reduce the current in multiple stages.

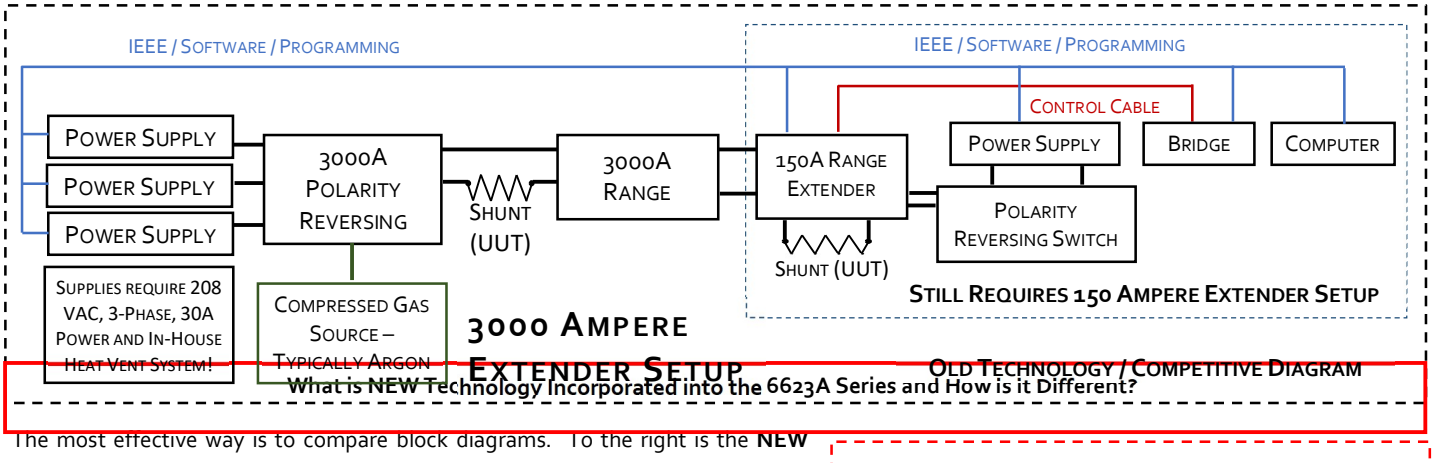
Reversing Switch – For DC resistance and current measurements it is required to switch the polarity on a periodic basis to adjust for EMF effects. Note that third-party power supplies used in old range extender technology do not have built-in switching and require external mechanical switches.

Power Supplies – Each Range Extender Model has power supplies to deliver the required current. This is true when Guildline developed the original old style Range Extenders and they are still required by competitive models. Third-party power supplies are not true current sources, thus do not automatically adjust for load and require mechanical polarity switching.

Examine an "Old Technology" 150 A output block diagram as shown. This diagram shows all the connections to the Range Extender, Reversing Switch, Bridge, Power Supply, Computer and even the UUT being measured. Since in reality this setup is not simple, other manufacturers use marketing tricks such as using a single box to show the extender, power supply and reversing switch as one unit. This way a customer does not understand how many standards are actually required to make a measurement, to learn and to support.

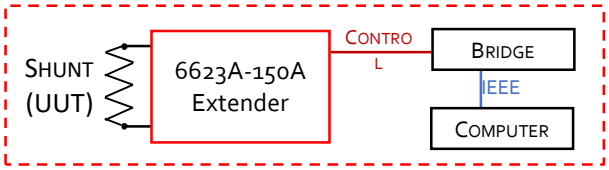


Now look at the old range extender technology to see what is required to work at 3000 Amperes. A customer must continue to use the "150 Ampere Setup" , but must add additional standards. Note that a customer must also use multiple connection points for the Shunt (UUT) being calibrated due to multiple extenders being required.

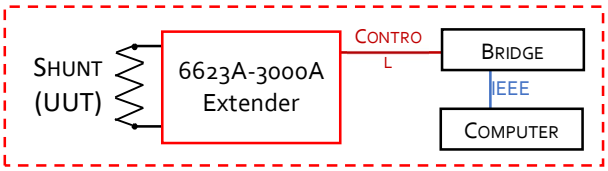


What is NEW Technology Incorporated into the 6623A Series and How is it Different?

The most effective way is to compare block diagrams. To the right is the **NEW 6623A 150 A Range Extender Diagram**. The 6623A unique design **includes (internally) the extender, electronic reversing switch and precision current source** (i.e. not just a power supply). A **150 A Extender** (i.e. with 50% more output current) is provided in a **single 3U** high unit – including full automation. Notice the only IEEE control is from the computer to the Bridge, and is **optional** since the Extender can be **controlled from the Bridge**. The best part is that **all operations are the same** whether it is 3 A, 150 A or up to 10,000 A model or any of **our over (64) sixty-four available 6623A Models**.

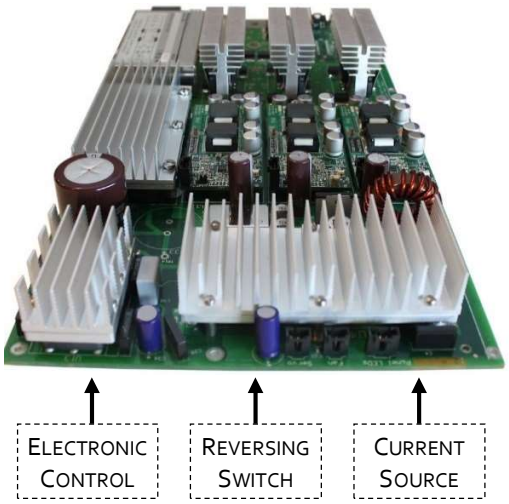


What does the 6623A look like at 3000 Amperes? Again – examine the block diagram shown to the right. Going from 150 Amperes to 3000 Amperes makes this unit slightly taller (i.e. only an **amazing 35 inches or 89 cm**). By comparison the old technology used by the competition requires two (2x) 5-foot tall (152 cm) racks with multiple standards from multiple vendors. Also for Guildline's 6623As – **NO** Compressed **Gas**, **NO 208 V_{ac} 3-Phase** required for external power supplies, **NO manual adjustments** for load, NO multiple extenders requiring wiring setup changes, **NO** multiple other **standards to learn, program or support**.



6623A Series of DCC Range Extenders

The heart of Guildline's 6623A design is our patented 150 ampere precision current source operating on a single board that Guildline spent over 1 million dollars ($1,000,000) to develop. This board is an electronically programmed single precision current source that provides both positive and negative test currents of equal magnitude via electronic polarity switching! This board incorporates automatic load balancing and smart electronics. Guildline's newly designed and innovative internal current source used in the 6623A Series eliminates completely the costly requirements for purchasing external power supplies, use of external mechanical switches and compressed gas; and even the software programming difficulties associated with implementing these external components. This means the 6623A can provide the required output current with automatic polarity reversal at user selected intervals, without using mechanical switches or specialized external computer controls. This takes automation, programmability and support to a whole new level.



6623A HAS ALL THE STANDARDS ON A SINGLE BOARD!

Each board also has ***SMART TECHNOLOGY*** incorporated into the design that allows command and control in terms of operation, switching and even board protection. This allows a connected Guildline DCC Bridge, or stand-alone control unit, to operate the current source without requiring a separate computer and custom programming.

In addition, Guildline's ***SMART TECHNOLOGY*** provides for more robust operation. For example, if a single board were to fail, **your System is not down**. You simply operate at a reduced current. If you had a 1000 A unit which has 7 boards, and a board fails, your system would continue to operate at 900 A. Send the board back for repair and when it is returned, simply insert it back in. The status of all boards is monitored and displayed visually via a LED bank

A Guildline 6623A-300A model, with more than 100 Systems already fielded, is a single unit that is 4-U high (i.e. about 18 cm or 7 inches) which contains internally two 150A precision current source pcbs, a single 300A range extender, NO mechanical switch, and ***SMART TECHNOLOGY***. The 6623A-300A comes with a control cable that connects directly to a Guildline DCC Bridge. Output current is controlled by the Bridge. NO separate custom program is required or separate PC to control a bridge, third-party power supplies and separate mechanical switch.

With the Guildline NEW 6623A Series the current source is based on modular 10A and 150A pcbs designed to operate in parallel and designed to provide very stable output currents up to 10,000 A. More importantly, the advanced design approach in the 6623A Series eliminates software programming so that a user simply specifies the output current, polarity reversal rate, etc on the DCC Bridge.

Guildline's design philosophy is to avoid problems. Thus the patented modular current source provides a single DC current source (i.e. NOT a bi-polar supply) with electronic polarity switching. **This avoids the requirements to match bi-polar power supplies, to use a mechanical switch, avoids the very real problem of needing compressed argon gas, and avoids the most common failure point with Range Extender or Shunt Measurement Systems (i.e. the mechanical switch).**

Complete Modularity – The 6623A High Current Series starts with a 150 A Range Extender / Precision Current Source with one PATENTED Guildline 6623A 150 A board. This is a completely self contained extender requiring no reversing switch and no power supply. Now need to go to 300 Amperes? Simply send your unit back, we will add a second 150 Ampere board, put it in a case and return. **You simply only pay the difference from what you paid for your 150 Ampere Range Extender, what a new 300 Ampere Range Extender costs, and a calibration. That's it.** When you get it back, your procedures will work, operation is the same, no new standards to learn – **This is as easy as it gets!**

How about going up to 450 A or even 600 A? Same Process – From a 300 A unit we simply add 1 or 2 boards (yes 600 A will run off 120 V) – and procedures still work, **operation is same – easy to upgrade**, and you maintain your original investment from the 150 An Extender. The Guildline 6623A Series **offers over 64 configurations** using multiple 150 A precision current source pcbs with electronic switching. And the Guildline 6623A Series can be expanded to 10,000 Amperes – **ALL modular and operating the same way** and programmed the same way.

Just look at two Range Extenders from different manufacturers. On the far right you have a diagram of a Measurements International (MI) 150 A Range Extender requiring a 1.2 meter (~ 3 feet) rack with multiple standards to support and program. A Guildline real 6623A-150 Range Extender is shown next to the MI equipment rack diagram. This is a single 3U integrated instrument (i.e. 5.25 inches or 13.3 cm tall). The complete 6623A-150 is actually smaller than just the external MI 6150A Power Supply on the bottom of the MI rack.

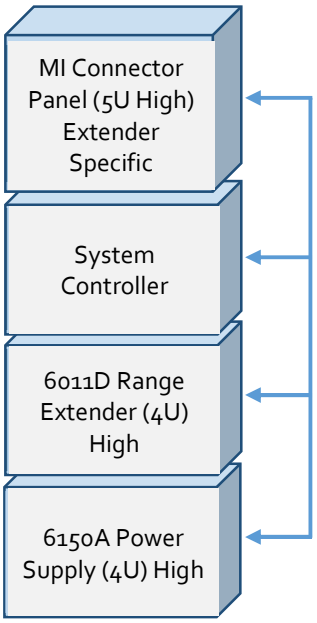
Now consider another example with a 3000 A System. MI needs two large racks requiring: 3-phase 30A circuits for the third-party power supplies, forced air ducting to get rid of excessive heat, compressed argon gas, multiple lead connections and changes, custom software programming, and difficult operation. In comparison, a single Guildline- 6623A-3000 Extender is only 35" or 89 cm tall and runs on a single-phase circuit. Below left is a real picture of the 6623A-3000 Ampere System with Peter to show the real size.

In addition Guildline's 6623A Models can operate as independent, highly precise DC Current Sources, controlled via a separate 66259 Stand-Alone Controller. When you use the 66259 Programmable Controller, you do not need a Resistance Bridge. Simply connect the 66259 to any 6623A Precision Current Source / Range Extender. You now have a USB Programmable Precision Current Source with full control of all measurement parameters via the 66259. Guildline's precision current source adjusts for load and has been NMI verified to operate at 5 ppm stability with 1000 A of output current. This is two orders of magnitude better performance than the third-party power supplies used by the competition!

Guildline 6623-3000A Extender (with Peter)

Guildline's 6623A-150 Extender Diagram Below Yes - Only One Standard

MI 150A Range Extender with Real Standards Required!



6623A Series of DCC Range Extenders

Try deciphering a MI 3000 Ampere Range Extender Diagram. MI misleadingly presents a "simple" diagram, as shown below in "blue". MI deliberately does not show all of the required standards, (i.e. 6025, 6014, etc), the massive amount of buss bars necessary, the excessive wiring, and the complexity of the installation. The following pictures are from a real MI 3000 Ampere System (complete 3000 A picture is shown on previous page).

Would you say this is "modular, upgradeable and easy to use?"

Keysight (Agilent) Supplies used (not MI) require lots of power **(minimum 208V_{ac}, 3 Phase, 30A) and buss bars.** All this power produces lots of heat **requiring a huge heat exhaust vent** above the Supply Rack!

6025 is a huge mechanical switch with numerous and integral bus bar system and a gas port. **Mechanical Switches** are known to have **high failure rates.**

RIBBON CABLE

6025 BUSS BAR RX CONNECTION 1

20+ Year old design means **2 Extenders** which also means **2 UUT Connection Points. The 3000 Amp Connection** uses **Buss Bars, Ribbon Cables** and **Buss Bar Adapters** while **6011-100 Amp Connection uses cables**. Because of excessive heat buss bars are recommended to connect shunts which **requires custom buss bars adapters designed for every shunt to be measured**!

RX CONNECTION 2

Keysight Supplies
1000A, 2000A or 3000 Amperes

6025
Current
In
Out

6014M
Current
In
Out

6011D
Current
In
Out

Large Venting Required

Front and Rear View

Review **Keysight (Agilent) 6680 Manual** for facts about Manual **Load Balancing!**

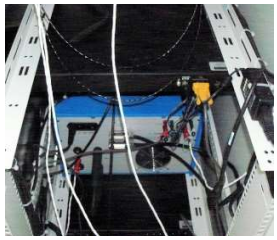
Compressed gas **is required** by the 6025 (no mention in data sheet). You may want to consider good ear protection due to **loud banging noise when switch reverses every cycle.**

6014 is down here. Connected to 6025 with what else – **buss bars, cables and more complexity**!

IEEE CONNECTIONS

A Separate Computer, IEEE Controller & Software is a Requirement for operation. **Cannot run Manually!** You must have and use a 6011 with a 3000A Extender as with this design the 6011 controls the 6014 meaning the 6011 is Extender IEEE Control master!

Front and Rear Views



3000 Amp Extender requires a 6010-100 Amp Extender with Reversing Switch and 6100-100 Amp Power Supply. **Also 6011 Provides Only IEEE For System so if this breaks – your Entire 3000A system is also down.** Just look at the wiring!

Compare all the additional MI equipment and the third party standards required to get higher currents compared to true modularity and upgradeability found in Guildline's innovative 6623A Range extenders.

See (and Hear) for yourself - Guildline's NEW 6623A patent protected technology versus a 30-year old approach. **Ask for a real demo 300A Extender** from both Guildline and Measurements International before buying. **Put BOTH companies to the test!**

6623A Models Design and Features Available!

6623A-3 and 6623A-10 Ampere Models

The 6623A Series starts with the 6623A-3 and 6623A-10 Models in rack or bench mount configurations. At only 3U in height, these units are perfect for those applications where currents up to 10 A are required. These currents allow precision calibration down to the 1 mΩ range. This is perfect when looking at calibration of milli-ohm standards; and decade boxes with 1 mΩ, 10 mΩ and 100 mΩ dials. These models can also calibrate shunts up to 10 A. The 6623A-3 provides division of higher currents when working with 6623A models from 1000 A to 3000 A. The 6623A-10 is also used for division of higher currents when working with 6623A models 4000 A up to 10,000 A. Both models use patent protected 5 A DC current source pcbs.

6623A-150 and 6623A-300 Ampere Standard Models

Need to go higher in currents? Consider the 6623A-150 or 6623A-300 ampere models. These models are very compact requiring only 3U in height for the 150 A and 4U for the 300 A. That's only 7 inches high or 18 cm for up to 300 A of current output including electronic polarity switching! When used with any of the 6622A Series bridges, the combined height is still only 8U or 9U (about 15 inches or 1/3 of a meter). In this space, you can have a measurement capability from 300 A at 1 µΩ all the way up to 1 kVdc at 1 GΩ. These models are available in Bench and Rack configurations. Power requirements are only 120VAC, 50/60 Hz. Competitors are still using old technology that requires two resistance bridges, an external voltage source, two external current sources, two range extenders, and mechanical switching to provide the same functionality and 300 A range.

Like the 6623A 3 A and 10 A models, the 150 ampere and 300 ampere models can be used with standard dedicated, 120 VAC power. This means you do not need special power to operate these models. There is also no requirement for special heat exhausts. These features allow for complete flexibility when designing room layouts. As with all 6623A models, the 150 A and 300 ampere models can be expanded all the way to our world class leading 10,000 ampere model. Complete investment protection!

6623A-450 and 6623A-600 Ampere Standard Models

The 450 and 600 ampere models are also available in bench or rack mount configuration and like our lower current series can be expanded all the way to 10,000 ampere. At only 5U (8.75" or 22.2 cm) in height, these compact models produce more current in the world's smallest available footprint for range extenders than any other product sold today. In fact, these complete current extender models are about the same size as the separate power supplies required by other manufacturers. Models up to 450 amperes can run on 120 VAC (50/60 Hz) or single phase 208 V, 50 Hz or 60 Hz. Like the 150 and 300 ampere models, these models do not require multiple external cascaded range extenders, do not require multiple external current sources, and do not require external mechanical switches. They are self contained with no additional standards required. This one unit shown is ALL you need for current measurements to 600 amperes!

Going Higher In Current Models – A True Modular Design!

As stated, the heart of the 6623A Range Extender is our ***Smart Technology*** - Patented Board. This advanced board's modularity and integration concept is best shown using a 6623A- 1000A picture and internal diagram. This 1000 A Precision Current Source contains up to a maximum of seven (7) 150 A PCBs. This means EACH 1000A Unit can provide current outputs of up to 1050 amperes in a 5U high chassis (i.e. 22.23 cm or 8.75 inches).

If you required say 1500As, we would use 1 CS 1000 as show, stack a second CS 1000 that only has 3 boards and this would allow currents at 1500 amperes. These 2, CS 1000 are shown below in a real rack configuration (2000 Ampere Below).

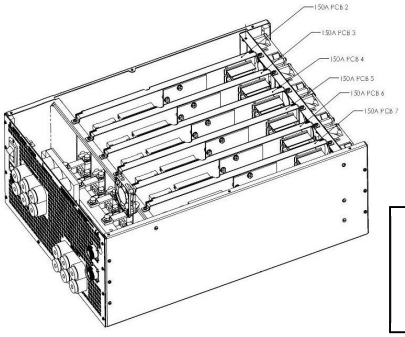
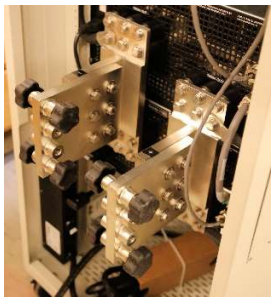


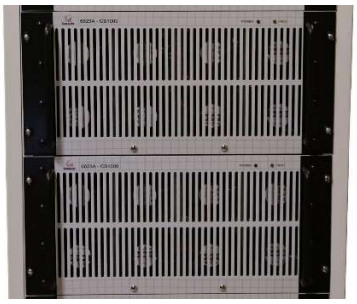
Diagram showing placement of Smart Boards in CS 1000 and a Completed CS Unit Shown

If you required 2000 Amperes in the future, simple send back the partially populated CS1000 (leaving one and the ability to continue to run at 1000A with your system) and we would add 3 more boards to your CS 1000 for a total new capability of 2000 Amperes. Since we are not changing any range extenders, any power supplies, any polarity reversal switches, any software, your system will run just as it did before with the same procedures, same software, same operation, but at higher currents. If you require 3000 Amperes in the future, you would not even have to send back a CS 1000, we would simply send a new CS 1000 that would be mounted in the System rack. With this design you are never down, and assured of true upgradeability.

Remember also that Guildline's 150 A pcb has "smart" technology provides command control in terms of operation, switching and even board protection. Even if a board was to fail, your system is not down. You simply operate at a reduced current. If you had a 1000 A unit and a board fails, your system would continue to operate at 900 A. Send the board back for repair and when it is returned, simply insert it back in. The status of all boards is monitored and displayed visually via a LED bank.

With the new 6623As, the operation and ease of connections is amazing. For high currents the 6623A uses 500 Ampere cables designed by Guildline. With the unique "circular" connection on the buss bars and compression welded cable ends, each 500 Ampere cable will provide the exact same contact resistance, regardless of how the cable is connected. This setup avoids operator variability and greatly simplifies operation.





Real 2000 Amp (Front and Rear) total of 44 cm (17.5 inches) is all that is required for the 2 CS 1000 A Sources

In contrast, the competition requires multiple Extenders, multiple Power Supplies, and multiple Reversing Switches for currents of 300 A or higher; and for currents of 1000 A or higher requires Pressurized Argon Gas, Forced Heat Venting, and specialized Power Circuits (have to go minimum 208 3-Phase). Customers also have to buy custom buss bar adapters for every shunt to be calibrated by the competitor's equipment.

6623A-1000, 6623A-2000 and 6623A-3000 Ampere Standard Models

Need higher currents? The 6623A Series of 1000, 2000 and yes - even 3000 ampere Standard models. With our unique 150 A patented design, we can provide standard models in-between these values (such as 750 ampere, 900 A, 1500 A, 2150 A, 2300 ampere, etc), however we have selected our most popular current ranges and provide them as standard configurations. All these currents are available as standard products or through our unique upgrade paths from smaller current models. Procedures developed for any previous Model will continue to work - just add the extra current capability you need! These are extremely compact models. The 1000 A model is s only 13U (i.e. 23 inches or 58 cm) in height. Better yet, each additional 1000 ampere (or increment of) only adds 5U (that's 8.75") to the total height. This means that a 2000 ampere Model is 18U, while our 3000 ampere model is only 23U (i.e. about 40 inches or 1 meter). Also note that all of these models only require a single phase circuit.

6623A-1000

6623A-3000

6623A-4000, 6623A-5000 and 6623A-6000 Ampere Standard Models

When you move to the 4 kA to 6 kA Models, only a second rack is required. The Range Extender is still controlled via the Bridge or optional 66259 stand-alone controller. The additional 1000 A Precision Current Sources are simply mounted in a second cabinet and the buss bar system allows easy access for connecting cables up to the unit.

A customer can output current from 300 amperes to 6000 amperes **without ever having to change a cable.** All switching and programming is accomplished from the Bridge and it is as simple as entering the desired current output. All units above 600 A also come with an emergency output current cut-off switch for user safety.

6623A-4000

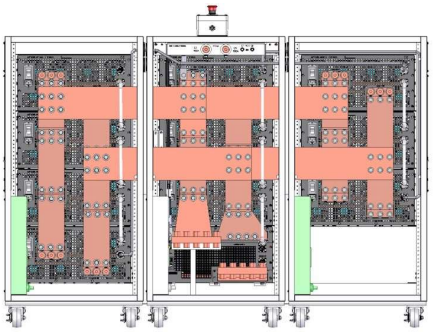
6623A-7000, 6623A-8000, 6623A-9000 & 6623A-10000 Ampere Standard Models

All from a single patented 150 Ampere Precision Current Source, Guildline now has the capability to deliver standard Range Extender Systems all the way to 10,000 amperes. No water cooling, no compressed air, no mechanical switches - nothing else is required.

When we go above 6000 ampere all we have to do is mount the additional current sources into a third cabinet. You can visually see how easy it is to go from 6 kA all the way to 10 kA in a modular and upgradeable path that no one else can provide.

Like all of our 6623A Series Range Extenders, no special control or programming is required. The current outputs are simply entered as a desired current output from the Bridge or Stand-Alone Controller and the system responds.

The 6623A Series - Built on years of experience and unique engineering design – providing best uncertainties, ease of use and built-in expansion capability for customers!



General Specifications (All Models)			
Temperature Coefficient ▶		±0.01 ppm/°C	
Ratio Transformation Linearity ▶		±0.01 ppm of Full Scale Ratio	
Test Current Resolution ▶		± 17 bits	
Communications	Via 6622A Bridge - IEEE 488.2 (SCPI Based Instructions)		Via 66259 - USB
Operating Temperature to Full Specifications ▶		23 °C ± 3 °C	73 °F ± 5.4 °F
Maximum Operating Range (<50 % RH) ▶		+18 °C to +28 °C	+64.4 °F to +82.4 °F
Temperature Storage Range ▶		-20 °C to +60 °C	-4 °F to +140 °F
Operating Humidity	20 % to 70 % RH	Storage Humidity	15 % to 80 % RH

3 Year Test Current Specifications (All Models)

6623A-3 and 6623A-10		3 A[1]	10 A (x20)[2]	10 A (x100)[2]
Test Current Specifications	Output Range	± 0.1 A to ± 3 A	± 0.1 A to ± 10 A	± 0.1 A to ± 10 A
	Accuracy	±0.1% ± 0.4 mA	±0.1% ± 0.4 mA	±0.1% ± 0.4 mA
	Stability (10 minutes)	±0.01% ± 0.1 mA	±0.01% ± 0.1 mA	±0.01% ± 0.1 mA
	Compliance	± 5 Volts	± 8 Volts	± 8 Volts

6623A-150		3 A	15 A	150 A
Test Current Specifications	Output Range	± 0.1 A to ± 3 A	± 3 A to ± 15 A	± 15 A to ± 150 A
	Accuracy	±0.1 % ± 0.4 mA	±0.3 % ± 5 mA	± 0.3 % ± 30 mA
	Stability (10 minutes)	±0.005 % ± 0.1 mA	±0.005 % ± 2 mA	±0.005 % ± 3 mA
	Compliance	± 5 Volts	± 7.5 Volts	± 1.5 Volts

6623A-300		3 A	15 A	300 A
Test Current Specifications	Output Range	± 0.1 A to ± 3 A	± 3 A to ± 15 A	± 15 A to ± 300 A
	Accuracy	±0.1 % ± 0.4 mA	±0.3 % ± 5 mA	±0.3 % ± 30 mA
	Stability (10 minutes)	±0.005 % ± 0.1 mA	±0.005 % ± 2 mA	±0.005 % ± 3 mA
	Compliance	± 5 Volts	± 7.5 Volts	± 1.5 Volts

6623A-450/600		3 A	30 A	450/600 A
Test Current Specifications	Output Range	± 0.1 A to ± 3 A	± 3 A to ± 30 A	± 30 A to ± 450/600 A
	Accuracy	±0.1 % ± 0.4 mA	±0.3 % ± 5 mA	±0.3 % ± 30 mA
	Stability (10 minutes)	±0.005 % ± 0.1 mA	±0.005 % ± 2 mA	±0.005 % ± 3 mA
	Compliance	± 5 Volts	± 7.5 Volts	± 1.5 Volts

6623A-1000/2000/3000		30 A	150 A	1 kA / 2 kA / 3 kA
Test Current Specifications (Note 1)	Output Range	± 3 A to ± 30 A	± 30 A to ± 150 A	± 150 A to ± 1k/2k/3k A
	Accuracy	±0.3 % ± 5 mA	±0.3 % ± 30 mA	±0.35 % ± 150 mA
	Stability (10 minutes)	±0.005 % ± 2 mA	±0.005 % ± 3 mA	±0.005 % ± 50 mA
	Compliance	± 7.5 Volts	± 1.5 Volts	± 1.5 Volts

3 Year Test Current Specifications - Continued (All Models)

6623A-4000/5000/6000		30 A	300 A	4 kA / 5 kA / 6 kA
Test Current Specifications (Note 2)	Output Range	± 10 A to ± 30 A	± 30 A to ± 300 A	± 300 A to ± 6000A
	Accuracy	±0.3 % ± 5 mA	±0.3 % ± 30 mA	±0.35 % ± 150 mA
	Stability (10 minutes)	±0.005 % ± 2 mA	±0.005 % ± 3 mA	±0.005 % ± 100 mA
	Compliance	± 7.5 Volts	± 1.5 Volts	± 1.5 Volts

6623A-7k/8k/9k/10k		30 A	300 A	7kA / 8kA / 9kA /10kA
Test Current Specifications (Note 2)	Output Range	± 10 A to ± 30 A	± 30 A to ± 300 A	± 300 A to ± 10000A
	Accuracy	±0.3 % ± 5 mA	±0.3 % ± 30 mA	±0.35 % ± 150 mA
	Stability (10 minutes)	±0.005 % ± 2 mA	±0.005 % ± 3mA	±0.005 % ± 100 mA
	Compliance	± 7.5 Volts	± 1.5 Volts	± 1.5 Volts

1 - For currents <3 amperes refer to 6623A-3 Specifications.
2 - For Currents <10 amperes, refer to 6623A-10 Specifications

6623A Series 36 Month Ratio Accuracy

Standard Model[1]	Transformation Ratio(s)	Ratio Accuracy	Maximum Ratio Current	Resistance Range
6623A - 3	20 : 1	±0.2 ppm	3 A	1 mΩ to 10 Ω
6623A - 10	20 : 1	±0.2 ppm	3 A	0.1 mΩ to 10 Ω
	100 : 1	±0.3 ppm	10 A	
6623A - 150	20 : 1	±0.3 ppm	3 A	1 μΩ to 10 Ω
	100 : 1	±0.4 ppm	15 A	
	1000 :1	±0.5 ppm	150 A	
6623A - 300	20 : 1	±0.3 ppm	3 A	1 μΩ to 10 Ω
	200 : 1	±0.4 ppm	15 A	
	2000 :1	±0.5 ppm	300 A	
6623A - 450 6623A - 600	20 : 1	±0.3 ppm	3 A	1 μΩ to 10 Ω
	400 : 1	±0.4 ppm	30 A	
	4000 :1	±0.5 ppm	FS	
6623A - 1000 6623A - 2000 6623A - 3000	200:1	±0.4 ppm	30 A	0.1 μΩ to 10 Ω
	2000 : 1	±0.5 ppm	150 A	
	20,000 :1	±0.6 ppm	Full Scale (FS) Current	
6623A - 4000 6623A - 5000 6623A - 6000	400:1	±0.4 ppm	30 A	0.1 μΩ to 10 Ω
	4000 : 1	±0.5 ppm	300 A	
	40,000 :1	±0.6 ppm	Full Scale (FS) Current	
6623A -7000 6623A - 8000 6623A - 9000 6623A – 10000	1000:1	±0.5 ppm	30 A	0.1 μΩ to 10 Ω
	10,000 : 1	±0.6 ppm	300 A	
	100,000 :1	±0.7 ppm	Full Scale (FS) Current	

6623A Range Extender Complete System Measurement Specifications

3 Year Specification Includes Specified Bridge(s), Patented Internal Precision Current Source, Internal Switching, System Scanner and Wiring. Coverage Factor k=2 (95%), Temperature Environment of 23°C ±3°C.

6623A-3	x20 – 3A 1 mΩ ~ 50mΩ	x20 – 3A 50mΩ ~10 Ω
6622A Base, 6622- XR	± 0.8 ppm	± 0.7 ppm
6622A-XP, XPR. & HV Models	± 0.7 ppm	± 0.6 ppm

6623A-10	x100 – 10A 0.1mΩ ~ 0.5mΩ	x100 – 10A 0.5mΩ ~ 0.01Ω	x20 – 3A 1mΩ ~ 50mΩ	x20 – 3A 50mΩ ~10 Ω
6622A Base, 6622- XR	± 3.5 ppm	± 0.9 ppm	± 0.8 ppm	± 0.7 ppm
6622A-XP, XPR. & HV Models	± 3 ppm	± 0.8 ppm	± 0.7 ppm	± 0.6 ppm

6623A-150	X1000 – 150A 1 µΩ ~ 10 µΩ	X1000 – 150A 10 µΩ ~ 0.1mΩ	X1000 – 150A 0.1mΩ ~ 0.5mΩ	x1000 – 150A 0.5mΩ ~ 0.01Ω	x100 – 15A 1mΩ ~ 50mΩ	x20 – 3A 50mΩ ~10 Ω
6622A Base, 6622- XR	± 20 ppm	± 10 ppm	± 3 ppm	± 0.8 ppm	± 0.7 ppm	± 0.7 ppm
6622A-XP, XPR. & HV Models	± 18 ppm	± 9 ppm	± 2.5 ppm	± 0.7 ppm	± 0.6 ppm	± 0.6 ppm

6623A-300	x2000 – 300A 1 µΩ ~ 10 µΩ	x2000 – 300A 10 µΩ ~ 0.1mΩ	x2000 – 300A 0.1mΩ ~ 0.5mΩ	x2000 – 300A 0.5mΩ ~ 0.01Ω	x200 – 15A 1mΩ ~ 50mΩ	x20 – 3A 50mΩ ~10 Ω
6622A Base, 6622- XR	± 15 ppm	± 8 ppm	± 2 ppm	± 0.8 ppm	± 0.7 ppm	± 0.7 ppm
6622A-XP, XPR. & HV Models	± 12 ppm	± 7 ppm	± 1.5 ppm	± 0.7 ppm	± 0.6 ppm	± 0.6 ppm

6623A-450A/600	x4000 – 600A 1 µΩ ~ 10 µΩ	x4000 – 600A 10 µΩ ~ 0.1mΩ	x4000 – 600A 0.1mΩ ~ 0.5mΩ	x4000 – 600A 0.5mΩ ~ 0.01Ω	x400 – 30A 1mΩ ~ 50mΩ	x20 – 3A 50mΩ ~10 Ω
6622A Base, 6622- XR	± 15 ppm	± 8 ppm	± 2 ppm	± 0.8 ppm	± 0.7 ppm	± 0.7 ppm
6622A-XP, XPR. & HV Models	± 12 ppm	± 7 ppm	± 1.5 ppm	± 0.7 ppm	± 0.6 ppm	± 0.6 ppm

6623A-1k/2k/3k (note 1)	x20000 – FSA 0.1 µΩ ~ 1 µΩ	x20000 – FSA 1 µΩ ~ 10 µΩ	x20000 – FSA 10 µΩ ~ 0.1mΩ	x20000 – FSA 0.1mΩ ~ 0.5mΩ	x2000 – 150A 0.5mΩ ~ 0.01Ω	x200 – 15A 1mΩ ~ 0.1Ω
6622A Base, 6622- XR	± 18 ppm	± 12 ppm	± 8 ppm	± 2 ppm	± 0.8 ppm	± 0.7 ppm
6622A-XP, XPR. & HV Models	± 16 ppm	± 10 ppm	± 7 ppm	± 1.5 ppm	± 0.7 ppm	± 0.6 ppm

6623A-4k/5k/6k (note 2)	x40000 – FSA 0.1 µΩ ~ 1 µΩ	x40000 – FSA 1 µΩ ~ 10 µΩ	x40000 – FSA 10 µΩ ~ 0.1mΩ	x40000 – FSA 0.1mΩ ~ 0.5mΩ	x4000 – 300A 0.5mΩ ~ 0.01Ω	x400 – 30A 1mΩ ~ 0.1Ω
6622A Base, 6622- XR	± 16 ppm	± 10 ppm	± 6 ppm	± 1.8 ppm	± 0.8 ppm	± 0.7 ppm
6622A-XP, XPR. & HV Models	± 14 ppm	± 8 ppm	± 5 ppm	± 1.4 ppm	± 0.7 ppm	± 0.6 ppm

6623A-7k/8k/9k/10k (note2)	x100 k – FSA 0.1 µΩ ~ 1 µΩ	x100 k – FSA 1 µΩ ~ 10 µΩ	x100 k – FSA 10 µΩ ~ 0.1mΩ	x100 k – FSA 0.1mΩ ~ 0.5mΩ	x10000 – 300A 0.5mΩ ~ 0.01Ω	x1000 – 30 A 1mΩ ~ 0.1Ω*
6622A Base, 6622- XR	± 14 ppm	± 8 ppm	± 5 ppm	± 1.6 ppm	± 0.8 ppm	± 0.7 ppm
6622A-XP, XPR. & HV Models	± 12 ppm	± 6 ppm	± 4 ppm	± 1.2 ppm	± 0.7 ppm	± 0.6 ppm

Note 1: FSA is Full Scale Amperes (from1 kA to 3 kA, depending on model). For x 20 Range - Refer to 6623A-3 Amp Specifications

Note 2: FSA is Full Scale Amperes (from 4 kA to 10 kA, depending on model). For x 20 and x100 Range - Refer to 6623A-10 Amp Specifications

6623A Series Models Dimensions

Standard Models[1]	6623A Dimensions (Height x Width x Depth)			
	Rack		Bench	
6623A-3/10	5.2" x 20.7" x 20.3"	132 x 526 x 516 mm	5.7" x 17.3" x 20.3"	145 x 440 x 516 mm
6623A-150	5.2" x 20.7" x 27.1"	132 x 526 x 693 mm	5.7" x 17.5" x 27.1"	145 x 445 x 693 mm
6623A-300	7.0" x 20.7" x 27.1"	178 x 526 x 693 mm	7.5" x 17.5" x 27.1"	145 x 445 x 693 mm
6623A-450/600	8.75" x 20.7" x 29.1"	222 x 526 x 739 mm	10" x 17.5" x 29.4"	254 x 445 x 747 mm
6623A-1k/2k/3k	44.7" x 21.8" x 36.7"	1135 x 552 x 932 mm		
6623A-4k/5k/6k	44.7" x 44.1" x 36.7"	1135 x 1120 x 932 mm		
6623A-7k/8k/9k/10k	44.7" x 66.2" x 36.7"	1135 x 1682 x 932 mm		

6623A Series Models Power and Weight Requirements

Standard Models[1]	6623A Power Requirements and Weight						
	Power			Rack Model Weight		Bench Unit Weight	
	Voltage	Frequency	VA (max) **	lbs	kg	lbs	kg
6623A-3	100 VAC to 240 VAC ± 10 %	50/60 Hz ± 5 %	100	23	10.5	28	12.7
6623A-10			400	25	11.4	30	13.7
6623A-150			800	46	21	50	22.7
6623A-300			1000	62	28.2	70	31.8
6623A-450			1250	67	30.5	86	39.1
6623A-600	208 VAC to 240 VAC ± 10 %	50/60 Hz ± 5 %	1900	76	34.5	95	43.2
6623A-1000			2600	360	164		
6623A-2000			4700	490	223		
6623A-3000			6800	620	282		
6623A-4000	208 VAC to 240 VAC ± 10 %	50/60 Hz ± 5 %	9200	930	423		
6623A-5000			11400	1070	486		
6623A-6000			13600	1210	550		
6623A-7000			16100	2030	923		
6623A-8000			18400	2170	986		
6623A-9000			20700	2310	1050		
6623A-10000			23000	2450	1114		

1 - Any model in increments of 150 A from 150 A to 10,000 A is available. Please contact Guildline for specifications. As a general rule, the specifications are typically close to the next higher model (eg a 1100 A to 1850 A models would have the same specifications as the 2000 A model).

6623A Series of DCC Range Extenders

Bridgeworks Software™

Not only does Guildline provide unique Current Range Extender and DCC Bridge hardware, but we offer a complete software solution. The **Bridgeworks™** software program provides setup, control, measurements, and reporting using both the 6622A Bridge and the 6623A Range Extender, or the 66259 Stand-Alone Controller and the 6623A Range Extender. This allows full automation of measurements using any model of the 6623A Series.

Complete - Right Down to the Cables and Lead Sets!

All 6623A Models come with output Cables covering the current range for each model. These are the best High Current Cables available to work with your 6623A Series. Incorporating a unique, high compression connection that eliminates thermals at the terminals, these cables are available in current ratings of 3A, 30A, 100A, 300A, and 500A values. For higher currents ultra high compression is used for the connection ends making them the best high current cables that are commercially available. Standard length is 1.5 meters and Guildline can make them in any length and with many different terminations. Guildline also provides precision low thermal leads for the voltage measurement. Note that the 6623A pricing is inclusive of all cables and lead sets. Competitors charge extra for the custom buss bars that their 30-year old technology needs.

Service and Support

Guildline is pleased to announce that we are **ISO 17025 Accredited**. We have the widest range of resistance accreditation with a range of **1 μΩ all the way to 10 PΩ**. Whether you own a Guildline product and have other manufacturer's standards**, call today** and see what we can do for you.

ORDERING INFORMATION	
3 Amp to 600 Amp Models Available in Bench Configuration.	
6623A-3	3 A Range Extender / Precision Current Source
6623A-10	10 A Range Extender / Precision Current Source
6623A-150	150 A Range Extender / Precision Current Source
6623A-300	300 A Range Extender / Precision Current Source
6623A-450	450 A Range Extender / Precision Current Source
6623A-600	600 A Range Extender / Precision Current Source
6623A-1000	1000 A Range Extender / Precision Current Source
6623A-2000	2000 A Range Extender / Precision Current Source
6623A-3000	3000 A Range Extender / Precision Current Source
6623A-4000	4000 A Range Extender / Precision Current Source
6623A-5000	5000 A Range Extender / Precision Current Source
6623A-6000	6000 A Range Extender / Precision Current Source
6623A-7000	7000 A Range Extender / Precision Current Source
6623A-8000	8000 A Range Extender / Precision Current Source
6623A-9000	9000 A Range Extender / Precision Current Source
6623A-10000	10000 A Range Extender / Precision Current Source
6623A-XXX	Other Value - Specify Maximum Current in 150 A Increments
SM6623A	Service Manual (Extra Charge)
66259	Programmable Extender Controller

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