

# 6640T AMS THERMOMETRY BRIDGE

Advanced Measurement Series of Temperature Bridges

*World's Most Advanced, and Best Performing, Temperature Bridges*



## 6640T SERIES FEATURES

- ◆ Best Accuracy:  $\pm 0.02$  ppm with 1 mA of Current across entire SPRT Operating Range
- ◆ Linearity:  $\pm 0.01$  ppm of Full Scale!
- ◆ Patent Pending Toroid Design Specifically for Temperature Measurement Applications!
- ◆ Measurement Rates fast as 0.5 Seconds!
- ◆ Built-in Windows 10 Computer and Touch Screen Display Providing Complete Measurement Results and Graphs!
- ◆ System Control via USB, Network, or IEEE!
- ◆ Widest Available Range up to 100k $\Omega$ !
- ◆ Full Pre-Heat and Individual Channel and Current Control with model 3210!
- ◆ Modular Design, Expandable Capabilities, Complete Investment Protection!
- ◆ Full 10.5 Digits (0.1 ppb) Display Resolution
- ◆ Change All Key parameters "on-the-fly" while the measurement is running!
- ◆ Wide Range of Ratios: 0.1:1 ~ 100:1!
- ◆ Available USB ports for data collection and/or ancillary items such as hard drives, mouse, keyboard, etc!
- ◆ BridgeWorks™ Data Acquisition Software!
- ◆ Unique Calibration Support Strategy!
- ◆ Complete Measurement Systems Available!

**GUILDLINE'S NEW 6640T SERIES OF TEMPERATURE BRIDGES** is a completely redesigned DCC Temperature Bridge to provide better uncertainties, faster measurement rates and more operational capability.

The large multi-touch screen with rich graphics is the most visible feature on the 6640T Series. The 6640T Series is much more than merely a touch screen interface centered on the same old technology used for the last 20 years. It incorporates the most advanced design and best operational features, some of which are patent pending. The 6640T is based on almost 60 Years of Guildline's experience designing and manufacturing DCC Bridges; and incorporates customer feedback from over two hundred Guildline 6622A Bridges in use at NIMs, militaries, and calibration laboratories.

Inside the 6640T incorporates a new patent-pending toroid design, low current measurement improvements, new nano-volt meter used as the null detector, very fast processor, and powerful new firmware. The new Windows 10 touch screen interface makes the 6640T easy to use while providing complete functionality for measurements and addressing the requirements for 17025 Accreditation of temperature measurements.

**The 6640T Series Provides the Best in Innovations, Advanced Technology, and Most Importantly - The Best in Measurement Performance of Any Temperature Bridge Manufactured Today!**

These new techniques provide a materially quieter measurement, faster measurement cycles, improved repeatability and the world's most advanced operator interface found on any Temperature Bridge.

While still maintaining the same form and fit of the widely - fielded Guildline 6622T and older 6675A Bridges, customers will be able to simply replace their current bridge without having to buy a new rack or any other equipment to interface with existing Guildline instruments and standards.

# 6640T AMS Series of Temperature Bridges

## 6640T Series – The Best in Engineering Design and Innovation

For quality in measurements, you must have quality design and quality manufacturing. If you examine the internal layout of the new 6640T Series Bridge you will see the absolute quality in the entire bridge with special attention paid to isolation and use of shielding to reduce noise, the latest in modern components to reduce affects due to temperature and power dissipation, increased resolution and stability in excitation current, increased reliability, and faster measurement cycles. The 6640T Temperature Bridge also has two processors, one dedicated to running the measurement circuitry, and one dedicated to the user interface. Add to this the new patent pending designs and a carefully thought out and designed internal layout, and you will find a Bridge Series that will meet customer requirements today, as well as years into the future.

While the design and measurement improvements are many, we did not forget what has made Guildline the leader in Laboratory Standards - the ability to buy what you require today - and ensure your investment is protected in modularity and upgradability for future requirements.

Like the world's most widely used DCC Bridge, the Guildline 6622A Series, the 6640T Series modular design allows a customer to buy what is required today with existing budgets, and when workload requirements change, simply expand your bridge to meet these requirements without any loss of your original investment! Modular design provides a single solution reducing life cycle costs not only for equipment support, but also for software development and operator training.

Customers should be wary of other manufacturer's claims of providing modular and upgradeable solutions in Temperature Bridges. When you decide to improve the measurement uncertainty on a 6640T Series Bridge, this is accomplished by upgrading your existing 6640T Bridge. With competitors' a customer has to purchase a brand new bridge. A Modular design, when implemented properly, provides the perfect solution for current and future needs, whether you need secondary uncertainties or as a Primary Laboratory Standard.

## Available 6640T AMS Series Models

**6640T-Base Model** - The entry level 6640T Base Temperature Bridge provides uncertainties down to 0.05 ppm at 1 mA and with a complete measurement range to 100 k $\Omega$ . The Base Model has the same advance measurement functions as the XP Model. The Base model is fully upgradeable to the XP Model for future requirements.



**6640T-XP Model** - The eXtended Performance (XP) Temperature Bridge provides uncertainties down to 0.02 ppm at 1 mA and with a complete measurement range to 100 k $\Omega$ ! Instrument control and internal menus will be the same, and your software procedures will still work – the same instrument operation and calibration support but with the improved uncertainties you need!



# 6640T AMS Series of Temperature Bridges

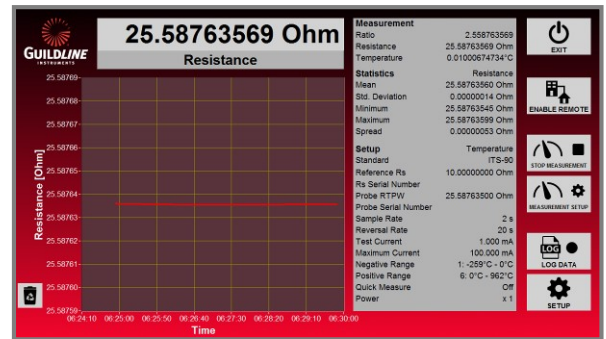
The choice of 6640T Model is yours and designed to meet your workload, not ours! Best of all, your current software programming will work and the menus will be the same, thus dramatically reducing learning curves and training requirements. Ongoing operating costs are also dramatically reduced because a **SINGLE 6640T TEMPERATURE BRIDGE** offers reduced support costs when the time comes for calibration.

And the best yet is the 6640T Series will continue to work with your current Guildline Bridge accessories. If you own a 3210 Thermometry Adaptor / Scanner, 5032 Air Bath, or 5600 Fluid / Oil Bath they will continue to work with a 6640T Bridge. You simply remove on older Guildline Automated Bridge and replace with a new 6640T Series and all you need to do is reconnect the terminal wires.

## 6640T Series Operator Interface

**NEW 10-inch capacitive multi-touch screen with full color graphical user interface.** The most visible feature on the new 6640T Series is the NEW 10 Inch embedded touch display running the latest Windows 10 Software. This display not only has low noise characteristics, but is designed to provide maximum protection from Electromagnetic Interface (EMI) and noise for the internal measurement circuitry, and also from the Bridge terminals.

When you buy any 6640T Series Bridge it's as if you know them all. Menu operation, measurement setup, and software are identical among all models. The easy-to-use embedded display and dedicated user-interface processor run under the Windows 10 Operating System. The **menu system is common to all models** eliminating in-depth operator learning requirements. **USB** is standard on all models with the universally recognized **Standard Code Programmable Interface (SCPI)** based commands incorporated as the programming language of choice. Optionally **IEEE 488.2** can be provided in addition to USB and Network connectivity. You can have a rack or bench mount model and even have your choice of **front or rear terminals**. Your requirements, your needs - one family of instruments!



All 6640T Bridges now provide a full  $10^{1/2}$  digits of resolution and the ability to **graphical see** the data (trending). You can have the data presented in a **summary or detailed format** right on the Bridge Screen or available via PC based BridgeWorks Software. Measurement and **Uncertainty Analysis** you need as a Metrologist or to meet the requirements of ISO 17025 Accreditation!

Every effort has been taken in the 6640T Series design to reduce noise and error. **Thermal EMF effects are eliminated** by automatic current reversal. The **unique architecture** of the bridge and its **control algorithms** further remove gain and offset errors in the **nano-volt balance detector** and the **new precision toroid**. The end results are shown by **long term accuracy and linearity** without the need for routine, frequent verification tests or calibrations.

The 6640T bridges can be used in either a **fixed or automatic** mode of operation. In fixed mode, **measurement rate** is programmable, updating measurements from every 0.5 seconds to 14 minutes. A unique computerized measurement mode provides automatic reversal rates, optimizing the measurement rate to the required uncertainty.

## 6640T AMS Series of Temperature Bridges

Although AC Bridges claim to provide a faster measurement, they have to be heavily filtered to meet a 0.02 ppm uncertainty, typically over 10 minutes. DC Temperature Bridges from other manufacturers are much slower compared to the 6640T and also rely on extensive filtering to meet stated uncertainties.

In addition, a customer can specify a **measurement rate that is independent from the reversal rate**. So many measurements can be made while on a single polarity. These are unique features that are only available with Guildline's 6640T Temperature Bridge.

Guildline's new 6640T Temperature Bridge provides best performance across the entire SPRT operating range; and provides ratios up to 1:100. Competitive products only provide ratios up to 1:4 which limits their use.

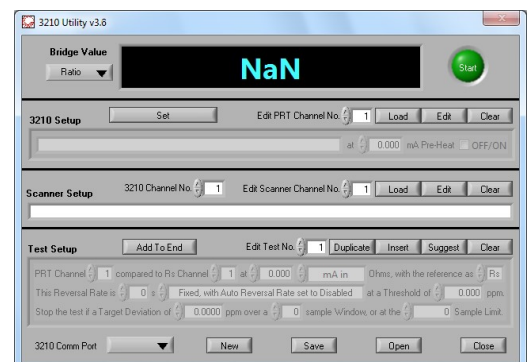
The 6640T Series, when used with the **Guildline Instruments Model 6634A Temperature Stabilized Resistance Standards**, effectively **eliminate errors** due to the affects of temperature environment, even when used in a calibration laboratory environment of **23 °C @ ± 3 °C**.

### 6640T BridgeWorks Software

Not only does Guildline provide unique Temperature Bridge hardware, but we offer complete new solutions for software as well. Guildline's proven **BridgeWorks** software provides for setup, control, measurements, and reporting. BridgeWorks is provided free with any of the Bridges in the 6640T Series. **Optional BridgeWorks Plug-Ins** that automate the calibration of instruments and standards are available to expand BridgeWorks functionality.

BridgeWorks software is extremely powerful, yet **straight forward and user friendly**. The software comes with all of the useful and convenient features commonly found in **Windows based** commercial software programs. **On-line context help** is available to provide added assistance in understanding the functions of the software. BridgeWorks was **developed in LabVIEW®** offering direct compatibility to all National Instruments GPIB interfaces. These interfaces come in a wide variety of connection options to your PC such as **USB, FireWire, Ethernet, PCI, PCMCIA, RS232/485**, and more. Guildline can even provide a complete 6645T Temperature Measurement System by adding Resistance Standards, Thermometry Adaptors/Scanners, and Software.

This System is integrated, verified and tested in a rack a little more than 36" high (i.e. less than 1 meter). **Complete turnkey solutions!**



For a **complete, automated temperature measuring system**, a 6640T Temperature Bridge can be used with Guildline's 3210 Low Thermal Thermometry Adaptors / Scanners which have programmable pre-heat on an individual channel basis, and Guildline's 6634A Temperature Stabilized Resistance Standards. When the Bridge is used with a Guildline Model 3210 **Low Thermal Thermometry Adaptor / Matrix Scanner**, the software can turn the bridge into a **multiple-channel** calibration and measurement system. Timed, sequenced single or multiple tests can be initiated while the

Bridge is unattended. All user **definable test variables**, such as excitation current, pre-heat current, measurement speed, reversal rate etc can be **programmed on a per test basis**, giving the **users full control and flexibility** in conducting well designed experiments, and for calibrating temperature probes.

# 6640T AMS Series of Temperature Bridges

Additionally, internal utilities reside within the software to enhance and **simplify the calibration of the 6640T Series DCC Bridge** by using the Guildline 6634A Series of Temperature Stabilized Resistance Standards.

**BridgeWorks Software** provides comprehensive graphic display, mathematical functions and trend analysis. Data can be **easily exported** to MS-Excel®, Crystal Reports® and in HTML format. All reports generated conform to traceability requirements of ISO-17025. Alternatively, all analysis can be performed on the Windows 10 computer which is embedded inside the 6640T Temperature Bridge.

**BridgeWorks** enhances temperature capabilities on other laboratory standards through the use of plug-ins and utilities. These optional utilities include control of connected Guildline Air Baths and Fluid/Oil Baths.

## 6640T Series Specifications

DCC bridges have inherently **better noise immunity** to external electromagnetic and mechanical noise when compared to AC bridges. Measurements are conducted in **true four-terminal mode** so long test leads can be used. Since excitation current is DC, reactance introduced by the probe and probe leads does not affect measurement accuracy. **Thermal EMF is eliminated** by periodic polarity reversal that is **programmable by the user**. The built-in, extremely stable current supply permits selection of output currents between 20 $\mu$ A and 150mA to satisfy a wide range of sensitivity requirements. Root square values can be conveniently chosen from the instrument front panel or via software. **Temperature conversion and display** is done on the front panel, or on a PC using the BridgeWorks software

One of the **key features** of Guildline's 6640T DCC Temperature Bridge is how the unit is calibrated. This option means that the 6640T is specifically **tested** at the **lower currents** (1 mA) found in thermometry and the calibration coefficients are stored separately for each decade of resistance and for each ratio. In contrast competitive DCC temperature bridges are all calibrated and specified for 10 mA to 150 mA of operation, rather than the 1 mA required for temperature measurements.



The 6640T Series specifications are **3 Year specifications** based on a 23°C  $\pm$ 3°C laboratory temperature, not limited to +0.5° or -0.5° C (1°C change), have minimal filtering (controllable) and have been verified for repeatability! Because the 6640T does not have embedded resistance standards the stability is primarily based on the current comparator so a Guildline

Bridge only needs to be calibrated once every three years. Guildline's specifications are also based on 1 mA of current typically used for temperature measurements in contrast to competitive DCC bridge manufacturers whose specifications are based on 10 mA to 150 mA, and can never be achieved under 1 mA thermometry conditions. Want to see how a Bridge really performs? Ask for a demo (available starting in 4th quarter, 2016).

## 6640T AMS Series of Temperature Bridges

6640T Series General Specifications			
Linearity		± 0.01 ppm (1:1 to 13.4:1)	
Display resolution (ppm)		Selectable (Programmable) from 0.0001 ppm to 10 ppm	
Temperature Coefficient		0.01 ppm/°C of reading (Outside 23°C ± 3°C)	
Automatic current reversal rate (in seconds)		4 to 1637 programmable, increment of 1 second	
Fastest Measurement Sample Rate		0.5 seconds	
Communication		USB, Network, IEEE 488.2 (Optional), SCPI Based Instructions	
Test current (for measurements to 100 kΩ)	Usable range (±30V) compliance (A)	10 μA ~ 150 mA (extension to 10,000A available for resistance measurements)	
	Resolution (μA)	1 μA	
	Accuracy [error(ppm) + offset(A)]	±100 ppm ± 10 μA	
Bridge Operating Temperature to Full Specifications		23°C ± 3°C	73°F ± 5°F
Bridge Maximum Operating Range (<50% RH)		+18°C to +25°C	+65°F to +82°F
Bridge Temperature Storage Range		-20°C to +60°C	-4°F to +140°F
Power Requirements		VAC: 100V, 120V, 220V and 240V ± 10% / 50 or 60Hz ±5%, 200VA	
Dimensions (Width x Height x Depth)			Weight
440 mm x 200 mm x 465 mm		17.3" x 7.8" x 18.3"	27 kg 59.5 lbs

**Note:** The 6640T-Base and 6640T-XP models are limited to a maximum of 100 kΩ with a maximum Rs (Resistance Standard) of 10 kΩ. Because of the unique variable ratios available on all models, it is possible to measure UUT's with a variety of Rs Standards. For example, a 10 kΩ UUT could be measured with a 100 Ω, 1 kΩ and 10 kΩ Resistance Standard (Rs). To determine the measurement uncertainty due to the bridge, simply look at the Rs you are using, and then go to the appropriate UUT Sub range.

Base Range: maximum 100 kΩ		<b>6640T-BASE</b>				
INTERCHANGE <sup>1</sup> SPECIFICATION	RESISTANCE STANDARD	3 YEAR RATIO SPECIFICATIONS <sup>2</sup>				
0.8 > Rx < 4.3	◀ ACTUAL RATIO ▶	0.08 > Rx < 0.8	0.8 > Rx < 4.3	4.3 > Rx < 13.4	13.4 > Rx < 107.5	
<b>1 : 1</b>	◀ NOMINAL RATIO ▶	<b>0.1 : 1</b>	<b>1 : 1</b>	<b>10 : 1</b>	<b>100 : 1</b>	
± <b>0.02 ppm</b>	◀ 1 Ω ▶	± 0.2 ppm	± 0.05 ppm	± 0.05 ppm	± 0.1 ppm	
± <b>0.02 ppm</b>	◀ 10 Ω ▶	± 0.2 ppm	± 0.05 ppm	± 0.05 ppm	± 0.1 ppm	
± <b>0.02 ppm</b>	◀ 100 Ω ▶	± 0.2 ppm	± 0.05 ppm	± 0.05 ppm	± 0.3 ppm	
± <b>0.02 ppm</b>	◀ 1 kΩ ▶	± 0.2 ppm	± 0.05 ppm	± 0.1 ppm	± 0.8 ppm	
± <b>0.05 ppm</b>	◀ 10 kΩ ▶	± 0.2 ppm	± 0.1 ppm	± 0.2 ppm	<b>RESISTANCE OPTION</b>	

## 6640T AMS Series of Temperature Bridges

XP Range: maximum 100 kΩ		<b>6640T-XP</b>				
INTERCHANGE <sup>1</sup> SPECIFICATION	RESISTANCE STANDARD	3 YEAR RATIO SPECIFICATIONS <sup>2</sup>				
0.8 > Rx < 4.3	◀ ACTUAL RATIO ▶	0.08 > Rx < 0.8	0.8 > Rx < 4.3	4.3 > Rx < 13.4	13.4 > Rx < 107.5	
<b>1 : 1</b>	◀ NOMINAL RATIO ▶	<b>0.1 : 1</b>	<b>1 : 1</b>	<b>10 : 1</b>	<b>100 : 1</b>	
<b>± 0.01 ppm</b>	◀ 1 Ω ▶	± 0.1 ppm	± 0.02 ppm	± 0.02 ppm	± 0.1 ppm	
<b>± 0.01 ppm</b>	◀ 10 Ω ▶	± 0.1 ppm	± 0.02 ppm	± 0.02 ppm	± 0.1 ppm	
<b>± 0.01 ppm</b>	◀ 100 Ω ▶	± 0.1 ppm	± 0.02 ppm	± 0.02 ppm	± 0.3 ppm	
<b>± 0.01 ppm</b>	◀ 1 kΩ ▶	± 0.1 ppm	± 0.02 ppm	± 0.05 ppm	± 0.8 ppm	
<b>± 0.03 ppm</b>	◀ 10 kΩ ▶	± 0.1 ppm	± 0.05 ppm	± 0.1 ppm	<b>RESISTANCE OPTION</b>	

1 - Interchange specification (i.e. sometimes referred to as a self-calibration) with minimal filtering.

2 - 3 Year Calibration interval with annual performance verification (automated).

3 - Specifications are based on 1 mA maximum current in Rs and temperature of 23°C ±3°C.

### Making the 6640T Series Even Better

Guildline provides a variety of standards to **support the 6640T Series** of Bridges. For the **ultimate in ease of use and wide** temperature operating environment, look at our 6634A Temperature Controlled Resistance Standards. These resistance standards are a rack or bench mount unit with up to 10-resistance values. The values are in a **shielded, self contained 30°C** temperature environment and usable in a laboratory environment of **23°C ± 5°C**. No more need for oil baths. For the **best in air resistances** see our 9334A Series of Air Resistance Standards.



Guildline is proud to announce the release of our **NEW AC/DC Oil Based Resistance Standards**, the 7330 Series. These resistors were made specifically to take advantage of the new **5600 Fluid Series Bath** also just recently introduced. They are **extremely useful** as references for DC and **AC Temperature Bridges** and for the calibration of resistance ranges of multi-function calibrators and high accuracy DVMs, as well as being used in more classical standards and calibration resistance measurements. With a standard range from 0.1 Ohms to 100 kOhms, or also available in custom values, these resistance standards are designed to work for years to come.

For **multi-channel operation** look at our 3210 Thermometry Adaptors with scanning and switching capability. Each model has a built-in switch to automatically measure multiple connected devices, while using individual programmable pre-heat/keep-warm currents in between measurements. Both IEEE 488.2 and USB connections are provided and the 3210 Thermometry Adaptor can be controlled by Guildline's PC based BridgeWorks software package. The 3210 Thermometry adaptor automates the calibration of up to eight PRT's or SPRT's with user programmable channel currents!

## 6640T AMS Series of Temperature Bridges



For the best Unit Under Test (UUT) environmental control Guildline produces the **5030 Series of Precision Air Baths** (shown to the right with optional window). This series of programmable Air Baths not only maintains an **ultra stable 0.015°C** environment but also provides **EMI and EMF Shielding** within the high quality dual wall Stainless Steel Chamber. Dual Heaters/Coolers/Fans provide for operational redundancy and the unit is **fully IEEE 488 programmable. Control Resolution is a 0.001°C**. A second temperature sensor is provided so that the actual interior bath temperature can be read directly on the front panel. This bath incorporates an extensive **Metrology based menu operation**.

The 5030 Series can be programmed right from Bridgeworks Software. With the large chamber capacity and when used with the 6664C Scanners, **multiple temperature probes** can be calibrated at one time. An operator simply has to review data when the multiple tests have finished.

And Guildline is back providing precision Fluid/Oil Baths. Guildline's new 5600 Series of Programmable Fluid Baths is based on a new design that includes the best features from our older baths. A 5600 Fluid bath uses a highly reliable and extremely stable analogue control, and adds fine control via an additional proportional-integral-derivative (PID) digital overlay. A windows tablet allows storing and accessing 17025 required Metrology Based data on resistors configurations, environmental and bath operation. A true Metrologist too! The 5600 Series of Baths can be used with oil, water, or salt water for oceanography applications. The 5600 provides uniform constant fluid temperature over a wide range from -5°C to 55°C with best stability < 0.0015°C. Three sizes of EMI shielded Fiberglass Tanks are available.



Guildline also provides **full system solutions and full system integration**. Need a base system with one thermometry adaptor / scanner and a resistance standard in a rack? Not a problem. Need a **6640T-XP with 32 channels**, and Resistance Standards? We can do it! In fact, Guildline has produced over one hundred 6625 Measurement Systems complete with Bridge, Multi-Channel Scanners, and Resistance Standards all in a single rack. The **6645T Temperature Measurement Systems** are supplied with all hardware and software installed, tested and verified. Need the **ultimate temperature measurement** in a single rack solution? Combine any one of the 6640T Series Temperature Bridges with a 6634A



Temperature Stabilized Resistance Standard, and 3210 Thermometry Adaptors / Scanners with individually programmable pre-heat per channels. Just ask what **Guildline can make for you**.



## Verification of Performance

Bridges are not self-calibrating. All Bridges must have an initial calibration done at time of manufacture, and subsequently must be verified or re-calibrated on a periodic time schedule. Competitors misleadingly state that their Bridges are self-calibrating but in reality their Bridges are calibrated the same way as all commercial bridges including Guildline's – via external resistance standards or via an external Cryogenic Current Comparator (i.e. CCC).

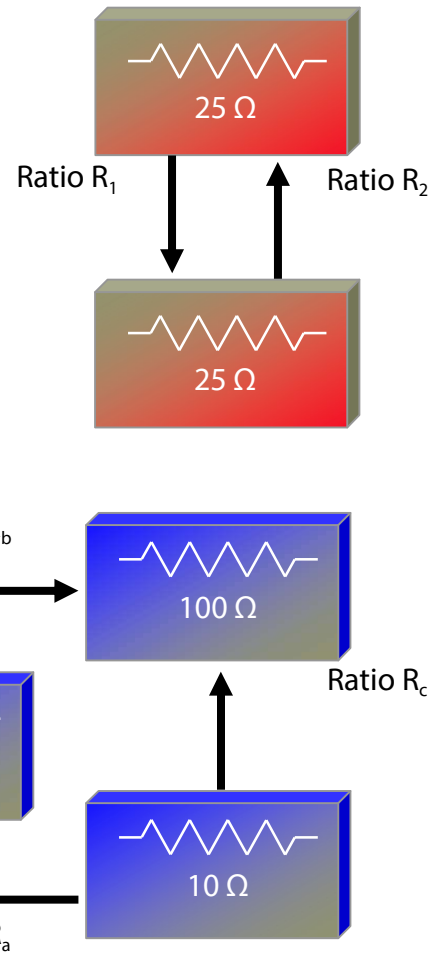
Historically the verification that a precision DCC Bridge is operating as per its last calibration was challenging. A Harmon type transfer standard was needed for the verification of a bridge's non 1:1 measurement ratios along with high technical skill levels. With the introduction of the 6640T Series, and previous 6622A multi-ratio Bridges, the verification of performance can be carried out with ease. Verification of the bridge performance can also provide insight into the bridge's short and long-term stability to improve user's confidence levels and uncertainties.

The 1:1 measurement ratio can be easily verified by interchange measurement tests using two stable standard resistors of same nominal values, as illustrated by the block diagram to the right. Bridge 1:1 measurement ratio error  $e_i$  (in ppm) is calculated using the following formula:

$$e_i = (1/2) \cdot |R_1 \cdot R_2 - 1| \cdot 10^6$$

Non 1:1 measurement ratios, such as 10:1 and 100:1 ratios can be easily verified by closure measurement tests using three stable standard resistors, as illustrated by the block diagram to the right. Bridge non 1:1 measurement ratio error  $e_c$  (in ppm) is calculated using the following formula

$$e_c = (1/3) \cdot |R_a - R_b \cdot R_c| / R_a \cdot 10^6$$



Note: Resistance values in these block diagram are only representative values and are selected for the illustration of methodology only. Other ratios can be verified in the same manner.

# 6640T AMS Series of DCC Temperature Bridges

## Warranty and Service

Is based on over 60 Years of Guildline innovation in engineering and design. The **6640T TEMPERATURE BRIDGES** provide **complete expandability and flexibility** that meet your current and future measurement needs. Options that satisfy real measurement needs and provide complete investment protection! How can you improve? Simple! Offer an industry leading **2-Year Warranty** to show your confidence. All 6640T Series of DCC Temperature Bridges come with a 2-year Warranty that covers both parts and labour.

ORDERING INFORMATION	
<b>6640T-B</b>	Base Accuracy, Range 100 kΩ, Front Terminals
<b>6640-XP</b>	Extended Performance, Range 100 kΩ, Front Terminals
	*All Bridges include Calibration Certificate, Operator and Software manual, and one set of Rs/Rx Low Thermal Leads
/R	Add's Resistance Option to Bridge
/RC	Report of Calibration Available at Nominal Charge
/RT	Specifies Rear Terminals
SM6640	Service Manual (Extra Charge)
<b>6640T SERIES OPTIONS</b>	
3210	8 Channel Thermometry Adapter with Pre-Heat
7330	AC/DC Oil Based Resistor (Specify Value)
5600	Automated Fluid Bath (Specify Size)
6634A	Temperature Stabilized Resistance Standard
SCW-30:18AWG	30 Meters Shielded, Copper, Low Thermal Wire (SCW) 18 Gauge
SCW-30:22AWG	30 Meters Shielded, Copper, Low Thermal Wire (SCW) 22 Gauge

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