

Automated Thermometry Bridge

- Best Accuracy +/- 0.015 ppm From 1 Ω to 10 k Ω
- NEW Quick Measure Mode under 20 Seconds to First . Reading
- NEW Current Reversal Rate of 2 Seconds •
- Measurement Rates as Fast as 0.1 seconds •
- New ADCC Technology .
- **Proprietary Comparator Design** •
- Self-Calibrating Ratio Bridge •
- 0.1Ω to $100 \text{ k}\Omega$ range
- Linearity < 0.005 ppm •
- IEEE488 and Manual Operation •
- Accu-T-Cal[™] Software For Calibrating PRTs Designed by • NMI
- 6 Channel Front Panel With Keep Warm Currents! •
- Keep Warm Current 1 mA
- New Smaller Design for Improved Quality and Performance

AccuBridge® MODEL 6020T



Two Models Available Based on Your Needs and Requirements!

MODEL INFORMATION AccuBridge[®] 6020T

The NEW AccuBridge[®] 6020T Thermometry Bridge (Furthermore 6020T) is the Metrologist's choice for primary lab level thermometry measurements. With its innovative technology, the 6020T's speed, measurement accuracy, and data handling capabilities make it the preferred primary thermometry measurement system in National Measurement Institutes (NMIs) and other primary labs worldwide. The 6020T designed for flexibility and ease of use. The 6020T features increased ampere-turn (AT) sensitivity with more turns on both the master and slave windings and a new voltage feedback circuit to improve on the linearity error of the nanovolt amplifier. Also improved is the ratio from previous 1.5:1 ratios to the NEW Ratio range covering from 0.1 up to a maximum ratio of 4.05 allowing customers to meet all of their requirements. MI customers now have unmatched features and functionality to support its world-class measurement uncertainty capability.

Quick Measure Mode Provides Customers with the ability to have the first reading within 20 seconds from pressing Start; Current Reversal Rates improved for 2 seconds with measurement sample times as low as 0.1 seconds!

Only MI offers a DC Bridge with these improvements that can meet specification!

NEW Features

For years customers have been asked for MI to extend the measurement features of the DC Comparator Bridge to replace existing AC Technology. MI has finally not only answered these requests with the release of the 6020T but taken them to the next level.





MODEL INFORMATION AccuBridge® 6020T

The 6020T features a new QUICK MEASURE mode which allows the bridge to balance faster thus improving the first measurement reading are displayed within less than 20 seconds from pressing START!

Next, we focused on current reversal time. Customers have been requesting that a DC Comparator Bridge meets that again of AC Bridges. We accomplished this with the improved reversal rate function of 2 seconds! MI is the only DC Comparator Bridge that has improved with these features and still meets stated specification!

Sum	mary Table	Graph	Mea.	info. Me	asurement Completed	00:02:02	Summary	Table Graph	Mea. Info. Mea	surement Completed	00:02:02
.022						Ratio		Rs [Chan-1]		Rt [Chan-1]	
							Туре	Resistor	Туре	Resistor	
						Ω	Absolute Valu	ie 25.0000000	Absolute Value	100	Ω
U				\sim		oc	Is (mA)	-3.9991 mA	It (mA)	0.99975580	or-
	$ \wedge $						Speed Mode	e Quick Pace	Serial #:		
022							Inputs Mode (Preheat Statu	Normal (Off)	# of Meas.	35	or
# 34	Ratio	Resistance	(Ω) 19	<u>Rs</u> 25.1333	Ch 1 <u>Rt</u> Ch Ω 99.8174 Ω	1 og	Settle Time(s) 2	# of Stats.	25	oK
35	4.0000369145	100.0009228	36 🔻	<u>Is</u> -3.9991 n	<u>It</u> nA -0.9998 mA	Save	Rs Unc. (ppn	n): O	Filter	3.0	Save
Average:	0000			Str	1.Dev. (ppm): 0.0054		Average:		Std.(Dev. (ppm): 0.0054	
4.		mote Test Finished	238	Uni	c. (ppm): 0.0054 annel Mode: Normal Run-Mode: Qui	Back	4.000	UU36982 Remote Test Finished	38 Unc.	(ppm): 0.0054 rel Mode: Normal Run-Mode: Quick	Back

We at MI understand budget limitations for customers and take that into account when designing new products. That is why the 6020T-Standard and 6020T-Premium models both equipped with a six-channel front panel design which incorporates a 1mA keep warm current. Why spend the money on two separate products from other manufacturers if your requirement completed with 1 product! No other DCC Bridge manufacturer offers both bridge and scanner in one unit!

If you required connection of more than 6, Optional 10—, 16—or 20—channel scanners could be used individually or together to connect to up to 40 channels of ratio measurement for up to 40 different test resistors/PRT's calibrated. Please see the model 4210T and 4220T for options. The 4210T, 4220T series of scanners from MI come standard with the keep warm current option.





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MODEL INFORMATION AccuBridge[®] 6020T

Ratio Range and Accuracy

The **AccuBridge**[®] Direct Current Comparator (DCC) with its binary wound current comparator technology balances current with an effective resolution of 25 bits. It provides ratio measurements with an accuracy to better than 15 ppb (Premium Model) It covers a ratio range of 0.1 to a maximum ratio of 4.05, with a linearity of better than 5 ppb.

The 6020T is perfectly suited for front panel operation, or you can team it with MI's Accu-T-Cal[™] Operating Software for fully automated measurements, history logging, graphing, and regression analysis. Stand–alone operation with the touch sensitive display panel provides full bridge capabilities to the operator. Multiple measurements over time can be numerically displayed or graphically displayed to fit your needs best.

Overview

The 6020T designed in two separate models for user's specification requirements or budget. The 6020T is available in two models Standard and Premium. The standard version is upgradeable at any time to Premium!

The operation of the 6020T bridges is simple and easy to use. You select functions using the menu on the large touch screen display. For absolute measurements enter the value and related uncertainty of the standard resistor using the display's keypad. You enter the measurement functions such as current through the unknown resistor, settle time, the number of measurements, and the number of statistics the same way. The 6020T's low-noise, touch screen display is interactive with the measurements. When a reading is complete, the average value and uncertainty (based on the number of statistics) are displayed. All uncertainty calculations are 2 sigma level. At MI, it's not only about the equipment and science; it's about what you can do and the ease with which you can do it.



MI New 6020T Series offers customers a Simple to Use, Cost Effective solution that offers the Very Best Measurement Uncertainties!

Automated Temperature Operation

Measurements International's Accu-T-Cal[™] SW is a software package for the automation of measurements and calibrations of platinum resistance thermometers at primary and secondary level. Accu-T-Cal[™] SW based on over 15 years of experience and research of metrologists from Laboratory of Metrology and Quality, Faculty of Electrical Engineering, University of Ljubljana (ULFE/LMK). UL-FE/LMK is the holder of the National





Measurements International

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MODEL INFORMATION AccuBridge® 6020T

Standard for Thermodynamic Temperature in Slovenia. Platinum resistance thermometers (PRTs) are calibrated at the highest level in fixed points, as specified in the International Temperature Scale ITS90. In this method, the PRT calibrated by making measurements at the fixed temperature maintained by the fixed point cell. This method gives the best achievable calibration uncertainties, usually down to about 1 mK. To reduce cost and time, platinum resistance thermometers can also be calibrated by comparison. In this method, the PRT is calibrated by comparing its reading with the reading of a reference thermometer, placed at the same temperature inside the temperature controlled calibration medium. The reference thermometer and the UUT measured with the same resistance bridge. The resistance bridge uses a switching matrix (scanner) to switch between both thermometers and alternately take resistance readings. Measurement method allows appropriate handling of readings from both thermometers to minimize possible sources of errors resulting from the short-term stability of the calibration medium temperature and measurement speed of the bridge. In the temperature range from -50 °C to 300 °C, it is possible to achieve uncertainties down to 5 mK, which is 3 to 5 times larger compared to calibration in fixed points. Accu-T-Cal™ SW has built drivers for all Measurements International Temperature and Resistance bridges as well as the MIL scanners, allowing to configure multiple PRT's to be calibrated. Communication with all equipment uses the IEEE-488 bus that comes standard with all MIL equipment. The configuration of hardware, standard PRT's as well as DUT's is easily entered into SW and is stored for future use or later measurement data analysis.

For More Information, Please Visit www.mintl.com and access the Accu-T-Cal[™] SW data sheet.

SW includes a list of the ITS90 fixed point cells parameters for use when configuring new measurements. Accu-T-Cal[™] SW has built in.

Procedure for evaluation and correction of the PRT's self-heating, with user-selectable steps at the measurement current. All measured data are available as graphical and tabular format and are automatically saved for detailed analysis and calibration report generation. Users can select evaluation of deviation function as per the ITS90, or polynomial representation of the PRT's characteristics from the data obtained during calibration. Accu-T-Cal[™] SW gives the user full freedom of selection or rejection of particular results from the analysis.





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MODEL INFORMATION ACCUBRIDGE® 6020T

Specifications: Rev 0

Model	6020T-S	tandard	6020T-Premium		
Maximum Ratio	14:1	1:14	4.05:1	1:4.05	
Current Reversal Minimum	2 sec	onds	2 seconds		
Sample Rate Minimum	0.1 se	conds	0.1 seconds		
0.1 to 1	0.07	0.07	0.015	0.02	
1 to 10	0.07	0.07	0.015	0.02	
10 to 100	0.07	0.07	0.015	0.02	
100 to 1000	0.07	0.07	0.015	0.02	
1000 to 10000	0.07	0.07	0.015	0.02	
10 k to 100 k	0.15	0.15	0.1	0.15	

Specification Shown in Part Per Million (PPM)

Dimensions (W x D x H):	Weight:	Shipping Weight:
438 x 565 x 178 mm	19 kg	23 kg

Main Power:

100 V, 120 V, 220 V, 240 VAC – 50/60Hz 200 VA Max.

Corporate Headquarters

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