

# 7520 PRECISION AUTOMATED VOLTAGE DIVIDER

First Automated and Self Calibrating Sub-ppm Voltage Divider



**GUILDLINE'S 7520 PRECISION AUTOMATED VOLTAGE DIVIDER** is the latest innovation in DC Voltage Dividers. The 7520 is a unique, patented Divider that provides self-alignment (i.e. true self-calibration) via an Internal Calibration System consisting of a Wheatstone bridge, Zener based Voltage Source, and an Optical Null Detector. The 7520 Voltage Divider can divide an input voltage ranging from 1 to 1100 volts into ratios of 1:1, 10:1, 100:1 and 1000:1 with corresponding uncertainties of 0.05, 0.1, 0.2, and 0.5  $\mu\text{V/V}$ . This fully automated, self-calibrating, instrument is priced in the range of a traditional voltage divider, making it an affordable option for sub-ppm ratio measurements.

The resistor voltage divider networks, Wheatstone bridge, voltage reference, and optical null detector are all inside a thermally regulated and EMI shielded chamber. In addition, the use of a patented optical null detector guarantees high isolation and low noise during the self-calibration process. Internal safety circuits are used to protect the devices connected to the 7520 Divider from being damaged by operator error or internal failure.

The internal 7520 system automatically checks for temperature stability in the chamber during start-up, operation and self-calibration. If there is instability in temperature, a warning or failure message will be displayed. Manual monitoring of temperature stability is not required. Progress of temperature warm-up and self-calibration are displayed in real-time.

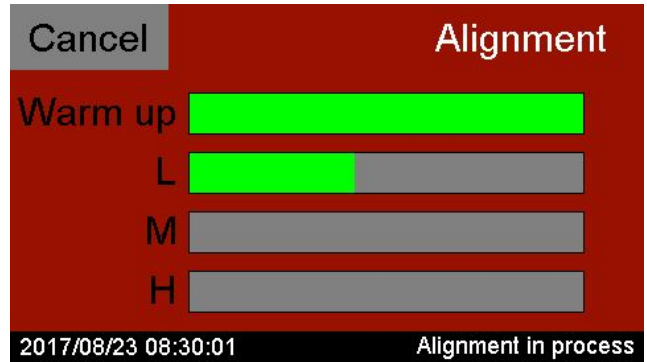
The 7520 Voltage Divider is controllable via the Ethernet/IEEE 488.2 bus interface or via a USB interface, enabling automated testing and calibration setups. A complete SCPI command set enables customers to develop their own automated calibration or measurement processes. Additionally, full manual operation is achieved via an internal micro-processor and front panel, color, touch sensitive screen.

## FEATURES

- Patented Automated Self-Alignment (i.e. True Self-Calibration) Incorporated into the Divider
- Built-In Wheatstone Bridge, Built-in Voltage Reference, and Built-in Null Detector. NO External Standards Required for Self-Calibration!
- Advanced Internal Temperature Control Chamber for Resistive Divider Networks
- Sub-ppm Ratio Uncertainties
- Provides for Wide Range of Ratios: 1:1, 1:10, 1:100 1:1000 and Reverse
- Fully Automated Operation with SCPI Command Set
- Automates Calibration of Voltage References
- Calibrates Precision Sources Including Calibrators
- Calibrates Voltage Measurements including DMMs
- Color Screen Touch Menu Operation
- Ethernet / IEEE-488.2 and USB Ports
- Replaces Old Divider Technology such as the Fluke 752A and Measurements International (MI) 1340A

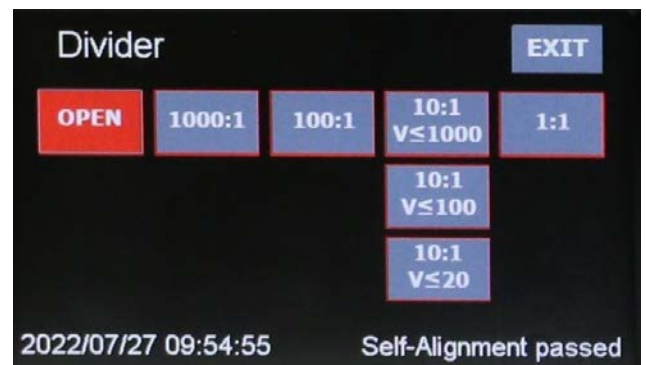
# Model 7520 Precision Automated Voltage Divider

The internal Calibration System that is incorporated into the 7520 provides a true self-calibration. The 7520's built-in Wheatstone Bridge, Voltage Reference, and Optical Null Detector are used to automatically perform the self-calibration of the voltage ratios. No external standards are required and once started no operator intervention is required. In comparison to the competition, which requires frequent manual calibrations with external standards, the 7520 automated self-alignment process takes a few seconds to initiate and automatically returns the 7520 to its original calibration state with sub-ppm uncertainties. The self-alignment process can be initiated through the front panel or a SCPI command and takes about 2 hours to complete. Once performed, the self-alignment is good for one month. The process can be run at any time, such as at the end of the day or over the weekend.



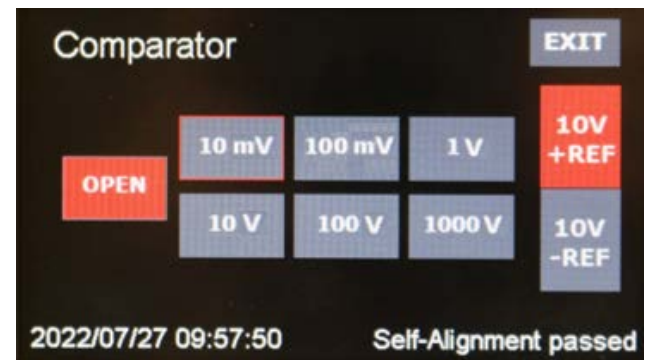
## 7520 Divider Mode of Operation

In the "Divider" mode of operation, the 7520 is connected to a Voltage Reference, typically a 10 V Zener reference or calibrator. The output voltage is based on the selected divider ratio. The Divider mode provides an accurate output voltage based on a reference voltage, with a sub-ppm uncertainty contribution.



## 7520 Comparator Mode of Operation

In the "Comparator" mode of operation, an external voltage input ( $V_{in}$ ) is connected to the Voltage Input Terminals and a second voltage standard ( $V_{ref}$ ) is connected to the Voltage Reference Terminals. The 7520 automatically divides either the  $V_{in}$  or  $V_{ref}$  if they do not match, and then provides the voltage difference between the  $V_{in}$  and  $V_{ref}$  as  $V_{out}$  on the Null Detector Terminals. The voltage difference between  $V_{in}$  and  $V_{ref}$  can be measured with an external null detector or external long scale DMM.



In addition, the 7520 is the only voltage divider where the polarity of the Voltage Reference can be switched inside the 7520 manually or automatically. This enables automated polarity switching for the Voltage Reference, thus the wires connecting the Voltage reference do NOT have to be manually switched to change the polarity. This also speeds up the calibration process because there is no wait time required due to switching the Voltage Reference leads.

## Ease of Use

The 7520 is a fully automated, and thus is easier to use than any other voltage divider. It is the only divider where the ratio can be selected from an on-instrument touch screen, and it is the only divider where leads do not have to be switched when selecting different ratios. This allows true automation, including the use of SCPI commands to calibrate all ranges of a Calibrator or DMM without having to manually switch the leads to select different ratios (i.e. different voltage ranges on the Calibrator or DMM).

# Model 7520 Precision Automated Voltage Divider

7520 SPECIFICATIONS			
Voltage Divider Ratio	Voltage Divider Ratios Output Uncertainty <sup>1,2</sup>		
1:1	0.05		
10:1	0.1		
100:1	0.2		
1000:1	0.5		
Maximum Voltages	Voltage Input Terminals		1100 V <sub>dc</sub>
	Reference Standard Terminals		12.5 V <sub>dc</sub>
Divider Mode	Ratios	Input Impedance <sup>3</sup>	Output Impedance
	1:1 ratio	2.303 MΩ	0 Ω
	10:1 ratio (V≤20)	43.2 kΩ	5.8 kΩ
	10:1 ratio (V≤100)	270 kΩ	43.2 kΩ
	10:1 ratio (V≤1000)	2.303 MΩ	270 kΩ
	100:1 ratio	2.303 MΩ	43.2 kΩ
	1000:1 ratio	2.303 MΩ	5.8 kΩ
Comparator Mode	Mode	Output Impedance	
	10 mV (1000:1 ratio)	5.8 kΩ ± 0.1 %	
	100 mV (100:1 ratio)	43.2 kΩ ± 0.1 %	
	1 V (10:1 ratio (V≤100))	43.2 kΩ ± 0.1 %	
	10 V (1:1 ratio)	0 Ω ± 0.1 %	
	100 V (10:1 ratio (V≤100))	43.2 kΩ ± 0.1 %	
	1000 V (100:1 ratio)	43.2 kΩ ± 0.1 %	
Communication	USB, IEEE 488.2, SCPI Based Language Instructions		
Environmental	Operating	Storage	
Temperature	+21 °C to +25 °C (69.8 °F to 77 °F)	-20 °C to +60 °C (-4 °F to 140 °F)	
Humidity	20 % to 70 % RH	15 % to 80 % RH (Non-Condensing)	
Power Requirements	VAC: 100 V to 240 V ± 10 % / 50 or 60 Hz ± 5 %, 60 VA		
Dimensions (Length x Width x Height)		Weight	
503 mm x 455 mm x 133 mm		11 kg	24 lbs

1 – Includes the uncertainty of the Self-Calibration. Relative to a 10 Vdc Voltage Reference Standard or Calibrator for 100 Vdc or 1000 Vdc. Maximum input to the 7520 Voltage Reference terminals is 12.5 Volts.

2 – After Self-Calibration or within one month from last Self-Calibration.

3 – Applies to Both the Divider Chain and Driven Guard.

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Ratio	Ratio Stability (parts in $10^{-6}$ )		Input Voltage
	7 Day	30 Day	
1:1 ratio	0.01	0.01	10 V
10:1 ratio ( $V \leq 20$ )	0.03	0.15	10 V
10:1 ratio ( $V \leq 100$ )	0.03	0.15	100 V
10:1 ratio ( $V \leq 1000$ )	0.03	0.15	1000 V
100:1 ratio	0.03	0.15	100 V
1000:1 ratio	0.05	0.25	1000 V

\*\*\* Note that the 7520 Self-Calibration does not need external standards or operator intervention, is automated, and can be initiated with a single touch on the 7520 display screen. There is no need for a stability specification beyond 30 days because it is recommended that the self-calibration be done on a weekly or monthly basis.

## Unparalleled Support

Guildline Instruments provides an **industry leading two year warranty** on every 7520 Automated Voltage Divider and all associated standards.

### GUILDLINE IS DISTRIBUTED BY:

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### ORDERING INFORMATION

<b>7520</b>	Precision Voltage Divider
	Operation Manual available from <a href="http://www.guildline.com">www.guildline.com</a>

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