RIGOL



DM858 Series

Digital Multimeter



Data Sheet DSC11103-1110 May. 2024











RIGOL



DM858 Series Digital Multimeter

Delicate Design, Full Functionality



266mm (W) * 165mm (H) * 80mm (D)













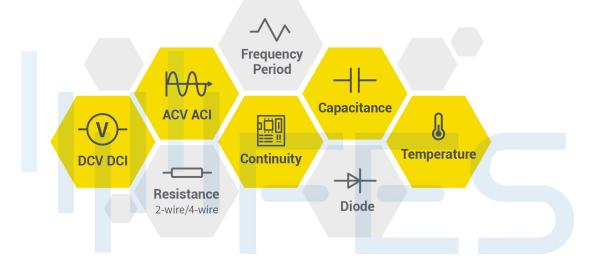
Product Features

5.5-Digit Resolution

This series provides two models with 5½-digit resolution and up to 125 readings/s measuring rate for high-speed tests. Its internal memory allows data logging of up to 500,000 points for recording and analyzing more data.

Various Measurement Functions

It supports a broad range of measurements: DCV, DCI, ACV, ACI, 2-wire resistance, 4-wire resistance, frequency, period, continuity, diode, capacitance, and any sensor measurements.



Graphical Display













7-Inch Color Touch Screen

The 7-inch color touch screen allows you to control the instrument with simple touch-screen gestures. The dual-display measurement capability saves you from switching between measurements, making it easier to observe and analyze data.

Compact in Size, Easy to Carry

With a compact size, it saves valuable space on your bench.

It can be powered by a mobile power source via its USB Type-C power interface, satisfying your test requirements in the field.



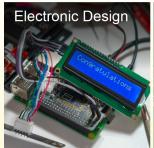
Flexible Control and Operation

It has standard USB and LAN interfaces for flexible PC connectivity and supports remote control via Web Control.





Applications



















Product Features

Product Features

- Max. reading rate: 125 readings/s
- Up to 500,000 points logging memory to record and analyze more data
- 5½-digit reading resolution (120,000 counts)
- True-RMS AC Voltage and AC Current measuring
- Built-in 10 groups of data storage and 10 groups of setup storage
- Strong Math functions, supporting various application protocols
- 7" color touch screen, displaying dual-measurement results concurrently
- Type-C interface for power charge; compact in size, freeing up your bench space
- Standard USB and LAN interfaces, supporting Web Control

DM858 series benchtop digital multimeter provides a highly cost-effective test tool for engineers. It features 5.5-digit resolution, max. 125 readings/s, data logging memory of 500,000 points, and 0.03% DCV accuracy (1 year). It provides 11 measurement functions for input signals, 5 Math operations, and 3 graphical display types, satisfying what most experiments and tests require of a multimeter. The 7" touch screen allows a clear view on measurement results. Its provides USB and LAN interfaces (standard) as well as the Web Control function for you to control the instrument directly, bringing smoother interaction. It is equipped with a Type-C interface for power charge. In addition, it has a compact size and supports the attachment to a bracket, saving valuable bench space for engineers.

Specifications for Different Models

	DM858	DM858E
DCV Accuracy (1 year)	0.030%	0.060%
Reading Rate	125 readings/s	80 readings/s
No. of Points in Data Logging Memory	500,000	20,000
Max. Current Measurement Range	10 A	3 A
Max. Capacitance Measurement Range	10 mF	1 mF











Specifications

Unless otherwise noted, all the technical specifications can be guaranteed for 30-minute warm-up, slow measurement mode, and calibration temperature within 18°C and 28°C.

DC Characteristics

Accuracy ± (% of reading + % of range)

Function	Range ^[1]	Test Current or Load Voltage	1 year 23℃ ± 5℃
DC Voltage (DCV)	100.000 mV	-	0.03 + 0.004 (DM858) 0.06 + 0.004 (DM858E)
	1.00000 V	-	0.03 + 0.003 (DM858) 0.06 + 0.003 (DM858E)
	10.0000 V	-	0.03 + 0.004 (DM858) 0.06 + 0.004 (DM858E)
	100.000 V	-	0.03 + 0.003 (DM858) 0.06 + 0.003 (DM858E)
	1000.00 V ^[2]	-	0.03 + 0.003 (DM858) 0.06 + 0.003 (DM858E)
	100.000 μΑ	<0.05 V	0.055 + 0.005
	1.00000 mA	<0.5 V	0.055 + 0.005
DC Current ^[3]	10.0000 mA	<0.05 V	0.095 + 0.020
	100.000 mA	<0.5 V	0.070 + 0.008
(DCI)	1.00000 A	<0.01 V	0.170 + 0.020
	3.00000 A (for DM858E)	<0.1 V	0.250 + 0.010
	10.0000 A (for DM858) ^[4]	<0.1 V	0.250 + 0.010
	100.000 Ω	1 mA	0.050 + 0.020
	1.00000 kΩ	100 μΑ	0.050 + 0.020
	10.0000 kΩ	10 μΑ	0.050 + 0.020
Resistance (R) ^[5]	100.000 kΩ	1 μΑ	0.10 + 0.05
	1.00000 ΜΩ	1 μΑ	1.00 + 0.05
	10.0000 ΜΩ	100 nA	1.50 + 0.05
	50.000 ΜΩ	10 nA	3.00 + 0.05
Diode Test	2.0000 V ^[6]	350 μΑ	0.050 + 0.15
Short-circuit Test	1000 Ω	100 μΑ	0.3 + 0.15











DC Voltage			
	100 mV, 1 V: 11.2 M Ω or >10 G Ω (selectable)		
Input Resistance	(Input signals that exceed \pm 2.5 V in these ranges will pass the 1 M Ω (typical) clamp resistance.)		
	10 V, 100 V, and 1000 V: 11.2 MΩ ± 5%		
Input Bias Current	<300 pA, 25℃		
Input Protection	1000 V on all ranges		
CMRR (Common Mode Rejection Ratio)	120 dB (for the 1 k Ω unbalanced resistance in LO lead, max. ± 500 VDC)		
NMRR (Normal Mode Rejection Ratio)	60 dB at "slow" rate		
Resistance			
Maaguramant	4-wire resistance or 2-wire resistance		
Measurement Method	Current source referenced to LO input		
On an Cinquit	Carrette searce referenced to 25 mpat		
Open Circuit Voltage	Limited to <5 V		
Max. Lead Resistance	10% of range per lead for 100 Ω and 1 $k\Omega$ ranges		
(4-wire)	1 k Ω per lead on all other ranges		
Input Protection	1000 V on all ranges		
DC Current			
	100 μA: <0.05 V		
	1 mA: <0.05 V		
Shunt Resistor	100 μA, 1 mA: 330 Ω		
	10 mA, 100 mA: 3.3 Ω		
	1 A, 3 A, 10 A: 0.008 Ω (3 A only available for DM858E and 10 A only available for DM858)		
	DM858: replaceable 10 A, 250 V fast-blow fuse on the front panel; 12 A, 1000 V fast-blow fuse internal		
Input Protection	DM858E: replaceable 3.15 A, 250 V fast-blow fuse on the front panel; 3.15 A, 1000 V fast-blow fuse internal		
Short Circuit/Diod	e Test		
Short Circuity Diod			
Measurement Method	Short circuit test: 100 μ A \pm 5% constant current source, <5 V open-circuit voltage		
Wethou	Diode test: 350 μA ± 5% constant current source, <5 V open-circuit voltage		













Short Circuit/Diode Test		
Response Time	DM858: 125 samples/s; DM858E: 80 samples/s, with beeper setting	
Short Circuit Resistance	Adjustable from 1 Ω to 1000 Ω	
Input Protection	1000 V	

Setup Time Attentions

The setup time about voltage measurement is affected by source impedance, dielectric characteristics of test cable, and input signal changes.

NOTE:

- [1]: 20% over range on all ranges except DCV 1000 V, ACV 750 V, DCI 10 A, 3 A, and ACI 10 A, 3 A.
- [2]: 0.02 mV additional error per 1 V over the first ±500 VDC.
- [3]: For 100 μ A, 1 mA, 10 mA, and 100 mA ranges, the internal current sensing resistor needs to be cooled when measuring >1 A current for more than 15 minutes.
- [4]: 10 A is only available for DM858. The max. current range for DM858E is 3 A. For continuous current greater than DC 7 A or AC RMS 7 A, 30 seconds ON and 30 seconds OFF.
- [5]: Specifications are for 4-wire resistance measurement or 2-wire resistance measurement using the "Relative" operation. $\pm 0.2~\Omega$ additional errors will be added in performing 2-wire resistance measurement without using the "Relative" operation.
- [6]: The accuracy specifications are for the voltage measured at the input terminals only. The typical value of the test current is 350 μ A. Variation in the current source will cause some variation in the voltage drop across a diode junction.

AC Characteristics

Accuracy \pm (% of reading + % of range)













Function	Range ^[1]	Frequency Range	1 year 23℃ ± 5℃
		20 Hz to 45 Hz	1.5 + 0.2
	100.000 mV	45 Hz to 1 kHz	0.2 + 0.1
	100.000 1117	1 kHz to 5 kHz	1.0 + 0.1
		5 kHz to 8 kHz	3.0 + 0.1
		20 Hz to 45 Hz	1.5 + 0.2
	1.00000 V	45 Hz to 1 kHz	0.2 + 0.1
	1.00000 V	1 kHz to 5 kHz	1.0 + 0.1
		5 kHz to 8 kHz	3.0 + 0.1
		20 Hz to 45 Hz	1.5 + 0.2
True-RMS AC	10.0000 V	45 Hz to 1 kHz	0.2 + 0.1
Voltage (ACV) ^[2]		1 kHz to 5 kHz	1.0 + 0.1
		5 kHz to 8 kHz	3.0 + 0.1
	100.000 V	20 Hz to 45 Hz	1.5 + 0.2
		45 Hz to 1 kHz	0.2 + 0.1
		1 kHz to 5 kHz	1.0 + 0.1
		5 kHz to 8 kHz	3.0 + 0.1
		20 Hz to 45 Hz	1.5 + 0.2
	750.00 V	45 Hz to 1 kHz	0.2 + 0.1
		1 kHz to 5 kHz	1.0 + 0.1
		5 kHz to 8 kHz	3.0 + 0.1









Function	Range ^[1]	Frequency Range	1 year
			23℃ ± 5℃
		20 Hz to 45 Hz	1.50 + 0.10
	100.000 μΑ	45 Hz to 1 kHz	0.50 + 0.10
		1 kHz to 8 kHz	2.50 + 0.20
		20 Hz to 45 Hz	1.50 + 0.10
	1.00000 mA	45 Hz to 1 kHz	0.50 + 0.10
		1 kHz to 8 kHz	2.50 + 0.20
		20 Hz to 45 Hz	1.50 + 0.10
	10.0000 mA	45 Hz to 1 kHz	0.50 + 0.10
		1 kHz to 8 kHz	2.50 + 0.20
True-RMS AC		20 Hz to 45 Hz	1.50 + 0.10
Current (ACI) ^[3]	100.000 mA	45 Hz to 1 kHz	0.30 + 0.10
Current (ACI)		1 kHz to 8 kHz	2.50 + 0.20
	1.00000 A	20 Hz to 45 Hz	1.50 + 0.20
		45 Hz to 1 kHz	0.50 + 0.20
		1 kHz to 8 kHz	2.50 + 0.20
		20 Hz to 45 Hz	1.50 + 0.15
	3.00000 A (for DM858E)	45 Hz to 1 kHz	0.50 + 0.15
		1 kHz to 8 kHz	2.50 + 0.20
	10.0000 A (for DM858) ^[4]	20 Hz to 45 Hz	1.50 + 0.15
		45 Hz to 1 kHz	0.50 + 0.15
		1 kHz to 8 kHz	2.50 + 0.20

Additional Crest Factor Error (non-sinusoidal waveforms) ^[5]			
Crest Factor	Error (% of range)		
1 to 2	0.05		
2 to 3	0.2		

True RMS AC Voltage (ACV)		
Measurement Method	AC-coupled True-RMS - measure the AC component of input with up to 1000 V DC bias on any range	
Crest Factor	≤3 at full scale	
Input Impedance	11.2 M Ω ± 5%, in parallel with <100 pF capacitance on any range	
AC Filter Bandwidth	20 Hz to 8 kHz	
CMRR (Common Mode Rejection Ratio)	60 dB (for the 1 k Ω imbalance resistance in LO lead and <60 Hz, max. ± 500 VDC)	

True RMS AC Current (ACI)		
	Direct coupled to the fuse and shunt; AC-coupled True RMS measurement (measure the AC component)	
Crest Factor	≤3 at full scale	















True RMS AC Curre	True RMS AC Current (ACI)		
Max. Input	DC + AC current peak value <300% of range; RMS current with DC current component: DM858: <10 A; DM858E: <3 A		
Shunt Resistor	100 μ A, 1 mA: 330 Ω 10 mA, 100 mA: 3.3 Ω 1 A, 3 A, 10 A: 0.008 Ω (3 A only available for DM858E and 10 A only available for DM858)		
Input Protection	DM858: replaceable 10 A, 250 V fast-blow fuse on the front panel; 12 A, 1000 V fast-blow fuse internal DM858E: replaceable 3.15 A, 250 V fast-blow fuse on the front panel; 3.15 A, 1000 V fast-blow fuse internal		

Setup Time Attentions

Make sure that the RC return at input terminal has been in a stable state completely (higher than 3 s) before accurate measurement.

Input >300 Vrms (or >5 Arms) will cause the self-heating of the signal conditioning component to generate error which is included in the characteristics of the instrument. Internal temperature variation due to the self-heating will cause an additional error on the lower AC range. The error is smaller than 0.03% of readings and will disappear after a few minutes.

NOTE:

[1]: 20% over range on all ranges except DCV 1000 V, ACV 750 V, DCI 10 A, 3 A, and ACI 10 A, 3 A.

[2]: Specifications are for sine-wave inputs >5% of the range. For the 750 VAC range, it is limited to 8 x 10⁷ Volts-Hz. For 5 kHz to 8 kHz, add 0.13% of range additional error.

[3]: Specifications are for sine-wave inputs >5% of the range. For 100 µA, 1 mA, 10 mA, and 100 mA ranges, the internal current sensing resistor needs to be cooled if >1 A current is applied for more than 15 minutes.

[4]: 10 A is only available for DM858. The max. current range for DM858E is 3 A. For continuous current greater than DC 7 A or AC RMS 7 A, 30 seconds ON and 30 seconds OFF.

[5]: For frequency <100 Hz.

Frequency and Period Characteristics

Accuracy ± (% of reading + % of range)













Function	Range	Frequency Range	1 year 23℃ ± 5℃
Frequency/Period	100 mV to 750 V ^[1]	20 Hz to 2 kHz	0.01 + 0.003
		2 kHz to 20 kHz	0.01 + 0.003
		20 kHz to 50 kHz	0.01 + 0.003
		50 kHz to 100 kHz	0.01 + 0.006
	DM858: 100 μA to 10 A ^[2]	20 Hz to 2 kHz	0.01 + 0.003
	DM858E: 100 μA to 3 A ^[3]	2 kHz to 10 kHz	0.01 + 0.003

Measurement Attentions

All frequency counters are susceptible to error when measuring low-voltage, low-frequency signals. Shielding inputs is critical for minimizing measurement errors from external noise.

Setup Time Attentions

Errors will occur when attempting to measure the frequency or period of the signal with a DC offset voltage change. Make sure that the RC return at input terminal has been in a stable state completely (higher than 3 s) before accurate measurement.

NOTE:

[1]: 100 mV: the specifications are for AC input voltage of 35% to 120% of range in <20 kHz frequency; 1 V, 10 V, 100 V, 750 V: the specifications are for AC input voltage of 35% to 120% of range (750 V range is limited to 750 Vrms).

[2]: 100 μ A to 10 A: the specifications are for AC input current of 20% to 120% of range (10 A range is limited to 10 Arms).

[3]: 100 μ A to 3 A: the specifications are for AC input current of 20% to 120% of range (3 A range is limited to 3 Arms).

Capacitance Characteristics

Accuracy \pm (% of reading + % of range)^[1]













Function	Range ^[2]	Max. Testing Current	1 year 23℃ ± 5℃
Capacitance	1.000 nF	200 nA	5 + 1.5
	10.00 nF	200 nA	5 + 1.5
	100.0 nF	2 μΑ	1 + 0.5
	1.000 μF	10 μΑ	1 + 0.5
	10.00 μF	10 μΑ	1 + 0.5
	100.0 μF	100 μΑ	1 + 0.5
	1.000 mF	0.5 mA	2 + 0.5
	10.00 mF (for DM858) ^[3]	1 mA	2 + 0.5

Capacitance Measurement		
Testing Method	Measure the rate of voltage change generated during the current flowing into the capacitance	
Connection Type	2-wire	
Input Protection	1000 V on all ranges	

Measurement Attentions

Due to external noise, measurement errors can occur when measuring small capacitance. Shielding inputs is critical for minimizing such errors.

NOTE:

- [1]: Specifications are guaranteed when the "Relative" operation is enabled. Additional errors may be caused by non-film capacitors.
- [2]: Specifications are guaranteed when the capacitance range is between 10% and 120%.
- [3]: 10 mF is only available for DM858. The max. measurement range for DM858E is 1 mF.

Trigger Characteristics

Trigger Characteristics			
Trigger Source	Auto, Single, External		
Samples Per Single Trigger	1 to 2000		
	Slow: 400 ms to 2000 ms		
Auto Trigger Interval	Medium: 50 ms to 2000 ms		
interval	Fast: 8 ms to 2000 ms (DM858); 12 ms to 2000 ms (DM858E)		
Reading Hold Sensitivity	0.01%, 0.1%, 1%, or 10% of the reading		
	Input Level	5 V TTL-compatible	
External Trigger Input	Trigger Condition	Rising edge/falling edge/high level/low level	
	Input Impedance	>20 kΩ, in parallel with 400 pF, DC-coupled	
	Min. Pulse Width	500 μs	











Trigger Characteristics		
	Level	5 V TTL-compatible
VMC Out	Output Polarity	Positive/negative
	Output Impedance	200 Ω, typical
	Output Pulse Width	Slow: 1 ms to 399 ms
		Medium: 1 ms to 49 ms
		Fast: 1 ms to 7 ms (DM858); 1 ms to 11 ms (DM858E)

Other Measurement Characteristics

Any Sensor		
	TC: B, E, J, K, N, R, S, T	
Temperature Sensor	RTD: 385 (0.00385), 389 (0.00389), 391 (0.00391), 392 (0.00392) temperature coefficient	
	Thermal: 2.2 k Ω , 3 k Ω , 5 k Ω , 10 k Ω , 30 k Ω resistance coefficient	
User-defined Sensor	Supports DCV, DCI, 2-wire resistance, 4-wire resistance, and frequency sensors	

History and Storage			
Volatile Memory	DM858: 500,000 readings DM858E: 20,000 readings		
Non-volatile Memory	10 groups of history data storage (DM858: 500,000 readings/group; DM858E: 20,000 readings/group) 10 groups of any sensor setup storage (DM858: 500,000 readings/group; DM858E: 20,000 readings/group) 10 groups of instrument setting storage Supports USB external storage extension		

Math Operation

dBm, dB, Relative, Statistics (Maximum/Minimum/Average/Standard Deviation), Limit, Histogram, Bar Chart, and Trend

General Specifications

Power Supply	
Power Interface	Type-C interface
Power Voltage	DC, 12 V, 3 A
Consumption	10 W (max.)

Mechanical Characteristics

Dimensions 266 mm (W) x 165 mm (H) x 80 mm (D)















Mechanical Characteristics		
Weight	Package excluded: <2 kg	
	Package included: <3 kg	
Remote Interface		
USB Host	1 on the front panel	
USB Device	1 on the rear panel	
LAN Port	1 on the rear panel, 10/100 Base-T, supporting LXI-C	
Others		
LCD	7-Inch color touch screen	
	Full accuracy: 0°C to 50°C, 80% RH, 40°C, without condensation	
Operating Environment	Storage temperature: -20°C to 60°C	
	Altitude: up to 3,000 meters	
Safety	Measurement Category ^[1] : CAT II 300 V, CAT I 1000 VDC 750 VAC RMS 2500	
	Vpk transient overvoltage	
	Pollution degree: 2	
	1 onution degree. 2	
Programming Language	Standard SCPI commands	

NOTE:

Warm-up Time

[1]: Measurement Category (CAT I-CAT IV) descriptions:

30 minutes

- CAT I is for measurements performed on circuits not directly connected to MAINS. Examples are measurements on batteries, electronic devices (especially laptops), and circuits not derived from MAINS, especially protected (internal) MAINS derived circuits.
- **CAT II** is for measurements performed on circuits directly connected to low voltage installation. Examples are measurements on household appliances, portable tools and similar equipment.
- CAT III is for measurements performed in the building installation. Examples are measurements on distribution boards, circuit-breakers, wiring (including cables, bus-bars, junction boxes, switches and socket-outlets) in the fixed installation, and equipment for industrial use and some other equipment. For example, stationary motors with permanent connection to a fixed installation.
- CAT IV is for measurements performed at the source of a low-voltage installation. Examples are electricity meters and measurements on primary overcurrent protection devices and ripple control units.

DANGER:

To avoid the danger of electric shock, do not make measurements out of the voltage range or at CAT III/CAT IV as described above.











Warranty and Calibration Interval

Warranty and Calibration Interval		
Warranty	3 years (excluding the accessories)	
Recommended Calibration Interval	12 months	

Regulation Standards

Regulation Standards				
Regulation Standar	Regulation Standards			
	Compliant with EMC Directive (2014/30/EU), compliant with or higher than the standards specified in EN 61326-1: 2013, EN 61326-2-1:2013, EN IEC 61000-3-2:2019+A1, EN 61000-3-3:2013+A1:2019			
	CISPR 11:2009+A1 Class A			
	EN IEC 61000-3-2:2019+A1	Harmonics, Class A		
	EN 61000-3-3:2013+A1:2019	Voltage flicker		
Electromagnetic Compatibility	EN 61000-4-2:2009	±4.0 kV (contact discharge), ±8.0 kV (air discharge)		
	EN 61000-4-3:2006+A1+A2	10 V/m (80 MHz to 1 GHz); 3 V/m (1.4 GHz to 6 GHz)		
	EN 61000-4-4:2004+A1	2 kV power cord		
	EN 61000-4-5:2006	1 kV (phase-to-neutral voltage); 2 kV (phase-to-earth voltage); 2 kV (neutral-to-earth voltage)		
	EN 61000-4-6:2009	10 V, 0.15 MHz to 80 MHz		
	EN 61000-4-11:2004	Voltage dip: 0% UT during half cycle; 0% UT during 1 cycle; 70% UT during 25 cycles		
		Short interruption: 0% UT during 250 cycles		
	EN 61010-1:2010+A1:2019			
Safety	IEC 61010-1:2010+A1:2016			
	UL 61010-1: 2012 R7.19			
	CAN/CSA-C22.2 NO. 61010-1-12 + GI1 + GI2 (R2017) + A1			
Vibration	Meets GB/T 6587; class 2 randon	n		
vibration	Meets MIL-PRF-28800F and IEC60068-2-6; class 3 random			













Regu	lation	Stand	ards

Meets GB/T 6587-2012; class 2 random

Shock

Meets MIL-PRF-28800F and IEC 60068- 2- 27; class 3 random

(in non-operating conditions: 30 g, half sine, 11 ms duration, 3 shocks along the main axis, a total of 18 vibrations)











Order Information and Warranty Period

Order Information

Order Information	Order No.		
Model			
DM858 (5½ Digital Multimeter)	DM858		
DM858E (5½ Digital Multimeter)	DM858E		
Standard Accessories			
Power Adaptor Conforming to the Standard of the Destination Country			
Ground Lead			
Two Alligator Clips (Black and Red)	ALLIGATORCLIP-DMM		
Two Digital Multimeter Test Pens (Black and Red)	LD-DM		
Two Backup Fuses: DM858: AC, 250 V, F10 A DM858E: AC, 250 V, F3.15 A			
Optional Accessories			
Kelvin Test Clip	KELVINTESTCLIP-DMM		
USB Cable (150 cm)	CB-USBA-USBB-FF-150		

NOTE:

For all the mainframes, accessories, and options, please contact the local office of RIGOL.









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Warranty Period

Three years for the mainframe, excluding the accessories.



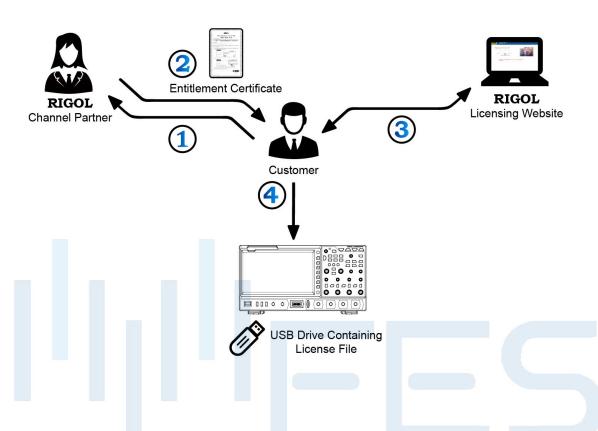








Option Ordering and Installation Process



- 1. According to the usage requirements, please purchase the specified function options from RIGOL Sales Personnel, and provide the serial number of the instrument that needs to install the option.
- 2. After receiving the option order, the **RIGOL** factory will mail the paper software product entitlement certificate to the address provided in the order.
- 3. Log in to RIGOL official website for registration. Use the software key and instruments serial number provided in the entitlement certificate to obtain the option license code and the option license file.
- 4. Download the option license file to the root directory of the USB storage device, and connect the USB storage device to the instrument properly. After the USB storage device is successfully recognized, the **Option install** menu is activated. Press this menu key to start installing the option.









