

TM9300 Fluxgate Magnetometer Calibration Device



*Reference only. Configuration and details may vary slightly corresponding to application.

1. Summary

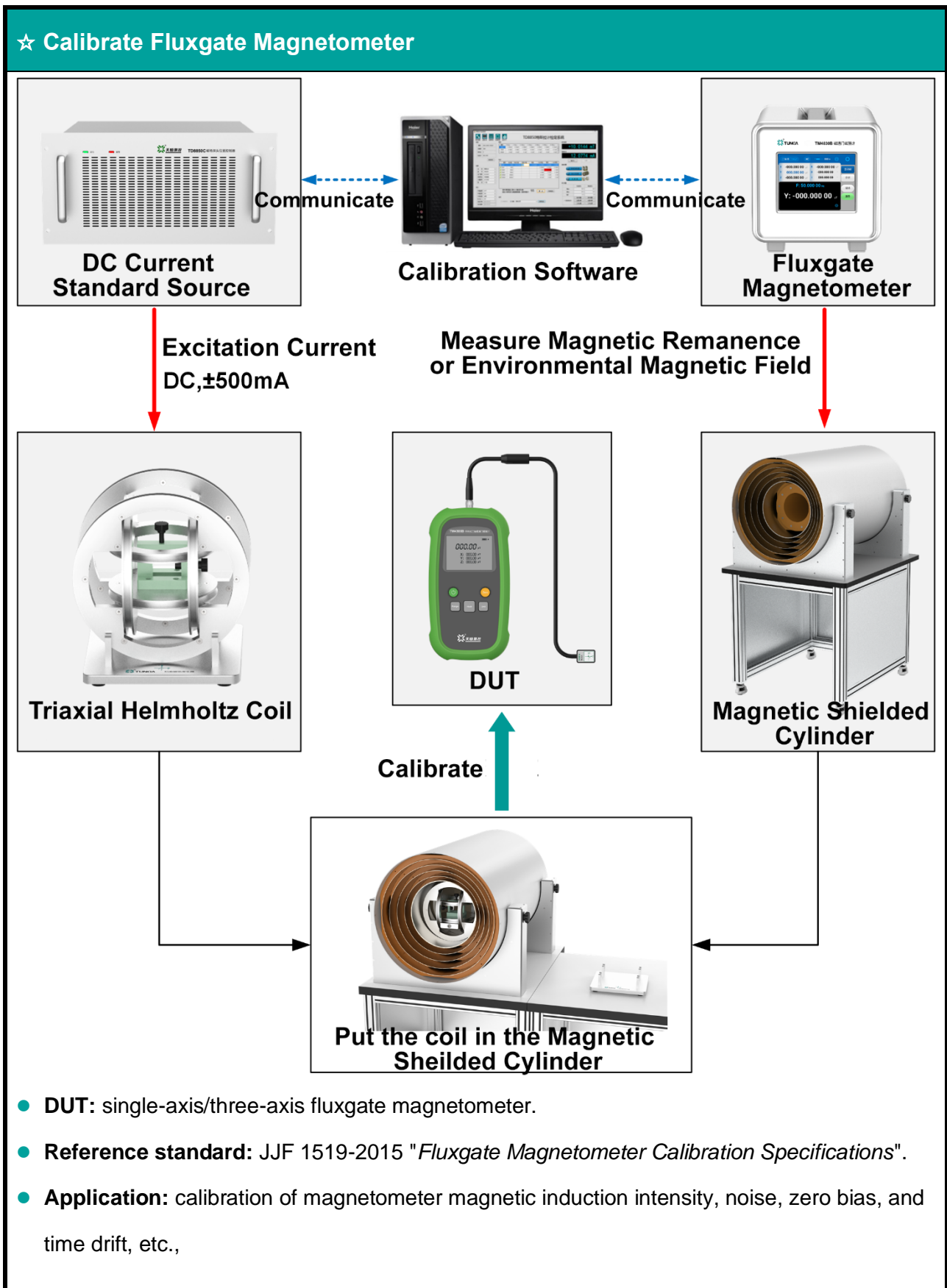
TM9300 is a high-precision fluxgate magnetometer calibration device. It consists of a DC current standard source, a three-axis Helmholtz coil, a magnetic shielded cylinder, a three-axis flux gate precision magnetometer, and automatic calibration software. TM9300 is suitable for calibrating single-axis and three-axis fluxgate magnetometers; it is suitable for metrology laboratories to establish weak magnetic field strength measurement and testing standards; it is also suitable for various research institutes, universities, and enterprises to conduct electromagnetic interference simulation experiments and material magnetic testing experiment, etc. Reference standard: JJF 1519-2015 "*Fluxgate Magnetometer Calibration Specifications*".

2. Features

- Equipped with a bipolar three-channel precision current source.
- Three channels can output current synchronously or asynchronously.
- The stability of the current source reaches 10 ppm/min.
- The accuracy of the current source reaches class 0.01.
- Annual error variation is better than 100 ppm.
- Use triaxial Helmholtz coil as magnetic field generator
- The single-axis coil can generate a standard magnetic field of up to 1000 μ T.

- Equipped with a special magnetic shielded cylinder, the internal magnetic field after degaussing is < 2 nT.
- The coil can be placed in a shielding cavity to shield the interference from environmental magnetic fields.
- The system adopts modular integrated design.
- Equipped with calibration software.

3. Application



4. Specifications

4.1 Three-Channel DC Current Standard Source



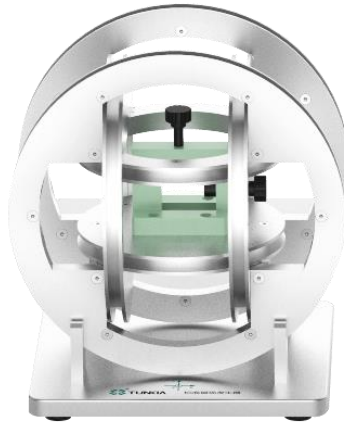
- This current source is a bipolar three-channel precision DC current standard source.
- It can accurately output $\pm(0\sim 500\text{mA})$ DC current synchronously or asynchronously.
- The current source can be continuously adjusted through program control, and has a small adjustment fineness.
- The current output stability is better than 10 ppm/min, and the annual error change is better than 100 ppm.

Specifications

Output Range	$\pm (0\sim 500 \text{ mA })$
Adjust Fineness	5 ppm*RG
Short Term Stability	10 ppm/min
Measurement Uncertainty (K=2)	$0.006\%*RD^{①} + 0.004\%*RG^{②}$
Full Scale Linearity	< 10 ppm
Annual Error Change	< 100 ppm
Single Channel Maximum Load Voltage	20 V
Protective Function	open circuit protection, overload protection functions
Power Supply	AC (220 \pm 22) V, (50 \pm 2) Hz

Note: ① RD is the reading value, ② RG is the range vaule.

4.2 Triaxial Helmholtz Coil



- The coil can be excited by a high-precision DC standard current source.
- Each axis can generate a maximum standard magnetic field of $\pm 1000 \mu\text{T}$.

Specifications

Excitation Current	$\pm (5 \text{ mA} \sim 500 \text{ mA})$
Maximum Magnetic Field (Single Axis)	$\pm 1000 \mu\text{T}$
Maximum Resultant Vector Magnetic Field	$\pm 1732 \mu\text{T}$
Magnetic Field Uniformity	Uniform field within 10 mm is better than 100 ppm
Magnetic Field Linearity	The magnetic field is proportional to the excitation current and has good linearity.
Temperature Influence	The coil constant K changes little with temperature, minimizing the influence of temperature.
Inner Hole Diameter	170 mm
Maximum Diameter	250 mm

4.3 TM4830B Fluxgate Magnetometer



- TM4830B is a high-precision three-axis fluxgate magnetometer.
- Equipped with a high-precision fluxgate probe with a $100\mu\text{T}$ range
- Suitable for measuring the magnetic remanence and environmental magnetic field of magnetic shielded cylinders.
- It can form a closed loop with the magnetic field generation system and realize feedback control through measured values.

Specifications

Single Axis Measuring Range	$0\sim\pm 100\ \mu\text{T}$
Resolution	0.01nT
Optimal Measurement Uncertainty (K=2)	0.2%
Linearity	< 0.0015%
Frequency Response	DC~3 kHz
Noise (Typical Specifications)	$6\sim 10\ \text{pT}_{\text{rms}} / \sqrt{\text{Hz}}@1\text{Hz}$
Note	The above indicators are related to the probe configuration.

4.4 TM2900 Magnetic Shielded Cylinder



- The inner frame is made of multi-layer coaxial high-permeability alloy.
- The large range of the central area in the hole can be regarded as zero magnetic field.
- Can be used for the research and development, testing and calibration of weak magnetic instruments.

Specifications

Residual Magnetism (After Degaussing)	2 nT
Attenuation	-80 dB
Inner Hole Size	Approx $\Phi 300$ mm \times 1000 mm
Size	Approx $\Phi 600$ mm \times 1000 mm
Operating Temperature	-20 °C ~ 70 °C
Note	A demagnetizer can be used to demagnetize the shielded cylinder before testing for better shielding.

5. General Specifications

Power Supply	AC (220 ± 22) V, (50 ± 2) Hz
Temperature Performance	Working temperature: 0°C~50°C; Storage temperature: -20°C~70°C
Humidity Performance	Working humidity: 40%~80% R·H; non-condensing Storage humidity: < 80% R·H; non-condensing

6. Configuration List

S/N	Name	Quantity	Configuration	Note
1	Three-channel DC Current Standard Source	1	Standard	Three-channel Output
2	Triaxial Helmholtz Coil	1	Standard	
3	TM4830B Fluxgate Magnetometer	1	Standard	Standard 100μT Range Probe
4	Magnetic Shielded Cylinder	1	Standard	Degaussing Machine
5	Fully Automatic Calibration Software	1	Standard	Software CD
6	Test Leads and Power Cables	1	Standard	
7	Workbench	1	Optional Accessory	Third party product
8	Computer	1	Optional Accessory	Third party product
9	Printer	1	Optional Accessory	Third party product

Note: The above is for reference only, the specific configuration list is subject to the technical agreement.