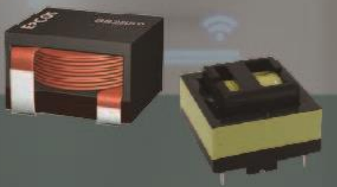
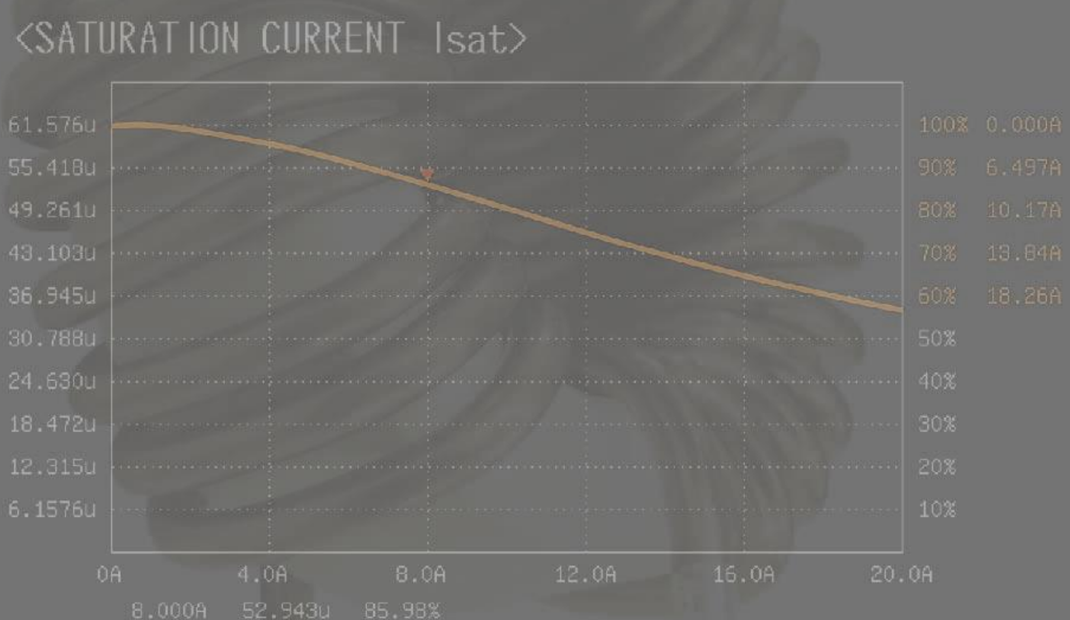
For 800kW Charging



Innovative Inductors and Transformers Complete Guide to Design and Optimization

Saturation Testing Redefined | Breakthrough in Magnetic Component Limits
MICROTEST Unveils the Industry's Only 640A DC Bias Solution
Essential Tool for EV and New Energy – **6632S+6243H DC Bias System**



MICROTEST

Electric Vehicle Charging Station Categories and Latest Standards (Power Boosted to 800kW)

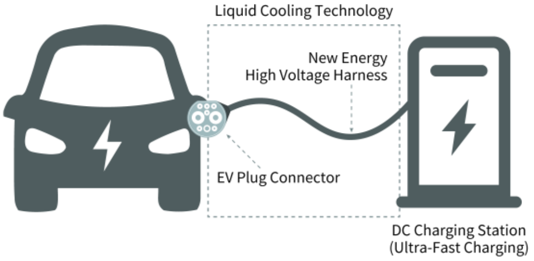
Electric vehicle charging stations are divided into DC (Direct Current) and AC (Alternating Current) chargers. Fast DC chargers can charge a battery from 0% to 80% in 20 to 30 minutes, and fully charge it in 40 to 50 minutes. Common power ratings for DC chargers include 58kW, 120kW, 180kW, 250kW, 350kW, 360kW, and 480kW. Slow charging AC stations take 5 to 8 hours to fully charge, with common power ratings being 7kW with a maximum current of 32A, and 11kW with a maximum current of 50A. For example, the Tesla Model 3, which has a range of 450 kilometers, would take 12 hours to charge from 0% to 100% using an AC charging station.

By comparison, DC charging is significantly faster. In September 2023, China's Ministry of Industry and Information Technology released two electric vehicle charging standards (GB/T20234.1-2023 and GB/T20234.3-2023), raising the maximum charging current from 250A to 800A and the charging power to 800kW, while ensuring compatibility between new and old charging interfaces.

To address the core issue of slow electric vehicle charging, high-power supercharging technology has been developed by increasing the voltage and current of charging stations. Currently, charging stations can output a maximum current of 800A and a maximum voltage of 1000V, bringing electric vehicles into the era of 'minute-level' charging.

From Air-Cooled to Liquid-Cooled 800kW Supercharging Ushers in the Era of Minute-Level Charging

800kW supercharging technology has ushered electric vehicle charging into the era of 'minute-level' speeds, but high-power charging also introduces significant heating issues. Traditional air-cooling methods struggle with uneven heat distribution, poor cooling effects, and high noise levels when facing high power.



Liquid cooling technology solves these problems by incorporating specialized liquid cooling circuits within the charging gun and cables, utilizing the circulation of coolants (such as water, ethylene glycol solution, air conditioning refrigerant, or silicone oil) to rapidly and effectively dissipate heat. This keeps charging equipment operating within an optimal temperature range, greatly improving cooling efficiency and uniformity, reducing noise, and supporting higher currents and voltages. This ensures stable operation of 800kW supercharging equipment under high-power conditions, reduces the weight of cables and connectors, mitigates equipment damage from overheating, and enhances the reliability and lifespan of electric vehicle charging equipment.

Brand	Huawei	VREMT	TELD New Energy	Star Charge	Tesla
Charging Power	600kW	800kW	600kW	480kW	600/250kW
Cooling Technology	Liquid Cooling	Liquid Cooling	Liquid Cooling	Liquid Cooling	Liquid Cooling

Compilation of Electric Vehicle Charging Technologies from Various Manufacturers

800kW Supercharging Technology Magnetic Component Design and Optimization

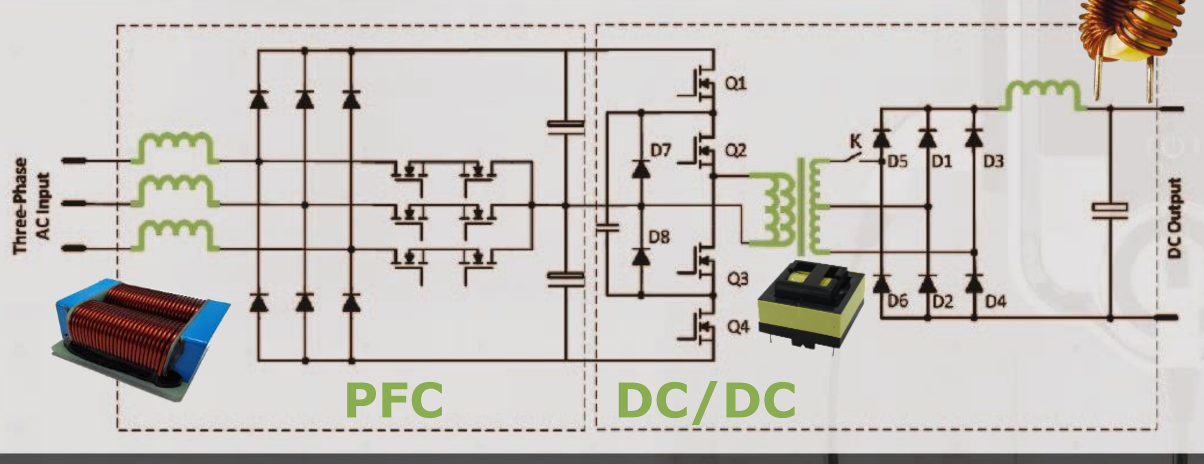
Under electric vehicle supercharging technology, taking the 800kW high-power supercharger as an example, the charging station outputs a maximum current of 800A and a maximum voltage of 1000V. To achieve maximum power output across the station while ensuring high safety during charging, comprehensive upgrades and optimizations are necessary for the four major components of the charging station: the pile, cable, gun, and cabinet.

To increase the driving range of electric vehicles, it is necessary to increase battery capacity. To shorten charging times, charging stations with high output capacity are required. Taking a 360kW charging station as an example, it would use 9 sets of 40kW power modules. In terms of circuit topology, unidirectional charging stations typically use efficient three-phase Vienna rectifiers and LLC circuits, while bidirectional charging stations employ three-phase B6-PFC combined with dual active bridge circuits to facilitate bidirectional energy transfer, meeting the needs of electric vehicles for grid and home power supply. In this process, alongside power components, the design and optimization of magnetic components are also indispensable. Together, they ensure the efficient, safe, and reliable operation of the charging system.

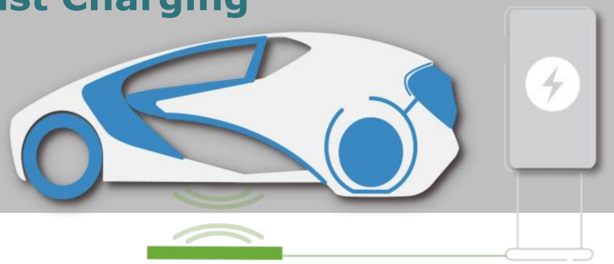
In high-power charging technology for electric vehicles, PFC inductors, LLC transformers, and filter inductors as magnetic components are key to efficiency conversion.

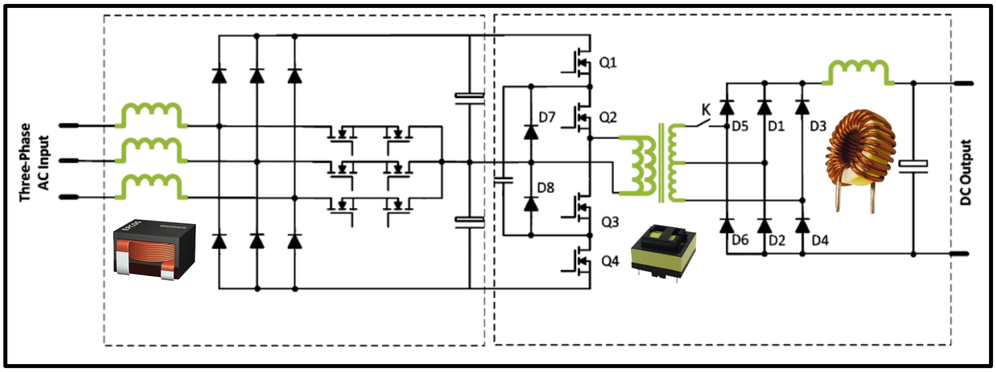
In charging station architectures, both the front stage (initial phase of power conversion that includes rectification and filtering, power factor correction, and EMI filtering) and the rear stage (subsequent phase of power conversion that includes DC-DC conversion, resonant transformation, and output filtering) utilize various magnetic components to achieve efficient energy conversion. The front stage employs PFC inductors, common mode chokes, and differential mode inductors. PFC inductors are used to enhance the power factor and reduce harmonic distortion, common mode chokes suppress common mode noise and minimize electromagnetic interference, and differential mode inductors handle filtering and smoothing of the current. The rear stage uses differential mode inductors for filtering in DC-DC converters, the main transformer for voltage conversion and electrical isolation, and resonant inductors provide efficient energy transfer in resonant converters.

For onboard charging, Vienna Power Factor Correction (PFC) and three-level phase-shifted full-bridge DC/DC converters are commonly used.



Complete Guide to Designing and Optimizing Magnetic Components for 800kW Ultra-Fast Charging





PFC Inductor
Inductor used for Power Factor Correction.

- Increases the power factor in the circuit
- Reduces harmonic distortion
- Improves the utilization of electrical energy

LLC Transformer
Transformer for LLC Resonant Converter.

- High efficiency energy conversion
- Compact size with efficient thermal management
- Suitable for high-frequency operation
- Reduces switching losses

Filter Inductor
Used for filtering and noise reduction.

- Smooths current
- Reduces electromagnetic interference (EMI)
- Improves output voltage quality
- Lowers high-frequency losses

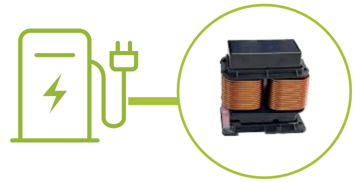
A Vienna PFC module uses at least one PFC inductor and other filtering components; while a three-level phase-shifted full-bridge DC/DC converter utilizes multiple magnetic components, including LLC transformers, filter inductors, and resonant inductors.

In the design of 800kW high-power charging technology for electric vehicles, optimizing magnetic components is key to enhancing efficiency and stability. Selecting core materials with high saturation magnetic flux density and low losses, such as iron-based or nickel-based alloys, maintains good performance under high-frequency operating conditions, effectively reducing thermal losses and improving efficiency.

Furthermore, improving thermal design is key to enhancing the efficiency and lifespan of magnetic components. The heat generated from high-power operations can be effectively managed by adding heat sinks, using heat pipes, or implementing liquid cooling systems.

Simultaneously, for filter inductors and resonant inductors, optimizing the filter topology and adjusting the resonance points are essential to reduce noise and enhance the quality of the output voltage.

Optimizing the Temperature and Saturation Characteristics of Magnetic Components is the Key Factor



As the power of the power module increases, considering the limitations on size, the cooling mechanism becomes a critical factor.

In Continuous Conduction Mode (CCM), the PFC inductor faces issues of magnetic saturation.

In CCM, current continuously flows through the PFC inductor, easily leading to persistent magnetization of the core. If the current is too high or lasts too long, the magnetic flux within the core will continuously increase, eventually reaching the saturation point of the core material. This causes a sharp decline in inductance. Additionally, sustained high currents cause the PFC inductor to heat up. The increase in temperature will affect the magnetic properties of the core, reducing its saturation magnetic flux density and making the core more susceptible to saturation, resulting in the PFC inductor's inability to effectively store and convert electrical energy.

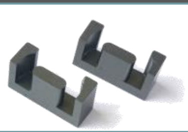
To achieve high power output in charging stations, temperature increase is the greatest challenge.

Raising the operating frequency and reducing the size of magnetic components generate more heat, and poor heat dissipation can lead to temperature increases that may damage components and reduce the reliability and efficiency of the charging station. Therefore, solving the heat dissipation problem is crucial to ensuring the stable operation of high-power charging stations.

Liquid-cooled power modules face the dual pressures of reduced current density and high-frequency operation.

In the use of liquid-cooled power modules, with the requirements for smaller current density and higher power density, reducing size necessitates an increase in operating frequency. Consequently, magnetic components are challenged by core losses, skin effect, electromagnetic interference, and thermal management challenges.

EV power modules use segmented designs; magnetic component design is crucial under increased power and space constraints.



The size and characteristics of the core determine the magnetic flux and electrical power it can handle, ensuring that the core does not saturate and can be effectively wound.

AP=Ae · Aw (Core Size Calculation)

Ae refers to the effective cross-sectional area of the core being large enough to avoid magnetic saturation.

Aw refers to the window area being large enough to transmit a significant amount of electrical energy in a short time during supercharging, ensuring that thicker wires with more turns can be wound.

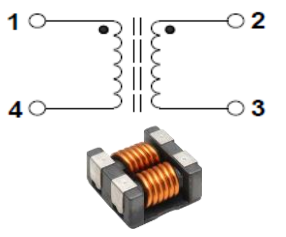
The winding method is determined based on the calculated skin depth at the operating frequency, choosing the maximum diameter for a single strand of wire. Additionally, the total area of the conductor is calculated based on the current density specified by the power current, ultimately determining the wire specification and winding method. Optimizing the winding design can reduce losses; a flat spiral vertical winding method can be used, suitable for high-frequency and high-power supercharging needs. For the selection of copper foil thickness, under space constraints, choose a thicker foil if possible. For stranded wires, aim to maximize the number of strands.

Key to High-Power Charging Performance
Saturation Current and Temperature Rise in Magnetic Components

The saturation flux density and permeability of core materials determine the magnetic flux a core can handle under specific magnetic field strengths. High permeability materials saturate easily at low magnetic fields, and high currents can rapidly increase flux density, leading to core saturation. High-frequency operation causes strong magnetic field changes, also increasing saturation risk. Additionally, rising operating temperatures can reduce permeability, making the core more prone to saturation. This drop in inductance weakens filtering effects, increases common mode noise, reduces transformer efficiency, and affects the stability and reliability of the entire charging system.

Part No.	OCL (1)-(4)&(2)-(3) (nH) ±15%	Li (1)-(4)&(2)-(3) (nH) Min.	DCR (1)-(4) (mΩ) ±10%	DCR (2)-(3) (mΩ) ±10%	Isat (1)-(4)& (2)-(3) (A) Typ.		Irms(1)-(4) (A)	Irms(2)-(3) (A)
					@25°C	@100°C		
GTLVR126011PV-R10L	105	71.4	0.125	0.37	125.0	106.0	77.0	45.0
GTLVR126011PV-R12L	120	81.6	0.125	0.37	102.0	87.0	77.0	45.0
GTLVR126011PV-R15L	150	102.0	0.125	0.37	84.0	71.0	77.0	45.0
GTLVR126011PV-R17L	170	115.6	0.125	0.37	70.0	60.0	77.0	45.0
GTLVR126011PV-R20L	200	136.0	0.125	0.37	58.0	50.0	77.0	45.0

Isat & Irms

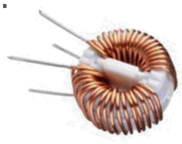


Both magnetic saturation and overheating negatively affect the lifespan of inductors. It's essential to define two key parameters: the saturation current (Isat) and the temperature rise current (Irms) to ensure that inductors operate without damage from saturation or overheating under normal conditions. In high-power and high-temperature conditions of electric vehicle charging stations, the saturation current (Isat) ensures that the inductor does not enter saturation under high current conditions, maintaining its energy storage and current smoothing capabilities. The temperature rise current (Irms) ensures that the inductor operates within an acceptable temperature rise range, preventing performance degradation or damage due to overheating, thereby optimizing the overall performance of the charging station's power system.

The impact of inductor saturation on the circuit

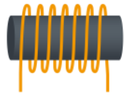
PFC inductors are generally used in inductive compensation PFC circuits or active PFC circuits (Power Factor Correction). When PFC inductors experience magnetic saturation, there is a significant decrease in inductance, preventing the inductor from effectively limiting and smoothing the alternating current passing through it. This leads to increased harmonic distortion in the power supply, reducing the effectiveness of the power factor correction (PFC). As a result, the power system generates more consumption and heat. Severe magnetic saturation can also cause the inductor to heat up, and over time may lead to permanent demagnetization of the magnetic material, reducing the reliability and lifespan of the inductor.

Filter inductors are typically made of ferrite materials and can be combined with through-hole capacitors to form a composite filter. When filter inductors become magnetically saturated, their effectiveness decreases, and they fail to efficiently smooth out and filter noise and spikes on the power line. This reduces the overall power quality, making the power module more susceptible to voltage fluctuations and interference, affecting its operational stability. Additionally, magnetic saturation can cause the inductor to heat up; prolonged overheating not only reduces the lifespan of the inductor itself but may also shorten the life or damage adjacent electronic components.

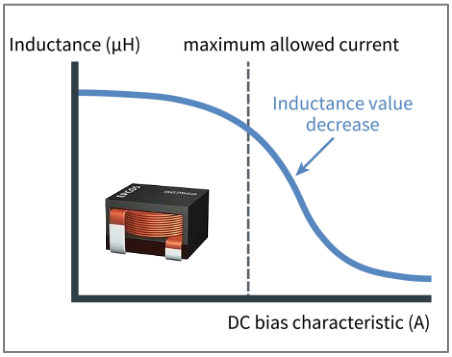


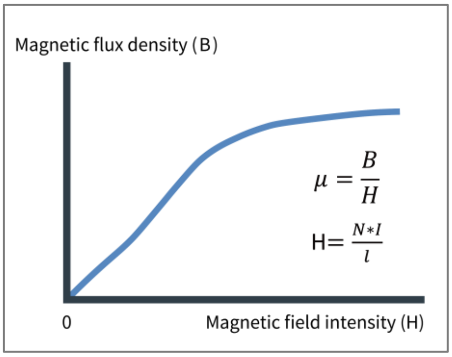
Definition of Saturation Current (Isat)

Inductors typically contain a core, especially power inductors, which exhibit magnetic saturation. When the magnetic field intensity reaches a certain level, the increase in magnetic flux density slows down and eventually saturates. Concurrently, the core's permeability (μ) significantly decreases, leading to a substantial drop in inductance and a loss of its normal current suppression capability.



$$L = \frac{\mu * N^2 * S}{l}$$

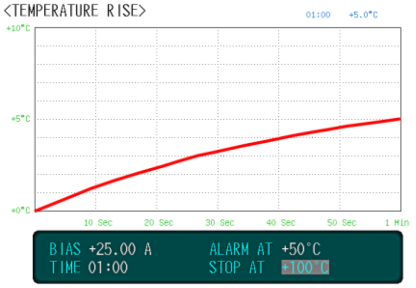




Saturated current is defined as the rated current where the inductance value drops by 20-30%. It is determined using the method of superimposing direct current to test the attenuation of inductance at various currents, thus analyzing the magnetic saturation characteristics of the inductor.

The definition of temperature rise current (Irms)

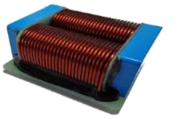
Due to the inherent parasitic DC resistance in inductors, the internal temperature of the inductor increases with the current during operation. Generally, the current at which the self-heating of the inductor does not exceed 20°C or 40°C is considered the temperature rise current, which is also the rated current for the application of the inductor. This ensures that the inductor will not be damaged by overheating when operating within this current range.



6632S+6243H DC Bias Current Test System

Industry's Highest Support for 640A Current Output

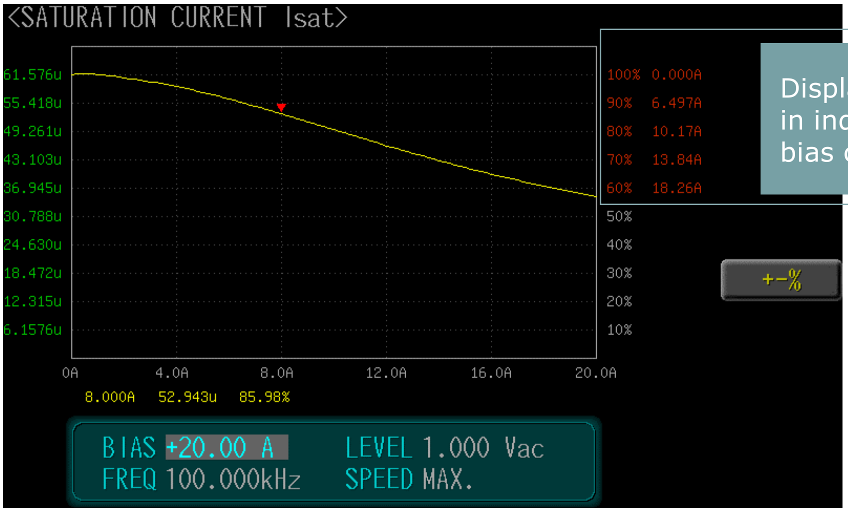
Meeting High Power PFC Inductor Large Current Testing



- DC Bias Current Max.640A
- High frequency response 100Hz-10MHz

Magnetic saturation current scan analysis function, displaying results as percentage reduction in inductance value.

Inductor manufacturers typically define the saturation current (Isat) as the current at which the inductance value drops by 30%.

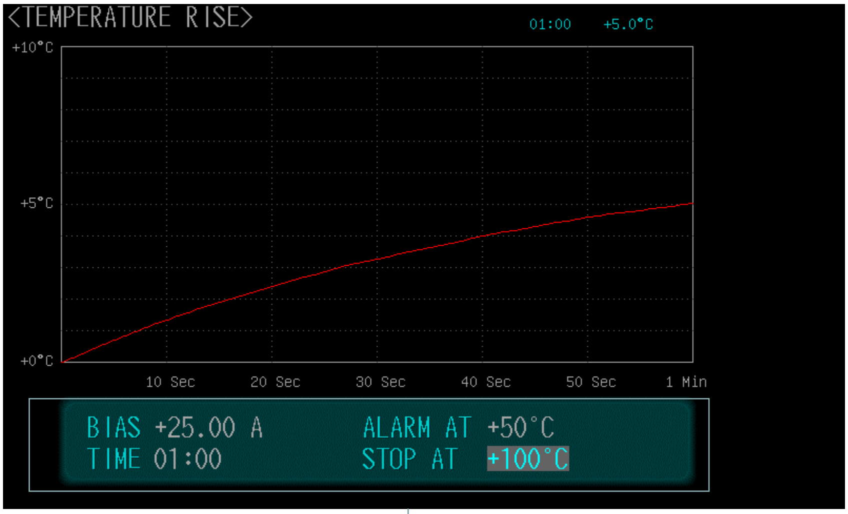


Display the percentage decrease in inductance value when DC bias current is applied.

Supports magnetic saturation current scan analysis, with maximum current output up to 640A and frequency response up to 100Hz-10MHz. In the graphical analysis mode, the X-axis represents the applied bias current, and the Y-axis represents the inductance value. The results are directly displayed as a percentage decrease in inductance (%), providing engineers with a more intuitive way to verify the magnetic saturation current of high-power inductors.

Temperature rise current analysis feature, using copper resistance measurement technology for more objective and accurate results.

Apply current to the inductor coil to simulate the operating current and measure the temperature rise characteristics. The measurement is conducted according to known standards (typically testing with the current that causes the inductor's self-temperature rise not to exceed 20°C or 40°C, using this current as the temperature rise current, Irms).



Current Magnitude	Set Temperature for Alert
Continuous Output Time	Upper Temperature Limit and Output Stop

Using the temperature coefficient of copper as the basis for inductance temperature rise analysis.

Based on the temperature coefficient of copper conductors, which is approximately 3,930 ppm

The Resistance at temperature rise Tr can be calculated as
RDC_Tr= RDC (1+0.00393Tr)

The temperature rise calculation is based on DCR (Direct Current Resistance) and involves simulating the operating current of the inductor to measure the temperature rise.

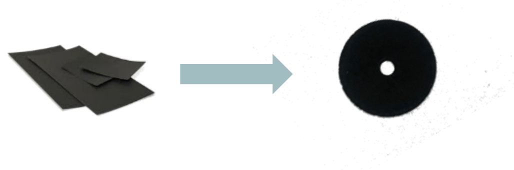
For every 1°C increase, the DCR increases by 0.393%

Use the formula $\Delta T = \frac{R_2 - R_1}{R_1} \div 0.0039$

Calculate the temperature rise characteristics of the inductor after applying current.

Supports Magnetic Material Analysis Function
Built-in Relative Permeability Measurement (μ_r'/μ_r'')

Before measurement, please cut the magnetic material into a ring shape
(The magnetic ring can be placed directly on the fixture)

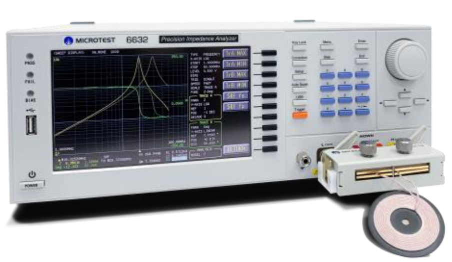


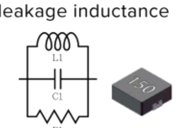
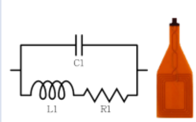
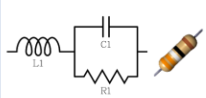
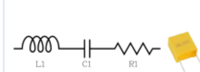
The inductance measurement technique is used to test the permeability coefficient, with a built-in permeability coefficient formula in the instrument. The optional FX-0000C8 permeability coefficient test fixture must be selected to measure the inductance (Ls) and permeability coefficient (μ_r'/μ_r'') directly on the machine.

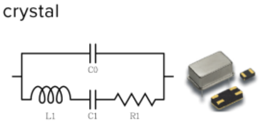
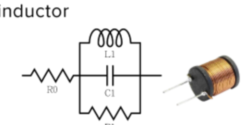
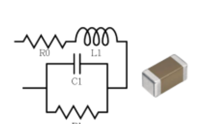
FX-0000C8 (Supported Sizes)
Type A: OD 8, ID 3.1, H 3 mm
Type B: OD 20.5, ID 4.8, H 11 mm
Type C: OD 65.5, ID 7.1, H 28 mm

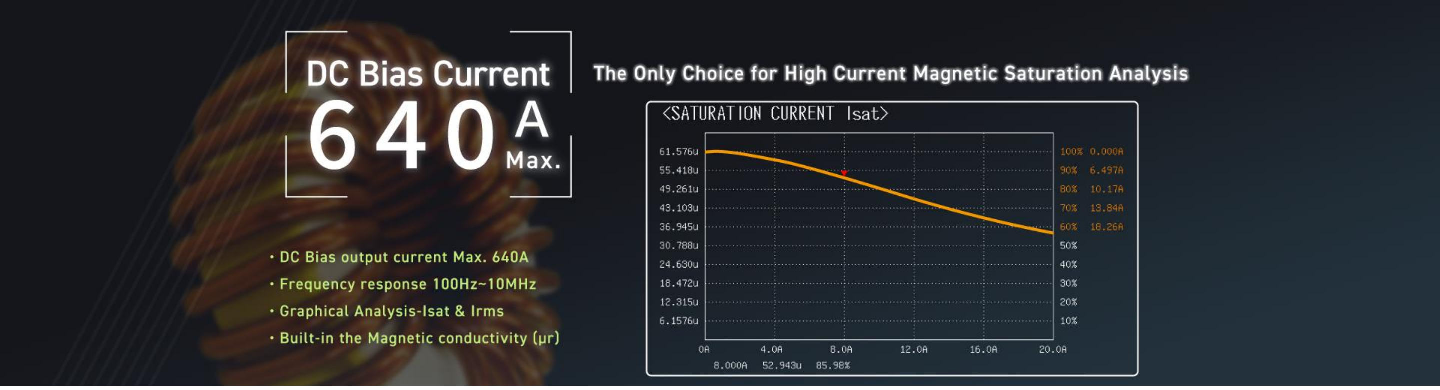
Supports Equivalent Circuit Analysis, real measurement, and simulation analysis of Three-Element/Four-Element Modeling to understand unexpected changes in magnetic components (Model 6632S)

Provides equivalent circuit analysis with seven models, utilizing three-element or four-element modeling to calculate impedance trajectories at different frequencies. This allows comparison with actual measurement curves, adjusting R1/L1/C1 values to observe changes in impedance and frequency characteristics, and evaluating shifts in the self-resonant frequency point. It is ideal for the rapid and accurate analysis of potential differences in components during the development of new materials or new manufacturing processes.

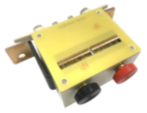
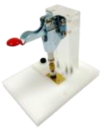


Through three-component modeling			
Model A	Model B	Model C	Model D
High magnetic leakage inductance	NFC	High resistance resistor	Capacitor
			

Through four-component modeling		
Model E	Model F	Model G
Piezoelectric element/ quartz crystal	Equivalent series resistance of inductor	Capacitor
		



MICROTEST DC Bias Current Source Testing System consists of an impedance analyzer/LCR meter paired with a DC bias current source. It can analyze the saturation and temperature rise characteristics of magnetic components. The system offers magnetic saturation current and temperature rise current sweep analysis, with data accessible via USB Host or PC connection. The system can be configured in a rack according to production line needs.

	Rack + PC	Benchtop + PC	Benchtop
Solution			
LCR Meter Impedance Analyzer	●	●	●
DC Bias Current Source	●	●	●
PC Link Software	●	●	/
Fixture	DIP Type Fixture  F6210		SMD Type Fixture  F6220  FX-DB0001
Features	• Easy management and maintenance • Convenient mobility • PC control and data collection	• Suitable for R&D or laboratory environments • PC control and data collection	• On-device operation and settings for testing

Offering three major series: 6632+, 6632S+, and 6350+ series, with model selection based on measurement needs.

Series	Function	User
6632+	6632 Impedance Analyzer, equipped with a DC bias current source, supports graphical analysis and Meter mode, providing magnetic saturation current and temperature rise current sweep analysis.	R&D Validation
6632S+	6632 Impedance Analyzer, equipped with a DC bias current source, supports graphical analysis and Meter mode, offering magnetic saturation current, temperature rise current, and Equivalent Circuit Analysis.	R&D Validation
6350+	6355/6356 LCR Meter, equipped with a DC bias current source, supports Meter mode and provides magnetic saturation current testing.	Production Quality Assurance

6632+ / 6632S+ Series
DC Bias Current Source Test System

RS-232

Handler

- **Maximum Output Current: 640A/320A/120A/60A**
- **Frequency Response: 100Hz-30MHz/10MHz/3MHz**
- **Magnetic Saturation Current Sweep Analysis**
- **Temperature Rise Current Sweep Analysis**
- **Equivalent Circuit Analysis (6632S+ Series)**
- **Supports PC Connection Software**

Application


PFC Inductor


Molded Inductor


Choke

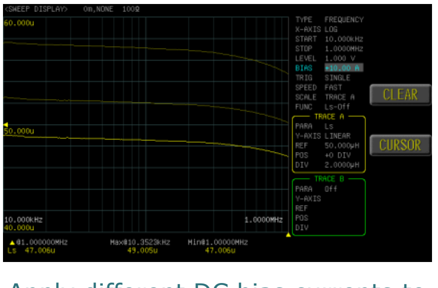

Inductor


Common Mode Inductor

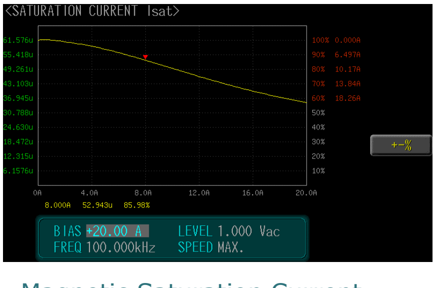

Magnetic Materials


Motor

DC Bias Current Source Testing System, paired with the 6632 Impedance Analyzer, can analyze the saturation characteristics of inductors, coils, ferrites, and cores. It also provides relative permeability (μ_r) testing, analyzing key characteristics of magnetic materials. The system supports magnetic saturation current and temperature rise current sweep analysis, offering quick and accurate current curve changes for R&D engineers. It can be integrated into production lines with the option of meter mode or multi-step mode. Measurement results are displayed numerically, and the system supports PC connection software for data storage or report analysis.

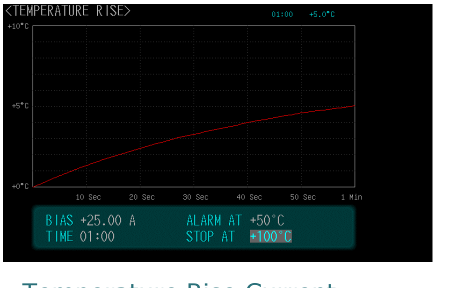


Apply different DC bias currents to observe changes in inductance values.



Magnetic Saturation Current Sweep Analysis

(Inductance Value Decrease Displayed in %)



Temperature Rise Current Sweep Analysis

6632+ / 6632S+ Series DC Bias Current Source Test System

6632+ / 6632S+ Series (S models support Equivalent Circuit Analysis)							
Impedance Analyzer	6632 6632S	6632 6632S	6632 6632S	6632 6632S	6632 6632S	6632 6632S	6632 6632S
DC Bias Current Source	6210	6220	6223	6225	6240A	6243	6243H
Frequency Response	100Hz-3MHz	100Hz-3MHz	100Hz-10MHz	100Hz-30MHz	100Hz-3MHz	100Hz-10MHz	100Hz-10MHz
Maximum Output Current	60A	120A	120A	20A	320A	320A	640A
Maximum Overlapping Units	6	6	6	1	8	8	16
Single Unit Output Current	10A	20A	20A	20A	40A	40A	40A
Power	320W	320W	320W	320W	640W	640W	640W
Current Accuracy	0.000A-1.000A 1%+5mA 1.001A-5.000A 2% 5.001A-40.000A 3%						
Constant Power Output	●	●	●	●	●	●	●
Positive and Negative Current Switching	●	●	●	—	●	●	●
Measurement Function	• DC Resistance Measurement Function (DCR) • Magnetic Saturation Current Sweep Analysis • Temperature Rise Current Sweep Analysis • Meter/List Test Mode • Model 6632S+ Series Supports Equivalent Circuit Analysis Function						

Impedance Analyzer 6632/6632S (Selection can be based on the measurement frequency)						
6632-1 6632-1S	6632-3 6632-3S	6632-5 6632-5S	6632-10 6632-10S	6632-20 6632-20	6632-30 6632-30S	6632-50 6632-50S
10Hz-1MHz	10Hz-3MHz	10Hz-5MHz	10Hz-10MHz	10Hz-20MHz	10Hz-30MHz	10Hz-50MHz

Basic Measurement Accuracy	±0.08% (Typical Value ±0.05%)
Output Impedance	25Ω/100Ω (Switchable)
Built-in DC Bias	0~±12V
Measurement Parameters	|Z| - Impedance, |Y| - Admittance, θ - Phase Angle, X – Reactance R - Series/Parallel Resistance, G - Conductance, B – Susceptance L - Inductance, D - Dissipation Factor, Q - Quality Factor, DCR - DC Resistance C - Capacitance, ESR - Equivalent Series Resistance, ε_r - Relative Permittivity μ_r - Relative Permeability

6350+ Series
DC Bias Current Source Test System

RS-232

Handler

- **Maximum Output Current: 640A / 320A / 120A**
- **Frequency Response: 100Hz - 500kHz / 200kHz**
- **Inductance Measurement with DC Bias Current**
- **Supports Meter Mode / List Mode**
- **Supports PC Connection Software**

Application


PFC Inductor


Molded Inductor


Choke


Inductor


Common Mode Inductor

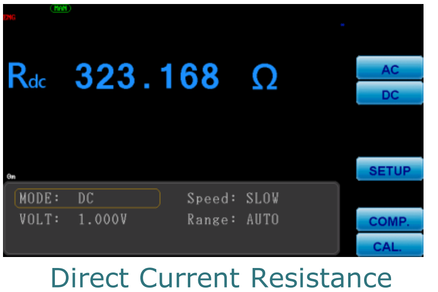

Magnetic Materials


Motor

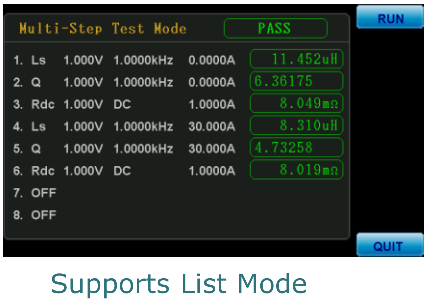
The DC bias source test system is an LCR tester equipped with a DC bias source, capable of analyzing the saturation characteristics of inductors, coils, ferrites, and cores. It can precisely verify the critical current—magnetic saturation current (Isat)—of magnetic components. For production line integration, it offers selectable meter mode or multi-step mode, with measurement results displayed as numerical values. Additionally, it supports PC connectivity for storing test data or conducting report analysis.

The inductance value before applying DC Bias Current is 11.392 µH.

Upon applying 30A, the inductance value, affected by the current, decreases to 8.842 µH.



Direct Current Resistance Measurement (DCR)



Supports List Mode

6350+ Series DC Bias Current Source Test System

6350+ Series						
LCR Meter	6355	6355	6355	6356	6356	6356
DC Bias Current Source	6223	6243	6243H	6223	6243	6243H
Frequency Response	100Hz-200kHz	100Hz-200kHz	100Hz-200kHz	100Hz-500kHz	100Hz-500kHz	100Hz-500kHz
Maximum Output Current	120A	320A	640A	120A	320A	640A
Maximum Overlapping Units	6	8	16	6	8	16
Single Unit Output Current	20A	40A	40A	20A	40A	40A
Power	320W	640W	640W	320W	640W	640W
Current Accuracy	0.000A-1.000A 1%+5mA 1.001A-5.000A 2% 5.001A-40.000A 3%					
Constant Power Output	●	●	●	●	●	●
Positive and Negative Current Switching	●	●	●	●	●	●
Measurement Function	• Direct Current Resistance Measurement Function (DCR) • Testing the Saturation Characteristics of Components with High DC Bias Output Current • Meter/List Testing Mode					

LCR Meter (Selection can be based on the measurement frequency)	
6355	6356
100Hz-200kHz	100Hz-500kHz
Basic Measurement Accuracy	±0.05%
Output Impedance	100Ω
Measurement Parameters	|Z| (Impedance), |Y| (Admittance), θ (Phase Angle), X (Reactance), R (Series/Parallel Resistance), G (Conductance), B (Susceptance), L (Inductance), D (Dissipation Factor), Q (Quality Factor), DCR (DC Resistance), C (Capacitance), Δ%

Ordering Information

MICROTEST DC Bias Current Test System				Frequency Response	Maximum Current & Number of Units		Function
	Impedance Analyzer	6632	6243H	100Hz-10MHz	640A	16	Meter Mode
	Impedance Analyzer	6632	6243H	100Hz-10MHz	640A	16	Graph/Meter/Equivalent Circuit
	LCR Meter	6356	6243H	100Hz-500kHz	640A	16	Meter Mode
	LCR Meter	6355	6243H	100Hz-200kHz	640A	16	Meter Mode
6632+	Impedance Analyzer	6632	6210	100Hz-3MHz	60A	6	Graph/Meter Mode
6632S+	Impedance Analyzer	6632	6210	100Hz-3MHz	60A	6	Graph/Meter/Equivalent Circuit
6632+	Impedance Analyzer	6632	6220	100Hz-3MHz	20A	6	Graph/Meter Mode
6632S+	Impedance Analyzer	6632	6220	100Hz-3MHz	20A	6	Graph/Meter/Equivalent Circuit
6632+	Impedance Analyzer	6632	6223	100Hz-10MHz	20A	6	Graph/Meter Mode
6632S+	Impedance Analyzer	6632	6223	100Hz-10MHz	20A	6	Graph/Meter/Equivalent Circuit
6632+	Impedance Analyzer	6632	6225	100Hz-30MHz	20A	1	Graph/Meter Mode
6632S+	Impedance Analyzer	6632	6225	100Hz-30MHz	20A	1	Graph/Meter/Equivalent Circuit
6632+	Impedance Analyzer	6632	6240A	100Hz-3MHz	320A	8	Graph/Meter Mode
6632S+	Impedance Analyzer	6632	6240A	100Hz-3MHz	320A	8	Graph/Meter/Equivalent Circuit
6632+	Impedance Analyzer	6632	6243	100Hz-10MHz	320A	8	Graph/Meter Mode
6632S+	Impedance Analyzer	6632	6243	100Hz-10MHz	320A	8	Graph/Meter/Equivalent Circuit
6350+	LCR Meter	6356	6243	100Hz-500kHz	320A	8	Meter Mode
6350+	LCR Meter	6355	6243	100Hz-200kHz	320A	8	Meter Mode

Standard Accessories

- Power Cable
- Network Cable
- F6210 DIP Component Test Fixture
- Current Connecting Clips (Black/Red) ★ For systems with more than 2 DC bias sources

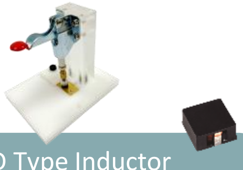
Option Accessories

- PC Link Software
- F6220 SMD Component Test Fixture
- FX-DB0001 SMD Component Test Fixture
- BNC to BNC Cable
- Current Connecting Clips (Long/Short)

F6210

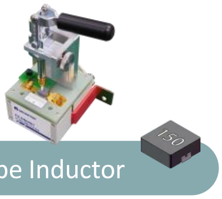
DIP Type Inductor

F6220



SMD Type Inductor

FX-DB0001



SMD Type Inductor

Selectable Test Fixtures Based on Inductor Type