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Made in Germany.**



SMA Coaxial Cables and BNC Adaptor Included.

Example Image Only, Colors and Markings May Vary.

亞傑科技股份有限公司

ACCELTEK TECHNOLOGY CO., LTD.

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Ultra-Fast Common Mode Choke

>4.5 GHz Bandwidth

1.5 mH Common Mode Inductance at 1 kHz

Optimized for connecting UFCS Series Current Shunts to Oscilloscopes

EN

Preliminary Instruction Manual



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Manufacturer

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Warranty

PMK warrants this product for normal use and operation within specifications for a period of two years from date of shipment and will repair or replace any defective product which was not damaged by negligence, misuse, improper installation, accident or unauthorized repair or modification by the buyer. This warranty covers defects in materials and workmanship only and does not cover wear and tear. PMK disclaims any other implied warranties of merchantability or fitness for a particular purpose. PMK will not be liable for any indirect, special, incidental, or consequential damages (including damages for loss of profits, loss of business, loss of use or data, interruption of business and the like), even if PMK has been advised of the possibility of such damages arising from any defect or error in this manual or product.

Declaration of Conformity



PMK declares the conformity of this product with the actual required safety standards:

The basis on which conformity is being declared:

EN IEC 61326-1:2021	Electrical equipment for measurement, control and laboratory use – EMC requirements - Part 1: General requirements
EN IEC 61000-4-2:2008	Electromagnetic compatibility (EMC) –Part 4-2: Testing and measurement techniques –Electrostatic discharge immunity test
EN IEC 61010-1:2020	Safety requirements for electrical equipment for measurement, control and laboratory use Part 1: General safety requirements for electrical equipment for measurement, control, and laboratory use.

WEEE/ RoHS Directives



This electronic product is classified within the WEEE/ RoHS category list as monitoring and control equipment (category 9) and is compliant to the following EC Directives.

WEEE Directive 2012/19/EU	Waste Electrical and Electronic Equipment
RoHS Directive 2011/65/EU	Restriction of the use of certain Hazardous Substances in Electrical and Electronic Equipment

Your help and efforts are required to protect and keep clean your environment. Therefore, return this electronic product at the end of its life either to our Service Department or take care of separate WEEE collection and professional WEEE treatment yourself. Do not dispose as unsorted municipal waste.

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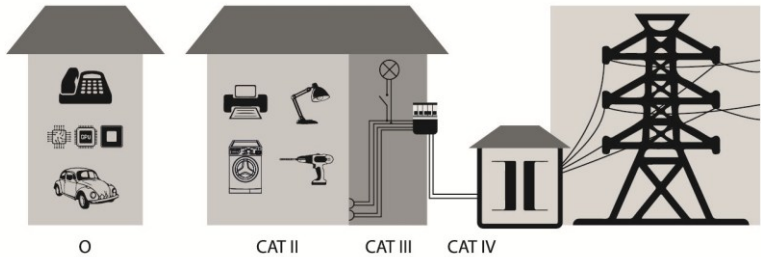
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IEC Safety Information

IEC Measurement Categories

This product series is not rated for CAT II, III or IV.

Definitions and Examples:



Overview of measurement categories according to IEC 61010-01
O = No Measurement Category (Other circuits that are not directly connected to mains)

IEC Pollution Degree

- Pollution Degree 1** No POLLUTION or only dry, nonconductive POLLUTION. NOTE: The POLLUTION has no influence.
- Pollution Degree 2** Only- nonconductive POLLUTION. Occasionally, however, a temporary conductivity caused by condensation must be accepted.
- Pollution Degree 3** Conductive POLLUTION occurs or dry, non-conductive POLLUTION occurs which becomes conductive due to condensation which is to be expected.

IEC Safety Symbols

The following symbols may appear on the product or in this instruction manual:

 Caution, risk of danger. Refer to manual.

 Caution, risk of electric shock.

 Earth (ground) TERMINAL.

 Caution, hot surface

Safety and Handling Information

Read the Instruction Manual before first use and keep it for future reference. A digital copy of the latest Instruction Manual revision can be downloaded at www.pmk.de.

This Choke series is for use with qualified personnel only. The overall safety of any measurement setup incorporating this probe is the responsibility of the user. To prevent electrical accidents, read the safety instructions carefully. Observe the five safety rules of the German standard series EN 50110-1.



Position and handle the choke only when the circuit under test is de-energized.

Use non-handheld and in test setups with safety environment only.

This choke is not for hand-held use. Install the choke in a safety protected test environment and make all required connections and configurations before starting the measurements. The choke's connector housings and cable shields will become energized to the "shield" potential of the connected UFCS probe and Oscilloscope, these must be included within the safety environment. In the event of a fault the shields may become energized to other potentials within the circuit under test.

The choke **does not** provide any protection to the oscilloscope in the event of a DUT or current shunt failure.



Use only grounded instruments.

Do not connect the product's ground connections to a potential other than earth ground. Always make sure the choke and the measurement instrument are grounded properly.



Caution, hot surface. Heat from the current shunt e.g. from measurements and soldering installation may be conducted into the UFCS choke. Use caution when connecting/disconnecting the choke from the shunt (heat resistant gloves recommended). Do not solder the shunt with the choke cable connected.



Prevent personal injury, fire and product damage.

To avoid personal injury and to prevent fire or damage to this product or products connected to it, review and comply with the following safety precautions. Be aware that if you use this choke assembly in a manner not specified the protection this product provides may be impaired. Only qualified personnel should use this probe assembly.



Connect securely to the circuit under test and measuring instrument.

Connect the choke input via one of the referring Choke-SMA-cables to the measurement circuit securely and with reliable electrical contact. Connect the choke output via one of the referring Choke-SMA-cables and the recommended SMA-BNC adapter to the measurement circuit securely and with a reliable electrical contact. A poor or unreliable electrical contact may lead to arcing, heat generation, burning, fire and arc flash.



Observe choke and choke accessory ratings.

Do not apply any electrical current or potential to the choke input which exceeds the maximum ratings of the shunt, or the accessories connected to it. In case of a combination, always the lower rating / measurement category applies to both probe and accessories connected to it.



Keep away from hazardous live circuits.

Avoid open circuitry. Do not touch connections or components when power is present.

Do not operate with suspected failures.

Refer to qualified service personnel.

Indoor use only.

Do not operate in wet or damp environment. Keep the product dry and clean.

Do not operate the product in an explosive atmosphere.

Safety and Handling Information (continued)



When using un-isolated equipment, connect the “shield” terminal of the shunt or probe to earth ground.

The PMK UFCS-shunt is not isolated. If the “shield” is connected to a different potential, then a “short circuit” will be present through the oscilloscope.



Note that the connections are sensitive. Do not damage through excessive bending or pulling. Avoid mechanical shock to this product in general to guarantee accurate performance and protection.



Any accessories provided with the choke have been safety tested. Do not use any other accessories than those originally provided or recommended.

About the Common-Mode UFCS-Choke

The UFCS-Choke performance has been optimized for use with the UFCS Current shunt series in ground referenced applications. The choke has a high common mode impedance to significantly reduce ground loop currents. It is designed to reduce the effects of “ground lift” resulting from high-speed voltage and current transients.

Whilst the UFCS choke provides a high common mode impedance at high frequency, it does not provide isolation. One side of the choke should always be grounded (e.g. by connecting it to a grounded oscilloscope) and the other side either grounded or floating (e.g. by using an isolated power supply to power the DUT).

The Choke and cable assembly has been designed with an extremely flat 1 GHz bandwidth ² to compliment the Bandwidth of the UFCS series current shunt. In addition, the system maintains excellent 50 Ω transmission line integrity across its operational bandwidth, preventing reflections from appearing in measurements.

Whilst the Choke is optimised for use with the UFCS it may also be used with other brands of current shunt, and its properties make it an excellent choice for applications such as reducing common mode noise in network analyser measurements.

Specifications

Read the Instruction Manual before first use and keep it for future reference. A digital copy of the latest Instruction Manual revision can be downloaded at www.pmk.de.

Electrical Specifications

The specifications are only valid when used with the recommended cables that are included in the scope of delivery.

This choke comes with 2 years warranty. Each specification is determined at +23°C ambient temperature. Do not exceed the specifications.

PMK's Common-Mode Chokes are for use in a controlled environment in accordance with the IEC 61010-1 only. The Chokes are not for hand-held use. This product is not rated for CAT II, III or IV. Do not exceed the specifications¹.

Parameter	UFCS-Choke Assembly (Including cables)	UFCS-Choke (Choke only)
3dB Bandwidth	> 4.5 GHz	> 6 GHz
1 dB Bandwidth	750 MHz	4.5 GHz
Return Loss (100 kHz - 200 MHz)	< -40 dB	<- 35 dB
Common Mode Inductance (100 kHz)	1.5 mH	1.5 mH
Delay	10.6 ns	3.1 ns

Notes:

¹ Electrical Specifications¹ that are not marked with (*) as guaranteed are typical.

² See Frequency Response Chart.

³ See Common Mode Inductance Chart.

The following specifications are valid for all models:

Pollution Degree: 1

Output connector: SMA (female)

Input Coupling of the Measuring Instrument: 50 Ω



Exceeding the specified ratings may cause irreversible failure and damage to the connected equipment.



The ratings may vary depending on usage conditions and usage environment. The provided data is intended as a reference only.

Environmental Specifications

Parameter		Specification
Temperature Range	Operating	-20 °C to +60 °C
	Non-Operating	-20 °C to +60 °C
Maximum Relative Humidity	Operating	80 % relative humidity for temperatures up to +31 °C, decreasing linearly to 40 % at +50 °C, non-condensing humidity
	Non-Operating	95 % relative humidity for temperatures up to +40 °C, non-condensing humidity
Altitude	Operating	up to 2000 m
	Non-Operating	up to 15000 m

Please contact sales@pmk.de, if another temperature range is of interest.

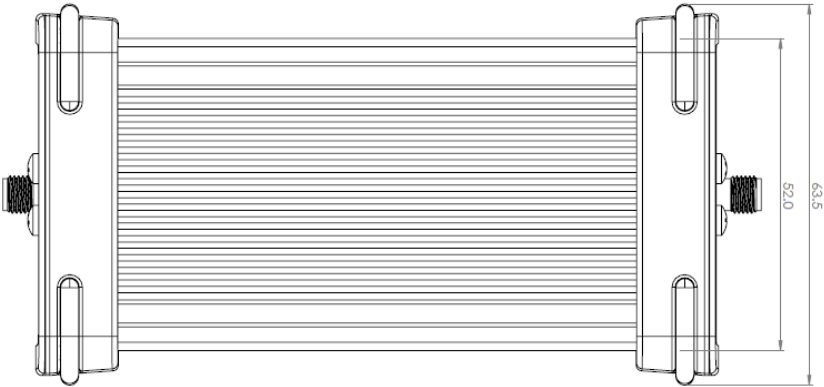
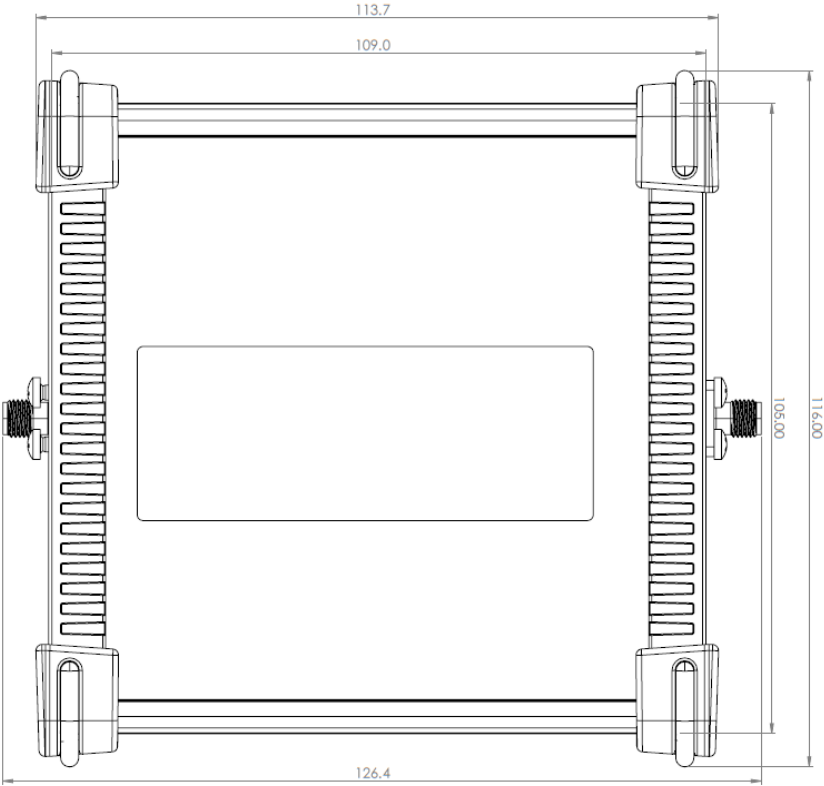
Mechanical Specifications

Parameter	UFCS-Choke Specifications
Weight	560g incl. cables
Dimensions (L x W x H)	12.65cm x 11.6cm x 6.3cm
Cable Input Connector	SMA (male)
Cable Output Connector	SMA (male) or BNC (male) with included adaptor
Input Coupling of the Measuring Instrument [†]	50 Ω
Minimum Bend Radius of Cables	60 mm

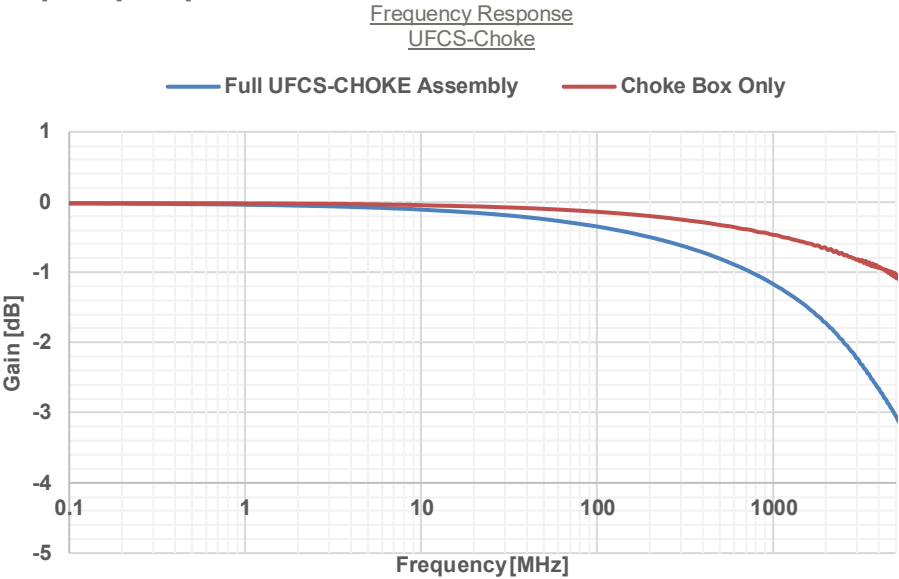
Notes:

[†] 50 Ω or 1 MΩ input impedance with 50 Ω feed-through termination, see Ordering Information.

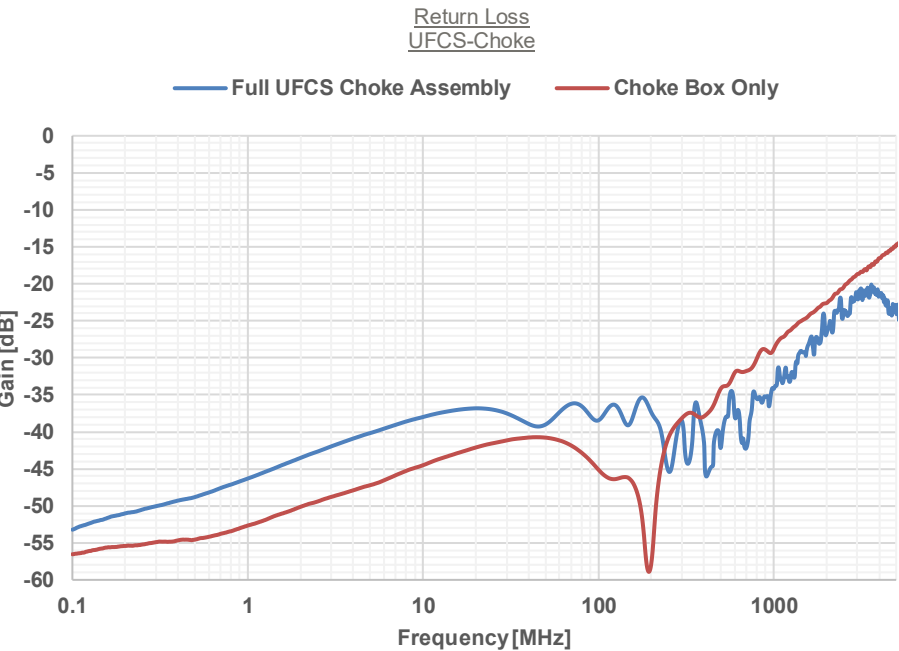
Dimensional Drawing



Frequency Response

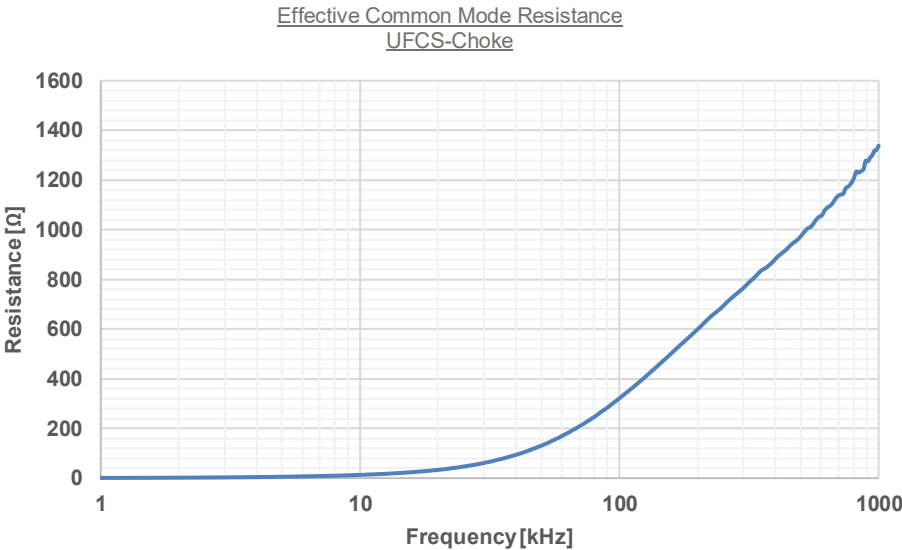
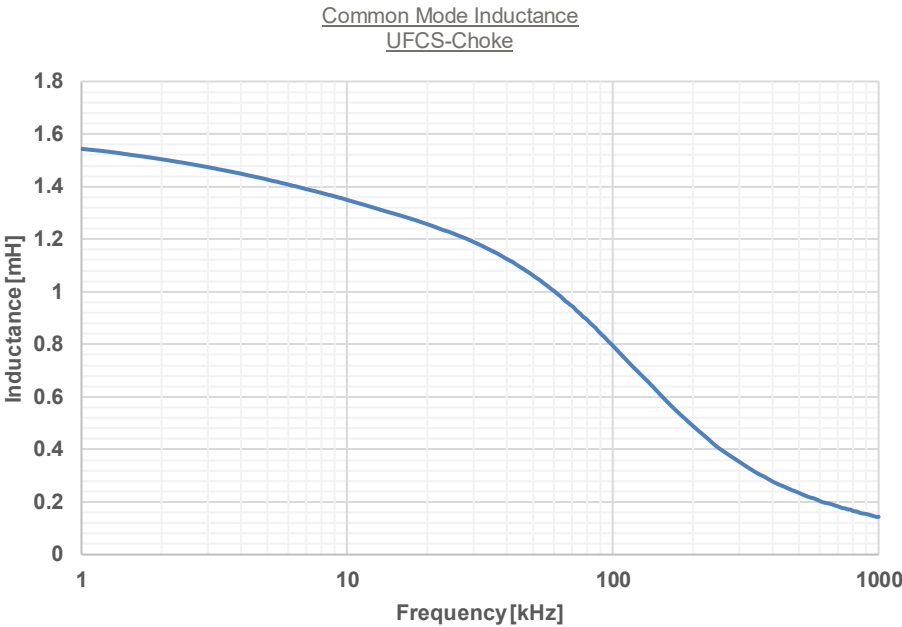


Return Loss



Common Mode Impedance

The common mode impedance charts are separated in Inductance and effective resistance over frequency.



Getting Started

Read the entire Instruction Manual before first use and keep it for future reference. A digital copy of the latest Instruction Manual revision can be downloaded at www.pmk.de.

About the Choke Connections

The UFCS-Choke kit is supplied with the Choke, 1m SMA-SMA Cable, 0.5m SMA-SMA Cable and an SMA-BNC adapter. The two different lengths of cable give flexibility on the placement of the choke within the test chamber.

Input and Output Connections

The choke's SMA output and input and be used vice versa. The choke can be connected to any 50 Ω input terminated measurement instrument (e.g. oscilloscope).



Observe all safety and handling instructions.



Make all connection only when the circuit under test is de-energized.



Observe the maximum voltage and power ratings of the measuring instrument in relation to the Choke output.

Scope of Delivery

All cables and adapters for connecting to a 50 Ω BNC input oscilloscope are included in the scope of delivery. See also the latest instruction manual for installation recommendations at www.pmk.de online.

UFCS-CHOKE Common-Mode Choke with female SMA outputs

018-291-970 SMA female to BNC male adapter for connection to BNC input oscilloscopes

Low loss, double shielded, 50 Ω SMA male to SMA male cable, 1 m

Low loss, double shielded, 50 Ω SMA male to SMA male cable, 0.5 m

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Ordering Information

UFCS-CHOKE 50 Ω connection kit for connecting UFCS directly to an oscilloscope. Includes SMA(F)-SMA(F) common mode choke, and dedicated 1 m SMA(M)-SMA(M) coaxial cable, 0.5 m SMA(M)-SMA(M) coaxial cable and SMA(F)-BNC(M) adaptor. Bandwidth >4.5 GHz.

D010031 50 Ω BNC feed-through for 1 M Ω input oscilloscopes, >500MHz



Re-Ordering Accessories:

018-291-970 Adapter for use with PMK's >1.5 GHz FireFly® optically isolated probe series' input tip cables with integrated 50 Ω feed-through. SMA plug to MMCX socket, 50 Ω



For ordering additional or replacement coaxial cables, please contact sales@pmk.de.



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Änderungen der Spezifikationen vorbehalten.