

RF CURRENT MONITORING PROBE

1 Introduction

The TBCP2-6M300 is a snap-on RF current monitoring probe, expanding the Tekbox product range of affordable test equipment.

The probe is characterized over the frequency range from 10 kHz to 500 MHz. It has a typical transfer impedance of 10 dBΩ and a 3dB bandwidth from 6 MHz – 300 MHz.

The TBCP2-6M300 can handle currents up to 400 A from DC to 400 Hz without affecting transfer impedance.



Picture 1: TBCP2-6M300 RF current monitoring probe

The aperture of the RF current monitoring probe is 32 mm. It is equipped with a hinge for easy installation.

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2 Specification

Characterized frequency range:	10 kHz to 500 MHz
3dB bandwidth:	6 MHz – 300 MHz, typ.
Transfer impedance:	10 dBΩ, 3.16 V/A, typ.
Max. primary current (DC - 400Hz):	400A, see graph in chapter 5
Max. primary current (RF):	20 A
Max. pulse current:	500 A
Current-time product:	0.0025 As
Max. core temperature:	125 °C
Connector type:	N female
Aperture diameter:	32 mm
Outside diameter:	73 mm
Height:	20 mm
Weight:	320 g



3 Transfer impedance

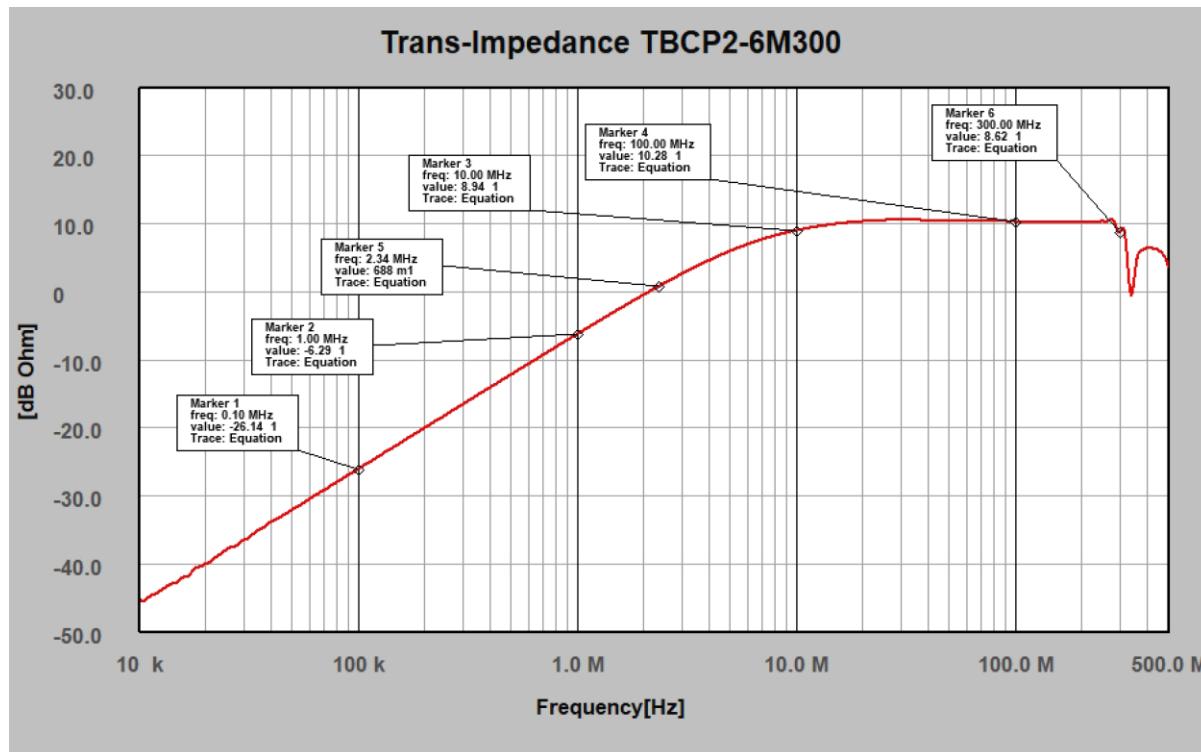


Figure 1: typical transfer impedance: 10 kHz to 500 MHz

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4 Typical transfer impedance table

The table below shows typical transfer impedance data of a TBCP2-6M300 current probe. Each current probe is delivered with its corresponding measurement protocol. This data can be used for the creation of a correction file for EMCview or similar EMC measurement software. The transfer impedance in $\text{dB}\Omega$ subtracted from the analyzer reading in $\text{dB}\mu\text{V}$ gives the corrected reading in $\text{dB}\mu\text{A}$.

Refer to the EMCview application notes on how to create a current probe correction file.

Frequency [MHz]	Transfer impedance [dBΩ]	Frequency [MHz]	Transfer impedance [dBΩ]
0,01	-44,82	25	10,48
0,025	-37,99	50	10,47
0,05	-32,04	75	10,34
0,075	-28,45	100	10,31
0,1	-26,04	125	10,22
0,25	-18,12	150	10,18
0,5	-12,15	175	10,19
0,75	-8,67	200	10,16
1	-6,23	225	10,18
2	-0,50	250	10,23
3	2,61	275	10,39
4	4,60	300	8,29
5	5,98	325	4,00
6	6,96	350	2,68
7	7,68	375	6,35
8	8,23	400	6,67
9	8,65	425	6,52
10	8,99	450	6,24
12,5	9,56	475	5,52
15	9,92	500	3,89
17,5	10,15		
20	10,31		

Table 1: Transfer impedance: 10 kHz to 500 MHz, typical data

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5 Transfer impedance with different supply currents

RF current monitoring probes are primarily used for common mode disturbance measurements, where forward and return supply current pass the aperture in opposite directions and the magnetic field of the supply current cancels out. Therefore, the supply currents' amplitude is irrelevant in common mode configurations.

When measuring differential mode currents or currents on single conductors, the magnetic field generated by DC currents or AC supply currents will cause core saturation at certain levels.

However, the probe's inductance begins to drop even before it reaches saturation. At lower frequencies, this results in a reduction of the probe trans-impedance.

The plot below shows the behaviour of the trans-impedance of the TBCP2-6M300 for supply currents up to 450A in the frequency range from DC to 400 Hz. Currents up to 400A have no effect on the trans-impedance.

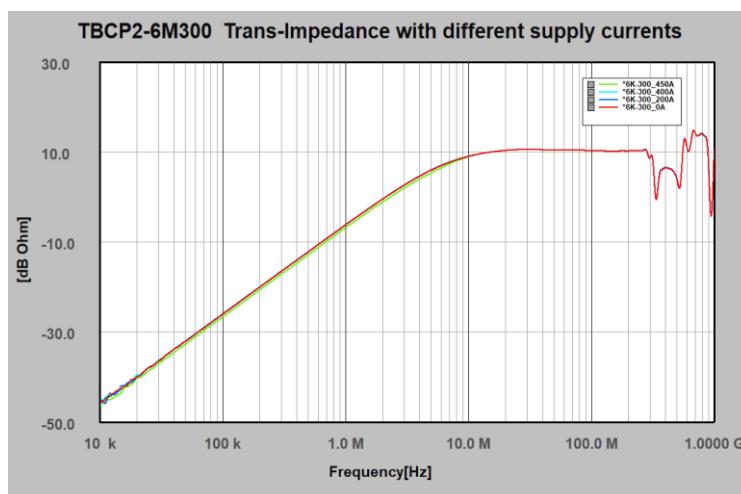
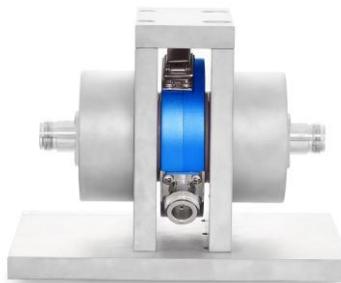


Figure2: transfer impedance versus supply current

6 Accessory

Tekbox supplies a calibrator corresponding with the TBCP2 series of snap on current probes:



Picture 2: TBCP2-CAL RF current probe calibration fixture

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7 Warning

RF current monitoring probes are primarily used for common mode disturbance measurements, where forward and return current pass the aperture in opposite directions and the magnetic field cancels out. When doing differential mode measurements or just passing a single current carrying wire through the aperture, EUTs with high inrush currents may cause a voltage transient, that might damage the receiver or analyzer frontend. Protect your equipment using attenuators, limiters, or disconnect the RF-input, while powering ON/OFF the EUT.

The TBCP2-6M300 can handle high currents. High currents create high voltages at the RF output of the probe. A 20A RMS current creates an RMS output voltage of 63.2 V or 80 W into 50 Ohm. Consider attenuators with suitable power rating when measuring unknown currents.

8 Ordering Information

Part Number	Description
TBCP2-6M300	Snap on RF current monitoring probe, wooden box, calibration protocol 10 kHz – 500 MHz
TBCP2-CAL	Calibration fixture for TBCP2 current probe series

9 History

Version	Date	Author	Changes
V 1.0	22.12.2025	Mayerhofer	Creation of the document