



RF CURRENT MONITORING PROBE

1 Introduction

The TBCP2-30M1000 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 1 GHz. It has a 3 dB bandwidth from 30 MHz – 900 MHz and a transfer impedance of $22 \text{ dB}\Omega \pm 2 \text{ dB}\Omega$ from 25 MHz – 1 GHz.



Picture 1: TBCP2-30M1000 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 1 GHz
3 dB bandwidth:	30 MHz – 900 MHz
Transfer impedance:	22 dBΩ ± 2 dBΩ from 25 MHz – 1 GHz
Max. primary current (DC - 400Hz):	> 50 A, see graph in chapter 5
Max. primary current (RF):	10 A
Max. pulse current:	50 A
Current-time product:	0.007 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

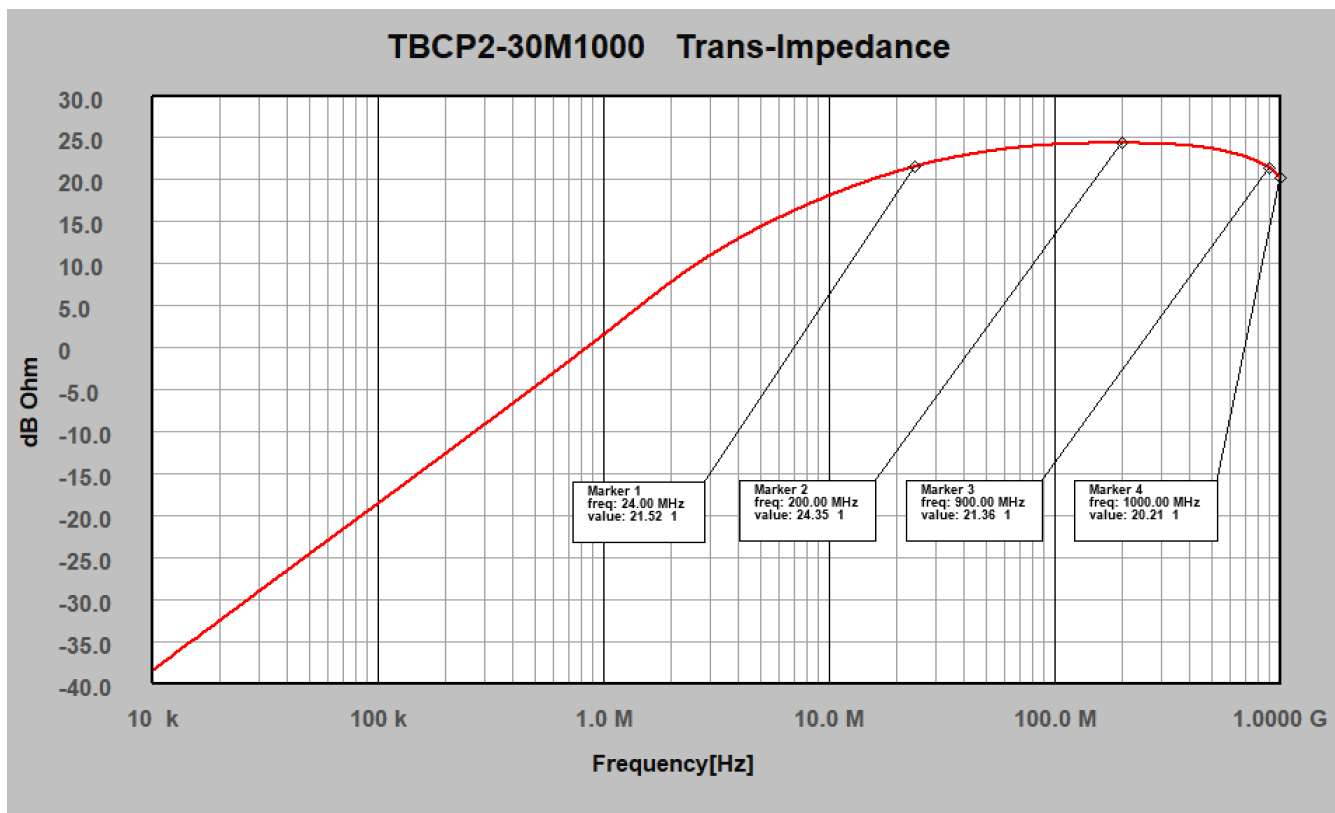


Figure1: typical transfer impedance: 10 kHz to 1 GHz

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4 Typical transfer impedance table

The table below shows typical transfer impedance data of a TBCP2-30M1000 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 dBΩ subtracted from the analyzer reading in dBμV gives the corrected reading in dBμA.

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	-38,55	375	24,08
0,025	-30,64	400	24,01
0,05	-24,65	425	23,93
0,075	-21,14	450	23,84
0,1	-18,66	475	23,76
0,25	-10,74	500	23,67
0,5	-4,70	525	23,57
0,75	-1,14	550	23,45
1	1,45	575	23,33
2,5	9,60	600	23,20
5	14,36	625	23,09
7,5	16,62	650	22,98
10	18,05	675	22,86
25	21,65	700	22,73
50	23,32	725	22,57
75	23,91	750	22,40
100	24,16	775	22,23
125	24,28	800	22,06
150	24,33	825	21,90
175	24,35	850	21,74
200	24,35	875	21,56
225	24,33	900	21,36
250	24,31	925	21,12
275	24,27	950	20,84
300	24,24	975	20,53
325	24,19	1000	20,21
350	24,14		

Table1: Transfer impedance: 10 kHz to 1 GHz, 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 TBCP2-30M1000 for supply currents up to 150A in the frequency range from DC to 400 Hz.

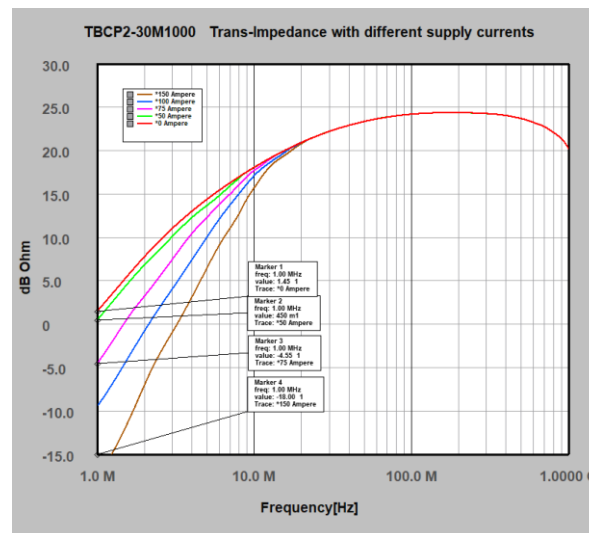
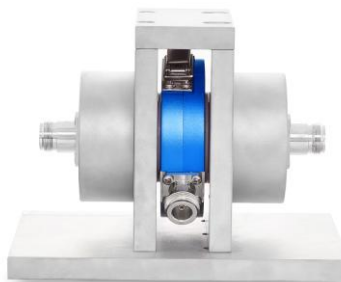


Figure2: transfer impedance versus supply current

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.

8 Ordering Information

Part Number	Description
TBCP2-30M1000	Snap on RF current monitoring probe, wooden box, calibration protocol 1 MHz – 1 GHz
TBCP2-CAL	Calibration fixture for TBCP2 current probe series

9 History

Version	Date	Author	Changes
V 1.0	22.8.2025	Mayerhofer	Creation of the preliminary document