# 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 dBΩ ± 2 dBΩ 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.

# RF CURRENT MONITORING PROBE

## 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 |

RoHS

## 3 Transfer impedance

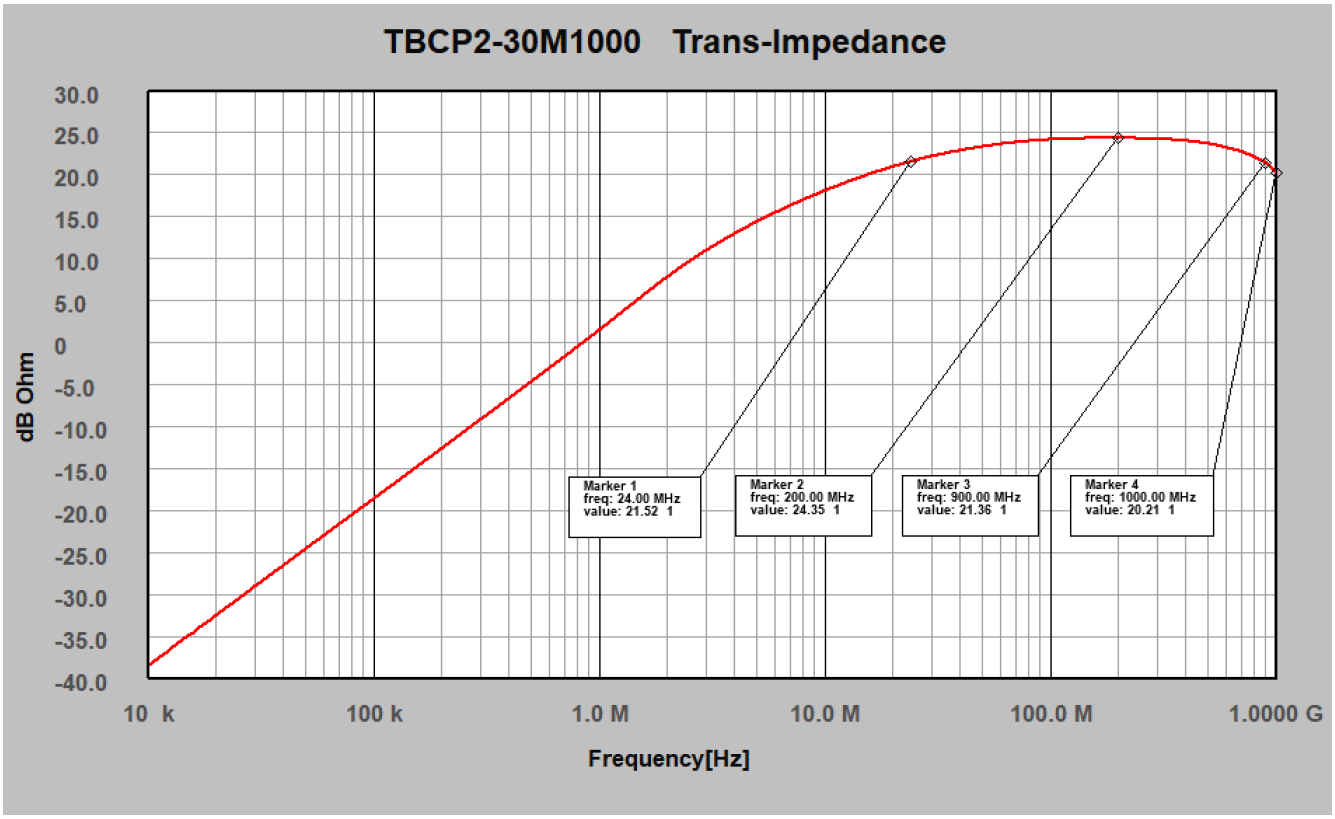



*Figure1: typical transfer impedance: 10 kHz to 1 GHz*

## 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*

## 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.

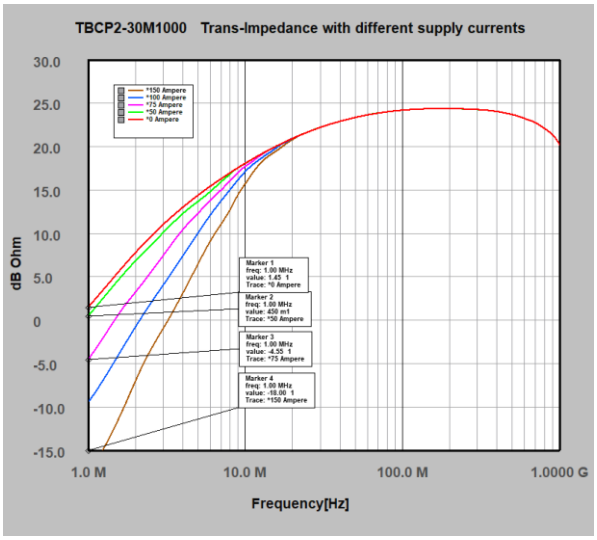
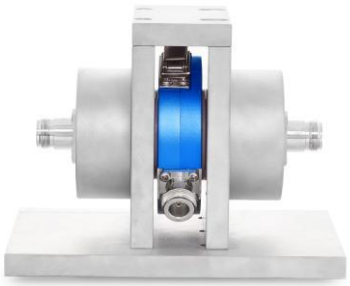



*Figure2: transfer impedance versus supply current*

## 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*

## 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 |
| | | | |