TBMHA1 Mains Harmonics Current Coupler

1. Introduction

The TBMHA1 is a current coupler, primarily designed for mains harmonics measurements. It is built around a REO WKO/CL-P25 AC/DC compensated wideband current transformer, with the mains line passing through its core aperture.
The TBMHA1 produces a current proportional to the mains current of the connected load. Consequently, it requires a shunt resistor, which can be the input impedance of a DC-coupled measurement receiver or a BNC 50 Ohm feed-through termination attached to the current coupler output. The current transformer's maximum primary current range is 25A, and its transducer factor is 1 mA/A. A 50 Ω termination results in a transducer factor of 50 mV/A.
The TBMHA1 is equipped with a 16A C19 connector at the mains input side and with country specific mains sockets at the mains output side.

Picture 1: TBMHA1 mains harmonics current coupler

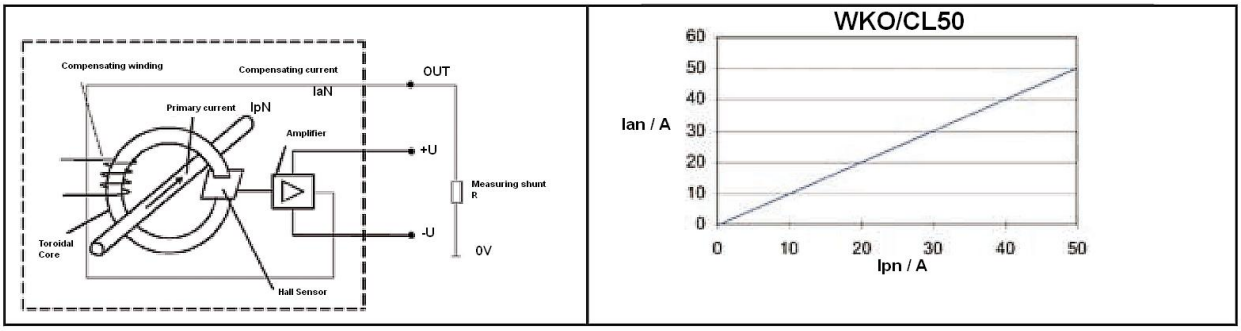
2. Specification

Mains voltage range:	100 V – 120 V / 200 V – 240 V; mains voltage selection switch
Max. mains current:	16 A, depending on country specific mains output socket
Transducer factor:	50 mV/A with 50 Ohm load resistor (DC coupled)
Mains input socket:	C19, 16 A
Mains output socket:	country specific; CEE7/3 16 A (Schuko), NEMA 5-15 15 A, AS/NZS 3112:201 15 A, BS1363, 13A
Current output socket:	BNC-Female
Dimensions:	W x H x L 100 mm x 118 mm x 240 mm
Weight:	1.4 kg

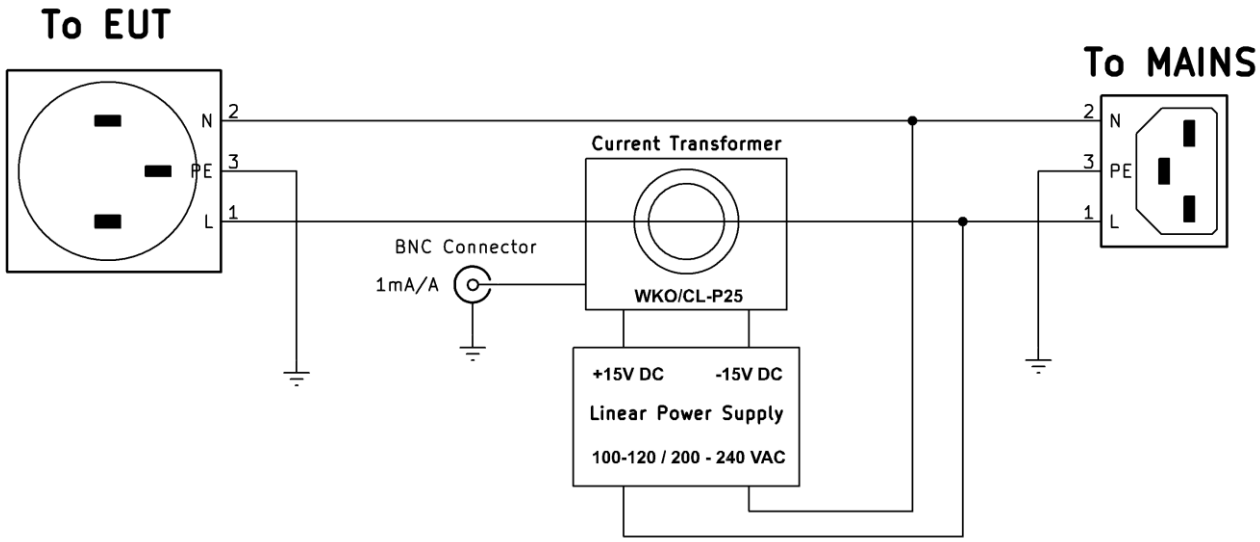
Current transformer characteristics:

Nominal primary current range, IpN:	0 - 25 A_{AC}
Maximum primary current range, ImaxpN:	35 A_{AC}
Output current range, IaN:	0 – 25 mA
Current transformation ratio, K:	1000:1
Minimum shunt (load) resistor, Rmin:	1 Ω
Maximum shunt (load) resistor, Rmax:	200 Ω
Frequency range:	DC – 150 kHz
Rise time, t_r:	≤ 1.5 µs
Offset current, I_{off}:	≤ 0.15 mA; nulling pot
Ambient current range:	-25°C - + 70°C

3. Principle schematic



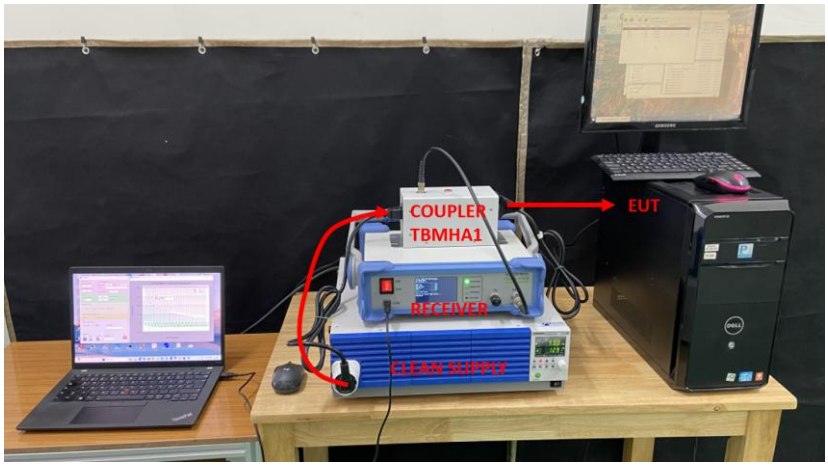
Basic circuit of the current transformer



Principle schematic of the mains harmonics current coupler

4. Application

The photo below shows a setup example for a mains harmonics measurement:



Mains harmonics measurement setup

Mains harmonics measurement result example

Refer to the application note *AN_TBMR-110M_EN61000-3-2_Mains Harmonics Analyzer.docx* for more details.

5. Ordering Information

Part Number	Description
TBMHA1 - EU	Mains harmonics current coupler with Schuko socket (CEE7/3, 8 A), 16 A cold appliance cable, 75 cm coaxial cable BNC-male / N-male/RG223
TBMHA1 - US	Mains harmonics current coupler with US socket (NEMA 5-15, grounded, type B, 15A), 15A cold appliance cable, 75 cm coaxial cable BNC-male / N-male/RG223
TBMHA1 - AU	Mains harmonics current coupler with Australian socket (AS/NZS 3112:201, 15A), 15A cold appliance cable, 75 cm coaxial cable BNC-male / N-male/RG223
TBMHA1 - UK	Mains harmonics current coupler with UK socket (BS1363, 13A), 16 A cold appliance cable, 75 cm coaxial cable BNC-male / N-male/RG223

6. History

Version	Date	Author	Changes
V 1.0	2.12.2025	Mayerhofer	Creation

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