

## PEWM-3C-C

**Portable Three-phase Working Standard Class 0.05 / 0.1 / 0.2 / 0.5**  
(Electricity Meter Tester, Current Transformer Tester and Circuit Analyzer)



### APPLICATION AND BRIEF DESCRIPTION

The three-phase energy standard PEWM-3C-C is an improved version (with color display) of the well-known standard PEWM-3C. It is used for quick on-site tests of all types of electricity meters and current transformers (CT), also for analysis of the available load. The current is measured either via direct connection up to 10A (class 0.1 or 0.05), or with three current clamps (CC) to 100A or 120A. The current on the primary of the CT is measured with three 1000A CC, or 3 Flexible Current probes to 3000A (with one joint box in 3 ranges). Isolated BNC input is provided to measure the signal from a High Voltage Current probe (Amp Lite Wire - 2000A/100kV).

**The error of the electricity meter** can be determined using Universal Scanning Head (counts disc revolutions and light pulses), or using a Manual button or a Functional Button. Meters for active, reactive or apparent energy can be tested in two-, three- or four-wire connection mode. Is the measurement carried out with the three 1000A current clamps (or with three Flexible probes) on the CT primary, the **error of the whole measuring circuit** will be determined. **Registers** of the electricity meter can be tested using a Manual button, or a Functional button on the panel keyboard.

Another function is electrical circuit **Analysis**. The first screen shows the **vector diagram** of the three-phase circuit, also – the numerical values of **current, voltage, phase shift, frequency and phase rotation**; thus detecting wiring faults.

The On-Board Consultant issues **warning messages**, if wiring faults are detected.

Other analysis screens show the measured values for **power (4 quadrant, P,Q,S), PF, harmonic distortion**, and the **wave-forms** of the input signals.

**CT ratio error and phase shift** is measured with the 1000A CC (or Flex, or HV) for the primary, and with the small current clamps for the secondary circuit.

The **Z-Burden** on the secondary of the Current Transformer or Voltage Transformer can be measured with one current clamp and a special cable for  $U_{sec}$ .

The device has a unique **wide-range power supply (up to 480 Vac)** powered from all the three phases of the measuring circuit.

300 screen displays of meter error or vector diagram measurement or current transformer measurement can be memorized in a non-volatile memory and transferred to a computer via specialized **USB cable** or printed directly on a **thermal printer**.

The instrument box is protected with a **rubber cover** against dropping or blow.

**PEWM-3C-C, Version "F"** is with 3 Flexible Probes to 3000A with joint box.

**PEWM-3C-C, Version "S"** is a simple version – without primary current probes and without the ability to measure Current Transformers and CT/VT Burden.

**PEWM-3C-C, Version "A"** is with improved accuracy for direct current – class 0.05.

**NEW: PEWM-3C-CF works with three Flexible Probes with joint box switched to 200/800/3000 A, powered from the device.**

TECHNICAL DATA	
Power supply auxiliary	230 Vac +15%, -25%
Power supply from the measuring circuit (phase-to-phase or phase-to-neutral)	45 ... 480 Vac, (45 ... 65 Hz)
Power consumption	max 20 VA
Dimensions	220 x 130 x 75 mm
Weight	1.6 kg
Housing	Hard plastic with protection
Operation temperature	-15 °C ... +50 °C
Relative humidity	< 95% non-condensing
Pulse output: (isolated BNC and LED)	50 000 imp/kWh(kVarh) -default
Color 5" display, 65K colors	640 x 480 pixels
Degree of protection	IP 40 (IP65- Peli case closed)
Temperature coefficient (0 ... 40°C)	0.005% / K
Drift / year for Voltage & Current (direct)	< 0.03 % / year
Measurement Stability	< 0.02 %
Dimensions of 100A CC (Jaw 10mm)	110 x 35 x 20 mm
Dimensions of 120 A CC (Jaw 20mm)	130 x 50 x 20 mm
Dimensions of 1000 A CC (Jaw 52mm)	205 x 100 x 30 mm
Dimensions of 3000 A Flexible Probes	∅ 190 mm, Length 600 mm
Current range of 10 A direct	0.001 A ... 10.0 A
Current range of 100 A (120 A) CC	0.01 A ... 100.0 (120.0) A
Current range of 1000 A CC	1.00 A ... 1000.0 A
Current range of Flex 3000 / 800 / 200 A	3.00 A ... 3000.0 A

MEASUREMENT ERRORS		
	ERROR	RANGE
Voltage (phase-neutral)	± 0.05 %	40.00 V ... 300.00 V
	± 0.2 %	5.00 V ... 39.99 V
Current (direct)	± 0.05 %	0.050 A ... 10.00 A
	± 0.05 % **	0.002 A ... 0.050 A
Current (120 A CC)	± 0.5 %	0.500 A ... 120.0 A
Current (100 A CC)	± 0.2 %	0.100 A ... 100.0 A
	± 0.2 % **	0.020 A ... 0.100 A
Current (1000 A CC)	± 0.2 %	5.000 A ... 1000.0 A
Current (2000 A HV Probe)	± 0.2 % + E <sub>s</sub>	20.00 A ... 2000.0 A
Current (3000A Flex probes)	± 1.0 %	10.00 A ... 3000.0 A
Power / energy (direct - Version A)	± 0.05 %	0.020 A ... 10.00 A
	± 0.05 % **	0.005 A ... 0.020 A
Power / energy (direct)	± 0.1 %	0.050 A ... 10.00 A
Power / energy (120 A CC)	± 0.5 %	0.500 A ... 120.0 A
Power / energy (100 A CC)	± 0.2 %	0.100 A ... 100.0 A
Power / energy (1000 A CC)	± 0.2 %	5.000 A ... 1000.0 A
Power / energy (3000 A Flex)	± 1.0 %	20.000 A ... 3000.0 A
Phase angle	± 0.1°	0.00° ... 359.99°
Frequency	± 0.01 Hz	40.00 Hz ... 70.00 Hz
Power Factor	± 0.002	-1.000 ... +1.000
CT Burden - U <sub>sec</sub>	± 0.5 %	0.100 V ... 10.00 V

**Notes:** 1. The power / energy errors are related to apparent power (to be divided by the power factor for active and reactive energy).

2. E<sub>s</sub> is the error of the sensor, specified by the manufacturer.

3. \*\* Error related to the maximum value of the Range.

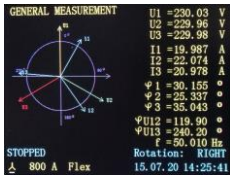
**SAFETY TESTS:** IEC 61010-1; IEC 61010-2-032; 300 V, Cat III

**EMC TESTS:** IEC 61000-4-2, IEC 61000-4-4, IEC 61000-4-5, IEC 61000-4-6

**FUNCTIONALITY:** IEC60736, IEC62052-11, IEC62053-21,-22,-23, IEC61869-2

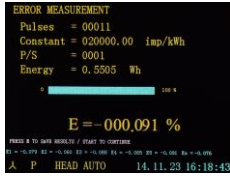
## FUNCTIONS OF PEWM-3C-C

### General Measurement



The vector diagram of the three-phase circuit is drawn on the large graphic display in this mode. The true RMS values of voltage and current, the angle between them, the angle between phase voltages for each phase; the frequency and sequence of rotation are also indicated. The On-board consultant will detect any wrong connection and indicate a message on the screen. This mode can be switched to measure three-wire or four-wire circuit types.

### Meter Error Measurement



The device indicates the electricity meter error in [%] and the true value of energy in this mode. The delivery of pulses is traced with a bar-graph. The pulses or revolutions number "P", the constant of the electricity meter "C" and the transformation ratio "Ratio" are preset by the operator. The measurement can be changed for two-, three- or four-wire connection, for active, reactive or apparent energy. The operator is able to count the pulses manually (with Manual button or Functional button on the panel) or use the universal Scanning Head.

The last feature since 2023 is Statistical measurement. Five consecutive Error measurements can be performed in "Auto" mode and the Average Error is calculated. The Software calculates additionally the Standard Deviation in Excel format.

### Register Error Measurement

The value of energy has to be set in this mode. The measurement is started and stopped by the operator using the Manual or Functional button. The error of the register is indicated in [%].

### Current Transformer Measurement

The parameters of the three Current Transformers (CT) are measured phase by phase, without the need to move the current probes. The true RMS values of primary and secondary current, the transformation ratio, the current phase shift and the ratio Error are indicated.

Parameters	Phase 1	Phase 2	Phase 3
Amps Prim.	19.977	22.016	20.949
Amps Sec.	2.0038	2.2061	2.1003
Ratio	49.80:5	49.85:5	49.85:5
Angle(Deg)	359.70	359.60	359.30
Error (%)	+00.30	+00.20	+00.26

### Burden Measurement

The Z-Burden of CTs is measured with a special cable, connected to the secondary  $U_{sec}$  circuit of the CT and the small clamp on  $I_1$ . The Burden of PTs is measured with one small clamp ( $I_1$ ) on the secondary of the PT and the voltage input for  $L_1$ . The output power of the measuring transformer is also indicated in [VA].

### Power Measurement

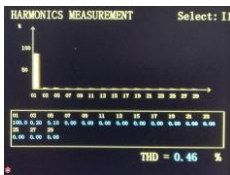
The values of Voltage, Current, Phase-shift, Power (active, reactive, and apparent) and Power Factor of the three phases are indicated in a table. This mode can be switched for three-wire or four-wire measurement. The time of measurement can be set to 1sec., 1min, 5min and 15min.

Parameters	Phase 1	Phase 2	Phase 3
Amps (A)	2.0038	0.6040	0.6992
Volts (V)	0.4049	0.4365	0.3619
Zburden (ohm)	0.2030	0.7230	0.5180
Power (VA)	0.8113	0.2636	0.2530

Phase	1	2	3	Σ
Volts	230.05	229.99	230.01	
Amps	2.0039	2.2061	2.1003	
φ <sub>u</sub>	30.110	25.136	34.923	
Watt	398.88	459.45	396.19	1254.5
VAr	230.99	215.19	276.33	722.51
VA	461.01	507.40	483.10	1451.5
φ <sub>w</sub>	0.0000	119.90	240.10	
PF	-0.8651	+0.9051	+0.8201	

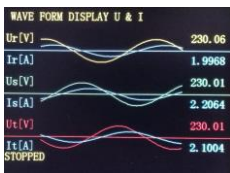
### Harmonics

The harmonic content of each input signal of voltage or current can be measured in this mode. The amplitude in [%] of the 1<sup>st</sup> harmonic and the odd harmonics up to the 29<sup>th</sup> are indicated graphically and numerically. The THD (True Harmonic Distortion) in percent is also displayed.



### Waveform Display

The wave-forms of the three input signals of voltage and current are drawn simultaneously on the display. The TRMS values of each voltage and current are also displayed.



### Settings

The last screen is intended for performing settings of some parameters like date, time and frequency of the standard's constant. From this screen the operator is able to enter into Calibration mode or connect to a PC.

### Memory

300 results of electricity meter error measurement or current transformer measurements or analysis can be stored in a non-volatile memory and transferred to a computer via USB cable.

### Software PEWM

The PEWM Software works under Windows, uses MySQL Database and its features are:

- Download and view the Test results;
- Database search by Date, ID No, Location;
- Add additional data like Meter, Technician;
- Print a Test Report;
- Export of a Test in Excel format;
- Import/Export of Database from/to another PC;
- Statistical presentation of 5 Errors, Average Error and Standard Deviation in Excel format..

Tools and Maintenance
1. ADJUST REAL TIME CLOCK
2. COMMUNICATION WITH PC
3. METER CONSTANT imp/kWh
4. CALIBRATION ON LINE
5. MANUAL CALIBRATION (PASSWORD)
MODIFIED 08.07.2020 FV1.2007CZ
Press M Button to Select Function