

Preliminary

NEW

2017

# DOW3000

A completely new era in IEC61000-4-18 testing





## EMC PARTNER AG

- ✓ Founded in 1994
- ✓ **Swiss** private company, headquarters in Laufen
- ✓ Largest choice of impulse generators
- ✓ Market leader, reputed worldwide
- ✓ Development, production and testing in house
- ✓ Global network of representatives



- ✓ Standard overview
- ✓ Technical specification of DOW3000
- ✓ Unique features of DOW3000
- ✓ Calibration and test setup examples

### Slow DOW

$t_r = 75 \text{ ns} \pm 20 \%$

$f_{\text{osc.}} = 1 / T_{\text{osc.}}$

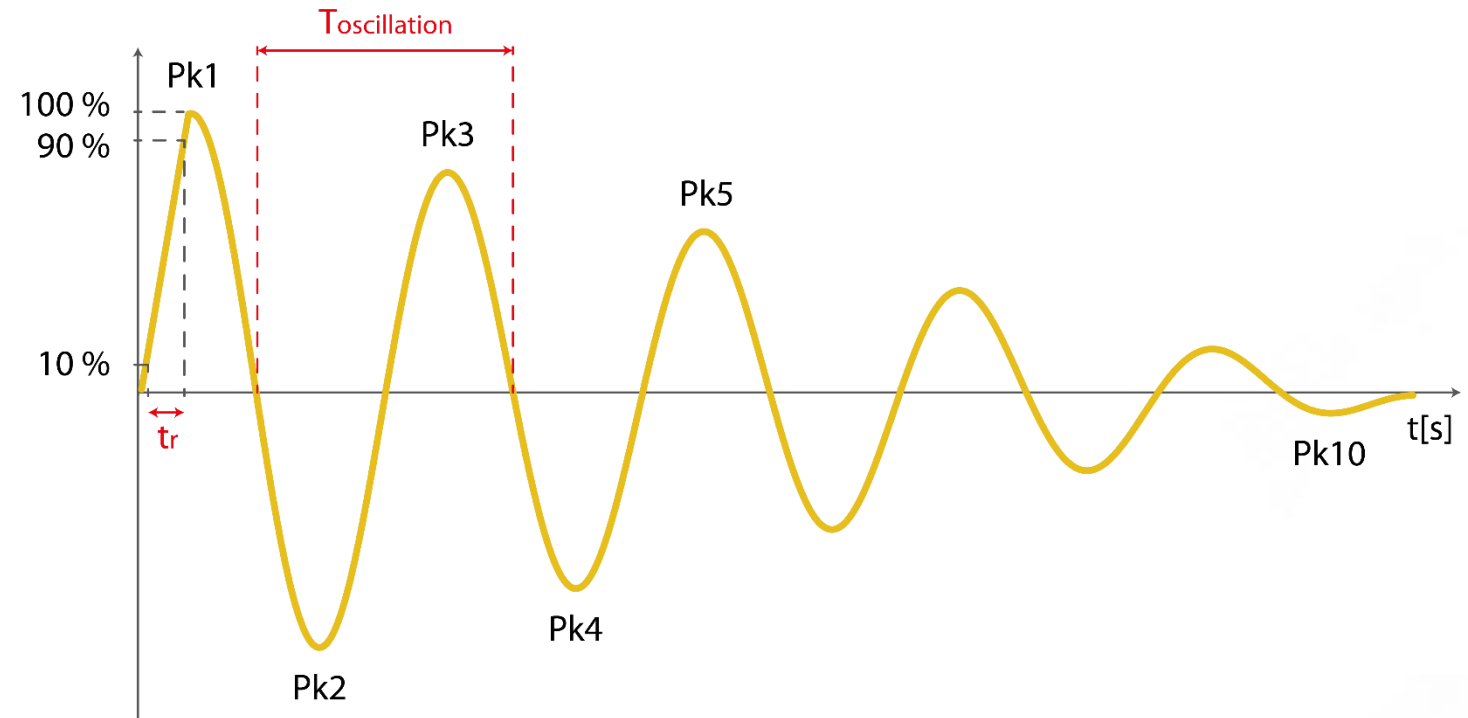
$f_{\text{osc.}} = 100 \text{ kHz}, 1 \text{ MHz} \pm 10 \%$

$Pk5 > 50\% \cdot Pk1 \mid Pk10 < 50\% \cdot Pk1$

Repetition: 40/s@100 kHz, 400/s@1 MHz

Burst duration:  $\geq 2 \text{ s}$

$Z_{\text{out}} = 200 \Omega \text{ (Voc/Isc)}$



## Fast DOW

$t_r = 5 \text{ ns} \pm 30 \%$

$f_{\text{osc.}} = 1 / T_{\text{osc.}}$

$f_{\text{osc.}} = 3 \text{ MHz}, 10 \text{ MHz}, 30 \text{ MHz} \pm 10 \%$

$Pk5 > 50\% \cdot Pk1 \mid Pk10 < 50\% \cdot Pk1$

Repetition: 5000 / s

Burst duration: 50 ms@ 3 MHz,

15 ms@10 MHz, 5 ms@30MHz

$Z_{\text{out}} = 50 \Omega \text{ (Voc/Isc)}$

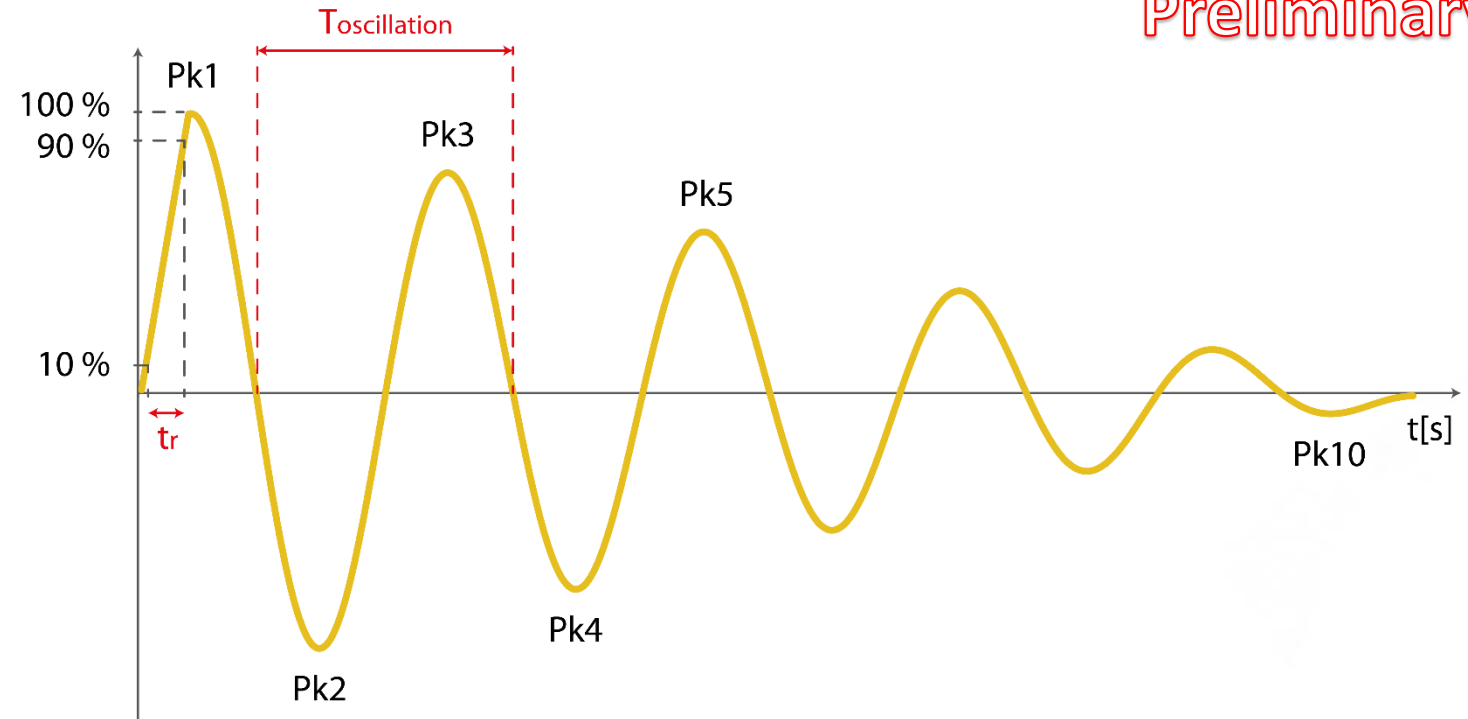
## Fast DOW: SC current requirements

$t_r < 330 \text{ ns @ } 3 \text{ MHz}, < 100 \text{ ns @ } 10 \text{ MHz}, < 33 \text{ ns @ } 30 \text{ MHz}$

$f_{\text{osc.}} = 1 / T_{\text{osc.}}$

$f_{\text{osc.}} = 3 \text{ MHz}, 10 \text{ MHz}, 30 \text{ MHz} \pm 30 \%$

$Pk5 > 25\% \cdot Pk1 \mid Pk10 < 25\% \cdot Pk1$



### Slow DOW

Test Level	CM [kV]	DM [kV]
1	0.5	0.25
2	1	0.5
3	2*	1
4	-	-
X	x	x

\* 2.5 kV for substation equipment

### Fast DOW

Test Level	CM [kV]	DM [kV]
1	0.5	-
2	1	-
3	2	-
4	4	-
X	x	-

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Coupling	Slow DOW	Fast DOW
Differential mode	yes	no
Common mode	yes	yes

Coupling C	Slow DOW	Fast DOW
0.5 $\mu$ F	yes	-
33 nF	-	yes

IEC61000-4-12 and IEC61000-4-18 refer to **different** phenomena that occur in different environments

Generally, equipment that requires DOW testing **does not** require Ring wave testing!

### Ring Wave

Addressed to equipment from many environments

Type of disturbance: non-repetitive

Duration of disturbance: 10 – 100  $\mu$ s

Definition of decay: different from IEC61000-4-18

Output impedance of generator: 12  $\Omega$  and 30  $\Omega$

Oscillation frequency: 100 kHz

### Damped Oscillatory Wave

Addressed to equipment from power substations

Type of disturbance: repetitive

Duration of disturbance: bursts/different durations up to 2 s

Decay:  $Pk5 > \frac{1}{2} * Pk1$ ,  $Pk10 < \frac{1}{2} * Pk1$

Output impedance of generator: 200  $\Omega$  and 50  $\Omega$

Oscillation freq.: 100 kHz, 1 MHz, 3 MHz, 10 MHz, 30 MHz



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Generally, equipment that requires DOW testing **does not** require Ring wave testing!

Product standards:

*IEC 62052-11* Electricity metering equipment: requires DOW but **no** Ring wave

*IEC 60255-27* Measuring relays and protection equipment: requires DOW but **no** Ring wave

*IEC 61850-3* Communication networks and systems for power utility automation: requires DOW but **no** Ring wave

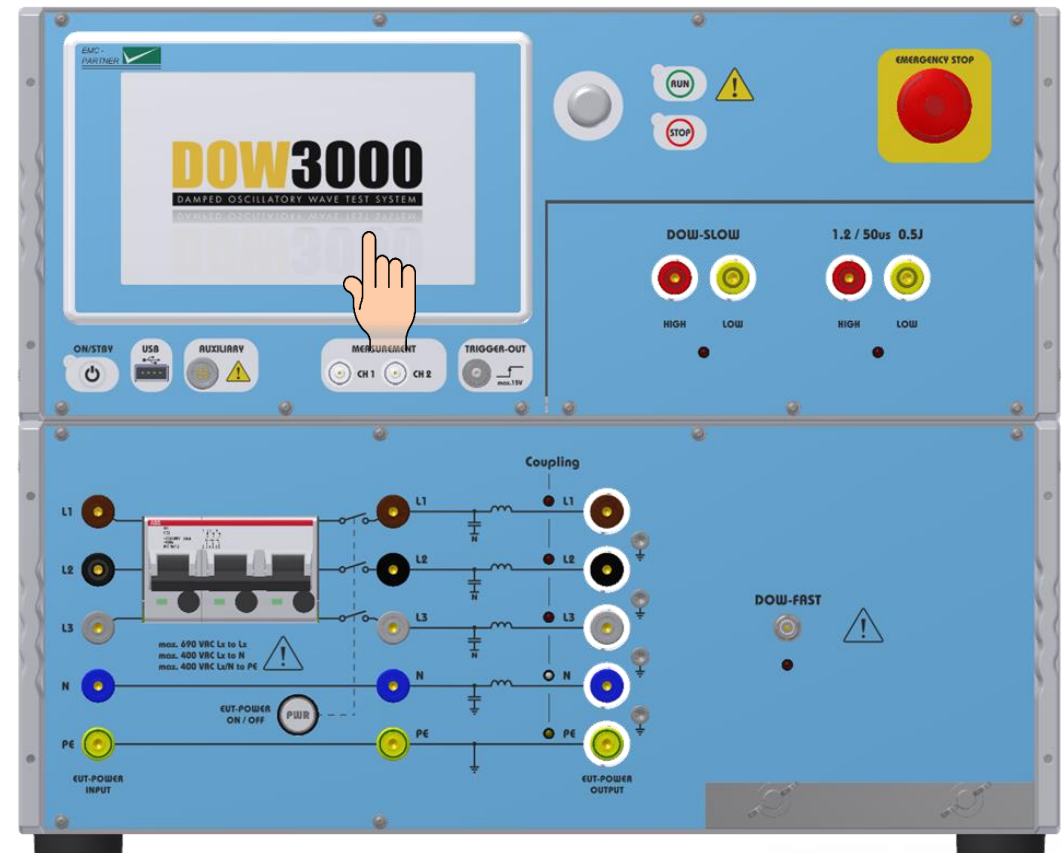
*IEEE/ANSI C37.90.1* Surge withstand capability tests for relays and equipment associated with power apparatus: requires DOW but **no** Ring wave

*IEEE 1613* Communications networking devices in electric power substations: requires DOW but **no** Ring wave

Ring wave tests **DO NOT** apply to equipment that require DOW tests!

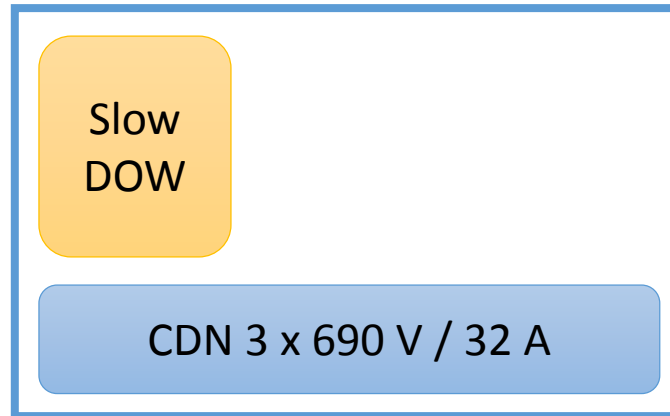
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- ✓ State of the art technology
- ✓ Sophisticated touch screen control
- ✓ Modular, configurable generator:  
SLOW and FAST DOW modules selectable
- ✓ Possibility to add 1.2/50  $\mu$ s pulse generator up to 8 kV with 500  $\Omega$  output and energy 0.5 J / pulse
- ✓ Built-in 3 phase CDN 3 x 690 V / 32 A per phase
- ✓ Maximum voltage L-N, L-PE: 400 V
- ✓ Advanced EUT automatic protection, supply control

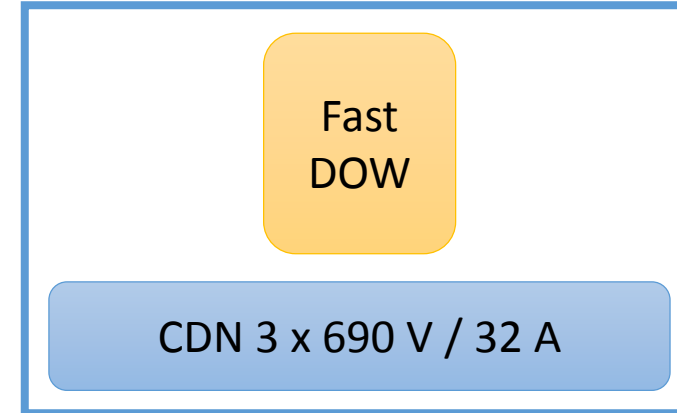


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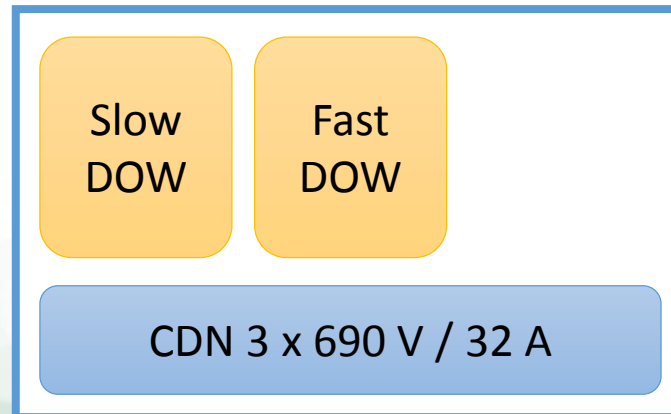
DOW3000 S



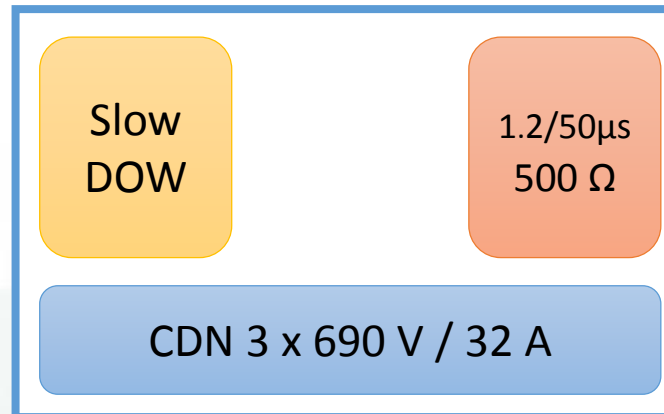
DOW3000 F



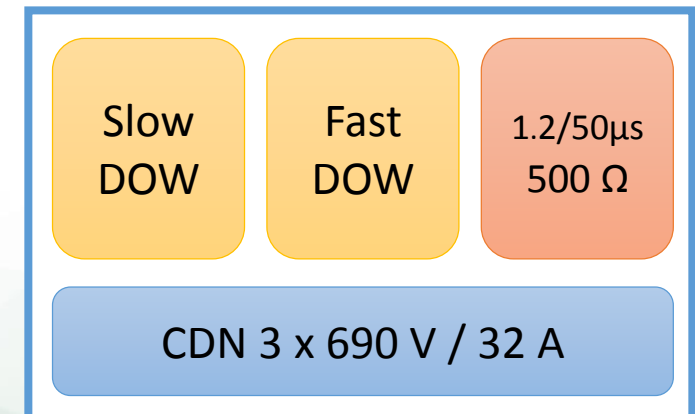
DOW3000 S-F



DOW3000 S-I



DOW3000 S-F-I



## Slow DOW

- ✓ Adjustable amplitude up to 4.4 kV for both 100 kHz and 1 MHz (norm requires 2.5 kV)
- ✓ Output impedance: 200  $\Omega$
- ✓ Burst duration, adjustable: continuous up to 2.5 kV, minimum 2 s up to 4.4 kV
- ✓ Pulse repetition, adjustable: 40/s @ 100 kHz and 400/s @ 1 MHz

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## Fast DOW

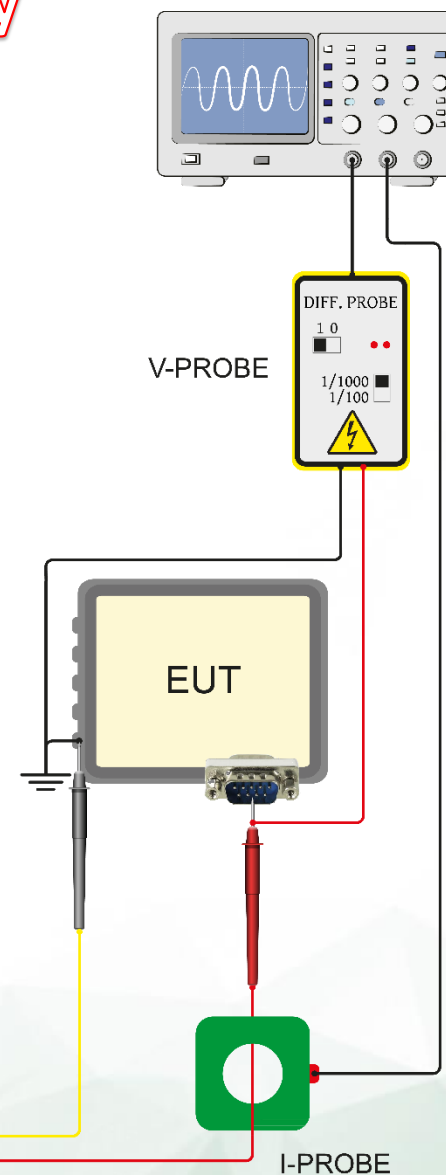
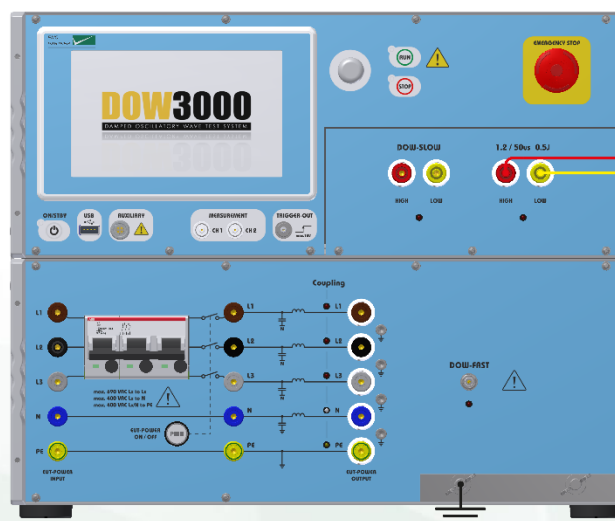
- ✓ Adjustable amplitude up to at least 4.1 kV for 3 MHz, 10 MHz and 30 MHz
- ✓ Output impedance: 50  $\Omega$
- ✓ Burst duration, adjustable: at least 50 ms / 300 ms (3 MHz), 15 ms / 300 ms (10 MHz), 5 ms / 300 ms (30 MHz) @ 4 kV
- ✓ Pulse repetition, adjustable: 5000/s @ all frequencies

Impulse test 1.2/50  $\mu$ s, 500  $\Omega$ , 0.5 J / pulse

- ✓ Adjustable amplitude up to 8 kV
- ✓ Pulse energy guaranteed at:  
0.5 kV, 1.0 kV, 1.5 kV, 2.0 kV, 2.5 kV, 3.0 kV, 4.0 kV, 5.0 kV, 6.0 kV, 8.0 kV
- ✓ Comfortable use with test pistols

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DOW3000



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**Leading technology** means:

Proprietary OS:

EMC PARTNER Operating System developed in house

**Benefits:**

- ✓ rapid implementation of new features and requirements
- ✓ advanced support capability
- ✓ strong feedback response possibility

**Leading technology** means:

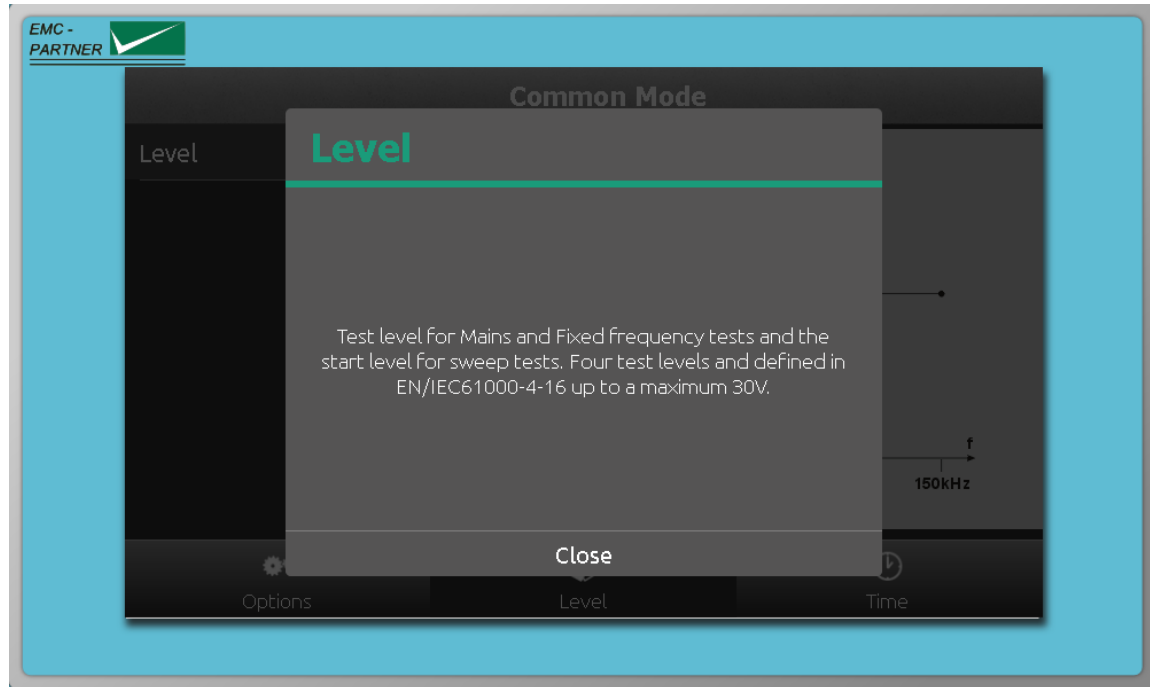
Modern GUI optimized for touch screen

**Benefits:**

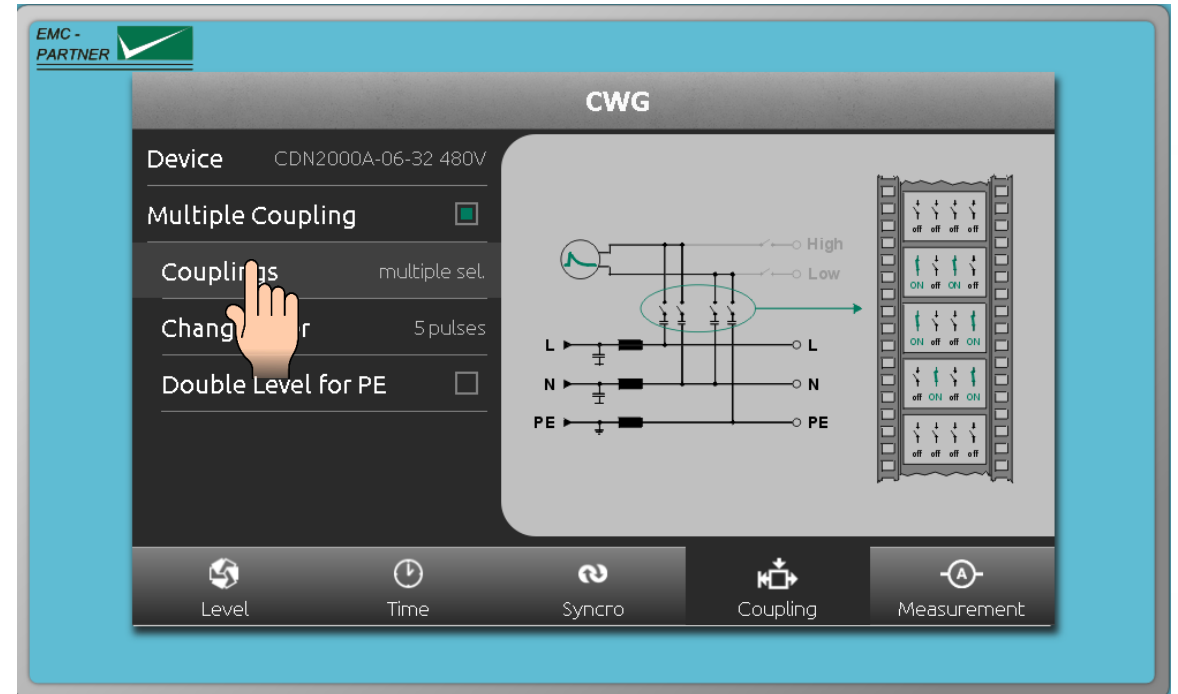
- ✓ intuitive operation (assisted)
- ✓ quick learning and accommodation process
- ✓ comfortable and comprehensive operation

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✓ Contextual help: just hold your finger on the screen



✓ Explanation figures





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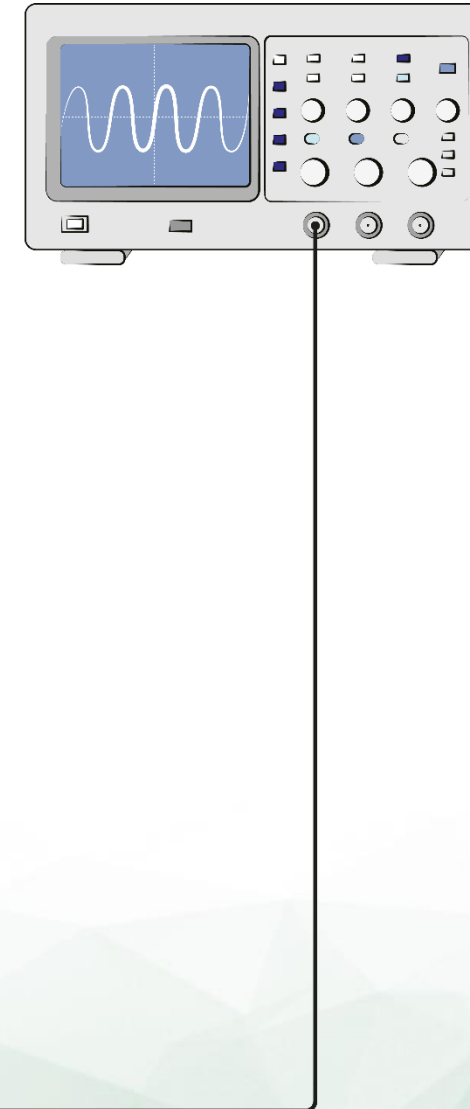
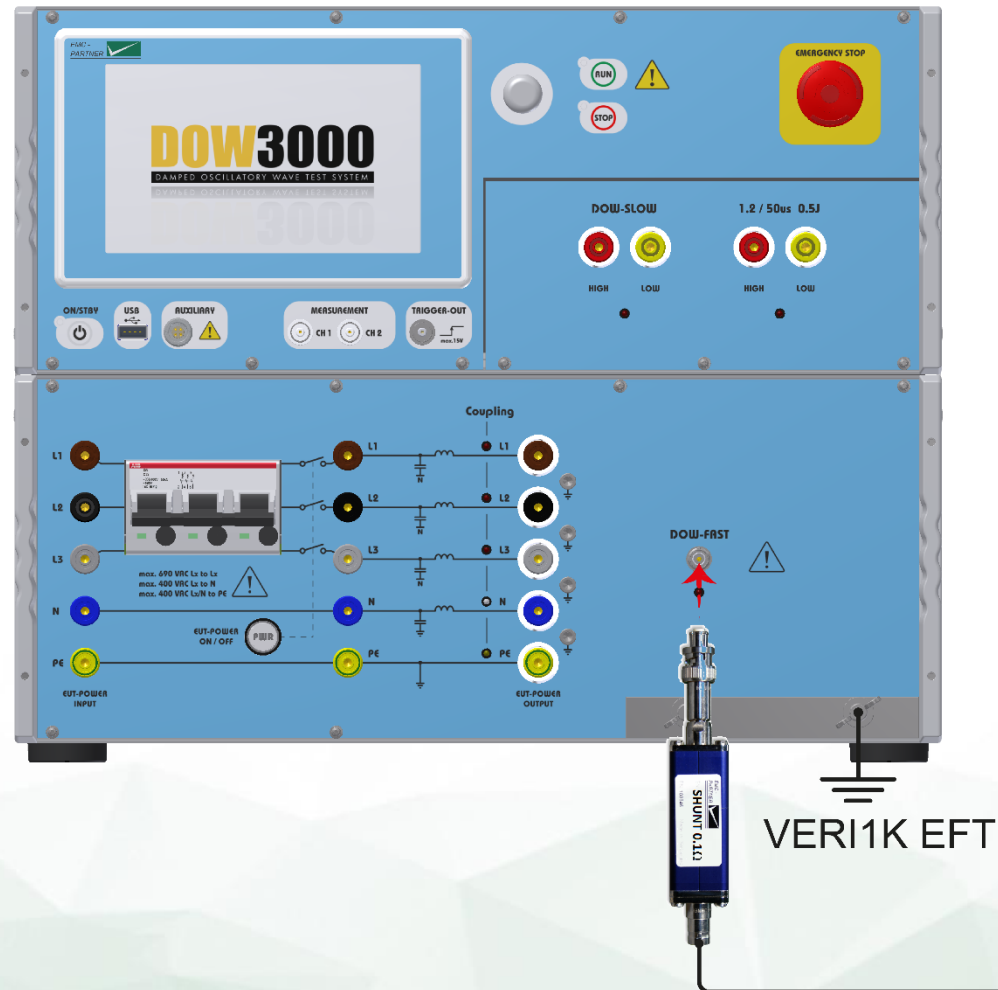
- ✓ Lifetime upgrade at no extra charge
- ✓ Up to 4 generators controlled in parallel
- ✓ DSO control
- ✓ Sequence mode
- ✓ Protocol
- ✓ Norm library



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## Fast DOW voltage calibration setup

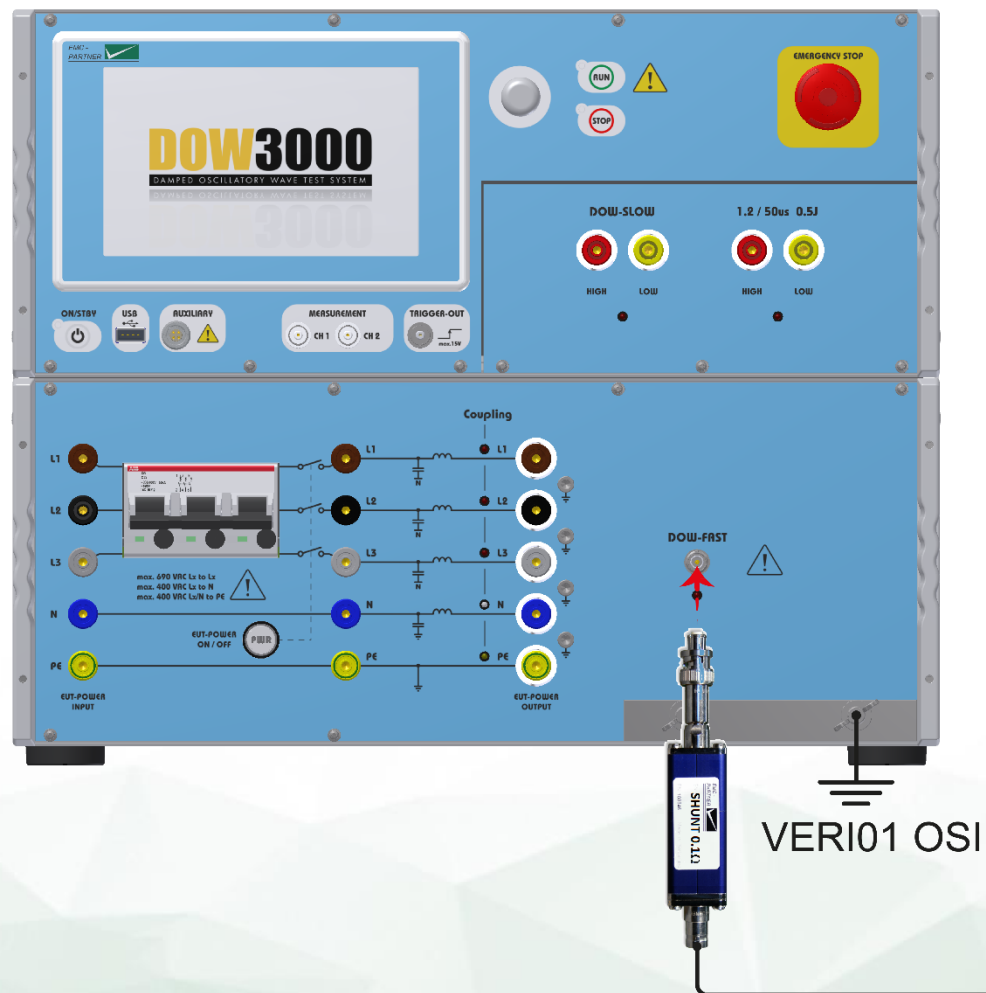
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## Fast DOW current calibration setup

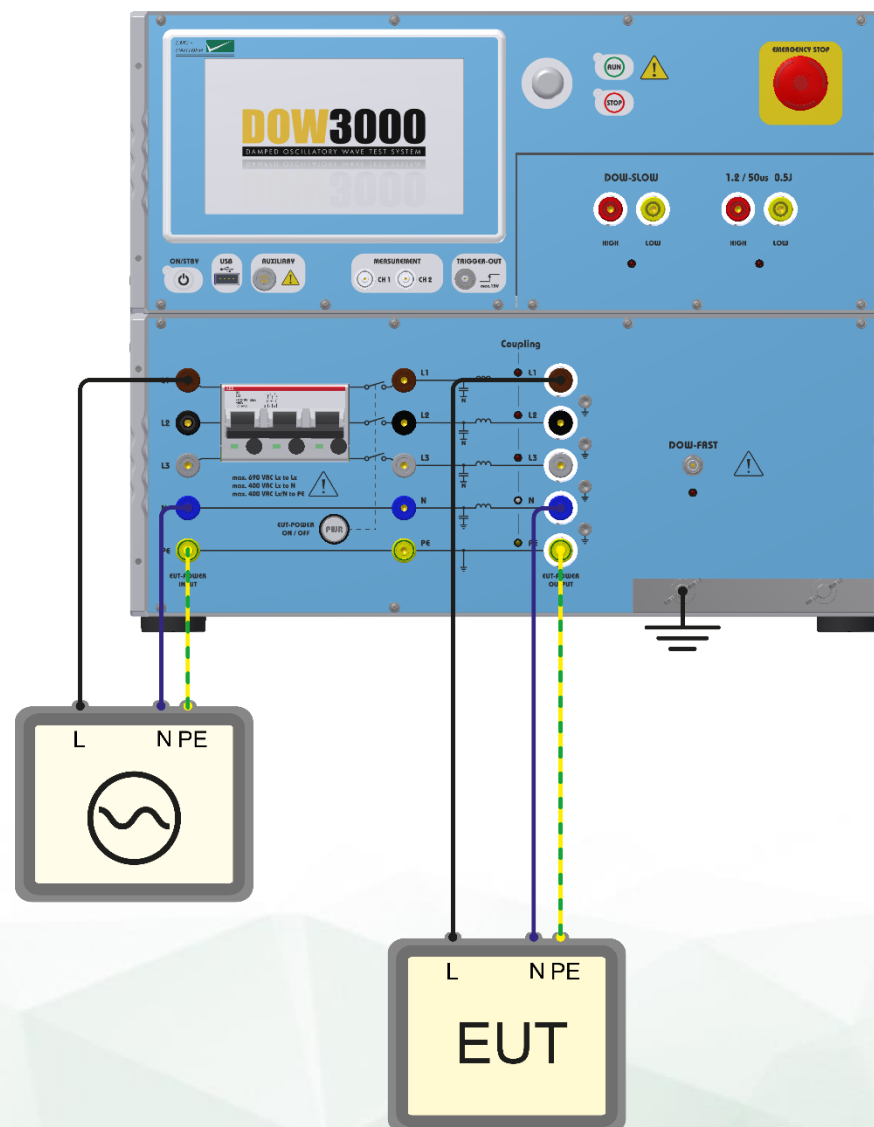
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## Fast DOW test setup one phase EUT

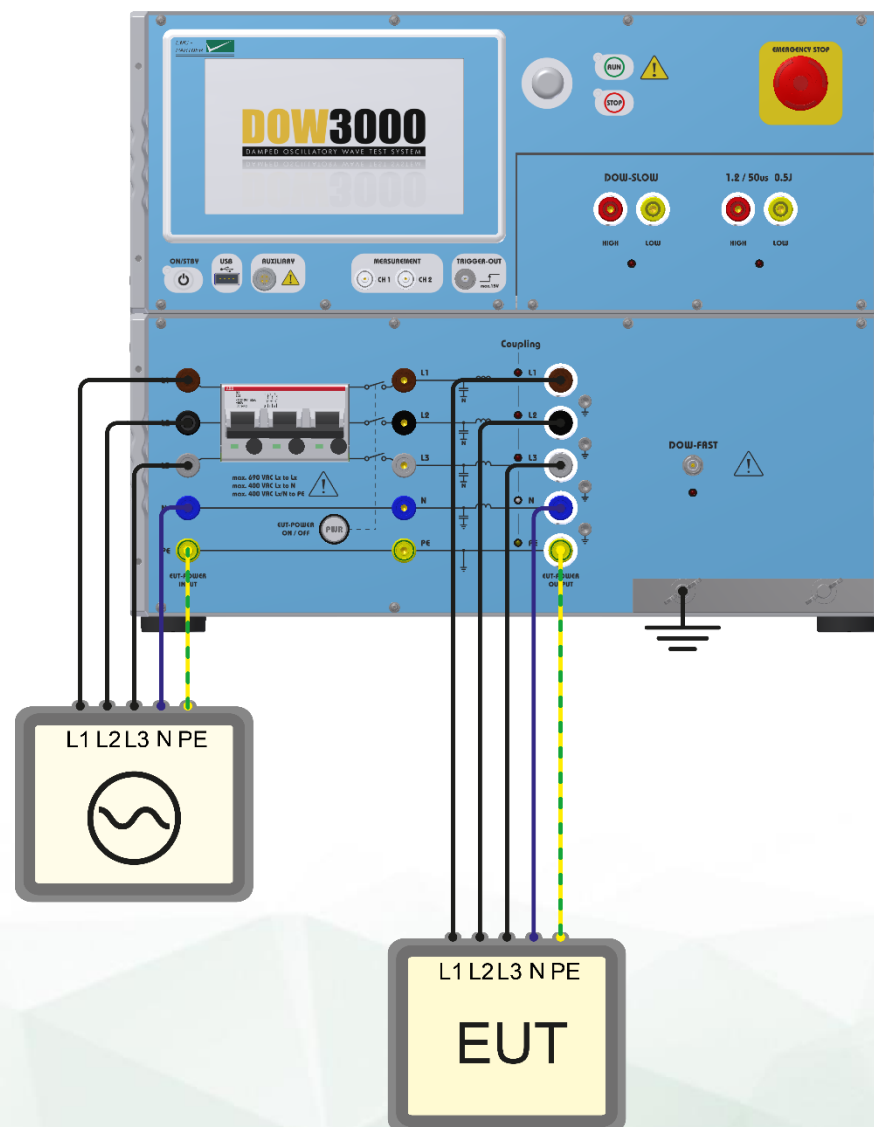
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## Fast DOW test setup three phase EUT

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**Thank you !**



Contact us worldwide: [www.emc-partner.com](http://www.emc-partner.com)