DIGITAL CLAMP METER SERIES 300xx

CleanTech

FEATURES

The current clamps of the 300xx series are especially known for their compact dimensions and the highest safety category CAT IV 1000V.

As the latest addition to the HDT CleanTec family for electricians, they perform the most reliable work every single day.

TECHNICAL DATA

Model	30011	30012	30020	30021	30030	30031
LCD	7 Segment, 4 digit display, APO, Continuity, Diode, Battery status, Polarity, AC/DC, Hold, Min/Max, Measuring unit	7 Segment, 4 digit display, APO, Continuity, Diode, Battery status, Polarity, AC/DC, Hold, Min/Max, Zero, Measuring unit	7 Segment, 4 digit display, NCV, APO, LPF, Continuity, Diode, Battery status, Polarity, AC/DC, Hold, Min/Max, Zero, Inrush, Measuring unit	7 Segment, 4 digit display, NCV, APO, LPF, Continuity, Diode, Battery status, Polarity, AC/DC, Hold, Min/Max, Zero, Inrush, BlueTooth, Measuring unit	7 Segment, 4 digit display, NCV, APO, LPF, Continuity, Diode, Battery status, Polarity, AC/DC, Hold, Min/Max, Zero, Measuring unit	7 Segment, 4 digit display, NCV, APO, LPF, Continuity, Diode, Battery status, Polarity, AC/DC, Hold, Min/Max, Zero, Inrush, BlueTooth, Measuring unit
Backlight	no		yes			
LED	no		Torch light, NCV			
Voltage Measurement	1 mV .... 1000 V AC, 1 mV .... 1500 V DC		1 mV .... 1000 V AC TRMS, 1 mV .... 1500 V DC			
Current measurement	Clamp: 0.1 .... 400 A AC	Clamp: 0.1 .... 400 A AC, 0.01 ..... 400 A DC	Clamp: 0.1 .... 400 A AC TRMS, 0.01 ..... 400 A DC Jack: 0.1 uA ….. 400 uA AC TRMS, DC		Clamp: 0.1 .... 1000 A AC TRMS, 0.01 ..... 1000 A DC Jack: 0.1 uA ….. 400 uA AC TRMS, DC	
Resistance	0 .... 40 MOhm					
Capacitance	10 nF .... 100 uF					
Continuity	< 30 R buzzer sound					
Diode	0 .... 1.5 V					
Frequency	up to 10 MHz					
Jaw opening	35 mm					
Leads connectors distance	25 mm					
TRMS	no		yes			
Power supply	2 x 1.5 V AAA					
NCV	no		yes			
Inrush Current - Jaw	no			yes	no	yes
LPF	no		yes, 1 KHz / -3 dB			
Torch Light	no		yes			
Auto-Power-Off	yes					
Self Test	yes					
Bluetooth	no			yes, 5.0	no	yes, 5.0
Overvoltage category	CAT III / 1000 V		CAT IV / 1000 V			
In complicance with	IEC 61010-1, IEC 61010-2-032					
Dimension	approx. 220 x 81 x 43 mm				approx. 255 x 81 x 43 mm	
Weight	approx. 260 g (without batteries)				approx. 300 g (without batteries)	

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DIGITAL CLAMP METER 30011/30012

FEATURES

- Current measurement AC up to 400A (30011), AC/DC up to 400 A (30012)
- Voltage measurement AC/DC, up to 1500 V DC
- Resistance measurement
- Capacity measurement
- Frequency measurement
- Diode test and continuity
- Auto-power off, self test
- Measurement category CAT III / 1000 V

Professional Clamp Meter for AC and DC – all what the electrician needs

SCOPE OF SUPPLY

1 pc. HDT 30011 or 30012
2 pcs. Test leads
2 pcs. Batteries 1,5 V / AAA
1 pc. Instruction manual

TECHNICAL DATA

Model	30011	30012
LCD	7 Segment, 4 digit display, APO, Continuity, Diode, Battery status, Polarity, AC/DC, Hold, Min/Max, Measuring unit	7 Segment, 4 digit display, APO, Continuity, Diode, Battery status, Polarity, AC/DC, Hold, Min/Max, Zero, Measuring unit
Voltage Measurement	1 mV .... 1000 V AC, 1 mV .... 1500 V DC	
Current measurement	Clamp: 0.1 .... 400 A AC	Clamp: 0.1 .... 400 A AC, 0.01 ..... 400 A DC
Resistance	0 .... 40 MOhm	
Capacitance	10 nF .... 100 uF	
Continuity	< 30 R buzzer sound	
Diode test	0 .... 1.5 V	
Frequency	up to 10 MHz	
Jaw opening	35 mm	
Leads connectors distance	25 mm	
Power supply	2 x 1.5 V AAA	
Auto-Power-Off	yes	
Self Test	yes	
Overvoltage category	CAT III / 1000 V	
In complicance with	IEC 61010-1, IEC 61010-2-032	
Dimension	approx. 220 x 81 x 43 mm	
Weight	approx. 260 g (without batteries)	

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DIGITAL CLAMP METER 30020/30021

Professional BT-Clamp Meter für Cleantec-Applications with highest safety category for AC and DC – the tool for PV and Industry

FEATURES

- Current measurement AC/DC, up to 400 A
- µA measurement AC/DC for HVAC
- Inrush current measurement (only 30021)
- Voltage measurement AC/DC, up to 1500VDC
- Highest safety CAT IV / 1000 V; CAT III / 1500 V
- TRMS
- Resistance, Capacity and Frequency measurement
- Diode test and continuity
- NCV
- LPF
- Torch light, LCD with backlight
- Auto-power off, self test

TECHNICAL DATA

Model	30020	30021
LCD	7 Segment, 4 digit display, NCV, APO, LPF, Continuity, Diode, Battery status, Polarity, AC/DC, Hold, Min/Max, Zero, Measuring unit	7 Segment, 4 digit display, NCV, APO, LPF, Continuity, Diode, Battery status, Polarity, AC/DC, Hold, Min/Max, Zero, Inrush, BlueTooth, Measuring unit
Backlight	yes	
LED	Torch light, NCV	
Voltage Measurement	1 mV .... 1000 V AC TRMS, 1 mV .... 1500 V DC	
Current measurement	Clamp: 0.1 .... 400 A AC TRMS, 0.01 ..... 400 A DC Jack: 0.1 uA ..... 400 uA AC TRMS, DC	
Resistance	0 .... 40 MOhm	
Capacitance	10 nF .... 100 uF	
Continuity	< 30 R buzzer sound	
Diode test	0 .... 1.5 V	
Frequency	up to 10 MHz	
Jaw opening	35 mm	
Leads connectors distance	25 mm	
TRMS	yes	
Power supply	2 x 1.5 V AAA	
NCV	ja	
Inrush Current - Jaw	no	yes
LPF	yes, 1 KHz / -3 dB	
Torch Light	yes	
Auto-Power-Off	yes	
Self Test	yes	
Bluetooth	no	yes, 5.0
Overvoltage category	CAT IV / 1000 V	
In complicance with	IEC 61010-1, IEC 61010-2-032	
Dimension	approx. 220 x 81 x 43 mm	
Weight	approx. 260 g (without batteries)	

SCOPE OF SUPPLY

1 pc. HDT 30020 or 30021
2 pcs. Test leads
2 pcs. Batteries 1,5 V / AAA
1 pc. Instruction manual

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DIGITAL CLAMP METER 30030/30031

Professional BT-Clamp Meter für Cleantec-Applications with highest safety category for AC and DC – the tool for PV and Industry

FEATURES

- Large teardrop shaped clamp to accomodate busbars
- Current measurement AC/DC, up to 1000 A
- µA measurement AC/DC for HVAC
- Inrush current measurement (only 30031)
- Voltage measurement AC/DC, up to 1500 V DC
- Highest safety CAT IV / 1000 V; CAT III / 1500 V
- TRMS
- Resistance, Capacity and Frequency measurement
- Diode test and continuity
- NCV
- LPF
- Torch light, LCD with backlight
- Auto-power off, self test

TECHNICAL DATA

Model	30030	30031
LCD	7 Segment, 4 digit display, NCV, APO, LPF, Continuity, Diode, Battery status, Polarity, AC/DC, Hold, Min/Max, Zero, Measuring unit	7 Segment, 4 digit display, NCV, APO, LPF, Continuity, Diode, Battery status, Polarity, AC/DC, Hold, Min/Max, Zero, Inrush, BlueTooth, Measuring unit
Backlight	yes	
LED	Torch light, NCV	
Voltage Measurement	1 mV...1000 V AC TRMS, 1 mV...1500 V DC	
Current measurement	Clamp: 0.1...1000 A AC TRMS, 0.01...1000 A DC Jack: 0.1 uA...400 uA AC TRMS, DC	
Resistance	0...40 MOhm	
Capacitance	10 nF...100 uF	
Continuity	< 30 R buzzer sound	
Diode test	0...1.5 V	
Frequency	up to 10 MHz	
Jaw opening	35 mm	
Leads connectors distance	25 mm	
TRMS	yes	
Power supply	2 x 1.5 V AAA	
NCV	ja	
Inrush Current - Jaw	no	yes
LPF	yes, 1 KHz / -3 dB	
Torch Light	yes	
Auto-Power-Off	yes	
Self Test	yes	
Bluetooth	no	yes, 5.0
Overvoltage category	CAT IV / 1000 V	
In complicance with	IEC 61010-1, IEC 61010-2-032	
Dimension	approx. 255 x 81 x 43 mm	
Weight	approx. 300 g (without batteries)	

SCOPE OF SUPPLY

1 pc. HDT 30030 or 30031
2 pcs. Test leads
2 pcs. Batteries 1,5 V / AAA
1 pc. Instruction manual

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WHAT IS THE CAT IV / 1000 V MEASUREMENT CATEGORY ALL ABOUT?

The measuring category specifies the permissible areas of application of measuring and testing devices for electrical equipment and installations (e.g. voltage testers, multimeters, VDE test devices) for use in the area of low-voltage power distribution. The classification of the measuring category is defined by IEC 61010-2-030 (Safety requirements for electrical equipment for measurement, control, and laboratory use - Part 2-030: Particular requirements for test and measurement circuits).

The measurement categories are similar or identical to the overvoltage categories in terms of values,[1] but are based on other standards and describe different circumstances.

The measurement category CAT II to IV is of particular importance for safety in measurements, since low-resistance circuits have higher short-circuit currents and overvoltage's and transients due to load switching, lightning strikes or phase errors. They must be withstood by the measuring device without endangering the user through electric shock, burns, mechanical hazards, fire, sparking, arcing or explosion.[2] Due to the low impedance of the public power supply network, the short-circuit currents are highest at the house infeed. Within the house installation, the maximum short-circuit currents are reduced by the series of resistances of the installation.

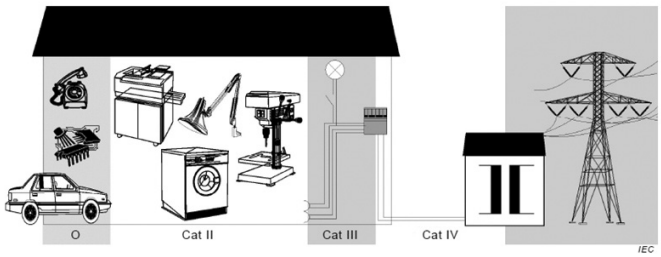
Technically, compliance with the category is achieved, among other things, through contact safety of plugs and sockets, insulation and stable flame-retardant housing, sufficient air and creepage distances, adequate conductor cross-sections and, in particular, a fuse with a high breaking capacity (typically 10 kA at nominal voltage).

The measurement category is marked on the measuring instruments with Roman numerals. If the indication is missing, the device may only be used for measurements "without category" (before category 1 (CAT I).

The following categories and intended uses are defined in IEC 61010-2-030:[3]

Without measurement category	Measurements on circuits that have no direct connection to the mains (battery operation), e.g. devices of protection class 3 (operation with safety extra-low voltage), battery-operated devices, 12...24 V car electrics.
CAT II	Measurements on circuits that have a direct connection to the low-voltage mains by means of a plug, e.g. household appliances, portable electrical appliances.
CAT III	Measurements within the building installation (stationary consumers with non-pluggable connection, distribution connection, permanently installed devices in the distribution board), e.g. sub-distribution.
CAT IV	Measurements at the source of the low-voltage installation (meter, main connection, primary overcurrent protection), e.g. meter, low-voltage overhead line, house connection box.

Source: https://de.wikipedia.org/wiki/Messkategorie, translated into English 15.12.2021



Key
0 Measuring circuits without a MEASUREMENT CATEGORY
CAT II MEASUREMENT CATEGORY II CAT III MEASUREMENT CATEGORY III
CAT IV MEASUREMENT CATEGORY IV

Figure AA.1 - Example to identify the locations of measuring circuits
Source: Standard 61010-2-030 as examples for the CAT rating, e-cars are still missing here.

The overvoltage categories were adapted in 2020 with the last update of standard 61010-2-033. Since then, there have been categories above 1000 V. The ranges 1000 V - 1500 V, 1500 V - 2000 V and 2000 V - 3000 V were added.

Table K. 101 - Clearances of measuring circuits rated for measurement categories III and IV

Nominal a.c. r.m.s. line-to-neutral or d.c. voltage of MAINS being measured V	CLEARANCE mm			
	BASIC INSULATION AND SUPPLEMENTARY INSULATION		REINFORCED INSULATION	
	MEASUREMENT CATEGORY III	MEASUREMENT CATEGORY IV	MEASUREMENT CATEGORY III	MEASUREMENT CATEGORY III
≤ 300	3,0	5,5	6	10,4
> 300 ≤ 600	5,5	8	10,4	15
> 600 ≤1.000	8	14	15	23,9
> 1.000 ≤1.500	11	18	22	36
> 1.500 ≤2.000	18	22	36	44
> 2.000 ≤3.000	22	25	44	50

Table 102 - Impulse voltages

Nominal a.c. r.m.s. line-to-neutral or d.c. voltage of MAINS being measured V	IMPULSE VOLTAGE V peak	
	MEASUREMENT CATEGORY III	MEASUREMENT CATEGORY IV
≤ 300	4.000	6.000
> 300 ≤ 600	6.000	8.000
> 600 ≤1.000	8.000	12.000
> 1.000 ≤1.500	10.000	15.000
> 1.500 ≤2.000	15.000	18.000
> 2.000 ≤3.000	18.000	20.000
Values over 1.000 V are from IEC TS 62993:2017, Table 1.		

Source: IEC 61010-2-033 standard (Particular requirements for hand-held multimeters and other hand-held measuring instruments for household and professional use, suitable for measuring mains voltages).

The HDT measuring instruments of the protection category CAT IV / 1000 V are designed to measure in a CAT IV environment up to 1000 V AC and DC.

For example, the HDT current clamps 30020 and 30021 measure DC voltage up to 1500 V. Up to 1500 V can be measured in a CAT III environment. The clearances, creepage distances and pulse strength requirements for CAT III / 1500 V are listed in the 2 standards tables above. Both are lower than for CAT IV / 1000 V.

Solar panels are seen as a CAT III environment, the protection category for e-cars is not yet defined but will most probably be CAT III because of the short-circuit currents.