EMC PARTNER

User Manual

CDN-A / CDN-M / CDN-F Series

- CDN-M-6-32 / CDN-M-8-32
- CDN-A-6-32 / CDN-A-8-32
- CDN-A-6-63 / CDN-A-8-63
- CDN-A-6-125 / CDN-A-8-125
- CDN-A-6-200 / CDN-A-8-200
- CDN-F-125
- PROTxx-yyAC
- PROTxx-yyDC
- DC-DCxx

This user manual provides additional information to assist correct use of the equipment listed above when used as part of the IMU3000 / IMU4000 test system. It is to be read in conjunction with the IMU3000 / IMU4000 system user manual and does not replace this manual in whole or in part.

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Typographical Conventions

Warnings
Safety notices that must be heeded are indicated with this warning triangle.

Additional Advice
Throughout the user manual very important or helpful advice is indicated with this symbol.

The Small Print

All products from EMC PARTNER, where appropriate, fulfil the requirements for CE and UKCA certification. A copy of the individual certificates can be viewed and downloaded from www.emc-partner.com section company documents.

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Technical Data 4.65

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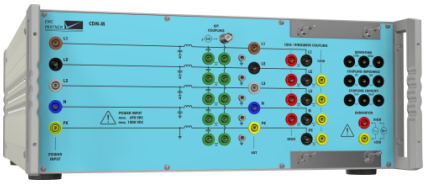
1 System overview

1.1 CDN-M-6-32 / CDN-M-8-32

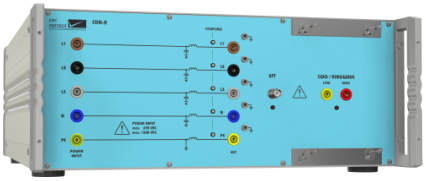


Manual 3 phase CDN to be used together with EMC PARTNER generator IMU3000 or IMU4000 and a maximal pulse level of 6kV (CDN-M-6-32) or 8kV (CDN-M-8-32).
The basic version allows to superpose Surge and EFT pulses in accordance with latest editions of IEC 61000-4-4 and IEC 61000-4-5 on power lines up to 690Vac and 500Vdc. The basic functionality can be extended with several options:

OPT-M-6-32 RWG / OPT-M-8-32 RWG
extends capability of CDN for Ring Wave Tests according 61000-4-12

OPT-M-6-32 1000V DC / OPT-M-8-32 1000V DC
extends DC voltage capability from 500 V to 1000 V DC

1.2 CDN-A-6-32 / CDN-A-8-32



Automatic 3 phase CDN to be used together with EMC PARTNER generator IMU3000 or IMU4000 and a maximal pulse level of 6kV (CDN-A-6-32) or 8kV (CDN-A-8-32).
The basic version allows to superpose Surge and EFT pulses in accordance with latest editions of IEC 61000-4-4 and IEC 61000-4-5 on power lines up to 690Vac and 500Vdc. The basic functionality can be extended with several options:

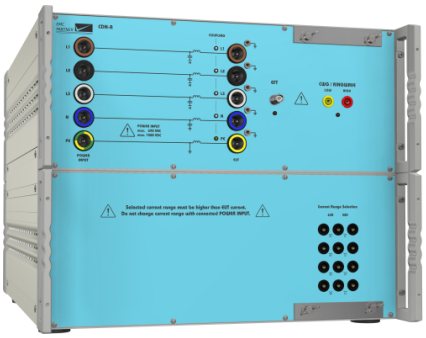
OPT-A-6-32 RWG / OPT-A-8-32 RWG
extends capability of CDN for Ring Wave Tests according IEC 61000-4-12

OPT-A-6-32 ANSI / OPT-A-8-32 ANSI
extends capability of CDN for ANSI couplings

OPT-A-6-32 1000V DC / OPT-A-8-32 1000V DC
extends DC voltage capability from 500 V to 1000 V DC

OPT-A-6-32 1500V DC / OPT-A-8-32 1500V DC
extends DC voltage capability from 500 V to 1500 V DC

1.3 CDN-A-6-63 / CDN-A-8-63



Automatic 3 phase CDN to be used together with EMC PARTNER generator IMU3000 or IMU4000 and a maximal pulse level of 6kV (CDN-A-6-63) or 8kV (CDN-A-8-63).
The basic version allows to superpose Surge and EFT pulses in accordance with latest editions of IEC 61000-4-4 and IEC 61000-4-5 on power lines up to 690Vac and 500Vdc. The basic functionality can be extended with several options:

OPT-A-6-63 RWG / OPT-A-8-63 RWG
extends capability of CDN for Ring Wave Tests according IEC 61000-4-12

OPT-A-6-63 ANSI / OPT-A-8-63 ANSI
extends capability of CDN for ANSI couplings

OPT-A-6-63 FULL RANGE / OPT-A-8-63 FULL RANGE
ensure that surge waveform can be applied also when testing EUTs in current range 0-32 A

OPT-A-6-63 1000V DC / OPT-A-8-63 1000V DC
extends DC voltage capability from 500 V to 1000 V DC

OPT-A-6-63 1500V DC / OPT-A-8-63 1500V DC
extends DC voltage capability from 500 V to 1500 V DC

1.4 CDN-A-6-125 / CDN-A-8-125

Automatic 3 phase CDN to be used together with EMC PARTNER generator IMU3000 or IMU4000 and a maximal pulse level of 6kV (CDN-A-6-125) or 8kV (CDN-A-8-125).
The basic version allows to superpose Surge and EFT pulses in accordance with latest editions of IEC 61000-4-4 and IEC 61000-4-5 on power lines up to 690Vac and 500Vdc. The basic functionality can be extended with several options:

OPT-A-6-125 RWG / OPT-A-8-125 RWG
extends capability of CDN for Ring Wave Tests according IEC 61000-4-12

OPT-A-6-125 ANSI / OPT-A-8-125 ANSI
extends capability of CDN for ANSI couplings

OPT-A-6-125 FULL RANGE / OPT-A-8-125 FULL RANGE
ensure that surge waveform can be applied also when testing EUTs in current range 0-32 A and 32-63 A

OPT-A-6-125 1000V DC / OPT-A-8-125 1000V DC
extends DC voltage capability from 500 V to 1000 V DC

OPT-A-6-125 1500V DC / OPT-A-8-125 1500V DC
extends DC voltage capability from 500 V to 1500 V DC

1.5 CDN-A-6-200 / CDN-A-8-200

Automatic 3 phase CDN to be used together with EMC PARTNER generator IMU3000 or IMU4000 and a maximal pulse level of 6kV (CDN-A-6-200) or 8kV (CDN-A-8-200). The basic version allows to superpose Surge and EFT pulses in accordance with latest editions of IEC 61000-4-4 and IEC 61000-4-5 on power lines up to 690Vac and 500Vdc. The basic functionality can be extended with several options:

OPT-A-6-200 RWG / OPT-A-8-200 RWG
extends capability of CDN for Ring Wave Tests according IEC 61000-4-12

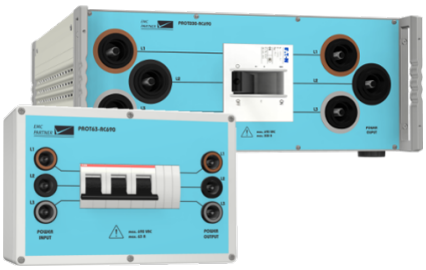
OPT-A-6-200 ANSI / OPT-A-8-200 ANSI
extends capability of CDN for ANSI couplings

OPT-A-6-200 FULL RANGE / OPT-A-8-200 FULL RANGE
ensure that surge waveform can be applied also when testing EUTs in current range 0-32 A, 32-63 A and 63-125 A

OPT-A-6-200 1000V DC / OPT-A-8-200 1000V DC
extends DC voltage capability from 500 V to 1000 V DC

OPT-A-6-200 1500V DC / OPT-A-8-200 1500V DC
extends DC voltage capability from 500 V to 1500 V DC

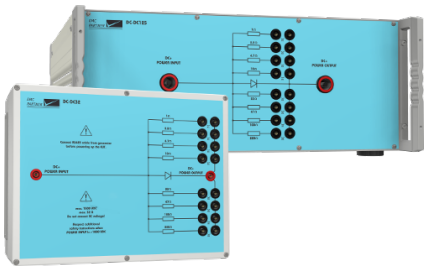
1.6 PROTxx-690AC / PROTxx-yyyDC



External Line Protection to protect the EUT against over-current. The protection is available for different current and voltage ratings.

- PROT32-690AC for 3-phase 32A and 690Vac
- PROT32-500DC for 32A and 500Vdc
- PROT32-1000DC for 32A and 1000Vdc
- PROT32-1500DC for 32A and 1500Vdc
- PROT63-690AC for 3-phase 63A and 690Vac
- PROT63-500DC for 63A and 500Vdc
- PROT63-1000DC for 63A and 1000Vdc
- PROT63-1500DC for 63A and 1500Vdc
- PROT125-690AC for 3-phase 125A and 690Vac
- PROT125-500DC for 125A and 500Vdc
- PROT125-1000DC for 125A and 1000Vdc
- PROT125-1500DC for 125A and 1500Vdc
- PROT200-690AC for 3-phase 200A and 690Vac
- PROT200-500DC for 200A and 500Vdc

1.7 DC-DCxx



DC-DCxx is an optional damping circuit, consisting of a high performance diode and selectable resistors. DC-DCxx is designed to reduce oscillation in DC circuits when powering on EUT through a standard surge CDN conforming to IEC 61000-4-5. Four versions of the DC-DCxx are available for different current ranges.

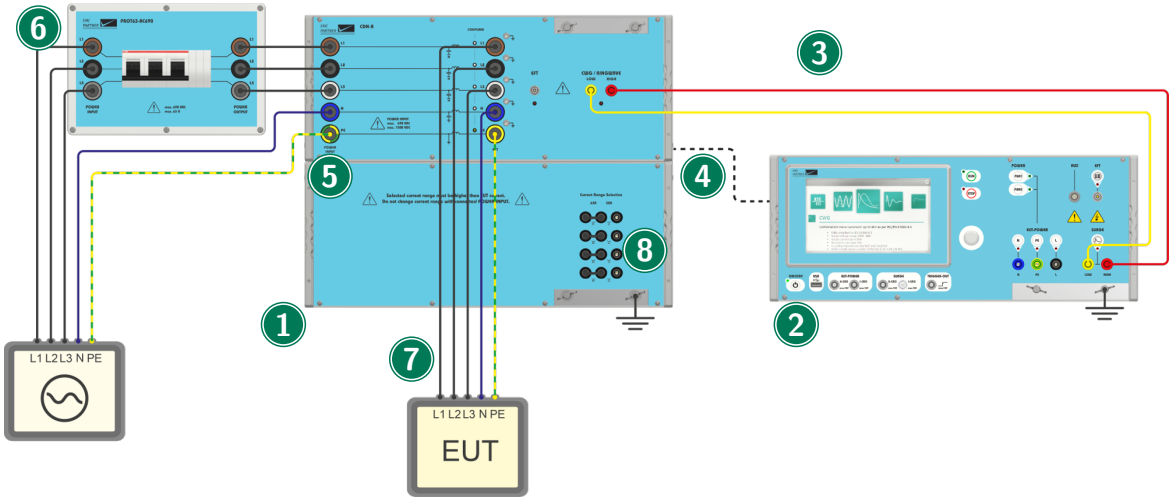
- DC-DC32 for up to 32A continuous current
- DC-DC63 for up to 63A continuous current
- DC-DC125 for up to 125A continuous current
- DC-DC200 for up to 200A continuous current

2 Perform a test

Additional information for calibration is also available in the calibration report.

2.1 CDN-A AC-Setup

The displayed test setup is CDN-A-8-63 with an IMU4000. The connections for test setups with different CDNs and / or an IMU3000 as generator are similar.



1 CDN-A

Connect the CDN to the public power mains. For the CDN-A-x-125 and CDN-A-x-200 is the connector on the front. All other have it on the backside. The CDN is activated by the IMU generator.

2 Generator

The CDN can be used together with EMC PARTNER generators for EFT, CWG and Ringwave in order to superpose pulses on power lines.

- IMU4000 (EFT and CWG)
- IMU3000 (EFT, CWG and Ringwave)

In the generator menu, select CDN-A as coupling device. For additional information, refer to the user manual of the IMU generator.

3 Impulse connection

Connect the output of the generator to the input of the CDN. Use only the supplied cables.

- EFT: 1m HV-BNC cable
- CWG / Ringwave: 1m low impedance twisted pair cable

4 Control connection

On the back, connect the RS485 control from the generator to the CDN. Use only the supplied cable.

5 Power Input

Line, Neutral and Earth is connected directly to the CDN if no external fuse is used. For a 3-phase system, L1, L2 and L3 is used. For a 1-phase system, only L1 is used.

High earth leakage currents
Due to the filter capacitors in the CDN and the coupling capacitor in the generator, an earth leakage current can flow. Earth leakage breakers in the public supply main should be deactivated or an insulating transformer used.

6 Fuses

An optional fuse can be connected between the EUT power supply and the power input of the CDN. Neutral and Earth is always connected directly to the CDN.

The current rating of the fuse must always be equal or lower than the current rating of the CDN. If the CDN has a selectable current range, the current rating of the fuse must be equal or lower than the selected current rating.

The housing of PROT200-690AC must be connected to protective earth on the back. This is not required for lower current circuit breaker due to the isolated housing.

7 Equipment under test (EUT)

Connect the EUT to the output of the CDN.

8 Current Range Selection

If the CDN has the FULL RANGE option, the current range can be selected according to the requirement of the EUT. Depending on the nominal current rating of the CDN, the following ranges are available

- 125-200 A, 63-125 A, 32-63 A and 0-32 A for CDN-A-x-200
- 63-125 A, 32-63 A and 0-32 A for CDN-A-x-125
- 32-63 A and 0-32 A for CDN-A-x-63

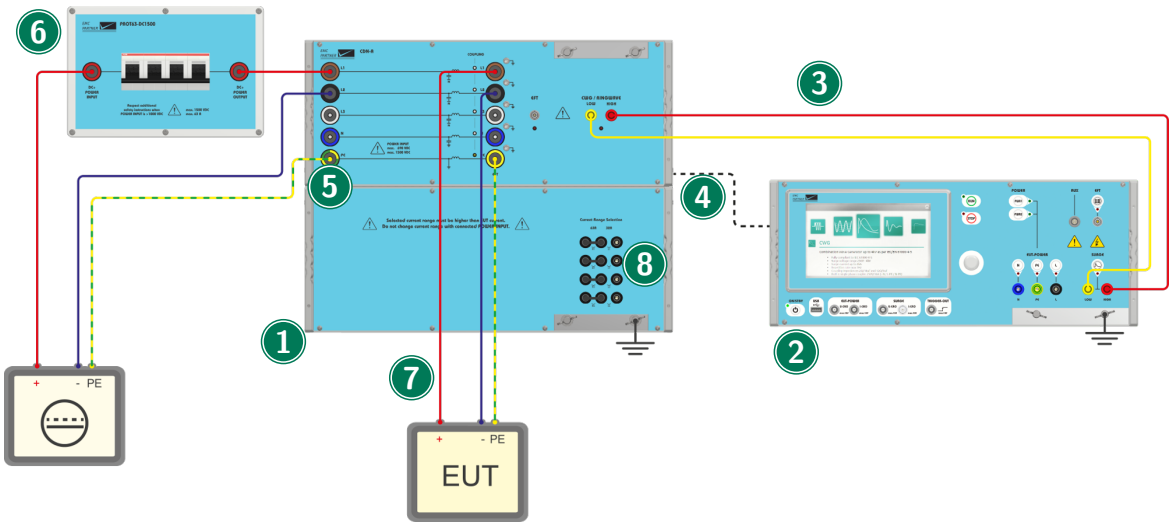
All Bridges must be plugged in for the same current range.

A lower current range results in a higher line impedance for decoupling. This will have an impact to the duration of the waveform.

Never exceed the current of the selected range. The fuse must be lower or equal than the selected range!

2.2 CDN-A DC-Setup

The displayed test setup is CDN-A-8-63 with an IMU4000. The connections for test setups with different CDNs and / or an IMU3000 as generator are similar.



1 CDN-A instrument Power

Connect the CDN to the public power mains. For the CDN-A-x-125 and CDN-A-x-200 is the connector on the front. All other have it on the backside. The CDN is activated by the IMU generator.

2 Generator

The CDN can be used together with EMC PARTNER generators for EFT, CWG and Ringwave in order to superpose pulses on power lines.

- IMU4000 (EFT and CWG)
- IMU3000 (EFT, CWG and Ringwave)

In the generator menu, select CDN-A as coupling device. For additional information, refer to the user manual of the IMU generator.

3 Impulse connection

Connect the output of the generator to the input of the CDN. Use only the supplied cables.

- EFT: 1m HV-BNC cable
- CWG / Ringwave: 1m low impedance twisted pair cable

4 Control connection

On the back, connect the RS485 control from the generator to the CDN. Use only the supplied cable.

5 Power Input

DC+ and DC- is connected directly to the CDN if no external fuse is used. Up to 2 DC Strings can be connected to the CDN.

- String 1: DC+ to L1, DC- to L2
- String 2: DC+ to L3, DC- to N

The 2 strings can be connected in parallel. This will double the current range of the CDN. Monitor the current in each string permanently to ensure, that the maximum current rating of a single string is never exceeded.

Additional Safety requirements
When the EUT power is higher than 1000Vdc, the following safety advices must be obtained.

- An additional safety barrier must be around the EUT and CDN
- Do not touch any cables

6 Fuses

An optional fuse can be connected between the EUT power supply and the power input of the CDN. DC- is always connected directly to the CDN.

The current rating of the fuse must always be equal or lower than the current rating of the CDN. If the CDN has a selectable current range, the current rating of the fuse must be equal or lower than the selected current rating.

7 Equipment under test (EUT)

Connect the EUT to the output of the CDN.

8 Current Range Selection

If the CDN has the FULL RANGE option, the current range can be selected according to the requirement of the EUT. Depending on the nominal current rating of the CDN, the following ranges are available

- 125-200 A, 63-125 A, 32-63 A and 0-32 A for CDN-A-x-200
- 63-125 A, 32-63 A and 0-32 A for CDN-A-x-125
- 32-63 A and 0-32 A for CDN-A-x-63

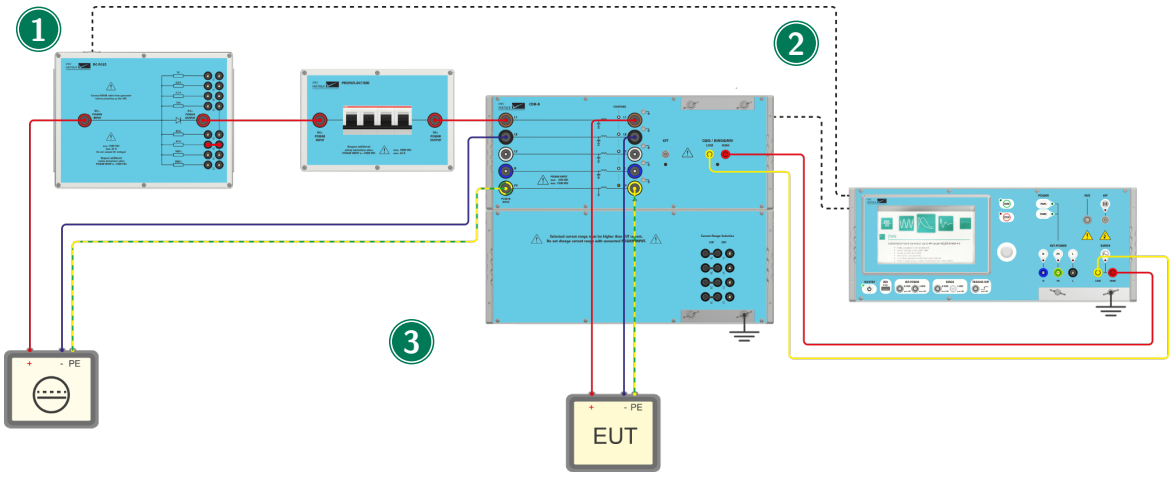
All Bridges must be plugged in for the same current range.

A lower current range results in a higher line impedance for decoupling. This will have an impact to the duration of the waveform.

Never exceed the current of the selected range. The fuse must be lower or equal than the selected range!

2.2.1 CDN-A DC-Setup with additional damping circuit

The displayed test setup is DC-DC63 with a PROT63 DC circuit breaker, CDN-A-8-63, and IMU4000. The connections for test setups with different damping circuits (DC-DC32, DC-DC63, DC-DC125, DC-DC200), different CDNs and/or an IMU3000 as generator are similar.



1 DC-DCxx

Connect the DC-DCxx in the DC+ string, between the DC power source and the CDN. In the example above, an addition external fuse is connected between the DC-DC63 and the CDN.

The optimal value of the damping resistor depends on the individual test setup, including the DC power source, the CDN, and the EUT. The DC-DCxx has a number of integrated standard resistance values which can be selected using an MC-bridge. The resistance value must be adjusted for each new test setup for optimal performance. Guidance for the selection of the resistance value can be found in the EMC PARTNER Whitepaper (Additional Information regarding IEC 61000-4-5:2014 / AMD1:2017).

2 Control connection

Connect the RS485 control from the generator rear panel to the DC-DCxx. Use only the supplied cable.

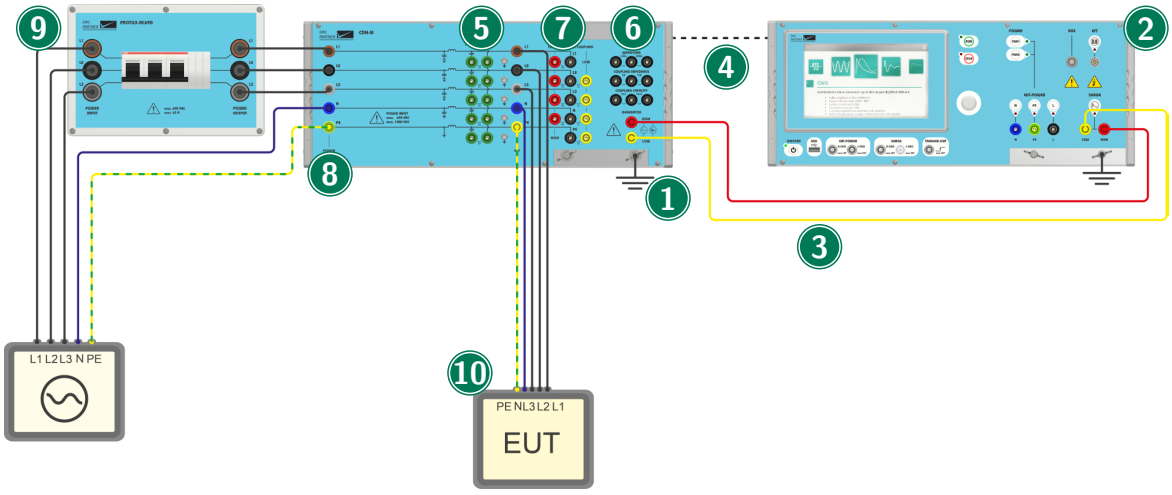
The RS485 connector is used to power the internal ventilation via a 24 V connection. Without this connection the fans do not operate and the device could overheat and be damaged as a consequence. The DC-DC125 and DC-DC200 need an additional connection to the public power mains.

3 Common DC Setup

Beside the DC-DCxx, the setup is similar to the basic DC setup.

2.3 CDN-M AC-Setup

The displayed test setup is CDN-M-8-32 with an IMU4000. The connections for test setups with an IMU3000 as generator is similar.



1 CDN-M

Connect the CDN-M to the protective earth.

2 Generator

The CDN can be used together with EMC PARTNER generators for EFT, CWG and Ringwave in order to superpose pulses on power lines.

- IMU4000 (EFT and CWG)
- IMU3000 (EFT, CWG and Ringwave)

In the generator menu, select CDN-M as coupling device. For additional information, refer to the user manual of the IMU generator.

3 Impulse connection

Connect the output of the generator to the input of the CDN. Use only the supplied cables.

- EFT: 1m HV-BNC cable
- CWG / Ringwave: 1m low impedance twisted pair cable

4 Control connection

On the back, connect the RS485 control from the generator to the CDN. Use only the supplied cable.

5 EFT Coupling

Plug in the bridge E1 to E5 for the desired EFT coupling. For the default common mode coupling according IEC-61000-4-4, all 5 bridges must be plugged in.

During a CWG or Ringwave pulse, the EFT bridges must be removed!

6 Waveform selection

The first bridge is for the selection between CWG and Ringwave impulse. For CWG, the desired coupling impedance (2 or 12 Ohm) and coupling capacity (9 or 18 uF) can be selected in any combination. During Ringwave test, the selected coupling impedance and coupling capacity has no effect.

IEC61000-4-5 request 2 Ohm / 18 uF for Line-Line coupling and 12 Ohm / 9 uF for Line-PE coupling.

7 Surge Coupling

Plug in one single bridge for the desired high coupling (H1 - H4). With a second bridge, the low path for the coupling is selected (L2 - L5).

Danger of short circuit
Never plug in 2 bridges at the same time on the high side (H1 - H4) or low side (L2- L5).

8 Power Input

Line, Neutral and Earth is connected directly to the CDN if no external fuse is used. For a 3-phase system, L1, L2 and L3 is used. For a 1-phase system, only L1 is used.

High earth leakage currents
Due to the filter capacitors in the CDN and the coupling capacitor in the generator, an earth leakage current can flow. Earth leakage breakers in the public supply main should be deactivated or an insulating transformer used.

9 Fuses

An optional fuse can be connected between the EUT power supply and the power input of the CDN. Neutral and Earth is always connected directly to the CDN.

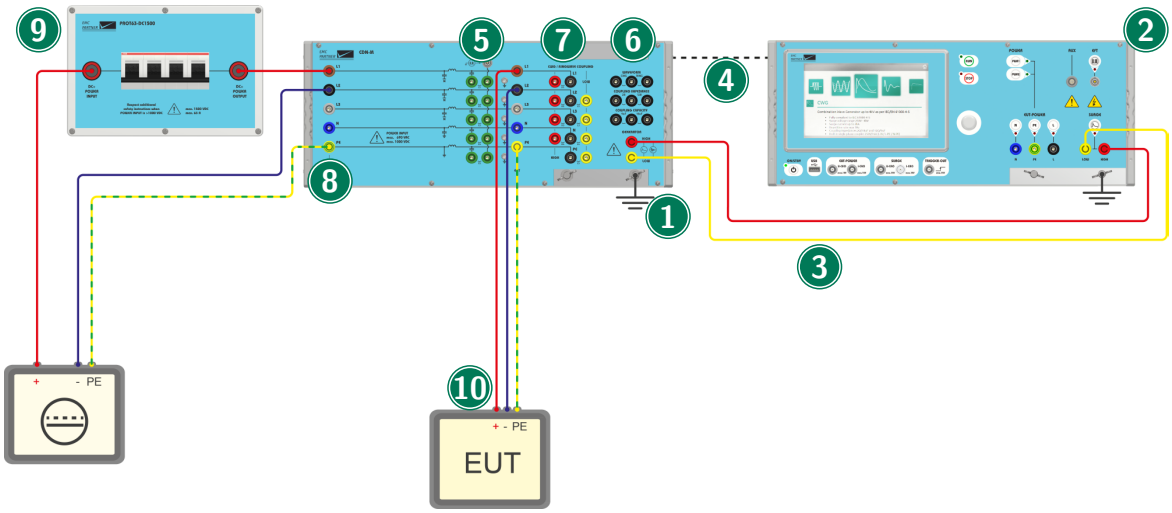
The current rating of the fuse must always be equal or lower than the current rating of the CDN.

10 Equipment under test (EUT)

Connect the EUT to the output of the CDN.

2.4 CDN-M DC-Setup

The displayed test setup is CDN-M-8-32 with an IMU4000. The connections for test setups with an IMU3000 as generator is similar.



1 CDN-M

Connect the CDN-M to the protective earth.

2 Generator

The CDN can be used together with EMC PARTNER generators for EFT, CWG and Ringwave in order to superpose pulses on power lines.

- IMU4000 (EFT and CWG)
- IMU3000 (EFT, CWG and Ringwave)

In the generator menu, select CDN-M as coupling device. For additional information, refer to the user manual of the IMU generator.

3 Impulse connection

Connect the output of the generator to the input of the CDN. Use only the supplied cables.

- EFT: 1m HV-BNC cable
- CWG / Ringwave: 1m low impedance twisted pair cable

4 Control connection

On the back, connect the RS485 control from the generator to the CDN. Use only the supplied cable.

5 EFT Coupling

Plug in the bridge E1 to E5 for the desired EFT coupling. For the default common mode coupling according IEC-61000-4-4, all 5 bridges must be plugged in.

During a CWG or Ringwave pulse, the EFT bridges must be removed!

6 Waveform selection

The first bridge is for the selection between CWG and Ringwave impulse. For CWG, the desired coupling impedance (2 or 12 Ohm) and coupling capacity (9 or 18 uF) can be selected in any combination. During Ringwave test, the selected coupling impedance and coupling capacity has no effect.

IEC61000-4-5 request 2 Ohm / 18 uF for Line-Line coupling and 12 Ohm / 9 uF for Line-PE coupling.

7 Surge Coupling

Plug in one single bridge for the desired high coupling (H1 - H4). With a second bridge, the low path for the coupling is selected (L2 - L5).

Danger of short circuit
Never plug in 2 bridges at the same time on the high side (H1 - H4) or low side (L2- L5).

8 Power Input

DC+ and DC- is connected directly to the CDN if no external fuse is used. Up to 2 DC Strings can be connected to the CDN.

- String 1: DC+ to L1, DC- to L2
- String 2: DC+ to L3, DC- to N

The 2 strings can be connected in parallel. This will double the current range of the CDN. Monitor the current in each string permanently to ensure, that the maximum current rating of a single string is never exceeded.

9 Fuses

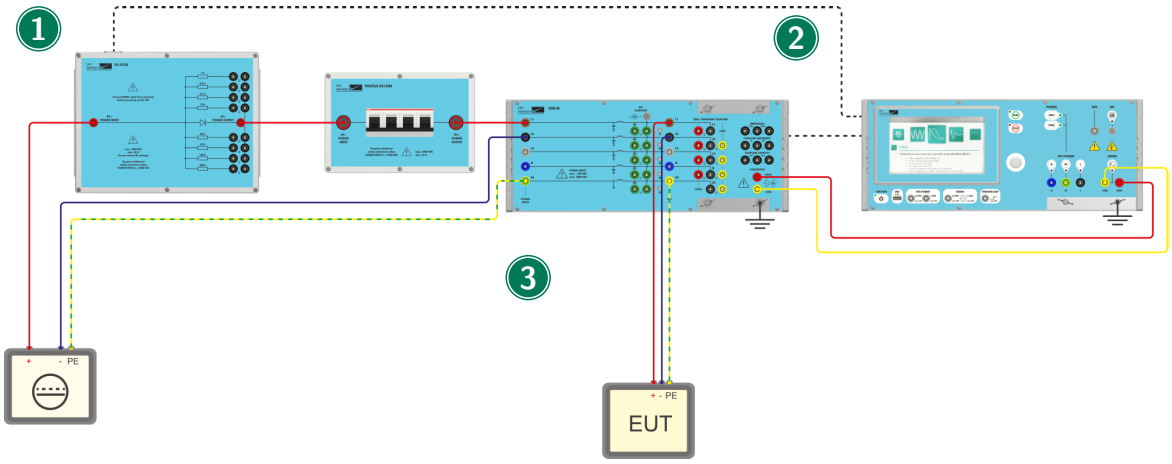
An optional fuse can be connected between the EUT power supply and the power input of the CDN. DC- is always connected directly to the CDN.

10 Equipment under test (EUT)

Connect the EUT to the output of the CDN.

2.4.1 CDN-M DC-Setup with additional damping circuit

The displayed test setup is DC-DC32 with a PROT32 DC circuit breaker, CDN-M-8-32, and IMU4000. The connections for test setups with an IMU3000 as generator are similar.



1 DC-DC32

Connect the DC-DC32 in the DC+ string, between the DC power source and the CDN. In the example above, an addition external fuse is connected between the DC-DC32 and the CDN.

The optimal value of the damping resistor depends on the individual test setup, including the DC power source, the CDN, and the EUT. The DC-DC32 has a number of integrated standard resistance values which can be selected using an MC-bridge. The resistance value must be adjusted for each new test setup for optimal performance. Guidance for the selection of the resistance value can be found in the EMC PARTNER Whitepaper (Additional Information regarding IEC 61000-4-5:2014 / AMD1:2017).

2 Control connection

Connect the RS485 control from the generator rear panel to the DC-DC32. Use only the supplied cable.

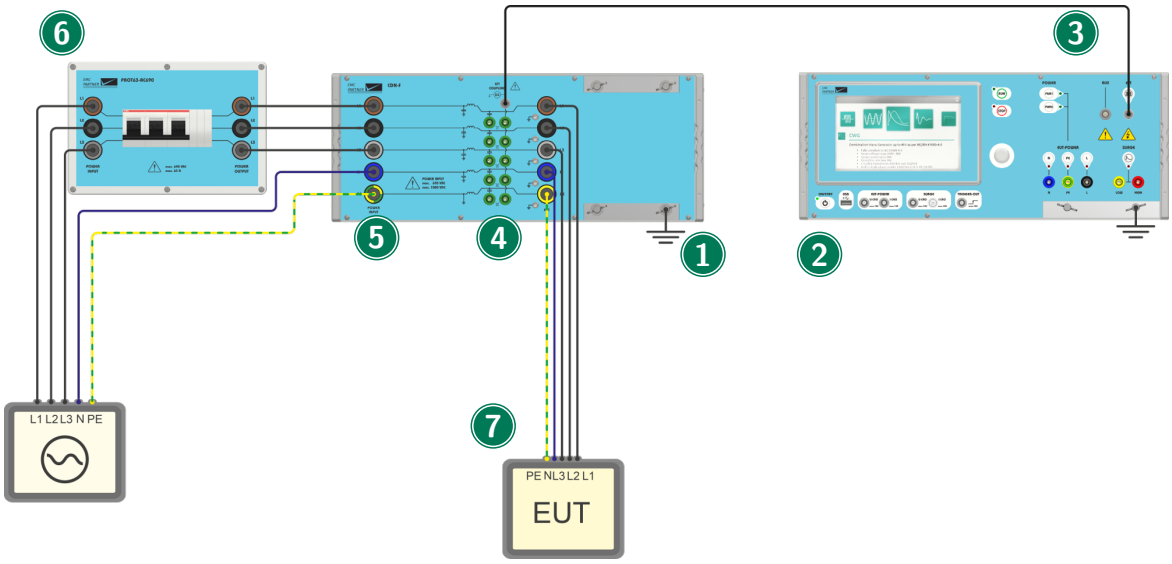
The RS485 connector is used to power the internal ventilation via a 24 V connection. Without this connection the fans do not operate and the device could overheat and be damaged as a consequence.

3 Common DC Setup

Beside the DC-DC32, the setup is similar to the basic DC setup.

2.5 CDN-F AC-Setup

The displayed test setup is CDN-F-125 with an IMU4000. The connections for test setups with an IMU3000 as generator is similar.



1 CDN-F

Connect the CDN-F to the protective earth.

2 Generator

The CDN can be used together with EMC PARTNER generators for EFT in order to superpose pulses on power lines.

- IMU4000
- IMU3000

In the generator menu, select CDN-F as coupling device. For additional information, refer to the user manual of the IMU generator.

3 Impulse connection

Connect the output of the generator to the input of the CDN. Use only the supplied 1m HV-BNC cable.

4 EFT Coupling

Plug in the bridge E1 to E5 for the desired EFT coupling. For the default common mode coupling according IEC-61000-4-4, all 5 bridges must be plugged in.

5 Power Input

Line, Neutral and Earth is connected directly to the CDN if no external fuse is used. For a 3-phase system, L1, L2 and L3 is used. For a 1-phase system, only L1 is used.

High earth leakage currents
Due to the filter capacitors in the CDN and the coupling capacitor in the generator, an earth leakage current can flow. Earth leakage breakers in the public supply main should be deactivated or an insulating transformer used.

6 Fuses

An optional fuse can be connected between the EUT power supply and the power input of the CDN. Neutral and Earth is always connected directly to the CDN.

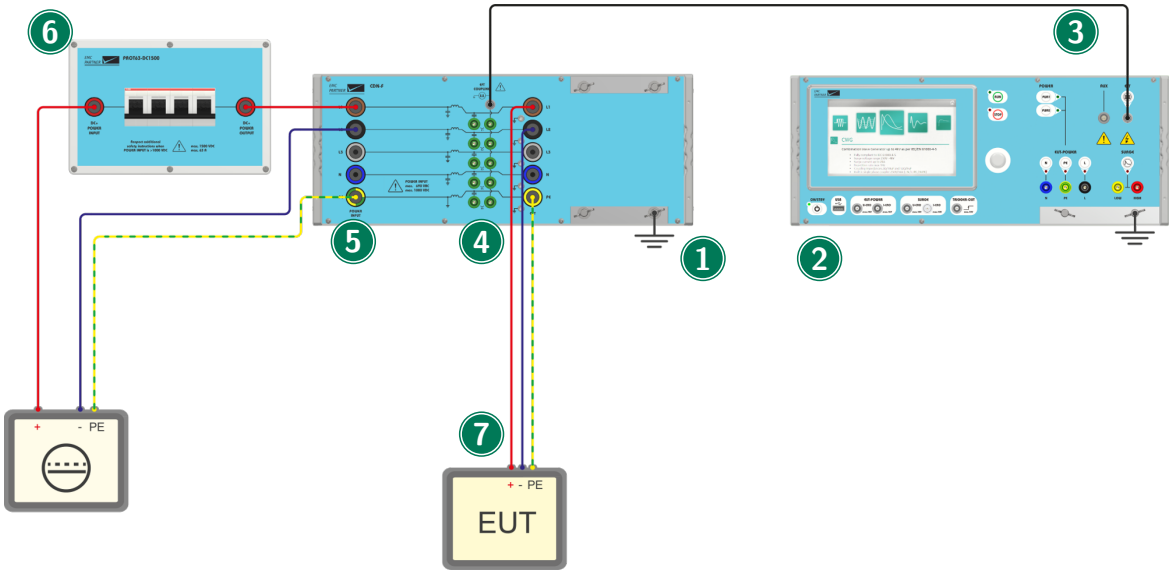
The current rating of the fuse must always be equal or lower than the current rating of the CDN.

7 Equipment under test (EUT)

Connect the EUT to the output of the CDN.

2.6 CDN-F DC-Setup

The displayed test setup is CDN-F-125 with an IMU4000. The connections for test setups with an IMU3000 as generator is similar.



1 CDN-F

Connect the CDN-F to the protective earth.

2 Generator

The CDN can be used together with EMC PARTNER generators for EFT in order to superpose pulses on power lines.

- IMU4000
- IMU3000

In the generator menu, select CDN-F as coupling device. For additional information, refer to the user manual of the IMU generator.

3 Impulse connection

Connect the output of the generator to the input of the CDN. Use only the supplied 1m HV-BNC cable.

4 EFT Coupling

Plug in the bridge E1 to E5 for the desired EFT coupling. For the default common mode coupling according IEC-61000-4-4, all 5 bridges must be plugged in.

5 Power Input

DC+ and DC- is connected directly to the CDN if no external fuse is used. Up to 2 DC Strings can be connected to the CDN.

- String 1: DC+ to L1, DC- to L2
- String 2: DC+ to L3, DC- to N

The 2 strings can be connected in parallel. This will double the current range of the CDN. Monitor the current in each string permanently to ensure, that the maximum current rating of a single string is never exceeded.

6 Fuses

An optional fuse can be connected between the EUT power supply and the power input of the CDN. DC- is always connected directly to the CDN.

7 Equipment under test (EUT)

Connect the EUT to the output of the CDN.

3 Technical Data

3.1 CDN-M-x-32

3.1.1 EUT

AC	
Lines	L1 / L2 / L3 / N / PE
Voltage [1]	
Line to Line	max. 690 V
Line to Neutral	max. 400 V
Line to Ground	max. 400 V
Current	3 x 32 A
Frequency	50 Hz / 60 Hz
DC	
Lines	String1+ / String1- String2+ / String2-
Voltage [2]	
Basic Version	max. 500 V
OPT-A-x-32 1000V DC	max. 1000 V
Current	max. 32 A

[1] The maximum ac-voltage is limited due to the hardware of the generator. IMU4000 with an older surge module (EXT-TRA3000 S and EXT-IMU4000 S with hardware version 1) limits the maximum voltage to 480V (Line-Line) and 300V (Line-PE). For EXT-IMU4000 S4, EXT-IMU4000 S5, IMU3000, IMU-MGS and IMU-MGE, there is no additional limitation.

[2] The maximum dc-voltage is limited due to the hardware of the generator. The surge module of IMU4000 (EXT-TRA3000 S, EXT-IMU4000 S) with hardware version 1 limits the maximum voltage for DC+ and DC- to 300Vdc against ground. For EXT-IMU4000 S4, EXT-IMU4000 S5 and IMU-MGS, there is no additional limitation. The measurement module of IMU3000 (Measurement) with hardware version 1 limits the maximum voltage for DC+ and DC- to 300Vdc against ground. Hardware version 2 allow a maximum dc-voltage of 1000V. The hardware version can be found in the General Menu > Generator > Extension. There is no additional limitation for IMU-MGE.

3.1.2 EFT

Standard	IEC 61000-4-4
Coupling	
AC	
calibrated	L1 / L2 / L3 / N / PE to Ground
selectable	individual combination
DC	
calibrated	String1+ / String1- / PE to Ground String2+ / String2- / PE to Ground
selectable	individual combination
Voltage into 50 Ohm	
Level calibrated	
CDN-M-6-32	500 V - 6 kV ±10 %
CDN-M-8-32	500 V - 8 kV ±10 %
Front Time	5.5 ns ±1.5 ns
Duration	45 ns ±15 ns
Residual Voltage	<5 % of applied test voltage

3.1.3 CWG

Standard	IEC 61000-4-5
Coupling	
AC	
Line to Line	L1-L2 L1-L3 L2-L3 Lx-N
Line to Ground	Lx-PE N-PE
DC	
Line to Line	String1+ - String1- String2+ - String2-
Line to Ground	String1+ - PE String1- - PE String2+ - PE String2- - PE
Impedance [3]	2 Ω/ 18 µF 12 Ω/ 9 µF 12 Ω/ 18 µF 2 Ω/ 9 µF
Open Circuit Voltage	
Level Line to Line	
CDN-M-6-32	250 V - 6 kV ±10 %
CDN-M-8-32	250 V - 7.6 kV ±10 %
Level Line to Ground	
CDN-M-6-32	250 V - 6 kV ±10 %
CDN-M-8-32	250 V - 8 kV ±10 %
Front Time	1.2 µs ±30 %
Duration	
Line to Line	50 µs +10 µs/-10 µs
Line to Ground	50 µs +10 µs/-25 µs
Residual Voltage	<12 % of applied test voltage
Level non-surged lines	<12 % of applied test voltage

[3] The impedance is freely selectable for all couplings. The calibration is performed according IEC 61000-4-5 with 2Ω/18µF for Line-Line and 12Ω/9µF for Line-PE.

Short Circuit Current	
Level Line to Line	
CDN-M-6-32	125 A - 3 kA ±10 %
CDN-M-8-32	125 A - 3.8 kA ±10 %
Level Line to Ground	
CDN-M-6-32	20.83 A - 500 A ±10 %
CDN-M-8-32	20.83 A - 667 A ±10 %
Front Time	
Line to line	8 µs ±20 %
Line to Ground	2.5 µs ±30 %
Duration	
Line to line	20 µs ±20 %
Line to Ground	25 µs ±30 %
Synchronisation	on EUT-Power
Generator	IMU-MGE / IMU3000 IMU-MGS / IMU4000

3.1.4 Ringwave

For ringwave, the additional option OPT-A-x-32 RWG is required.

Standard	IEC 61000-4-12
Coupling	
AC	
Line to Line	L1-L2 L1-L3 L2-L3 Lx-N
Line to Ground	Lx-PE N-PE
DC	
Line to Line	String1+ - String1- String2+ - String2-
Line to Ground	String1+ - PE String1- - PE String2+ - PE String2- - PE
Impedance	12 Ω 30 Ω
Open Circuit Voltage	
Level 12 Ω	
CDN-M-6-32	250 V - 6 kV ±10 %
CDN-M-8-32	250 V - 7.6 kV ±10 %
Level 30 Ω	
CDN-M-6-32	250 V - 6 kV ±10 %
CDN-M-8-32	250 V - 8 kV ±10 %
Front Time	500 ns ±30 %
Voltage frequency	100 kHz ±10 %
Peak ratio	
Peak2 to Peak1	0.4 to 1.1
Peak3 to Peak2	0.4 to 0.8
Peak4 to Peak3	0.4 to 0.8
Residual Voltage	<12 % of applied test voltage
Level non-surged lines	<12 % of applied test voltage
Short Circuit	
Level 12 Ω	
CDN-M-6-32	20.83 A - 500 A ±10 %
CDN-M-8-32	8.33 A - 633.3 A ±10 %
Level 30 Ω	
CDN-M-6-32	8.33 A - 200 A ±10 %
CDN-M-8-32	8.33 A - 266.7 A ±10 %
Front Time	<1 µs
Synchronisation	on EUT-Power
Generator	IMU-MGE / IMU3000

3.1.5 General

Dimensions	
Basic Version	57 cm x 45 cm x 19 cm / 19" 4HU
Weight	34.4 kg
Environmental Conditions	
Temperature	10 °C - 35 °C
Humidity	<80 % non condensing
Pressure	86 kPa - 106 kPa
Generator	IMU-MGE / IMU3000 IMU-MGS / IMU4000

3.2 CDN-A-x-32

3.2.1 EUT

AC	
Lines	L1 / L2 / L3 / N / PE
Voltage [4]	
Line to Line	max. 690 V
Line to Neutral	max. 400 V
Line to Ground	max. 400 V
Current	3 x 32 A
Frequency	50 Hz / 60 Hz
DC	
Lines	String1+ / String1- String2+ / String2-
Voltage [5]	
Basic Version	max. 500 V
OPT-A-x-32 1000V DC	max. 1000 V
OPT-A-x-32 1500V DC	max. 1500 V
Current	max. 32 A

[4] The maximum ac-voltage is limited due to the hardware of the generator. IMU4000 with an older surge module (EXT-TRA3000 S and EXT-IMU4000 S with hardware version 1) limits the maximum voltage to 480V (Line-Line) and 300V (Line-PE). For EXT-IMU4000 S4, EXT-IMU4000 S5, IMU3000, IMU-MGS and IMU-MGE, there is no additional limitation.

[5] The maximum dc-voltage is limited due to the hardware of the generator. The surge module of IMU4000 (EXT-TRA3000 S, EXT-IMU4000 S) with hardware version 1 limits the maximum voltage for DC+ and DC- to 300Vdc against ground. For EXT-IMU4000 S4, EXT-IMU4000 S5 and IMU-MGS, there is no additional limitation. The measurement module of IMU3000 (Measurement) with hardware version 1 limits the maximum voltage for DC+ and DC- to 300Vdc against ground. Hardware version 2 allow a maximum dc-voltage of 1000V. For 1500V hardware version >=3 is required. The hardware version can be found in the General Menu > Generator > Extension. There is no additional limitation for IMU-MGE.

3.2.2 EFT

Standard	IEC 61000-4-4
Coupling	
AC	
calibrated	L1 / L2 / L3 / N / PE to Ground
selectable	individual combination
DC	
calibrated	String1+ / String1- / PE to Ground String2+ / String2- / PE to Ground
selectable	individual combination
Voltage into 50 Ohm	
Level calibrated	
CDN-A-6-32	500 V - 6 kV ±10 %
CDN-A-8-32	500 V - 8 kV ±10 %
Front Time	5.5 ns ±1.5 ns
Duration	45 ns ±15 ns
Residual Voltage	<5 % of applied test voltage

3.2.3 CWG

Standard	IEC 61000-4-5 ANSI C62.45
Coupling	
AC	
Line to Line	L1-L2 L1-L3 L2-L3 Lx-N
Line to Ground	Lx-PE N-PE
with OPT-A-x-32 ANSI	L1&L2&L3&N-PE L1&L2&L3-PE L1&L2&L3-N
DC	
Line to Line	String1+ - String1- String2+ - String2-
Line to Ground	String1+ - PE String1- - PE String2+ - PE String2- - PE
Impedance [6]	2 Ω/ 18 µF 12 Ω/ 9 µF 12 Ω/ 18 µF 2 Ω/ 9 µF

[6] The impedance is freely selectable for all couplings. The calibration is performed according IEC 61000-4-5 with 2Ω/18µF for Line-Line and 12Ω/9µF for Line-PE.

Open Circuit Voltage	
Level Line to Line	
CDN-A-6-32	250 V - 6 kV ±10 %
CDN-A-8-32	250 V - 7.6 kV ±10 %
Level Line to Ground	
CDN-A-6-32	250 V - 6 kV ±10 %
CDN-A-8-32	250 V - 8 kV ±10 %
Front Time	1.2 µs ±30 %
Duration	
Line to Line	50 µs +10 µs/-10 µs
Line to Ground	50 µs +10 µs/-25 µs
Residual Voltage	<12 % of applied test voltage
Level non-surged lines	<12 % of applied test voltage
Short Circuit Current	
Level Line to Line	
CDN-A-6-32	125 A - 3 kA ±10 %
CDN-A-8-32	125 A - 3.8 kA ±10 %
Level Line to Ground	
CDN-A-6-32	20.83 A - 500 A ±10 %
CDN-A-8-32	20.83 A - 667 A ±10 %
Front Time	
Line to line	8 µs ±20 %
Line to Ground	2.5 µs ±30 %
Duration	
Line to line	20 µs ±20 %
Line to Ground	25 µs ±30 %
Synchronisation	on EUT-Power
Generator	IMU-MGE / IMU3000 IMU-MGS / IMU4000

3.2.4 Ringwave

For ringwave, the additional option OPT-A-x-32 RWG is required.

Standard	IEC 61000-4-12 ANSI C62.45
Coupling	
AC	
Line to Line	L1-L2 L1-L3 L2-L3 Lx-N
Line to Ground	Lx-PE N-PE
with OPT-A-x-32 ANSI	L1&L2&L3&N-PE L1&L2&L3-PE L1&L2&L3-N
DC	
Line to Line	String1+ - String1- String2+ - String2-
Line to Ground	String1+ - PE String1- - PE String2+ - PE String2- - PE
Impedance	12 Ω 30 Ω
Open Circuit Voltage	
Level 12 Ω	
CDN-A-6-32	250 V - 6 kV ±10 %
CDN-A-8-32	250 V - 7.6 kV ±10 %
Level 30 Ω	
CDN-A-6-32	250 V - 6 kV ±10 %
CDN-A-8-32	250 V - 8 kV ±10 %
Front Time	500 ns ±30 %
Voltage frequency	100 kHz ±10 %
Peak ratio	
Peak2 to Peak1	0.4 to 1.1
Peak3 to Peak2	0.4 to 0.8
Peak4 to Peak3	0.4 to 0.8
Residual Voltage	<12 % of applied test voltage
Level non-surged lines	<12 % of applied test voltage
Short Circuit	
Level 12 Ω	
CDN-A-6-32	20.83 A - 500 A ±10 %
CDN-A-8-32	8.33 A - 633.3 A ±10 %
Level 30 Ω	
CDN-A-6-32	8.33 A - 200 A ±10 %
CDN-A-8-32	8.33 A - 266.7 A ±10 %
Front Time	<1 µs

Synchronisation	on EUT-Power
Generator	IMU-MGE / IMU3000

3.2.5 General

Input Power	
Voltage	100 V - 240 V ±10 %
Frequency	50 Hz - 60 Hz
Consumption	max. 150 VA
Dimensions	
Basic Version	57 cm x 45 cm x 19 cm / 19" 4HU
with OPT-A-x-32 ANSI	60 cm x 45 cm x 37 cm / 19" 8HU
Weight	
Basic Version	38.8 kg
with OPT-A-x-32 ANSI	tbd kg
Environmental Conditions	
Temperature	10 °C - 35 °C
Humidity	<80 % non condensing
Pressure	86 kPa - 106 kPa
Generator	IMU-MGE / IMU3000 IMU-MGS / IMU4000

3.3 CDN-A-x-63

3.3.1 EUT

AC	
Lines	L1 / L2 / L3 / N / PE
Voltage [7]	
Line to Line	max. 690 V
Line to Neutral	max. 400 V
Line to Ground	max. 400 V
Current	3 x 63 A
Frequency	50 Hz / 60 Hz
DC	
Lines	String1+ / String1- String2+ / String2-
Voltage [8]	
Basic Version	max. 500 V
OPT-A-x-63 1000V DC	max. 1000 V
OPT-A-x-63 1500V DC	max. 1500 V
Current	max. 63 A

[7] The maximum ac-voltage is limited due to the hardware of the generator. IMU4000 with an older surge module (EXT-TRA3000 S and EXT-IMU4000 S with hardware version 1) limits the maximum voltage to 480V (Line-Line) and 300V (Line-PE). For EXT-IMU4000 S4, EXT-IMU4000 S5, IMU3000, IMU-MGS and IMU-MGE, there is no additional limitation.

[8] The maximum dc-voltage is limited due to the hardware of the generator. The surge module of IMU4000 (EXT-TRA3000 S, EXT-IMU4000 S) with hardware version 1 limits the maximum voltage for DC+ and DC- to 300Vdc against ground. For EXT-IMU4000 S4, EXT-IMU4000 S5 and IMU-MGS, there is no additional limitation. The measurement module of IMU3000 (Measurement) with hardware version 1 limits the maximum voltage for DC+ and DC- to 300Vdc against ground. Hardware version 2 allow a maximum dc-voltage of 1000V. For 1500V hardware version >=3 is required. The hardware version can be found in the General Menu > Generator > Extension. There is no additional limitation for IMU-MGE.

3.3.2 EFT

Standard	IEC 61000-4-4
Coupling	
AC	
calibrated	L1 / L2 / L3 / N / PE to Ground
selectable	individual combination
DC	
calibrated	String1+ / String1- / PE to Ground String2+ / String2- / PE to Ground
selectable	individual combination
Voltage into 50 Ohm	
Level calibrated	
CDN-A-6-63	500 V - 6 kV ±10 %
CDN-A-8-63	500 V - 8 kV ±10 %
Front Time	5.5 ns ±1.5 ns
Duration	45 ns ±15 ns
Residual Voltage	<5 % of applied test voltage

3.3.3 CWG

For CDNs with option OPT-A-x-63 FULL RANGE, the technical data of CDN-A-x-32 (when selected 32A range) are applicable.

Standard	IEC 61000-4-5 ANSI C62.45
Coupling	
AC	
Line to Line	L1-L2 L1-L3 L2-L3 Lx-N
Line to Ground	Lx-PE N-PE
with OPT-A-x-63 ANSI	L1&L2&L3&N-PE L1&L2&L3-PE L1&L2&L3-N
DC	
Line to Line	String1+ - String1- String2+ - String2-
Line to Ground	String1+ - PE String1- - PE String2+ - PE String2- - PE
Impedance [9]	2 Ω/ 18 µF 12 Ω/ 9 µF 12 Ω/ 18 µF 2 Ω/ 9 µF
Open Circuit Voltage	
Level Line to Line	
CDN-A-6-63	250 V - 6 kV ±10 %
CDN-A-8-63	250 V - 7.6 kV ±10 %
Level Line to Ground	
CDN-A-6-63	250 V - 6 kV +10 % / -15 %
CDN-A-8-63	250 V - 8 kV +10 % / -15 %
Front Time	1.2 µs ±30 %
Duration	
Line to Line	50 µs +10 µs/-20 µs
Line to Ground	50 µs +10 µs/-35 µs
Residual Voltage	<12 % of applied test voltage
Level non-surged lines	<12 % of applied test voltage

[9] The impedance is freely selectable for all couplings. The calibration is performed according IEC 61000-4-5 with 2Ω/18µF for Line-Line and 12Ω/9µF for Line-PE.

Short Circuit Current	
Level Line to Line	
CDN-A-6-63	125 A - 3 kA ±10 %
CDN-A-8-63	125 A - 3.8 kA ±10 %
Level Line to Ground	
CDN-A-6-63	20.83 A - 500 A ±10 %
CDN-A-8-63	20.83 A - 667 A ±10 %
Front Time	
Line to line	8 µs ±20 %
Line to Ground	2.5 µs ±30 %
Duration	
Line to line	20 µs ±20 %
Line to Ground	25 µs ±30 %
Synchronisation	on EUT-Power
Generator	IMU-MGE / IMU3000 IMU-MGS / IMU4000

3.3.4 Ringwave

For ringwave, the additional option OPT-A-x-63 RWG is required. For CDNs with option OPT-A-x-63 FULL RANGE, the technical data of CDN-A-x-32 (when selected 32A range) are applicable.

Standard	IEC 61000-4-12 ANSI C62.45
Coupling	
AC	
Line to Line	L1-L2 L1-L3 L2-L3 Lx-N
Line to Ground	Lx-PE N-PE
with OPT-A-x-63 ANSI	L1&L2&L3&N-PE L1&L2&L3-PE L1&L2&L3-N
DC	
Line to Line	String1+ - String1- String2+ - String2-
Line to Ground	String1+ - PE String1- - PE String2+ - PE String2- - PE
Impedance	12 Ω 30 Ω
Open Circuit Voltage	
Level 12 Ω	
CDN-A-6-63	250 V - 6 kV ±10 %
CDN-A-8-63	250 V - 8 kV ±10 %
Level 30 Ω	
CDN-A-6-63	250 V - 6 kV ±10 %
CDN-A-8-63	250 V - 8 kV ±10 %
Front Time	500 ns ±30 %
Voltage frequency	100 kHz ±10 %
Peak ratio	
Peak2 to Peak1	0.4 to 1.1
Peak3 to Peak2	0.4 to 0.8
Peak4 to Peak3	0.4 to 0.8
Residual Voltage	<12 % of applied test voltage
Level non-surged lines	<12 % of applied test voltage

Short Circuit	
Level 12 Ω	
CDN-A-6-63	20.83 A - 500 A +10 % / -25 %
CDN-A-8-63	8.33 A - 666.7 A +10 % / -25 %
Level 30 Ω	
CDN-A-6-63	8.33 A - 200 A +10 % / -25 %
CDN-A-8-63	8.33 A - 266.7 A +10 % / -25 %
Front Time	<1 µs
Synchronisation	on EUT-Power
Generator	IMU-MGE / IMU3000

3.3.5 General

Input Power	
Voltage	100 V - 240 V ±10 %
Frequency	50 Hz - 60 Hz
Consumption	max. 150 VA
Dimensions	60 cm x 45 cm x 37 cm / 19" 8HU
Weight	71 kg
Environmental Conditions	
Temperature	10 °C - 35 °C
Humidity	<80 % non condensing
Pressure	86 kPa - 106 kPa
Generator	IMU-MGE / IMU3000 IMU-MGS / IMU4000

3.4 CDN-A-x-125

3.4.1 EUT

AC	
Lines	L1 / L2 / L3 / N / PE
Voltage [10]	
Line to Line	max. 690 V
Line to Neutral	max. 400 V
Line to Ground	max. 400 V
Current	3 x 125 A
Frequency	50 Hz / 60 Hz
DC	
Lines	String1+ / String1- String2+ / String2-
Voltage [11]	
Basic Version	max. 500 V
OPT-A-x-125 1000V DC	max. 1000 V
OPT-A-x-125 1500V DC	max. 1500 V
Current	max. 125 A

[10] The maximum ac-voltage is limited due to the hardware of the generator. IMU4000 with an older surge module (EXT-TRA3000 S and EXT-IMU4000 S with hardware version 1) limits the maximum voltage to 480V (Line-Line) and 300V (Line-PE). For EXT-IMU4000 S4, EXT-IMU4000 S5, IMU3000, IMU-MGS and IMU-MGE, there is no additional limitation.

[11] The maximum dc-voltage is limited due to the hardware of the generator. The surge module of IMU4000 (EXT-TRA3000 S, EXT-IMU4000 S) with hardware version 1 limits the maximum voltage for DC+ and DC- to 300Vdc against ground. For EXT-IMU4000 S4, EXT-IMU4000 S5 and IMU-MGS, there is no additional limitation. The measurement module of IMU3000 (Measurement) with hardware version 1 limits the maximum voltage for DC+ and DC- to 300Vdc against ground. Hardware version 2 allow a maximum dc-voltage of 1000V. For 1500V hardware version >=3 is required. The hardware version can be found in the General Menu > Generator > Extension. There is no additional limitation for IMU-MGE.

3.4.2 EFT

Standard	IEC 61000-4-4
Coupling	
AC	
calibrated	L1 / L2 / L3 / N / PE to Ground
selectable	individual combination
DC	
calibrated	String1+ / String1- / PE to Ground String2+ / String2- / PE to Ground
selectable	individual combination
Voltage into 50 Ohm	
Level calibrated	
CDN-A-6-125	500 V - 6 kV ±10 %
CDN-A-8-125	500 V - 8 kV ±10 %
Front Time	5.5 ns ±1.5 ns
Duration	45 ns ±15 ns
Residual Voltage	<5 % of applied test voltage

3.4.3 CWG

For CDNs with option OPT-A-x-125 FULL RANGE, the technical data of CDN-A-x-63 (when selected 63A range) or CDN-A-x-32 (when selected 32A range) are applicable.

Standard	IEC 61000-4-5 ANSI C62.45
Coupling	
AC	
Line to Line	L1-L2 L1-L3 L2-L3 Lx-N
Line to Ground	Lx-PE N-PE
with OPT-A-x-125 ANSI	L1&L2&L3&N-PE L1&L2&L3-PE L1&L2&L3-N
DC	
Line to Line	String1+ - String1- String2+ - String2-
Line to Ground	String1+ - PE String1- - PE String2+ - PE String2- - PE
Impedance [12]	2 Ω/ 18 µF 12 Ω/ 9 µF 12 Ω/ 18 µF 2 Ω/ 9 µF
Open Circuit Voltage	
Level Line to Line	
CDN-A-6-125	250 V - 6 kV ±10 %
CDN-A-8-125	250 V - 7.6 kV ±10 %
Level Line to Ground	
CDN-A-6-125	250 V - 6 kV +10 % / -20 %
CDN-A-8-125	250 V - 8 kV +10 % / -20 %
Front Time	1.2 µs ±30 %
Duration	
Line to Line	50 µs +10 µs/-25 µs
Line to Ground	50 µs +10 µs/-40 µs
Residual Voltage	<12 % of applied test voltage
Level non-surged lines	<12 % of applied test voltage

[12] The impedance is freely selectable for all couplings. The calibration is performed according IEC 61000-4-5 with 2Ω/18µF for Line-Line and 12Ω/9µF for Line-PE.

Short Circuit Current	
Level Line to Line	
CDN-A-6-125	125 A - 3 kA ±10 %
CDN-A-8-125	125 A - 3.8 kA ±10 %
Level Line to Ground	
CDN-A-6-125	20.83 A - 500 A ±10 %
CDN-A-8-125	20.83 A - 667 A ±10 %
Front Time	
Line to line	8 µs ±20 %
Line to Ground	2.5 µs ±30 %
Duration	
Line to line	20 µs ±20 %
Line to Ground	25 µs ±30 %
Synchronisation	on EUT-Power
Generator	IMU-MGE / IMU3000 IMU-MGS / IMU4000

3.4.4 Ringwave

For ringwave, the additional option OPT-A-x-125 RWG is required. For CDNs with option OPT-A-x-125 FULL RANGE, the technical data of CDN-A-x-63 (when selected 63A range) or CDN-A-x-32 (when selected 32A range) are applicable.

Standard	IEC 61000-4-12 ANSI C62.45
Coupling	
AC	
Line to Line	L1-L2 L1-L3 L2-L3 Lx-N
Line to Ground	Lx-PE N-PE
with OPT-A-x-125 ANSI	L1&L2&L3&N-PE L1&L2&L3-PE L1&L2&L3-N
DC	
Line to Line	String1+ - String1- String2+ - String2-
Line to Ground	String1+ - PE String1- - PE String2+ - PE String2- - PE
Impedance	12 Ω 30 Ω
Open Circuit Voltage	
Level 12 Ω	
CDN-A-6-125	250 V - 6 kV ±10 %
CDN-A-8-125	250 V - 8 kV ±10 %
Level 30 Ω	
CDN-A-6-125	250 V - 6 kV ±10 %
CDN-A-8-125	250 V - 8 kV ±10 %
Front Time	500 ns ±30 %
Voltage frequency	100 kHz ±10 %
Peak ratio	
Peak2 to Peak1	0.4 to 1.1
Peak3 to Peak2	0.4 to 0.8
Peak4 to Peak3	0.4 to 0.8
Residual Voltage	<12 % of applied test voltage
Level non-surged lines	<12 % of applied test voltage

Short Circuit	
Level 12 Ω	
CDN-A-6-125	20.83 A - 500 A +10 % / -25 %
CDN-A-8-125	8.33 A - 666.7 A +10 % / -25 %
Level 30 Ω	
CDN-A-6-125	8.33 A - 200 A +10 % / -25 %
CDN-A-8-125	8.33 A - 266.7 A +10 % / -25 %
Front Time	<1 µs
Synchronisation	on EUT-Power
Generator	IMU-MGE / IMU3000

3.4.5 General

Input Power	
Voltage	100 V - 240 V ±10 %
Frequency	50 Hz - 60 Hz
Consumption	max. 150 VA
Dimensions	60 cm x 65 cm x 105 cm
Weight	191 kg
Environmental Conditions	
Temperature	10 °C - 35 °C
Humidity	<80 % non condensing
Pressure	86 kPa - 106 kPa
Generator	IMU-MGE / IMU3000 IMU-MGS / IMU4000

3.5 CDN-A-x-200

3.5.1 EUT

AC	
Lines	L1 / L2 / L3 / N / PE
Voltage [13]	
Line to Line	max. 690 V
Line to Neutral	max. 400 V
Line to Ground	max. 400 V
Current	3 x 200 A
Frequency	50 Hz / 60 Hz
DC	
Lines	String1+ / String1- String2+ / String2-
Voltage [14]	
Basic Version	max. 500 V
OPT-A-x-200 1000V DC	max. 1000 V
OPT-A-x-200 1500V DC	max. 1500 V
Current	max. 200 A

[13] The maximum ac-voltage is limited due to the hardware of the generator. IMU4000 with an older surge module (EXT-TRA3000 S and EXT-IMU4000 S with hardware version 1) limits the maximum voltage to 480V (Line-Line) and 300V (Line-PE). For EXT-IMU4000 S4, EXT-IMU4000 S5, IMU3000, IMU-MGS and IMU-MGE, there is no additional limitation.

[14] The maximum dc-voltage is limited due to the hardware of the generator. The surge module of IMU4000 (EXT-TRA3000 S, EXT-IMU4000 S) with hardware version 1 limits the maximum voltage for DC+ and DC- to 300Vdc against ground. For EXT-IMU4000 S4, EXT-IMU4000 S5 and IMU-MGS, there is no additional limitation. The measurement module of IMU3000 (Measurement) with hardware version 1 limits the maximum voltage for DC+ and DC- to 300Vdc against ground. Hardware version 2 allow a maximum dc-voltage of 1000V. For 1500V hardware version >=3 is required. The hardware version can be found in the General Menu > Generator > Extension. There is no additional limitation for IMU-MGE.

3.5.2 EFT

Standard	IEC 61000-4-4
Coupling	
AC	
calibrated	L1 / L2 / L3 / N / PE to Ground
selectable	individual combination
DC	
calibrated	String1+ / String1- / PE to Ground String2+ / String2- / PE to Ground
selectable	individual combination
Voltage into 50 Ohm	
Level calibrated	
CDN-A-6-200	500 V - 6 kV ±10 %
CDN-A-8-200	500 V - 8 kV ±10 %
Front Time	5.5 ns ±1.5 ns
Duration	45 ns ±15 ns
Residual Voltage	<5 % of applied test voltage

3.5.3 CWG

For CDNs with option OPT-A-x-200 FULL RANGE, the technical data of CDN-A-x-125 (when selected 125A range), CDN-A-x-63 (when selected 63A range) or CDN-A-x-32 (when selected 32A range) are applicable.

Standard	IEC 61000-4-5 ANSI C62.45
Coupling	
AC	
Line to Line	L1-L2 L1-L3 L2-L3 Lx-N
Line to Ground	Lx-PE N-PE
with OPT-A-x-200 ANSI	L1&L2&L3&N-PE L1&L2&L3-PE L1&L2&L3-N
DC	
Line to Line	String1+ - String1- String2+ - String2-
Line to Ground	String1+ - PE String1- - PE String2+ - PE String2- - PE
Impedance [15]	2 Ω/ 18 µF 12 Ω/ 9 µF 12 Ω/ 18 µF 2 Ω/ 9 µF
Open Circuit Voltage	
Level Line to Line	
CDN-A-6-200	250 V - 6 kV ±10 %
CDN-A-8-200	250 V - 7.6 kV ±10 %
Level Line to Ground	
CDN-A-6-200	250 V - 6 kV +10 % / -25 %
CDN-A-8-200	250 V - 8 kV +10 % / -25 %
Front Time	1.2 µs ±30 %
Duration	
Line to Line	50 µs +10 µs/-30 µs
Line to Ground	50 µs +10 µs/-45 µs
Residual Voltage	<12 % of applied test voltage
Level non-surged lines	<12 % of applied test voltage

[15] The impedance is freely selectable for all couplings. The calibration is performed according IEC 61000-4-5 with 2Ω/18µF for Line-Line and 12Ω/9µF for Line-PE.

Short Circuit Current	
Level Line to Line	
CDN-A-6-200	125 A - 3 kA ±10 %
CDN-A-8-200	125 A - 3.8 kA ±10 %
Level Line to Ground	
CDN-A-6-200	20.83 A - 500 A ±10 %
CDN-A-8-200	20.83 A - 667 A ±10 %
Front Time	
Line to line	8 µs ±20 %
Line to Ground	2.5 µs ±30 %
Duration	
Line to line	20 µs ±20 %
Line to Ground	25 µs ±30 %
Synchronisation	on EUT-Power
Generator	IMU-MGE / IMU3000 IMU-MGS / IMU4000

3.5.4 Ringwave

For ringwave, the additional option OPT-A-x-200 RWG is required. For CDNs with option OPT-A-x-200 FULL RANGE, the technical data of CDN-A-x-125 (when selected 125A range), CDN-A-x-63 (when selected 63A range) or CDN-A-x-32 (when selected 32A range) are applicable.

Standard	IEC 61000-4-12 ANSI C62.45
Coupling	
AC	
Line to Line	L1-L2 L1-L3 L2-L3 Lx-N
Line to Ground	Lx-PE N-PE
with OPT-A-x-200 ANSI	L1&L2&L3&N-PE L1&L2&L3-PE L1&L2&L3-N
DC	
Line to Line	String1+ - String1- String2+ - String2-
Line to Ground	String1+ - PE String1- - PE String2+ - PE String2- - PE
Impedance	12 Ω 30 Ω
Open Circuit Voltage	
Level 12 Ω	
CDN-A-6-200	250 V - 6 kV ±10 %
CDN-A-8-200	250 V - 8 kV ±10 %
Level 30 Ω	
CDN-A-6-200	250 V - 6 kV ±10 %
CDN-A-8-200	250 V - 8 kV ±10 %
Front Time	500 ns ±30 %
Voltage frequency	100 kHz ±10 %
Peak ratio	
Peak2 to Peak1	0.4 to 1.1
Peak3 to Peak2	0.4 to 0.8
Peak4 to Peak3	0.4 to 0.8
Residual Voltage	<12 % of applied test voltage
Level non-surged lines	<12 % of applied test voltage

Short Circuit	
Level 12 Ω	
CDN-A-6-200	20.83 A - 500 A +10 % / -25 %
CDN-A-8-200	8.33 A - 666.7 A +10 % / -25 %
Level 30 Ω	
CDN-A-6-200	8.33 A - 200 A +10 % / -25 %
CDN-A-8-200	8.33 A - 266.7 A +10 % / -25 %
Front Time	<1 µs
Synchronisation	on EUT-Power
Generator	IMU-MGE / IMU3000

3.5.5 General

Input Power	
Voltage	100 V - 240 V ±10 %
Frequency	50 Hz - 60 Hz
Consumption	max. 150 VA
Dimensions	60 cm x 65 cm x 105 cm
Weight	247 kg
Environmental Conditions	
Temperature	10 °C - 35 °C
Humidity	<80 % non condensing
Pressure	86 kPa - 106 kPa
Generator	IMU-MGE / IMU3000 IMU-MGS / IMU4000

3.6 CDN-F-125

3.6.1 EUT

AC	
Lines	L1 / L2 / L3 / N / PE
Voltage	
Line to Line	max. 690 V
Line to Neutral	max. 400 V
Line to Ground	max. 400 V
Current	3 x 125 A
Frequency	50 Hz / 60 Hz
DC	
Lines	String1+ / String1- String2+ / String2-
Voltage	max. 1000 V
Current	max. 125 A

3.6.2 EFT

Standard	IEC 61000-4-4
Coupling	
AC	
calibrated	L1 / L2 / L3 / N / PE to Ground
selectable	individual combination
DC	
calibrated	String1+ / String1- / PE to Ground String2+ / String2- / PE to Ground
selectable	individual combination
Voltage into 50 Ohm	
Level calibrated	500 V - 8 kV $\pm$10 %
Front Time	5.5 ns $\pm$1.5 ns
Duration	45 ns $\pm$15 ns
Residual Voltage	$<$5 % of applied test voltage

3.6.3 General

Dimensions	57 cm x 45 cm x 19 cm / 19" 4HU
Weight	14 kg
Environmental Conditions	
Temperature	10 °C - 35 °C
Humidity	<80 % non condensing
Pressure	86 kPa - 106 kPa
Generator	IMU-MGE / IMU3000 IMU-MGS / IMU4000

3.7 PROT32-690AC / PROT63-690AC / PROT125-690AC / PROT200-690AC

Rated Current	
PROT32-690AC	32 A
PROT63-690AC	63 A
PROT125-690AC	125 A
PROT200-690AC	200 A
Rated Voltage	
AC	690/400 Vac
DC	125 Vdc
Pole	3
Tripping Characteristic	C
Short-circuit Capacity	>3 kA
Dimensions	
PROT32-690AC	24 cm x 16 cm x 9 cm
PROT63-690AC	24 cm x 16 cm x 9 cm
PROT125-690AC	24 cm x 16 cm x 9 cm
PROT200-690AC	57 cm x 45 cm x 19 cm / 19" 4HU
Weight	
PROT32-690AC	1.8 kg
PROT63-690AC	1.8 kg
PROT125-690AC	1.8 kg
PROT200-690AC	13 kg

3.8 PROT32-yyyDC / PROT63-yyyDC / PROT125-yyyDC / PROT200-500DC

Rated Current	
PROT32-yyyDC	32 A
PROT63-yyyDC	63 A
PROT125-yyyDC	125 A
PROT200-500DC	200 A
Rated Voltage	
PROTxx-500DC	500 Vdc
PROTxx-1000DC	1000 Vdc
PROTxx-1500DC	1500 Vdc
Pole	1
Tripping Characteristic	B
Short-circuit Capacity	>5 kA
Dimensions	
PROTxx-yyyDC	24 cm x 16 cm x 9 cm
PROT200-500DC	60 cm x 45 cm x 19 cm / 19" 4HU
Weight	
PROTxx-yyyDC	1.8 kg
PROT200-500DC	12.4 kg

3.9 DC-DC32 / DC-DC63 / DC-DC125 / DC-DC200

Forward Current	
DC-DC32	32 A
DC-DC63	63 A
DC-DC125	125 A
DC-DC200	200 A
Max. EUT Voltage	1500 V
Diode Forward Voltage Drop	max. 3 V
Damping Resistor	1 Ω 2.2 Ω 4.7 Ω 10 Ω 22 Ω 47 Ω 100 Ω 220 Ω
Standard	IEC 61000-4-5 Ed. 3 Amd. 1
Dimensions	
DC-DC32	30 cm x 23 cm x 11 cm
DC-DC32	30 cm x 23 cm x 11 cm
DC-DC125	57 cm x 45 cm x 19 cm / 19" 4HU
DC-DC200	57 cm x 45 cm x 19 cm / 19" 4HU
Weight	
DC-DC32	4 kg
DC-DC32	5 kg
DC-DC125	16 kg
DC-DC200	20 kg
Power Consumption	
DC-DC32	3 W @ 24 V
DC-DC32	6 W @ 24 V
DC-DC125	32 W @ 115/230 V
DC-DC200	44 W @ 115/230 V