



ESD3000 - MODULAR HANDHELD TESTER

Electrostatic Discharge Testing



 This document has been optimized for electronic media

 Smart navigation through technical specifications. Click the green links.



Accredited Calibration

Quality at EMC PARTNER is based on an ISO 9001 management system. This is the foundation for an ISO 17025 accreditation verified by the Swiss Calibration Service (SCS). SCS No. 146 is the accreditation number of EMC PARTNER AG. Locally accredited but recognized worldwide through affiliation with the ILAC organisation



THE ESD TESTING SOLUTION

POWER AT YOUR FINGER TIPS

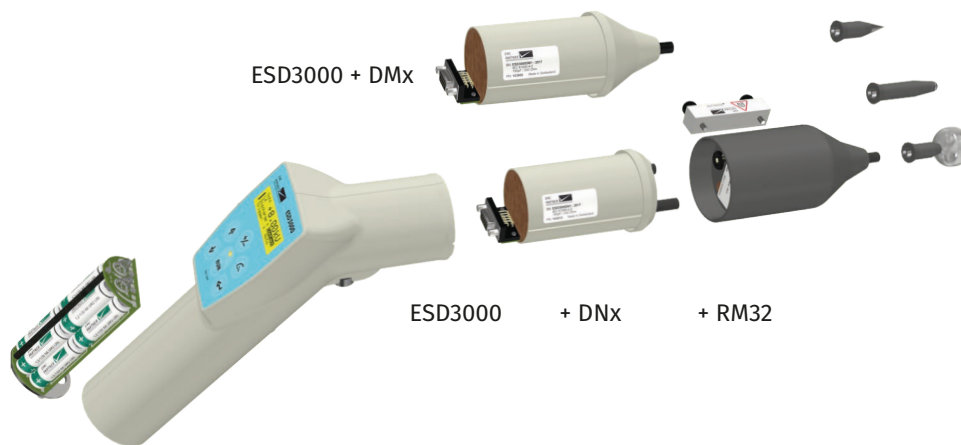
Electrostatic Discharge (ESD) is the most common test procedure applied to any electronic or electrical equipment. Used extensively to test:

- › Commercial products
- › Industrial systems
- › Military electronics
- › Automotive electronics
- › Fuses and detonators
- › Railway electronics
- › Avionic equipment qualification
- › Telecom equipment
- › Electronic components

The easily changeable and fully calibrated discharge networks, quickly adapt ESD3000 to the requirements of any new application.
Light and easy to use.

EASILY EXPANDABLE

ESD3000 is designed with the user in mind. The modular design allows configuration according to customer wishes, addition of more networks when adding applications and easy extension from 16kV to 30kV using the same generator. Automatic network recognition means ESD3000 is always ready.



Discharge Modules (DMx)

up to 16kV Air / 10kV Contact Discharges

- ESD3000 required

Available Extensions

- DM1 (150pF, 330 Ohm)
- DM4 (100pF / 1500 Ohm)
- DM6 (100pF / 1500 Ohm)

Discharge Networks (DNx)

up to 30kV Air- and Contact Discharges

- ESD3000 & RM32 required

Available Extensions

- DN1 (150pF / 330 Ohm)
- DN2 (330 pF, 2000 Ohm)
- DN3 (150 pF, 2000 Ohm)
- DN4 (500 pF, 5000 Ohm)
- DN5 (500 pF, 500 Ohm)
- DN6 (330 pF, 330 Ohm)

Included

Rechargeable Long-life batteries
 Up to 3 test tips (Sharp, Round, Corona)
 Charger & Firmware update cable
 Handy, robust carrying case



AVAILABLE MODULES

Commercial & Industrial

IEC 61000-4-2

ESD3000DM1 (150pF, 330 Ohm)



Component Test

IEC 60749-26 / JEDEC JS-001 / MIL-STD-750D

ESD3000DM6 (100pF / 1500 Ohm)



Automotive

ISO 10605 / SAEJSSI-IS / FORD AB/AC / GMW 3097

ESD3000DN1(150pF / 330 Ohm)

ESD3000DN2 (330pF / 2000 Ohm)

ESD3000DN3 (150pF / 2000 Ohm)

ESD3000DN6 (330pF / 330 Ohm)



Military

MIL-STD-883 / GR78-CORE

ESD3000DM4 (100pF / 1500 Ohm)

ISO 14304 / MIL-STD-331 / MIL-STD-1512

ESD3000DN4 (500pF / 5000 Ohm)

MIL-STD-331 / MIL-DTL-23659D

ESD3000DN5 (500pF / 500 Ohm)

MIL-STD-1576

ESD3000DN32-MIL3 (500pF / 0 Ohm)






UNIQUE FEATURES


The original 30kV battery powered generator with a unique system of changeable modules. Flexibility and power combined.

AA battery powered




Long life standard battery. Up to 8 hours on full battery charge. Readily available in any store.

Electronic polarity change




Single key press switches polarity before and during the test.

Extend testing capability



Add calibrated modules to maintain the system value. Unique modules and accessories for special applications.

Compact solution



Ergonomic hand held tester without additional base unit. Program directly on generator.

Technical Specifications

ESD3000 MODULES

ESD3000	Mainframe	DM1 (16 kV)	DM4	DM6	RM32	DN1 (30 kV)	DN2	DN3	DN4	DN5	DN6	MIL3
IEC 61000-4-2	✓	✓				alt*						
MIL-STD-883	✓		✓									
GR78-CORE	✓		✓									
IEC 60749-26	✓			✓								
JS-001	✓			✓								
MIL-STD-750	✓		✓									
ISO 10605	✓				✓	✓	✓	✓			✓	
DO-160 S25	✓	✓			✓	✓						
MIL-STD-461G CS118	✓	✓			✓	✓						
GMW3097	✓				✓		✓	✓			✓	
MIL-STD-331	✓				✓				✓	✓		
MIL-STD-1576	✓				✓							✓

* DN1 as alternative to DM1. Standard requires only 15 kV.

ACCESSORIES FOR DIFFERENT MODULES

ESD3000	Mainframe	DM1	DM4	DM6	RM32	DN1	DN2	DN3	DN4	DN5	DN6	MIL3
EARTH CABLE	✓	IEC, CS118				IEC, CS118						
ESD-VCP50	✓	IEC				IEC						
ESD-TARGET2 DN	✓	IEC				ISO	ISO	ISO			ISO	
TARGET2-ADAPTER N-MALE	✓	IEC				ISO	ISO	ISO			ISO	
TARGET2-ADAPTER N-FEMALE	✓	IEC				ISO	ISO	ISO			ISO	
ESD-VERI-V	✓	✓	0		0	✓	0	0	✓	✓	0	✓
ESD-STAND ED2	✓	0	0	0	0	0	0	0	0	0	0	0
ESD-HCP-AUTO	✓					ISO					ISO	
DM-EXT	✓								MIL	MIL		
SAFETY-S	✓								MIL	MIL		
TC-ST ED	✓								MIL	MIL		
WARNING LAMP	✓								MIL	MIL		
EMERGENCY STOP	✓								MIL	MIL		
ESD3000 CNH12	✓					0	0	0	0	0	0	0
OPTOLINK	✓	0	0	0	0	0	0	0	0	0	0	0
TEMA	✓	0	0	0	0	0	0	0	0	0	0	0

0 = Optional Accessories, see product details

ESD3000	EARTH CABLE	ESD-VCP50	ESD-TARGET2 DN	TARGET2-ADAPTER N-MALE	TARGET2-ADAPTER N-FEMALE	ESD-VERI-V	ESD-STAND ED2	ESD-HCP-AUTO	DM-EXT	ESD-SAFETY-S	TC-ST ED	WARNING LAMP	EMERGENCY STOP	ESD3000 CNH12	ESD-OPTOLINK	TEMA SOFTW.
IEC61000-4-2	✓	✓	opt	opt	opt	opt	opt								opt	opt
MIL-STD-883															opt	opt
GR78-CORE															opt	opt
JS-001																
MIL-STD-750															opt	opt
ISO10605	✓		opt	opt	opt	opt	opt	opt							opt	opt
DO-160 S25						✓									opt	opt
MIL-461G CS118	✓		✓	opt	opt	✓									opt	opt
GMW3097															opt	opt
MIL-STD-331									✓	✓	✓	✓	✓		opt	opt
MIL-STD-1576															opt	opt

1. ESD3000 MAINFRAME AND MODULES

1.1. TECHNICAL SPECIFICATIONS

ESD3000 Mainframe

To be used with modules	all modules from this document are compatible
Construction	fully portable, no additional basic unit
Control	LCD and 6 menu buttons, 1 trigger button
Maximum voltage	16 kV or 30 kV, depending on modules chosen
Voltage steps	100 V - test
Discharge polarity	positive, negative, alternating
Discharge modes	contact discharge (CD) and air discharge (AD)
Discharge frequency CD	max. 20 Hz, (pulse every 0.05, 0.1, 0.2 ... 60 s)
Discharge frequency AD	≥ 30 Hz or more, for ex. with DM1, DN1, other
Counter	pre-selectable, 1 to 29999
Discharge detection	selectable, count pulses or count discharges
Holding time	≥ 5 s
Trigger	manual, automatic, remote
Ramps	voltage, polarity
Reporting with TEMA	automatic report sequence, amplitude, polarity
Dimensions	for ex. with DM1 and tip 340 x 130 x 70 mm
Weight mainframe	730 g, w/o battery pack and module
Weight equipped	1050 g, with battery pack, DM1 and AD tip
Power supply	10 x AA rechargeable batteries or mains
Included	10 batteries, mains adapter, ground cable 2 m, 3 test tips (AD, AD2, CD), carrying case, RS232 cable, E3Loader for remote control
Requires	at least a DM module, or a DN module + RM32



ESD3000DM1

Standards	IEC 61000-4-2 (latest)
Other standards	MIL-STD-461G CS118, DO-160 Section 25
Storage capacitor	150 pF according to IEC61000-4-2
Discharge resistor	330 Ω according to IEC61000-4-2
Circuit inductance	< 5 μ H
Voltage range AD	0.2 – 16 kV \pm 5 %
Voltage range CD	0.2 – 10 kV \pm 5 %
Current rise time into 2 Ω	0.8 \pm 25 %
First I peak into 2 Ω CD	7.5 A @ 2 kV – 37.5 A @ 10 kV (\pm 15 %)
Current at 30 ns	4 A @ 2 kV – 20 A @ 10 kV (\pm 30 %)
Current at 60 ns	2 A @ 2 kV – 10 A @ 10 kV (\pm 30 %)
Optional	ESD-TARGET2



ESD3000DM4

Standards	MIL-STD-883, GR78-CORE, MIL-STD-750
Storage capacitor	100 pF \pm 10 %
Discharge resistor	1500 Ω \pm 10 %
Voltage range AD	0.2 – 16 kV \pm 5 %
Voltage range CD	0.2 – 10 kV \pm 5 %
Current rise time into 2 Ω	< 10 ns @ 0.2 – 8 kV
I peak into 2 Ω (CD)	2.66 A @ 4 kV, 3.33 A @ 5 kV
RC time constant	150 \pm 20 ns



ESD3000DM6

Standards	IEC 61340-3-1, JS-001
Storage capacitor	100 pF according to IEC61000-4-2
Discharge resistor	1500 Ω according to IEC61000-4-2
Voltage range CD	0.25 – 8 kV \pm 10 %
Current rise time into 2 Ω	2 – 10 ns @ 0.25 – 8 kV
RC time constant	150 \pm 20 ns



30 KV

These extensions need the module ESD3000RM32

ESD3000DN1

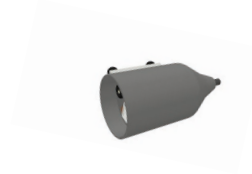
Standards	IEC 61000-4-2, ISO 10605
Other standards	MIL-STD-461G CS118, DO-160 Section 25
Storage capacitor	150 pF according to IEC61000-4-2
Discharge resistor	330 Ω according to IEC61000-4-2
Circuit inductance	< 5 μ H
Voltage range AD	1 – 30 kV
Voltage range CD	1 – 30 kV
Current rise time into 2 Ω	0.8 \pm 25 %
First I peak into 2 Ω CD	7.5 A @ 2 kV – 112.5 A @ 30 kV
Current at 30 ns	4 A @ 2 kV – 60 A @ 30 kV
Current at 60 ns	2 A @ 2 kV – 30 A @ 30 kV
Requires	ESD3000RM32
Included in ESD3000RM32	detachable module for faster tr (<700ps)
Optional	ESD-TARGET2 DN , ESD-HCP-AUTO

ESD3000DN2

Standards	ISO 10605, GMW3097
Storage capacitor	330 pF according to IEC61000-4-2
Discharge resistor	2000 Ω according to IEC61000-4-2
Voltage range AD	2 – 30 kV \pm 5 %
Voltage range CD	2 – 30 kV \pm 5 %
Current rise time into 2 Ω	0.7 – 1 ns
First I peak into 2 Ω CD	7.5 A @ 2 kV – 112.5 A @ 30 kV (- 0 / + 30 %)
RC time constant	600 \pm 130 ns
Requires	ESD3000RM32
Optional	ESD-TARGET2 DN

ESD3000DN3

Standards	ISO 10605, GMW3097
Storage capacitor	150 pF according to IEC61000-4-2
Discharge resistor	2000 Ω according to IEC61000-4-2
Voltage range AD	2 – 30 kV \pm 5 %
Voltage range CD	2 – 30 kV \pm 5 %
Current rise time into 2 Ω	0.7 – 1 ns
First I peak into 2 Ω CD	7.5 A @ 2 kV – 112.5 A @ 30 kV (- 0 / + 30 %)
RC time constant	300 \pm 60 ns
Requires	ESD3000RM32
Optional	ESD-TARGET2 DN



ESD3000DN4

Standards	ISO14304 MIL-STD-1512, MIL-STD-331
Storage capacitor	500 pF ± 10 %
Discharge resistor	5000 Ω ± 10 %
Voltage range CD	2 – 30 kV ± 5 %
I rise time into 2 Ω CD	0.7 – 1 ns
Requires	ESD3000RM32
Optional	ESD3000 SAFETY-S , DM-EXT , TC-ST ED , WARNING-LAMP , EMERGENCY-STOP



ESD3000DN5

Standards	MIL-STD-1512, MIL-STD-331
Storage capacitor	500 pF ± 10 %
Discharge resistor	500 Ω ± 10 %
Voltage range CD	2 – 30 kV ± 5 %
I rise time into 2 Ω CD	0.7 – 1 ns
Requires	ESD3000RM32
Optional	ESD3000 SAFETY-S , DM-EXT , TC-ST ED , WARNING-LAMP , EMERGENCY-STOP



ESD3000DN6

Standards	ISO 10605, GMW3097
Storage capacitor	330 pF according to IEC61000-4-2
Discharge resistor	330 Ω according to IEC61000-4-2
Voltage range AD	2 – 30 kV ± 5 %
Voltage range CD	2 – 30 kV ± 5 %
Current rise time into 2 Ω	0.7 – 1 ns
RC time constant	300 ± 130
Requires	ESD3000RM32
Optional	ESD-TARGET2 DN , ESD-HCP-AUTO



ESD3000DN32-MIL3

Standard	MIL-STD-1576
Storage capacitor	500 pF
Discharge resistor	0 Ω
Voltage range CD	2 – 30 kV ± 5 %
Requires	ESD3000RM32



1.2. POWER, CLIMATIC CONDITIONS, SHIPPING WEIGHT, DIMENSIONS

ESD3000 mainframe

Mains adapter	95 – 250 V (50/60 Hz)
Power consumption	ON < 20 VA, standby < 5 VA
Temperature range	15 – 35 °C
Humidity	30 – 60 % non-condensing
Air pressure	86 – 106 kPa
Shipping weight	2.4 kg plus selected modules
Carrying case dimensions	46 x 41 x 17 cm
Included in delivery	
User manual	with conformity declaration
Calibration certificate	factory calibration for selected modules

2. ACCESSORIES FOR ESD3000

2.1. TECHNICAL SPECIFICATIONS

EARTH CABLE

Application	connection of HCP or VCP to ground plane
Impedance	2 x 470 k Ω \pm 1 %
Length	2 m
Connectors	2 x banana plugs

ESD-VCP50

Application	indirect ESD application as per IEC 61000-4-2
Spacer in between	10 cm wooden spacer
Coupling plane	50 x 50 cm
Application points	one on each side
Dimensions	50 x 50 x 10 cm
Weight	8 kg
Included	2 m earth cable (with 2 x 470 k Ω)



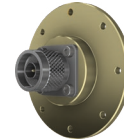
ESD-TARGET2 DN

Standard	IEC 61000-4-2 latest
Application	current target for calibration of ESD generator
Surface Finish	gold plated, lifetime protection against corrosion
Input impedance	2 Ω
Input voltage	max. 30 kV CD
Frequency range	\pm 0.5 dB up to 1 GHz, \pm 1.2 dB up to 4 GHz
Current range	0 – 120 A standard, could be extended
Transfer function	0.2 V / 1 A with 20 dB, 0.02 V / 1 A with 40 dB
Diameter	70 mm
Thickness	40 mm
Weight	398 g including attenuator
Fixing	8 x M3 screws, included in delivery
Included	40 dB att., 50 Ω coax. cable (1 m) with SMA out



TARGET2-ADAPTER N-MALE

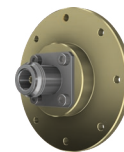
Standards	IEC 61000-4-2 latest
Application	verification of ESD-TARGET2 DN
Surface finish	gold plated, lifetime protection against corrosion
Output Impedance	$50 \pm 1 \Omega$ (within 4 GHz bandwidth)
Return loss (≤ 1 GHz)	< 30 dB ¹⁾
Return loss (≤ 4 GHz)	< 20 dB ¹⁾
Insertion loss (≤ 4 GHz)	< 0.3 dB (total)
Geometry	conical as per standard
Coaxial Connector	N-Male
Diameter	70 mm
Thickness	30 mm
Weight	250g
Fixing	8x M3 screws, included in delivery
requires	ESD-TARGET2 DN



1) face-to-face with ESD-TARGET2 DN

TARGET2-ADAPTER N-FEMALE

Standards	IEC 61000-4-2 latest
Application	verification of TARGET2-ADAPTER N-MALE
Surface finish	gold plated, lifetime protection against corrosion
Output Impedance	$50 \pm 1 \Omega$ (within 4 GHz bandwidth)
Return loss (≤ 1 GHz)	< 30 dB ¹⁾
Return loss (≤ 4 GHz)	< 20 dB ¹⁾
Insertion loss (≤ 4 GHz)	< 0.3 dB (total)
Geometry	conical as per standard
Coaxial Connector	N-Female
Diameter	70 mm
Thickness	30 mm
Weight	250g
Fixing	8x M3 screws, included in delivery
requires	TARGET2-ADAPTER N-MALE



1) face-to-face with TARGET2-ADAPTER N-MALE

ESD-VERI-V

Application	adapter for ESD DC voltage measurement
Input impedance	$20 \text{ G}\Omega \parallel 3 \text{ pF}$
Input voltage range	0 – 32 kV
Output voltage range	0 – 1.6 V in $10 \text{ M}\Omega$ or $1 \text{ M}\Omega$
Output connector	BNC
Dimensions	17 cm height, 5.5 cm diameter
Weight	433 g
Included	earth conductor, BCN adapter, BNC termination



ESD-STAND Ed2

Application	stand for supporting ESD gun, fixed point test
Height	50 – 180 cm, adjustable
Position	360° adjustable
Dimensions	64 x 17 x 12 cm (packed)
Weight	4 kg
Included	cable holder for calibration

ESD-HCP-AUTO

Application	coupling plane as per ISO 10605 annex F
Length	1500 mm
Insulation distance	50 mm
Test level	8 – 20 kV, as per standard
Dimensions	180 x 120 x 5 cm
Weight	2.2 kg
Included	EARTH CABLE



ESD3000DM-EXT

Application	1 m extension cable for ESD3000 modules
Compatibility	DM and DN modules
Cable length	1 ± 0.05 m
Weight	0.5 kg including accessories
Can be used with	DN modules



ESD3000 SAFETY-S

Standard	MIL-STD-331, MIL-STD-1512
Application	safety switch for testing explosive devices
Voltage	max. 30 kV CD
Dimensions	20 x 16 x 12 cm
Weight	2 kg including accessories
Included	mains adapter
To be used with	ESD3000DM-EXT , TC-MIG24 ED



TC-ST ED for testing explosive devices

Application	test cabinet
Voltage insulation	max. 36 kV
EUT dimensions	max. 20 x 30 x 20 cm
EUT weight	max. 5 kg
Safety circuit	door interlock
Signal lamps	red and green lamps built-in
External warning lamps	requires WARNING-LAMP , EMERGENCY-STOP
Dimensions	47 x 43.5 x 25.4 cm
Weight	8.5 kg
Included	connection cable 25pol to ESD3000 SAFETY-S



WARNING-LAMP

Cable length	5 m
Dimensions	diameter 7x cm x 25 cm
Weight	0.5 kg



EMERGENCY-STOP

Cable length	5 m
Dimensions	8 cm x 8 cm x 10cm
Weight	0.3 kg



ESD3000 CNH12

Application	Magnetic field loop for ESD3000 test system
Loop diameter	12 cm
Loop current allowed	> 100 A
Discharge mode selection	contact discharge (CD)
Current at 15 kV setting	50 A, with RM32 and DN1
Current at 30 kV setting	108 A, with RM32 and DN1
Dimensions	33 x 13 x 1 cm
Weight	0.2 kg including accessories
Requires	ESD3000RM32 , ESD3000DN1 or other DN



ESD3000-OPTOLINK

Application	(insulating) optical cable ESD3000 - computer
Length	10 m
Interface	RS232, requires USB adapter
Baud rate	9600 bps
Weight	0.2 kg
Included	tranceiver with mains adapter



TEMA

Application	control software for ESD3000 system
License	1 license for 1 generator
Capabilities with ESD3000	Sequences, reporting, remote control
Compatibility	Windows XP up to 10
Requires	ESD3000-OPTOLINK

EMC PARTNER

PRODUCT APPLICATION RANGE

CONSUMER & INDUSTRIAL ELECTRONICS

Transient Test Systems for conducted EMC tests on electronic equipment. ESD, EFT, surge, ring wave, DOW, dips, magnetic field, common and differential mode. Compliant to IEC, EN and ANSI standards.



AEROSPACE ELECTRONICS

Impulse generators and couplers for avionic applications. Single stroke, multiple stroke and multiple burst according to RTCA / DO-160, EUROCAE / ED-14 and aircraft manufacturer standards.



Component TestING

Voltage and current Impulse generators for design and production testing of varistors, gas discharge tubes, surge protective devices, X / Y capacitors and specialist impulse generators for semiconductor tests.



DEFENCE ELECTRONICS

Complete test solutions for MIL-STD-461 requirements CS06, CS106, CS115, CS116, CS117 and CS118.



TELECOM & data line testing

Voltage and current impulse generators, CDNs, power contact, power induction equipment for exchange and customer equipment according to ITU, IEC, EN and ETSI requirements.



ENERGY & UTILITY EQUIPMENT

High current CDNs combined with transient test equipment fulfil requirements to test renewable and classical energy distribution network and monitoring equipment.



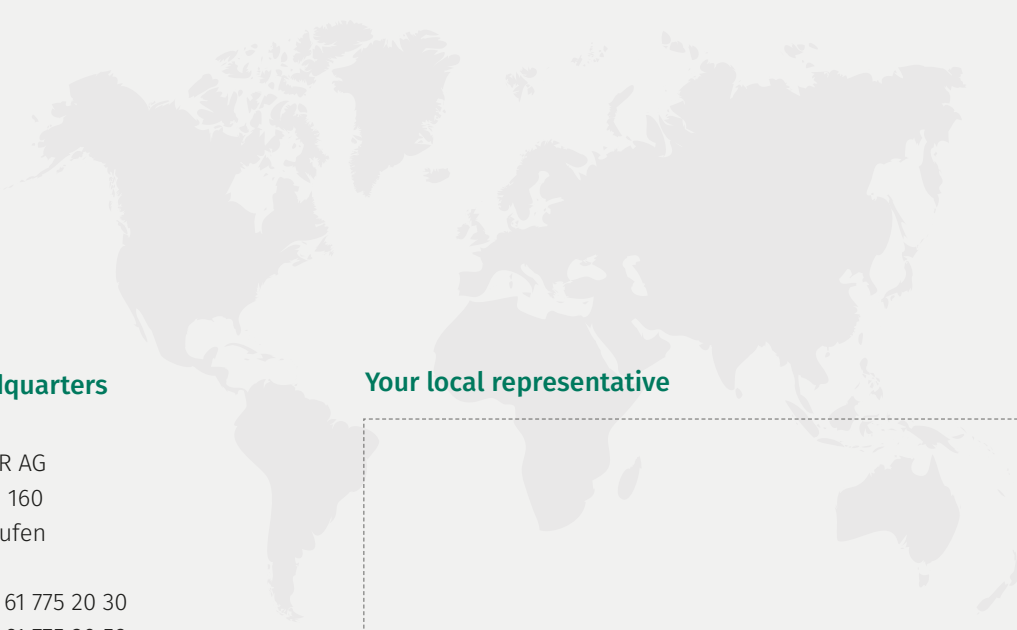
CUSTOMER ServiceS

Customer support throughout an equipment's lifetime is central to the EMC PARTNER AG philosophy. Directly from our ISO accredited facility in Switzerland or through our network of services centres, we provide support wherever you



For further information please do not hesitate to contact your local EMC PARTNER AG representative.
Visit our website for more information and contact details.

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