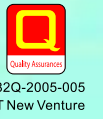




**eca3G** Ground Magic  
*Earthling Device without burying*

Established the Contraction  
for the Third Person Unit Prices



Pro-environmental 3rd generation Digital grounding device

**eca<sup>1,602 x 10<sup>-19</sup></sup>3G**

Ground & Lightning Protection



GROUND's FUTURE is SCIENCE!



**Ground co., Ltd.**  
*Perfect Ground System*

**PGS** PGS installation method is developed firstly in the world, through the scientific approach by the Runge-Kutta numeric integration to solve the differential equation of the lightning strike. Ground corp. assures 100% for all/every installations of PGS Lightning Protection System and Grounding System by Company Liabilities Program Enforcement.

PGS Research and Development team, which is composed with experts on the field of grounding and lightning, developed PGS on the basics of Runge-Kutta numeric analysis. PGS R&D team applied the grounding and lightning protection solution, which was deduced from fundamental analysis of the relationship between the grounding resistance, ground-impedances and characteristics of lightning, to the PGS system.

For the more, the team has developed the third generation of Digital Grounding Equipment, ega3G, not burying the lightning-rod but installing the system in convenience, which is environment-friendly grounding system, and had good reputations not only in Korea but also overseas.

During last ten years, the theory of PGS and the quality of PGS products has been proved its reliabilities as perfect in its application field of the lightning protection and grounding, systematic electricity grounding, electro-static damage prevention, power line voltage regulation, communication system protection, safety of waterworks or hospital mains and etc.



Good product approved by Public Procurement Service



INNOBIZ certification



Performance certification from small and medium business administration



Quality guarantee Q Mark



New technology venture business certification



Performance verification by KETI



Korean patent



Mark to signify conformance with EU regulations



ISO9001: 2000  
ISO 14001: 2004

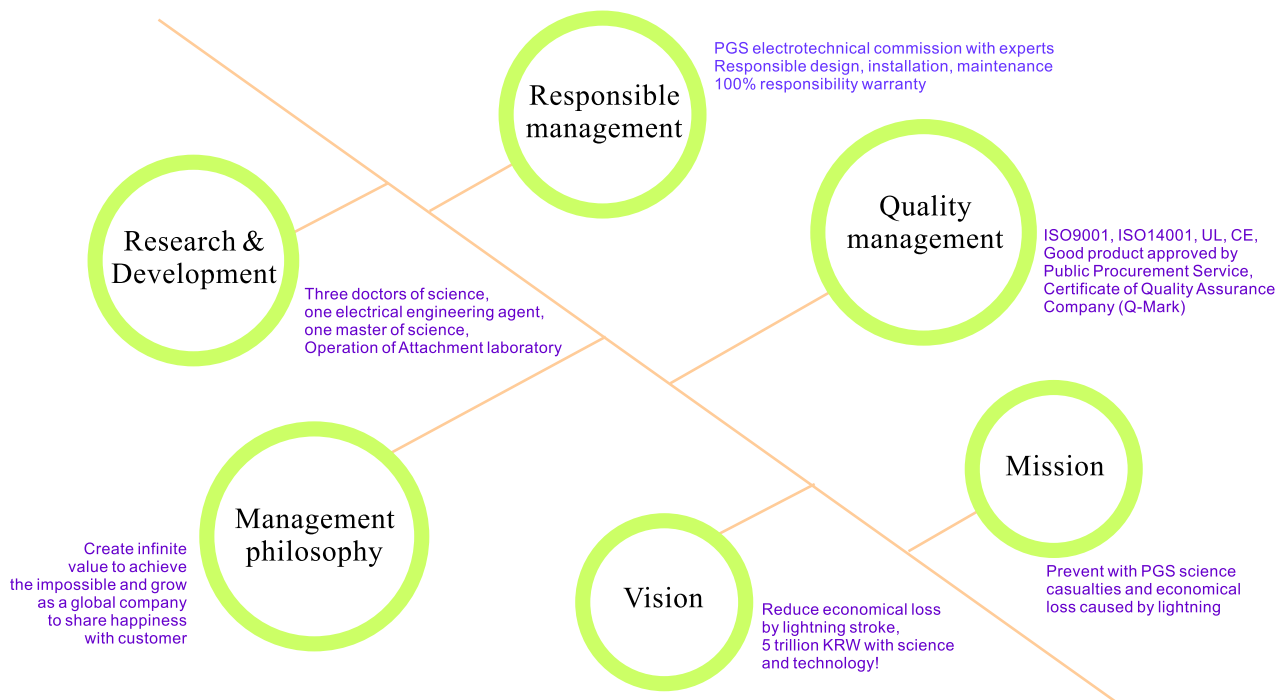


Performance guarantee insurance of Machinery mutual aid association



A billion won insurance from LIG PL

## Introduction



## Company information

### ■ Company

Ground Co., Ltd.

### ■ Established

March 1995

### ■ Head office

Rm 209, 2nd floor, Suntech city 2, 307-2 Sangdaewon-dong, Jungwon-gu, Seongnam-si, Gyeonggi-do, Korea  
Tel : 02-572-0008 fax : 02-572-3224  
Customer Service Toll Free Number: 080-558-8800  
Website : www.ground.co.kr  
E-mail : ground@ground.co.kr

### ■ Factory & Domestic

#### Chungnam factory

228-38 Sinduk-ri, Ijang-myeon, Chunan-si, Chungnam, Korea

#### Chungbuk factory

170-10 Yonggye-ri, Gumwang-ub, umseong-gun, Chungbuk, Korea

#### Domestic

Industry Academic Cooperation Foundation  
Complex #401, Sun Moon University,  
Tangjeong-myeon, Asan-si, Chungnam, Korea

### ■ Main business areas

Grounding and lightning arresting equipment manufacture and installation, Grounding and lightning arresting device manufacture and installation, Voltage quality enhancement device manufacture, Voltage quality examination, Power-saving equipment manufacture, Information and communications business, Communication equipment ground installation, Communication equipment lightning arrestor installation, Grounding and lightning arresting equipment examination, design, and installation, Noise, ESD Solution Lightning strike simulation

### ■ Branches

#### GangWon branch office

2nd Fl, Daehan redcross society, #53, Jungangno 1-ga, Chuncheon-si, Gangwon-do, Korea  
Tel : 033-243-4114 Fax : 033-243-4114

#### DaeGu, GyeongBuk branch office

3rd Fl., #320 Yucheon-dong, Dalseo-gu, Daegu, Korea 704-390  
Tel : 053-643-7700 Fax : 053-643-7702

#### JeJu branch office

#2386-17, Yeondong, JeJu, 690-818  
Tel : 064-747-1492 Fax : 064-747-0493

#### Overseas branches

#### NOVA PGS in china

D903 Hwajadaeha, 168 Shibudae street, Hwapeong-gu, Simyang-si, China

#### PGS South-eastern Corp.

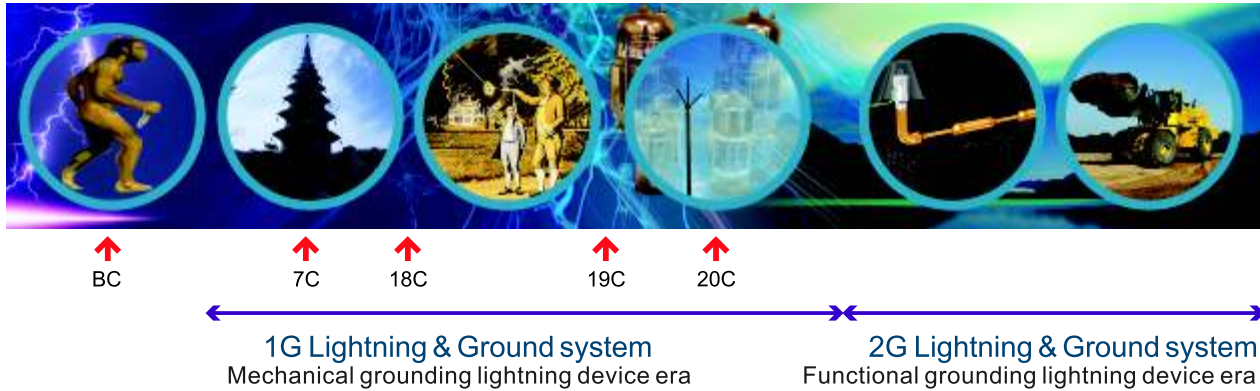
**BongHyeon Seo,**  
Philippines  
Tel: +63-916-211-8872

#### PGS Pioneer Corp.

**HongBin Lim,**  
Philippines  
Tel: +63-908-228-7546

# History of the grounding technology of lightning

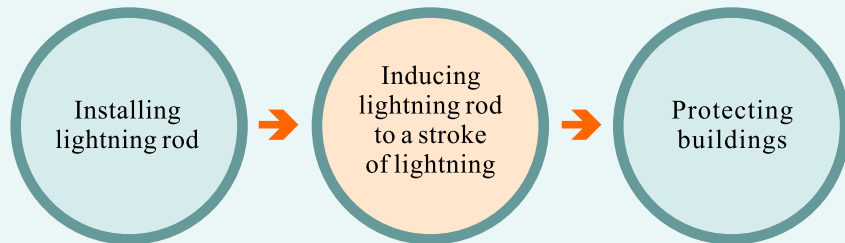
The 1st generation : Franklin lightning rod



## 1 What are the 3rd generation grounding device, **eca3G**?

### ● The 1st generation grounding & lightning device

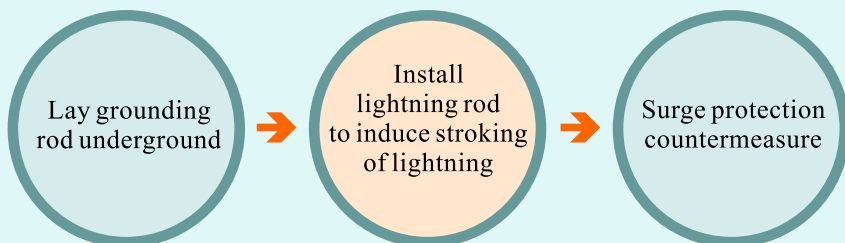
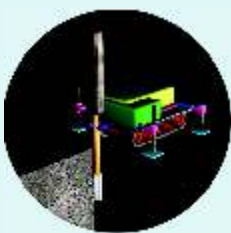
The generation that Franklin experiments with kites on lightning rod to preventing buildings from directly being struck by lightning



▶ Technology to prevent buildings from directly being struck by lightning as inducing lightning rod to a stroke of lightning

### ● The 2nd generation grounding & lightning device

The generation that the shape and function of lightning rod and grounding rod became various and functional grounding rod and lightning rod and surge protector are developed by the research of stroke of lightning, Surge, Noise, ESD

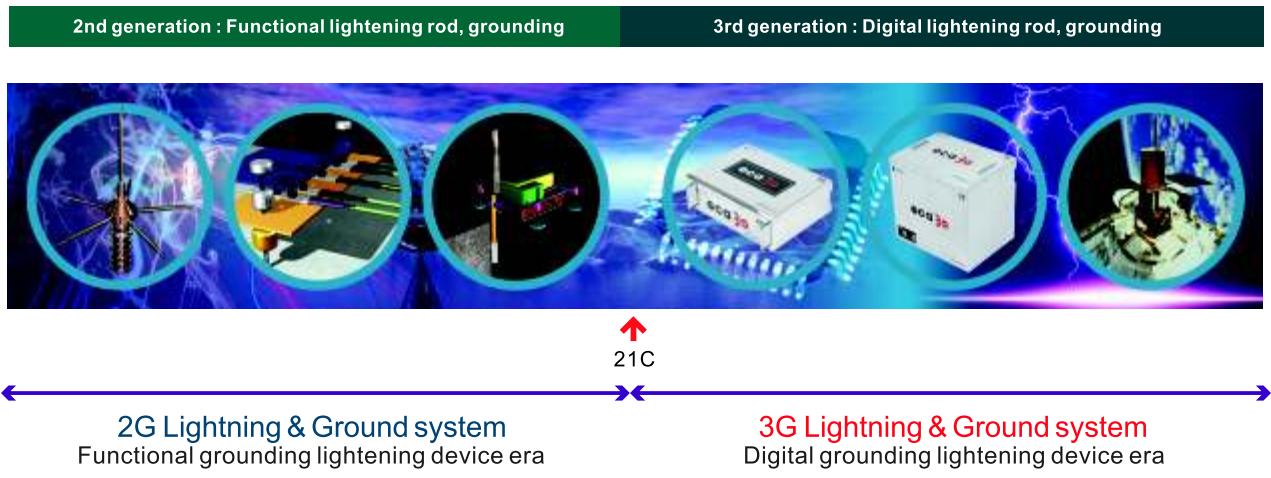


Developing Functional grounding rod that has reducing technology of grounding resistance

High-voltage wide-area lightning rod  
Ion emanation wide-area lightning rod

Power quality improving device,  
Surge protector

▶ Wide-area lightning rod with wide protection radius, grounding rod to reduce grounding resistance, SPD to decrease surge



● 3rd generation digital grounding device **eca3g**

The 3rd generation digital grounding device that protects electric power and system by the way that neutralizes and eliminates abnormal electric voltage using abnormal electric voltage & electric current analyzing detection device energy conversion & electric charge neutralizing device, not by the way that discharging the stroke of lightning, surge, noise, ESD, grounding electric current, etc to the ground through grounding rod!



- Not need to dig in the ground
- Install on the ground not bury under ground
- Convenient as anyone just plug into plug socket and uses
- 100% liability guarantee by a billion won product liability compensation insurance
- Science that developed by the PGS technology of doctors team of science in KAIST



● Specification

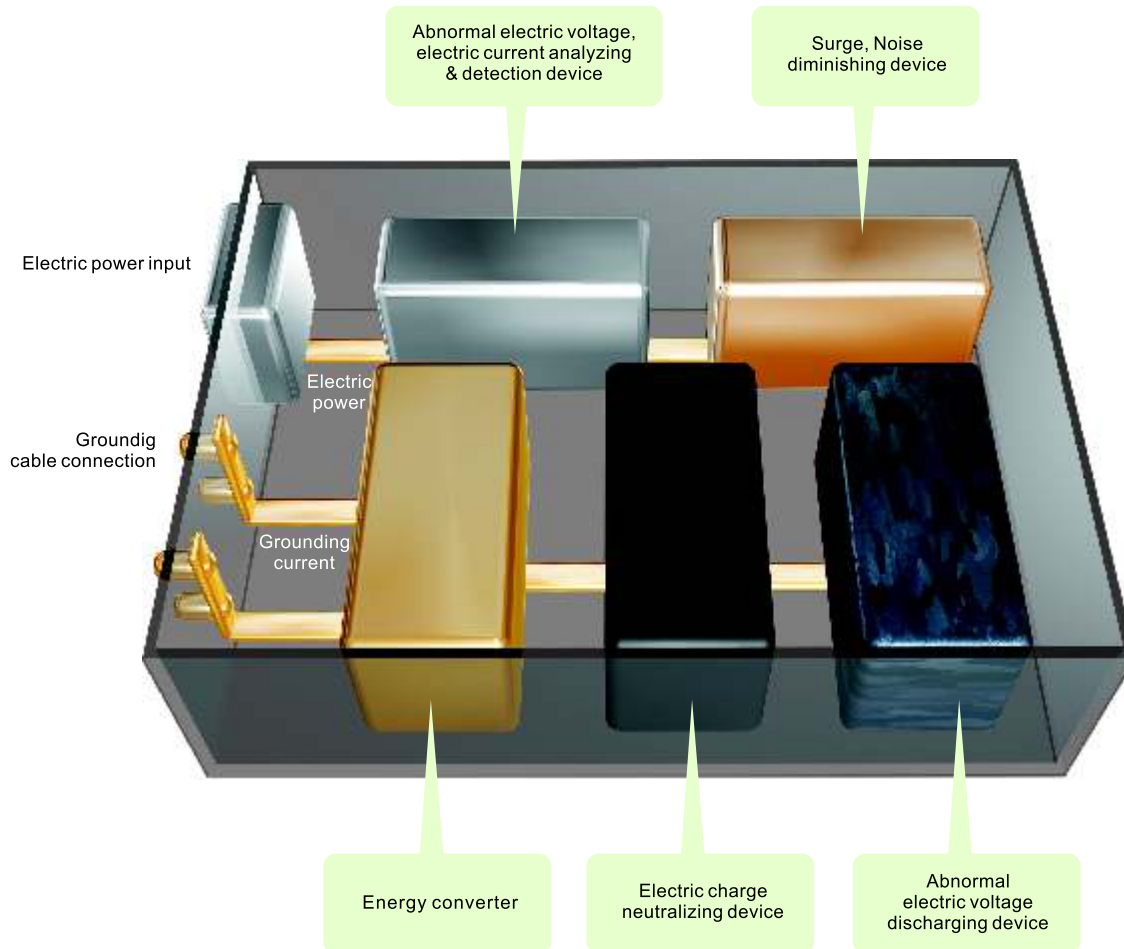
Section	100% liability guarantee	100% refund guarantee	Standard electrical potential grounding function	Eliminating function of lightning stroke current	Elimination function of Surge	Grounding rod reducing stuff	Ground drilling laying construction	Damaging environment / contamination of soil
Yes / No	<b>Yes</b>	<b>Yes</b>	<b>Yes</b>	<b>Yes</b>	<b>Yes</b>	<b>No</b>	<b>No</b>	<b>No</b>

■ The images of this product might be changed

■ Reduce economical loss by lightning stroke, 5 trillion won with science and technology!

## 2 Function & operation principle of **eca3G**

The 3rd generation digital grounding device that protects electric power and system by the way that neutralizes and eliminates abnormal electric voltage using abnormal electric voltage & electric current analyzing detection energy conversion & electric charge neutralizing device, not by the way that discharging the stroke of lightening, surge, noise, ESD, grounding electric current, etc to the ground through grounding rod!



- **Electric power input:** Input electric power of switchboard and unprotected facilities
- **Grounding cable connection:** Connect with unprotected facilities & MGB(Main Ground Board) & Grounding cable
- **Abnormal electric voltage, electric current analyzing & detection device:** Analyze and detect power quality of power switchboard and abnormal power voltage characteristics so eliminate abnormal power voltage using the device derived from this result
- **Surge, Noise diminishing device:** Maintain good electric power quality diminishing surge and noise incoming from electric power
- **Energy converter:** Eliminating electric energy by converting abnormal power voltage (induced lightening, surge, noise) coming from power supply and grounding power current coming from grounding cable to thermal energy
- **Electric charge neutralizing device:** Eliminating electric characteristic energy by neutralizing electric characteristics of abnormal power voltage and abnormal power current incoming from power supply and grounding cable
- **Abnormal electric voltage discharging device:** Discharging detected abnormal power voltage(induced lightening, surge, noise) and grounding electric current by Arch discharging so that convert to heat & light energy and eliminate abnormal power voltage

### 3 Certifications and advantages of eca3G

ISO9001,14001, Good product approved by Public Procurement Service, Performance certification, CE mark, NT&INNOBIZ enterprise, LIG PL insurance a billion won, joining performance guarantee insurance of Machinery mutual aid association, 100% refund & recall



Title	Certification No.	Issued by.
Good product approved by Public Procurement Service (3rd generation grounding device)	2007093	the head of Public Procurement Service
3rd generation grounding device(eca3G)	PCT/KR2006002907	International patent
Korean patent(3rd groudning device)	No. 10-0599359	the Korean Intellectual Property Office
ISO9001	AR 3871	SIRIM QAS international Sdn.Bhd.
ISO14001	F004401096	SIRIM QAS international Sdn.Bhd.
CE	GROUND-0101~3	Comunaute Europeene
Performance certification	No. 27-098	The head of small and medium business administration
INNOBIZ business	No. 6066-3249	The head of small and medium business administration
New technology venture business	No. 061625231-00669	The head of small and medium business administration of Gyeonggy



Public Procurement Service Good products are preferentially supplied to public organization by private contract following national contract laws

Public Procurement Service Good products are those which approved through strict assessment on good quality products between those products produced from small and medium venture business for quality improvement of supplied resources

comparative items	Previous 1,2 generation grounding device	3rd generation digital grounding device - eca3G
<b>Economy</b>	Heavy cost by construction with engineers and heavy machinery	Economical as anyone can install without heavy machinery
<b>Convenience</b>	limit of place and area, expert needed	anyone can install anywhere
<b>Environmental</b>	Cause environmental and ground pollution from laying underground	No pollution as no laying underground needed
<b>Technology</b>	Causing 2nd trouble by reversal of discharging current	Neutralization elimination of electric characteristics by digital energy conversion
<b>Liability assurance</b>	unable to find who is responsible as it's difficult to find causes	100% guarantee by a billion won PL insurance
<b>Maintenance management</b>	Difficult maintenance as laying underground	Easy maintenance as installing on the ground
<b>Exchange refund</b>	Unable to exchange and refund as laying underground	100 % exchange, refund guarantee as installing on the ground
<b>Construction period</b>	Long construction time	Short time for simple installing not constructing
<b>Lifetime Guarantee</b>	Depends on installation circumstance(2years~10years)	No influence from environmental changes (30 years ~ over 40 years)

■ The images of this product might be changed

## 4 eca3G Lightning Ground Magic (LM Series)

### Function

3rd generation digital grounding device that protects electric power and system by the way that neutralizes and eliminates abnormal electric voltage using abnormal electric voltage & electric current analyzing detection device energy conversion & electric charge neutralizing device, not by the way that discharging the stroke of lightning, surge, noise, ESD, grounding electric current, etc to the ground through grounding rod!



Product code	Product Name	Standard	Voltage /breaker	Place to use
39121613-21084414	LM-12-10-30M	1Φ2w/110V/240KA/30MJ	110V/30A	Device scale Small
39121613-21084420	LM-12-20-60M	1Φ2w/220V/240KA/60MJ	220V/30A	Device scale Small
39121613-21084419	LM-33-20-60M	3Φ3w/220V/320KA/60MJ	220V/30A	Device scale Medium
39121613-21084417	LM-33-38-90M	3Φ3w/380V/320KA/90MJ	380V/50A	Device scale Medium
39121613-21084418	LM-34-38-90M	3Φ4w/380V/400KA/90MJ	380V/100A	Device scale Large
39121613-21084416	ECA3G-50M	15MV/120KA/0.1sec/50MJ		Capacity expansion module
39121613-21084415	ECA3G-100M	15MV/240KA/0.1sec/100MJ		Capacity expansion module

■ Voltage/breaker : Voltage is Use power voltage, breaker A indicates main power breaker capacity of switchboard in facility room to protect example: 110V/30A indicates that use 110V power voltage and the capacity of switchboard main breaker in the place to install ECA3G is 30A

■ MJ(Mega joule) : work energy(Joule) = P X Dt = resistance X current<sup>2</sup> X time

### Application

- Matches with the place that lightning often strokes and is easy to be struck by lightning as facilities are exposed.
- Places that induced lightning is expected to the power supply, communication, signal cable.
- Lightning facilities of newest information electronic communication facilities, base station, cable, remote communication facilities, electric facilities, radar, intelligent buildings
- Computing center, military operations communication facilities, broadcasting facilities, instrumentation control facilities, lightning rod installed place

■ The images of this product might be changed

■ Reduce economical loss by lightning stroke, 5 trillion won with science and technology!



## 5 eca3G Car Ground Magic (CM Series)

### Function

- Military communication operating vehicle, vehicle moving base station, aircraft, naval vessels, moving broadcast vehicle, moving measuring facilities
- Facility for vehicle : For the purpose of simply installing and using in vehicles that need grounding such as communication and operating vehicle
- Facility for moving: For the purpose of quick installation such as to the equipments that is unable to ground



Product code	Product Name	Standard	Voltage /breaker	Place to use
39121613-21084421	CM-DC-02-20M	DC/24V/120KA/20MJ	24V/30A	Vehicles for communication Small
39121613-21084422	CM-DC-04-30M	DC/48V/120KA/30MJ	48V/30A	Vehicles for communication Small
39121613-21084423	CM-12-10-30M	1Φ2w/110V/120KA/30MJ	110V/30A	Vehicles for communication Medium
39121613-21084424	CM-12-20-60M	1Φ2w/220V/240KA/60MJ	220V/30A	Vehicles for communication Large

- Voltage/breaker : Voltage is Use power voltage, breaker A indicates main power breaker capacity of switchboard in facility room to protect example: 110V/30A indicates that use 110V power voltage and the capacity of switchboard main breaker in the place to install ECA3G is 30A
- MJ(Mega joule) : work energy(Joule) = P X Dt = resistance X current<sup>2</sup> X time

### Application

- Grounding system of Military communication operating vehicle, vehicle moving base station, electric wave measuring vehicle, environmental monitoring moving vehicle, Military operating communication facility, aircraft, naval vessel, moving broadcasting vehicle, communication relay vehicle

■ The images of this product might be changed

## 6 eca3G Telecom Car Ground Magic (TM Series)

### Function

- Functional effects of stable device operation by solving problems of lightning stroke, surge, grounding of high-tech electric-electronic communication information facilities
- Grounding function of communication facilities, signal facilities installed in building or container and have a little influence of direct stroke of lightning



Product code	Product Name	Standard	Voltage /breaker	Place to use
39121613-21109982	TM-DC-01-1M	DC/12V/40KA/1MJ	12V/30A	Device scale Small
39121613-21084434	TM-DC-02-2M	DC/24V/40KA/2MJ	24V/30A	Device scale Small
39121613-21084435	TM-DC-04-5M	DC/48V/40KA/5MJ	48V/30A	Device scale Small
39121613-21084436	TM-12-10-10M	1Φ2w/110V/80KA/10MJ	110V/50A	Device scale Small
39121613-21084437	TM-12-20-20M	1Φ2w/220V/80KA/20MJ	220V/75A	Device scale Medium
39121613-21084438	TM-34-38-50M	3Φ4w/380V/80KA/50MJ	380V/100A	Device scale Large

- Voltage/breaker : Voltage is Use power voltage, breaker A indicates main power breaker capacity of switchboard in facility room to protect  
example: 110V/30A indicates that use 110V power voltage and the capacity of switchboard main breaker in the place to install ECA3G is 30A
- MJ(Mega joule) : work energy(Joule) = P X Dt = resistance X current<sup>2</sup> X time

### Application

- Measuring device, Computing equipment, control facility, assessment equipment, electronic communication facility, communication equipment, sound broadcast facility, electronic communication instrumentation control PLC facility, cable facility of high-tech information electronic communication, instrumentation facility, PLC facility

■ The images of this product might be changed

■ Reduce economical loss by lightning stroke, 5 trillion won with science and technology!

## 7 eca3G Surge Ground Magic (SM Series)

### Function

- Protect high-tech electric-electronic communication information facility from lightning stroke, surge, induced lightning surge so produce stable equipment operating function
- Install when neutralize and eliminate surge current incoming through electric power cable, communication cable

Product code	Product Name	Standard	Voltage /breaker	Place to use
39121613-21084439	SM-12-10-30M	1Φ2w/110V/120KA/30MJ	110V/30A	Device scale Small
39121613-21084440	SM-12-20-60M	1Φ2w/220V/120KA/60MJ	220V/30A	Device scale Small
39121613-21084441	SM-33-20-60M	3Φ3w/220V/160KA/60MJ	220V/50A	Device scale Medium
39121613-21084442	SM-33-38-90M	3Φ3w/380V/160KA/90MJ	380V/75A	Device scale Medium
39121613-21084443	SM-34-38-90M	3Φ4w/380V/240KA/90MJ	380V/100A	Device scale Large

■ Voltage/breaker : Voltage is Use power voltage, breaker A indicates main power breaker capacity of switchboard in facility room to protect example: 110V/30A indicates that use 110V power voltage and the capacity of switchboard main breaker in the place to install ECA3G is 30A

■ MJ(Mega joule) : work energy(Joule) = P X Dt = resistance X current<sup>2</sup> X time



### Application

- Measuring device, Computing equipment, control facility, assessment equipment, communication equipment, sound broadcasting facility, instrumentation facility, cable facility of high-tech information electronic communication, remote base station, remote-cable communication facility, PLC facility
- Place that need surge protection such as radar, computing center etc.

## 8 eca3G General Ground Magic (GM Series)

### Function

- Protect electric-electronic communication information facility from grounding electric current, surge, noise so produce stable equipment operating function
- Install when neutralize and eliminate grounding power current and surge current of ordinary electricity, communication, electronic facilities

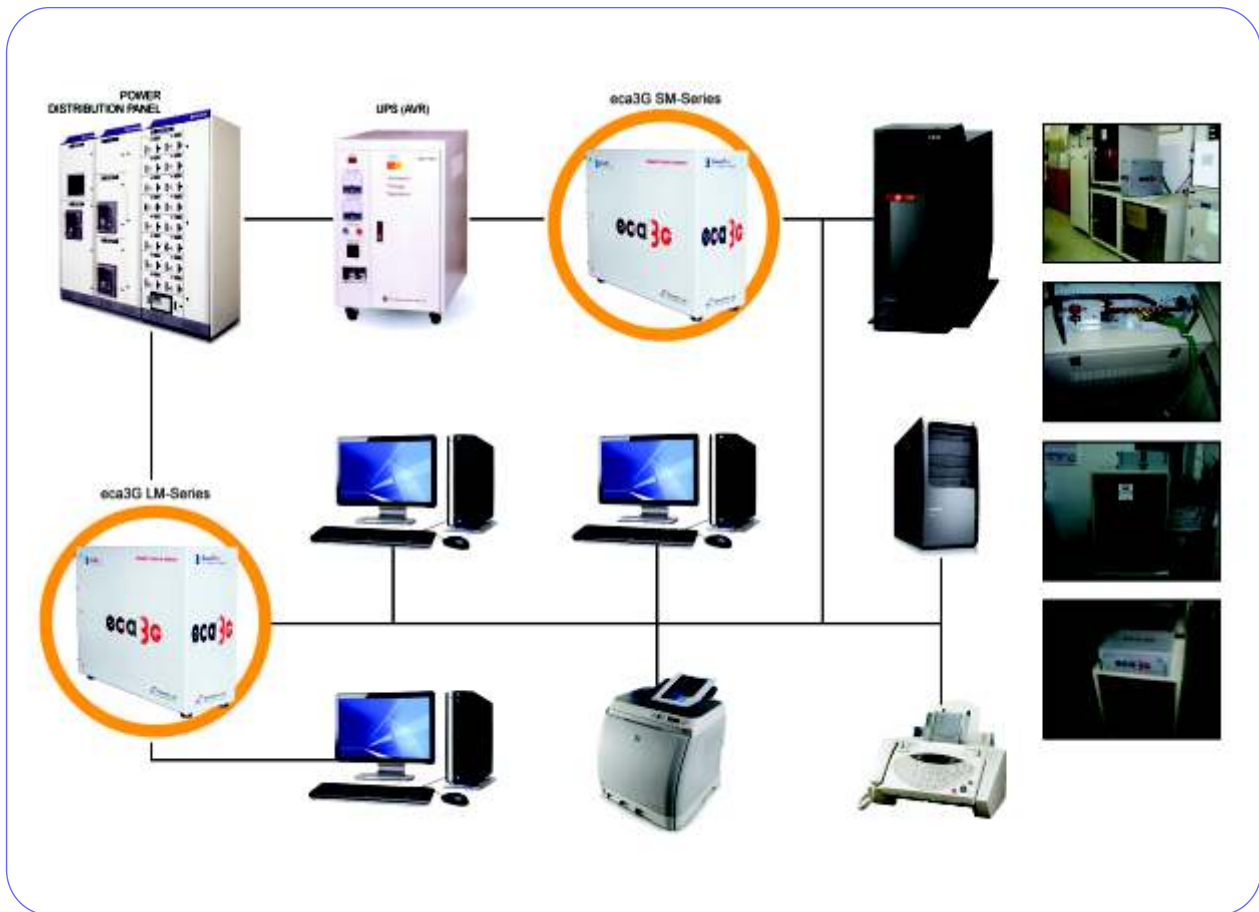
Product code	Product Name	Standard	Voltage /breaker	Place to use
39121613-21084444	GM-12-10-30M	1Φ2w/110V/120KA/30MJ	110V/30A	Device scale Small
39121613-21084445	GM-12-20-60M	1Φ2w/220V/120KA/60MJ	220V/30A	Device scale Small
39121613-21084446	GM-33-20-60M	3Φ3w/220V/160KA/60MJ	220V/50A	Device scale Medium
39121613-21084447	GM-33-38-90M	3Φ3w/380V/240KA/90MJ	380V/75A	Device scale Large

■ The images of this product might be changed

## 9 eca3G solution : Communication equipments of office automation, computation facilities, IDC

### outline of solution

- LM-Series which remove lightning current (Indirect Stroke) through power line are installed in main power distribution panel to protect human life and electric equipments of office automation for example Computers in office, server, printer, scanner, communication network from lightning strokes, surge, electric shock.  
SM-Series which remove indirect stroke and surge that may come through communication line, data line and power line are installed in UPS(AVR) to protect and to operate equipments 100% safely.



### Design condition and requisite for estimate

- Main power breaker capacity of switchboard in facility room is 380V/100A, Equipments quantity under 40. Unprotected facilities are located inside of 10 meters from each eca3G(All equipments which are inside of 10 meters are connected with four eca3G)

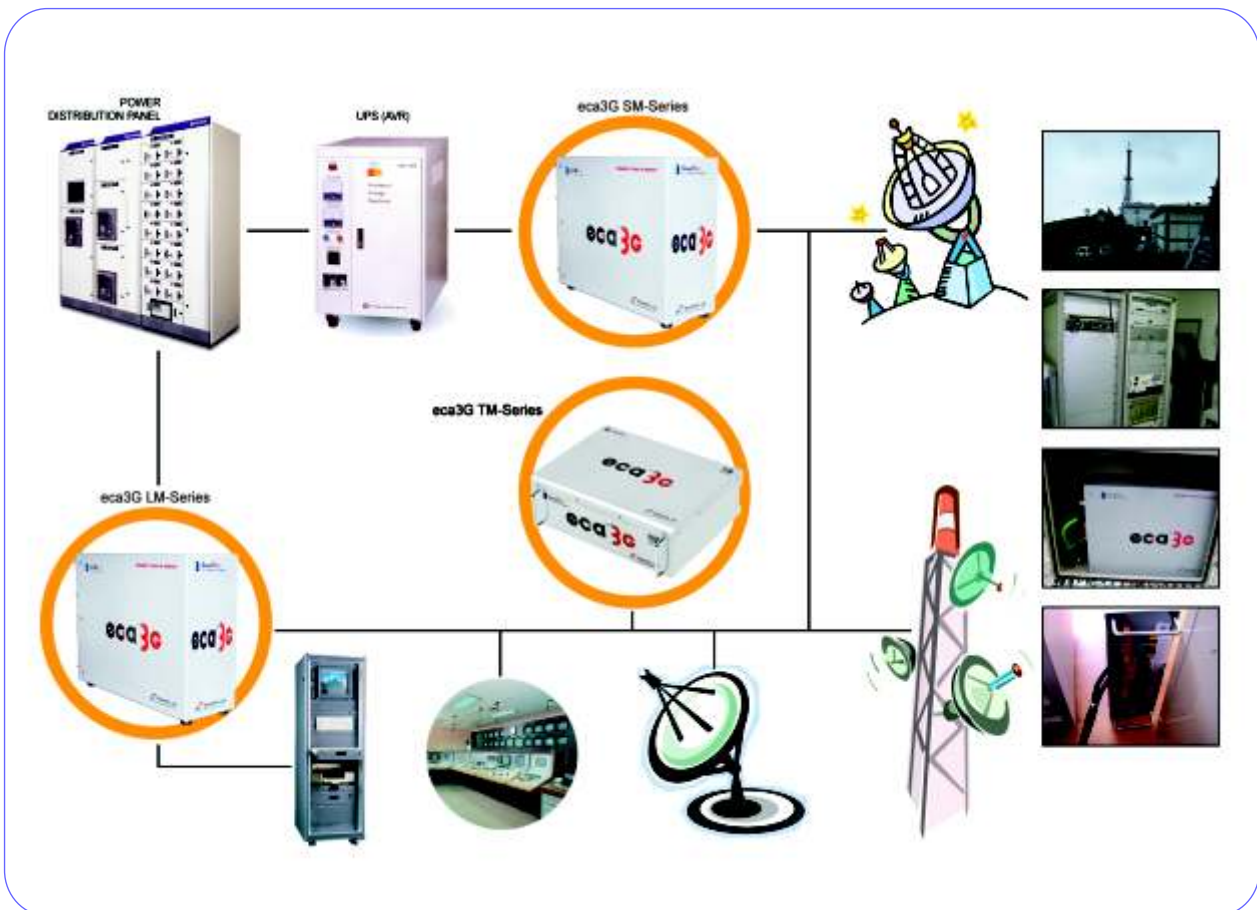
Product code	Product Name	Standard	Voltage /breaker	Place to use
39121613-21084418	LM-34-38-90M	3Φ4w/380V/400KA/90MJ	380V/100A	1 EA
39121613-21084443	SM-34-38-90M	3Φ4w/380V/240KA/90MJ	380V/100A	1 EA
<b>transportation, All sorts of expenses and establishment cost</b>				

■ Requisite for estimate : Lightning damage reparation responsibility insurance (LIG PL insurance one billion KRW), Performance guarantee insurance of Machinery mutual aid association

## 10 eca3G solution : Base station, relay station, transmission/reception station, PLC instrumentation facility, subway, railway, communication, communication & signal facility, remote-cable communication facility.

### outline of solution

- LM-Series which remove lightning current (Indirect Stroke) through power line and lightning rod are installed in main power distribution panel and lightning rod to protect electric communication equipments in Base station, relay station and transmission/reception station from lightning strokes, surge.
- SM-Series which remove indirect stroke and surge that may come through power line are installed in UPS(AVR), TM-Series which remove indirect stroke and surge that may come through antenna, signal power line, communication line, data line to protect equipments 100% safely.



### Design condition and requisite for estimate

- Main power breaker capacity of switchboard in facility room is 380V/100A, Equipments quantity under 40. Unprotected facilities are located inside of 10 meters from each eca3G(All equipments which are inside of 10 meters are connected with four eca3G).

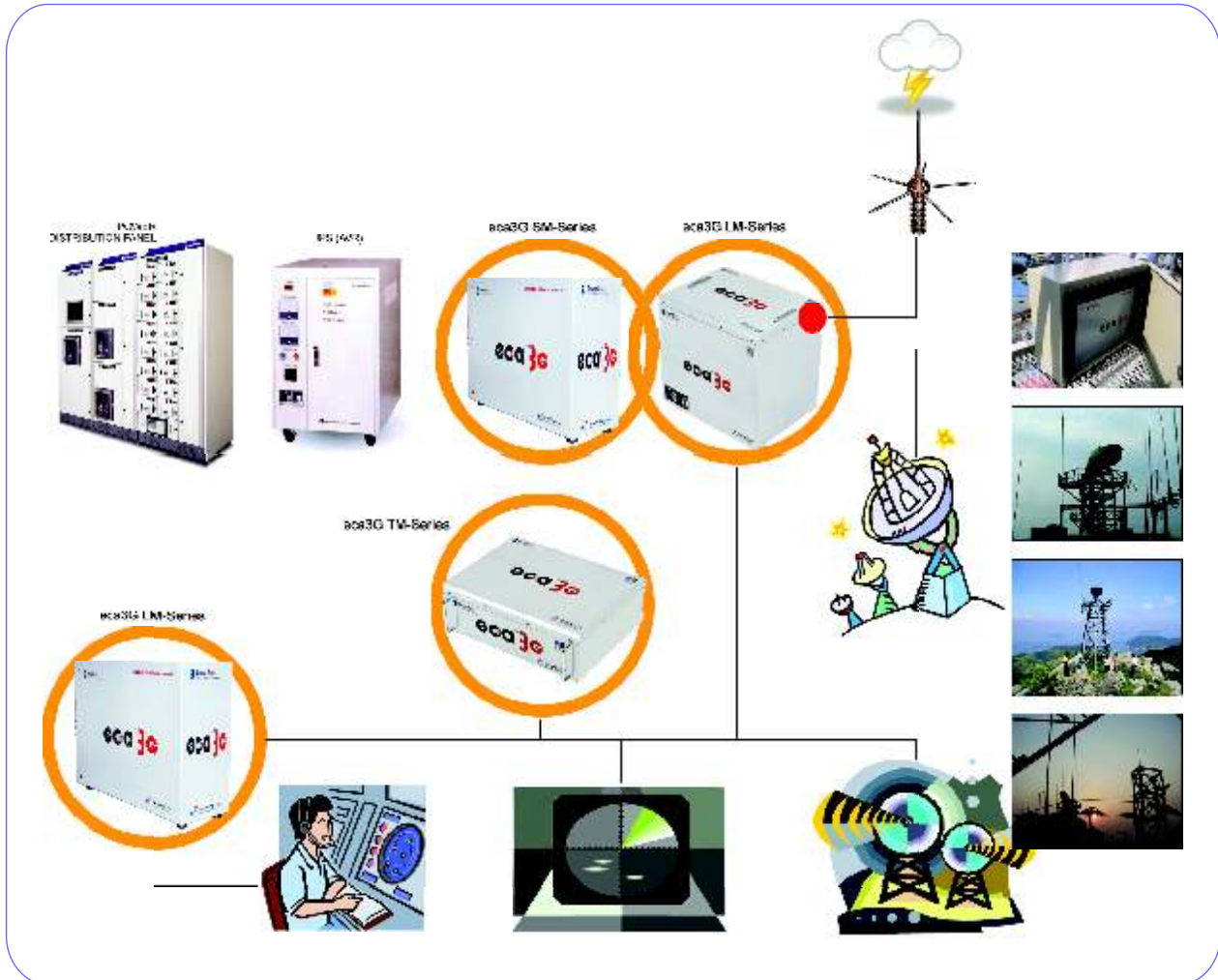
Product code	Product Name	Standard	Voltage /breaker	Place to use
39121613-21084418	LM-34-38-90M	3Φ4w/380V/400KA/90MJ	380V/100A	2 EA
39121613-21084438	TM-34-38-50M	3Φ4w/380V/80KA/50MJ	380V/100A	1 EA
39121613-21084443	SM-34-38-90M	3Φ4w/380V/240KA/90MJ	380V/100A	1 EA
<b>transportation, All sorts of expenses and establishment cost</b>				

■ Requisite for estimate : Lightning damage reparation responsibility insurance (LIG PL insurance one billion KRW), Performance guarantee insurance of Machinery mutual aid association

# 11 eca3G solution : Radar station, broadcasting facility (relay station, transmission station, antenna)

## outline of solution

- Each LM-Series which remove lightning current (Indirect Stroke) through power line and lightning rod are installed in main power distribution panel and lightning rod to protect radar station, broadcasting relay station, transmission/reception station from lightning strokes, surge. SM-Series which remove indirect stroke and surge that may come through power line are installed in UPS(AVR), TM-Series which remove indirect stroke and surge that may come through antenna, radar signal power line, communication line, data line to protect equipments 100% safely.



## Design condition and requisite for estimate

- Main power breaker capacity of switchboard in facility room is 380V/100A, Equipments quantity under 40. Unprotected facilities are located inside of 10 meters from each eca3G(All equipments which are inside of 10 meters are connected with four eca3G)

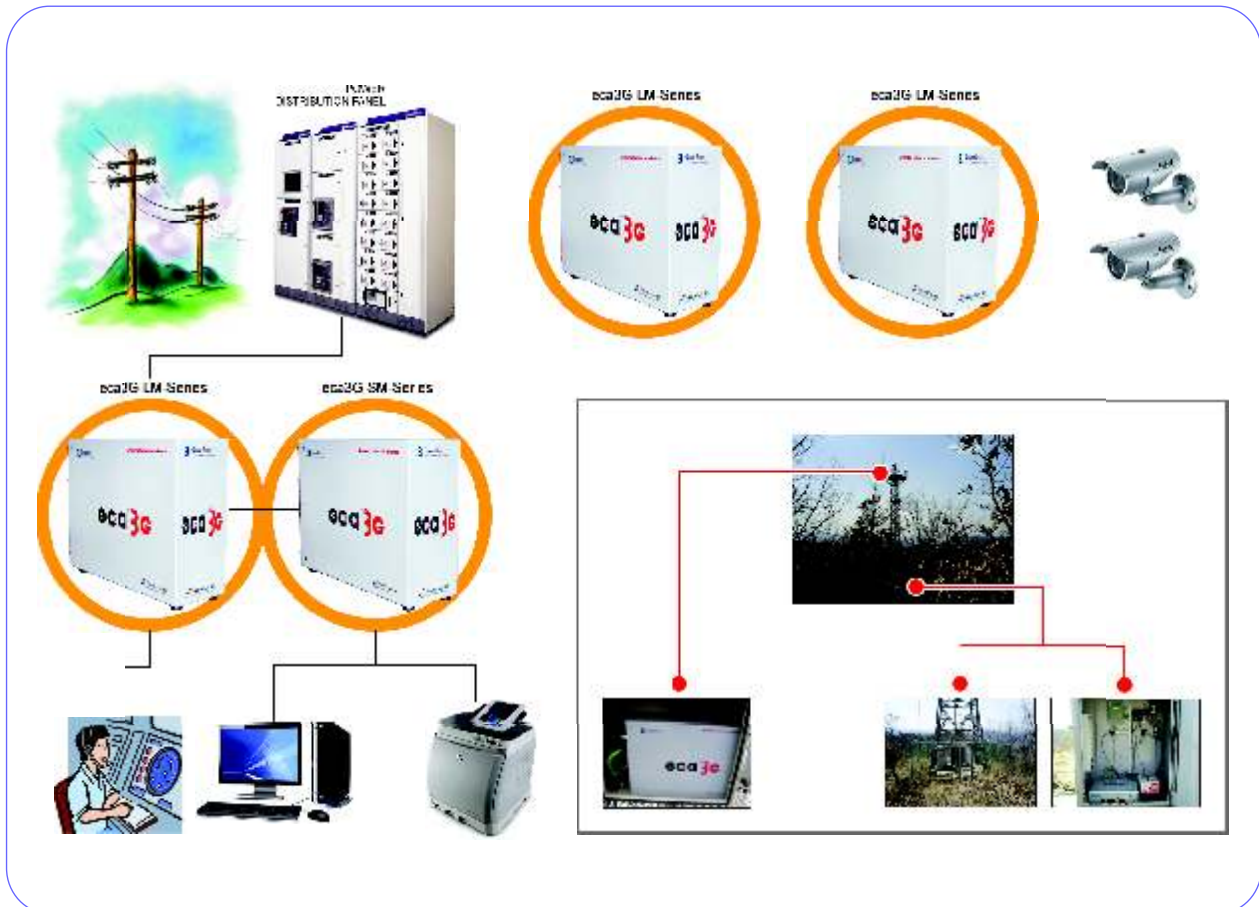
Product code	Product Name	Standard	Voltage /breaker	Place to use
39121613-21084418	LM-34-38-90M	3Φ4w/380V/400KA/90MJ	380V/100A	2 EA
39121613-21084438	TM-34-38-50M	3Φ4w/380V/80KA/50MJ	380V/100A	1 EA
39121613-21084443	SM-34-38-90M	3Φ4w/380V/240KA/90MJ	380V/100A	1 EA
<b>transportation, All sorts of expenses and establishment cost</b>				

■ Requisite for estimate : Lightning damage reparation responsibility insurance (LIG PL insurance one billion KRW), Performance guarantee insurance of Machinery mutual aid association

## 12 eca3G solution : Observation facility of wood fire, remote-cable communication facility in fire station

### outline of solution

- Each LM-Series which remove lightning current (Indirect Stroke) through power line are installed in main power distribution panel to protect remote-cable communication equipments in Observation facility of wood fire and fire station from lightning strokes. SM-Series which remove surge that may come through antenna, communication line, data line are installed to protect equipments 100% safely.



### Design condition and requisite for estimate

- Main power breaker capacity of switchboard in facility room is 380V/100A, Equipments quantity under 20. Unprotected facilities are located inside of 10 meters from each eca3G(All equipments which are inside of 10 meters are connected with two eca3G)

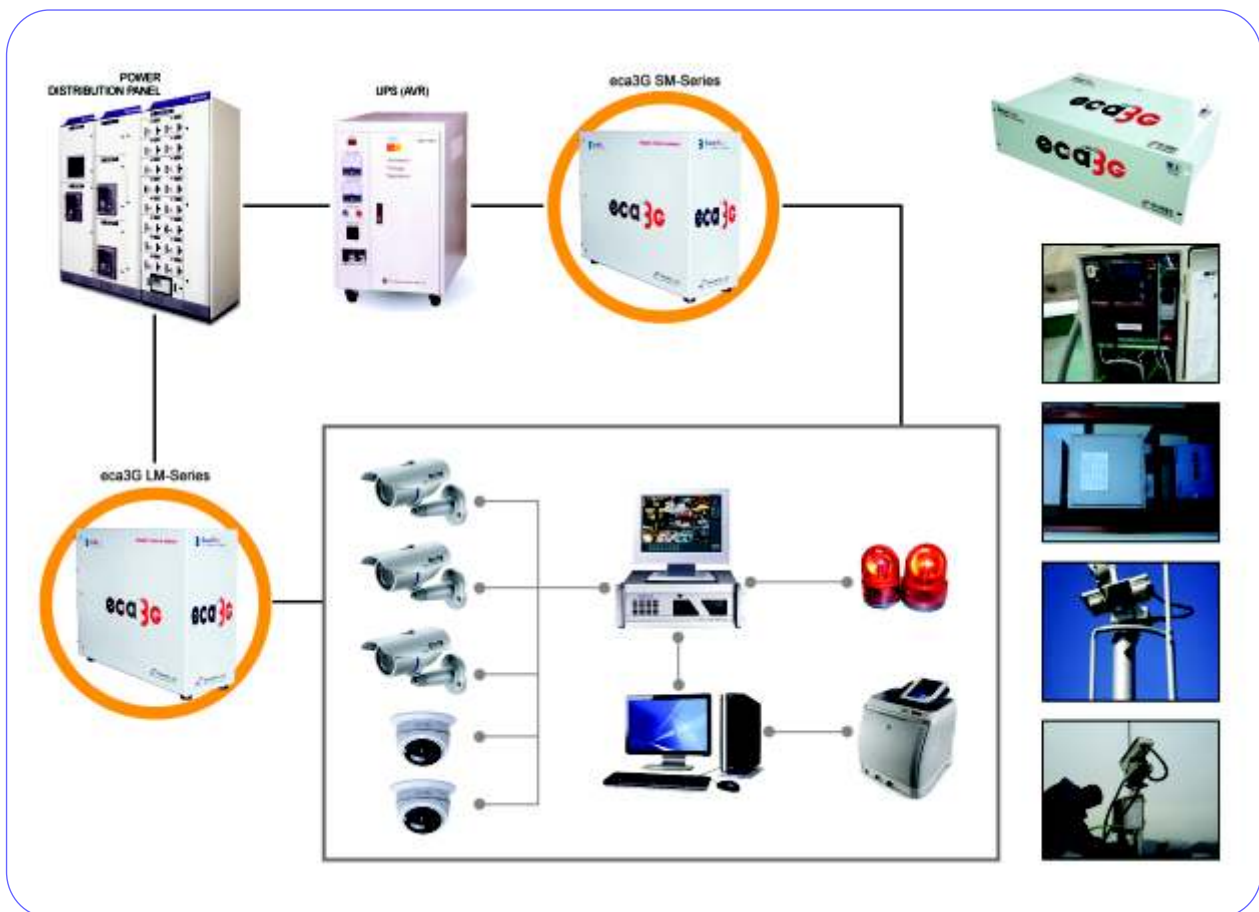
Product code	Product Name	Standard	Voltage /breaker	Place to use
39121613-21084418	LM-34-38-90M	3Φ4w/380V/400KA/90MJ	380V/100A	1 EA
39121613-21084440	SM-12-20-60M	1Φ2w/220V/120KA/60MJ	220V/30A	1 EA
<b>transportation, All sorts of expenses and establishment cost</b>				

- Requisite for estimate : Lightning damage reparation responsibility insurance (LIG PL insurance one billion KRW), Performance guarantee insurance of Machinery mutual aid association

## 13 eca3G solution : CCTV security system

### outline of solution

- LM-Series which remove lightning current (Indirect Stroke) through power line are installed in main power distribution panel to protect equipments of CCTV security guarding system from lightning strokes and surge.  
SM-Series which remove indirect stroke and surge that may come through communication line, data line and power line are installed in UPS(AVR) to protect equipments 100% safely.



### Design condition and requisite for estimate

- Main power breaker capacity of switchboard in facility room is 220V/30A, Equipments quantity under 20. Unprotected facilities are located inside of 10 meters from each eca3G(All equipments which are inside of 10 meters are connected with two eca3G)

Product code	Product Name	Standard	Voltage /breaker	Place to use
39121613-21084420	LM-12-20-60M	1Φ2w/220V/240KA/60MJ	220V/30A	1 EA
39121613-21084440	SM-12-20-60M	1Φ2w/220V/120KA/60MJ	220V/30A	1 EA
<b>transportation, All sorts of expenses and establishment cost</b>				

- Requisite for estimate : Lightning damage reparation responsibility insurance (LIG PL insurance one billion KRW), Performance guarantee insurance of Machinery mutual aid association



## 14 eca3G solution : Mobile operation vehicle, Communication vehicle

### outline of solution

- LM-Series which remove lightning current (Indirect Stroke) through outside power are installed in main power distribution panel (line breaker) to protect people and equipments, launched in mobile operation vehicles, wave measurement vehicles and communication vehicles, from lightning and surge.  
CM-Series which remove Indirect Stroke and Surge through cables of antenna and radar installed inside and outside vehicles are installed in power control panel of inside equipment (UPS, AVR), so that it will protect equipments 100% safely.



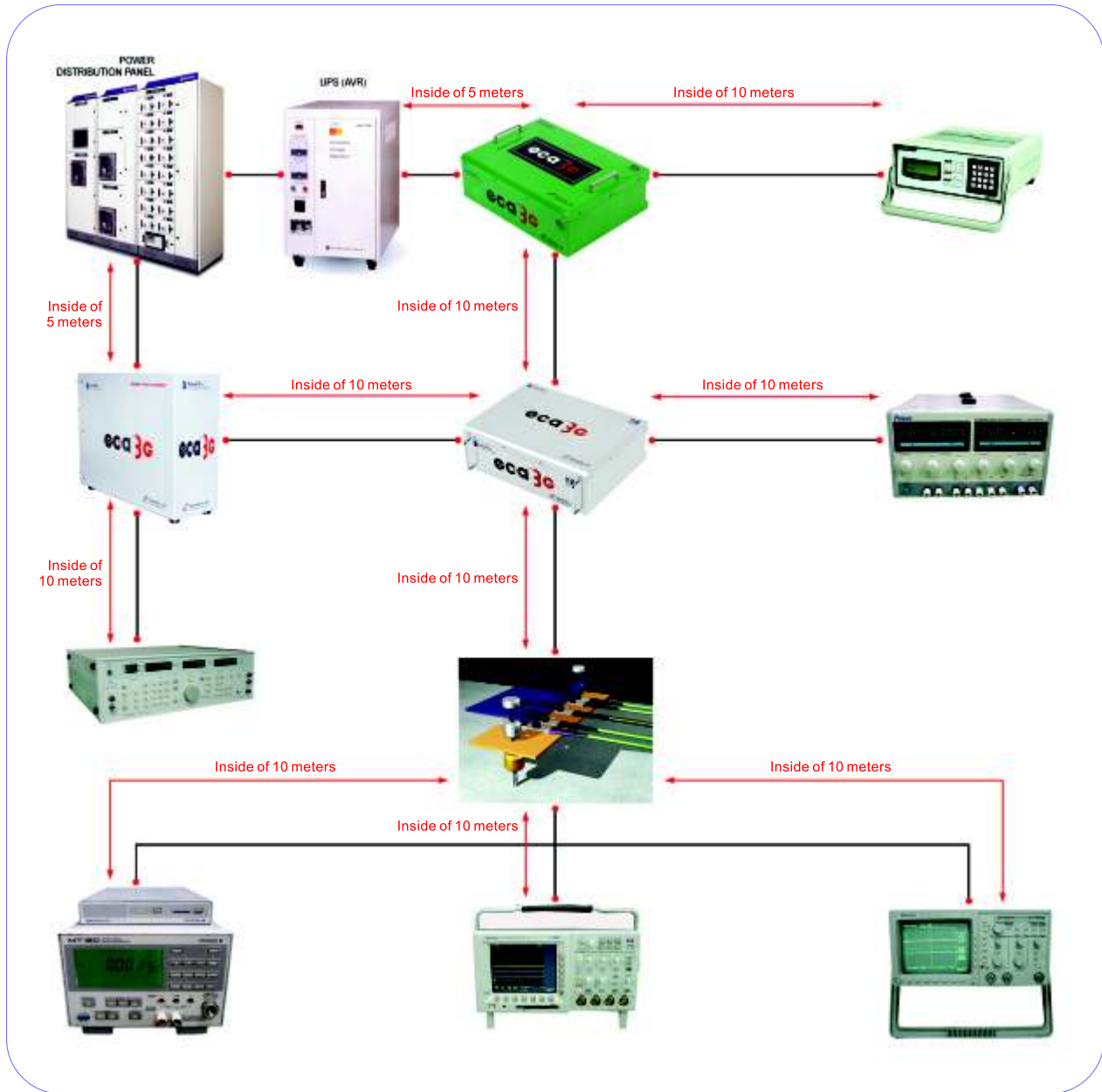
### Design condition and requisite for estimate

- Main power breaker capacity of switchboard in facility room is 220V/30A, Equipments quantity under 20. Unprotected facilities are located inside of 10 meters from each eca3G (All equipments which are inside of 10 meters are connected with two eca3G).

Product code	Product Name	Standard	Voltage /breaker	Place to use
39121613-21084418	LM-34-38-90M	3Φ4w/380V/400KA/90MJ	380V/100A	1 EA
39121613-21084424	CM-12-20-60M	1Φ2w/220V/240KA/60MJ	220V/30A	1 EA
<b>transportation, All sorts of expenses and establishment cost</b>				

- Requisite for estimate : Lightning damage reparation responsibility insurance (LIG PL insurance one billion KRW), Performance guarantee insurance of Machinery mutual aid association

# 15 eca3G Installation standard



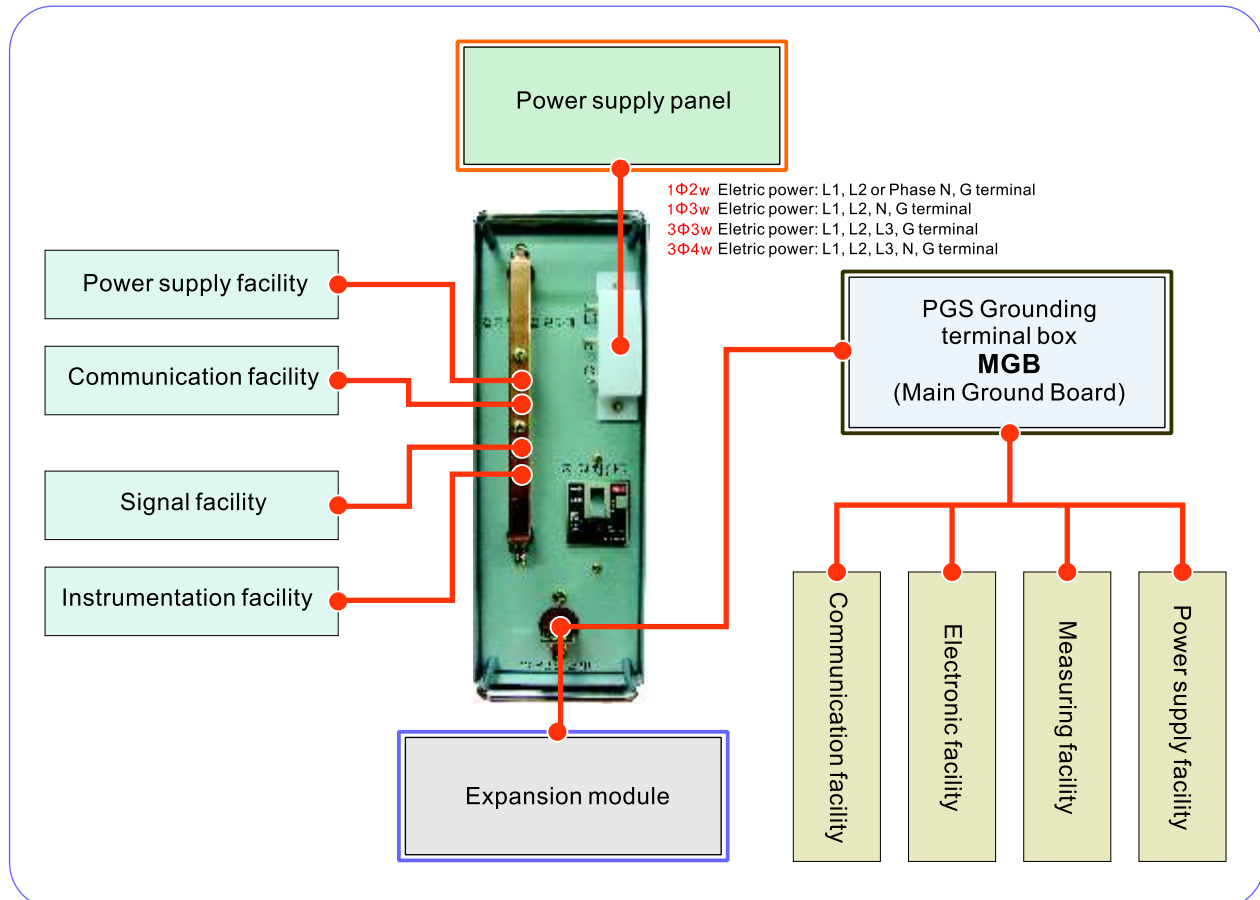
## Installation standard

section	Power switchboard → eca3G	eca3G → Unprotected facilities	Remark
Grounding wire standard	4mm <sup>2</sup> ~ 10mm <sup>2</sup>	over 4mm <sup>2</sup>	KIV, GREEN
Power line standard	4mm <sup>2</sup> ~ 10mm <sup>2</sup>		KSC IEC 규격
Length of grounding wire	Inside of 5 meters	Inside of 10 meters	CV/3C ~ CV/5C
Length of compression terminal	One hole of copper tube terminal	One hole of copper tube terminal	4mm <sup>2</sup> ~ 10mm <sup>2</sup>
The others	Reduction leading wire of lightning rod ~ Connective terminal of main grounding terminal plate ~ MGB Grounding wire of unprotected facilities : Over 35mm		

■ The images of this product might be changed

■ Reduce economical loss by lightening stroke, 5 trillion won with science and technology!

## 16 eca3G Installation manual

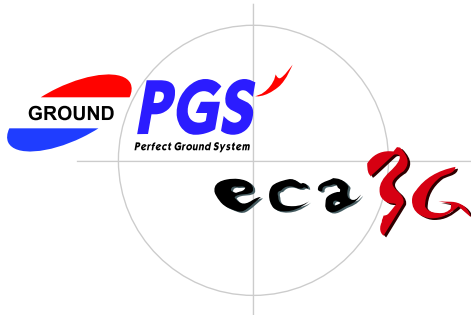


- 1 It's efficient to install within 5m from power switchboard of the facilities to protect from lightning stroke, surge etc and 10m from unprotected facilities
- 2 Place power breaker of eca3G to off, place main breaker of switchboard to off and draw out the power from 2nd shaft power line of main breaker and connect to power connect terminal of eca3G(cable standard : 4mm<sup>2</sup>-10mm<sup>2</sup>, cable length : within 5m)
- 3 Connect grounding cable to grounding terminal of facility to protect and connect to grounding cable connecting bolt of grounding cable connecting terminal board (\*connection cable standard : over 4mm<sup>2</sup>, length : within 10m recommended)
- 4 In the case that grounding of unprotected facility is connected to MGB, connect grounding to MGB of eca3G and firmly connect to MGB that grounding of protected facility is connected.
- 5 Connect coaxial cable of CCTV facility to coaxial cable 1st(in), 2nd(out) terminal
- 6 If lightning rod is installed, connect grounding cable of more than 35mm<sup>2</sup> to grounding cable which is connected to lightning reduction cable so that make electric connection better to MGB of eca3G(grounding cable standard : over 35mm<sup>2</sup>)
- 7 Replace main breaker of switchboard and power breaker switch of eca3G to ON

■ The images of this product might be changed

## 17 Common specification for each model of **eca3G** grounding device

Section	Specification for each model						
Model Name	LM	CM	EM	NM	TM	SM	GM
Use for	Lightning	Car	Static Electricity	Noise	Telecom	Surge	General
Service voltage[V]	AC: 100~440[V], DC 10~200[V]						
Frequency[Hz]	50~60Hz						
Surge current	20KA~420KA						
Impulse operation frequency	> 0.5kHz						
Insulation resistance [MΩ] 600V(Case-Line)	> 10MΩ						
Technology standard specification approval	IEC 61643-11, EN 61643-11, UI1449 ed2, NF EN 61643-11						
Operation temperature	-40 °C / +80 °C						
Degree of Protection	Ip22						
Caseing materials	Steel, pulverulent body painting						



PGS+eca3G method guarantees 100% protection from lightning stroke by 100% technology assurance which is demonstrated through no accident for 100,000 hours and PL insurance(a billion won)

### Grounding resistance value comparison tested on lightning surge simulation

Model Name	Standard	Lightning surge simulation grounding resistance value	test voltage 1.25/50 $\mu$ s	test electric current 8/20 $\mu$ s
LM-Series	240KA/30MJ	15 $\Omega$	15,000V	7,500A
LM-Series	320KA/60MJ	10 $\Omega$	15,000V	7,500A
LM-Series	420KA/90MJ	7 $\Omega$	15,000V	7,500A
TM-Series	80KA/20MJ	15 $\Omega$	15,000V	7,500A
TM-Series	80KA/50MJ	12 $\Omega$	15,000V	7,500A
SM-Series	120KA/60MJ	11 $\Omega$	15,000V	7,500A
SM-Series	240KA/90MJ	8 $\Omega$	15,000V	7,500A

18 Major installation supply record of PGS & eca3G

 <b>대한민국해군</b> REPUBLIC OF KOREA NAVY	 <b>대한민국해병대</b> REPUBLIC OF KOREA MARINE CORPS
 <b>대한민국공군</b> REPUBLIC OF KOREA AIR FORCE	 the Office of the Presidential Security
 <b>서울특별시</b> Seoul metropolitan city	 <b>YOUNG City</b> CHANGWON
 <b>광 양 시</b> GwangYang city	 <b>춘 천 시</b> ChunCheon city
 <b>해양수산부</b> MINISTRY OF MARITIME AFFAIRS & FISHERIES	 <b>군산지방해양수산청</b> Integrated logistics information on Gumi
 <b>Korea Forest Service</b>	 <b>한국관광공사</b> KOREA TOURISM ORGANIZATION
 <b>Korea Metrological Administration - JeJuDo</b>	 <b>Seoul Metro</b> 서울메트로
 <b>서울특별시도시철도공사</b> Seoul Metropolitan Rapid Transit Corporation	 <b>CRMO 중앙전파관리소</b> Central Radio Monitoring Office
 <b>SK Telecom</b>	<i>First in Mobile</i>  <b>KTF</b>
 <b>KBS</b> Korean Broadcasting System	 <b>kti 한국산업기술시험원</b> Korea Testing Laboratory
 <b>한양대학교</b> Hanyang University	 <b>KCCH 원지력병원</b> KOREA CANCER CENTER HOSPITAL
 <b>명 지 병 원</b> MYONGJI HOSPITAL	

## 19 Certifications for grounding device **eca3G**



Certificate of Korean patent



Certificate for Good product approved by Public Procurement Service



Certificate of INNO-BIZ



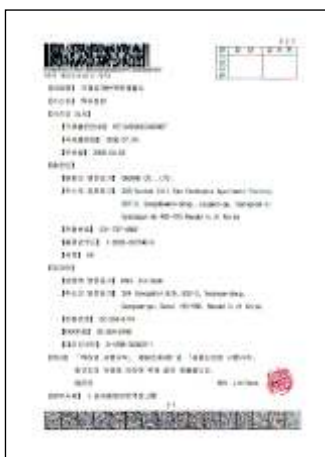
Certificate of Performance  
The head of small and medium business administration



Mark to signify conformance with EU regulations



Certificate of enterprise research laboratory



International Patent



Certificate of Product Liability insurance

# Product guarantee of eca3G

eca3G product is guaranteed for 10 years from the day of completion(supply)

- We, PGS performs product guarantee below following consumer harm compensation regulation for each items (the Ministry of Finance and Economy notice 2000-21 )
- When product is out of order call branch office which you bought (when unable to connect branch office then call service center)
- When requested, Ground corp. or appointed partner companies will serve.
- Service center : **toll-free call for whole country : 080-558-8800**

Construction (Delivery )name		Guarantee No.	
Order(purchase) company		Completion (Delivery) date	
Company of construction	Ground Co., Ltd.	Construction (Delivery) cost	

## Free Services

You can get services at free of charge during the period of product guarantee from completion (delivery) date when ECA3G has functional errors

Consumer damage type	Compensation and period	
When repair or exchange requested on fetal performance, function error during 10 years including defect performance guarantee period	Exchange or repair at free of charge within 10 years	Exchange of repair with charge after 10years
When disorder by lightning stroke is clearly verified for the equipments that match the test standard and relevant technology standard such as KSC, IEC, IEEE, ANSI, UL 1449, IEC	Exchange or repair at free of charge within 10 years	Exchange of repair with charge after 10years

## Service with charge

### 1. When it's not out of order

- Service request on non-disorder is chargeable
- Please check out operation manual, installation photos, report

Annual eac3G state check	Free of charge for 2years including defect performance guarantee period
Request eca3G reinstallation technology support for equipment installing, moving, changing	Chargeable from the 1st time
Research factor of product malfunction which is disconformed with relevant technology standard, test standard of IEEE, IEC, MIL-Std 461B, UL 1449	Research cost is chargeable from 1st time

### 2. Dysfunction by user's mistakes.

- Dysfunction by user's mistakes
- When malfunction occurs by facility addition or change eca3G system by user's discretion
- When defective electricity causes malfunction
- Changing, damaging, separating PGS system cause malfunction

### 2. ETC.

- When natural calamity (fire, salt damage, flood damage) causes damages





Good product approved by Public Procurement Service



ISO9001: 2000  
ISO14001: 2004



Korean patent



Mark to signify conformance with EU regulations



Y82Q-2005-005  
NT New Venture



INNOBIZ certification



Performance certification from small and medium business administration



New technology venture business certification



Performance guarantee insurance of Machinery mutual aid association



Performance verification by KETI



A billion won insurance from LIG PL

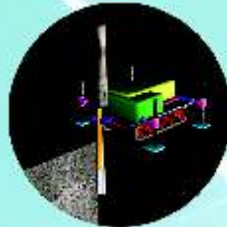
## GROUND's FUTURE is SCIENCE!

Reduce economical loss by lightning stroke, 5 trillion won with science and technology!

Weather disaster and global warming cause a lot of strokes of lightning. A lot of disaster caused by strokes of lightning are expected in this year, please establish countermeasure to protect from stroke of lightning



1G



2G



3G



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