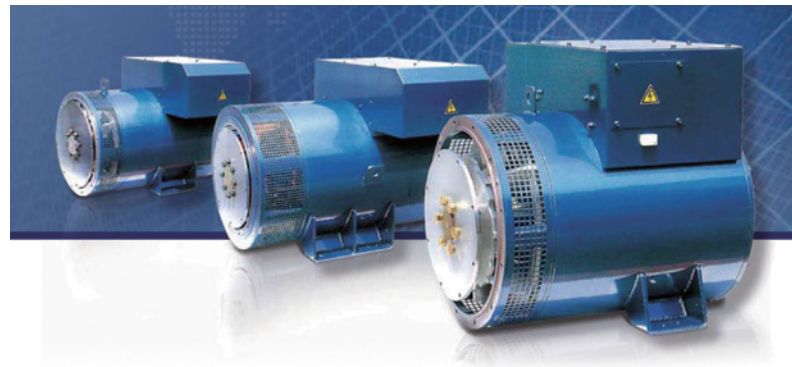


A. GENERATOR

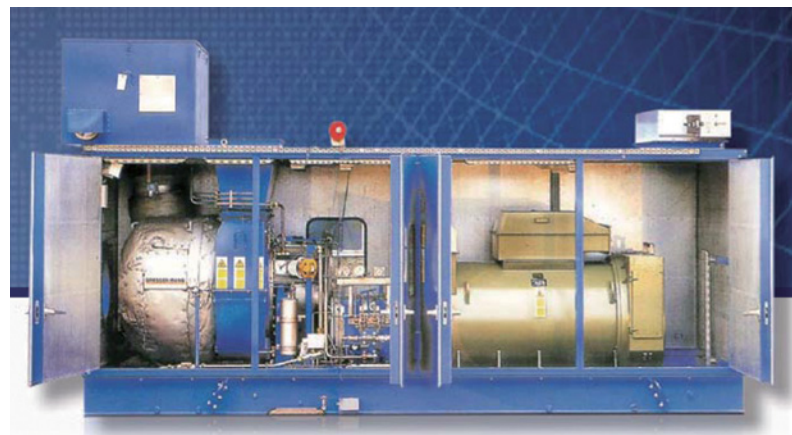
1 Alternator

- Class H Insulation System & Voltage Regulator
- Optimized Electrical Design
- Parallel Operation(Optional)
- Aux. Winding System
- Digital Surge Tester



2 Generator

- Gas Turbine Generator
- Diesel Generator
- Welding Generator
- Gasoline Generator



3 Gas CHP System

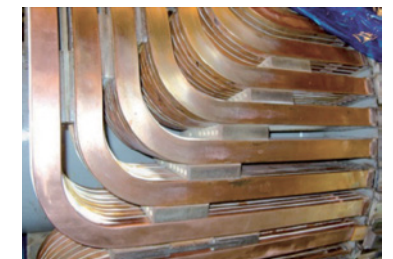
- Prevention of Noise Structure
- Excellent Durability & Economical High Efficiency



4 Turbine Generator Components

1) Rotor Coil

- Square pipe drawing Hardening System
- Copper conductor DC current to flow through the field to Rotor Shaft
- Material : Silver bearing copper (B50A200) Cu 99.99%



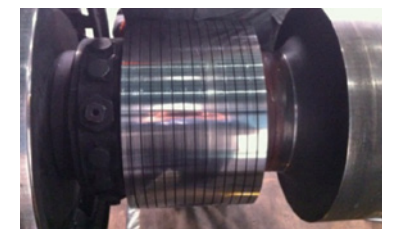
2) Slot wedge

- Material : beryllium copper (C17510)
- Tensile strength : more than 110KSI
- Yield strength : more than 90 KSI
- Silver plating : both ends 0.01mm



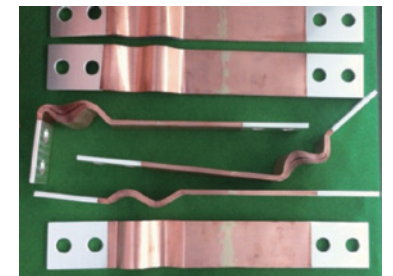
3) Collector ring (Slip ring)

- Stator by the rotor side device that delivers electrical energy (current)
- Material : nickel chromium copper (C18000)



4) Flexible connector

- Generator Lead IPB connection
- Material : oxygen free copper (C10100), Cu 99.99%
- Conductivity & copper Content : 100% & 99.99%
- Oxygen content : 0.4PPM or less
- Silver plating : both ends more than 15µm



5) Industrial Carbon Brush

- Grade : F24/HG2634
- 100% Graphite, resistance 1,200~3,000µm /cm²
- Bending strength 50~200 kg/cm²
- Application : Turbine Generator, Industrial Motors



B. MOTOR

1 High Voltage Induction Motor

1) Squirrel Cage Totally Enclosed Air to Air Cooled Horizontal Type

- Protection : Totally Enclosed
- Rotor Type : Squirrel Cage
- No. of Poles : 2 ~ Poles
- Voltage : 3.3 ~ 13.8 kV
- Output Range : 180 ~ 10,000 kW
- Frame Size : 315 Frame or more
- Protection Class : IP 44, 54, 55
- Cooling System : IC511, IC611
- Insulation/Temp. rise : F / F,B
- Mounting : IM B3



2) Squirrel Cage Drip-proof Horizontal Type

- Protection : Open Drip Proof
- Rotor Type : Squirrel Cage
- No. of Poles : 2 ~ 10 Poles
- Voltage : 3.3 ~ 13.8 kV
- Output Range : 55 ~ 3,550 kW
- Frame Size : 280 ~ 560 Frame
- Protection Class : IP 23, 23
- Cooling System : IC01
- Insulation/Temp. rise : F / F,B
- Mounting : IM B3



3) Squirrel Cage Weather Protected Horizontal Type

- Protection : Weather Protected I, II
- Rotor Type : Squirrel Cage
- No. of Poles : 2 ~ Poles
- Voltage : 3.3 ~ 13.8 kV
- Output Range : 200 ~ 4,300 kW
- Frame Size : 315 Frame or more
- Protection Class : IP 23, 24
- Cooling System : IC01
- Insulation/Temp. rise : F / F,B
- Mounting : IM B3



4) Wound Rotor Totally Enclosed Air to Air Cooled Horizontal Type

- Protection : Totally Enclosed
- Rotor Type : Wound Rotor
- No. of Poles : 2 ~ Poles
- Voltage : 3.3 ~ 13.8 kV
- Output Range : 220 ~ 8,000 kW
- Frame Size : 355 ~ 900 Frame
- Protection Class : IP 44, 54, 55
- Cooling System : IC511, IC611
- Insulation/Temp. rise : F / F,B
- Mounting : IM B3



5) Wound Rotor Drip-proof Horizontal Type

- Protection : Open Drip Proof
- Rotor Type : Wound Rotor
- No. of Poles : 2 ~ Poles
- Voltage : 3.3 ~ 13.8 kV
- Output Range : 45 ~ 3,000 kW
- Frame Size : 280 ~ 630 Frame
- Protection Class : IP 22, 23
- Cooling System : IC01
- Insulation/Temp. rise : F / F,B
- Mounting : IM B3



C. SWITCHGEAR / LOAD CENTER / MCC

1 High Voltage Metalclad Switchgear

- High & Low Voltage Metalclad(3.3kV, 6.6kV)
- Extra High Voltage(22.9kV)
- Low Voltage(110/220/380/440/460/480V)
- Motor Control Center(110/220/380/440/460/480V)



2 Air Circuit Breaker

- Rated Voltage : 690V
- Rated Current : 1600A, 2000A, 3200A
- Rated Frequency : 50Hz/60Hz
- Rated Short - Time withstand current(kA/1sec) : 1600AF~3200AF / 50~65kA
- Insulated Material : Air
- Applied standard : IEC 60947-1



3 Low Voltage Switchgear

- Rated Voltage : 600V
- Rated Current : 400A, 630A, 800A, 1000/2500A, 1600A, 2000/3200A, (4000A, 5000A, 6000A)
- Rated Frequency : 50/60Hz
- Rated Short-Time withstand Current(kA/1sec) : MAX.65
- Applied standard : IEC60947, IEC60439, IEC60529m ABSU C37.20.1, ES158, JEM1265



4 Motor Control Center

- Rated Voltage : 600V
- Rated Current : MAX.4000A
- Rated Frequency : 50/60Hz
- Rated Short-Time withstand Current(kA/1sec) : MAX.65
- Applied standard : IEC60439, NEMA ICS2.322, JEM1195



D. TRANSFORMER

1 Pad Mounted Transformer

- Ratings
 - Phase : 1Ø, 3Ø
 - Frequency : 50Hz, 60Hz
 - Input Voltage : 6.6kV, 11.4kV, 13.2kV, 22.9kV
 - Output Voltage : 120V, 208V, 220V, 277V, 380V, 400V
 - Capacity : 50~500kVA



2 Oil Immersed Pad Mounted Transformer

- Ratings
 - Phase : 1Ø, 3Ø
 - Frequency : 50Hz, 60Hz
 - High Voltage : 11.4kV~66kV
 - Capacity : 1,000~50,000kVA
 - Connection : Δ-Δ, Δ-y, y-Δ, y-y, etc

3 Power Transformer

- Applicable Standards
 - KS(Korea Industrial Standards)
 - IEC(International Electrotechnical Commission)
- Ratings
 - Phase : 1Ø, 3Ø
 - Frequency : 50Hz, 60Hz
 - High Voltage : 11kV~66kV
 - Capacity : 1,000~50,000kVA



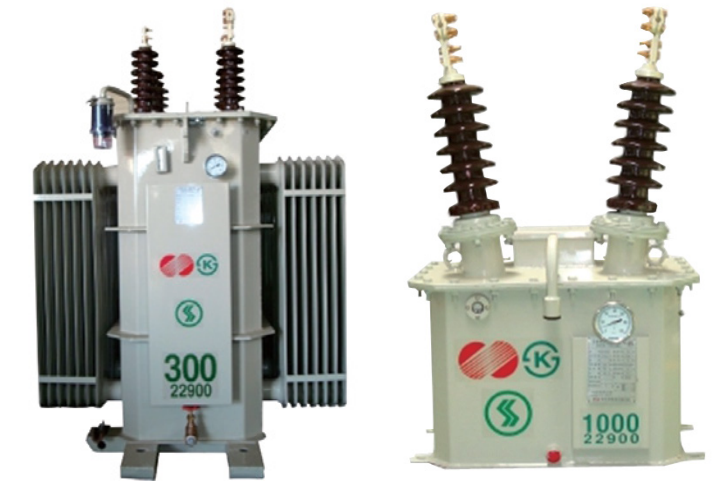
4 Capacitor

1) Series Reactors for High Voltage Power Capacitors

- Ratings
 - Phase : 1Ø, 3Ø
 - Frequency : 50Hz, 60Hz
 - High Voltage : 3.3kV~77kV
 - Reactor capacity : *1Ø : 10~150kVA
*3Ø : 3~3,000kVA
 - Capacity : 1,000~50,000kVA

2) Discharge Coil for High Voltage Power Capacitors

- Ratings
 - Phase : 1Ø, 3Ø
 - Frequency : 50Hz, 60Hz
 - A primary voltage (Line Voltage) :
* 1Ø : 10~150kVA
* 3Ø : 3~1,800kVA
 - High Voltage : 6.6kV, 11.4kV, 13.2kV, 22.9kV
 - Discharge Capacity : 100~30,000kVA



E. EXCITATION SYSTEM & SIMULATOR

1 Excitation Control System

- Generator voltage soft start
- Adjustable under. frequency threshold
- Dual mode of controller
- Reference adjuster for remote/manual control
- Control via a contact input, front panel switches
- Output annunciation via general alarm contacts
- Field over Voltage/ Current
- Loss of voltage sensing
- Input/Output: 74 Points (AI:18, AO:8, 01:32, 00:16)



2 Excitation Tester Simulator

- Breakdown diagnosis & adjustment of excitation system
- Function of freely-manipulating output of simulation signal
- Total test and examination of functional performance of automatic voltage regulator of generator
- MVR operation test
- AVR operation test
- Generator over voltage test
- V/Hz limit test
- AVR step response test
- Under Excitation limit test
- PSS test



F. PROTECTION EQUIPMENT

1 Digital Protective Relay(VIPAM5000)

- Relay Functions : OCR(50, 50x2), OCGR(50G, 51Gx2)
UBOC(46), OVGR(64G), OVR(59)
UVR(27x2), Reclosing(79)
- Digital Input : 27 Pint
- Digital Output : 16 Pint
- Analog input : CT : 5 Point(4+for ZCT)
PT : 5 Point(3+for GPT+for Bus)
AI : Maximum of 4 Point
- Protocol : IEC61850
- Connection Type : Optic fiber



2 Vacuum Circuit Breaker(VCB_7.2kV)

- Class 1E VCB for Nuclear Power plants
- Operation Duty : O-0.3S-CO-3min-CO
- Life(Rated Current Input) : 5,000 times
- Rated Operating Voltage(For Motor) : DC 125V
- Rated Operating Current(For Motor) : Inrush 8.5A, steady state 1.5A



3 Automatic Transfer Switches

- Rated voltage : 800/1000A
- Rated current : AC 600V
- Connection type : Double Throw
- Short-time withstand current(1s)kA : 25
- Short circuit peak current : 50kA
- Switching frequency : 150(No.4)



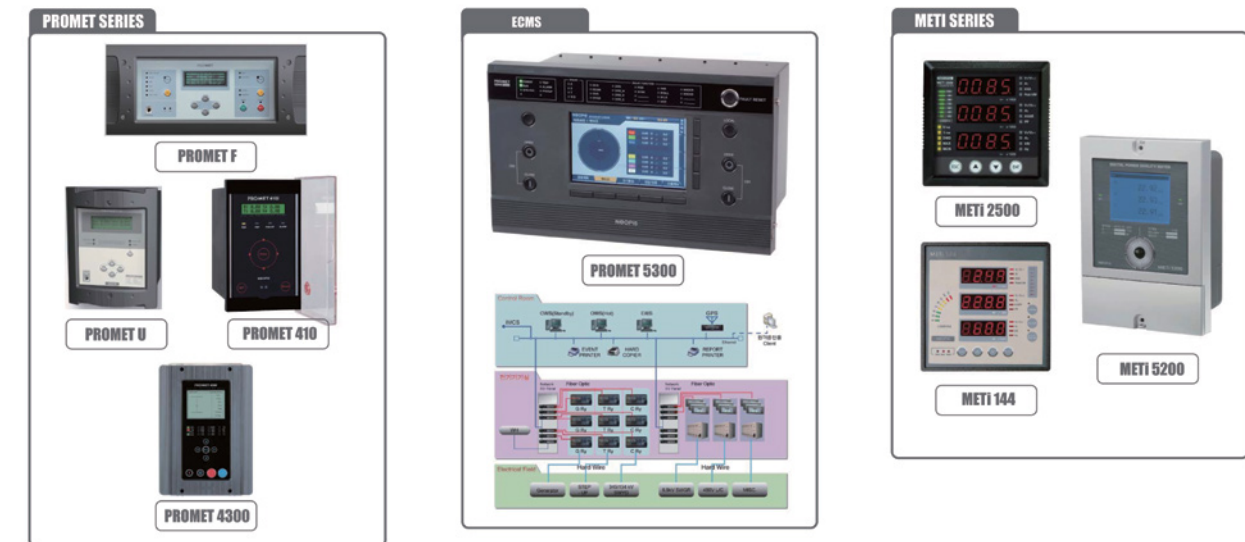
4 ECMS

1) Digital Protection Management

- Digital Protective Relays (generators, transformers, lines, motor)
- IEC61850-based protection IED, EM type alternative for digital protection relays

2) Digital Power Meter

- Power quality meter (PQM), smart meters, power meters, electronic watt-hour meter.
- System S/W & Engineering : Power management systems, electric power equipment diagnostic systems, power plant ECMS, Web-based energy management system



G. POWER QUALITY MANAGEMENT SYSTEM

1 Intelligent Var Management System(IVMS)

- Reduced losses on mains and power transformers
- Increase of plant available power
- Minimizes network disturbances such as Voltage Drop and Flicker
- Reduced maintenance
(i.e. no Electromagnetic contactors)
- Enhanced capacitor life expectancy
- Unlimited response time(20ms)



II. ELECTRIC

2 Intelligent Harmonic Management System(IVMS)

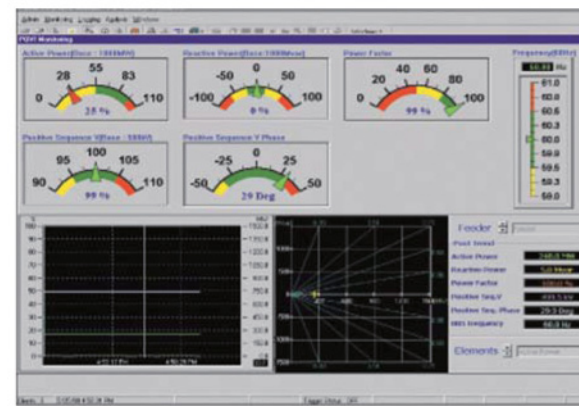
- Instantaneous Dynamic Response Time
- Minimum Heat Loss
- Graphic Color LCD and Touch Screen
- Capacity Ratings (up to 600A)
- Event Log of up to 256 records
- Power Factor Correction



H. EQUIPMENTS

1 Digital Fault Recorder

- Measuring of power flow
- Detecting system fault and fluctuation
- Monitoring transient and stability of normal conditions
- Remote data receiving and configuration set-up



2 Current Transformer Tester

- Automatic test of ratio, polarity, phase angle, voltage
- Printing test result & saturation curve instantly
- High speed operation by adopting DSP processor



3 Power Transformer Tester

- Test of various rating power transformers
- Automatic test of ratio, polarity, phase angle deviation and short circuits test etc.
- All the test functions available without changing any test lead connections
- High speed operation by adopting DSP processor



I. POWER SYSTEM

1 UPS(Superex)

- Hot Standby system
- Parallel operation with redundancy
- High power factor rectifier
- Monitoring & control system by remote panel
- Remote monitoring & control system by modem
- Various input/output and DC voltage
- Internet web based remote monitoring & control system
- BMS(Battery Management System)



2 Battery Charger

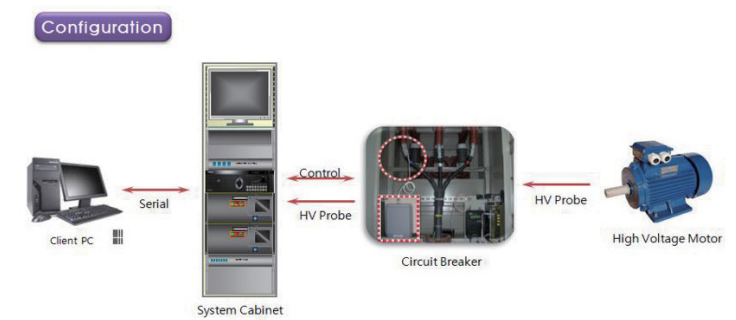
- Superior regulation of voltage
- Setting up the output voltage
 - Input voltage : 110V, 220V, 380V, 440V, 460V
 - Input Frequency : 50Hz, 60Hz
 - Input voltage variation : +/- 10%
 - No. of Input Phase : 1Phase, 3Phase
 - Rated output voltage : 12V, 24V, 48V, 110V, 125V, 220V
 - Regulation : +/- 0.5%
 - Cooling method : Self cooling or Fan cooling
 - Control method : SCR control or Magnetic amplifier control



J. MONITORING SYSTEM

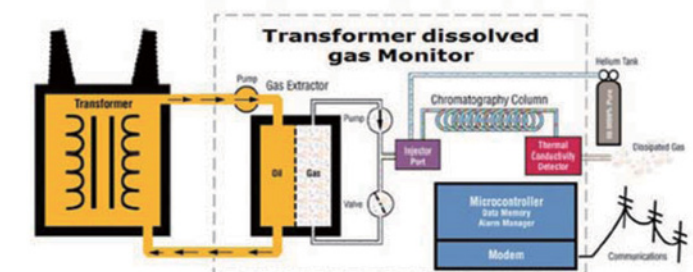
1 Remote Insulation Resistance Monitoring System

- Remote Measurement Equipment
- Protection for Man & Machine
- Triple Safety System



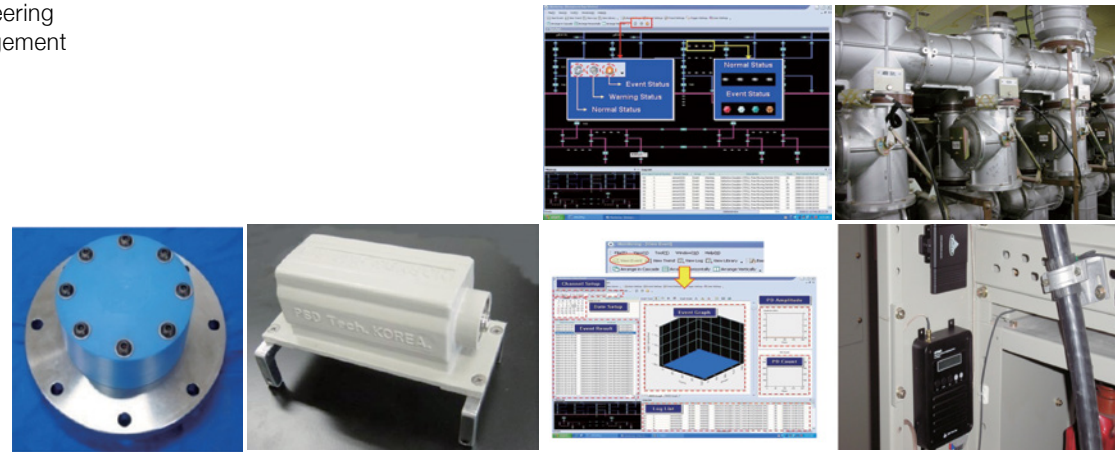
2 On-Line Transformer Dissolved Gas Monitor

- DGA(Dissolved Gas Analysis) Monitoring
- Reliable Management for Transformer
- Connecting to SCADA/EMS
- Data Management / Warning & Alarm



3 Partial Discharge Diagnosis System

- Control Room Engineering
- Power Quality Management
- GIS
- Main Transformer
- MCC
- Cable & Power Line



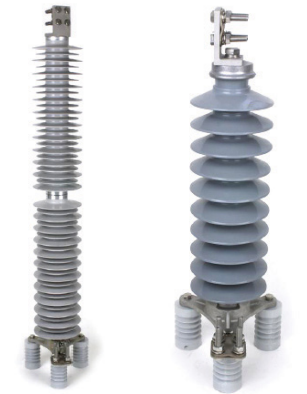
3 Polymer Insulator for Distribution and Transmission Line

- 1) Distribution Line
 - Nominal Voltage : 15kV ~ 69kV
 - Mechanical Load : 7kN ~ 70kN
- 2) Transmission Line
 - Nominal Voltage : 69kV ~ 500kV
 - Mechanical Load : 133kN ~ 210kN



4 Transmission Polymer Surge Arrester

- High Voltage Polymer Surge Arrester**
IEC Class 2 type series CA42/10.2S to CA 288/10.2S
IEC Class 3 type series CA42/10.3S to CA 360/10.3S
- Rated voltage U_r : 42kV to 288kV (Class 2), 42kV to 360kV (Class 3)
 - Nominal discharge current : 10kA
 - High current impulse (4/10) : 100kA
 - Long duration current impulse : 500A/2000 μ s (Class 2), 1,000A/2000 μ s (Class 3)
 - Pressure relief class : 50kA
 - Line discharge class : 2
 - Energy withstand capacity : 4.5kJ/kV (Class 2), 6.7kJ/kV (Class 3)
 - Torsional strength (MML) : 1,000Nm
 - Bending strength (MML) : 3,500Nm
 - Tensile strength (MML) : 50kN
(SML= 2,5 * MML)



K. TRANSMISSION ACCESSORIES

1 Line Disconnecter Switches

- IEC 62271-1**
- Rated Voltage : 12kV
 - Rated Frequency : 60Hz(50Hz)
 - Rated Current : 630A / 1,250A
 - Rated Short Time Current : 25kA
 - Rated Duration of Short Time Circuit : 3sec
 - Rated Withstand Voltage (Impulse / Power Frequency) : 75kV / 28kV



2 Distribution Polymer Surge Arrester

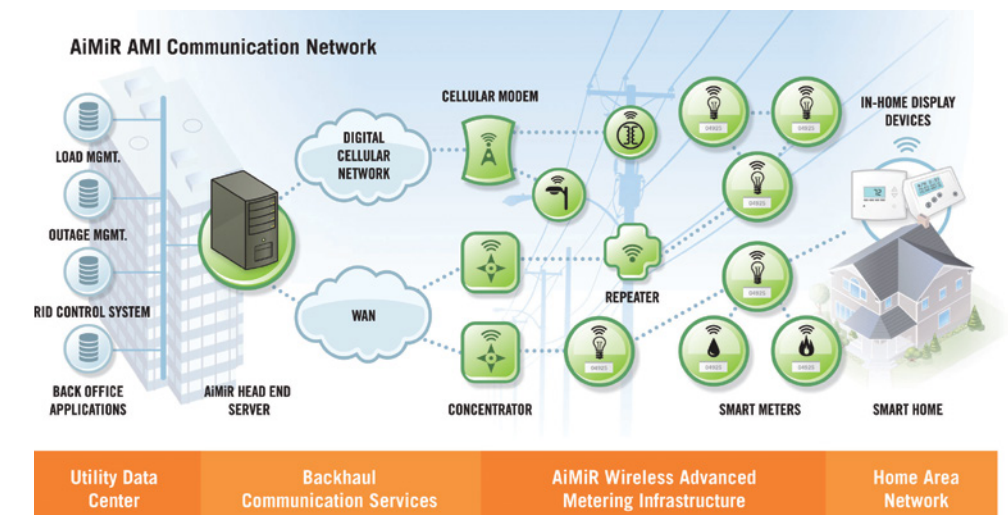
- High Voltage Polymer Surge Arrester**
IEC Class 2 type series CA06/10.2S to CA54/10.2S
- Rated voltage U_r : 6kV to 54kV
 - Nominal discharge current : 10kA
 - High current impulse (4/10) : 100kA
 - Long duration current impulse : 500A/2000 μ s
 - Pressure relief class : 50kA
 - Line discharge class : 2
 - Energy withstand capacity : 4.5kJ/kV
 - Torsional strength (MML) : 1,000Nm
 - Bending strength (MML) : 3,500Nm
 - Tensile strength (MML) : 50kN
(SML= 2,5 * MML)



L. AMR / AMI SYSTEM

1 AMR / AMI System

- AMR / AMI System
- Energy Management System
- Electronic Bill Present and Payment Service
- Energy Portal Service



M. CABLE & ACCESSORIES

1 Cable

- Standard Cable
- High Voltage Power Cable
- Cable for Nuclear Power Plant
- Shipboard Cable



Certified Cable Standard		ABS	BV	RINA	DNV	GL	KR	LR	NK	CCS
Basic	Safety Standard									
JIS C 3410(99)	IEC 60332-1									
	IEC 60332-3 A									
	IEC 60331									
	-30°C Cold Resistant									
IEC 60092-353 XLPE/SHF1	IEC 60331									
	IEC 60332-3 A									
	IEC 60754-1									
	IEC 61034									
IEC 60092-354 EPR/PVC	IEC 60332-1									
	IEC 60332-3 A									

2 Ignitor for Boiler

1) Smart Spark Exciter

- Solid State Type & LED Lamp
- Low Tension 2500Vdc
- Stored Energy : 12J(Min.) / Temp. : -25~85°C



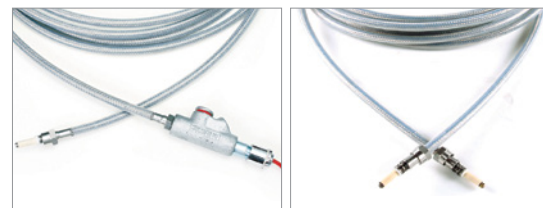
2) Spark Plug

- Pressurized Seal Structure
- Various Connector Type
- Heat-Resistant Alloy for Tip-Edge
- Create a path of electricity flowing by Semiconductor



3) Cable Lead

- Teflon coating
- Damage protection
- Various Connector Type



3 Heat Tracing System

1) Power Control Unit

- Controlling heating cable ON/OFF (Smart Energy Saving)
- Self-diagnosis function
- Operating voltage : 100-250V

2) Local Control Unit

- Monitors temperature, voltage, heating cable status etc.
- Trouble shooting and Alarm
- Touch screen (Steel/SUS case, 10.4")
- Temperature measurement range : -200 ~ 600°C



4 LED Lighting

1) LED 60W/90W (Pendant Type)

Model No.	LUCIA 60-1-P	LUCIA 60-1-C	LUCIA 90-1-P	LUCIA 90-1-C
Power	60W		90W	
Replaced	MH250~400W		MH250~700W	
Energy Saving	85%		85%	
High Efficiency	O		O	
Luminous Efficiency	145 lm/w		140 lm/w	
Total Luminous Flux	8700 lm		12487 lm	



2) Explosive Atmosphere Light (Exd IIB+H2)

Model No.	Exd IIB T6-L60-120			
Power	30W	45W	55W	60W
Replaced	MH175W	MH250W	MH300W	MH400W
Energy Saving	85%	85%	85%	85%
Luminous Efficiency	140 lm/w	140 lm/w	139 lm/w	147 lm/w
Total Luminous Flux	4,281 lm	6,300 lm	7,661 lm	8,849 lm
Type	Built-in, SMPS			



3) Roadway Lighting

Model No.	APA-L70	APA-L80-CD	APA-L100	APA-L120	APA-L150
Power	70W	80W	100W	120W	150W
Replaced	MH300W	MH400W	MH400W	MH500W	MH700W
Energy Saving	85%	85%	85%	85%	85%
High Efficiency	O	O	O	O	ongoing
Luminous Efficiency	141 lm/w	145 lm/w	153 lm/w	148 lm/w	136 lm/w
Total Luminous Flux	10,125 lm	11,598 lm	15,300 lm	17,902 lm	20,260 lm
Type	External, SMPS				

