



APM TECHNOLOGIES

APM

About **APM**

*APM Technologies Inc.
A Global Leader in Partial
Discharge Monitoring System*



APM Technologies Inc. (APM) is a global leader in Partial Discharge monitoring system based in South Korea, developing technologies for Partial Discharge monitoring system and analysis for the enhancement, reliability, and maintenance of substation facilities, particularly for Gas Insulated Switchgear, Transformer, Medium Voltage Switchgear, EHV Cables, and Cable Terminations. APM's products enable the intelligent digital substation by means of supporting global smart grid standards such as IEC 61850.

APM (Advanced PD Monitoring) series have been adopted for numerous governmental and private projects around the world, and approved world's first PD Monitoring Manufacturer approved by Saudi Electricity Company. APM 5000 is the on-line, real-time, fixed system to measure the PD in GIS. APM 2000 is portable and it detects, analyses and records ultra-wide bandwidth of electro wave signals by highly sensitive UHF sensors in all voltage ranges which can be generated by Partial Discharge in GIS.

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History

Advanced Partial Discharge Monitoring System

2008	APM Established
2010	- Certified ISO9001 : 2008 / ISO14000 : 2008 - Certified R&D Center by KOITA - Certified member of "One-KEPCO Expert Business Group" organized by KEPCO
2011	Certified performance by Zhuhai QINYUN S/S in China
2012	Certified performance by KEWP(a subsidiary of KEPCO)
2014	- APM5000 & APM2000 pre-qualification approved by SEC/NGSA - Listed as ADNOC's pre-qualified vendor in Abu Dhabi
2015	Listed as pre-qualified manufacturer by SEC
2016	- Multiple APM5000 / APM1200 contracts with major EPCs in KSA for 380/132kV - Online PD Diagnostic Measurement Contract with SEC (3-year, 400 substations)
2017	Signing of MOU with Saudi GCC Electrical Testing Laboratory (GCC Lab) for PD (Partial Discharge) Testing
2021	- Certified as Technical Innovation Business Group by Government Agency - Performance Certified for APM3000 from Korea Government
2024	Selected as one of the 1,000 + Global Small Giants by the Korean Ministry of SMEs and Startups

Valued Clients

Who we've worked with

Business

*The World's First Approved
PD Monitoring Manufacturer by
Saudi Electricity Company*

Electric power facility diagnosis trends are moving from offline diagnosis (performed during power stoppage) to online diagnosis (diagnosis during operation).

As a result of the rapid developments in technologies, APM Technologies Inc. is on the forefront of the new diagnostic capabilities.

Our competitive technologies come from excellent engineers who have high level of skills from their experiences in the Partial Discharge Diagnostics industry.

The APM Technologies equipment has exceeded all of the highest standards used in the industry and we will continue to maintain the highest standards, while introducing a variety of innovative PDM systems for the electric power equipment diagnosis market.



Our Work Scope



Products

Key Features

PDMS with True UHF Bandwidth

Superior accuracy and noise gating features based on the state-of-the-art UHF technology. Conventional PDMS systems may convert PD signals in UHF band to RF band because their systems do not have sufficient performance to analyze PD signals in UHF band directly. PDMS systems of APM Technologies include high performance data acquisition units that are capable of analyzing PD signals in UHF band.

IEC 61850 Certified

Supports the latest Substation Automation System including remote PD monitoring using IEC 61850 protocol

Unparalleled Multi-Step Noise Filtering Method

1. Programmable hardware band pass filtering
2. Eliminating external noises by comparing signals from PD Sensors with Noise Sensor
3. Distinguishing various types of Noise signals including Mobile Network, WIFI by using Neural Network AI engine

Artificial Intelligence Analysis

Signals measured from each PD Sensor are analyzed in real time based on the database by AI, and reported instantly with their cause when PD is detected. The AI database includes various types of defect including Protrusion Electrode, Floating Electrode, Defective Insulator, Free Moving Particle and Noises.

WHY UHF?

- UHF PD detection method can be used for a wide range of high voltage equipment including GIS, GIB, AIB, Transformer, etc.
- UHF PD detection method can detect PDs earlier than other methods.

Enhanced HMI

- Provides PD analyzing features using AI, Trend features which shows PD changes over time, and integrated features such as real time signal analysis
- Provides independent conditions setting according to each sensor's installation environment
- Provides user account and control management and regular automatic report generating features

Expandability

In case more bays are added to an existing GIS where APM's PDMS has been installed, the PDMS can be expanded to support the additional bays by adding Local Units and PD Sensors with the minimum cost.

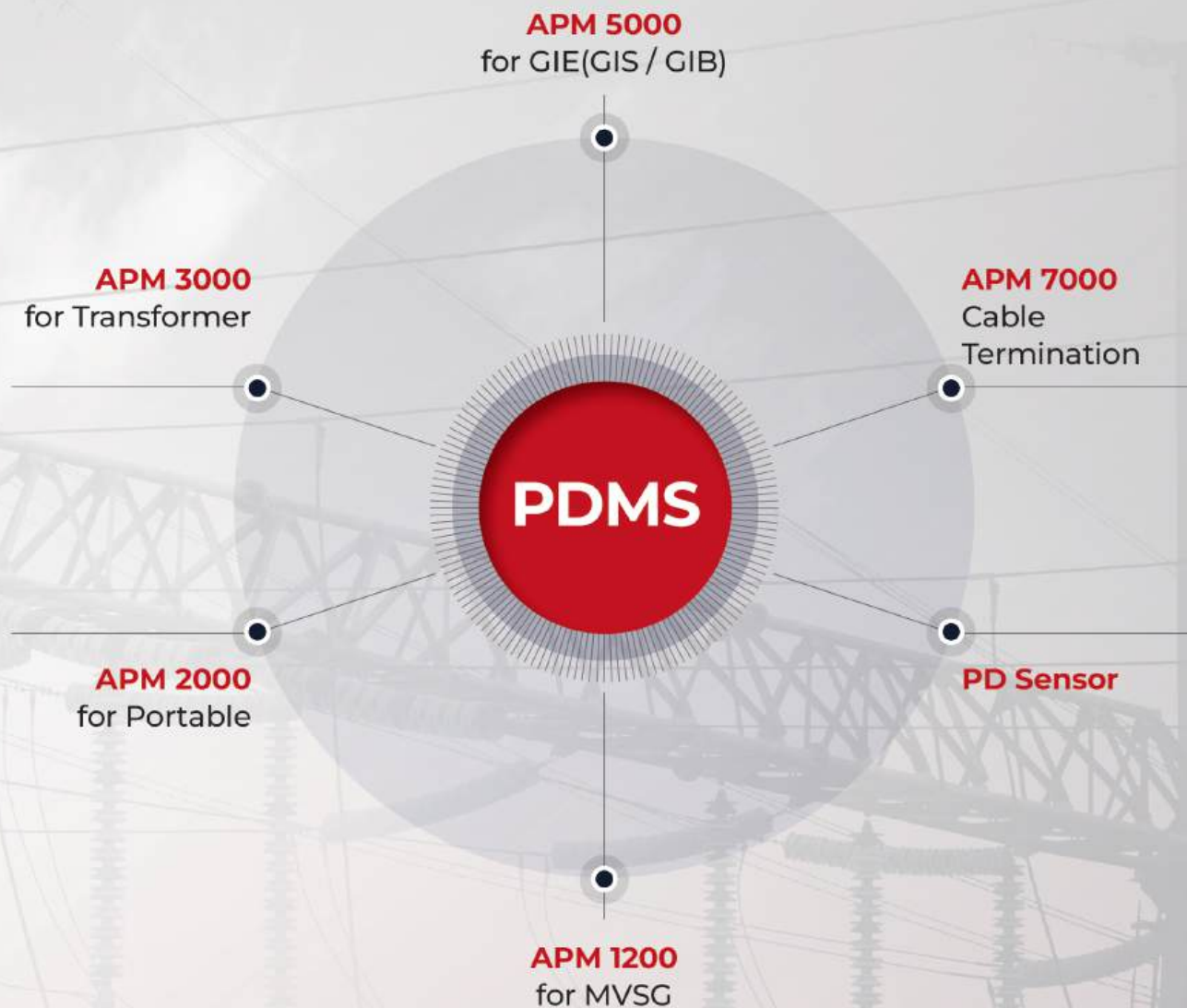
Self-Diagnosis

- Monitors Local Units in HMI providing alarms and automatic recovery feature
- Provides PRPD, PRPS and other graphic charts for PD experts
- Stores real time PD data for long period



- UHF PD detection method can diagnose causes of defect in real time more accurately.
- PD Sensors for GIS and AIS, Noise Gating Sensors, UHF Drain Valve Sensor for Transformer.

Product-Line up_PDMS



Features

- UHF band measurement technologies
- Time-domain analysis technology
- Noise elimination technology
 - Bandpass filter technology using a 3x3 filter combination
 - Noise gating technology using a noise sensor
- PD analysis technology using a neural network engine
- PD pattern libraries
- User-friendly HMI for operator convenience
- Alarm application for PD occurrence classification (normal, alarms, alert)
- Protocol support for Substation Automation System (IEC 61850 etc.)

APM 7000 & APM 7000P

APM7000 is the most effective insulation diagnosis system that analyzes the cable's failure phenomenon due to Partial Discharge in real time to prevent accidental power failure.

Additional Details

Localized defects of insulation system cause Partial Discharge. Electrical treeing which is made by Partial Discharge can lead to insulation breakdown.

Partial Discharge measurement is useful method to decide how much systems are degraded by electrical and thermal stress, manufacturing defects and installation errors in cable insulation system.

APM7000P is designed as compact size for portable PD measurement and enabled to operate for continuous monitoring with computer. This equipment aims at preventing electrical accidents of cable through identifying insulator faults in advance.



Features

- Real-Time Monitoring Mode
- Continuous Measurement Mode
- Time-Domain Analysis
- Frequency Domain Analysis
- Time of Arrival Analysis
- PRPD/PRPS PD Pattern Analysis
- Frequency Analysis by Filter or Tuner
- Pulse Shape Analysis
- Battery(Optional)
- Fiber Optic(APM7000)
- LAN Interface(APM7000P)



APM 5000

APM 5000 detects and alerts various defects inside GIS by analyzing UHF signals generated by Partial Discharge that can cause progressive deterioration of insulating materials, ultimately leading to electrical breakdown.

Additional Details

- Suitable for on-line Partial Discharge monitoring of extra-high voltage GIS and GIB
- Able to detect less than 5 pC according to CIGRE TF 15/33.03.05
- Compliant with EMC and electricity safety international standards such as IEC 61000-4-X, IEC 60255-5, IEC 60068-2-X, IEC 60529/2001, IEC 60270, and CISPR22



Features

- Superior Reliability and Accuracy, Capturing and analyzing PD data continuously, Super-reliable real-time OS
- Self-diagnosis function (Watch-dog function), Precise data analyzing and recording, Measuring PD signal in Real-Time/Event/Trend mode
- Enterprise Solution, Supporting Client & Server
- Intelligent Remote Access Management
- User-friendly Operation, Analyzing and displaying PRPD/PRPS simultaneously, Generating reports automatically, Auto-regenerating event data, Convenient alert system by email and SMS, Supporting SCADA and IEC 61850
- Enhanced Noise Control, Unmatched noise elimination with 3x3 combinational filter matrix, Noise Gating with broadband noise sensor (Patent pending), Differentiating PD signal from noise with advanced Neural Network

Diagnosis Unit

Item	Specification
Power	90 to 240 VAC, 50/60Hz
Input	More than 250 channels
Diagnosis	Built in neural network engine classifies PD into 5 types: Protrusion Electrode, Floating Electrode, Defective Insulator, Free Moving Particle, and Noise
Alarming	HMI, Email, IEC61850
Graphic Tools	PRPD, PRPS, Trend, and others
Channel Configuration	Three threshold levels for alarming can be configured for each channel individually
IEC61850	Enabled
Remote Monitoring	Enabled
Communication	10/100Base-T/TX Ethernet
Storage	Database
Self Test	Enabled

Local Unit

Item	Specification
Power	90 to 240 VAC, 50/60Hz 120 to 370 VDC
Input	8 UHF Channels, N-Type Connector
Sensitivity	Can detect discharge less than 5 pC within monitoring area of GIS/GIB
Input Bandwidth	Wide Bandwidth 100~2000MHz
Dynamic Input Range	-65 to 0 dBm
Band Pass Filter	Combination of 3 LPF and 3 HPF
Noise Gating	Enabled (External Noise Sensor)
Communication	Fiber Optic (100Base-FX)
Notification	4 x LED Status Indicators
Operating Temperature	-25°C to 55°C
Operating Humidity	100%
Enclosure Rating	IP54
Dimensions	355 x 625 x 270 (W x H x D) mm

APM 3000

APM 3000 is an Online Partial Discharge Monitoring System (OPDM) for power transformers based on UHF Partial Discharge technologies. APM 3000 monitors and diagnoses various defects timely and accurately to support improved Condition Based Management (CBM) and to prevent serious breakdown of power transformers.

Additional Details

- Suitable for on-line Partial Discharge monitoring of extra-high voltage Power Transformer.
- Distinguishes PD signals from similar noise signals by analyzing the characteristic of individual PD pulse signal UHF bandwidth at time domain and frequency domain.
- Compliant with EMC and electricity safety international standards such as IEC 61000-4-X, IEC 60255-5.



Features

- UHF sensor with high sensitivity
- Large dynamic range RF processing unit
- Various noise removal technology, anti-interference ability
- Artificial neural network technology
- IEC61850 protocol support
- High reliability and safety

Diagnosis Unit

Item	Specification
Power	90 to 240 VAC, 50/60Hz
Input	More than 250 channels
Analysis	Individual discharge signal is analyzed and its characteristics is mapped in 2-dimensional time-frequency space to make one group of discharge signals of one cause distinguished from others.
Diagnosis	Built in neural network engine classifies PD into 5 types: Protrusion Electrode, Floating Electrode, Defective Insulator and Noise, etc.
Alarming	HMI, Email, IEC61850
Graphic Tools	PRPD, PRPS, Trend and others
Channel Configuration	Three threshold levels for alarming can be configured for each channel individually
IEC 61850	Enabled
Remote Monitoring	Enabled
Communication	1000Base-T Ethernet
Storage	Database
Self Test	Enabled

Local Unit

Item	Specification
Power	90 to 240 VAC, 50/60Hz 120 to 370 VDC
Input	8 UHF Channels, N-Type Connector
Sensitivity	Can detect discharge less than 5 pC within monitoring area of Transformer
Input Bandwidth	Wide Bandwidth 100~2000MHz
Dynamic Input Range	- 65 to 0 dBm
Band Pass Filter	Combination of 3 LPF and 3 HPF
Data Acquisition	Individual Discharge Signal Shape in Time Domain and Frequency Domain
Noise Gating	Enabled (External Noise Sensor)
Communication	Fiber Optic (1000Base-X)
Notification	4 x LED Status Indicators
Operating Temperature	-25°C to 55°C
Operating Humidity	100%
Enclosure Rating	IP54
Dimensions	450 x 703 x 300 (W x H x D) mm

APM 2000

APM 2000 detects and alerts various defects inside EHV/MV Equipment by analyzing UHF signals generated by Partial Discharge. It monitors, records and analyzes PD signal continuously and alerts the status with lightweight and small-sized equipment.

Additional Details

- Suitable for the PD measurement of the extra-high voltage and medium voltage equipment
- Portable light-weight and small-sized equipment maintain PD analysis features
- Provides project management features for multiple PD sensors at multiple sites.
- Able to detect less than 5 pC according to CIGRE TF 15/33.03.05
- Compliant with EMC and electricity safety international standards such as IEC61000-4-X, IEC60255-5, IEC60068-2-X, IEC60529/2001, IEC60270, and CISPR22



Features

- Superior Reliability and Accuracy**
 - Capturing and analyzing PD data continuously
 - Super-reliable real-time OS
 - Precise data analyzing and recording
 - Measuring PD signal in Real-Time / Event / Trend mode
 - Real-time algorithm operation
- Enhanced Noise Control**
 - Unmatched noise elimination with 3x3 combinational filter matrix
 - Noise Gating utilizing broadband noise sensor
 - Differentiating PD signal from noise with advanced Neural Network
- User-friendly Operation**
 - Light-weight and portable size
 - Robust design for the challenging environment
 - Analyzing and displaying PRPD / PRPS simultaneously
 - Auto-regenerating event data
 - Equipped with 4 channels(standard) / 7 channels(optional)

System

Item	Specification	Item	Specification
Power	90 to 240 VAC, 50 /60Hz 120 to 370 VDC	Diagnosis	Built in neural network engine classifies PD into 5 types: Protrusion Electrode, Floating Electrode, Defective Insulator, Free Moving Particle and Noise
Input	4 UHF Channels, N - Type Connector	Storage	Database
Bandwidth	Wide Bandwidth 100~2000MHz	Communication	10 /100Base - T /TX Ethernet
Dynamic Range	- 65 to 0 dBm	Operating Temperature	-25°C to 55°C
Band Pass Filter	Combination of 4 LPF and 4 HPF	Operating Humidity	100%
Noise Gating	Enabled (External Noise Sensor)	Enclosure Rating	IP 41
Sensitivity	Can detect discharge below 5 pC within monitoring area	Dimensions	457 x 337 x 170 (W x H x D) mm

APM 1200

It is an advanced online diagnosis system for metal clad switch gear that predicts any problems for advanced maintenance by detecting Partial Discharge.

Additional Details

Enhanced detecting range

Patent-pending pattern antenna design / Trend mode



Features

- **Superior Reliability and Accuracy**
 - Monitoring and analyzing PD signal continuously
 - Measuring PD signal in Real-time / Event / Trend mode
 - Precise data analyzing and recording
- **User Friendly Operation & System**
 - Generating reports automatically
 - Supporting SCADA
 - Displaying PD signal in Real-time / Trend mode

Diagnosis Unit

Item	Specification
Power	90 to 240 VAC, 50 /60Hz
Input	More than 250 channels
Diagnosis	Built in neural network engine classifies PD into 5 types: Protrusion Electrode, Floating Electrode, Defective Insulator, Free Moving Particle and Noise
Alarming	HMI, Email
Graphic Tools	PRPD, PRPS, Trend, and others
Channel Configuration	Three threshold levels for alarming can be configured for each channel individually
IEC61850	Enabled
Remote Monitoring	Enabled
Communication	10/100Base-T/TX Ethernet
Storage	Database
Self Test	Enabled

Local Unit

Item	Specification
Power	90 to 240 VAC, 50 /60Hz 120 to 370 VDC
Input	8 UHF Channels, N-Type Connector
Sensitivity	Can detect discharge less than 5 pC within monitoring area of MVSG
Input Bandwidth	Wide Bandwidth 100~2000MHz
Dynamic Input Range	- 65 to 0 dBm
Band Pass Filter	Combination of 3 LPF and 3 HPF
Noise Gating	Enabled (External Noise Sensor)
Communication	Fiber Optic (100Base-FX)
Notification	4 x LED Status Indicators
Operating Temperature	-25°C to 55°C
Operating Humidity	100%
Enclosure Rating	IP54
Dimensions	355 x 625 x 270 (W x H x D) mm

APM Sensor

The PD sensor is used to detect Partial Discharge signals in UHF (Ultra High Frequency) band.

Additional Details

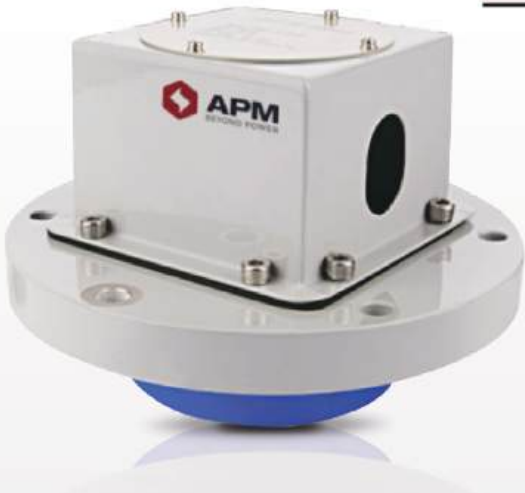
The External PD Sensor is installed on open-type insulating GIS spacer.

The Internal PD Sensor is installed in mounted window of GIS enclosure.

The Noise Sensor is a device installed externally at the substation GIS to detect various external electromagnetic signals such as corona, mobile phone, radar, switching surge.

Internal Sensor

Frequency Range	100~2,000 MHz
Output Power (5pC)	Over -20 dBm
Impedance	50 Ω
Sensitivity	Below 5pC
Connector	N - Type
Material	Aluminum, Epoxy
Install Position	GIS Window



External Sensor



Frequency Range	100~2,000 MHz
Output Power (5pC)	Over -20 dBm
Impedance	50 Ω
Sensitivity	Below 5pC
Connector	N - Type
Material	Aluminum, Epoxy
Install Position	GIS Spacer

Noise Sensor



Frequency Range	100~2,000 MHz
Impedance	50 Ω
Connector	N - Type
Material	PE
Install Position	Near GIS, Transformer, Cable

Drain Valve Sensor



Frequency Range	100~2,000 MHz
Output Power (5pC)	Over -20 dBm
Impedance	50 Ω
Sensitivity	Below 5pC
Connector	N - Type
Material	SUS, MC Nylon
Install Position	Transformer Drain Valve

HFCT Sensor



Frequency Range	1 ~ 100 MHz
Output Power (2pC)	Over 4.5 mV
Impedance	50 Ω
Connector	N - Type
Material	AL, Steel
Install Position	Ground Line, Cable

PD Diagnostic Service

- PD Diagnosis for Reliability-Centered Maintenance (RCM)
- Specialized PD Diagnosis
- High-Reliability PD Analysis with Diagnostic DB

PD Diagnosis for Reliability-Centered Maintenance (RCM)

Our service provides continuous monitoring and diagnosis of insulation abnormalities, critical for the RCM of power facilities. It ensures the ongoing reliability of your systems with precise, high-reliability results.

Specialized PD Diagnosis

We offer detailed analysis of PD causes and locations within power facilities, providing actionable insights that support efficient and accurate maintenance strategies.

High-Reliability PD Analysis with Diagnostic DB

Utilizing advanced diagnostic DB techniques, our PD service delivers accurate and dependable analysis, ensuring the reliable operation and maintenance of power facilities.



Available services

Genegal Diagnosis Service

- Comparison between noise signals and the internal signals of the GIS sensor
- Differentiates the PD signal from background noise
- Identifies background noise sources
- Proceeds with Precision Diagnosis if a PD signal is detected

Precision Diagnosis Service

- Analyzes a PD defect type with the evaluation of streamed data
- Identifies the PD defect type in the PD Pattern Library with Comparative
- Pattern analysis on the consecutive data
- PD source location can be estimated by Time of Arrival Method.

Service Cases (for 8 Years)

GIS

VOLTAGE	No. of Substations	No. of Bays
33 to 132 kV	208	2,490
230 kV	11	111
380 kV	82	657
TOTAL	302	3,258

Transformer

VOLTAGE	No. of Substations	No. of Transformers
380 kV	33	79
230 kV	7	11
132 kV	58	116
TOTAL	98	206

Cable Termination

VOLTAGE	No. of Substations	No. of Cable Terminations
380 kV	101	328
230 kV	7	22
132 kV	111	303
TOTAL	219	653

Global Network

KOREA

#1010, Geumto-ro 80-beon-gil, Sujeong-gu, Seongnam-si, Gyeonggi-do, Korea

Phone: +82-2-545-6286 / Fax: +82-2-545-6287

US OFFICE

20 Maxwell Irvine, CA 92618 USA

Phone: +1-949-387-6554 / Fax: +1-949-266-5666

KINGDOM OF SAUDI ARABIA (FACTORY AND TECHNICAL SUPPORT TEAM)

2989 Prince Mashur Ibn Abdulaziz, Al Mursalat, Riyadh, Kingdom of Saudi Arabia

BAHRAIN

#3454 Building 1398, Road 4626, Block 346, Sea front, Manama, Bahrain

Product Quotes : sales@apmtech.co.kr / Information : info@apmtech.co.kr





APM Technologies INC.

HQ: #1010, Geumto-ro 80-beon-gil, Sujeong-gu, Seongnam-si, Gyeonggi-do, Korea

Factory: #505, D Building, 700, Pangyo-ro, Bundang-gu, Bundang-si, Gyeonggi-do, Korea

KSA Partner (ARKAN): PO Box 13325 Al Iman Abdullah bin Saud Bin Abdul Aaziz Rd. Ishbiliya Dist. Riyadh KSA

Phone: +82-2-545-6286 **FAX:** +82-2-545-6287 **Product Quotes:** sales@apmtech.co.kr