2009 SAMSUNG

DVM PLUS III

DIGITAL VARIABLE MULTI



SYSTEM AIRCONDITIONERS

Digital Scroll Technology For Variable Capacity A/C Systems

Vayut Suvanlak

Emerson Business Overview


Process Management


Climate Technologies


Network Power


Industrial Automation

- Founded in USA in 1890
- Global Sales Of US22.6 Billion in 2007
- Global Product And Market Leadership
- 60+ Industry-leading Divisions Located in ~245 Locations In More Than 150 Countries
- 111,000 Employees Worldwide


Appliance Solutions

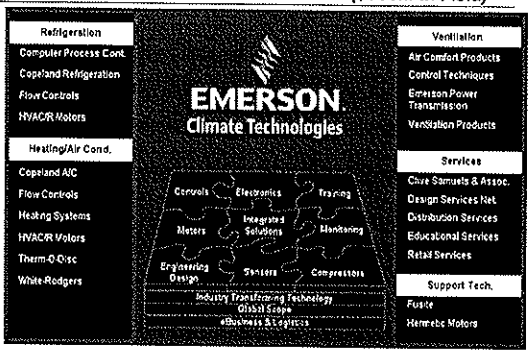

Professional Tools


Motor Technologies


Storage Solutions

Emerson Climate Technologies

$3B Portfolio Of Products & Services ($550M In Asia)



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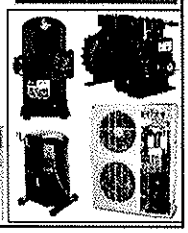
Asia-Pacific Profile

- Fully Capable Entity Serving Over 100 Major Customers
- Headquartered In Hong Kong, China
- 5 Manufacturing Facilities
- 15 Sales Offices And Support Locations
- Engineering Centers In India And Suzhou
- Over 2,000 Employees







Air Conditioning Technology Trends

Traditional

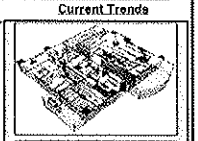


Ducted, Chillers

Central Plants

Energy Savings
Zone Comfort
Flexibility
Maintenance
Aesthetics

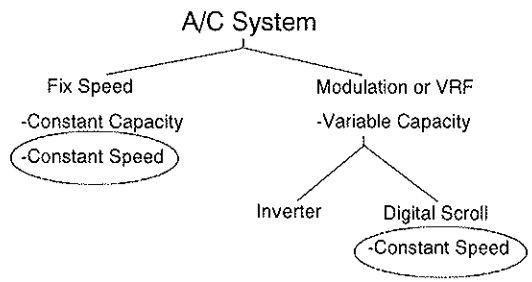
Current Trends





VRF Technology
Capacity Modulated System

A/C System Overview



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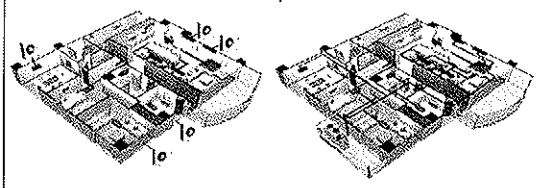
A/C Market Transition
Shift To Variable Refrigerant Flow (VRF)

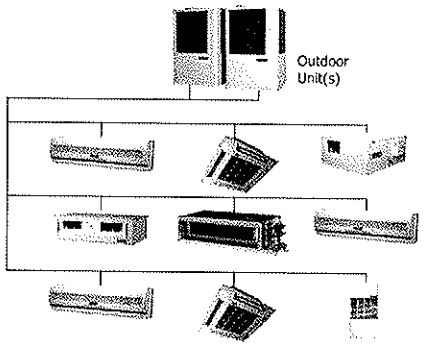
Conventional Splits ⇨ VRF A/C



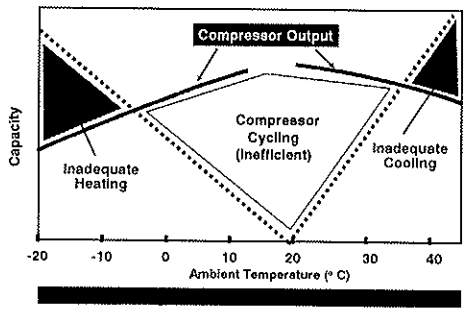
Benefits Of VRF A/C Systems
- Precise Temperature Control ± 0.5° C
- Precise Humidity Control
- Individual Room Comfort Control
- Superior Aesthetics & Prestige

Market Shift In Both Residential & Commercial

VRF Configuration



Fixed Speed Systems Do Not Match Load Requirements



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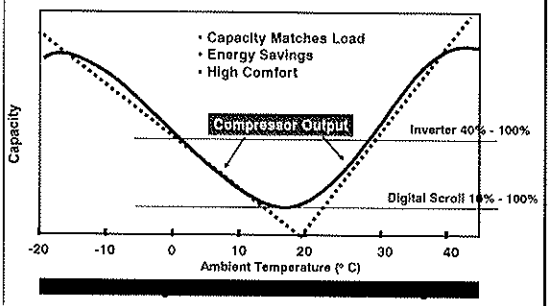
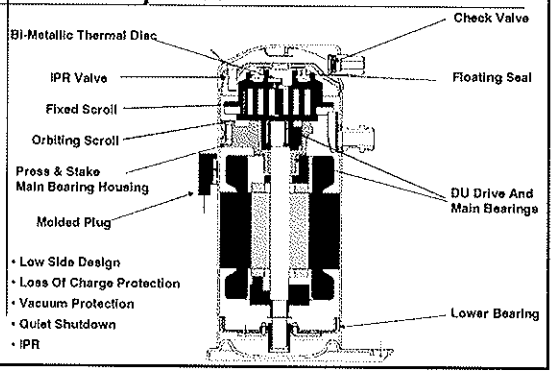
Modulated Compressor Matches Supply & Demand



Global Modulated Market Overview

- European VRF Market Gaining Share Against Traditional Chillers
  - Korean & Chinese OEMs Started Competing Against Japanese VRF
- Japanese Commercial Market Converting To Modulation
  - OEMs Pushing Higher Efficiency, R410A
- Korean Modulation Market Growing Very Rapidly
  - Both Residential & Commercial
  - Driven Heavily By Samsung & LG
- Chinese Market Growth Of Over 50% For Central A/C Systems
  - DX Systems Gaining Over Chillers/Ducted
  - Major Players Aggressively Promoting VRF Systems
- Australia, Taiwan, Thailand, India Market Rapidly Expanding

Scroll Compressor



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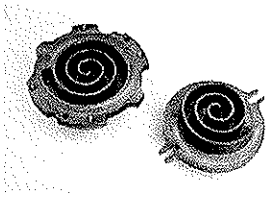
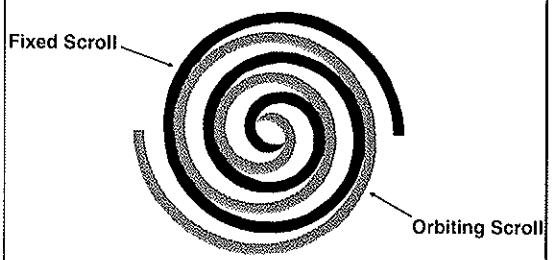
Scroll Sets

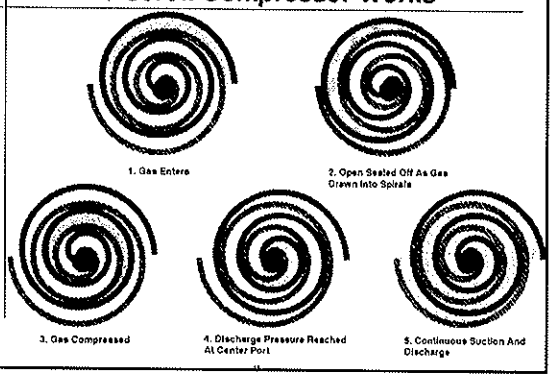


Comprised Of Two Scroll Parts

How The Scroll Compressor Works



How The Scroll Compressor Works



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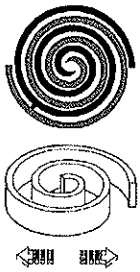
Copeland Scroll Features

1. Full Compliance (Axial And Radial)
2. Static Seals Vs. Dynamic Seals
3. DU Bearing
4. Built-In Protective Devices

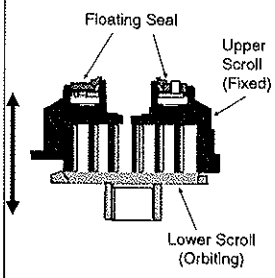
Radial Compliance





- Ensures Scroll Contact
- But, Allows Scrolls To Separate Sideways
- So Debris And Liquid Can Pass Without Damage

Axial Compliance



- Maintains Constant, Even Pressure On Scroll Tips
- Floating Seal Is Key
  - Optimizes Tip Loading
  - Pressure Balanced
    - Eliminates Leakage
  - Patented Design

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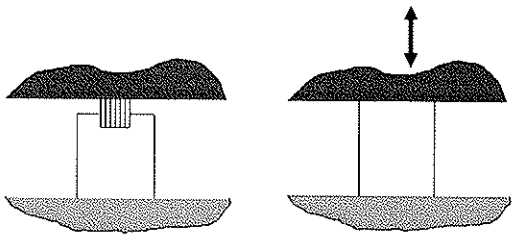
Advantages Of Full Compliance

1. High Efficiency
   1. Scrolls Wear In Rather Than Wear Out
   2. Less Performance Variability
2. Durability/Reliability Enhancement
   1. Better Liquid Handling
   2. Better Debris Handling
   3. No Wear Out Unlike Tip Seal Design
3. Low Sound Level
   1. Smooth Spectrum And Good Sound Quality
4. Unloaded Start

Static Seals Vs. Dynamic Seals

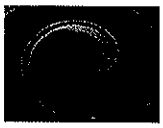


Dynamic Seal

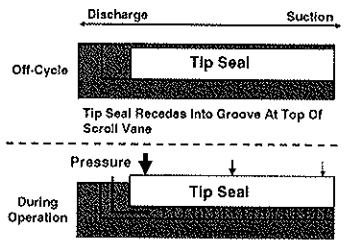
Static Seal

Tip Seal Operation





Cross-Sectional View Of Scroll Vane



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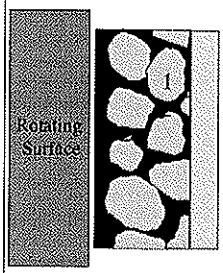
Static Seals Vs. Dynamic Seals

- Dynamic Seals
  - Wear
  - Are Sensitive to Liquid and Debris
  - Are More Quickly Damaged By Excess Heat
- Static Seals
  - Do Not Wear
  - Are More Robust

Heavy Duty "DU" Bearings



- Heavy Duty Material
  - (1) Porous Bronze
  - (2) PTFE-Lead Overlay
- Allows Extended Operation Without Full Lubrication
  - Exceptionally Low Friction
- Used In Two Places
  - Upper Main Bearing
  - Orbit Eccentric

PTFE = DuPont "Teflon"

Protective Devices

1. Internal Motor Protector: Line Break
   1. Senses Both Temperature & Current
   2. Protects Against Low Voltage & Phase Loss
2. Floating Seal
   1. Deep Vacuum Protection
3. Therm-O-Disc
   1. Bi-Metal For High Scroll Temperature Protection
4. Internal Pressure Relief (IPR) Valve
   1. High Discharge Pressure Protection

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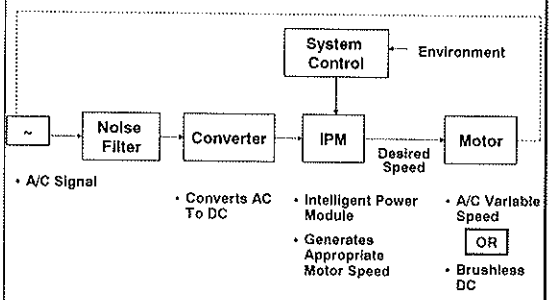
Copeland Digital Scroll Technology



Digital Scroll Compressor

Modulation With Inverter



Alternate Inverter Technology Is Complex

- Resonant Frequency
- Capacity Range From 40% to 100%, Not Wide Enough
- Need Expensive Inverter And Electronic Controls
- Oil Return Problem
- EMC/EMI Issues
- Complicated By-Pass Circuits
- Not Easy To Service
- Inverter loss & motor switching loss (15-20%)

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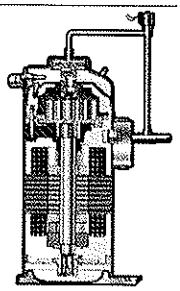
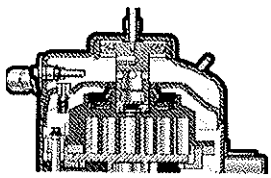
Digital Scroll Compressor
Development History

- 1993 Concept Developed
- 1995 First Prototype Developed
- 1997 Completed Concept Design
- 1997 Tested In Constant Temp/Humidity A/C
- 1999 Refrigeration Application Completed
- 1999 Started To Develop A/C Product
- 2000 Stopped Variable Speed Compressor
- 2000 Started To Supply To Samsung
- 2002 Started To Supply Rest Of Asia

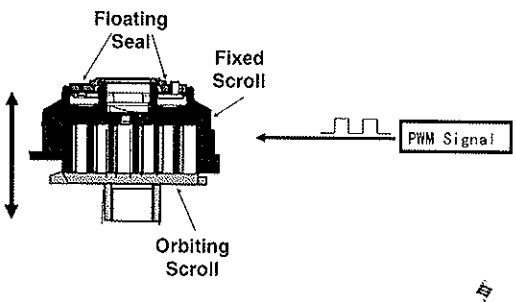


Digital Scroll: New Modulation Technology

New Scroll Modulation Concept
Enabled By Copeland Compliant Scroll
10~100% Continuous Capacity ✓
Excellent Performance
Requires Simple Electronics ✓



Scroll Movement During Operation



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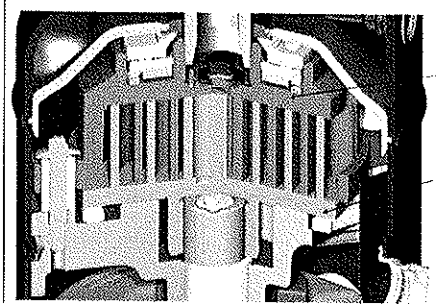
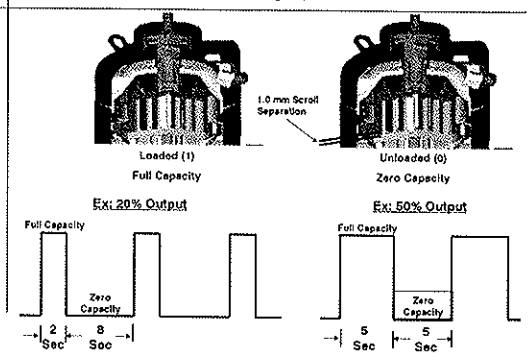
Digital Scroll Capacity Modulation



Modulation Mechanism



Seamless Capacity Delivery

$$\text{Capacity} = \frac{(\text{Loaded Time} \times 100\% + \text{Unloaded Time} \times 0\%)}{\text{Total Time}}$$

Example: Cycle Time = 10 Seconds

Capacity	Loaded Time
10%	1.0 Second
11%	1.1 Second
12%	1.2 Second
...	
...	
25%	2.5 Second
...	
50%	5.0 Seconds
...	
90%	9.0 Seconds

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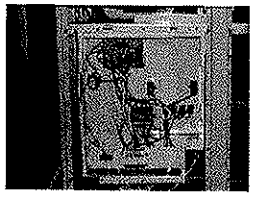
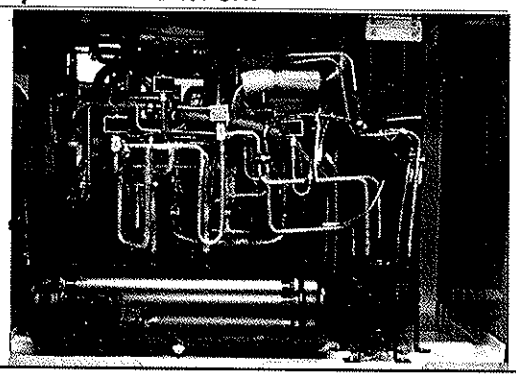
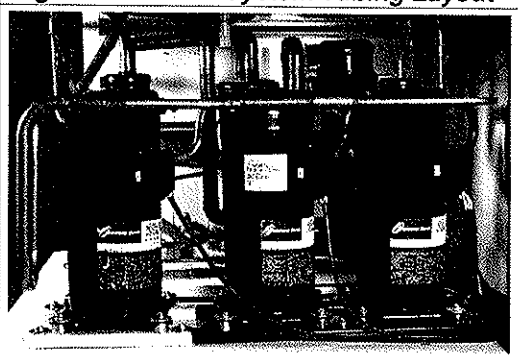
Simplicity In Controls

Non Digital Scroll System		Digital Scroll System
		
5x	Electronic Hardware	x
3x	Valves	x
Complex	Oil Management	Simple
Complex	Programming	Simple

Japanese Inverter 8HP



Digital VRF 21HP System Tubing Layout



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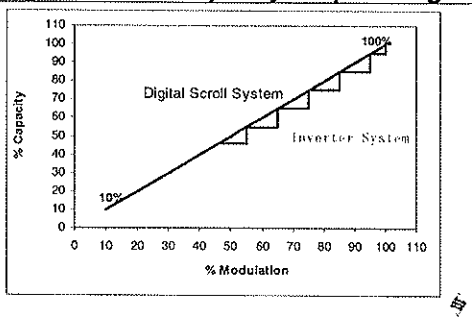
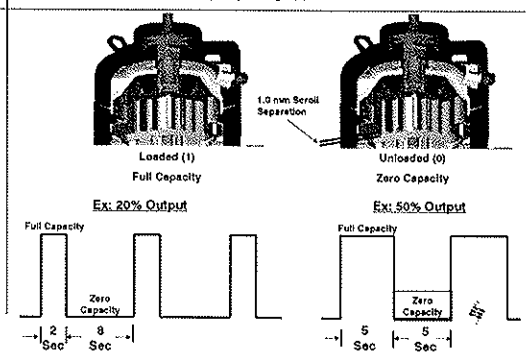
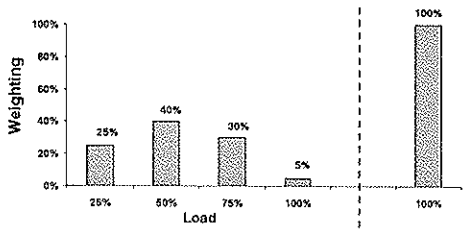
Digital Scroll : Capacity Output Range



Modulation Mechanism



IPLV For Better Rating Of "Real" Usage



	IPLV (Integrated Part Load Value)	EER
A/C System	Variable Capacity	Fixed Speed
Weighting	Close To Actual Usage	100% Load Only

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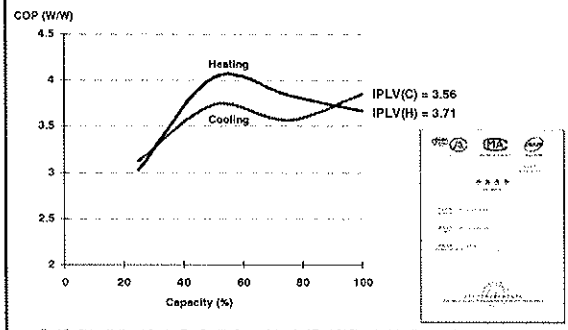
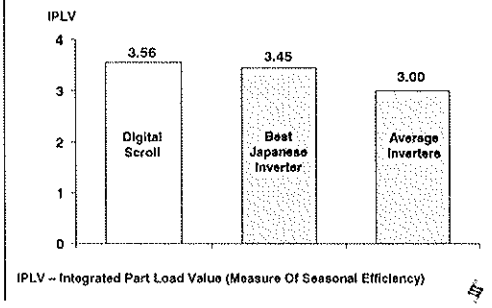
Digital Multi-System 10HP Test Data
As Per GB/T 18837 – 2002 & ARI210/240



Test By China National Center For Quality Supervision And Test Of Electrical Appliances , June 2005

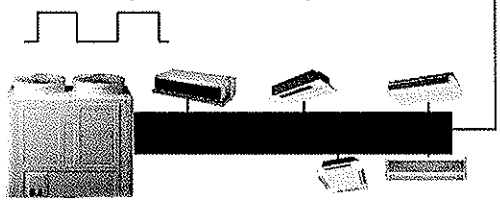
Energy Efficiency Performance



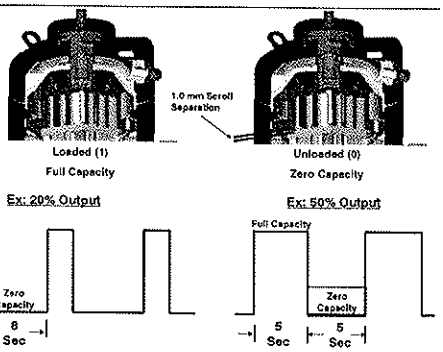
IPLV – Integrated Part Load Value (Measure Of Seasonal Efficiency)

Reliability - Easy Oil Return

- Easy Oil Return During Low Loads
  - No Oil "Pump Out" During Unloading
  - Loaded Cycle Gas Velocity Sufficient To Return Oil
- Don't Need Oil Separator Or Oil Return Cycle



Modulation Mechanism



A/C Reliability (CFM) Tests

High Pressure Ratio	2,000 Hours For Lubrication / High Temperature
High Load	2,000 Hours For High Temperature / Pressure
Start / Stop	520,000 Cycles For Vibration
Flooded Start	1,000 Cycles At 100 To 150% Charge Limit For Slugging And Lubricant Migration
Defrost Floodback	2,000 Hours At 100% Charge Limit For Liquid Slugging
Sequence	200 On / Off Cycles At Each Window Corner 30 Min / Cycle, Repeat Sequence 4 Times
Specific Tests	Based On Field Data Recorder Input
Digital Solenoid Valve	40,000,000 Cycles

Digital Compressor

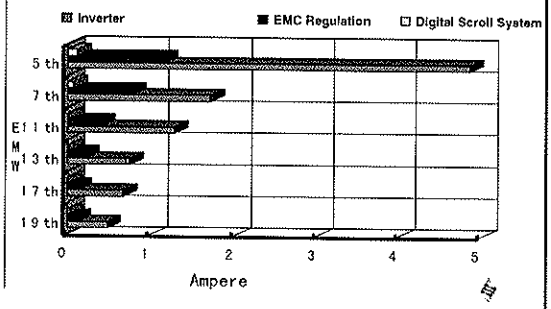
Asia Reliability Performance

Total Digital Compressor In Field	500,000+
Reliability	99.996%

Inverter Failure Rates ~2%+

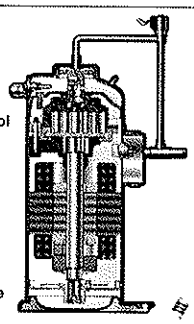
10-15% cheaper

Comparison Of Electromagnetic Interference Digital Scroll versus Inverter



Digital Scroll Has Excellent Performance

- Energy Saving
  - Excellent EER / SEER
- Better Comfort
  - Precise Room Temperature Control
  - Effective Room Humidity Control
  - Wider Capacity Range
- Reliable
  - Simple System
  - No Oil Return Issue
- No Electromagnetic Interference Issue



Digital Scroll Is A Winning Technology
Gaining Industry Recognition

Date	Country	Award
Dec 2001	Korea	Korea New Technology Award
Dec 2001	Korea	Samsung Group Technology Award – Finalist
Dec 2001	Korea	Grand Prize Of Korea Energy Award
Dec 2001	Asia	Far East Economic Review Innovation Award Finalist
Dec 2002	Korea	Korea New Technology Award
Nov 2002	China	China Household Appliance – Best Technology
Jan 2003	USA	AHR Expo Award For Technology Innovation
Mar 2006	Hong Kong	Technology Achievement

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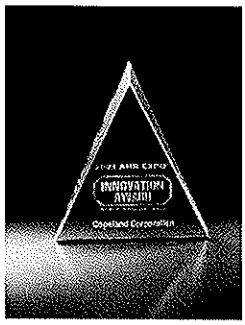
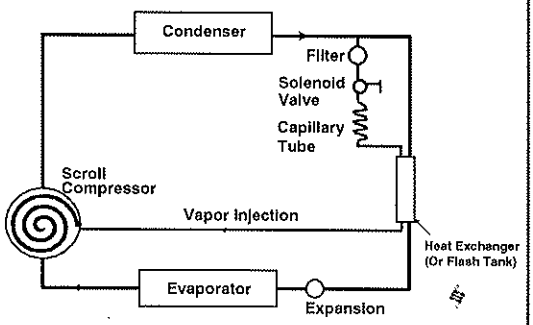
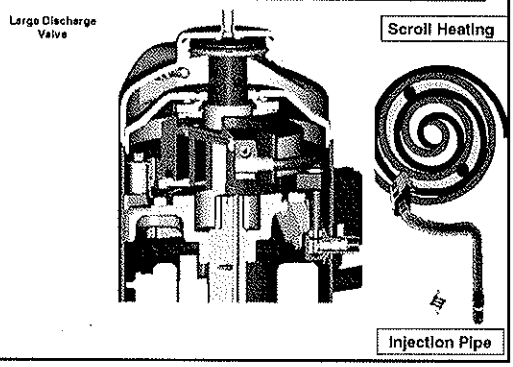
2003 , 2007 AHR Expo Award



Digital Scroll-Vapor Injection



Digital-Vapor Injection Design



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Digital Scroll-Vapor Injection



Position A

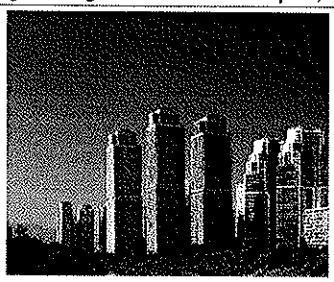
- Improve Heating Performance
- Replace Central Heating System In Northern China

Position B

- Improve Cooling COP
- Achieve High IPLV (4.5) In R410A Module System

Korea's Most Prestigious Project

Dogok Dong Condominium Complex, Seoul



Dogok Dong Complex, Seoul 4,000 Digital Scroll Systems

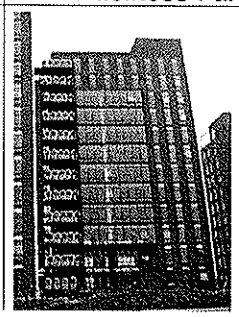
Project Details

- Over 4,000 Apartments
- 1,500 – 4,000 Sq Feet

Why Digital Scroll?

- Global Technology
- International Credibility
- Best-In-Class
- Best Performance
- Superior Reliability

ABP Business Park – Beijing, China



- Largest Commercial Project In China
- 10.2 Million Sq Feet
- 500 Individual Buildings
- Samsung/Digital Scroll Won Project
- 3 Month Field Test With Competition

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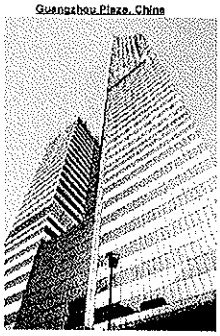
VRF For Large Space A/C
Digital Scroll VRF Systems

Spaceflight Exhibition Hall, Beijing China



Guangzhou Plaza, China



ABP Park Beijing China



Digital Scroll Projects Win In China

Project Name	Units #	Project Name	Units #
University Of Technology, Zhejiang	52	Industry Administrator Committee, Zhejiang	40
Jiao Tong University, Shanghai	40	Institute Of Petrochemical Technology, Beijing	40
Jinggan People Courthouse, Zhejiang	52	Jin Shan Middle School, Shanghai	73
Xi Yuan, Guangdong	130	Hangzhou Wanshili Hospital, Zhejiang	35
Kong Qiao Villa, Shanghai	30	Tian'an Tower	48
Mingzhou Business Harbor, Shandong	150	Foshan Court, Shandong	93
Shuo Huang Railway, Shandong	50	Industry Administrator Committee, Shandong	63
Yizhong Tobacco Co., , Shandong	51	Bao'an Rongjing Garden, Guangdong	210
Henan Apartment	140	Huazhong Normal University	65
Wangfujing Office Building, Beijing	59	Beijing Mechanics University Library	49
Business Affairs Bureau, Beijing	59	Architecture Technology Institute,Hefei	50
Agriculture Bureau, Beijing	22	Zhenzhou Environmental Bureau, Jiangsu	23
Civil Aviation University, Tianjin	20	Datong Electric Power, Xi'an	28
Judicatory Bureau, Henan	22	Bank Of Agriculture, Anhui	26
Xinhai Apartment, Shandong	450	Suzhou Apartment, Jiangsu	200
ABP, Beijing	3,005	Zhuboyuan Apartement, Beijing	63
Deji Tower, Jiangsu	100	Spaceflight Exhibition Center, Beijing	100

Digital Scroll Project Wins In India

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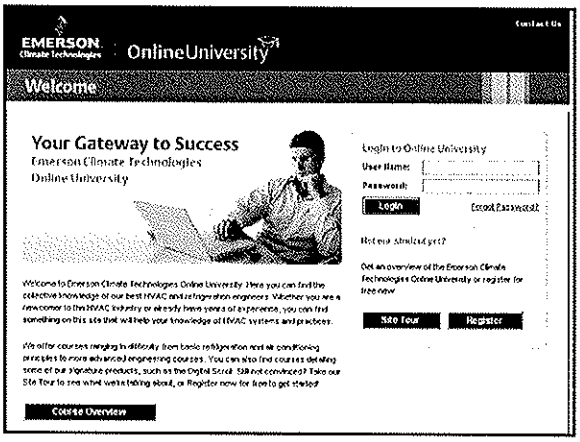
www.digitalscroll.com







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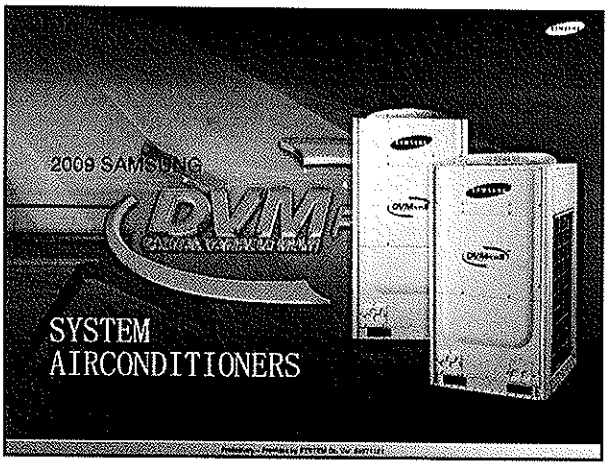
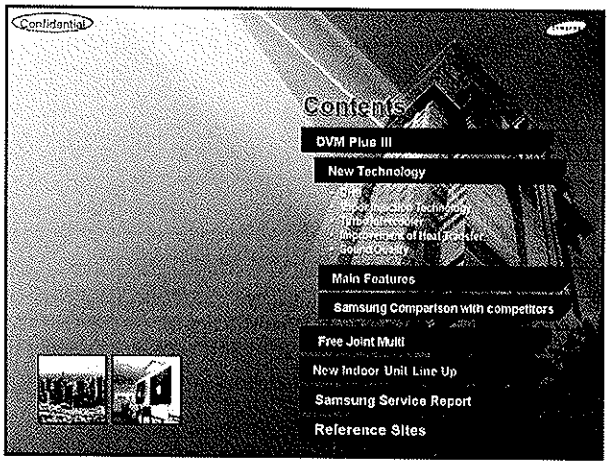
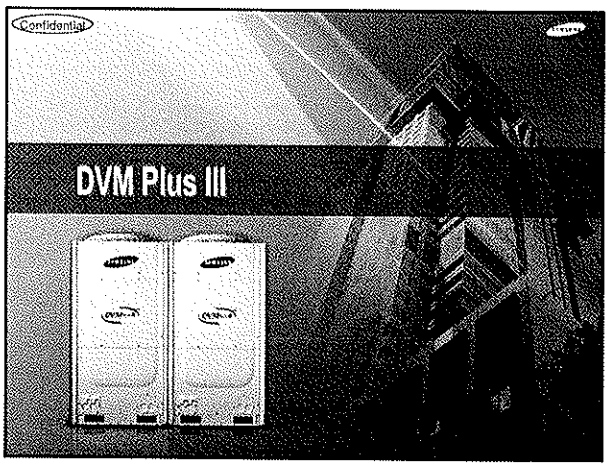
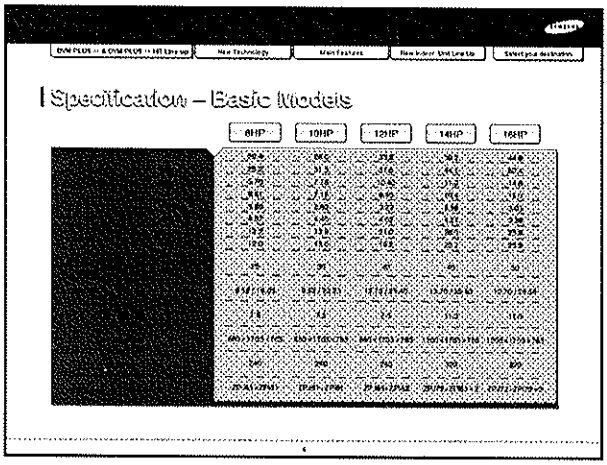
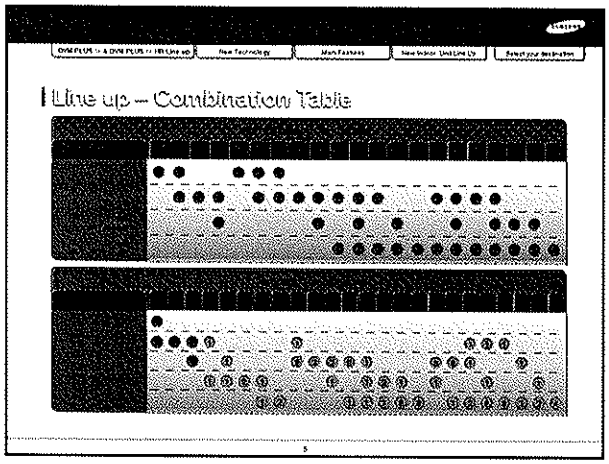
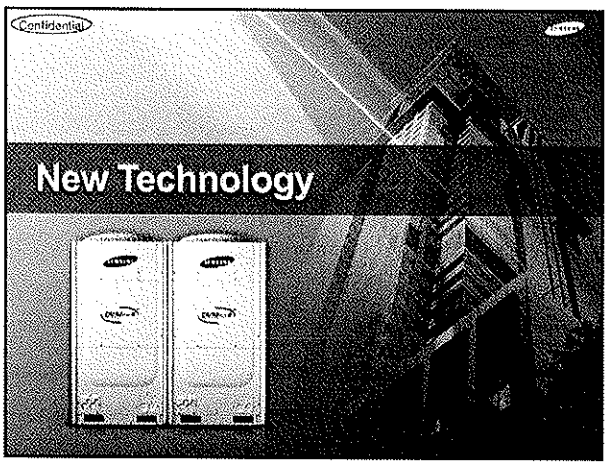

2009 SAMSUNG
SYSTEM
AIRCONDITIONERS

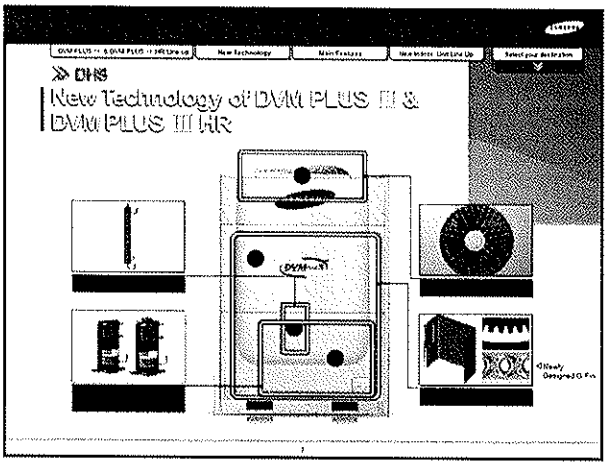

Confidential
Contents
DVM Plus III
New Technology
Main Features
Samsung Comparison with competitors
Free Joint Multi
New Indoor Unit Line Up
Samsung Service Report
Reference Sites

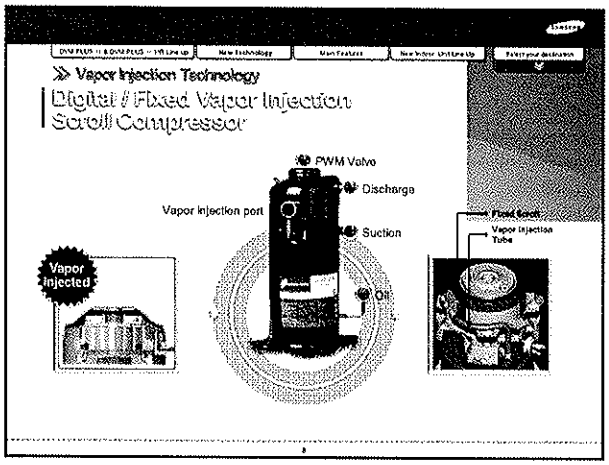

Confidential
DVM Plus III

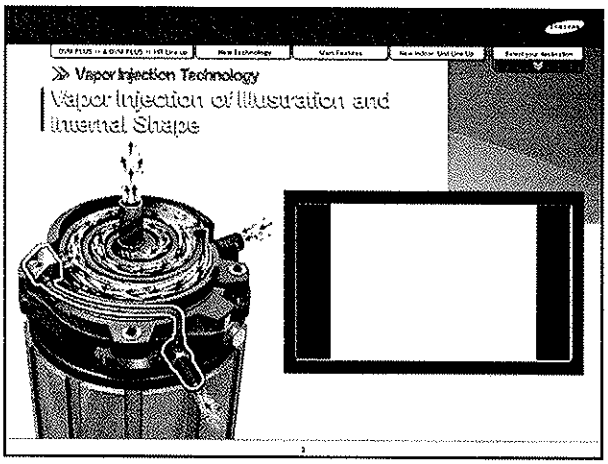

Specification – Basic Models

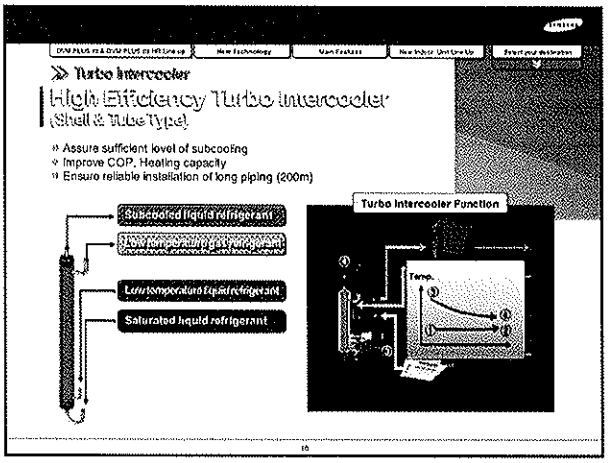

Line up – Combination Table

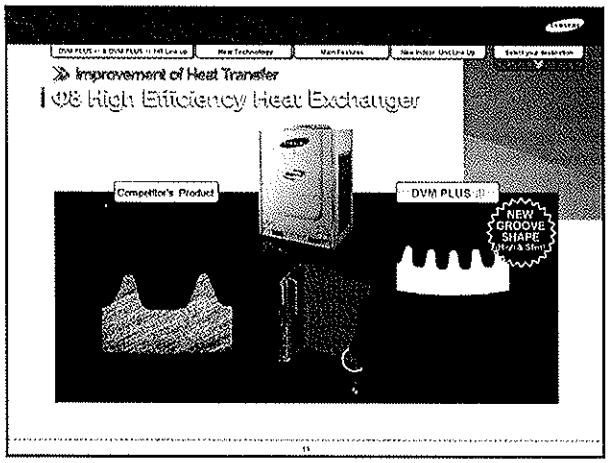

Confidential
New Technology

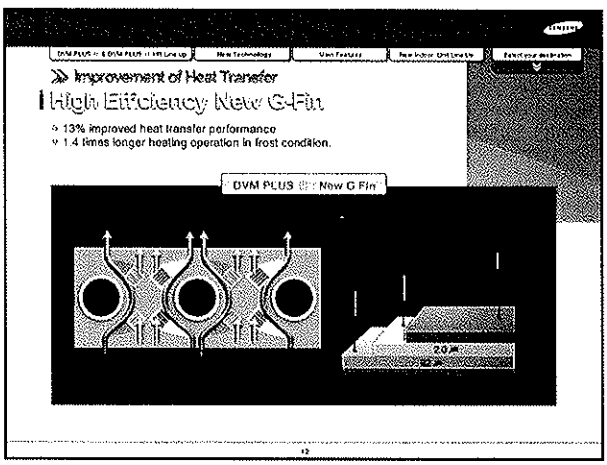

≫ DHS
New Technology of DVM PLUS III &
DVM PLUS III HR

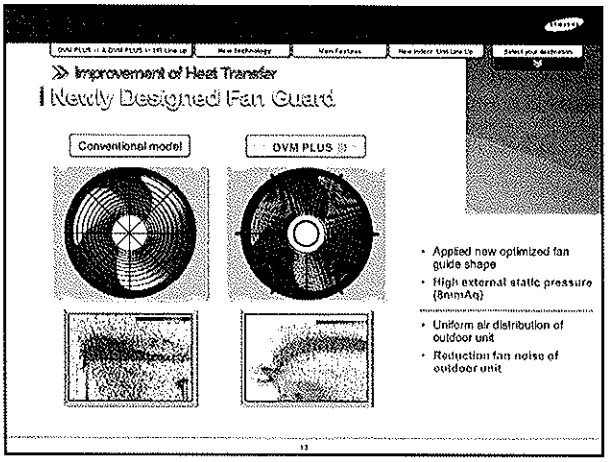

≫ Vapor Injection Technology
Digital / Fixed Vapor Injection
Scroll Compressor
PWM Valve
Discharge
Vapor injection port
Suction
Vapor injected
Oil
Vapor Injection
Tube

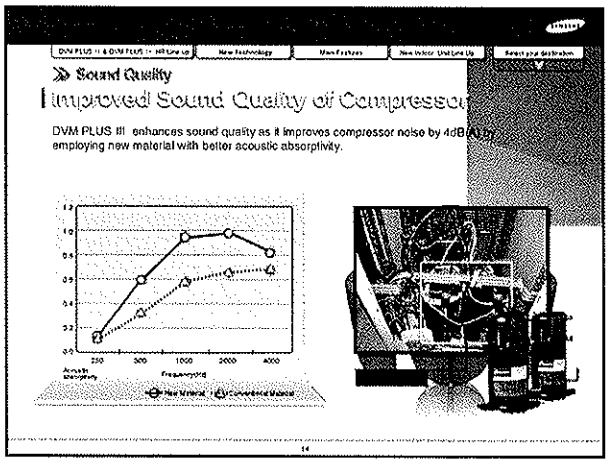

≫ Vapor Injection Technology
Vapor Injection of Illustration and
Internal Shape

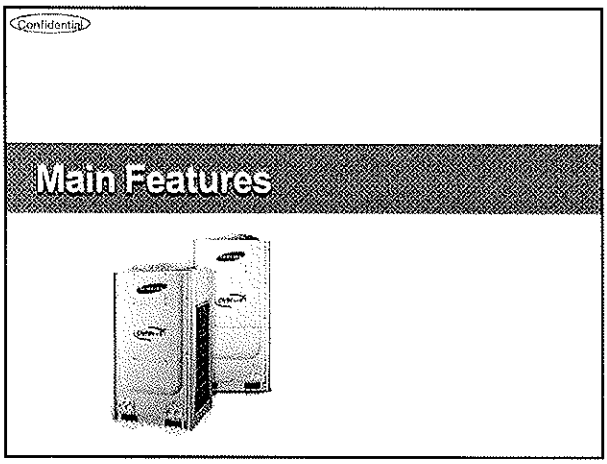

≫ Turbo Intercooler
High Efficiency Turbo Intercooler
(Shell & Tube Type)
» Assure sufficient level of subcooling
» Improve COP, Heating capacity
» Ensure reliable installation of long piping (200m)
Subcooled liquid refrigerant
Low temperature liquid refrigerant
Saturated liquid refrigerant
Turbo Intercooler Function
Temp.


≫ Improvement of Heat Transfer
High Efficiency Heat Exchanger
Competitor's Product
DVM PLUS III
NEW GROOVE SHAPE


≫ Improvement of Heat Transfer
High Efficiency New C-Fin
» 13% improved heat transfer performance
» 1.4 times longer heating operation in frost condition.
DVM PLUS III New C Fin







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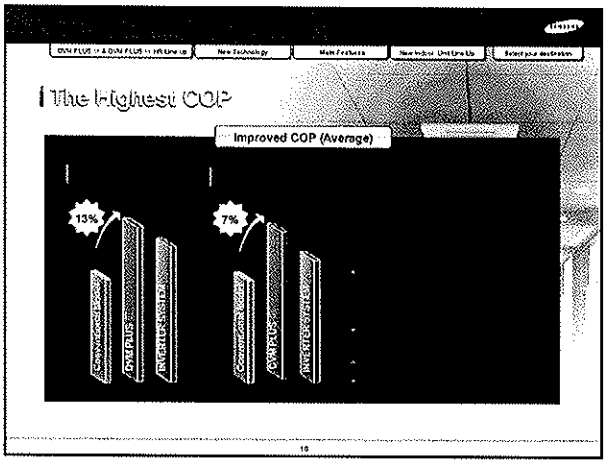
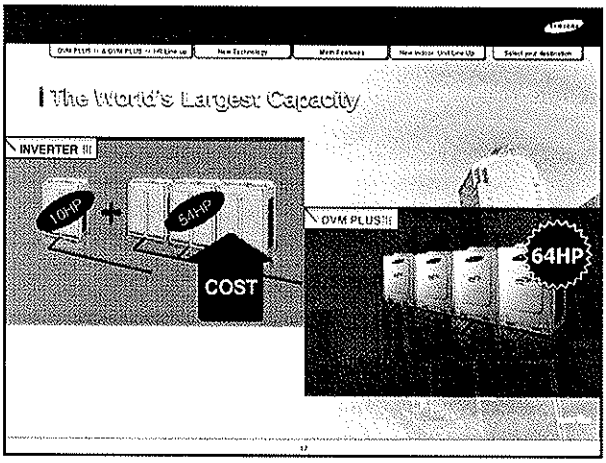
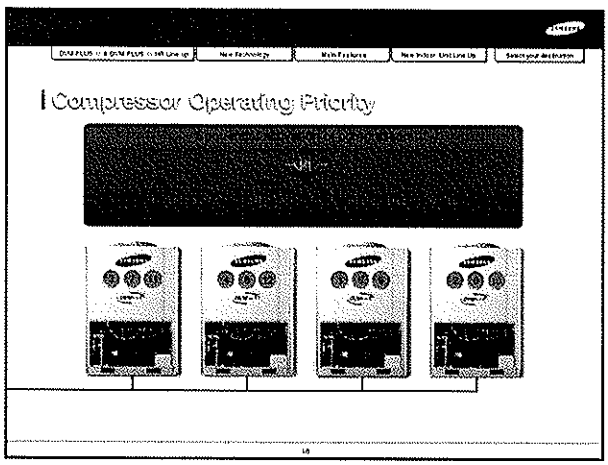
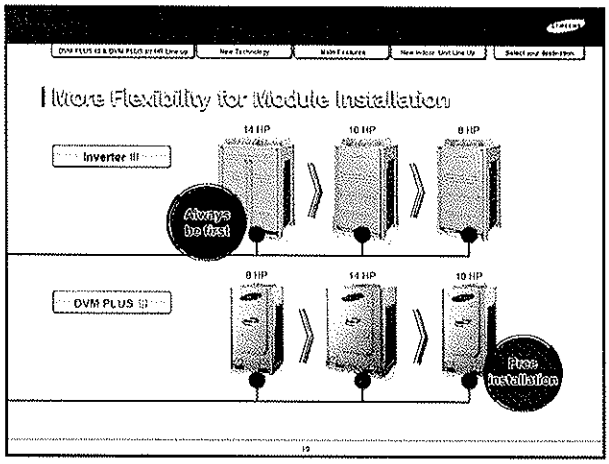
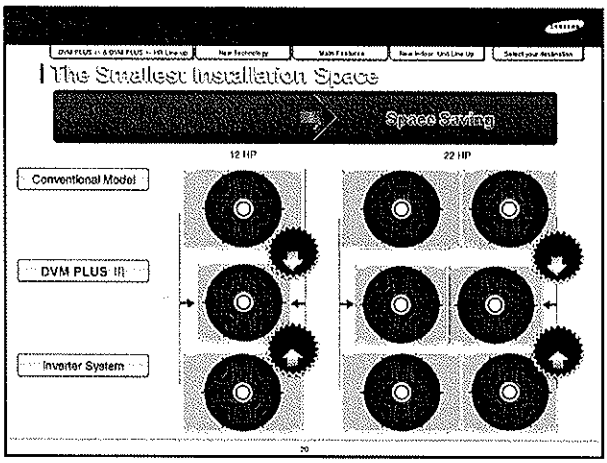
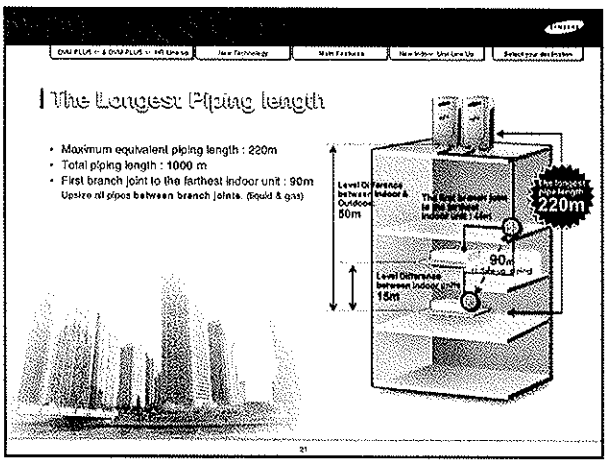

The Highest COP
Improved COP (Average)
13%
7%


The World's Largest Capacity
INVERTER !!!
10HP
64HP
COST
DVM PLUS!!!
64HP

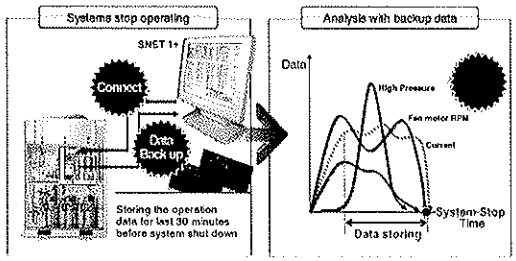

Compressor Operating Priority


More Flexibility for Module Installation
Inverter III
14 HP
10 HP
8 HP
Always be first
DVM PLUS III
8 HP
14 HP
10 HP
Free Installation

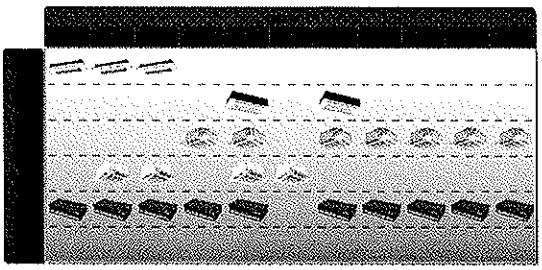

The Smallest Installation Space
Space Saving
12 HP
22 HP
Conventional Model
DVM PLUS III
Inverter System


The Longest Piping length
Maximum equivalent piping length : 220m
Total piping length : 1000 m
First branch joint to the farthest indoor unit : 90m
Upsize all pipes between branch joints. (liquid & gas)
Level Difference between Indoor & Outdoor 50m
The longest pipe length 220m
90m
Level Difference between Indoor units 15m

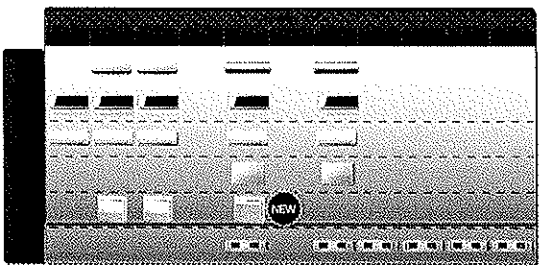
Data Backup in PCB (Printed Circuit Board)



Full Line up



Full Line up



Operation Cost Comparison (Samsung DVM Plus III Vs Japanese Brand)

Operation Cost Comparison for Samsung DVM Plus III and Top Japanese Brand (HI-EER)

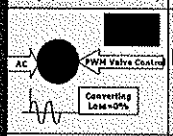
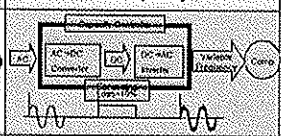
Explanation	Samsung DVM Plus III (Digital) Vapour Injection Compressor	Top Japanese Brand Inverter Compressor
Horse Power (HP)	48	48
COP (w/w)	3.58	3.17
Power Input (kW)	37.50	42.00
Inverter Loss	No Loss, as compressor Capacity is control by PWM Value.	10% for one inverter compressor, 0% for the standard compressor and so the average of 3 compressor is 3.3%
KW after including the inverter loss	-	42.00 x 1.033 = 44.01
Oil Return Mechanism Loss	Our average oil circulation rate is less than 1%	5% due to comparatively lesser oil outflow
KW after including oil return loss	-	44.01 x 1.05 = 46.05
Working Hours Per Day	12	12
Working Days Per Year	300	300
Total Annual Power Consumption	37.50 x 12 x 300 = 135,000 KWH	46.05 x 12 x 300 = 165,840 KWH
Diversity Factor (The equipment will not always operate at 100% load, depend on which part of the day)	0.7	0.7
Net Annual Energy Consumption	94,651 KWH	137,550 KWH
Annual Operation Cost (@ 25cts c/w gst) Efficiency Tariff from 1st Jul to 30th Sep 2009	$18,248.71	$22,665.18

Note : Above are base on High Efficiency Model

Annual Cost Saving for using digital Compressor compare with a Japanese Inverter Compressor **$4,416.47**

Note : This presentation is for your information only and presented strictly confidential and cannot be reproduced

Samsung Comparison with Competitors

Difference	PWM Control	Inverter Control
Control	Duty (On Time Ratio)	Frequency
Convert Loss		
Structure		 Outdoor unit control part  Inverter control part

Samsung Comparison with Competitors

Difference	PWM Control	Inverter Control
EMS life	N/A	Must
Oil Return	Better High flow speed during Loading	Bad Low flow speed At Low Frequency
Overload Operation	Better	Bad Performance Down (to protect controller)
SVC	Better	Performance Down (to protect controller)

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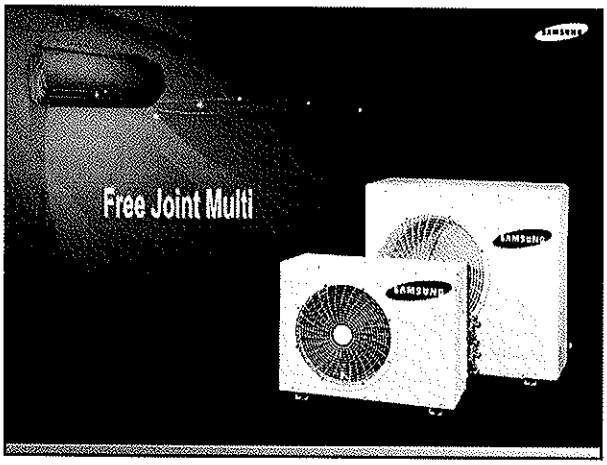
Samsung Comparison with Competitors

	SAMSUNG DVM PLUS III	JAPAN INVERTER
Compresser Type	Discharge Suction  Low Side Design	Suction Discharge  High Side Design
Compresser Type	Vapour Injection Digital Scroll (Digital + Fixed Scroll)	BLDC Inverter Scroll (Inverter + Fixed Scroll)
Feature	Low Side Design > Suction gas helps to cool the motors > Motor can operate at high efficiency and at higher ambient temperature	High Side Design > Motor is exposed to the discharge temperature > It reduces the performance of the motor much faster at high amnient temperature



Outdoor F-JM

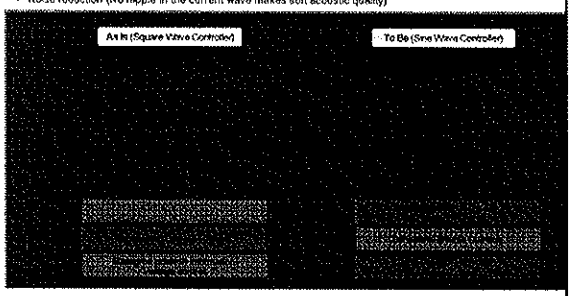
Specifications



Model					
22.4	25.0	28.0	30.0	33.5	36.0
8	9	10	11	12	13
22.4	25.0	28.0	30.0	33.5	36.0
8	9	10	11	12	13
22.4	25.0	28.0	30.0	33.5	36.0
8	9	10	11	12	13
63.0	71.0	80.0	85.0	95.0	100.0

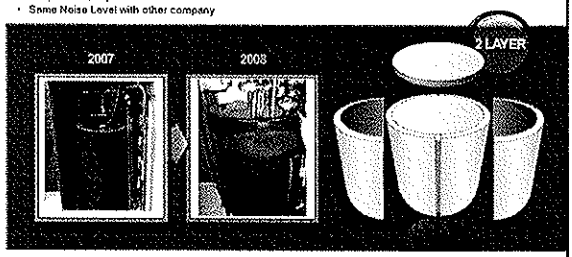
Sine Wave Controller

- Sine Wave Controller : All Model adopt newly developed Sine Wave Controller
- Noise reduction (No ripple in the current wave makes soft acoustic quality)



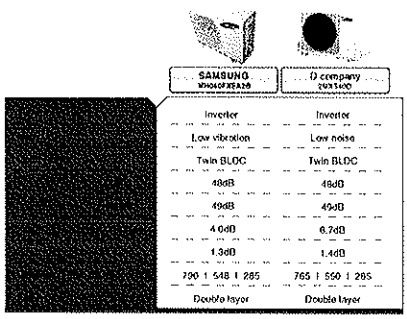
Felt Structure

- New Felt developed for Noise reduction.
  : Best noise reduction performance Felt was selected among several new design Felt .
- 2 layer Felt structure and absorb noise by two times.
- Adopted Felt Top
- Same Noise Level with other company



Outdoor F.M

Competitors Comparison



SAMSUNG	D company
Inverter	Inverter
Low vibration	Low noise
Twin BLDC	Twin BLDC
48dB	48dB
49dB	49dB
4.0dB	6.7dB
1.3dB	1.4dB
790 ↑ 548 ↓ 285	765 ↑ 550 ↓ 285
Double layer	Double layer

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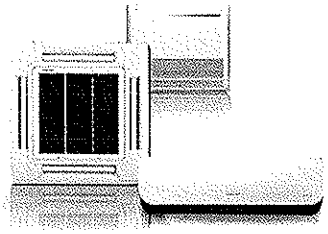
New Indoor Unit Line Up



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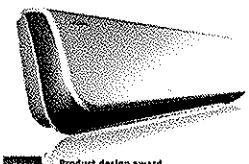
Product Summary



Product design award

MB wall-mounted air conditioner has been awarded with IF product design award 2009.

Basic Information	
CONCEPT	Interior Décor with Minimalistic Design Dust Free & Fresh Air with Auto Roof Shutter, MPI & DNA Filter
CAPACITY	2.6/3.5/5.2kW

USPs	
	Auto Roof Shutter(Dust Free) The Auto Roof Shutter keeps out from getting inside
mpi	MPI Innovative Air Purifying Technology with Micro Plasma Ion
DNA Filter	DNA Filter Special filter for harmful substances
good sleep II	Good Sleep II Cooling mode + Heating mode

Silver Coated Evaporator

The fins of the evaporator are triple coated with

Confidential

Product Summary



Basic Information	
CONCEPT	MPI, Good Sleep, Mirror Design
CAPACITY	2.0/2.8/3.5/5.2kW

USPs	
mpi	MPI Innovative Air Purifying Technology with Micro Plasma Ion
good sleep I	Good Sleep I Cooling mode + Heating mode
	Mirror Design Artistic & graceful image
	Slim Solution

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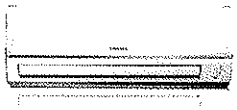
Indoor Neo Forte

Product Summary

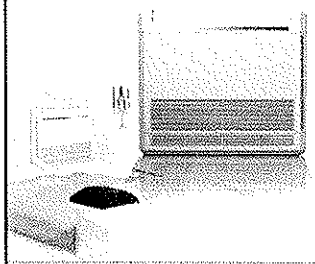


Basic Information	
CONCEPT	Simple, Chic and Slim body adds Mole to your Interior
CAPACITY	2.0/2.0/3.5/5.2kW

USPs	
	Good Sleep II Cooling mode + Heating mode
	Flush Front Panel Clean Cut Front Panel + Silver Accent Line

Indoor Console

Product Summary

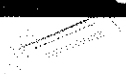


Basic Information	
CONCEPT	Interior shape, Clean panel Compact depth, Silent operation, MPI
CAPACITY	2.0/3.5kW

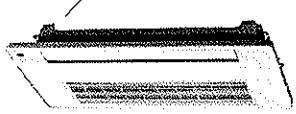
USPs	
	Slim Design This is only 199mm thick, the slimmest on the market. Its slim design easily integrates the unit into your decor
	Black Display Functional art, the touch screen display is elegant while it maximizes the convenience of control.
	MPI Zone MPI Zone is a technology that generates activated hydrogen and oxygen ions, which exterminates viruses and allergy causing microbes
	Silent Operation The silent, yet powerful and efficient cooling and heating system keeps things more comfortable

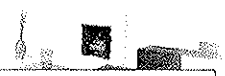
Indoor Slim 1way cassette

Product Summary



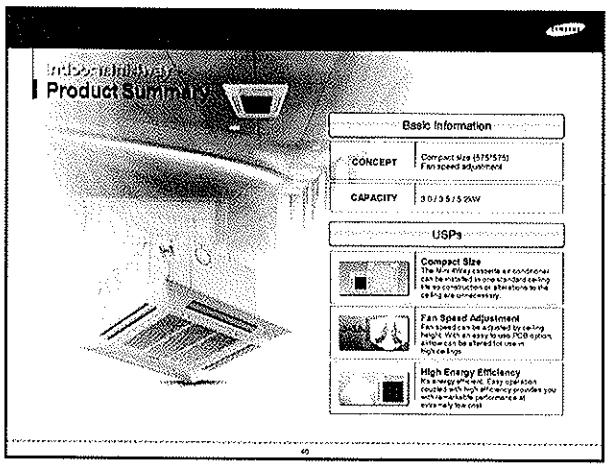
World Slimmest Indoor Air-conditioner Unit
Only 135mm in Depth
Can Be installed practically anywhere

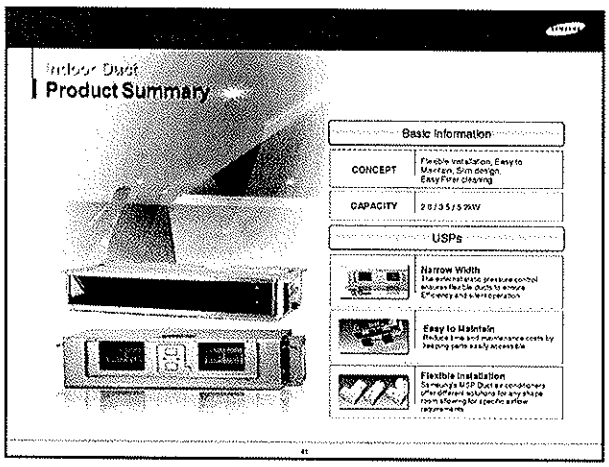


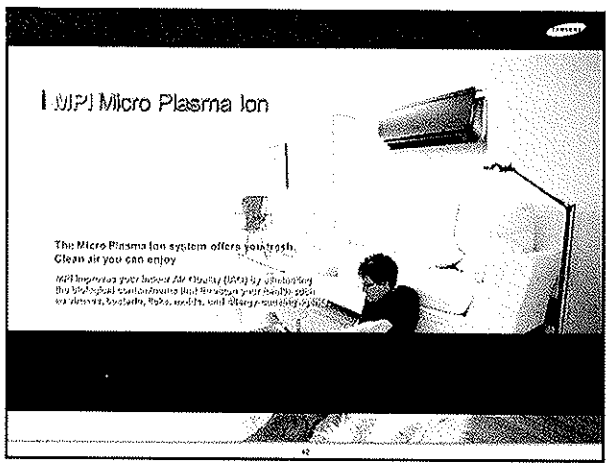


USPs	
	Slim and Compact Body= 180mm Ideal type for any small and shallow void space
	Lift up Drain Pump Water up to 750mm allowing flexible and convenient installation
	Quiet Operation Samsung's advanced cross fan reduces sound pressure level dramatically

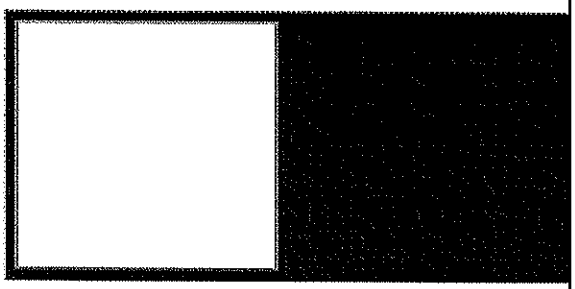
Basic Information	
CONCEPT	Compact size, Lift up drain pump, Quick lock, Bio heat exchanger
CAPACITY	2.6/3.5kW


Product Summary
Basic Information
CONCEPT
Compact size (575*575)
Fan speed adjustment
CAPACITY
3.0/3.5/5.2kW
USPs
Compact Size
Fan Speed Adjustment
High Energy Efficiency

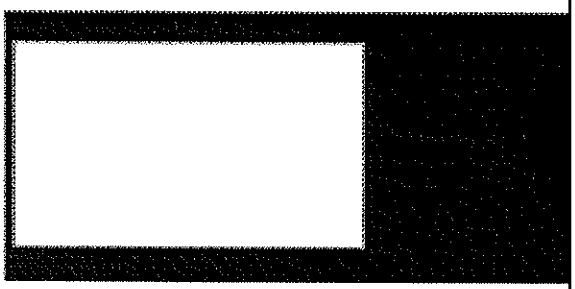

Product Summary
Basic Information
CONCEPT
Flexible installation, Easy to Maintain, Slim design, Easy Filter cleaning
CAPACITY
2.0/3.5/5.2kW
USPs
Narrow Width
Easy to Maintain
Flexible Installation


MPI Micro Plasma Ion
The Micro Plasma Ion system offers you fresh,
Clean air you can enjoy

MPI Micro Plasma Ion



MPI Micro Plasma Ion



MPI Micro Plasma Ion Globally recognized air purification technology



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MPI Micro Plasma Ion

Authentication authorities in UK, USA, Japan and South Korea have acknowledged the excellent Air filtering and cleaning function of Micro Plasma Ion technology, which kills 99% of airborne pathogens.
BAF : the Brown Allergy Foundation / RTI International : Research Triangle Institute

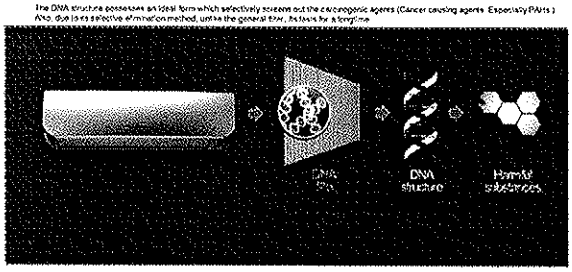
Virus	Influenza Virus A Type (FM)	99.6% removal 99.8% removal	Environmental science center (Japan) Yonsei University (Korea)
	Corona Virus (SARS virus)	99% removal	Kitasato Medical Center Hospital (Japan)
Bacterium / Mold	Yellow Micrococcus, Coliform Black Mold, Green Mold	99.9% removal	Korean consuming scientific research center
Allergy	Dust Mite / Cat / Dog	Certified effective	BAF Mark (UK)
MRSA	Methicillin Resistant Staphylococcus aureus	99.9999% removal	Kitasato Environmental Science Center (Japan)
Active Hydrogen	Hydrogen Atom Confirmed	Generation of Hydrogen Confirmed	Hiroshima university (Japan)
Animal poisonous	Seoul National Univ. Veterinary Department	Nontoxic Confirmed	Tested by GLP Global Standards (Korea)

43

DNA Filter

Why is the DNA filter more effective?

The DNA structure possesses an ideal form which selectively screens out the carcinogenic agents (Cancer causing agents, Especially PAHs.)
Also, due to its selective elimination method, unlike the general filter, its lasts for a longtime



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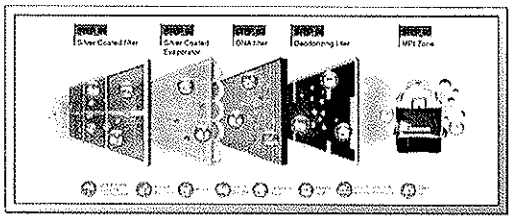
Multi Step Filter

5 step-filter completely filters out harmful substances

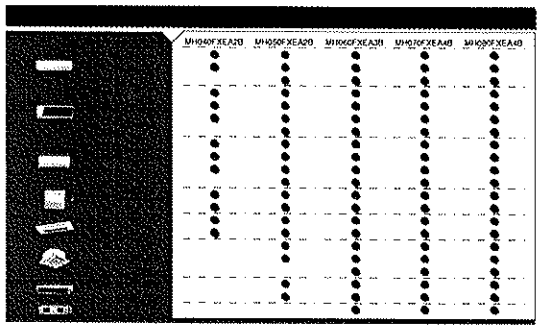


[illegible]

[illegible] to ensure efficient removal of condensation and to guarantee the production of clean and fresh air

48

FJM Combination Table



Design Hub @ Tampines





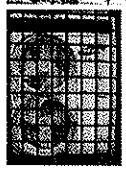
- Location : Singapore, East Region
- Remarks : Concept
  - 1-Stop Design Centre
  - * Interior Design
  - * Renovation
  - * Lighting
  - * Sanitary equipment, etc
- Status : Under Construction
- AirCon : Samsung DVM System
- Installation : est. Jan '10

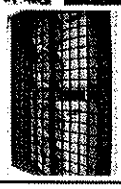
- Equipment

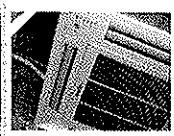
	Model	Quantity
Outdoor Unit	DVM Plus III	119
Indoor Unit	AVDUIII	335

Starhub @ Bukit Panjang











- Location : Singapore, West Region
- Remarks : Server Room
- Status : In operation since Dec'08
- AirCon : Samsung DVM System

- Equipment

	Model	Quantity
Outdoor Unit	Mini DVM	6
Indoor Unit	AVDCMH	18

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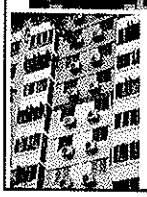
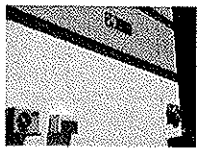
Samsung Multi Split Reference Site (Singapore)



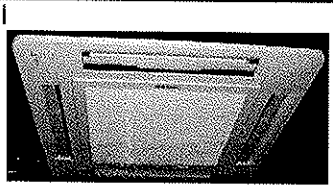
HDB @ Havelock Road
- Location : Singapore, Central Region
- Remarks : Hostel
- Status : In operation since Apr '09
- AirCon : Samsung Multi Split System / Neo Forte Wall Mount
- Equipment

	Model	Quantity
Outdoor Unit	MC18B2BX	256
Indoor Unit	MC09F2BN	492



Lounge @ Jalan Sultan



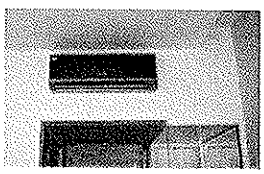
- Location : Singapore, Central Region
- Remarks : KTV Outlet
- Status : Installation in process, completed by Mid Aug '09
- AirCon : Samsung DVM System / 4 Way Cassette
- Equipment

	Model	Quantity
Outdoor Unit	[illegible]	3
Indoor Unit	[illegible]	12



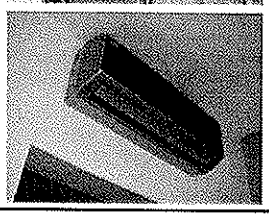
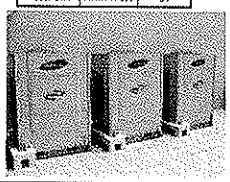


Boutique Hotel @ New Bridge Road



- Location : Singapore, Central Region
- Remarks : Vivace Wall Mount
- Status : Installation in process, completed by Mid Aug '09
- AirCon : Samsung DVM System / Vivace Wall Mount
- Equipment

	Model	Quantity
Outdoor Unit	[illegible]	6
Indoor Unit	[illegible]	54

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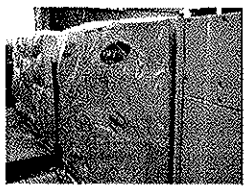
Apartments @ Roberts Lane
•Location : Singapore, North Region
•Remarks : Mix Development
•Status : Installation in process, completed by End Aug '09
•AirCon : Samsung DVM System / Vivaco Wall Mount

•Equipment

	Model	Quantity
Outdoor Unit	RVXV01T100	9
Indoor Unit	AVXVV01056	38

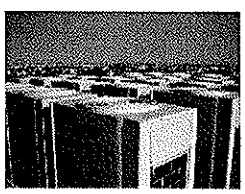


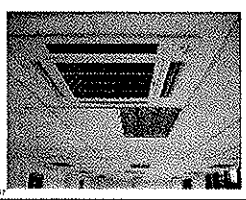




Project:
RMIT University
Location:
Hochiminh City D7, Vietnam
Total capacity of outdoor units:
12 Module (138HP)
Number of indoor units:
44 units + ERV
Year of Completion: 2008



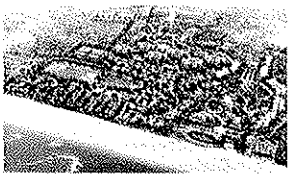




Project:
SK IT Center
Location:
Hochiminh City D7, Vietnam
Total capacity of outdoor units:
12 Module (138HP)
Number of indoor units:
100 sets
Year of Completion: 2007



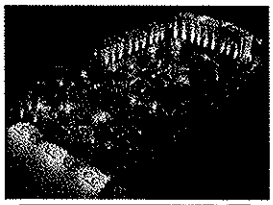
Project:
Intercontinental Hotel & Residents
(Kumho Asiana Plaza)
Location:
Le Duan St., Hochiminh City 01, Vietnam
Total capacity of outdoor units:
1522HP
Number of indoor units:
1155 units
Year of Completion: 2009



Project:
West Sands Resort
Location:
Mai Khao Beach, Phuket, Thailand
Total capacity of outdoor units:
984 HP
Number of indoor units:
755 units
Year of Completion: 2009

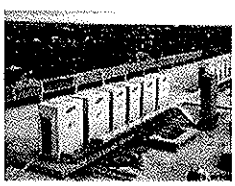






Project:
Cebu Imperial Palace Hotel & Resorts
Location:
Mactan Island, Cebu City, Philippines
Total capacity of outdoor units:
2850HP
Number of indoor units:
1355 units
Year of Completion: 2008. Dec





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Project:
Meralco Business Center
Location:
Ortigas, Manila, Philippines
Total capacity of outdoor units:
3364 HP
Number of indoor units:
995 units
Year of Completion: 2009. Feb



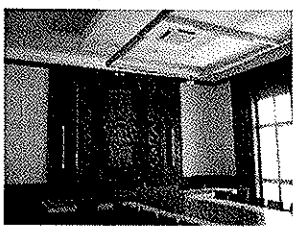


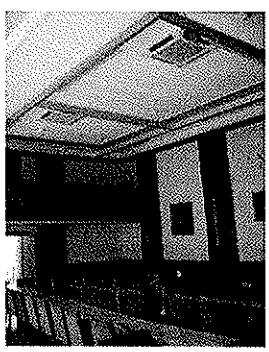




Project:
Megaworld (under construction)
Location:
Ortigas, Manila, Philippines
Total capacity of outdoor units:
3364 HP
Number of indoor units:
995 units
Year of Completion: 2009. Feb

■ Austria _ Cityhall





Project:
Cityhall Traiskirchen
Location:
Traiskirchen, Austria
Number of outdoor units:
3
Number of indoor units:
26
Control system:
LonWorks



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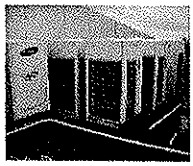
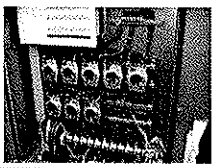
■ Germany _ Office building

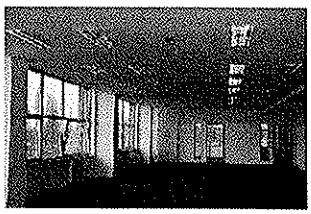
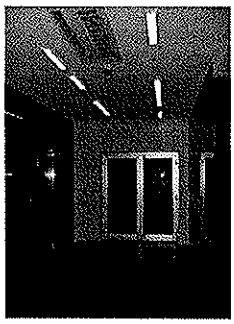





Project:
Business Park
Location:
Munchen, Germany
Number of outdoor units:
13
Number of indoor units:
219
Control system:
Centralized controller,
Power distribution unit, DMS

64

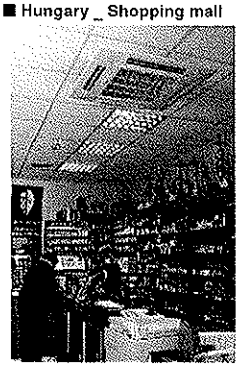
■ Croatia _ Business building


Project:
VMD Business building
Location:
Croatia
Number of outdoor units:
88
Number of indoor units:
480 (1way, 4way CST)
Control system:
Centralized controllers, DMS, S-net 3

65

■ Hungary _ Shopping mall






Project:
Shopping mall
Location:
Gyongyos, Hungary
Number of outdoor units:
18
Number of indoor units:
85
Control System:
DMS, Power distribution readers

66

■ Hungary _ Factory

Project:
LCD TV factory
Location:
Budapest, Hungary
Number of outdoor units:
20
Number of indoor units:
202
Control System:
Centralized controller, DMS






■ China _ Office building

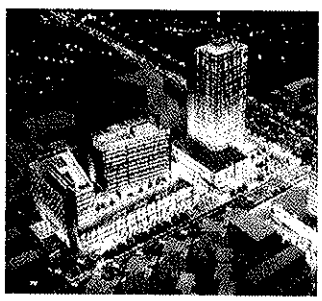


Project:
Advanced office buildings
Location:
Beijing, China
Total capacity of outdoor units:
23000 HP
Number of indoor units:
4604



■ China _ Office building

Project:
Advanced office buildings
Location:
Shanghai, China
Total capacity of outdoor units:
2600HP
Number of indoor units:
1009
Control system:
Centralized controller, DMS, S-Net 3



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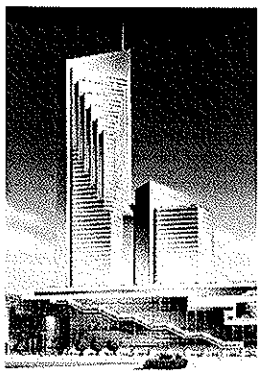
■ China _ Office building

Project:
Advanced office buildings
Location:
Kuangchou, China
Total capacity of outdoor units:
4472 HP
Number of indoor units:
1640
Control system:
Centralized controller, DMS, S-Net 3

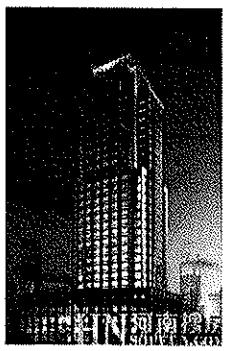


70

■ China _ Office building



Project:
Advanced office buildings
Location:
Zhongzhou, China
Total capacity of outdoor units:
2238 HP
Number of indoor units:
1073
Control system:
Centralized controller, DMS, S-Net 3



71

■ China _ Office building

Project:
Science research center
Location:
Beijing, China
Total capacity of outdoor units:
1149 HP
Number of indoor units:
341
Control system:
Centralized controller,
DMS, S-Net 3



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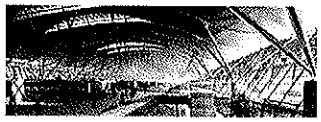
■ China _ Office building

Project:
Shanghai Pudong airport
Location:
Shanghai, China
Total capacity of outdoor units:
616 HP
Number of indoor units:
162
Control system:
Centralized controller,
DMS, S-Net 3





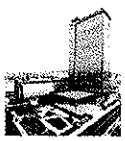
■ Korea_Residential building

Project:
Tower palace
Location:
Seoul, Korea
Number of outdoor units:
3,614
Number of indoor units:
17,731
Control system:
Centralized controller,
DMS, S-Net 3





■ Korea_Samsung HQ

Office			
Location	Suwon, Korea	Seoul, Korea	
Completion	2005	2007	2008
Area	214,676㎡	84,298㎡	195,438㎡
Floor	37F, B5F	31F, B7F	42F, B8F
Product	DVM PLUS	DVM PLUS II	DVM PLUS II

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