SAMSUNG ELECTRONICS AIR CONDITIONER EUROPE

SAMSUNG CLIMATE SOLUTIONS

HRISTINA PETROVA
DIMITAR TSONEV
Samsung is a company established in the city of Daegu, South Korea in 1938. The beginning was marked with a small trade operations, importing and exporting different goods in and outside the city.

The company was initially established by 3 families, which explains the symbolic meaning in Korean – 3 Stars. Samsung Electronics Industry Co. Ltd. is established 31 years later.

Once Upon a Time in South Korea...
This is how it started...

1974 Air-conditioner

1970 Black & White TV
1972 Stereo soundbar
1974 Tape player
1974 Refrigerator
1974 Washing machine

1980 Colour TV
1983 64Kb DRAM
1988 256Kb DRAM
1994 Digital TV

1979 VCR
1979 Camera
1988 Mobile phone

Samsung Electronics
Innovations during the past years

1974
Began WAC Production

1975
Began RAC Production

1985
Began Invac.RAC / F(P) AC Production

1992
Began SAC Production

2000
First Launched DVM Water

2007
World’s Largest Capacity Launched DVM+4 (22HP, Max 88HP)

2012
Launched Wi-Fi Control RAC (Jungfrau)

2013
Launched Triangle Architecture RAC (A3050)

2015
Launched 360 Cassette, 30HP DVM

2017
Launched Wind-Free™ Wall Mounted

2018
Launching Wind-Free™ Cassette
### Samsung Electronics

- **Global Operation with daily focus in R&D**
- **220 operations in 80 countries**
- **319,000 employees**
- **69,300 of in R&D**
- **6.3% of annual sales invested in R&D**
- **$13.6 billion annual R&D spending**

#### R&D Facilities

<table>
<thead>
<tr>
<th>Facility Type</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Manufacturing Facilities</td>
<td>38</td>
</tr>
<tr>
<td>Design Centers</td>
<td>6</td>
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<tr>
<td>R&amp;D Labs</td>
<td>34</td>
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<tr>
<td>Regional Headquarters</td>
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<td>Regional Subsidiaries</td>
<td>54</td>
</tr>
<tr>
<td>Others</td>
<td>73</td>
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</tbody>
</table>
Unique Solutions – Wind-Free™

- Wind Free Revolution in Technology
- Air Velocity Lower Than 0.15m/s = No Wind (ASHRAE)

21,000 micro-holes for Wind Free Cooling

Wind-Free™ The Comfort Master

- 1-way: 10,000
- 4-way: 15,700
- 4-way Mini: 9,000
- Wall Unit: 21,000

风无™ 快乐大师

21,000 micro-holes for Wind Free Cooling

- 1-way: 10,000
- 4-way: 15,700
- 4-way Mini: 9,000
- Wall Unit: 21,000
Uneven cooling and heating

- Air flow is concentrated to certain area, generating huge gap between people directly exposed to the flow and others who don’t.
- Each corner of 4-way cassette is not directly covered by the unit, leaving these area to rely on natural convection of conditioned air.
Samsung’s compressors – efficiently made by us

- **Flash Injection Technology** – an upgrade of Vapour Injection
  - Flash Injection provides increased refrigerant flow by 32% and extended heating operation range to -25°C
  - Features on all new Samsung Scroll Compressors (DVM S Eco, DVM S Water, DVM S, DVM Chiller)

※ Flash Injection : Injection of mixed Vapor with liquid Ref. for increasing Ref. flow density at low ambient.
2021 SAMSUNG ECO HEATING SYSTEM

R32 NEW REFIT EXCHANGER
A2W Heat pumps - EHS

- Air-to-Water (A2W) Heat Pumps: EHS

1. **Air-to-Air + Air-to-Water**
   - Outdoor Unit + EEV Kit + Indoor Unit
   - Outdoor Unit + Hydro Unit + Underfloor Heating
   - Radiator + DHW Tank + Solar Panel

2. **Air-to-Water (Split Type)**
   - Outdoor Unit + Hydro Unit + Underfloor Heating
   - Radiator + DHW Tank + Solar Panel

3. **Air-to-Water (Mono Type)**
   - Mono Unit + Underfloor Heating + Radiator
   - DHW Tank + Solar Panel

**Certification:**
- MCS
- NF
- Q
- EUROVENT CERTIFIED PERFORMANCE

* Solar Panel, Back-up Boiler, and DHW Tank are Optional.*
Eco Heating System, TDM

**Enjoy smart temperature control**

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**Samsung**

- Acts like multi air-conditioners
- Acts like a high efficiency boiler

**Company A**

- Cooling
- Heating

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**EHS TDM requires installation of only one outdoor unit!**
Quick heating with TDM technology

Quick Heating (Samsung EHS TDM)

Normal Heating

- Target Temp.
- Room Temp.
- Initial Temp.

Normally 5~20 minutes

Samsung EHS
Normal Heat Pumps (Floor Heating)
EHS TDM plus
Consists of an outdoor unit, hydro unit and indoor units

System Configuration

Hot Water (up to 55℃)
**Overview**

Various Indoor Unit
- Wall mounted, Console, LSP Duct, Duct S (MSP)

Connect up to 7 units
- Expand the A2A connectivity
- * connect up to 7 units

World-class Efficiency
- The Higher Grade
- A++
- 4.4 2
- Before New (TDM plus 4.4kW)

Wide Range of Operation
- Down to -25°C
- * at winter season

Smart Home
- Control Anywhere, Anytime
- * Optional Kit

The Full Capacity
- Capacity from 4.4kW to 16kW

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Various Indoor Unit
- Wall mounted, Console, LSP Duct, Duct S (MSP)
High Efficiency Heat Exchanger

- The New Multiple-teeth Screw Pipes (8mm) Which **Can Improve the Heat Exchangeability by 30.8%**
- The Patent G-Fin Design Can Improve the Efficiency of Heat Exchanger by 13%, as well

**upgraded**

**SAMSUNG Lab. Test result**
Wide Range of Operation, down to -25°C

The full range, from 4.4kw to 16kW, is designed to operate down to -25°C and designed to provide heating and domestic hot water even the toughest winter climates.
Powerful Heating

Max Leaving Water Temperature: 65°C

Higher PdesignH comparing conventional R410A model

Ratio PdesignH (kW) to Rated Capacity (kW)

<table>
<thead>
<tr>
<th>SPLIT</th>
<th>MONO</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>11</td>
</tr>
<tr>
<td>6</td>
<td>10</td>
</tr>
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<td>9</td>
<td>8</td>
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<td>5</td>
<td>10</td>
</tr>
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<td>9</td>
<td>9</td>
</tr>
<tr>
<td>2</td>
<td>8</td>
</tr>
<tr>
<td>1</td>
<td>10</td>
</tr>
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</table>

R3
R410A
Higher Heating Capacity at Low Temperature

- The new models provide comfort with 90% of heating performance at -10°C of ambient temperature.

※ At the temperature -25°C ~ -20°C, operation is available but capacity cannot be guaranteed.
Feature

- **World-class Seasonal Coefficient of Performance**
  - Acquired A++ (W35°C) Energy grade (All models, 4.4kW to 16kW)

※ according to EN 14815
Feature

World-class Energy Efficiency

- Has Superior Seasonal Energy Efficiency (A++)

Efficiency (EHS TDM Plus)

SCOP Energy Grade (W35°C)

* A2W Condition: (Heating) Water In/Out 30°C/35°C, Outdoor Air 7°C[DB]/6°C[WB]; (Cooling) Water In/Out 23°C/18°C, Outdoor Air 35°C[DB].
Smart Grid Ready & PV(Photovoltaic) Enable

Smart Grid Ready

When Users make contracts with local electric power company for limiting power consumption, Users can set the function with FSV.

PV(Photovoltaic) Enable

For energy saving by using the Solar Energy

Solar Energy

Power supply

PV Input Signal (dry contact)
Various A2A Indoor units, connecting up to 7 units

Wall mounted, Console, LSP Duct, MSP Duct (Duct S) are available for TDM plus and connecting up to 7 units for big residential site.
Feature

3-Step Silent Mode

- Ensure Silent Operation during Night Time with Reduced Noise Level at 3~7dB
- 1 Step: ▼3dB / 2 Step: ▼5dB / 3 Step: ▼7dB
A2W Heat pumps  EHS

- **EHS TDM Plus Indoor Line-up**
  - Combination ratio of up to 200%
  - Low noise console (floor standing units) units with top or bottom air discharge

<table>
<thead>
<tr>
<th>Integrated tank</th>
<th>Capacity (kW)</th>
<th>2.2</th>
<th>2.8</th>
<th>3.6</th>
<th>5.6</th>
<th>7.1</th>
<th>9.0</th>
<th>16.0</th>
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<td></td>
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<tr>
<td></td>
<td>3ph</td>
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<td>Wall Mount</td>
<td>A3050 Good1</td>
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<td><em>Without EEV</em></td>
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<td>Duct</td>
<td>Slim Duct</td>
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<td></td>
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<td></td>
<td>MSP Duct</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(Duct S)</td>
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<td></td>
<td></td>
<td></td>
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<td></td>
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<tr>
<td>-</td>
<td>Console</td>
<td></td>
<td></td>
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<td>Wall Mount</td>
<td>New Borocay</td>
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</tbody>
</table>

Wi-Fi kit

3rd party Thermostat

Wired R/C

Wireless R/C
A2W Heat pumps EHS

Product concept

- Hydro unit + DHW Tank ➔ Tank integrated hydro unit
- Eco-friendly R32 refrigerants
- DHW Efficiency A+ (Split) & Leaving water temperature 65°C (How water: Max. 70°C with booster heater)
Solution Overview

0 Tank Integrated Hydro Unit
Total Solution for Heating & DHW

- Hydro Unit
- DHW Tank

2 Type of Water Vol: 200/260L

02 Easy Installation
Easy Installation & Service through SD Card & Mobile App

03 2-Zone Control
2-Zone Control with New Remote Control

04 Color
Color Display, Multi Language (6)

05 Back up Heater Installed
- 1Ph: 2kW (Default)
- 4/6kW (Optional)
- 3Ph: 6kW (Default)

06 SG Ready / PV
*SG: Operated by 4 input signal
**PV: Energy saving by solar energy

*Smart Grid / **Photovoltaic
Control AC Anywhere, Anytime (Optional)

- Can control your air conditioner with your smart phone.
- Can easily turn it on/off outside the house.
Low CO₂ Emission

New R32 EHS makes it possible to reduce 70% of CO₂ Emission

* GWP: Global Warming Potential
Top Class Seasonal Coefficient of Performance

Superior Energy Label Grade: All capacity range SCOP A+++ 

SCOP Comparison of SPLIT

Superior SCOP in same capacity

<table>
<thead>
<tr>
<th>Type</th>
<th>SPLIT</th>
<th>MONO</th>
</tr>
</thead>
<tbody>
<tr>
<td>Capacity</td>
<td>4 kW</td>
<td>6 kW</td>
</tr>
<tr>
<td>SCOP</td>
<td>4.58</td>
<td>4.58</td>
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<tr>
<td>Energy Grade</td>
<td>A+++</td>
<td>A+++</td>
</tr>
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</table>

* A+++ label is available from 26, Sep. 2019 and should be considered as A++ label until that time.
Feature

**EHS Simulator, Simulate EHS installation and operation**

- You can select devices and simulate heating load, energy consumption, cost, CO2 emission and LCC (Life cycle cost) analysis according to national/regional temperature and architectural conditions.

**General conditions**
- Location / Design Conditions / Application Setting

**Comparisons chart**
- Monthly Heating Load / Annual Energy Consumption & Cost / CO2 Emission / GHG Benefit / LCC Analysis

**Equipment**
- Installation Diagram / Available Equipment List Check
Samsung Support Tools

- E-Solution - Seasonal Efficiency & Energy Consumption Simulation tool

### Annual energy simulation

<table>
<thead>
<tr>
<th>Description</th>
<th>Unit</th>
<th>Jan</th>
<th>Feb</th>
<th>Mar</th>
<th>Apr</th>
<th>May</th>
<th>Jun</th>
<th>Jul</th>
<th>Aug</th>
<th>Sep</th>
<th>Oct</th>
<th>Nov</th>
<th>Dec</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cooling Load</td>
<td>kW</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1,787.64</td>
<td>2,162.42</td>
<td>2,797.54</td>
<td>4,887.32</td>
<td>4,380.74</td>
<td>2,987.51</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>19,003.17</td>
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<tr>
<td>Cooling Energy consumption</td>
<td>kW</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>264.69</td>
<td>117.27</td>
<td>442.08</td>
<td>1,000.00</td>
<td>817.94</td>
<td>502.54</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>3,244.52</td>
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<tr>
<td>Heating Load</td>
<td>kW</td>
<td>7,971.09</td>
<td>7,659.00</td>
<td>7,615.20</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>2,099.94</td>
<td>4,807.75</td>
<td>5,699.35</td>
<td>35,852.33</td>
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<tr>
<td>Heating Energy consumption</td>
<td>kW</td>
<td>1,301.10</td>
<td>1,816.95</td>
<td>1,807.31</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>644.65</td>
<td>1,055.66</td>
<td>1,252.53</td>
<td>8,478.21</td>
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<tr>
<td>Cost of electricity (Monthly)</td>
<td>€</td>
<td>266.15</td>
<td>254.37</td>
<td>253.02</td>
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<td>44.42</td>
<td>61.89</td>
<td>140.00</td>
<td>114.51</td>
<td>70.36</td>
<td>90.25</td>
<td>147.79</td>
<td>175.35</td>
<td>1,655.18</td>
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</table>

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The chart above shows the annual energy simulation for cooling and heating loads, along with the monthly cost of electricity. The data is presented in a tabular format and graphically as a bar chart, detailing the consumption for each month and the total annual cost.
# Commercial EHS: VRF DVM + Hydro Unit

- Low Temperature (HE) Hydro Unit - AM***FNBDEH/EU (160/320/500) – 50°C

## Specifications

<table>
<thead>
<tr>
<th>AM***FNBDEH</th>
<th>160</th>
<th>320</th>
<th>500</th>
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<tbody>
<tr>
<td>Power</td>
<td>Φ, #, V, Hz</td>
<td>1,220-240.50</td>
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</tr>
<tr>
<td>Cooling Capacity</td>
<td>kW</td>
<td>14.00</td>
<td>28.00</td>
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<tr>
<td>Heating Capacity</td>
<td>kW</td>
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<td>32.00</td>
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<tr>
<td>Power Input Cool.</td>
<td>W</td>
<td>10.00</td>
<td>10.00</td>
</tr>
<tr>
<td>Power Input Heat.</td>
<td>W</td>
<td>10.00</td>
<td>10.00</td>
</tr>
<tr>
<td>Water Flow Rate</td>
<td>LPM</td>
<td>48</td>
<td>92</td>
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<tr>
<td>Leaving Water Temp. Cooling</td>
<td>°C</td>
<td>5.0-30.0</td>
<td></td>
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<tr>
<td>Leaving Water Temp. Heating</td>
<td>°C</td>
<td>20.0-50.0</td>
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</tr>
<tr>
<td>Liquid Pipe</td>
<td>Φ, mm</td>
<td>9.52</td>
<td>9.52</td>
</tr>
<tr>
<td>Gas Pipe</td>
<td></td>
<td>15.88</td>
<td>22.2</td>
</tr>
<tr>
<td>Sound Pressure H/M/L</td>
<td>dB(A)</td>
<td>27</td>
<td>28</td>
</tr>
<tr>
<td>Sound Power</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Net Weight</td>
<td>kg</td>
<td>29</td>
<td>33</td>
</tr>
<tr>
<td>Net Dimensions</td>
<td>mm</td>
<td>518 x 627 x 330</td>
<td></td>
</tr>
</tbody>
</table>

- Automatic Anti-Legionella control
- Water Law control
- Chilled & Hot Water Production
- Extended Ambient Temperature range (+35°C)
Commercial EHS: VRF DVM + Hydro Unit

- High Temperature (HT) Hydro Unit - AM***FNBF E/G B/EU (160/250) – 80\(^\circ\) C

- Automatic Anti-Legionella control
- Water Law control
- Cascade Refrigerant Cycle with Dual Plate Heat Exchanger
- Extended Ambient Temperature range

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<table>
<thead>
<tr>
<th>AM***FNBFGB</th>
<th>160</th>
<th>250</th>
<th>160</th>
<th>250</th>
</tr>
</thead>
<tbody>
<tr>
<td>Power</td>
<td>Φ, #, V, Hz</td>
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<td>3,4380-415,50</td>
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</tr>
<tr>
<td>Cooling Capacity</td>
<td>kW</td>
<td>-</td>
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</tr>
<tr>
<td>Heating Capacity</td>
<td>kW</td>
<td>16.0</td>
<td>25.0</td>
<td>16.0</td>
</tr>
<tr>
<td>Power Input Cool.</td>
<td>W</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Power Input Heat.</td>
<td>W</td>
<td>3100</td>
<td>3100</td>
<td>5000</td>
</tr>
<tr>
<td>Water Flow Rate</td>
<td>LPM</td>
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<td>23</td>
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<tr>
<td>Leaving Water Temperature</td>
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<td>25.0~80.0</td>
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<tr>
<td>Liquid Pipe</td>
<td>Φ, mm</td>
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<td>9.52</td>
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<tr>
<td>Gas Pipe</td>
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<td>15.88</td>
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<td>Sound Pressure H/M/L</td>
<td>dB(A)</td>
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<td>42</td>
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<td>Sound Power</td>
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<tr>
<td>Net Weight</td>
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<tr>
<td>Net Dimensions</td>
<td>mm</td>
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<td>518 x 210 x 330</td>
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</table>
Water Cooled VRF (DVM S Water)
Find More on Our Global Partner Portal:
https://partnerhub.samsung.com/

Contact Our Team:

Hristina Petrova
h.petrova@samsung.com
+359 893 388 918

Dimitar Tsonev
d.tsonev@samsung.com
+359 892 289 870
Thank You