The Best Choice for HVAC Maintenance Service

LG BECON cloud (TMS)

LG Maintenance Service

LG offers many types of Annual Maintenance Contract (AMC) services with BECON cloud.

Please check out the Maintenance service website (https://www.lg.com/global/business/service-maintenance) or contact the nearest LGE or LGE partner.

Distributed by

Ver. 2.1

BECON cloud

Why do professional HVAC[1] environments need professional maintenance solutions?

HVAC systems are complex in structure and control, so they require specialized knowledge to check the operating status and systematic management through abundant experience and know-how.

Building Owners

Concern about cost savings

Is there more economical solution in order to reduce annually increasing energy and maintenance cost?

Facility Managers

Concern about efficient operation

Is there an effective way to improve operational efficiency while managing various air conditioning solutions installed in the building?

End Users

Concern about a pleasant environment

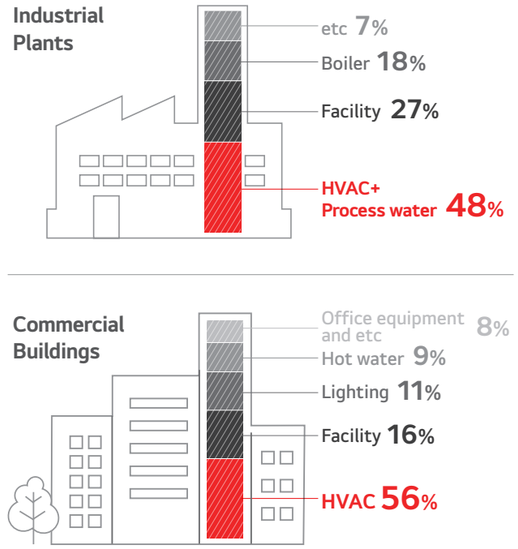
It's very inconvenient to take a long time to repair a breakdown that occurs during the peak season, so is there a good way to make a more comfortable environment last longer?

1) HVAC stands for Heating, Ventilation, and Air Conditioning. It is a system that controls and regulates temperature, humidity and air flow.
* These images are designed to help customers understand.

Characteristics of HVAC

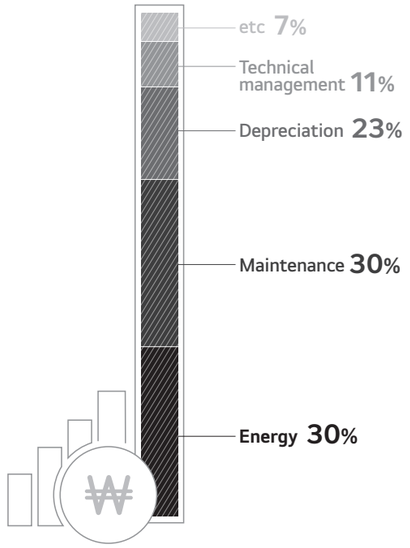
It is used in a variety of industrial / commercial environments, and the high cost of operation and maintenance requires a reliable and economical system.

Industrial / Commercial Energy Usage



* Public Data Portal Energy Census Statistical Table (2020 year in Korea).

High Maintenance Cost of HVAC System



The Importance of HVAC Maintenance

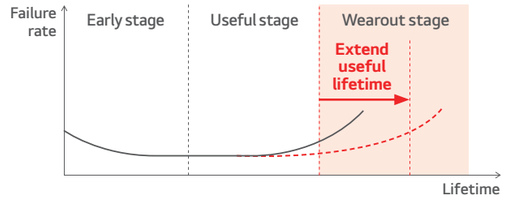
Regular inspections and professional maintenance are essential to maintain performance, prevent device failures, and operate the system efficiently and stably.

Stable Operation

Failure prevention

Rapid response within the promised time

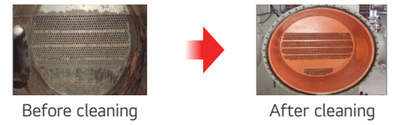
Span lifetime



Reduced Operating Costs

Need the optimized service to operate within your budget

Minimizing energy loss



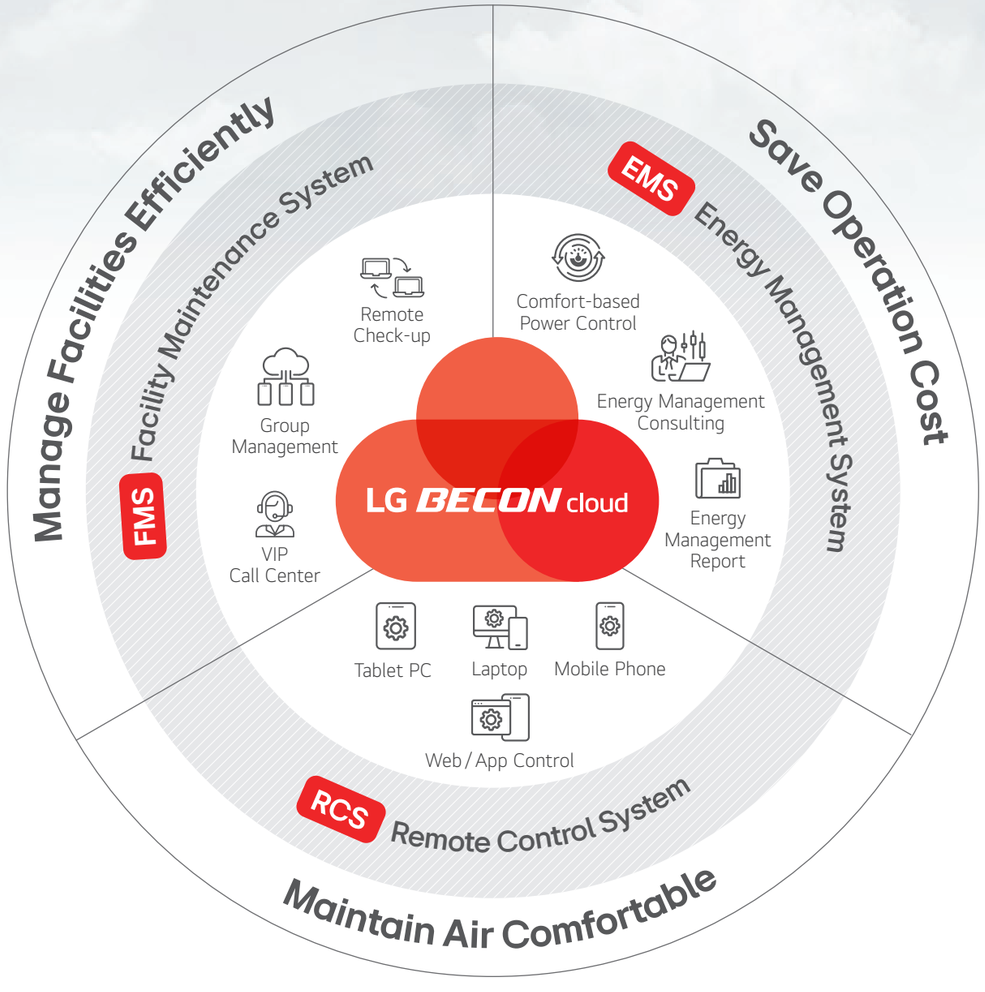
Before cleaning After cleaning

By removing foreign substances and scale from the heating tube, it is possible to improve the heat exchange capacity of the condenser and reduce energy loss.

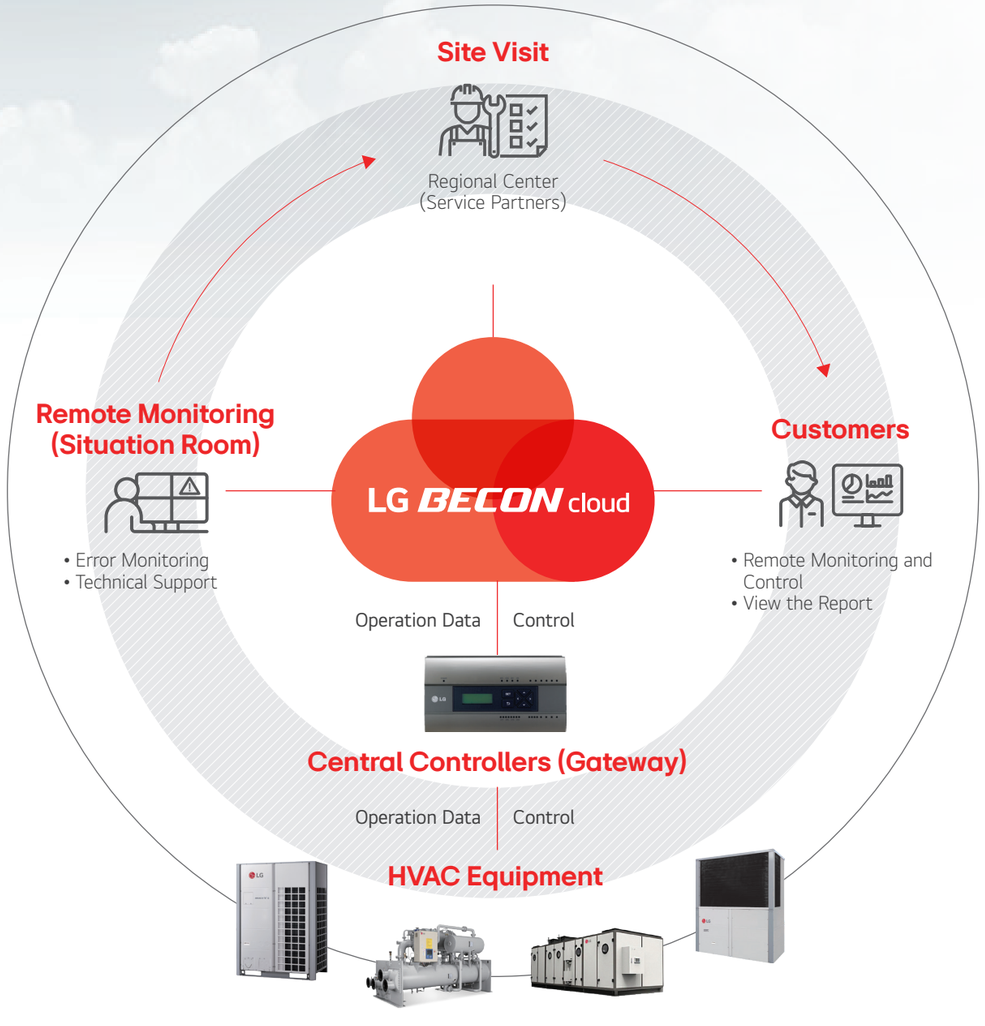
Integrated maintenance solutions optimized for HVAC environments

BECON cloud is a cloud-based platform that provides total maintenance services for Air Solution products, offering prompt dispatch services through real-time monitoring, efficient management of facilities, and energy management.

BECON cloud



Operation Process



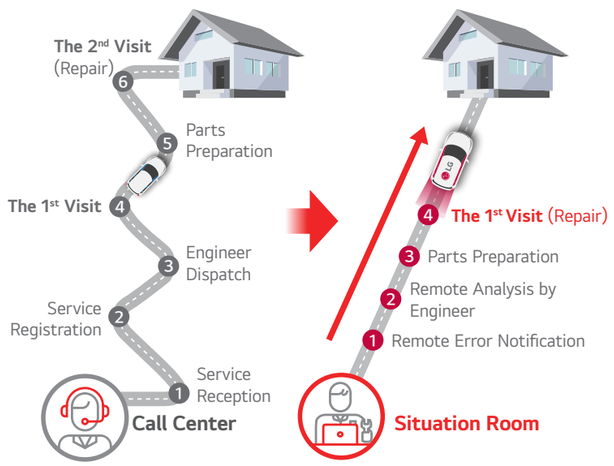
* In order to use BECON cloud service, you must sign up membership and install BECON cloud app to use on a mobile device.
* For Android or iOS Users : Search for “BECON cloud” on Google Play or the Apple Store and proceed with the download
* A maintenance service contract is required to use various service described this catalog.
* Features described may vary by regions or countries.

What makes BECON cloud different?

You can keep peace of mind even if sudden breakdowns or unexpected problems occur!

Rapid response to problems

BECON cloud monitors remotely connected devices in real time to quickly identify problems based on operation information in the event of a failure, reduces downtime by quickly handling faults through the supply of necessary spare parts, and enables prompt technical consultation support.



* These images are designed to help customers understand.

BECON cloud makes it easy to control connected devices anytime, anywhere, preventing unnecessary energy waste and improving operational efficiency!

Easy to manage

In the cloud-based Web / App environment, monitoring and control are possible without time and space limitations, and users can maintain a comfortable environment and self-manage unnecessary energy use, improving operational efficiency.

BECON cloud can have an excellent cost-saving effect through systematic energy management!

Cost savings through energy management

BECON cloud provides energy-saving services that prioritize a comfortable environment. It analyzes energy usage patterns in various environments and applies cloud-based optimized energy saving logic. It can also help increase cost savings by preventing unnecessary energy use.

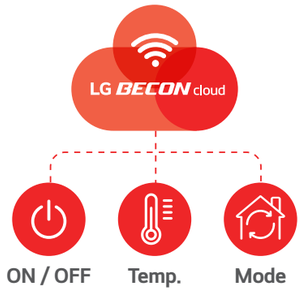
Control more conveniently! Manage smarter!
BECON cloud Key Features

Manage faster and more conveniently in real time!
Remote Monitoring & Control

Easy management of devices and energy | **Intuitive monitoring by Map View** | **Accessible to multiple users**

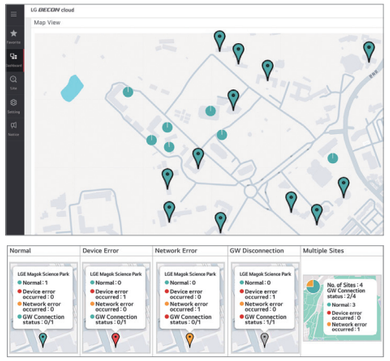
Through the real-time remote control function (Web / App), it is possible to monitor, control the status of the device anytime, anywhere. In addition, it is easy to manage each tenant or floor of the building through the assistance site manager function (App only) that can manage the control authority for each occupant.

Remote Control by Web / App



Maintaining a pleasant environment and manage energy usage.

Map-Based Multi Sites Monitoring



※ Available when selecting map widget in dashboard.

Respond quickly with fast detection of device abnormalities!
Notification Function

Quick response (Customer) | **Check operation in advance** (Engineer)

When an error occurs, real-time notification is provided to the user to enable prompt service based on detailed device operation information.
It can assist you in receiving service call and technical support from professional engineers.

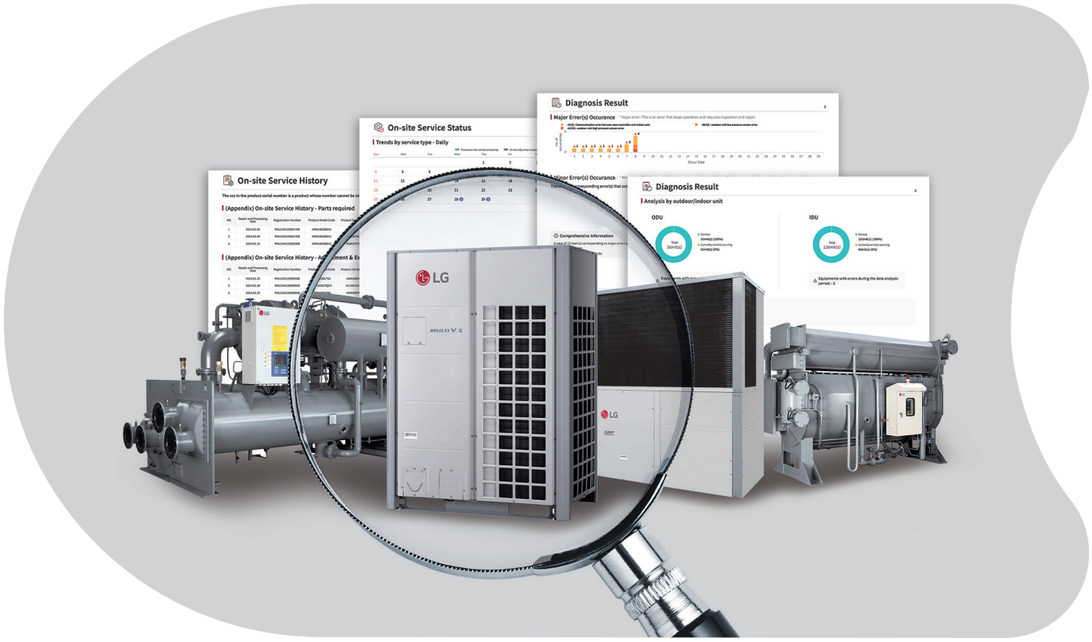
* Email error notification : EHP / GHP, Chiller
* APP push notification : Chiller

* In order to receive real-time notifications, you need to install the BECON cloud APP, the user sign up, and set the notification ON on smartphone.
* These images are designed to help customers understand.
* Features described may vary by regions or countries.

Systematic operation with continuous predictive management!
Regular Reporting

Prevention of breakdown | **Reduced operating costs**

By providing situational reporting for each device, it is possible to predict unexpected situations or failures in advance and make them into a database.



EHP / GHP Device Status

It is possible to manage the operation history of all devices installed in the field and can grasp the exact operation status at a glance.

For facility managers

EHP AI Diagnosis [1)]

AI diagnosis reports are provided so that you can check the current performance status of your products.

For facility managers

EHP Energy Management [1)]

Efficient energy management is possible with regular reports up to last 12 months of energy savings prediction and actual savings analysis.

For building owners and facility managers

Chiller Smart Diagnosis [2)]

It analyzes the product operation data to diagnose the condition of the device and provides the diagnosis report.

For facility managers

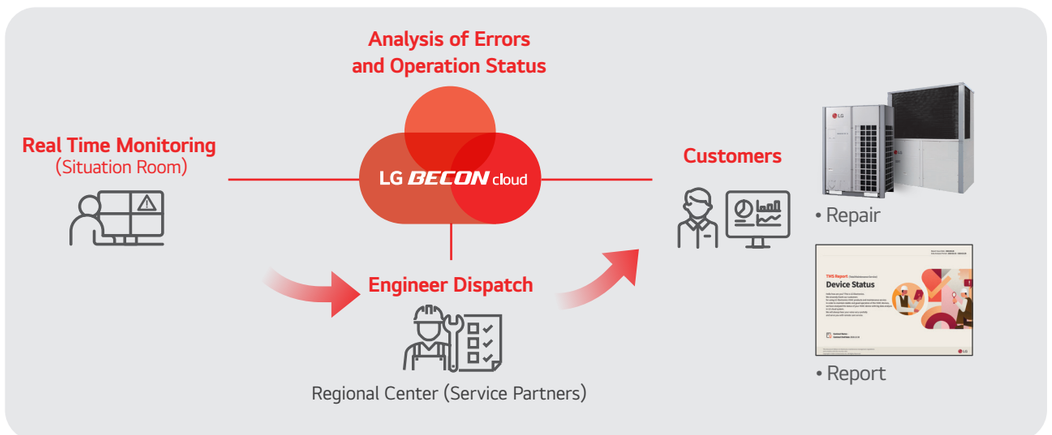
1) These services are available in South Korea. These features will become available in other countries soon and may vary by regions or countries. Stay tuned for updates.
2) Chiller Smart Diagnosis report supports centrifugal and absorption chiller.

EHP / GHP [1)]

EHP / GHP Device Status

* This feature is available now. Renewed design and new content will be updated soon. Stay tuned for updates.

It provides pro-active service in the event of a failure through real-time monitoring of devices connected to BECON cloud, and provides reports of failures and service history, including operation status.

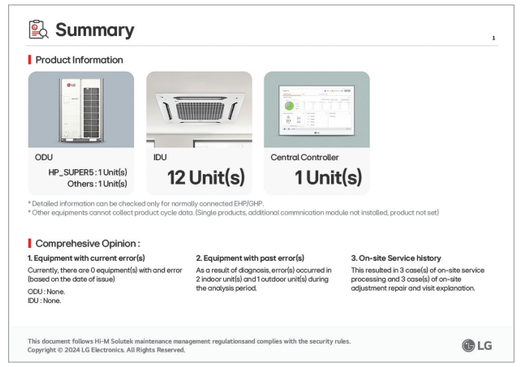


1) EHP stands for Electrical Heat Pump, which is a heating and cooling system that uses an electric motor to drive a compressor. GHP stands for Gas Heat Pump, which is a heating and cooling system that uses a gas engine to drive a compressor.

Report Contents

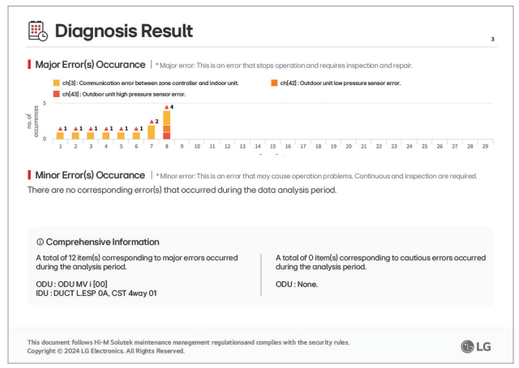
Comprehensive Device Inspection

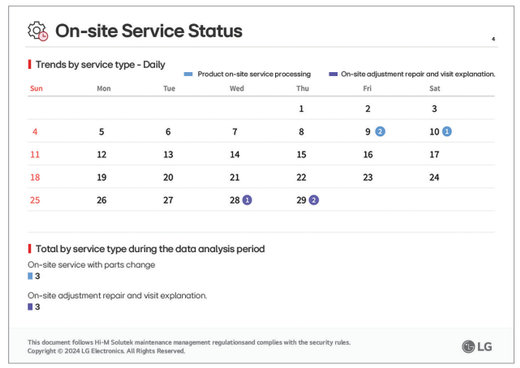
Check the installed and connected device information, as well as the status of breakdowns and service that occurred while operating.



Error and Service History (Up to 12 months)

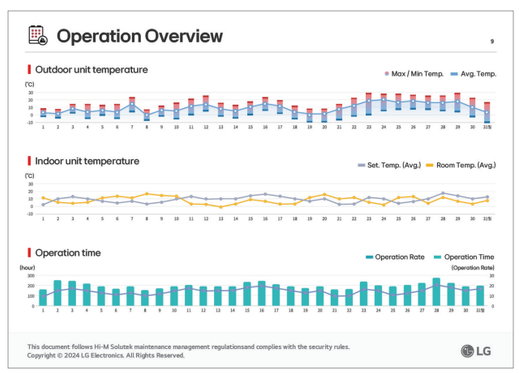
Check the detailed error diagnosis results by day or month and the service history according to the service type.





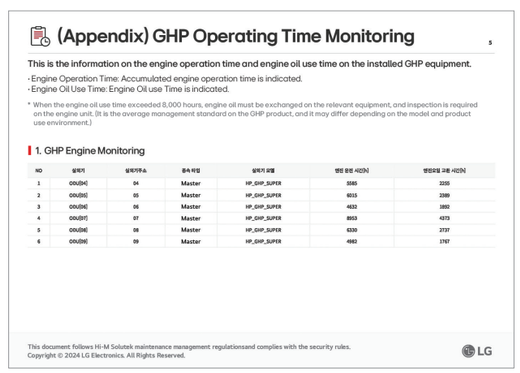
Device Operation Information Trend

Check the average operation time and rate of your device per day or month.



GHP Engine Operating Time / Oil Change Time

It shows the engine running time and oil change time at the GHP installation site.



EHP AI Diagnosis

* This service is available in South Korea. These features will become available in other countries soon and may vary by regions or countries. Stay tuned for updates.

Analyze the operation data of devices connected to BECON cloud and conduct on-site inspections based on the diagnosis results to prevent breakdowns by taking proactive measures before problems occur.

Operation Data → LG BECON cloud → Anomaly Analysis

Notification Inspection Needed Items → On-site Inspection (Off seasons Pre-inspection)

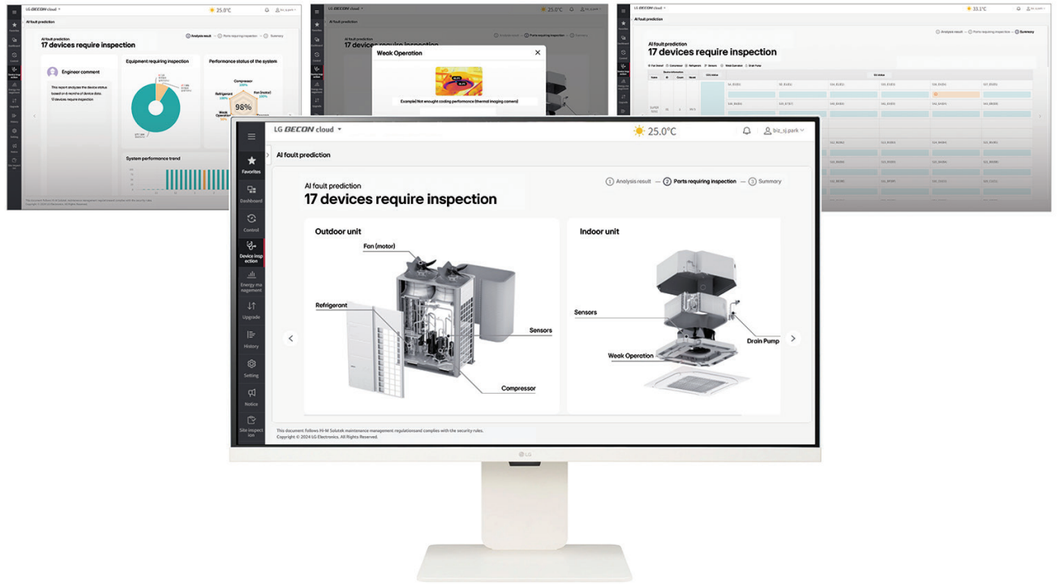
Customers Report (Web / App)

Core 6 Items Diagnostics - Compressors, Sensors, Fans (motors), Refrigerant Amount, Drain Pumps, Weak Operation

- Compressor : Operation history / abnormal signal (including PCB) inspection notification
- Sensors : Inspection notification through short-circuit / deviation, atmospheric and sensor temperature analysis
- Fan (Motor) : Inspection notification based on RPM / sensor information (including PCB)
- Refrigerant amount : Inspection notification based on compressor / valve / refrigerant flow rate analysis
- Drain Pump : Drain pump abnormality / Indoor unit operation-based inspection notification
- Weak operation : Indoor unit sensor / valve operation based on cooling / heating temperature notification

Customers Report (Web / App)

Check the status information of the abnormal device.



* These images are designed to help customers understand.

EHP Energy Management

* This service is available in South Korea. These features will become available in other countries soon and may vary by regions or countries. Stay tuned for updates.

BECON cloud is a cloud-based method of adjusting the compressor operating by analyzing the temperature / humidity condition and operation status of the customer's room, and provides energy management through optimal operation that maintains a comfortable environment.

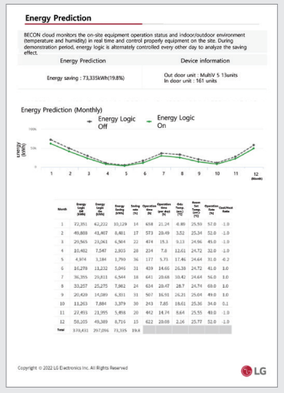
Step by Step Approach of Energy Saving Solution

* Demonstration results in 28 elementary, middle and high schools nationwide in 2023 (The Society of Air-conditioning and Refrigerating Engineers of Korea)

The 1st stage : Prediction

Prediction of savings based on on-site devices operation data

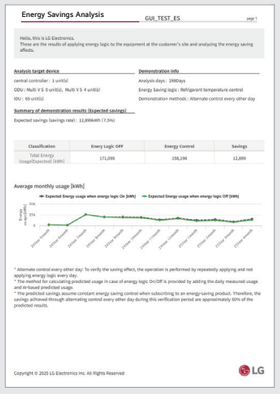
Based on long-term data such as past device usage history, outdoor temperature, humidity, etc., predictive analysis of energy saving effect for up to 12 months

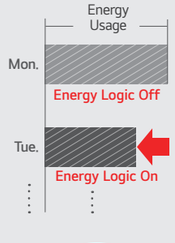


Prediction Report (Example)

The 2nd stage : Demonstration

Analyze your savings by operating energy control every other day[1)]





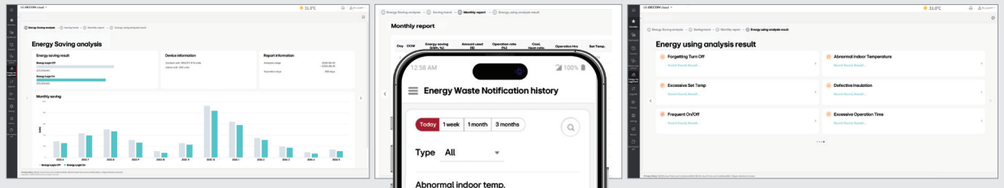
Saving Effect **7%~27%**

Demonstration Report (Example)

The 3rd stage : Saving

Energy Saving Results, Device Usage Analysis

Management of accumulated amount of energy savings, analysis of energy during peak season



Periodic report 1~2 times a year, providing the results of the analysis of the energy consumption of the device

Providing an energy waste notification app

* No need to install an additional power meter. (However, it is mandatory to install a central controller to connect to BECON cloud.)

1) **operating energy control every other day** : To eliminate the effects of outdoor environment and indoor use environment as much as possible through daily energy logic application and non-application for comparison of power consumption in general.

Energy Waste Notification

Usage pattern analysis detects when energy is wasted, providing administrators with mobile alerts and additional energy management.

Forgetting Turn OFF

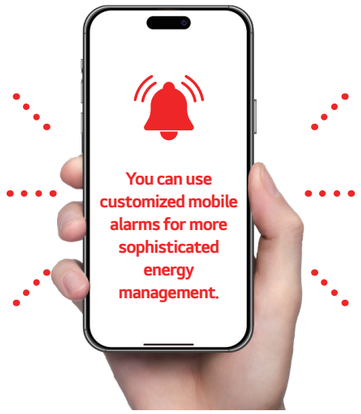
"There is an indoor unit that is turned on. Check the air conditioner On / Off."

Defective Insulation

"The indoor unit has not reached the set temperature. Please check the surrounding environment."

Excessive Set Temp.

"There are indoor units that need to be adjusted to the proper temperature. Check the set temperature."



Abnormal Indoor Temp.

"The temperature inside the room fluctuates even while the specific indoor unit is operating. Indoor unit and caution Environmental inspection is required."

Excessive Operating Time

"The operation of the indoor unit has been continued for a long time. You need to confirm the use of the indoor unit."

Frequent ON / OFF

"The installed space is presumed to be a space that does not require much cooling / heating. You need to check the usage environment."

* In order to receive real-time notifications, you need to install the BECON cloud APP, the user sign up, and set the notification ON on smartphone.

Differentiation Point

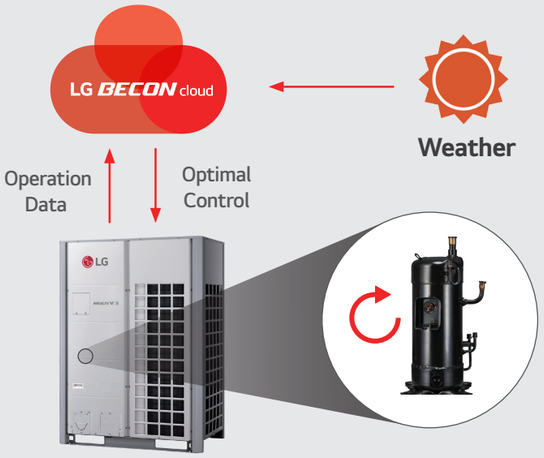
Energy control according to indoor and outdoor environment (temperature / humidity) to maintain **the comfort of occupants and save energy**

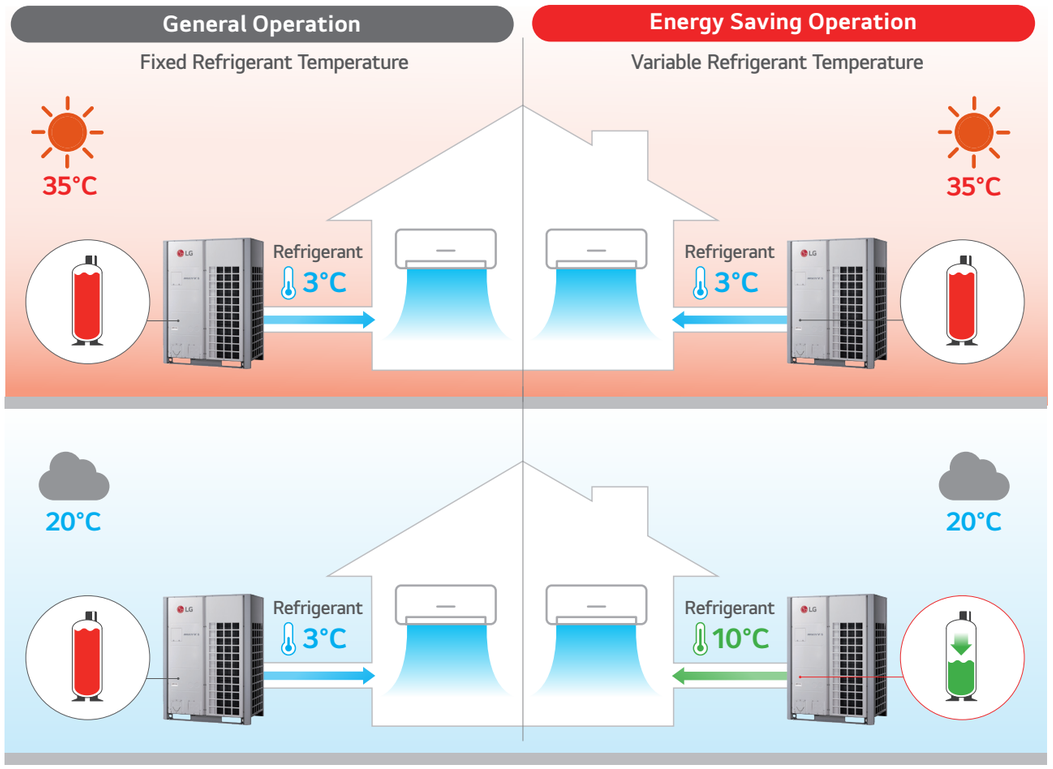
In 2022, the results of the demonstration of savings at the summer contract site

Business Type	ODU Qty (units)	IDU Qty (units)	Saving Amount (kWh)
A Company in Seoul	10	218	11,453
B Company in Seoul	8	116	10,307
C Hospital in Daegu	20	196	15,317
D Hospital in Changwon	17	134	11,352

Energy Saving Logic Principle

BECON cloud server analyzes and diagnoses the operating data of the device in real time.
While prioritizing a comfortable environment, it implements optimal refrigerant temperature control via the Internet based on weather information in order to save energy consumption.





2. Differentiated Service by Product 2.1 EHP / GHP

FAQ

Q : If using energy saving service, won't it be hot even if the air conditioner is running in the middle of summer?

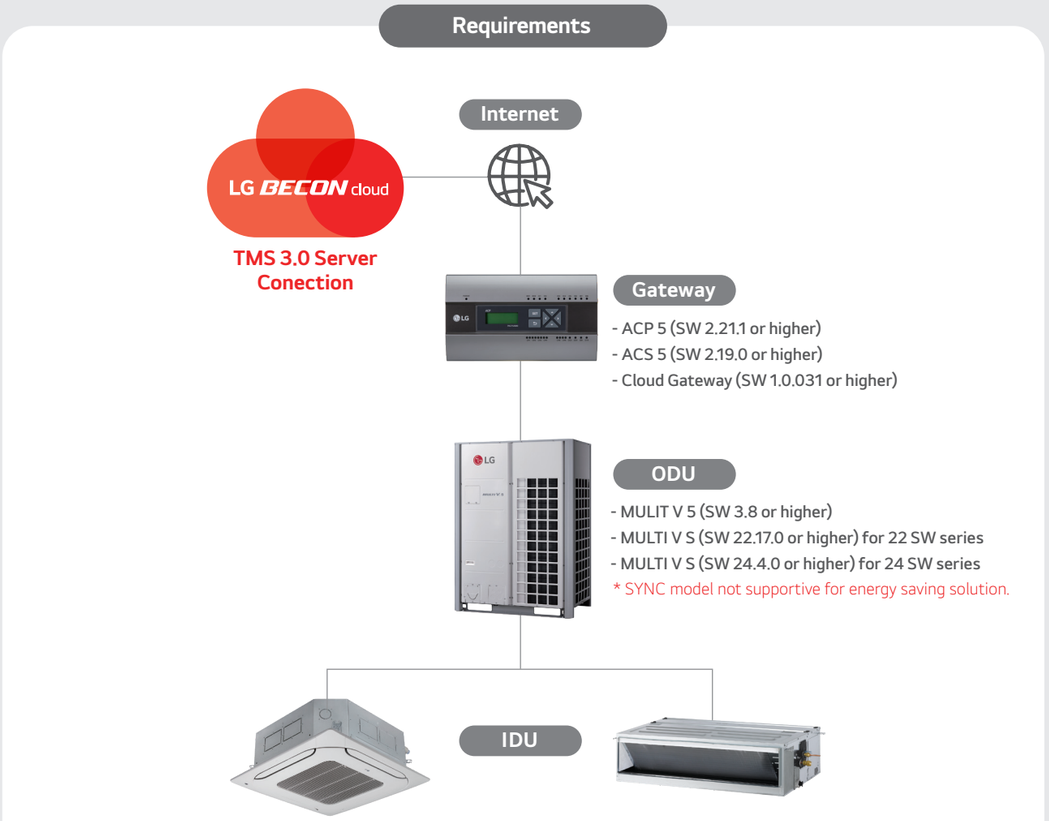
A : No. energy-saving logic prioritizes the user's comfort. If necessary, it operates at 100% rate in order to reach the set temperature, and if it is judged to be more than necessary, the operating rate is adjusted.

Q : If using energy saving service, is the set temperature limited?

A : Energy-saving logic is not a method of limiting the product's operating rate. You can set the desired temperature, and the air conditioner will operate to reach that temperature.

Q : Additional power meter is required in this program?

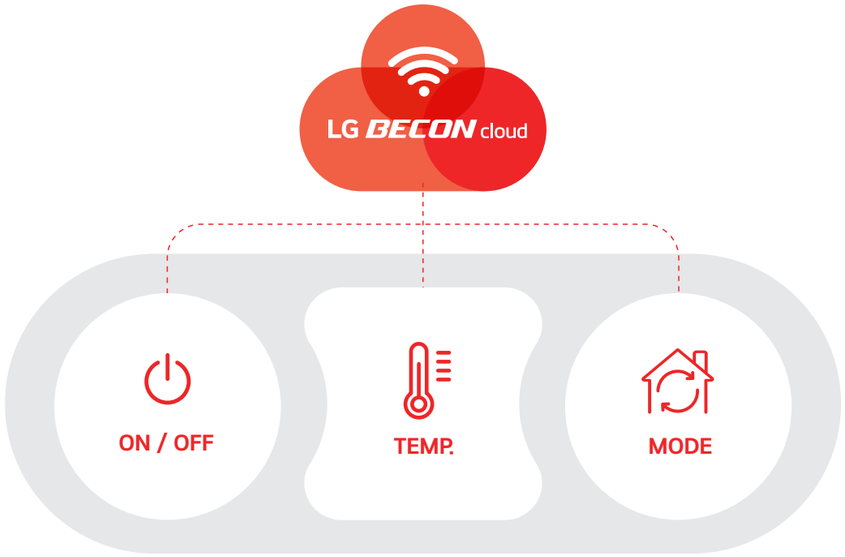
A : No, PDI (Power Distribution Indicator) is not necessary. Recent products are supportive and connected with BECON cloud server continuously.



* AHU is not supportive for energy saving solution.
* Group control of indoors units are not allowed.
* High speed (9,600 bps, DIP SW #3 ON) communication required between MULTI V 5 / S and IDU
* Set the maintenance time of energy saving control (CMD9) as OP5 in SE36
* The number of indoor units connected to each outdoor unit registered in the central controller must be the same as the number of indoor units displayed in the cycle data of the outdoor unit.

Remote Management

In order to maintain a comfortable environment and minimize energy usage, you can remotely monitor operating devices, turn off unnecessarily operating devices, control operating mode and temperature according to a schedule.



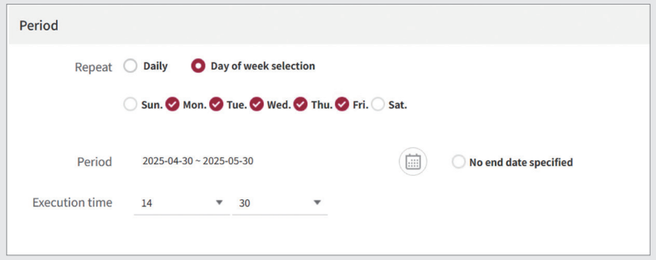
Remote Device Control

You can remotely monitor operating devices, reduce energy by turning off devices that are running unnecessarily, and change operating modes and temperatures to ensure a comfortable environment.

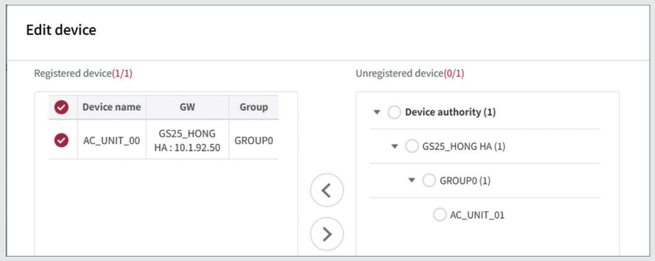
Schedule Management

If you need to remotely control HVAC devices periodically, you can register a schedule for each device and control it as you want. Therefore, energy usage can be reduced due to optimal setting of air conditioners operation.

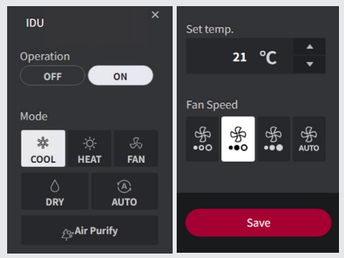
❶ Select the cycle and start time of operation according to the usage environment



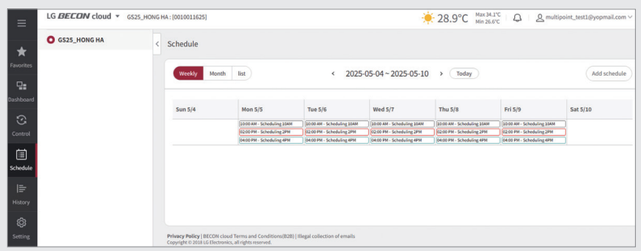
❷ Select the applicable indoor unit



❸ Select operation ON/OFF, mode, and set temperature



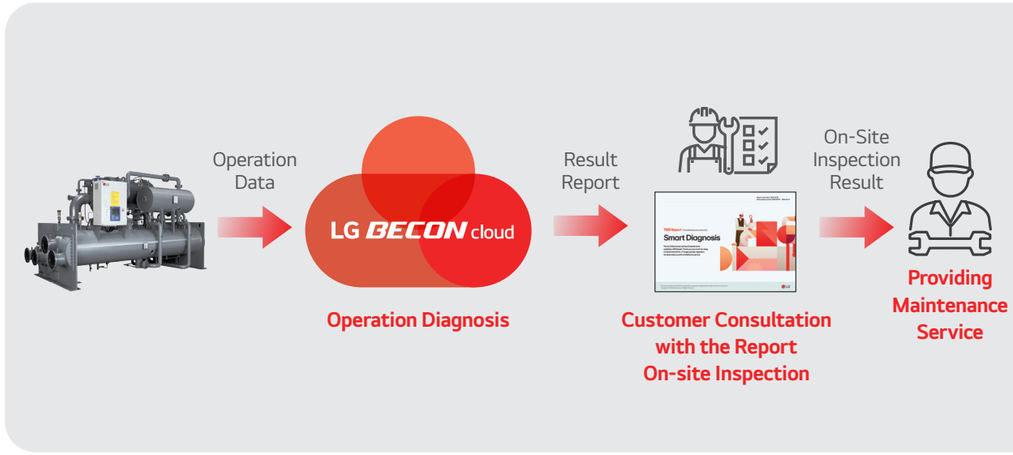
❹ You can create and manage multiple schedules to suit your usage environment



Chiller

Chiller Smart Diagnosis * It supports Centrifugal and Absorption chillers.

Analyze the vibration, oil and bearing of the chiller compressor, and the gap of the magnetic bearing to diagnose the health of the compressor and guide you through the report.

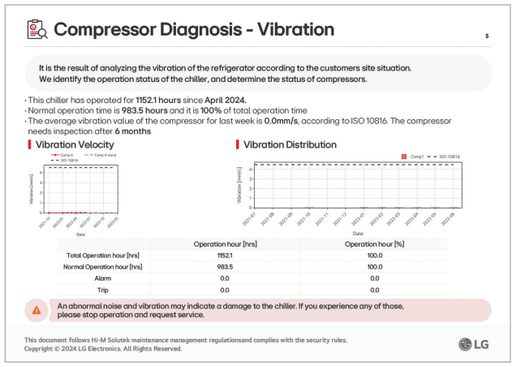


Report Contents

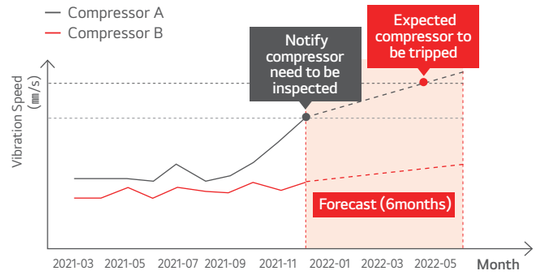
Compressor Health Diagnosis

Chiller compressor vibrations, oils, and bearings and magnetic bearing gaps are analyzed to diagnose compressor health and guide action.

Vibration



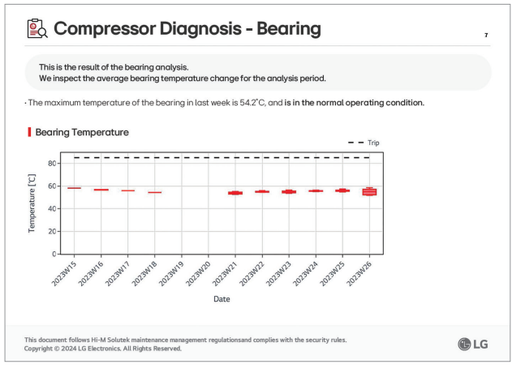
Analyze the vibration value of the compressor and let you know when to take precautionary measures.



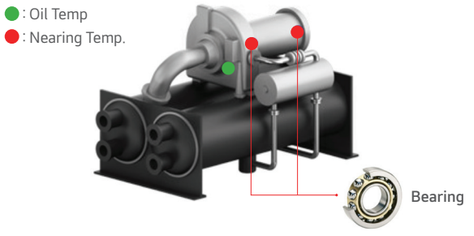
→ Compressor A needs to be serviced within month 0.
→ Compressor B needs to be serviced after 6 months.

※ It can be applied when a vibration sensor is installed.

Oil and Bearing

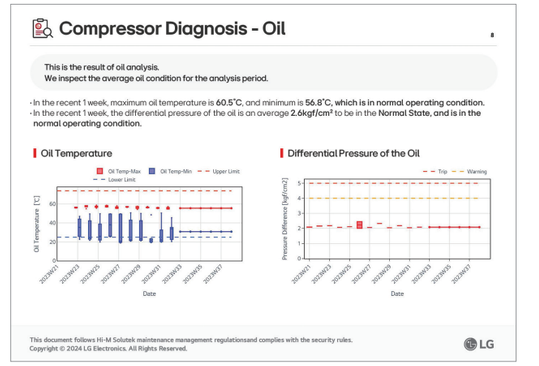


Oil and bearing temperature monitoring prevents compressor burnout.

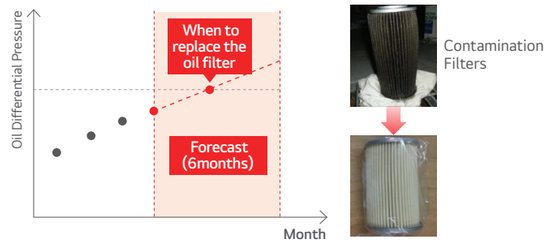


Increased Oil Temperature

→ Bearing temperature rises and wears (deformation) occur
→ Compressor burnout



By using oil differential pressure, you can know in advance when to change the oil filter.

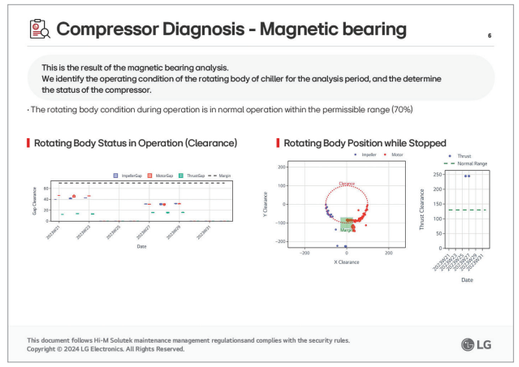


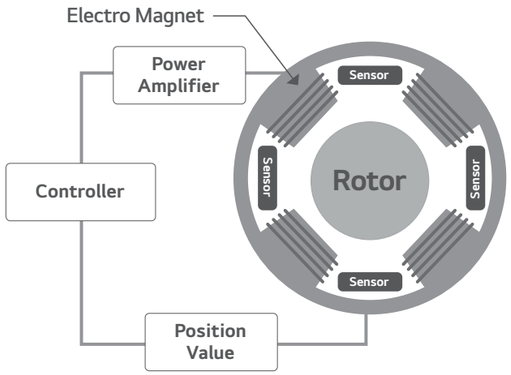
Foreign Materials Accumulates in the Filter

→ Difficulty in supplying adequate oil
→ Loss of key parts such as bearings and gears

Magnetic Bearing Gap Analysis

The position of the oil-free compressor rotor can be continuously recorded to manage the rotor's deviation from the center.





Operating

❶ 2,000 rotor position checks per second

❷ Electromagnetic force adjustment of 4 electromagnets

❸ Adjusting the Rotor Position

Stalling

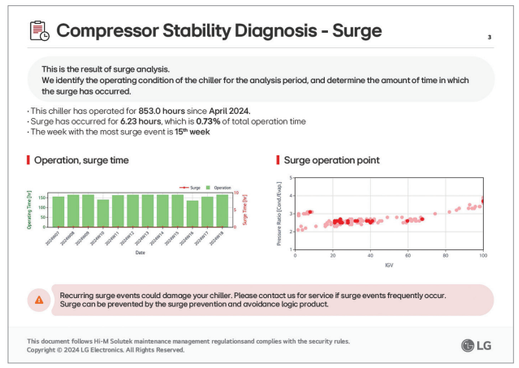
❶ Bearing gap checks

❷ Diagnosis of the Rotor Position

Compressor Stability Diagnosis

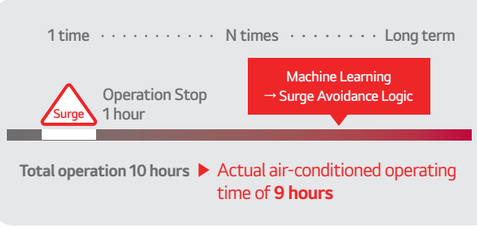
Surge Analysis and Avoidance

By applying machine learning capabilities, the chiller product can learn on its own and dramatically reduce surges.



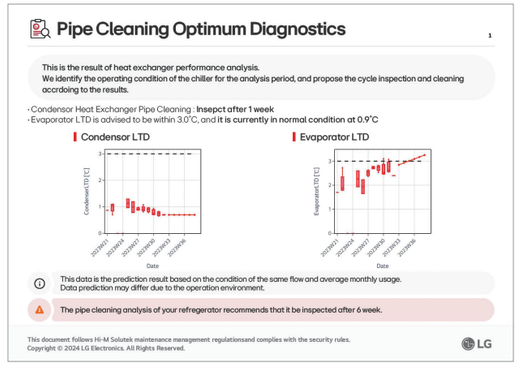
Machine Learning Continuous Operation

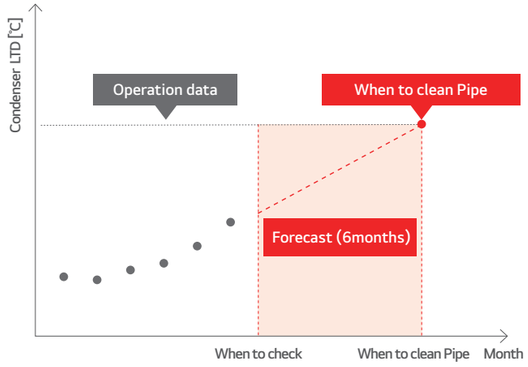
After learning the occurrence of surges based on machine learning, it is updated to avoid driving points that cause surges to prevent surges from occurring.



Pipe Cleaning Optimum Diagnostics

Through diagnosing the condition of the chiller's heat exchanger, we will guide you to the right time for pipe cleaning management.

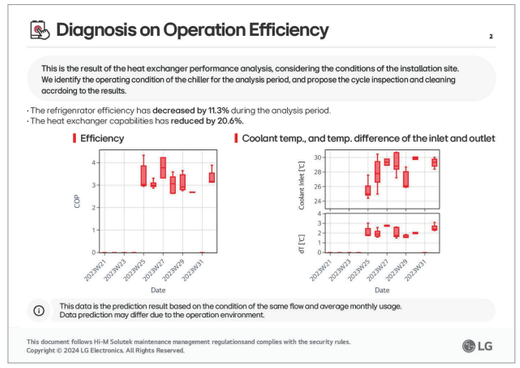




→ Condenser heat exchanger needs inspection after 6 months of customs.

Operation Efficiency Diagnosis

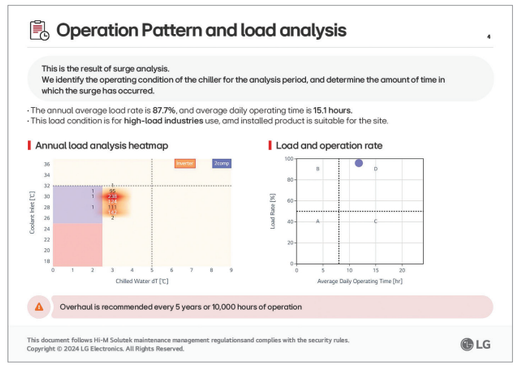
During the analysis period, we analyze the operating efficiency of the refrigerator and show the trend of change.

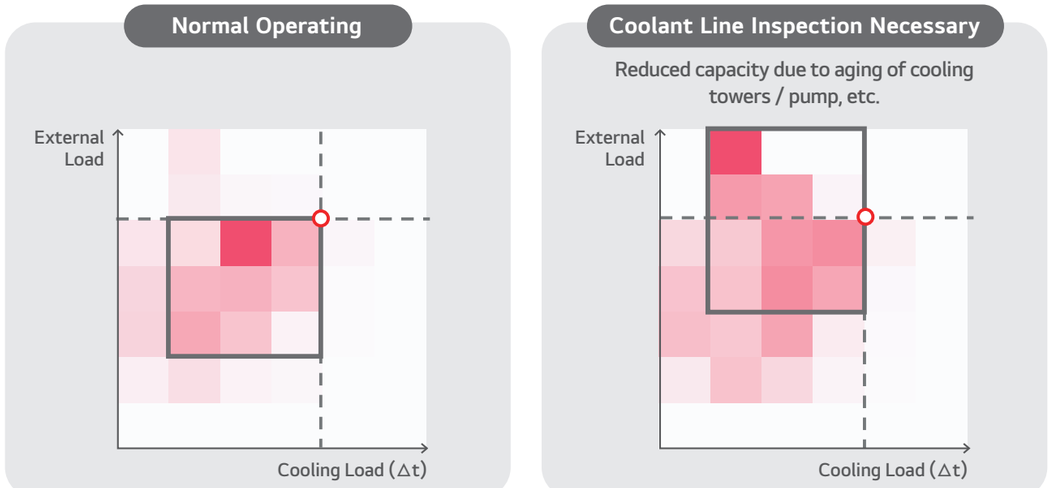


Check the heat exchanger performance and know the increase or decrease in efficiency according to the external load (coolant temperature) and refrigeration capacity (evaporator inlet and outlet temperature difference). Based on the results, we will suggest cycle inspection and customs.

Operating Pattern Analysis

Long-term operation data analyzed to provide customized operation guides for specific sites.



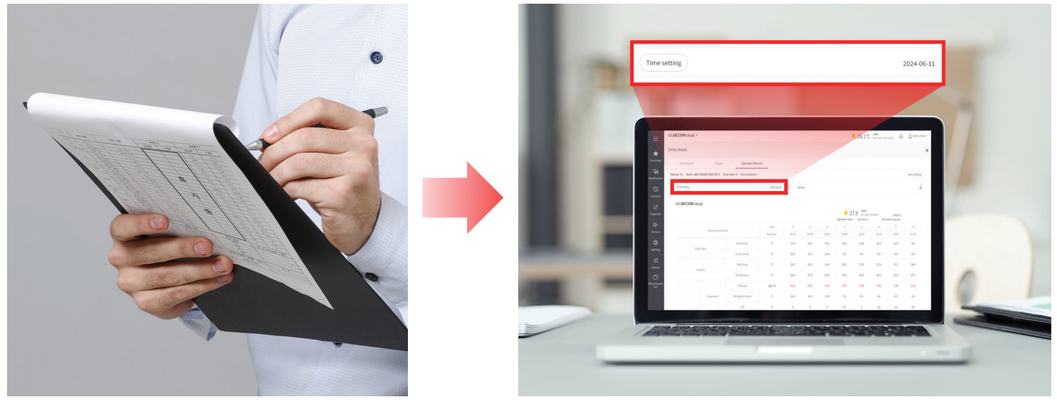


* This is an illustration for illustration purposes only and may vary depending on the actual usage environment.

2. Differentiated Service by Product 2.2 Chiller

Operation Data Management & Inquiry

Remotely view the daily operation record for each product and download it as a file. In addition, detailed historical data can be viewed and downloaded by desired time period, making it convenient to record the user's device status.



Operation Record File

Download the operation record as a file at a fixed time every day.

Measurement Items			Units	1	2	3	4	5	6	7	8
			Hour : Min.	00:00	03:00	06:00	09:00	12:00	15:00	18:00	21:00
Cold Water		Inlet Temp.	℃	9.9	9.8	9.8	10.1	10.0	9.9	10.2	9.7
		Outlet Temp.	℃	5.9	5.7	6.0	5.9	5.7	5.6	5.9	5.8
Coolant		Inlet Temp.	℃	27.3	27.2	27.4	27.6	28.7	27.3	27.4	27.3
		Outlet Temp.	℃	29.9	29.8	30.0	30.4	31.8	30.4	30.4	29.7
Cycle A	Evaporator	Pressure	kgf/cm²	2.54	2.54	2.57	2.55	2.51	2.49	2.55	2.57
		Refrigerant Temp.	℃	5.0	5.0	5.3	5.1	4.8	4.6	5.1	5.3
		LTD	℃	0.9	0.7	0.7	0.8	0.9	1	0.8	0.5
	Condenser	Pressure	kgf/cm²	7.54	7.53	7.60	7.71	8.08	7.70	7.75	7.52
		Refrigerant Temp.	℃	33.0	33.0	33.3	33.7	35.2	33.7	33.9	33.0
		LTD	℃	3.1	3.2	3.3	3.3	3.4	3.3	3.5	3.3
	Compressor	Current Limit	%	100	100	100	100	100	100	100	100
		Operation Current	A	619.3	614.2	620.5	645.5	679.5	664.5	662.3	599.9
		Inverter Frequency	Hz	-	-	-	-	-	-	-	-
		Coil Temp. R	℃	15.7	15.8	15.4	17.7	20.3	20.2	18.5	14.9
		Coil Temp. S	℃	0.0	-0.4	-0.6	1.3	3.6	4.5	3.2	-0.7
		Coil Temp. T	℃	1.0	1.5	0.5	2.9	6.5	6.1	4.6	0.5
		Bearing Temp.	℃	-	-	-	-	-	-	-	-
		Discharge Gas Temp.	℃	7.3	7.5	7.8	7.2	7.1	5.6	6.3	8.2
		Vane Opening	%	43	43	42	35	21	29	30	48
		Diffuser Opening Status	%	0	0	0	0	0	0	0	0

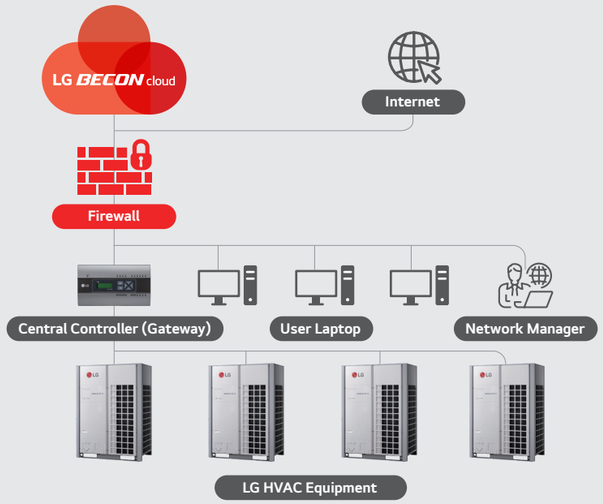
Make your information safer!
Security is more complete!
BECON cloud network security process

How to Connect to BECON cloud Server Safely

Case 1

Access using the company's Internet network

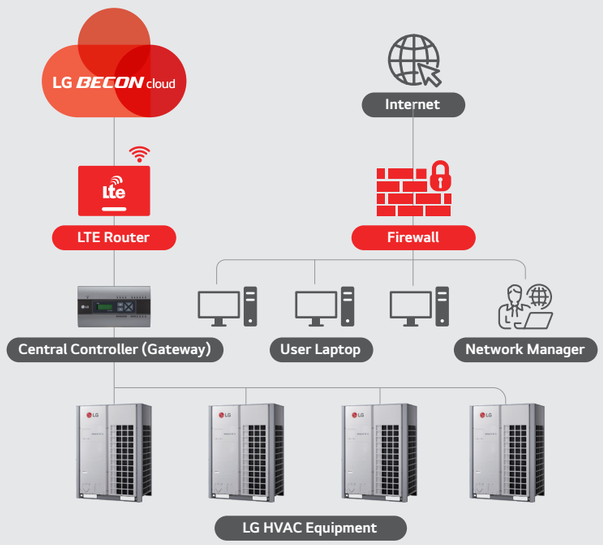
- Stable communication through on-site security firewall
- No need for additional network expansion



Case 2

Connection using LTE network

- Separation of existing internal network by building a new external network
- Increased scope of security due to network expansion



BECON cloud Security Policy

- The central controller uses only **outbound calls** with the security **authentication key** assigned by BECON cloud (Inbound calls from the outside can be restricted by network firewall)
- The central controller **supports private IP** setting (Static or DHCP IP) according to customers network operation policy.
- Encryption-based **Internet security protocol.** (SSL[1)]) when connecting to the Internet

1) SSL, or Secure Sockets Layer, is an encryption-based Internet security protocol.
* These images are designed to help customers understand.

Easy BECON cloud connection
Take your service to a whole new level
professional maintenance solutions
for a wide range of products

EHP / GHP

Connectable Gateway		Connectable SAC Products			
 ACP 5 PACP 5A000	Number of indoor units connected **Up to 256 units**	EHP / GHP	 MULTI V 3 ~ 5 MULTI V S MULTI V *i*	 GHP GEN1 ~ 3	 Single / Multi * Depending on the detailed model, it is necessary to check whether support is available
 AC Smart PACS 5A000	Up to 128 units				
 AC Ez Touch PACEZA000	Up to 32 units	Etc	 AHU * Depending on the detailed model, it is necessary to check whether support is available	 AWHP * Interlocking with BECON cloud after production number in October 2021	 ERV * Depending on the detailed model, it is necessary to check whether support is available
 Cloud GW PWEMDB200	Up to 32 units[1)]				

1) It only supports up to 16 devices when connected to ThinQ.

CHILLER

Connectable Gateway		Chiller
 ACP 5 PACP 5A000	Number of chiller connected **Up to 10 units**	 Centrifugal
 AC Smart PACS 5A000	Up to 5 units	 Absorption
 Chiller AI Engine	1 unit	 Screw
 Chiller AI Gateway	1 unit	 Scroll

* When ordering chiller products including BECON cloud, we are expanding interlocked products with BECON cloud by reflecting the development.