

A GUIDE TO R32 REFRIGERANT



SAFETY DEVICES & SAFETY MEASURES

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01

Introduction

R32 and the Shift in HVAC System Design

Environmental regulations, sustainability targets, and evolving industry standards are driving a global shift toward next-generation refrigerants in HVAC system design and installation. As a result, consultants, project developers, and system designers are increasingly looking at refrigerant options that can combine strong performance with lower environmental impact.

One of the leading options in this transition is R32, which delivers a significantly lower environmental impact than conventional refrigerants. With a GWP of 675, roughly one-third that of R410A, it also offers higher energy efficiency and improved cooling and heating performance.

■ 100 Year Global Warming Potential (GWP) of Different Refrigerants



*Values for 100 year global warming potential (GWP) from IPCC Fourth Assessment Report. Comparative 100-year GWP: HFC410A, 2088; HFC32, 675.

INTRODUCTION

If you're a project developer or consultant, the appeal is clear, but adopting R32 can initially seem complex due to updated safety requirements. In practice, these requirements are well-structured and readily addressed through standard system design approaches. Additionally, refrigerants with a GWP over 750 are set to be phased out by 2029.

▪ Timeline for Reduction of F-gas with GWP Above 2033



- Source: <https://climate.ec.europa.eu>
- Lot 21: Air-conditioner ≥ 12kW (up to 200kW)

LG supports this transition with R32-based solutions and clear design guidance, so you can implement new installations and upgrades with confidence.

02

UNDERSTANDING R32 SAFETY REQUIREMENTS

Flammability, System Design, and Controlled Risk

As with any refrigerant selection, system performance is only one part of the decision-making process. It is equally important to understand how safety requirements are addressed within the design and installation environment.

R32 is classified as a mildly flammable refrigerant, which means system design needs to account for how the refrigerant is managed within a space. This mild flammability is readily manageable. Just as we safely use gas stoves, refuel at petrol stations, and handle household chemicals every day, R32 systems deliver safe, efficient climate control when properly designed and installed.

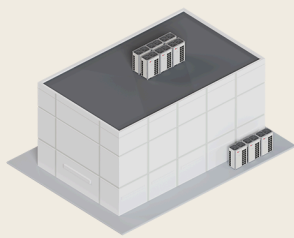
Daily Item	Inherent Risk	Safety Measure	R32 Parallel
Gas Stove	Gas leaks	Extractor fans, gas detectors, alarms	Leak detectors, shut-off valves, alarm, ventilation
Petrol Station	Gas leaks	Warning label, safety zone	Warning label, Natural ventilation, F-gas training

While the indoor unit heat exchanger is identified as the primary leakage point, other sources must also be considered, including refrigerant piping and connections, outdoor units installed in enclosed spaces, ductwork inlets and outlets, and unprotected pipework.

To apply these principles in practice, each installation must be reviewed according to the specific conditions of the space and system design. Three key factors determine how much refrigerant can be safely charged in a given installation.

▪ 02-01 Installation Location

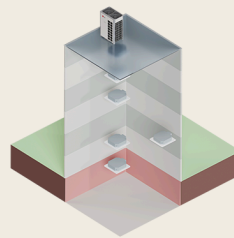
One of the first considerations in system planning is the installation environment, as different locations require different safety approaches. The risk profile depends on where the system is installed, whether in occupied spaces, machinery rooms, outdoor areas, or lowest underground floors.



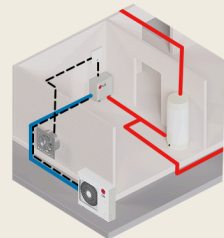
Outdoor Locations



Occupied Locations



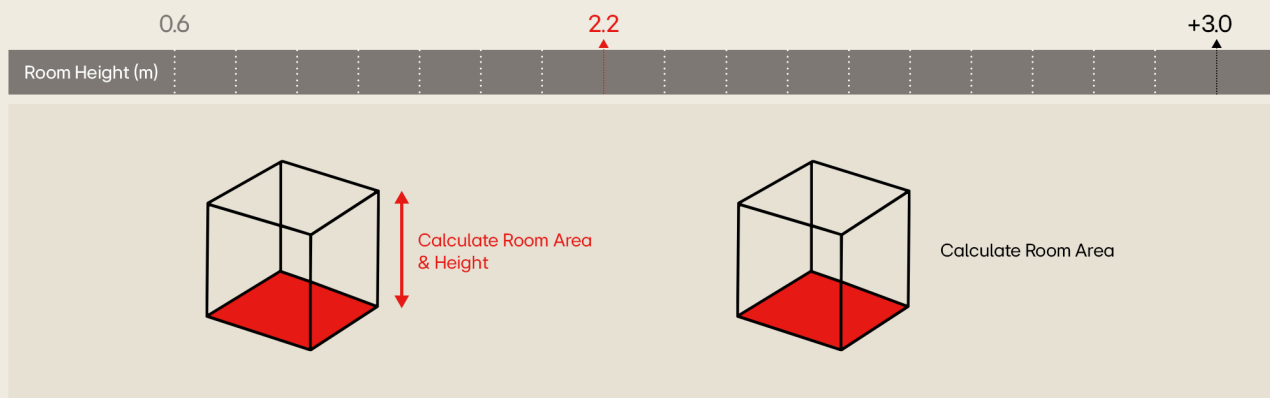
Lowest
Underground Floor



Machinery Rooms

▪ 02-02 Installation Dimensions

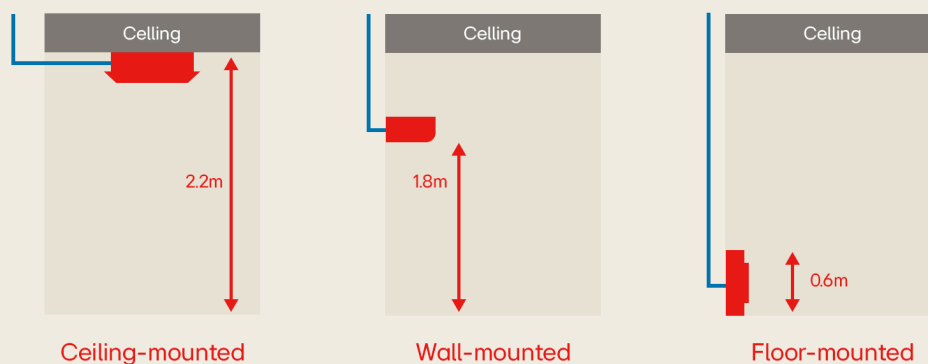
Room height influences how refrigerant charge is evaluated within the installation space. Where the space height is 2.2 m or greater, the assessment is based on room area. In lower-height spaces, indoor unit installation height is also taken into account, as it affects how refrigerant may accumulate within the space.



■ 02-03 Installation Dimensions

Indoor unit installation height is an important factor, as R32 refrigerant is heavier than air and may accumulate at lower levels within a space. In typical applications, installation heights are approximately 0.6 m for floor-mounted units, 1.8 m for wall-mounted units, and 2.2 m for ceiling-mounted units. The actual installation height of the indoor unit is considered in the calculation.

* For systems where Enhanced Tightness Refrigerating System criteria are applied, the indoor unit is considered to be installed at a height of 2.2 m regardless of the actual installation position.



Enhanced Tightness Refrigerating Systems

Built to higher system integrity standards that reduce the likelihood of refrigerant leakage, allowing greater flexibility in charge amount and installation conditions.

Non-Enhanced Tightness Refrigerating Systems

Applied to specific products such as HydroKit, where refrigerant is contained within a dedicated installation space separate from occupied areas.

03

LG SAFETY DEVICES

for Enhanced Tightness Refrigerating Systems

For Enhanced Tightness Refrigerating Systems, the required level of protection can be matched to the application. LG offers two safety device solutions that can be applied based on system design and installation conditions:

▪ **03-01 Shut-off Valve Unit**

In the event of a leak, the unit automatically isolates refrigerant flow to help prevent further refrigerant release and support system safety.

1 Port	2 Port	3 Port	4 Port
PRHPZ010	PRHPZ020	PRHPZ030	PRHPZ040
			

The shut-off valve can be applied as a single-unit configuration or extended to support multiple indoor units (2 to 4 connections), allowing flexible system design across different installation sizes.

▪ 03-02 Refrigerant Leak Alarm

When refrigerant is detected in the space, the alarm system provides immediate audible and visual alerts, enabling a rapid response.



R32 Alarm Kit (PLDCAA0S)

▪ 03-03 Additional Alarm-Enabled Solutions

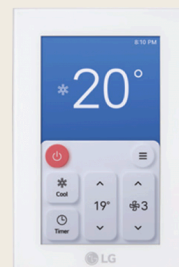
In addition to dedicated alarm kits, alarm functionality may also be provided through other system components.

- Refrigerant Leak Detector (alarm embedded)
- Wired Remote Controller (alarm embedded)

These options allow alarm functionality to be integrated into the system depending on design requirements.



Refrigerant Leak Detector (PLDRNV1S)



Wired Remote Controller (PREMTB200B)

04

LG SAFETY MEASURES

for Non-Enhanced Tightness Refrigerating Systems

When it comes to Non-Enhanced Tightness Refrigerating Systems, mechanical ventilation is applied to maintain safe refrigerant concentration levels within the installation space. A ventilation fan is required to support air exchange with the outdoor environment.

LG provides a Dry Contact relay interface that activates ventilation equipment based on system conditions. The Dry Contact functions as an interface device and is not considered a safety measure itself.

* LG does not provide a ventilation fan. The system must be integrated with a third-party ventilation component.



Dry Contact

05

LG PRODUCT LINE-UP

with Enhanced Tightness Refrigerating Systems

Wondering whether your selected indoor unit falls under the Enhanced Tightness Refrigerating System category? The table below provides a clear overview of the full LG product lineup, with each model marked accordingly.

▪ 05-01 Connectable Indoor units(ARN-/LZ-)

Product			R32 Compatibility	R32 Leak Detector	ETRS ¹⁾
Wall Mounted	Artcool Mirror 			Accessory	●
	Standard 			Accessory	●
Ceiling Mounted Cassette	4 Way (Mini) 			Accessory	●
	4 Way (Dual Vane) 			Accessory	●
	Round 			Accessory	●
	2 Way 			Accessory	●
	1 Way 		 2)	x	●
Ceiling Concealed Duct	High Static 			x	●
	Mid Static 			x	●
	Low Static 			x	●
Ceiling Suspended Unit 			 2)	x	●
Console 				x	x
Floor Standing Unit	with Case 			x	x
	without Case 			x	x
Hydro Kit (High Temperature)	Floor Standing 			x	-
Hydro Kit (Medium Temperature)	Floor Standing 			x	-
	Wall Mounted 			x	-
	IWT 			x	-
Fresh Air Intake Unit 			x	x	x
ERV with DX Coil	with Humidifier 			Accessory	●
	without Humidifier 			Accessory	●

1) ETRS: Enhanced Tightness Refrigerating Systems

2) Installation is permitted only when the installation space meets the minimum area requirements specified in IEC 60335-2-40.

■ 05-02 Connectable Indoor units(ZRN-/ZE-)

Product			R32 Compatibility	R32 Leak Detector	ETRS ¹⁾
Wall Mounted	Artcool Mirror 			Embedded	●
	Standard 			Embedded	●
Ceiling Mounted Cassette	4 Way (Mini) 			Embedded	●
	4 Way (Dual Vane) 			Embedded	●
	1 Way (Dual Vane) 			Embedded	●
Ceiling Concealed Duct	High Static 			Embedded	●
	Mid Static 			Embedded	●
	Low Static 			Embedded	●
Floor Standing Unit	with Case 			Embedded	●
	without Case 			Embedded	●
Hydro Kit (High Temperature)	Floor Standing 			Embedded	-
Hydro Kit (Medium Temperature)	Floor Standing 			Embedded	-
	Wall Mounted 			Embedded	-
	IWT 			Embedded	-
ERV with DX Coil	with Humidifier 			Embedded	●
	without Humidifier 			Embedded	●

1) ETRS: Enhanced Tightness Refrigerating Systems

* Several models will be launched with an embedded refrigerant leak detector, and the schedule may vary by model.

: Wall Mounted Unit('269) / Hydro Kit('269) / Mini 4way Cassette('26.12) / New Mid Static Ducted Unit('26.12) / Floor Standing Unit('27.1) / 4way Cassette('27.3) / 1way Cassette('27.3)

06

RISK MANAGEMENT LOGIC, INSTALLATION SCENARIOS

After identifying the applicable product type, the next step is to understand how safety requirements change depending on the installation space. The following scenarios show how refrigerant charge and room conditions work together to determine the appropriate safety solution for a compliant system.

▪ 06-01 Enhanced Tightness Refrigerating Systems

Commercial systems such as ceiling cassettes, ducted units, and wall-mounted units are typically designed as Enhanced Tightness Refrigerating Systems. The following scenarios show how safety measures are applied across different office environments.

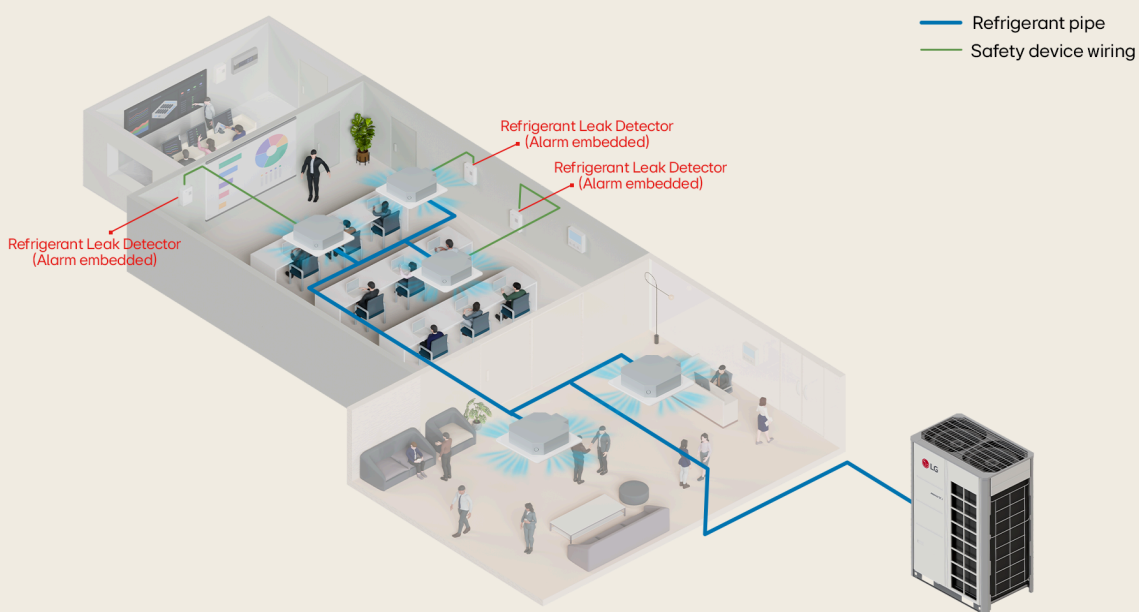
Scenario 1: Large Office Space : No Safety Device Required

In larger or open-plan spaces, the available room area is sufficient to keep refrigerant concentration below safety thresholds in the event of a leak. No additional devices are required beyond standard system design, delivering lower installation costs, reduced complexity, and faster project turnaround.



Scenario 2: Medium-Sized Enclosed Space : One Safety Device Needed

In enclosed or moderately sized spaces, refrigerant concentration may approach defined safety limits depending on system charge. A refrigerant leak alarm provides early detection and ensures appropriate response before critical levels are reached.

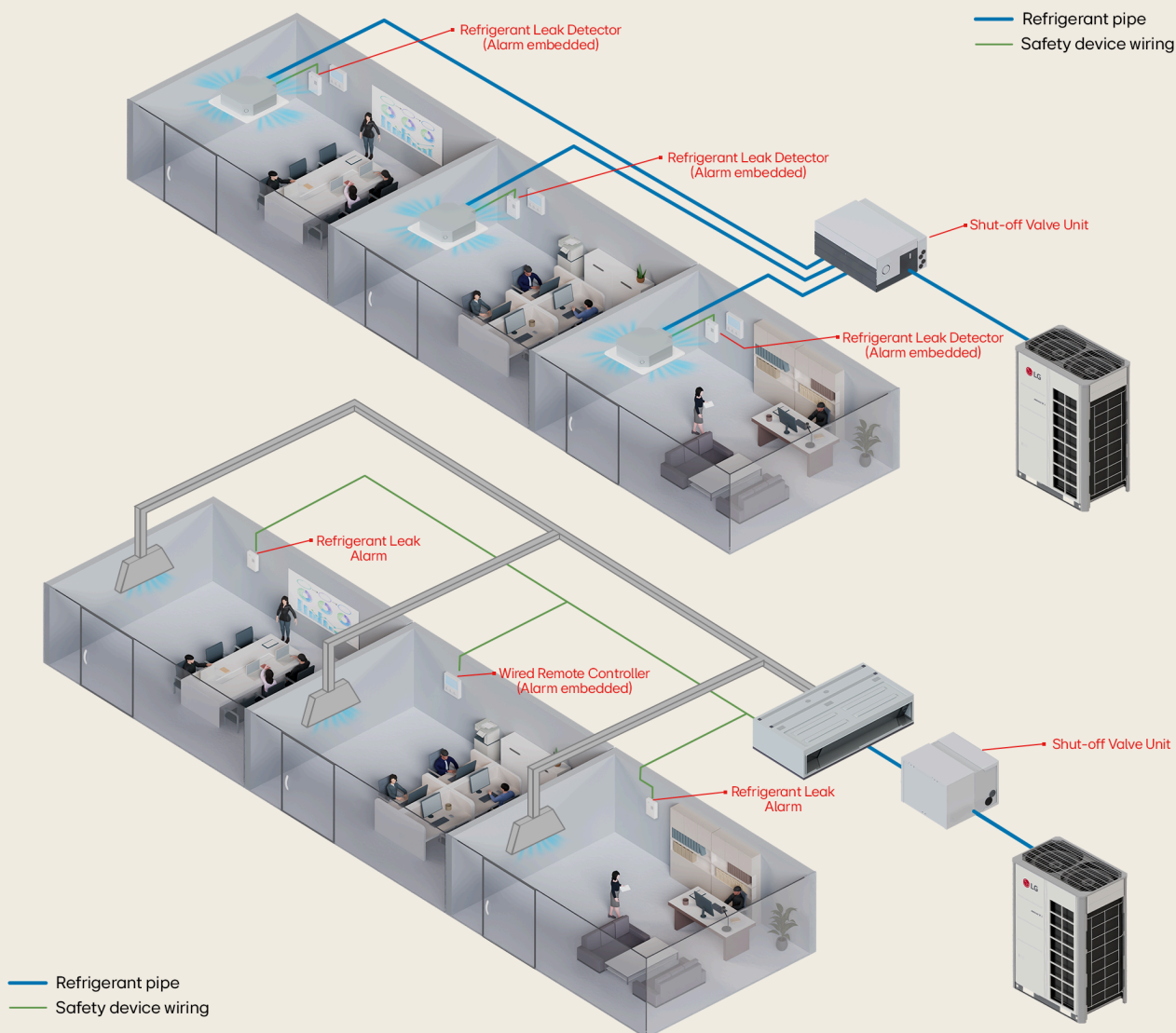


Scenario 3: Smaller or High-Density Installation : Two Safety Devices Needed

In smaller or confined spaces, higher refrigerant concentration may occur due to limited volume or higher system charge. A refrigerant leak alarm combined with a shut-off valve enables detection and automatic isolation of the system to prevent further refrigerant release.

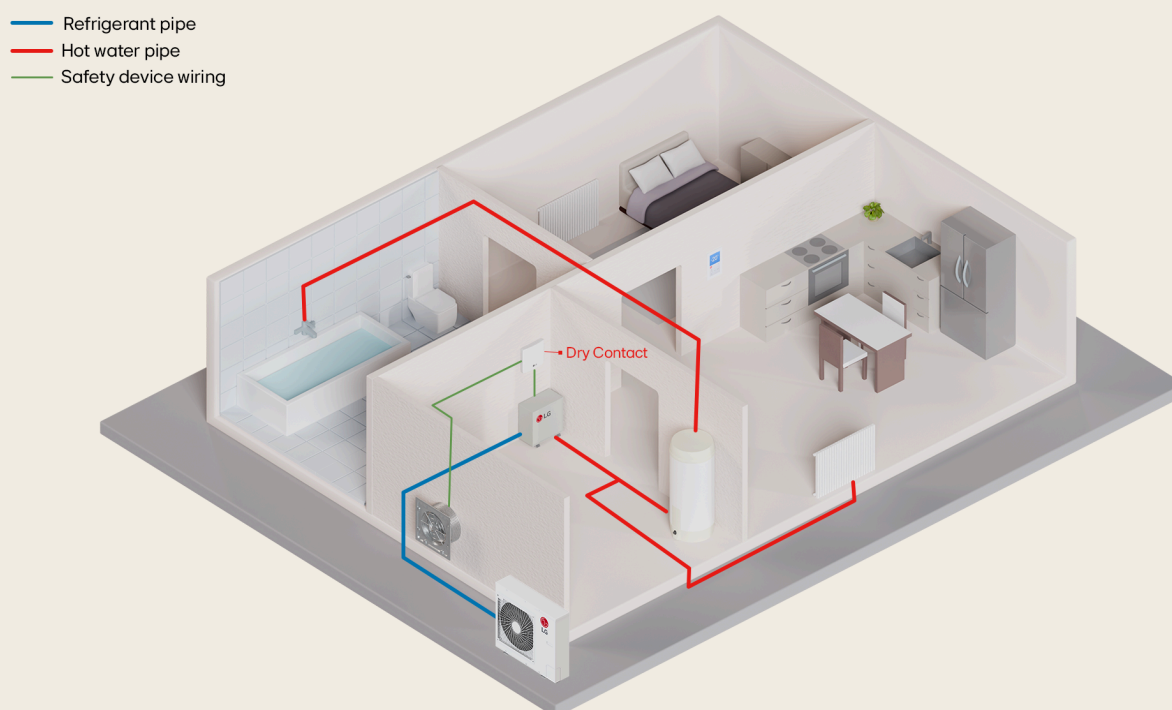
A single shut-off valve can also be grouped to protect multiple indoor units across different rooms, reducing hardware and installation costs. While this approach may appear to reduce installation flexibility, it actually enables the system to be more precisely designed to match the specific application, rather than presenting a range of generalized solution options.

LG's refrigerant leak detector combines detection and alarm functions in a single compact unit, and can be grouped to cover multiple indoor units within a 10-meter radius, reducing component count and long-term maintenance.



▪ 06-02 Non-Enhanced Tightness Refrigerating System

In residential applications, refrigerant is contained within the unit installation space, while water is distributed throughout the living areas. Mechanical ventilation is applied within the installation space to maintain safe refrigerant concentration levels, ensuring occupied areas remain unaffected.



07

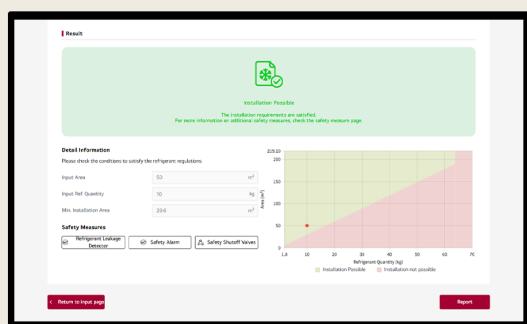
LG SOLUTIONS FOR SYSTEM DESIGN & OPERATION

Simplifying Planning and Ongoing Management

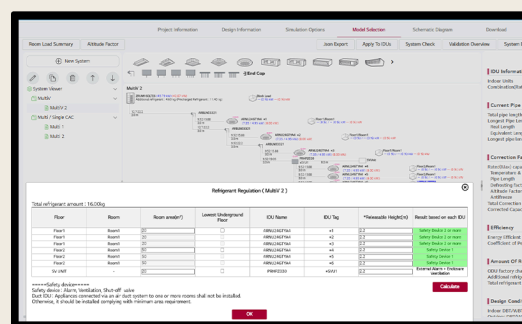
Beyond initial installation, successful R32 projects also depend on efficient planning, ongoing visibility, and reliable system management over time. LG provides a complete set of tools and system solutions that support both design and day-to-day operation, helping projects move from planning to long-term management with confidence.

▪ 07-01 LATS R-Checker / LATS HVAC

Design software for model selection, refrigerant charge calculation, and piping estimation. It verifies systems against safety thresholds for room area, installation height, and charge amount, flagging where a refrigerant leak alarm or shut-off valve is required.



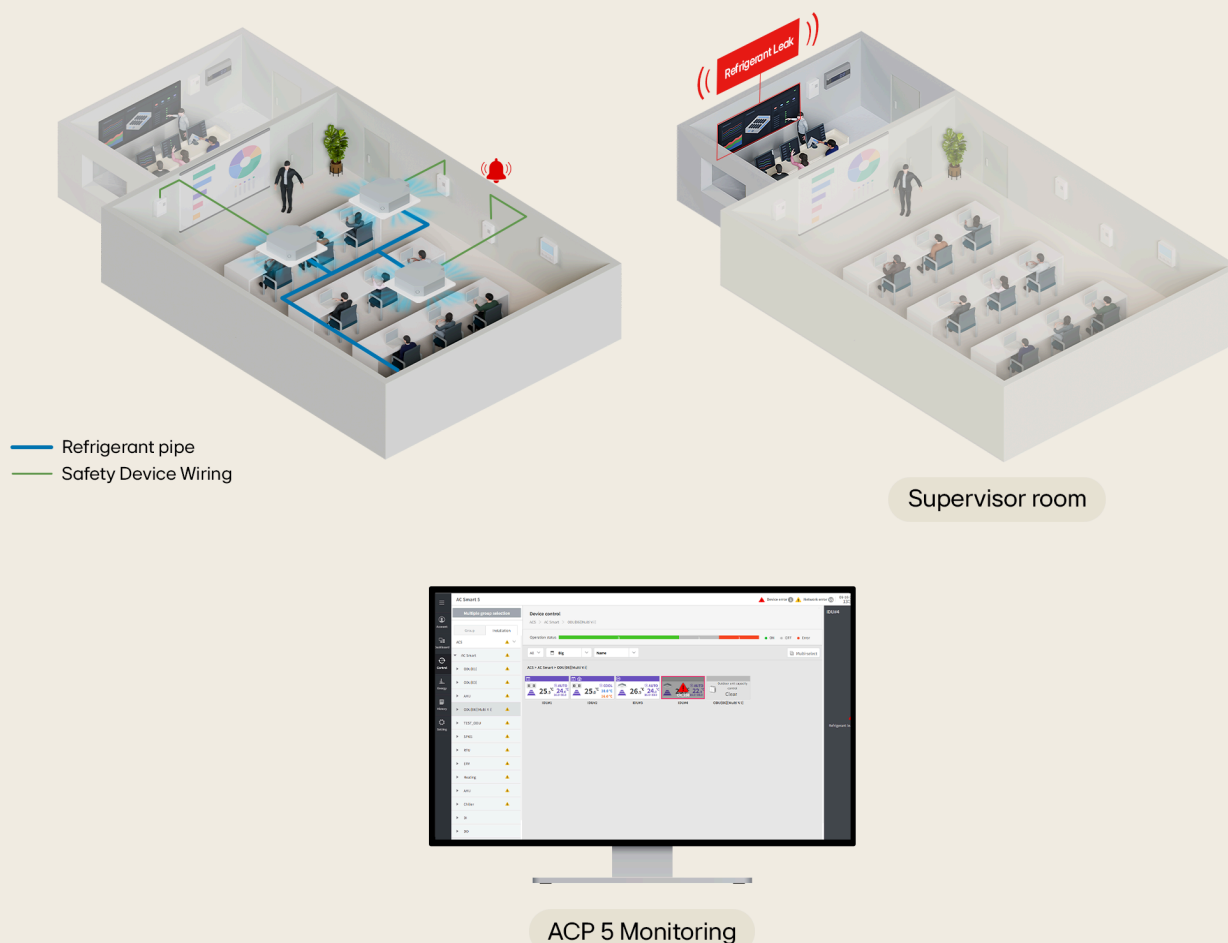
LATS R-Checker



LATS HVAC

▪ 07-02 Central Control (ACP 5)

A central controller that manages up to 256 units from a single interface via PC, tablet, or smartphone. The alarm linked to the central controller serves as an informational alert for the system operator, rather than functioning as a refrigerant leak detection alarm. It also supports BMS integration via BACnet IP and Modbus TCP.



▪ 07-03 Error Code Guidance (e.g., CH230)

Specific diagnostic codes support rapid response during operation. CH230 indicates a detected refrigerant leak, CH229 flags the end of sensor lifetime, and CH228 signals a sensor malfunction. Each of these is paired with a defined response procedure.

* The error code can be displayed on the wired remote controller or the outdoor unit's 7-segment display.

Conclusion

LG R32 solutions help make safety planning clearer and more manageable by combining defined system criteria, dedicated safety devices/measures, and practical design tools. This allows consultants and project developers to apply the right solution for each installation with greater confidence. For project-specific guidance or further information, you can find your regional LG representative.

Inquiries

For project-specific guidance or further information, you can find your regional LG representative by scanning the QR code below.



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