

# IT Cooling

## s-MEXT split system

s-MEXT split System		362
s-MEXT G00 System	NEW	368
s-MEXT G00 Indoor Unit	NEW	370
Mr. SLIM Outdoor Unit	NEW	372

## MULTIDENSITY modular system

MULTIDENSITY	NEW	374
m-MOCU	NEW	378
m-MROW / m-MRAC	NEW	380





# s-MEXT split system

Close Control Unit for IT Cooling applications.  
Direct expansion system, full inverter for Edge Data Center.



## Edge computing: the new trend for cloud decentralization

A new concept that places it self side by side to cloud computing is appearing on the market, thanks to the unstoppable digital transformation we are experiencing. It's the Edge computing.

In 2018, into the top ten strategic technological trends for companies and organizations, Gartner, a leading company in research and consulting, reported the "Cloud to the Edge" trend in fifth position.

This technology imposes the cloud decentralization, which translate into a new reference model for designing data centers. Concepts like IoT, 5G will inevitably lead a resources fragmentation in data centers

management. In fact, we speak of granularity, investments in smaller and widespread data centers, developed to respond to the growing demand for web connections with low latency and high performances.

As result, data processing times will have to be faster, and the only way to comply with both the connections' growing number and consumers' needs in terms of performances will have to be, according to the experts, to data processing closer to the users themselves.

Then we start to talk about Edge Data Centers, little data centers or server rooms, scattered on territory and used to host cloud services and local data processing.



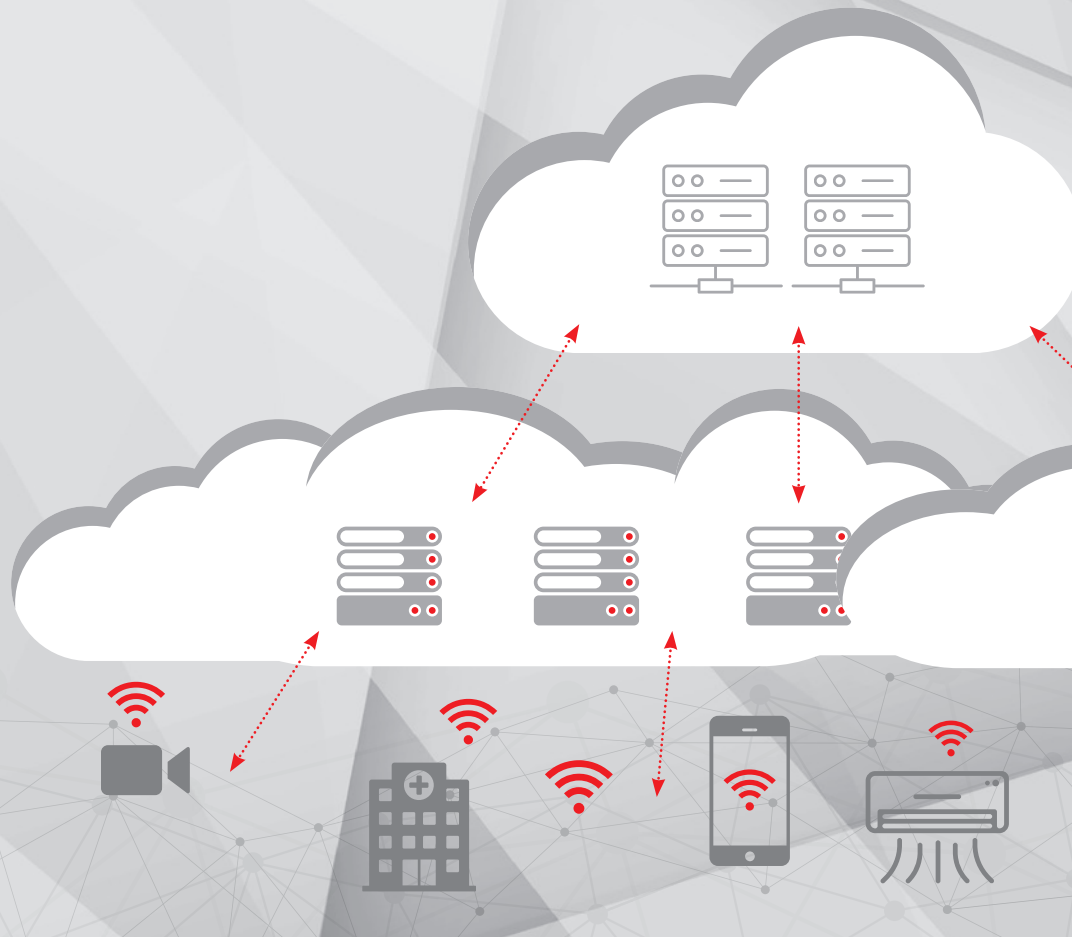
cloud

users



cloud

edge  
datacenter





## Cloud Computing

### Traditional cloud model

The traditional model is facing some latency problems, limited bandwidth, dependability that cause traffic congestions, not suitable for future IoT implementations.

**Advantages:** large data processing capacity for complex analysis.

**Products and applications:** chillers, precision conditioners, infrastructures, control systems and accessories with RC brand.



## Edge Computing

### Distributed intelligence model

Edge computing, by distributing intelligence, will bring down the reduction of the amount of data to be processed, prioritizing management of critical data, latency sensitive, next to the users, filtering and passing to the cloud less impacting data. It will manage big data processing.

**Advantages:** low latency, high elaboration performances with less investments in infrastructures.

**Products and applications:** precision air conditioners, infrastructures, control systems and accessories branded Mitsubishi Electric and RC.









# s-MEXT G00 system NEW

R410A

R32

HIGH EFFICIENCY LEVEL,  
REDUCED OCCUPATION



Under

Over

S-MEXT COMBINES MORE THAN 50 YEARS OF EXPERIENCE OF RC BRAND IN THE IT COOLING MARKET, WITH THE MITSUBISHI ELECTRIC EXCELLENCE QUALITY.

S-MEXT AND MR. SLIM  
PERFECT SYNERGY



MITSUBISHI ELECTRIC QUALITY  
READY TO SERVE YOUR EDGE  
DATA CENTER

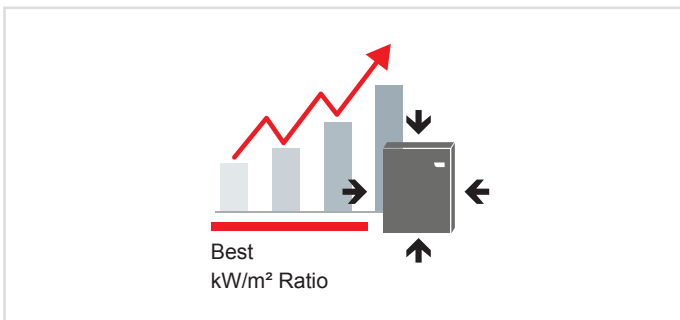


Mitsubishi Electric present s-MEXT, developed with the RC experience and notoriety in the IT Cooling market: the brand new combined system that combines all the experience of a specialized brand in precision air conditioning with the technological excellence and reliability of Mitsubishi Electric.

**The innovative system dedicated to Edge Data Center combines a precision air conditioner (indoor unit) with the commercial outdoor unit of Mr.Slim series.**

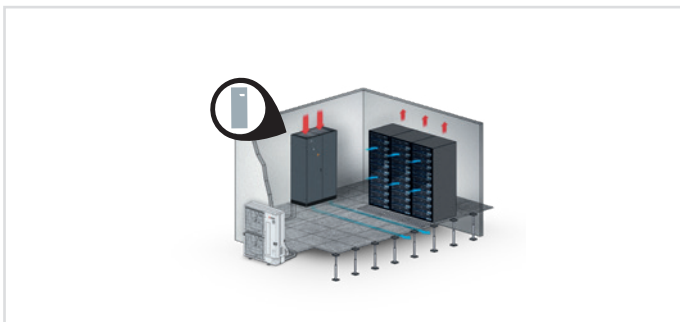
### Best kW/m<sup>2</sup> Ratio

Thanks to the innovative system, s-MEXT guarantees high level performances while occupying very small floor space. It's compact layout allows to easily integrate the unit in existing data centers, without sacrificing any kW per square meter.



### Beyond the traditional Operational limits

The continuous increase of the thermal load in the IT environments has led to an increasing temperature inside the server rooms (up to 27°C) s-MEXT system has been developed to operate with return air temperature up to 35°C.

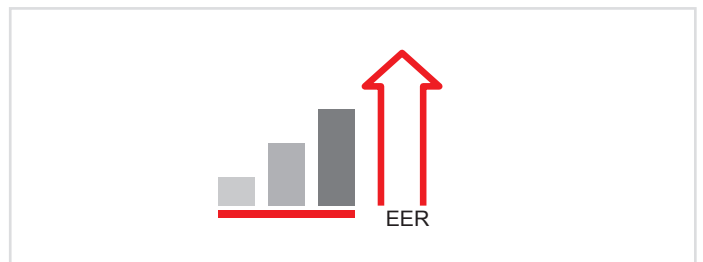


### Efficiency beyond expectations

A data center's air conditioning system accounts for over 40% of total data center energy consumption. An efficient approach to air conditioning can generate an enormous advantage in efficiency and reduction of operating costs.

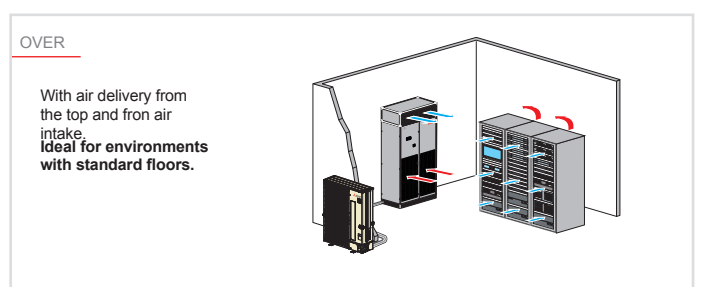
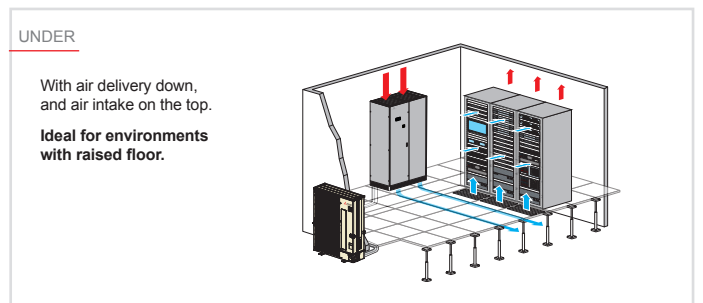
s-MEXT system is characterized by high quality components and control logics aimed at managing the system in the most efficiency mode.

- DC inverter scroll for linear and continuous modulation of cooling capacity based on the load.
- DC fans for best modulation of the air flow.



### Flexibility in the air flows' choice

Flexible installation of the unit, thanks to the possibility of choosing between two air requirements: Under and Over.



# s-MEXT G00 Indoor Unit NEW

R410A

R32

PRECISION CONDITIONER  
(INDOOR UNIT)

ABLE TO MANAGE TEMPERATURE  
AND HUMIDITY VARIABLES, WITH  
EXTREME PRECISION, EVEN IN  
THE EVENTS OF LARGE LOADS  
VARIATIONS



DESIGNED TO PERFECTLY COMBINE  
EFFICIENCY AND RELIABILITY IN  
ALL OPERATING CONDITIONS,  
THESE INDOOR UNITS USE ONLY  
CERTIFIED AND HIGH QUALITY  
COMPONENTS: EC FAN, DX COIL  
WITH HYDROLYSIS TREATMENT  
AND ADVANCED CONTROL  
SYSTEM.

A WIDE RANGE OF ACCESSORIES  
COMPLETES THE SERIES AND  
MAKES S-MEXT SUITABLE  
FOR THE MOST CRITICAL  
ENVIRONMENTAL CONDITIONS

## Quick and easy installation

The construction features and the unit layout have been designed to ensure quick installation and facilitate front access for easy maintenance activity.

## New EC inverter fan

High performance EC fan ensures a perfect modulation of air flow for partial loads. Made of ultra-light polymeric material, this fan is distinguished by:

- Sound level reduction by 4-5 dB(A);
- Reduction of 25% of power consumption, compared to traditional solutions.

## Advanced Control System

Control System is the heart of the unit. Designed for monitoring and to operate the functional and environmental single unit's parameters. The Control System allows:

- Automatic reset after power failures;
- Serial interconnection with most modern BMS systems;
- up to 100 events recording;
- "Non-volatile" data storage for saving files;

Via simple and intuitive graphic display.



## Technical specifications

MODEL			006	009	013	022	038	044
Outdoor unit	n°		1	1	1	1	2	2
	Model	PUHZ-ZRP	60 VHA2	100 VKA3	125 YKA3	250 YKA3	200 YKA3	250 YKA3
Cooling (1)		PUHZ-ZM	60 VHA	100 VKA	125 YKA	250 YKA	200 YKA	250 YKA
	Cooling capacity	kW	6,79	10,1	11,9	22,5	38,8	42,4
	Sensible	kW	6,28	9,0	10,3	19,5	34,0	37,5
	SHR (2)		0,92	0,89	0,87	0,87	0,88	0,88
	System EER (nominal) 27°C - 47% RH		3,92	3,98	2,97	2,87	3,15	2,59
	SUPPLY FAN	n°	1	1	1	2	1	1
	Air flow	m³/h	2000	2500	2800	5000	8800	10000
	Nominal external static pressure	Pa	20	20	20	20	20	20
	Maximum external static pressure	Pa	200	25	45	25	125	25
	Power input (3)	kW	0,21	0,37	0,52	0,74	1,43	2,10
	Absorbed current (4)	A	0,93	1,64	3,23	3,28	2,20	3,22
	Starting current	A	0,5	0,5	0,5	0,5	0,5	0,5
Plate current	A	2,3	2,3	3,15	4,6	4,2	4,2	
Electrical panel	Power input	kW	0,14	0,14	0,14	0,14	0,14	0,14
	Pressure level	dB(A)	53	57	61	60	63	67
Sound level (ISO 3744) (4)	Power level	dB(A)	69	73	77	76	79	83
	AIR FILTERS	n°	1	1	1	2	4	4
	Extended filtering surface	m²	0,68	0,68	0,68	1,05	1,76	1,76
	Efficiency (ISO EN 16890)	COARSE	60%	60%	60%	60%	60%	60%
	REFRIGERANT CIRCUITS	n°	1	1	1	1	2	2
	POWER SUPPLY	V/Ph/Hz	230/1/50	230/1/50	230/1/50	230/1/50	400/3+N/50	400/3+N/50
Dimensions	Length	mm	600	600	600	1000	1000	1000
	Depth	mm	500	500	500	500	890	890
	Height	mm	1980	1980	1980	1980	1980	1980
	NET WEIGHT Over	kg	103	115	115	185	297	297
	NET WEIGHT Under	kg	103	115	115	185	297	297
Connections	Refrigerant pipes: Gas - Liquid	Ø Inch	5/8" - 3/8"	5/8" - 3/8"	5/8" - 3/8"	1" - 1/2"	1" - 3/8"	1" - 1/2"
	Condensate (5)	Ø mm	19	19	19	19	19	19
	Power supply wiring cable (6)	n° x mm²	3G1.5	3G1.5	3G1.5	3G1.5	4G1.5	4G1.5

Notes:

THE COOLING CAPACITY DOES NOT CONSIDER THE SUPPLY FAN MOTOR THERMAL LOAD

(1) Gross value. Characteristics referred to entering air at 27°C-47% RH; Ambient temperature 35°C; ESP=20Pa; Connection pipes length 5m;

(2) SHR= Sensible cooling capacity / Total cooling capacity.

(3) Corresponding to the nominal ESP=20Pa.

(4) Sound pressure level on air return at 1m .

(5) Rubber pipe-referred to internal diameter.

(6) Minimum section.

These units contain <HFC R410A [GWP<sub>100</sub> 2088]> fluorinated greenhouse gas.

These units contain <HFC R32 [GWP<sub>100</sub> 675]> fluorinated greenhouse gas.

# Mr. SLIM

NEW

## OUTDOOR UNIT

OUTDOOR UNIT EQUIPPED WITH DC SCROLL INVERTER COMPRESSOR AND AXIAL FANS WITH DC ELECTRIC MOTOR

THE HEAT EXCHANGER IS THUS EXPLOITED ENTIRELY IN ITS EXCHANGE SURFACE.



OUTDOOR UNIT THAT BENEFIT FROM SCROLL COMPRESSOR, IS ALSO EQUIPPED WITH A DEVICE CALLED "POWER RECEIVER", A REFRIGERANT ACCUMULATOR ACCOMPANIED BY A PAIR OF LEV VALVES, WITH THE DUAL FUNCTION (SUBCOOLING/OVERHEATING THE REFRIGERANT).

## Technologies and Functions

Mr.Slim presents excellent performances in all loading conditions thanks to the sophisticated power inverter technology with advanced features:

- “Rotation and Backup” function for automatic switching on a second unit in case of first unit block.
- “Easy and fast maintenance” function and automatic monitoring of the refrigerant status.

## Linear Expansion Valve (LEV)

The Mr.Slim linear expansion valve (LEV) allows precise regulation of the refrigerant flow, optimizing the compressor’s performances.

- Fast achievement of system stability.
- Quick adaptation to load fluctuations.

## Scroll Inverter compressor

Full inverter technology applied to the compressor allows continuous modulation of the cooling capacity according to the real needs of the servers.

In this way the rotation speed is continuously modulated helping to significantly increase the efficiency for partial loads.

- Elimination of inrush currents;
- Energy consumption reduction for 25%, compared to traditional ON/OFF technology;
- Maximum reliability thanks to continuous modulation without annoying ON/OFF cycles.



Technical specifications			PUHZ-ZM 60VHA	PUHZ-ZM 100VKA	PUHZ-ZM 125YKA	PUHZ-ZM 250YKA	PUHZ-ZM 200YKA	PUHZ-ZM 250YKA
OUTDOOR UNIT								
	Indoor unit model		006	009	013	022	038	044
	Outdoor unit to be coupled to the indoor	n°	1	1	1	1	2	2
	COMPRESSOR	n°	1	1	1	1	1	1
	Power INPUT	kW	1,19	1,88	2,82	6,01	4,33	6,01
	Refrigerant charge	kg	2,8	4	4	7,7	7,1	7,7
	CONDENSER FAN	n°	1	2	2	2	2	2
	Air flow	m³/h	3300	6600	7200	8400	8400	8400
Dimensions	Power input	kW	0,06	0,06	0,06	0,2	0,2	0,2
	Lenght	mm	950	1050	1050	1050	1050	1050
	Depth	mm	355	370	370	370	370	370
	Height	mm	943	1338	1338	1338	1338	1338
	NET WEIGHT	kg	70	116	125	135	135	135

Notes:

(1) Characteristics referred to ambient temperature 35°C – indoor air condition 27°C-47% UR - Connection pipes length 5m;

(2) Sound pressure level on unit front at 1m.

(3) Minimum section.

(4) For standard refrigerant charge.

(5) With additional refrigerant charge.

(\*) Data are referred to single outdoor unit.

(+) from 71 to 100 m please refer to Mr Slim O&M Manual.

These units contain <HFC R32 [GWP<sub>100</sub> 675]> fluorinated greenhouse gas.



# MULTIDENSITY modular system

Efficient, rational, plug & play solution for high density data rooms.  
Full inverter VRF system for small & medium size it environments  
with hot spots up to 50 kW.



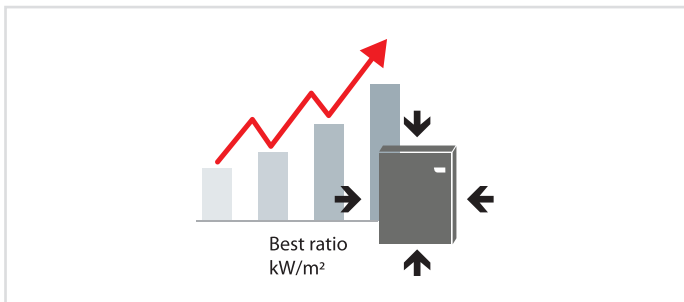
## Up to 8 indoor units connected to one OUTDOOR unit

High density hot spots are managed by indoor units connected to condensing units working together as a unique system.



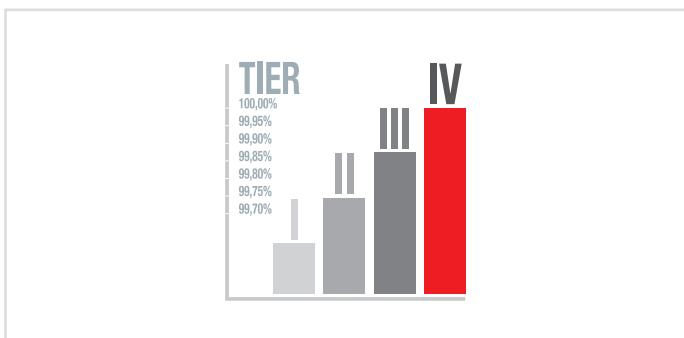
## Highest capacity per footprint

Thanks to the possibility to minimise the number of outdoor units, the overall footprint of the whole system is drastically reduced.



## Choose your system's reliability

A multitude of configurations are available to provide customers with their desired level of reliability (configuration N, N+1, 2N). The Multidensity system is in line with TIER III and IV design topologies, based on the configuration chosen.

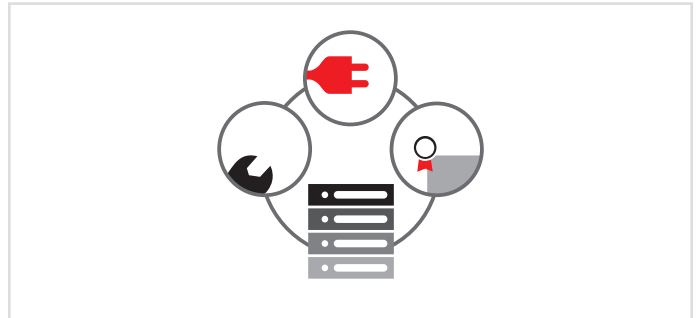


## Adaptable flexibility

Match any kind of cooling requirement, from localised cooling to hot and cold aisle cooling management.

## Rational design for optimised CAPEX

The rational design of the VRF system is combined with the experience and reliability of the Mitsubishi Electric brand, which guarantees the best quality for your IT infrastructure.



## Plug and Play Installation

**PLUG & PLAY SOLUTIONS** No additional elements such as pumps, tanks, and valves are required. This installation simplicity results in a quicker start-up and more reliable maintenance, which are key factors for reducing installation and maintenance costs.

## Active Redundancy

**Active Redundancy** Advanced load sharing logics of the Active Redundancy function ensure that the heat loads are balanced among the units (including those units that usually remain in stand-by) according to the actual requirements of the IT infrastructure, leveraging on the multi-unit configuration of redundant systems.



## The modular approach of MULTIDENSITY SYSTEM

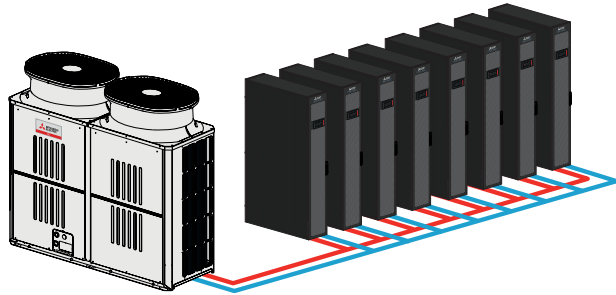
Indoor units are connected in master-slave configuration, if the master unit fails for any reason, the Dynamic Master logic automatically elects a new master from the other units.

Thanks to the flexible and modular approach of the MULTIDENSITY SYSTEM, it represents a tailored solution for any data center layout.

### CONFIGURATION WITHOUT REDUNDANCY (N)

#### Ideal for small to medium IT rooms

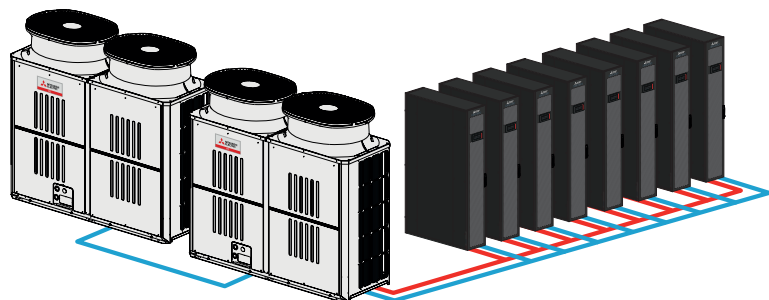
- 1 external unit paired with up to 8 indoor units
- Average system EER is around 3.00
- Cooling capacity up to 50 kW



### CONFIGURATION WITH REDUNDANCY (N+1)

#### Ideal for TIER II IT rooms

- 2 external units paired with up to 8 indoor units
- The external units operate in load sharing at partial loads for higher efficiency
- In case of failure of one of the condensing units, the second one operates at full load
- Average system EER is around 3.25
- Cooling capacity up to 50 kW

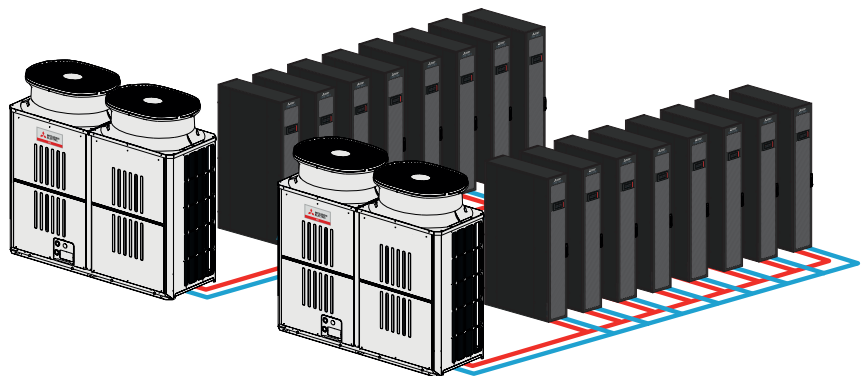


### CONFIGURATION (2N)

#### Ideal for TIER III and TIER IV data centers

In accordance with the Uptime's Institute's classification, this configuration offers:

- A fully redundant and mirrored system with two independent distribution systems
- 1+1 external units paired with up to 8+8 indoor units

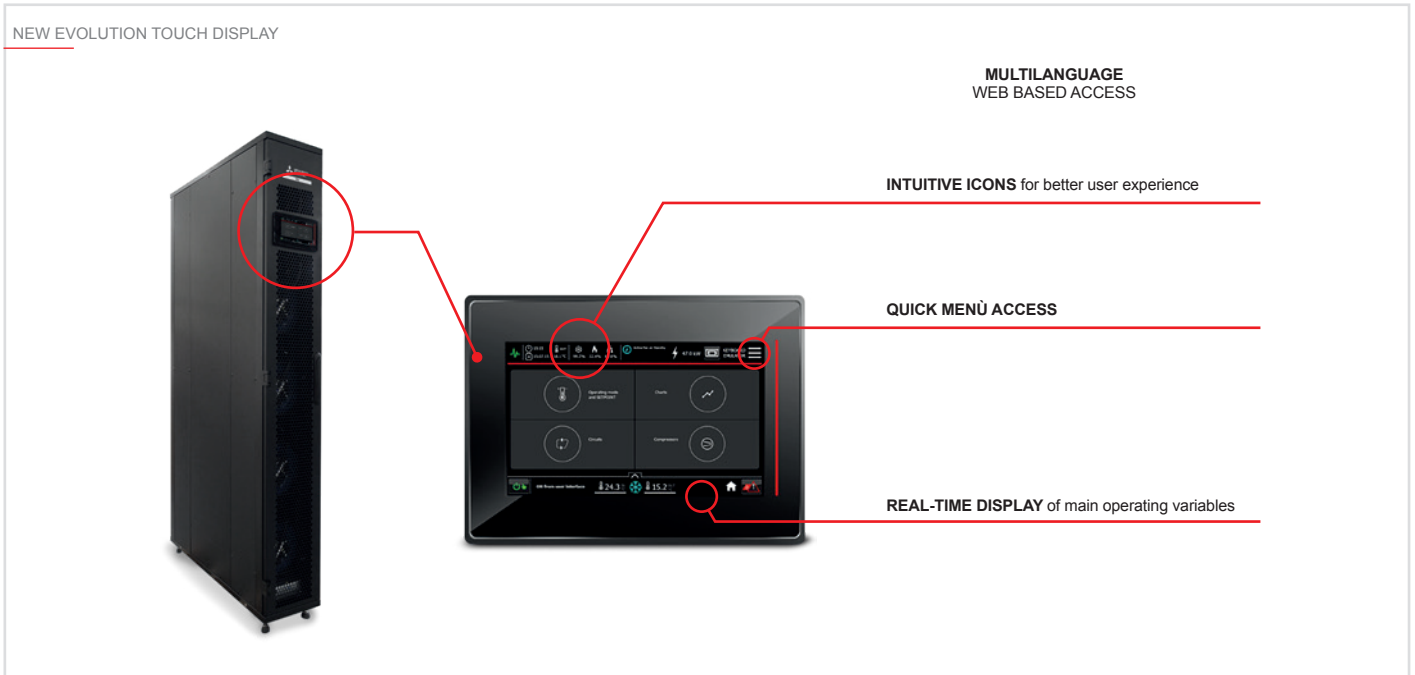


## New evolution touch display

The evolution touch display is available for the room units m-MROW and m-MRAC.

Through simple, easy-to-read colour graphics, the innovative touch screen display (available as an option) shows the real performance of key components.

A completely redesigned interface improves the user experience. The 7" touch screen display ensures the immediate visualization of the indoor units' status thanks to dedicated screens for main operating parameter control: temperature, humidity, ventilation and then, alarms and event management.



## KIPLink innovative interface

Multidensity system is also available, as option, with KIPLink interface. Based on WI-FI technology, KIPLink gets rid of the standard keyboard and allows one to operate on the unit directly from a mobile devices (smartphone, tablet, notebook).



## Dimensioning and design

Thanks to the sizing and design tool typical of Mitsubishi Electric direct expansion systems - New Design Tool – it's possible to simplify the design phases by minimizing the learning curve.



# m-MOCU NEW

AIR-COOLED OUTDOOR UNIT FOR OUTDOOR INSTALLATION  
TO BE COUPLED WITH IT COOLING INDOOR UNITS

mitsubishi electric's  
experience in vrf  
applied to it cooling  
infrastructures

bell-mouth shape  
designed propeller  
fans with inverter  
control brushless  
dc motors

bldc scroll compressors  
with inverter technology to  
produce the exact output  
needed by the system

modular design and  
reduced footprint  
for any installation  
requirement

increased performance

extreme reliability

suitable for long  
refrigerant pipe distance

low noise operation



Technical specifications CONDENSING UNITS				
Outdoor Unit			1x m-MOCU-G02-050	2x m-MOCU-G02-050
Cooling Capacity	Total <sup>(1)</sup>	kW	50	50
	System EER <sup>(1)</sup>	kW/kW	2.96	3.24
Unit Electrical Data	Power input <sup>(1)</sup>	kW	15.2	13.7
Compressor		Nr.	1	2x 1
	Power input <sup>(1)</sup>	kW	14.3	2x 14.3
Condenser Fans		Nr.	2	2x 2
	Total air flow	m <sup>3</sup> /h	19.200	2x 19.200
	Power input	kW	2x 0.92	4x 0.92
	External static pressure	Pa	0	0
Sound Level Iso 3744	Pressure level <sup>(2)</sup>	dB(A)	65	68
Refrigerant Circuits		Nr.	1	2x 1
	Refrigerant type		R410A	R410A
	Pre-charged refrigerant	kg	11.8	2x 11.8
	F-GAS - CO <sub>2</sub> equivalent	t	24.63	2x 24.63
Refrigerant Piping	Max pipe length (from the outdoor unit to the farthest indoor unit)	m	165	165
	Max height difference (outdoor unit higher than indoor units)	m	50	50
	Max height difference (outdoor unit lower than indoor units)	m	40	40
Power Supply		V/Ph/Hz	380-400-415 / 3+N / 50-60	380-400-415 / 3+N / 50-60
Dimensions	Length	mm	1750	2x 1750
	Depth	mm	740	2x 740
	Height	mm	1650	2x 1650
Net Weight		kg	304	2x 304

1. Gross Value. Characteristics referred to room air temperature 35°C with 27%RH and external ambient air temperature 35°C. ESP=20Pa.

2. Gross Value. Characteristics referred to room air temperature 46°C with 16%RH and external ambient air temperature 35°C. ESP=20Pa.

3. Sound pressure level on air return at 1m.

# m-MROW NEW m-MRAC

THESE INDOOR RACK COOLING UNITS, FROM 10 TO 28 KW,  
ARE DESIGNED TO BE CLOSE-COUPLED TO BLADE SERVERS AND MANAGE HOT SPOTS

OPTIMIZED FOR MULTIDENSITY  
SYSTEM

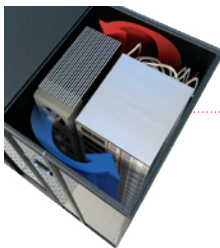
REDUCED SPACE OCCUPANCY  
(UP TO 0,36 M<sup>2</sup>)

COOLING ONLY WHERE NEEDED

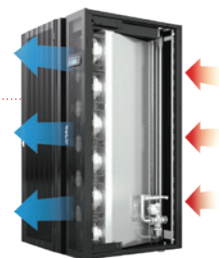
EC PLUG FANS FOR  
REDUCING ENERGY  
CONSUMPTION  
AND NOISE LEVELS

ELECTRONIC EXPANSION  
VALVE TO ACHIEVE  
A MUCH WIDER  
MODULATION CAPACITY

BOTH IN-ROW AND  
ENCLOSURE  
VERSIONS AVAILABLE



**ENCLOSURE**  
IDEAL FOR REMOVING  
HOT SPOTS IN STAND  
ALONE SYSTEMS



**IN ROW**  
IDEAL FOR HOT/COLD  
AISLE CONFIGURATIONS

Technical specifications INDOOR UNITS					
Indoor unit			m-MROW-G02-009	m-MROW-G02-015	m-MROW-G02-025
			m-MRAC-G02-009	m-MRAC-G02-015	m-MRAC-G02-025
Unit size			9	15	25
Cooling capacity m-MROW	Total (1)	kW	10.6	16.6	28.6
	Sensible (1)	kW	9.6	15.7	27.4
	SHR (1)		0.91	0.94	0.96
	Indoor unit EER (1)	kW/kW	58.9	50.3	32.5
Cooling capacity m-MROW	Total (2)	kW	10.9	22.9	32.8
	Sensible (2)	kW	10.9	22.9	32.8
	SHR (2)		1	1	1
	Indoor unit EER (2)	kW/kW	60.5	69.3	37.2
Supply fan		Nr.	2	4	5
	Air flow	m <sup>3</sup> /h	1500	2700	4200
	Power input	kW	0.18	0.34	0.85
	Nominal external static pressure	Pa	20	20	20
	Maximum external static pressure	Pa	60	60	60
Sound level ISO 3744	Pressure level (3)	dB(A)	63.5	64.5	70.5
	Power level	dB(A)	79.0	80.0	86.0
Air filters		Nr.	2	2	2
	Extended filtering surface	m <sup>2</sup>	0.35	0.35	0.35
	Efficiency (ISO EN 16890)	COARSE	40%	40%	40%
Refrigerant circuits		Nr.	1	1	1
	POWER SUPPLY	V/Ph/Hz	230/1/50-60	230/1/50-60	230/1/50-60
Dimensions	Width	mm	300	300	300
	Length	mm	1000 / 1200	1000 / 1200	1000 / 1200
	Height	mm	2085	2085	2085
Net weight	m-MROW	kg	175	190	193
	m-MRAC	kg	185	200	203