MITSUBISHI ELECTRIC
HYDRONICS & IT COOLING SYSTEMS S.p.A.

IT COOLING

EVAPORATIVE COOLING SYSTEM

SIVIS

2 STAGE INDIRECT ADIABATIC COOLING SYSTEM FOR LARGE DATA CENTERS FROM 80 TO 320 kW

rcitcooling.com

SIVIS

ADIABATIC COOLING FOR HIGH EFFICIENCY

- Variable air flow and cooling capacity
- Fully aluminum structure (20-year warranty against corrosion)
- Low pPUE index: 1,025
- Modular units

SIVIS IS THE INDIRECT ADIABATIC COOLING SYSTEM FOR LARGE DATA CENTERS.

SIVIS is a smart cooling system that grants important decrease of power consumption in order to meet the continuous request to achieve LOW pPUE.
SIVIS foresees 3 operation conditions:
Total Free-cooling,
Free-cooling + adiabatic cooling
Free-cooling + adiabatic cooling + mechanical cooling.

BENEFITS

- **ZERO INDOOR FOOTPRINT:**
  Installation on the external perimeter of the building.
  Roof installation to reduce or eliminate the space occupied around the building.
- **AVAILABILITY OF AN AUXILIARY COOLING SOURCE:**
  Direct expansion system
  Chilled water system.
- **NO RECYCLING WATER:**
  The humidification system does not recirculate the water. All in one equipment for a quick installation and maintenance.
  Only electric, hydraulic and delivery/return canalization installation are required.
- **MODULAR UNITS:**
  Side by side installation of units.

HARDWARE

PACKAGED UNIT: all-in-one unit for fast installation and maintenance. Only electrical power and ducts for return/supply air to the Data Hall are required.

READY TO USE: no extra components needed. Built in control system for ALL parts.

RUST FREE: totally recyclable: the whole unit is made of aluminium. 20-years warranty on the full CASING of the unit against corrosion.

2 STAGE INDIRECT ADIABATIC COOLING SYSTEM FOR LARGE DATA CENTERS

EVAPORATIVE Cooling

ADIABATIC

The cooling effect is achieved by water evaporation; water passes from liquid state to vapor state by being atomized in millions of little droplets, that spontaneously evaporate in the air.
1 LITRE OF EVAPORATED WATER ABSORBS 0.7 kWh OF HEAT

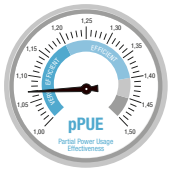
HIGH EFFICIENCY

Decreasing energy consumption and making use of the best technologies as much as possible in order to obtain maximum annual energy savings every year.

Energy efficiency up to 38,9 kW/kW.

1.025 LOWpPUE

LOWER pPUE
PARTIAL POWER USAGE EFFECTIVENESS
UP TO 1.025 kWh OF HEAT



low CO_2 emission

Lower CO_2 emissions compared to a traditional CW System
- 736,3 Tons of CO_2 a year
1 MW cooling load with PUE 1,23.
European average value: 0,410 kg CO_2 / kWh

Al ALUMINUM

The choice of the materials used to construct the units, the possibility to recycle them, and the energy used to produce and recycle them are very important things to consider when referring to global energy savings and CO_2 emissions reductions.

20 years WARRANTY

- Aluminum can be recycled infinite times with low energy costs
- Aluminum doesn't need any special protective surface treatments
- No need for painting
- Higher corrosion resistance
- 2,8 times lighter then steel;

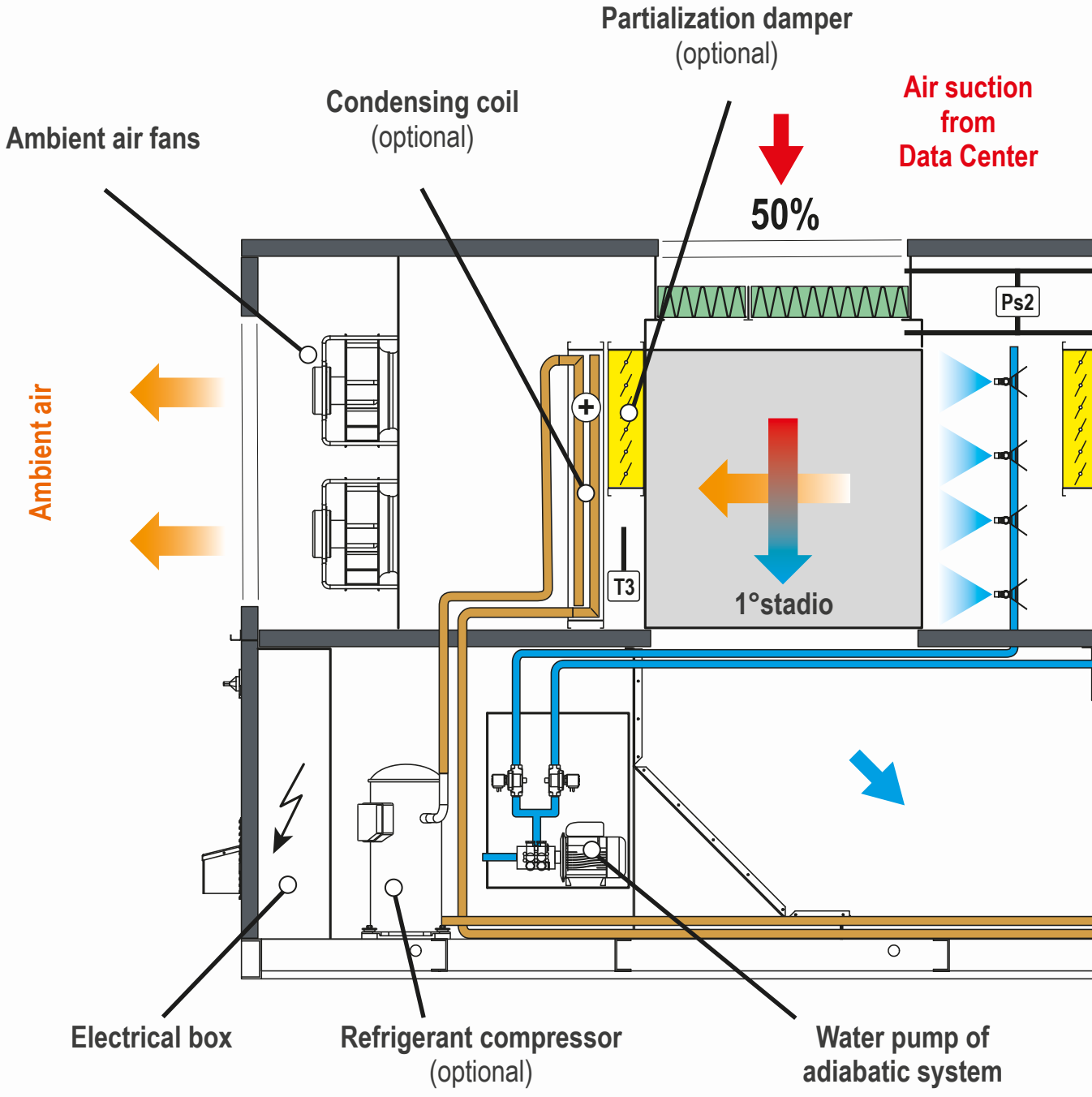
SIVIS structure is guarantee against corrosion for 20 years
The series is designed for easy deconstruction: SIVIS units are 98% recyclable.

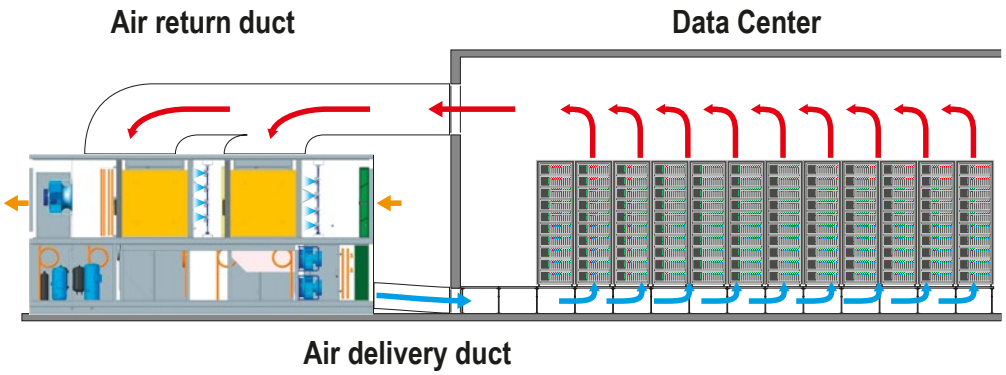
WORKING PRINCIPLE

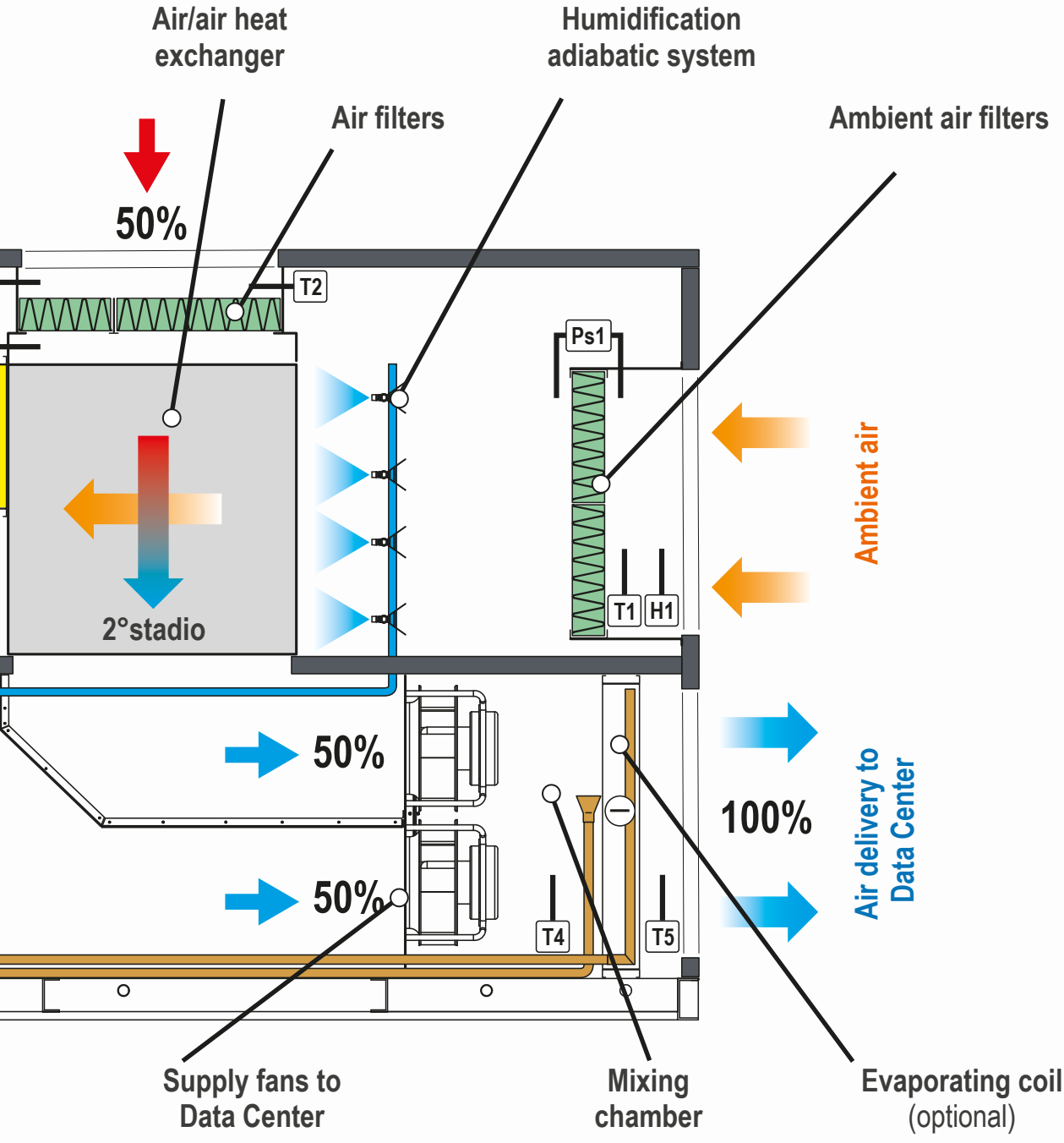
The machine is equipped with two cooling sections, each with filtering section, air/air heat exchangers and supply fans with variable air-flow.
Each cooling section handle 50% of the total air flow of the system.

The cooling effect is obtained inside the cross-flow air to air heat exchangers where the ambient air flow and Data Center airflow never come into direct contact ensuring treated air purity.

The ambient air flow is ensured by dedicated fans with variable flow.
A suction filter section guarantees the quality of ambient air flow.




Air return duct
Data Center
Air delivery duct


Air/air heat exchanger
Humidification adiabatic system
Air filters
Ambient air filters
50%
T2
Ps1
2°stadio
T1
H1
Ambient air
50%
100%
Air delivery to Data Center
50%
T4
T5
Supply fans to Data Center
Mixing chamber
Evaporating coil (optional)

CLIMATE CONDITIONS

The operation of the SIVIS system is influenced by the climate and not all climates are suitable for the Adiabatic Cooling System. An analysis of the climate profile at the place of installation is necessary to verify the operation conditions of SIVIS system.

Weather Data Location United Kingdom: LONDON

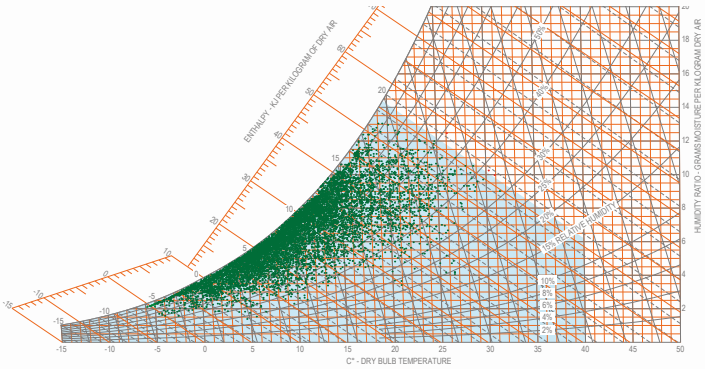
Altitude: 62 meters

Barometric Pressure: 100.584 kPa

Atmospheric Pressure: 14.588 psia

Each point represent one hour of the thermal profile of London for a total of 8760 hours

Operation area of the SIVIS Adiabatic Cooling System



Thermal load 100% - Site LONDON Working example of SIVIS system.

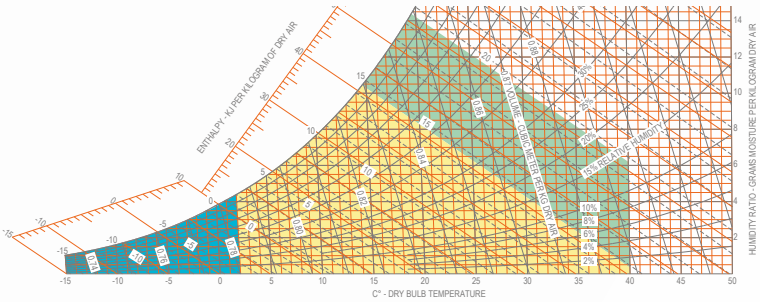
Environmental conditions: LONDON

Thermal load: 100%

DRY OPERATION
Free-Cooling

WET OPERATION
Adiabatic cooling

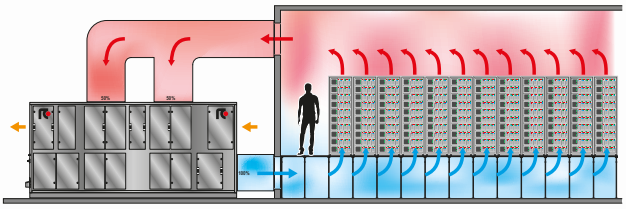
WET OPERATION + COMPRESSOR
Adiabatic cooling + Mechanical cooling



INSTALLATION

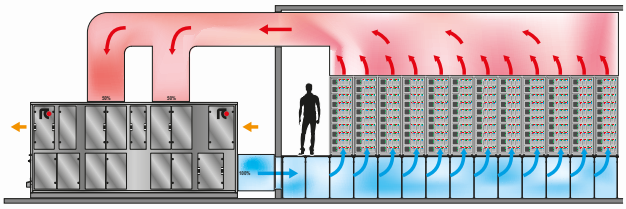
PERIMETER INSTALLATION

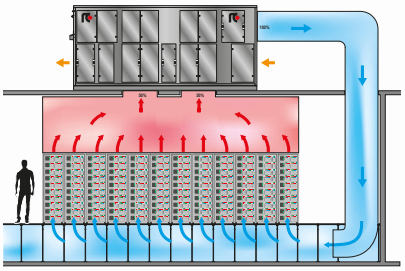
Installation on perimeter of the building.



PERIMETER INSTALLATION WITH HOT AISLE COMPARTMENT

Installation on perimeter of the building.





ROOF INSTALLATION WITH HOT AISLE COMPARTMENT

Possibility of roof installation to reduce or eliminate the footprint aroud Data Center building.

pPUE 1,025

AL ALUMINUM

20 YEARS WARRANTY

on cabinet

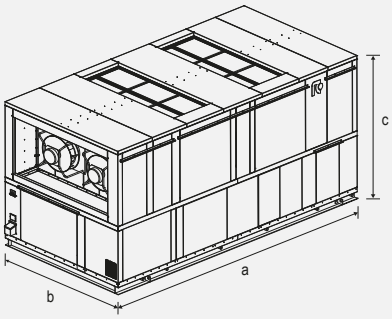
EER up to 38,9 (London climatic profile)

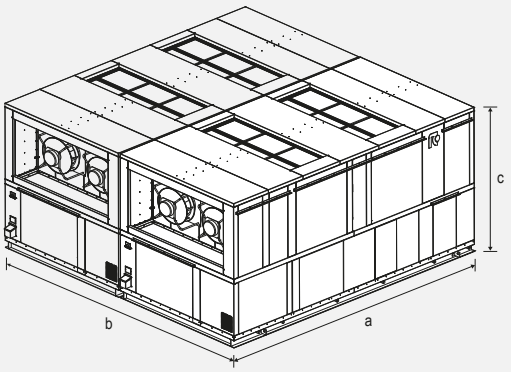
TECHNICAL DATA - SIVIS

MODEL		SIVIS 20	SIVIS 30	SIVIS 40	SIVIS 80
COOLING CAPACITY (1)					
Total	kW	80	120	160	320
Sensible	kW	80	120	160	320
SHR		1,00	1,00	1,00	1,00
SUPPLY AIR FANS	n.	4	4	4	8
Air flow	m³/h	20000	30000	40000	80000
Nominal external static pressure	Pa	100	100	100	100
EXTERNAL AIR FANS	n.	2	2	3	6
Air flow	m³/h	15000	20000	27000	54000
Min Air flow	m³/h	5000	6670	9000	18000
Nominal external static pressure	Pa	0	0	0	0
RETURN AIR FILTERS	n.	12	17	24	48
Efficiency		G4	G4	G4	G4
EXTERNAL AIR FILTERS	n.	6	8	12	24
Efficiency		G4	G4	G4	G4
ADIABATIC SYSTEM					
Water flow - 1st stage	m³/h	0,1	0,15	0,20	0,40
Water flow - 2nd stage	m³/h	0,04	0,07	0,08	0,16
ENERGY EFFICIENCY INDEXES					
SEER – load 100% (2)		8,0	11,0	11,8	11,8
SEER – load 50% (2)		28,0	30,8	38,9	38,9
POWER SUPPLY	V/Ph/Hz	400-3-50+N	400-3-50+N	400-3-50+N	400-3-50+N
Max operating current (FLA)	A	35,7	54,0	57,4	114,9
SOUND LEVEL					
Indoor sound power level (in duct) [Lw] (3)	dB(A)	76,4	79,5	83,3	86,3
Outdoor sound power level [Lw] (3)	dB(A)	63,1	66,0	69,9	72,8
NET WEIGHT	kg	2600	4050	4760	9520
HYDRAULIC CONNECTIONS					
Water feeding	F Ø	1/2"	1/2"	1/2"	2 x 1/2"
Water drainage	Ø ext	14	14	14	2 x 14

DIMENSIONS (mm)

SIZE	a	b	c
SIVIS 20	5200	2200	2400
SIVIS 30	6500	2350	2800
SIVIS 40	7200	2350	3300
SIVIS 80	7200	4700	3300





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

1. Characteristics referred to supply air at 23°C-50%RH and return air at 35°C-25%RH.
2. Referred to London Climatic conditions.
3. Sound power level Lw according to ISO EN 9614 – 2.

RC SIVIS_05-18_ENG

for a greener tomorrow

Eco Changes is the Mitsubishi Electric Group's environmental statement, and expresses the Group's stance on environmental management. Through a wide range of businesses, we are helping contribute to the realization of a sustainable society.

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