

Climaveneta Technical Documentation  
WSM\_A164\_A1004\_202005\_ML

# REGULATION (EU) N. 2016/2281 FOR ROOFTOP HEAT PUMPS

**Ecodesign requirements for space heaters**

REVERSIBLE AIR COOLED ROOFTOP UNIT

**WSM A164 - A1004**

Heating Capacity Range 51,7 - 317 [kW] - (EN14511 VALUE)  
Nominal Heating Capacity at TdesignH Range 55,0 - 309 [kW]



IT

EN

DE

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FR

**1. REGULATION (EU) N. 2016/2281 FOR ROOFTOP HEAT PUMPS**

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# 1. REGULATION (EU) N. 2016/2281 FOR ROOFTOP HEAT PUMPS

## 1.1 Scope of the document

This document is compliant with the Commission Regulation (EU) N. 2016/2281 regarding "REQUIREMENTS FOR PRODUCT INFORMATION" (Annex II, Point 5). In particular, it deals with rooftop heat pumps and contains information required by Table 14 of the above-mentioned regulation, which is entitled "Information requirements for heat pumps".

## 1.2 REGULATION (EU) N. 2016/2281 description

The COMMISSION REGULATION (EU) N. 2016/2281 of 30 November 2016, implementing Directive 2009/125/EC of the European Parliament and of the Council, establishes eco-design requirements for the placing on the market and/or putting into service of: air heating products with a rated heating capacity which does not exceed 1MW, cooling products and high temperature process chillers with a rated cooling capacity which do not exceed 2 MW, and all fan coil units. All these energy-related products are defined in Article 2 of the Regulation in question.

## 1.3 Description of the data declared by Mitsubishi Electric Hydronics & IT Cooling Systems

- Rooftop heat pumps: an air-to-air or water/brine-to-air heat pump driven by an electric compressor, with evaporator, compressor and condenser integrated into a single package.
- T<sub>designH</sub>: temperature at reference design conditions.
- Design heating load (P<sub>designh</sub>): the heating load applied to a heat pump at the reference design temperature whereby the design heating load is equal to the part load for heating with outdoor temperature equal to reference design temperature for heating, expressed in kW.
- Seasonal space heating energy efficiency ( $\eta_{s,h}$ ): ratio between the space heating demand pertaining to the designated heating season, and the annual energy consumption required to meet this demand, expressed in %.
- Seasonal Coefficient Of Performance (SCOP): the overall energy efficiency ratio of the rooftop heat pump, representative for the heating season, calculated as the reference annual heating demand divided by the annual energy consumption for heating.
- Bivalent temperature: the outdoor temperature declared by the manufacturer at which the declared capacity for heating equals the part load for heating and below which the declared heating capacity requires a supplementary back-up heater capacity to meet the part load for heating, expressed in degrees Celsius.
- Operation limit temperature: the outdoor temperature declared by the manufacturer for heating, below which the heat pump will not be able to deliver any heating capacity, and the declared heating capacity is equal to zero, expressed in degrees Celsius.
- Degradation coefficient: measure of efficiency loss due to cycling of the rooftop.
- Off mode: a condition in which the rooftop is connected to the mains power source and is not providing any function.
- Thermostat off-mode: condition corresponding to the hours with no heating load and activated heating function, whereby the heating function is switched on but the rooftop is not operational.
- Crankcase heater mode: condition in which a heating device is activated to avoid the refrigerant migrating to the compressor so as to limit the refrigerant concentration in oil when the compressor is started.
- Standby mode: condition where the rooftop is connected to the mains power source and depends on energy input from the mains power source to work as intended. The unit provides only the following functions, which may persist for an indefinite time: reactivation function, or reactivation function and only an indication of enabled reactivation function, and/or information or status display.
- Supplementary capacity for heating: rated supplemental heat output provided by a supplementary heater when the heating load exceeds the heating capacity of the rooftop heat pump, expressed in kW.
- Capacity control: the ability of a rooftop to change its heating capacity by changing the volumetric flow rate of at least one of the fluids needed to operate the refrigeration cycle.
- Sound power level (LWA): the A-weighted sound power level, indoors and/or outdoors, expressed in dB.
- Annual electricity consumption for heating: the energy consumption required to meet the reference annual heating demand.
- Global warming potential (GWP) of the refrigerant: the 100-year climatic warming potential of one kilogram of a greenhouse gas relative to one kilogram of dioxide (CO<sub>2</sub>).

## 2. CLIMAVENETA CONTENTS UNIT

### 2.1 Table index

REVERSIBLE AIR COOLED ROOFTOP UNIT

#### WSM A164 - A1004

Heating Capacity Range 51,7 - 317 [kW]

Nominal Heating Capacity at TdesignH Range 55,0 - 309 [kW]

Units	Version	Size					Pag.
WSM		A1004	A164	A184	A204	A704	5
		A804	A904				

WSM AR A1004			
Air-to-air heat pump	yes / no		yes
Water-to-air heat pump	yes / no		no
Brine-to-air heat pump	yes / no		no
With supplementary heater:	yes / no		no
Air flow rate	fixed / variable		fixed
Parameters are declared for average/warmer/colder climate conditions (1)	average / warmer / colder		average
Nominal heating capacity	Prated	[kW]	309
Seasonal space heating energy efficiency	$\eta_s$	[%]	132,2
<b>Declared capacity for heating for part load at indoor temperature 20 °C and outdoor temperature Tj</b>			
Declared capacity for heating with outdoor temperature Tj = - 7 °C	Pdh	[kW]	203
Declared capacity for heating with outdoor temperature Tj = +2 °C	Pdh	[kW]	142
Declared capacity for heating with outdoor temperature Tj = +7 °C	Pdh	[kW]	91,0
Declared capacity for heating with outdoor temperature Tj = +12 °C	Pdh	[kW]	92,7
Declared capacity for heating with outdoor temperature Tj = Bivalent temperature	Pdh	[kW]	212
Declared capacity for heating with outdoor temperature Tj = Operation limit temperature	Pdh	[kW]	181
For air-to-water heat pumps: Tj = - 15 °C (if TOL < - 20 °C)	Pdh	[kW]	-
Bivalent temperature	Tbiv	[°C]	-5,0
Degradation coefficient	Cdh	-	0,25
<b>Declared coefficient of performance or primary energy ratio for part load at indoor temperature 20 °C and outdoor temperature Tj</b>			
Declared coefficient of performance with outdoor temperature Tj = - 7 °C	COPd	-	2,57
Declared coefficient of performance with outdoor temperature Tj = +2 °C	COPd	-	3,61
Declared coefficient of performance with outdoor temperature Tj = +7 °C	COPd	-	4,07
Declared coefficient of performance with outdoor temperature Tj = +12 °C	COPd	-	4,33
Declared coefficient of performance with outdoor temperature Tj = Bivalent temperature	COPd	-	2,64
Declared coefficient of performance with outdoor temperature Tj = Operation limit temperature	COPd	-	2,38
For air-to-water heat pumps: Tj = - 15 °C (if TOL < - 20 °C)	COPd	-	-
For air-to-water HP : Operation limit temperature	TOL	[°C]	-10
<b>Power consumption in modes other than active mode</b>			
Off mode	POFF	[kW]	0,000
Thermostat-off mode	PTO	[kW]	1,148
Standby mode	PSB	[kW]	0,682
Crankcase heater mode	PCK	[kW]	0,682
<b>Supplementary heater</b>			
Back-up heating capacity	Psup	[kW]	82,1
Type of energy input			electric
<b>Other items</b>			
Capacity control	fixed/variable/staged		Staged
Sound power level, outdoors	LWA	[dB(A)]	97
Annual electricity consumption for heating	QHE	[kWh]	108767
GWP of the refrigerant		[Kg CO2eq]	2088
<b>Outdoor heat exchanger</b>			
For air-to-air HP: Rated air flow rate, outdoors	Qairsorce	[m³/h]	0
For water-/brine-to-air heat pumps: Rated brine or water flow rate, outdoor heat exchanger	Qwater/brine source	[m³/h]	-

Unit in standard configuration/execution, without optional accessories.

Contact details: Mitsubishi Electric Hydronics & IT Cooling Systems S.p.A., via Caduti di Cefalonia 1 - 36061 Bassano del Grappa (VI) - Italy

WSM AR A164			
Air-to-air heat pump	yes / no		yes
Water-to-air heat pump	yes / no		no
Brine-to-air heat pump	yes / no		no
With supplementary heater:	yes / no		no
Air flow rate	fixed / variable		fixed
Parameters are declared for average/warmer/colder climate conditions (1)	average / warmer / colder		average
Nominal heating capacity	Prated	[kW]	55
Seasonal space heating energy efficiency	$\eta_s$	[%]	134,2
<b>Declared capacity for heating for part load at indoor temperature 20 °C and outdoor temperature Tj</b>			
Declared capacity for heating with outdoor temperature Tj = - 7 °C	Pdh	[kW]	35,6
Declared capacity for heating with outdoor temperature Tj = +2 °C	Pdh	[kW]	24,9
Declared capacity for heating with outdoor temperature Tj = +7 °C	Pdh	[kW]	16,0
Declared capacity for heating with outdoor temperature Tj = +12 °C	Pdh	[kW]	13,9
Declared capacity for heating with outdoor temperature Tj = Bivalent temperature	Pdh	[kW]	37,4
Declared capacity for heating with outdoor temperature Tj = Operation limit temperature	Pdh	[kW]	31,7
For air-to-water heat pumps: Tj = - 15 °C (if TOL < - 20 °C)	Pdh	[kW]	-
Bivalent temperature	Tbiv	[°C]	-5,0
Degradation coefficient	Cdh	-	0,25
<b>Declared coefficient of performance or primary energy ratio for part load at indoor temperature 20 °C and outdoor temperature Tj</b>			
Declared coefficient of performance with outdoor temperature Tj = - 7 °C	COPd	-	2,68
Declared coefficient of performance with outdoor temperature Tj = +2 °C	COPd	-	3,58
Declared coefficient of performance with outdoor temperature Tj = +7 °C	COPd	-	4,35
Declared coefficient of performance with outdoor temperature Tj = +12 °C	COPd	-	4,93
Declared coefficient of performance with outdoor temperature Tj = Bivalent temperature	COPd	-	2,76
Declared coefficient of performance with outdoor temperature Tj = Operation limit temperature	COPd	-	2,47
For air-to-water heat pumps: Tj = - 15 °C (if TOL < - 20 °C)	COPd	-	-
For air-to-water HP : Operation limit temperature	TOL	[°C]	-10
<b>Power consumption in modes other than active mode</b>			
Off mode	POFF	[kW]	0,000
Thermostat-off mode	PTO	[kW]	0,062
Standby mode	PSB	[kW]	0,160
Crankcase heater mode	PCK	[kW]	0,490
<b>Supplementary heater</b>			
Back-up heating capacity	Psup	[kW]	14,6
Type of energy input			electric
<b>Other items</b>			
Capacity control	fixed/variable/staged		Staged
Sound power level, outdoors	LWA	[dB(A)]	82
Annual electricity consumption for heating	QHE	[kWh]	18887
GWP of the refrigerant		[Kg CO2eq]	2088
<b>Outdoor heat exchanger</b>			
For air-to-air HP: Rated air flow rate, outdoors	Qairsorce	[m³/h]	0
For water-/brine-to-air heat pumps: Rated brine or water flow rate, outdoor heat exchanger	Qwater/brine source	[m³/h]	-

Unit in standard configuration/execution, without optional accessories.

Contact details: Mitsubishi Electric Hydronics & IT Cooling Systems S.p.A., via Caduti di Cefalonia 1 - 36061 Bassano del Grappa (VI) - Italy

WSM AR A184			
Air-to-air heat pump	yes / no		yes
Water-to-air heat pump	yes / no		no
Brine-to-air heat pump	yes / no		no
With supplementary heater:	yes / no		no
Air flow rate	fixed / variable		fixed
Parameters are declared for average/warmer/colder climate conditions (1)	average / warmer / colder		average
Nominal heating capacity	Prated	[kW]	55
Seasonal space heating energy efficiency	$\eta_s$	[%]	133,4
<b>Declared capacity for heating for part load at indoor temperature 20 °C and outdoor temperature Tj</b>			
Declared capacity for heating with outdoor temperature Tj = - 7 °C	Pdh	[kW]	36,1
Declared capacity for heating with outdoor temperature Tj = +2 °C	Pdh	[kW]	25,2
Declared capacity for heating with outdoor temperature Tj = +7 °C	Pdh	[kW]	16,2
Declared capacity for heating with outdoor temperature Tj = +12 °C	Pdh	[kW]	17,6
Declared capacity for heating with outdoor temperature Tj = Bivalent temperature	Pdh	[kW]	37,8
Declared capacity for heating with outdoor temperature Tj = Operation limit temperature	Pdh	[kW]	32,1
For air-to-water heat pumps: Tj = - 15 °C (if TOL < - 20 °C)	Pdh	[kW]	-
Bivalent temperature	Tbiv	[°C]	-5,0
Degradation coefficient	Cdh	-	0,25
<b>Declared coefficient of performance or primary energy ratio for part load at indoor temperature 20 °C and outdoor temperature Tj</b>			
Declared coefficient of performance with outdoor temperature Tj = - 7 °C	COPd	-	2,48
Declared coefficient of performance with outdoor temperature Tj = +2 °C	COPd	-	3,70
Declared coefficient of performance with outdoor temperature Tj = +7 °C	COPd	-	4,40
Declared coefficient of performance with outdoor temperature Tj = +12 °C	COPd	-	4,87
Declared coefficient of performance with outdoor temperature Tj = Bivalent temperature	COPd	-	2,56
Declared coefficient of performance with outdoor temperature Tj = Operation limit temperature	COPd	-	2,29
For air-to-water heat pumps: Tj = - 15 °C (if TOL < - 20 °C)	COPd	-	-
For air-to-water HP : Operation limit temperature	TOL	[°C]	-10
<b>Power consumption in modes other than active mode</b>			
Off mode	POFF	[kW]	0,000
Thermostat-off mode	PTO	[kW]	0,092
Standby mode	PSB	[kW]	0,160
Crankcase heater mode	PCK	[kW]	0,490
<b>Supplementary heater</b>			
Back-up heating capacity	Psup	[kW]	14,7
Type of energy input			electric
<b>Other items</b>			
Capacity control	fixed/variable/staged		Staged
Sound power level, outdoors	LWA	[dB(A)]	84
Annual electricity consumption for heating	QHE	[kWh]	19200
GWP of the refrigerant		[Kg CO2eq]	2088
<b>Outdoor heat exchanger</b>			
For air-to-air HP: Rated air flow rate, outdoors	Qairsorce	[m³/h]	0
For water-/brine-to-air heat pumps: Rated brine or water flow rate, outdoor heat exchanger	Qwater/brine source	[m³/h]	-

Unit in standard configuration/execution, without optional accessories.

Contact details: Mitsubishi Electric Hydronics & IT Cooling Systems S.p.A., via Caduti di Cefalonia 1 - 36061 Bassano del Grappa (VI) - Italy

WSM AR A204			
Air-to-air heat pump	yes / no		yes
Water-to-air heat pump	yes / no		no
Brine-to-air heat pump	yes / no		no
With supplementary heater:	yes / no		no
Air flow rate	fixed / variable		fixed
Parameters are declared for average/warmer/colder climate conditions (1)	average / warmer / colder		average
Nominal heating capacity	Prated	[kW]	62
Seasonal space heating energy efficiency	$\eta_s$	[%]	132,2
<b>Declared capacity for heating for part load at indoor temperature 20 °C and outdoor temperature Tj</b>			
Declared capacity for heating with outdoor temperature Tj = - 7 °C	Pdh	[kW]	40,9
Declared capacity for heating with outdoor temperature Tj = +2 °C	Pdh	[kW]	28,6
Declared capacity for heating with outdoor temperature Tj = +7 °C	Pdh	[kW]	18,4
Declared capacity for heating with outdoor temperature Tj = +12 °C	Pdh	[kW]	20,6
Declared capacity for heating with outdoor temperature Tj = Bivalent temperature	Pdh	[kW]	42,9
Declared capacity for heating with outdoor temperature Tj = Operation limit temperature	Pdh	[kW]	36,5
For air-to-water heat pumps: Tj = - 15 °C (if TOL < - 20 °C)	Pdh	[kW]	-
Bivalent temperature	Tbiv	[°C]	-5,0
Degradation coefficient	Cdh	-	0,25
<b>Declared coefficient of performance or primary energy ratio for part load at indoor temperature 20 °C and outdoor temperature Tj</b>			
Declared coefficient of performance with outdoor temperature Tj = - 7 °C	COPd	-	2,33
Declared coefficient of performance with outdoor temperature Tj = +2 °C	COPd	-	3,78
Declared coefficient of performance with outdoor temperature Tj = +7 °C	COPd	-	4,26
Declared coefficient of performance with outdoor temperature Tj = +12 °C	COPd	-	4,75
Declared coefficient of performance with outdoor temperature Tj = Bivalent temperature	COPd	-	2,41
Declared coefficient of performance with outdoor temperature Tj = Operation limit temperature	COPd	-	2,15
For air-to-water heat pumps: Tj = - 15 °C (if TOL < - 20 °C)	COPd	-	-
For air-to-water HP : Operation limit temperature	TOL	[°C]	-10
<b>Power consumption in modes other than active mode</b>			
Off mode	POFF	[kW]	0,000
Thermostat-off mode	PTO	[kW]	0,120
Standby mode	PSB	[kW]	0,160
Crankcase heater mode	PCK	[kW]	0,490
<b>Supplementary heater</b>			
Back-up heating capacity	Psup	[kW]	16,6
Type of energy input			electric
<b>Other items</b>			
Capacity control	fixed/variable/staged		Staged
Sound power level, outdoors	LWA	[dB(A)]	85
Annual electricity consumption for heating	QHE	[kWh]	21975
GWP of the refrigerant		[Kg CO2eq]	2088
<b>Outdoor heat exchanger</b>			
For air-to-air HP: Rated air flow rate, outdoors	Qairsorce	[m³/h]	0
For water-/brine-to-air heat pumps: Rated brine or water flow rate, outdoor heat exchanger	Qwater/brine source	[m³/h]	-

Unit in standard configuration/execution, without optional accessories.

Contact details: Mitsubishi Electric Hydronics & IT Cooling Systems S.p.A., via Caduti di Cefalonia 1 - 36061 Bassano del Grappa (VI) - Italy



WSM AR A704			
Air-to-air heat pump	yes / no		yes
Water-to-air heat pump	yes / no		no
Brine-to-air heat pump	yes / no		no
With supplementary heater:	yes / no		no
Air flow rate	fixed / variable		fixed
Parameters are declared for average/warmer/colder climate conditions (1)	average / warmer / colder		average
Nominal heating capacity	Prated	[kW]	213
Seasonal space heating energy efficiency	$\eta_s$	[%]	138,2
<b>Declared capacity for heating for part load at indoor temperature 20 °C and outdoor temperature Tj</b>			
Declared capacity for heating with outdoor temperature Tj = - 7 °C	Pdh	[kW]	138
Declared capacity for heating with outdoor temperature Tj = +2 °C	Pdh	[kW]	96,4
Declared capacity for heating with outdoor temperature Tj = +7 °C	Pdh	[kW]	62,0
Declared capacity for heating with outdoor temperature Tj = +12 °C	Pdh	[kW]	59,2
Declared capacity for heating with outdoor temperature Tj = Bivalent temperature	Pdh	[kW]	145
Declared capacity for heating with outdoor temperature Tj = Operation limit temperature	Pdh	[kW]	123
For air-to-water heat pumps: Tj = - 15 °C (if TOL < - 20 °C)	Pdh	[kW]	-
Bivalent temperature	Tbiv	[°C]	-5,0
Degradation coefficient	Cdh	-	0,25
<b>Declared coefficient of performance or primary energy ratio for part load at indoor temperature 20 °C and outdoor temperature Tj</b>			
Declared coefficient of performance with outdoor temperature Tj = - 7 °C	COPd	-	2,62
Declared coefficient of performance with outdoor temperature Tj = +2 °C	COPd	-	4,04
Declared coefficient of performance with outdoor temperature Tj = +7 °C	COPd	-	4,02
Declared coefficient of performance with outdoor temperature Tj = +12 °C	COPd	-	4,26
Declared coefficient of performance with outdoor temperature Tj = Bivalent temperature	COPd	-	2,71
Declared coefficient of performance with outdoor temperature Tj = Operation limit temperature	COPd	-	2,40
For air-to-water heat pumps: Tj = - 15 °C (if TOL < - 20 °C)	COPd	-	-
For air-to-water HP : Operation limit temperature	TOL	[°C]	-10
<b>Power consumption in modes other than active mode</b>			
Off mode	POFF	[kW]	0,000
Thermostat-off mode	PTO	[kW]	0,648
Standby mode	PSB	[kW]	0,670
Crankcase heater mode	PCK	[kW]	0,670
<b>Supplementary heater</b>			
Back-up heating capacity	Psup	[kW]	56,4
Type of energy input			electric
<b>Other items</b>			
Capacity control	fixed/variable/staged		Staged
Sound power level, outdoors	LWA	[dB(A)]	92
Annual electricity consumption for heating	QHE	[kWh]	71056
GWP of the refrigerant		[Kg CO2eq]	2088
<b>Outdoor heat exchanger</b>			
For air-to-air HP: Rated air flow rate, outdoors	Qairsorce	[m³/h]	0
For water-/brine-to-air heat pumps: Rated brine or water flow rate, outdoor heat exchanger	Qwater/brine source	[m³/h]	-

Unit in standard configuration/execution, without optional accessories.

Contact details: Mitsubishi Electric Hydronics & IT Cooling Systems S.p.A., via Caduti di Cefalonia 1 - 36061 Bassano del Grappa (VI) - Italy

WSM AR A804			
Air-to-air heat pump	yes / no		yes
Water-to-air heat pump	yes / no		no
Brine-to-air heat pump	yes / no		no
With supplementary heater:	yes / no		no
Air flow rate	fixed / variable		fixed
Parameters are declared for average/warmer/colder climate conditions (1)	average / warmer / colder		average
Nominal heating capacity	Prated	[kW]	244
Seasonal space heating energy efficiency	$\eta_s$	[%]	136,2
<b>Declared capacity for heating for part load at indoor temperature 20 °C and outdoor temperature Tj</b>			
Declared capacity for heating with outdoor temperature Tj = - 7 °C	Pdh	[kW]	158
Declared capacity for heating with outdoor temperature Tj = +2 °C	Pdh	[kW]	110
Declared capacity for heating with outdoor temperature Tj = +7 °C	Pdh	[kW]	70,8
Declared capacity for heating with outdoor temperature Tj = +12 °C	Pdh	[kW]	79,1
Declared capacity for heating with outdoor temperature Tj = Bivalent temperature	Pdh	[kW]	165
Declared capacity for heating with outdoor temperature Tj = Operation limit temperature	Pdh	[kW]	140
For air-to-water heat pumps: Tj = - 15 °C (if TOL < - 20 °C)	Pdh	[kW]	-
Bivalent temperature	Tbiv	[°C]	-5,0
Degradation coefficient	Cdh	-	0,25
<b>Declared coefficient of performance or primary energy ratio for part load at indoor temperature 20 °C and outdoor temperature Tj</b>			
Declared coefficient of performance with outdoor temperature Tj = - 7 °C	COPd	-	2,62
Declared coefficient of performance with outdoor temperature Tj = +2 °C	COPd	-	3,98
Declared coefficient of performance with outdoor temperature Tj = +7 °C	COPd	-	3,89
Declared coefficient of performance with outdoor temperature Tj = +12 °C	COPd	-	4,34
Declared coefficient of performance with outdoor temperature Tj = Bivalent temperature	COPd	-	2,71
Declared coefficient of performance with outdoor temperature Tj = Operation limit temperature	COPd	-	2,40
For air-to-water heat pumps: Tj = - 15 °C (if TOL < - 20 °C)	COPd	-	-
For air-to-water HP : Operation limit temperature	TOL	[°C]	-10
<b>Power consumption in modes other than active mode</b>			
Off mode	POFF	[kW]	0,000
Thermostat-off mode	PTO	[kW]	0,868
Standby mode	PSB	[kW]	0,670
Crankcase heater mode	PCK	[kW]	0,670
<b>Supplementary heater</b>			
Back-up heating capacity	Psup	[kW]	64,5
Type of energy input			electric
<b>Other items</b>			
Capacity control	fixed/variable/staged		Staged
Sound power level, outdoors	LWA	[dB(A)]	94
Annual electricity consumption for heating	QHE	[kWh]	82225
GWP of the refrigerant		[Kg CO2eq]	2088
<b>Outdoor heat exchanger</b>			
For air-to-air HP: Rated air flow rate, outdoors	Qairsorce	[m³/h]	0
For water-/brine-to-air heat pumps: Rated brine or water flow rate, outdoor heat exchanger	Qwater/brine source	[m³/h]	-

Unit in standard configuration/execution, without optional accessories.

Contact details: Mitsubishi Electric Hydronics & IT Cooling Systems S.p.A., via Caduti di Cefalonia 1 - 36061 Bassano del Grappa (VI) - Italy

WSM AR A904			
Air-to-air heat pump	yes / no		yes
Water-to-air heat pump	yes / no		no
Brine-to-air heat pump	yes / no		no
With supplementary heater:	yes / no		no
Air flow rate	fixed / variable		fixed
Parameters are declared for average/warmer/colder climate conditions (1)	average / warmer / colder		average
Nominal heating capacity	Prated	[kW]	275
Seasonal space heating energy efficiency	$\eta_s$	[%]	130,2
<b>Declared capacity for heating for part load at indoor temperature 20 °C and outdoor temperature Tj</b>			
Declared capacity for heating with outdoor temperature Tj = - 7 °C	Pdh	[kW]	179
Declared capacity for heating with outdoor temperature Tj = +2 °C	Pdh	[kW]	125
Declared capacity for heating with outdoor temperature Tj = +7 °C	Pdh	[kW]	80,2
Declared capacity for heating with outdoor temperature Tj = +12 °C	Pdh	[kW]	73,0
Declared capacity for heating with outdoor temperature Tj = Bivalent temperature	Pdh	[kW]	187
Declared capacity for heating with outdoor temperature Tj = Operation limit temperature	Pdh	[kW]	159
For air-to-water heat pumps: Tj = - 15 °C (if TOL < - 20 °C)	Pdh	[kW]	-
Bivalent temperature	Tbiv	[°C]	-5,0
Degradation coefficient	Cdh	-	0,25
<b>Declared coefficient of performance or primary energy ratio for part load at indoor temperature 20 °C and outdoor temperature Tj</b>			
Declared coefficient of performance with outdoor temperature Tj = - 7 °C	COPd	-	2,53
Declared coefficient of performance with outdoor temperature Tj = +2 °C	COPd	-	3,49
Declared coefficient of performance with outdoor temperature Tj = +7 °C	COPd	-	4,05
Declared coefficient of performance with outdoor temperature Tj = +12 °C	COPd	-	4,41
Declared coefficient of performance with outdoor temperature Tj = Bivalent temperature	COPd	-	2,61
Declared coefficient of performance with outdoor temperature Tj = Operation limit temperature	COPd	-	2,34
For air-to-water heat pumps: Tj = - 15 °C (if TOL < - 20 °C)	COPd	-	-
For air-to-water HP : Operation limit temperature	TOL	[°C]	-10
<b>Power consumption in modes other than active mode</b>			
Off mode	POFF	[kW]	0,000
Thermostat-off mode	PTO	[kW]	0,909
Standby mode	PSB	[kW]	0,656
Crankcase heater mode	PCK	[kW]	0,656
<b>Supplementary heater</b>			
Back-up heating capacity	Psup	[kW]	72,9
Type of energy input			electric
<b>Other items</b>			
Capacity control	fixed/variable/staged		Staged
Sound power level, outdoors	LWA	[dB(A)]	97
Annual electricity consumption for heating	QHE	[kWh]	97373
GWP of the refrigerant		[Kg CO2eq]	2088
<b>Outdoor heat exchanger</b>			
For air-to-air HP: Rated air flow rate, outdoors	Qairsorce	[m³/h]	0
For water-/brine-to-air heat pumps: Rated brine or water flow rate, outdoor heat exchanger	Qwater/brine source	[m³/h]	-

Unit in standard configuration/execution, without optional accessories.

Contact details: Mitsubishi Electric Hydronics & IT Cooling Systems S.p.A., via Caduti di Cefalonia 1 - 36061 Bassano del Grappa (VI) - Italy

ENGLISH	ITALIANO	FRANCAISE	DEUTSCH	ESPAÑOL
Air-to-air heat pump	Pompa di calore aria/aria	Pompe à chaleur air-air	Luft-Luft-Wärmepumpe	Bomba de calor aire-aire
Water-to-air heat pump	Pompa di calore acqua/aria	Pompe à chaleur eau-air	Wasser-Luft-Wärmepumpe	Bomba de calor agua-aire
Brine-to-air heat pump	Pompa di calore salamoia/aria	Pompe à chaleur eau glycolée-air	Sole-Luft-Wärmepumpe	Bomba de calor salmuera-aire
With supplementary heater:	Con riscaldatore supplementare:	Équipée d'un dispositif de chauffage d'appoint:	Mit Zusatzheizgerät:	Equipado con un calefactor complementario:
Air flow rate	Portata Aria	Débit d'air	Luftdurchsatz	Caudal de aire
Parameters are declared for average/warmer/colder climate conditions	I parametri sono dichiarati per condizioni climatiche medie/ alte/ basse	Les paramètres sont déclarés pour les conditions climatiques moyennes/chaud/basse	Die Parameter sind für eine Mitteltemperaturanwendung anzugeben	Los parámetros se indicarán para condiciones climáticas medias/ alta/ baja
Nominal heating capacity	Potenza termica nominale	Puissance thermique nominale	Heizleistung nominal	Potencia térmica nominal
Seasonal space heating energy efficiency	Efficienza energetica stagionale del riscaldamento d'ambiente	Efficacité énergétique saisonnière pour le chauffage des locaux	Jahreszeitbedingte Raumheizungs-Energieeffizienz	Eficiencia energética estacional de calefacción
<b>Declared capacity for heating for part load at indoor temperature 20 °C and outdoor temperature Tj</b>	<b>Capacità di riscaldamento dichiarata a carico parziale, con temperatura interna pari a 20 °C e temperatura esterna Tj</b>	<b>Puissance calorifique déclarée à charge partielle pour une température intérieure de 20 °C et une température extérieure Tj</b>	<b>Angegebene Leistung für Teillast bei Raumlufttemperatur 20 °C und Außenlufttemperatur Tj</b>	<b>Capacidad de calefacción declarada para una carga parcial a una temperatura interior de 20 °C y una temperatura exterior Tj</b>
Declared capacity for heating with outdoor temperature Tj = - 7 °C	Capacità di riscaldamento con temperatura esterna Tj = - 7 °C	Puissance calorifique déclarée avec la température extérieure Tj = - 7 °C	Erklärt, Raumheizung mit Außenlufttemperatur Tj = - 7 °C	Capacidad de calefacción para una temperatura exterior Tj = - 7 °C
Declared capacity for heating with outdoor temperature Tj = +2 °C	Capacità di riscaldamento con temperatura esterna Tj = + 2 °C	Puissance calorifique déclarée avec la température extérieure Tj = +2 °C	Erklärt, Raumheizung mit Außenlufttemperatur Tj = +2 °C	Capacidad de calefacción para una temperatura exterior Tj = +2 °C
Declared capacity for heating with outdoor temperature Tj = +7 °C	Capacità di riscaldamento con temperatura esterna Tj = + 7 °C	Puissance calorifique déclarée avec la température extérieure Tj = +7 °C	Erklärt, Raumheizung mit Außenlufttemperatur Tj = +7 °C	Capacidad de calefacción para una temperatura exterior Tj = +7 °C
Declared capacity for heating with outdoor temperature Tj = +12 °C	Capacità di riscaldamento con temperatura esterna Tj = + 12 °C	Puissance calorifique déclarée avec la température extérieure Tj = +12 °C	Erklärt, Raumheizung mit Außenlufttemperatur Tj = +12 °C	Capacidad de calefacción para una temperatura exterior Tj = +12 °C
Declared capacity for heating with outdoor temperature Tj = Bivalent temperature	Capacità di riscaldamento con temperatura esterna Tj = temperatura bivalente	Puissance calorifique déclarée avec la température extérieure Tj = Température bivalente	Erklärt, Raumheizung mit Außenlufttemperatur Tj = Bivalenttemperatur	Capacidad de calefacción para una temperatura exterior Tj = Temperatura bivalente
Declared capacity for heating with outdoor temperature Tj = Operation limit temperature	Capacità di riscaldamento con temperatura esterna Tj = temperatura limite di esercizio	Puissance calorifique déclarée avec la température extérieure Tj = Température maximale de service	Erklärt, Raumheizung mit Außenlufttemperatur Tj = Betriebsgrenzwert-Temperatur	Capacidad de calefacción para una temperatura exterior Tj = Temperatura límite de funcionamiento
For air-to-water heat pumps: Tj = - 15 °C (if TOL < - 20 °C)	Per le pompe di calore aria/acqua: Tj = - 15 °C (se TOL < - 20 °C)	Pour les pompes à chaleur air-eau: Tj = - 15 °C (si TOL < - 20 °C)	Für Luft-Wasser-Wärmepumpen: Tj = - 15 °C (wenn TOL < - 20 °C)	Para bombas de calor aire-agua: Tj = - 15 °C (si TOL < - 20 °C)
Bivalent temperature	Temperatura bivalente	Température bivalente	Bivalenttemperatur	Temperatura bivalente
Degradation coefficient	Coefficiente di degradazione	Coefficient de dégradation	Minderungsfaktor	Coefficiente de degradación
<b>Declared coefficient of performance or primary energy ratio for part load at indoor temperature 20 °C and outdoor temperature Tj</b>	<b>Coefficiente di prestazione dichiarato o indice di energia primaria per carico parziale, con temperatura interna pari a 20 °C e temperatura esterna Tj</b>	<b>Coefficient de performance déclaré ou coefficient sur énergie primaire déclaré à charge partielle pour une température intérieure de 20 °C et une température extérieure Tj</b>	<b>Angegebene Leistungszahl oder Heizzahl für Teillast bei Raumlufttemperatur 20 °C und Außenlufttemperatur Tj</b>	<b>Coefficiente de rendimiento declarado o factor energético primario para una carga parcial a una temperatura interior de 20 °C y una temperatura exterior Tj</b>
Declared coefficient of performance with outdoor temperature Tj = - 7 °C	Coefficiente di prestazione con temperatura esterna Tj = - 7 °C	Coefficient de performance déclaré avec la température extérieure Tj = - 7 °C	Erklärten Leistungszahl bei Außenlufttemperatur Tj = - 7 °C	Capacidad de calefacción para una temperatura exterior Tj = - 7 °C
Declared coefficient of performance with outdoor temperature Tj = +2 °C	Coefficiente di prestazione con temperatura esterna Tj = + 2 °C	Coefficient de performance déclaré avec la température extérieure Tj = +2 °C	Erklärten Leistungszahl bei Außenlufttemperatur Tj = +2 °C	Capacidad de calefacción para una temperatura exterior Tj = +2 °C
Declared coefficient of performance with outdoor temperature Tj = +7 °C	Coefficiente di prestazione con temperatura esterna Tj = + 7 °C	Coefficient de performance déclaré avec la température extérieure Tj = +7 °C	Erklärten Leistungszahl bei Außenlufttemperatur Tj = +7 °C	Capacidad de calefacción para una temperatura exterior Tj = +7 °C
Declared coefficient of performance with outdoor temperature Tj = +12 °C	Coefficiente di prestazione con temperatura esterna Tj = + 12 °C	Coefficient de performance déclaré avec la température extérieure Tj = +12 °C	Erklärten Leistungszahl bei Außenlufttemperatur Tj = +12 °C	Capacidad de calefacción para una temperatura exterior Tj = +12 °C
Declared coefficient of performance with outdoor temperature Tj = Bivalent temperature	Coefficiente di prestazione con temperatura esterna Tj = temperatura bivalente	Coefficient de performance déclaré avec la température extérieure Tj = Température bivalente	Erklärten Leistungszahl bei Außenlufttemperatur Tj = Bivalenttemperatur	Capacidad de calefacción para una temperatura exterior Tj = Temperatura bivalente
Declared coefficient of performance with outdoor temperature Tj = Operation limit temperature	Coefficiente di prestazione con temperatura esterna Tj = temperatura limite di esercizio	Coefficient de performance déclaré avec la température extérieure Tj = Température maximale de service	Erklärten Leistungszahl bei Außenlufttemperatur Tj = Betriebsgrenzwert-Temperatur	Capacidad de calefacción para una temperatura exterior Tj = Temperatura límite de funcionamiento
For air-to-water heat pumps: Tj = - 15 °C (if TOL < - 20 °C)	Per le pompe di calore aria/acqua: Tj = - 15 °C (se TOL < - 20 °C)	Pour les pompes à chaleur air-eau: Tj = - 15 °C (si TOL < - 20 °C)	Für Luft-Wasser-Wärmepumpen: Tj = - 15 °C (wenn TOL < - 20 °C)	Para bombas de calor aire-agua: Tj = - 15 °C (si TOL < - 20 °C)

ENGLISH	ITALIANO	FRANCAISE	DEUTSCH	ESPAÑOL
For air-to-water HP : Operation	Per le pompe di calore aria/	Pour les pompes à chaleur	Für Luft-Wasser-Wärmepumpen:	Para bombas de calor aire-agua:
<b>Power consumption in modes other than active mode</b>	<b>Consumo energetico in modi diversi dal modo attivo</b>	<b>Consommation d'électricité dans les modes autres que le mode actif</b>	<b>Stromverbrauch in anderen Betriebsarten als dem Betriebszustand</b>	<b>Consumo de electricidad en modos distintos del activo</b>
Off mode	Modo spento	Mode arrêt	Aus-Zustand	Modo desactivado
Thermostat-off mode	Modo termostato spento	Mode arrêt par thermostat	Thermostat-aus-Zustand	Modo desactivado por termostato
Standby mode	Modo stand-by	Mode veille	Bereitschaftszustand	Modo de espera
Crankcase heater mode	Modo riscaldamento del carter	Mode résistance de carter active	Betriebszustand mit Kurbelgehäuseheizung	Modo riscaldamento del carter
<b>Supplementary heater</b>	<b>Riscaldatore supplementare</b>	<b>Dispositif de chauffage d'appoint</b>	<b>Zusatzheizgerät</b>	<b>Calefactor complementario</b>
Back-up heating capacity	Potenza termica backup	Puissance calorifique du dispositif de chauffage d'appoint	Reserveheizleistung	Potencia de calefacción de reserva
Type of energy input	Tipo di input energia	Type d'énergie utilisée	Art der Energiezufuhr	Tipo de energía consumida
<b>Other items</b>	<b>Altri elementi</b>	<b>Autres caractéristiques</b>	<b>Sonstige Elemente</b>	<b>Otros elementos</b>
Capacity control	Controllo della capacità	Régulation de la puissance	Leistungssteuerung	Control de capacidad
Sound power level, outdoors	Livello della potenza sonora, all'esterno	Niveau de puissance acoustique, à l'extérieur	Schalleistungspegel, außen	Nivel de potencia acústica (exterior)
Annual electricity consumption for heating	Consumo di elettricità annuale per il riscaldamento	Consommation annuelle d'électricité pour le chauffage	Jahresstromverbrauch für die Heizung	Consumo anual de electricidad para la calefacción
GWP of the refrigerant	GWP del refrigerante	PRP du fluide frigorigène	Treibhausgaspotenzial des Kältemittels	PCA del refrigerante
<b>Outdoor heat exchanger</b>	<b>Scambiatore di calore esterno</b>	<b>Echangeur de chaleur côté extérieur</b>	<b>Wärmetauscher außen</b>	<b>Intercambiador de calor de exterior</b>
For air-to-air HP: Rated air flow rate, outdoors	Per le pompe di calore aria/aria: portata d'aria, all'esterno	Pour les pompes à chaleur air-air: débit d'air, mesuré à l'extérieur	Für Luft-Luft- Wärmepumpen: Luftdurchsatz, außen gemessen	Bombas de calor aire- aire: caudal de aire (exterior)
For water-/brine-to-air heat pumps: Rated brine or water flow rate, outdoor heat exchanger	Per le pompe di calore acqua/aria e salamoia/aria: flusso di salamoia o acqua nominale, scambiatore di calore all'esterno	Pour les pompes à chaleur eau/eau glycolée-air: débit nominal d'eau glycolée ou d'eau, échangeur de chaleur côté extérieur	Für Wasser/Sole-Luft-Wärmepumpen: Wasser- oder Sole- Nenndurchsatz, Wärmetauscher außen	Para bombas de calor agua-aire/salmuera- aire: caudal nominal de salmuera o agua, intercambiador de calor de exterior
Notes:	Note:	Remarques:	Hinweise:	Notas:
The parameters are declared for application at medium temperature, except in the case of low temperature heat pumps. For low temperature heat pumps, the parameters are declared for application at low temperature.	I parametri sono dichiarati per l'applicazione a temperatura media, tranne per le pompe di calore a bassa temperatura. Per le pompe di calore a bassa temperatura, i parametri sono dichiarati per l'applicazione a bassa temperatura.	Les paramètres sont déclarés pour l'application à moyenne température, excepté pour les pompes à chaleur basse température. Pour les pompes à chaleur basse température, les paramètres sont déclarés pour l'application à basse température.	Die Parameter sind für eine Mitteltemperaturanwendung anzugeben, außer für Niedertemperatur-Wärmepumpen. Für Niedertemperatur-Wärmepumpen sind die Parameter für eine Niedertemperaturanwendung anzugeben.	Los parámetros se declararán para aplicaciones de media temperatura, excepto si se trata de bombas de calor de baja temperatura. En el caso de las bombas de calor de baja temperatura, los parámetros se declararán para aplicaciones de baja temperatura.
Unit in standard configuration/execution, without optional accessories.	Unità in configurazione ed esecuzione standard, priva di accessori opzionali.	Unité en configuration et exécution standard, sans accessoires optionnels.	Gerät mit Standard-Konfiguration und -Ausführung, ohne wunschweises Zubehör.	Unidad en configuración y ejecución estándar, sin accesorios opcionales.



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.



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

Head Office: Via Caduti di Cefalonia 1 - 36061 Bassano del Grappa (VI) - Italy

Tel (+39) 0424 509 500 - Fax (+39) 0424 509 509

[www.climaveneta.com](http://www.climaveneta.com)

[www.melcohit.com](http://www.melcohit.com)