

# PAS Kp

**AIR COOLED HEAT PUMPS FOR OUTDOOR INSTALLATION**  
WITH SEMIHERMETIC RECIPROCATED COMPRESSORS AND AXIAL FANS

Cooling capacity from 36 kW to 290 kW



R290



AIR



AC

EC



ERP 2021

## VERSIONS

**PAS Kp** - standard version

The packaged air cooled heatpumps of PAS Kp series are suitable for outdoor installation and can be used to cool pure fluid solutions for industrial applications or in air conditioning systems of the service industry, where it is necessary to grant excellent performances and a very low environmental impact.

The refrigerant used is Propane, a non-toxic hydrocarbon, even at high concentrations, with almost a null ozone depletion potential, negligible global warming potential and thermodynamic properties which allow to reach high efficiency values.

For this reason the units are designed for external installation, in compliance with the European standard EN 378 and his updates.

Depending on the required heating capacity, the units are available in mono or multi compressor with 1 or 2 independent cooling circuits.

Thanks to the many available options, these units are particularly versatile and are easily adaptable to the different types of plant, where production of chilled water is required.

All the units are completely factory assembled, tested and supplied with refrigerant non-freezing oil charge; so, once on installation site, they only need to be positioned and connected to the hydraulic and power supply lines.

Units CE certified in compliance with the European regulation 813/2013, to working conditions 30/35°C on the user side.

# MAIN COMPONENTS

## FRAME

Strong and compact structure, made of base and frame with high-thickness galvanized steel elements assembled with stainless steel rivets. All galvanized steel surfaces externally positioned are superficially coated by an oven powder-painting with colour RAL7035. The technical section which contains compressors and the other cooling circuit elements, except the condensing part, is closed in a cabinet; if a refrigerant leak occurs the technical vane is automatically airy using an external axial fan which is able to clean all the air inside the cabinet 4 time/minute.

To reduce the sound level it is possible to insulate the technical section with a sound and fire proof standard thickness material or higher thickness material (CFU option).

## COMPRESSORS

Semi hermetic alternative type optimized to operate with the hydrocarbons and realized in compliance with the safety regulation in force. The electrical motor, arranged for starts with low inrush current (PW option), is equipped with thermal protection module (installed in the electrical cabinet); the lubricating system, of forced type, is equipped with oil filters and check valves to survey the lubricating pressure and is made through a high pressure pump. Each compressor is installed on rubber type vibration dampers and is provided with switch-off valve on suction and discharge side, electronic differential pressure switch for the oil level control, crankcase heater and temperature probe on discharge side to control the compressor's discharge temperature. If the compressors are installed in "tandem" version each one is equipped with oil level sensor and oil recuperator; this device activates automatically when in one compressor the lubricant level goes down then minimum value.

## USER SIDE EXCHANGER

Stainless steel plates type mono or bi circuits, thermally insulated using a flexible closed cells mattress of high thickness. Is also provided with a safety differential pressure switch which does not allows the unit operation in case of water flow lack or reduction.

## COILS

The external heat exchanger coils are made of micro-finned copper pipes placed in asymmetrical rows and mechanically expanded in an aluminium frame. The aluminium fin is supplied with standard hydrophilic treatment and is designed in order to ensure maximum heat exchange efficiency. The defrosting of the hot-gas finned exchangers is pressure-controlled.

## FANS

6 poles axial fans with electrical motor and external rotor directly coupled to the impeller; aluminium blades with wings profile are suitably designed to avoid any turbulence in the iar detachment zone, granting in this way the maximum efficiency with the minimum noise level. The fan is equipped with a galvanized steel protection grid painted after the construction; the fan motors are of totally closed type and have got a protection factor IP54 and winding-flooded protection thermostat.

## REGENERATIVE EXCHANGER

Heat regenerative exchanger gas/fluid of plates type, installed on each circuit to grant a suitable overheating value to the compressor sucked gas and at the same time to increase the cooling circuit efficiency thanks to higher sub-cooling of condensing coil leaving fluid. Insulated thermally using a close cells mattress of great thickness.

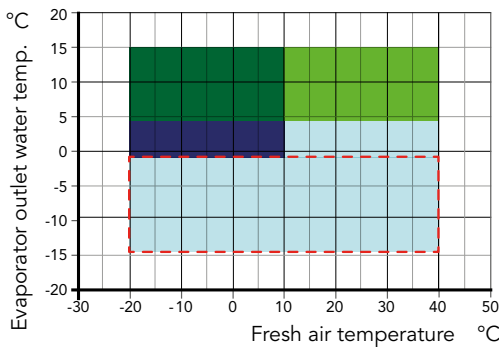
## COOLING CIRCUIT

Independent cooling circuits, each provided with a shut-off valve for refrigerant charge, antifreeze probe, sight glass, dehydrating filter for R290 with wide filtering surface, high pressure side safety valve equipped with connector to the discharge refrigerant conveying piping, electronic thermostatic valve (for 1001, 2402 and bigger frames), pressure switches and high/low pressure gauges for R290 specifically. All the units are equipped with a leak sensor which is able to turn off the compressors and turn on the extraction fan in case of a refrigerant leak occurs.

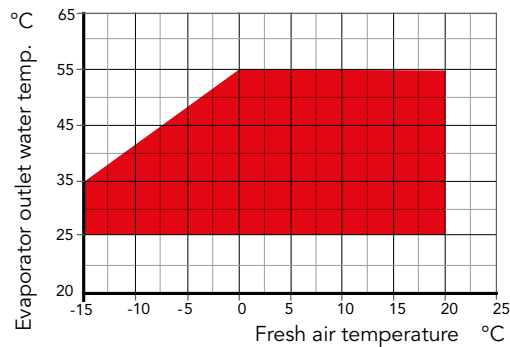
## ELECTRICAL BOARD

Built in compliance with 61439-1 standards, inside of which all the control system elements and the ones required for electrical motors starting and protection are located, all the components are factory connected and testes. The electrical cabinet has got a watertight structure, equipped with cable glands with protection factor of IP54. Besides the electrical cabinet contains all the power and control devices, microprocessor electronic board complete with keyboard and display for visualizing several function available, main switch of lock-door type, isolation transformer for auxiliary circuits, automatic switches, fuses and protection switches for compressors and fans motors, terminals for general alarm and unit remote ON/OFF, spring type terminal board and the possibility to interface to BMS system.

# OPERATING RANGE



- Cooling mode with cond. press. contr.
- Cooling mode
- Cooling mode with cond. press. contr. and glycol (Only VB versions)



- Cooling mode with glycol (Only VB versions)
- Brine version, cooling mode
- Heating mode

## ACCESSORIES

PAS Kp

PAS Kp		451	521	651	731	881	1001	1201
Amperometer + Voltmeter	A+V	o	o	o	o	o	o	o
Electrical power supply different than standard	AE	□	□	□	□	□	□	□
Operation in cooling mode down to -20°C	BF	o	o	o	o	o	o	o
Operation in cooling mode down to -10°C	BT	●	●	●	●	●	●	●
Soundproofed compressors cabinet with higher thickness material	CFU	o	o	o	o	o	o	o
Compressors inrush counter	CS	o	o	o	o	o	o	o
Refrigerant leakage detector	DR	●	●	●	●	●	●	●
Axial fans with electronic commutated motor	EC	o	o	o	o	o	o	o
Anticorrosive electro coating protection of condensing coils	ECP	--	--	--	--	--	--	--
Condensing coil protection grid	GP	o	o	o	o	o	o	o
High pressure double safety valve	HRV2	o	o	o	o	o	o	o
Victaulic insulation on pump side	I1	o	o	o	o	o	o	o
Victaulic insulation buffer tank side	I2	--	--	--	--	--	--	--
RS 485 Serial interface	IH	o	o	o	o	o	o	o
BACNET Protocol serial interface	IH-BAC	o	o	o	o	o	o	o
TCP/IP Protocol serial interface	IWG	o	o	o	o	o	o	o
Phase monitor	MF	o	o	o	o	o	o	o
MP advanced control for MSC - up to n.2 units	MP ADV	o	o	o	o	o	o	o
Up to two units	MS	o	o	o	o	o	o	o
Advanced Cascade system - up to n.6 units	MSC	o	o	o	o	o	o	o
Remote monitoring for units in cascade	MSHWEV	o	o	o	o	o	o	o
Pressure gauges	MT	●	●	●	●	●	●	●
Buffer tank module	MV	--	--	--	--	--	--	--
Pump group	P1	o	o	o	o	o	o	o
Higher available pressure pump group	P1H	o	o	o	o	o	o	o
Double pump group	P2	o	o	o	o	o	o	o
Higher available pressure double pump group	P2H	o	o	o	o	o	o	o
Rubber-type vibration dampers	PA	◇	◇	◇	◇	◇	◇	◇
Anti-corrosive protection of the condensing coils	PCP	--	--	--	--	--	--	--
Spring-type vibration dampers	PM	◇	◇	◇	◇	◇	◇	◇
Remote display	PQ	◇	◇	◇	◇	◇	◇	◇
Part-Winding	PW	o	o	o	o	o	o	o
Nordic option for electric panel (in/out covers for grilles + 15W/m electric heater)	QN	o	o	o	o	o	o	o
Anti-freeze heater on evaporator	RA	o	o	o	o	o	o	o
Shut-off valve on compressors discharge side	RD	●	●	●	●	●	●	●
Power factor correction system cosφ ≥ 0,9	RF	o	o	o	o	o	o	o
Shut-off valve on compressors suction side	RH	●	●	●	●	●	●	●
Compressor overload relays	RL	o	o	o	o	o	o	o
Condensing coil with pre-painted fins	RM	o	o	o	o	o	o	o
Partial heat recovery	RP	o	o	o	o	o	o	o
Copper/Copper coil	RR	o	o	o	o	o	o	o
Metal door for display	SPX	o	o	o	o	o	o	o
Personalized frame painting	RV	□	□	□	□	□	□	□
Double layer treatment of the coil	TDS	o	o	o	o	o	o	o
Electronic thermostatic valve	TE	o	o	o	o	o	o	●
Brine Version	VB	o	o	o	o	o	o	o
Periodic fans running during stand-by (1min/h)	VMA	--	--	--	--	--	--	--
Inverter on compressor	VSC	o	o	o	o	o	o	o
Inverter for pump	VSP1	o	o	o	o	o	o	o
High pressure inverter for pump	VSP1H	o	o	o	o	o	o	o
Inverter for parallel pumps (only one running)	VSP2	o	o	o	o	o	o	o
High pressure inverter for parallel pumps (only one running)	VSP2H	o	o	o	o	o	o	o
Hiweb	XW	o	o	o	o	o	o	o

● Standard, o Optional, ◇ Optional (external kit)-- Not available, □ Contact sales department

PAS Kp		1502	1702	2102	2502	2902	3402
Amperometer + Voltmeter	A+V	o	o	o	o	o	o
Electrical power supply different than standard	AE	□	□	□	□	□	□
Operation in cooling mode down to -20°C	BF	o	o	o	o	o	o
Operation in cooling mode down to -10°C	BT	●	●	●	●	●	●
Soundproofed compressors cabinet with higher thickness material	CFU	o	o	o	o	o	o
Compressors inrush counter	CS	o	o	o	o	o	o
Refrigerant leakage detector	DR	●	●	●	●	●	●
Axial fans with electronic commutated motor	EC	o	o	o	o	o	o
Anticorrosive electro coating protection of condensing coils	ECP	--	--	--	--	--	--
Condensing coil protection grid	GP	o	o	o	o	o	o
High pressure double safety valve	HRV2	o	o	o	o	o	o
Victaulic insulation on pump side	I1	o	o	o	o	o	o
Victaulic insulation buffer tank side	I2	--	--	--	--	--	--
RS 485 Serial interface	IH	o	o	o	o	o	o
BACNET Protocol serial interface	IH-BAC	o	o	o	o	o	o
TCP/IP Protocol serial interface	IWG	o	o	o	o	o	o
Phase monitor	MF	o	o	o	o	o	o
MP advanced control for MSC - up to n.2 units	MP ADV	o	o	o	o	o	o
Up to two units	MS	o	o	o	o	o	o
Advanced Cascade system - up to n.6 units	MSC	o	o	o	o	o	o
Remote monitoring for units in cascade	MSHWEV	o	o	o	o	o	o
Pressure gauges	MT	●	●	●	●	●	●
Buffer tank module	MV	--	--	--	--	--	--
Pump group	P1	o	o	o	o	o	o
Higher available pressure pump group	P1H	o	o	o	o	o	o
Double pump group	P2	o	o	o	o	o	o
Higher available pressure double pump group	P2H	o	o	o	o	o	o
Rubber-type vibration dampers	PA	◇	◇	◇	◇	◇	◇
Anti-corrosive protection of the condensing coils	PCP	--	--	--	--	--	--
Spring-type vibration dampers	PM	◇	◇	◇	◇	◇	◇
Remote display	PQ	◇	◇	◇	◇	◇	◇
Part-Winding	PW	o	o	o	o	o	o
Nordic option for electric panel (in/out covers for grilles + 15W/m electric heater)	QN	o	o	o	o	o	o
Anti-freeze heater on evaporator	RA	o	o	o	o	o	o
Shut-off valve on compressors discharge side	RD	●	●	●	●	●	●
Power factor correction system cosφi ≥0,9	RF	o	o	o	o	o	o
Shut-off valve on compressors suction side	RH	●	●	●	●	●	●
Compressor overload relays	RL	o	o	o	o	o	o
Condensing coil with pre-painted fins	RM	o	o	o	o	o	o
Partial heat recovery	RP	o	o	o	o	o	o
Copper/Copper coil	RR	o	o	o	o	o	o
Metal door for display	SPX	o	o	o	o	o	o
Personalized frame painting	RV	□	□	□	□	□	□
Double layer treatment of the coil	TDS	o	o	o	o	o	o
Electronic thermostatic valve	TE	o	o	o	●	●	●
Brine Version	VB	o	o	o	o	o	o
Periodic fans running during stand-by (1min/h)	VMA	--	--	--	--	--	--
Inverter on compressor	VSC	o	o	o	o	o	o
Inverter for pump	VSP1	o	o	o	o	o	o
High pressure inverter for pump	VSP1H	o	o	o	o	o	o
Inverter for parallel pumps (only one running)	VSP2	o	o	o	o	o	o
High pressure inverter for parallel pumps (only one running)	VSP2H	o	o	o	o	o	o
Hiweb	XW	o	o	o	o	o	o

● Standard, o Optional, ◇ Optional (external kit)-- Not available, □ Contact sales department

## TECHNICAL DATA

PAS Kp		451	521	651	731	881	1001	1201
Cooling capacity	kW	36,6	44,9	53,9	61,0	76,4	90,9	104,3
Total input power	kW	12,5	14,4	16,4	19,1	24,0	29,3	35,4
Nominal input current	A	25,9	27,8	34,0	37,0	42,8	52,0	63,8
EER		2,94	3,12	3,28	3,19	3,18	3,10	2,94
Circuits	n°	1	1	1	1	1	1	1
Compressors	n°	1	1	1	1	1	1	1
<b>Refrigerant R290</b>								
Refrigerant charge	kg	5,5	6,5	9,5	9,5	10	13	13
Global warming potential (GWP)	-	0,02	0,02	0,02	0,02	0,02	0,02	0,02
Equivalent CO <sub>2</sub> charge	kg	0,11	0,13	0,19	0,19	0,2	0,26	0,26
<b>Axial fans <sup>(1)</sup></b>								
Quantity	n°	1	1	2	2	2	2	2
Total air flow	m <sup>3</sup> /h	21620	20920	10460	10460	21560	20850	20850
Total power input	kW	1,9	1,9	3,8	3,8	3,8	3,8	3,8
Total input current	A	3,9	3,9	7,8	7,8	7,8	7,8	7,8
<b>Evaporator <sup>(2)</sup></b>								
Quantity	n°	1	1	1	1	1	1	1
Water flow	m <sup>3</sup> /h	6,3	7,7	9,3	10,5	13,1	15,6	17,9
Pressure drop	kPa	35	47	28	35	17	23	29
<b>Heat pump mode <sup>(3)</sup></b>								
Nominal heating capacity	kW	43,0	50,7	61,1	69,4	84,8	103,3	119,5
Total input power	kW	13,1	15,0	16,6	19,1	24,0	29,3	34,4
Total nominal current	A	26,9	28,9	34,7	37,5	43,0	52,3	62,5
SCOP	-	3,28	3,27	3,56	3,47	3,37	3,45	3,35
COP	-	3,28	3,38	3,69	3,63	3,54	3,53	3,48
<b>Weight</b>								
Transport weight	kg	882	946	1258	1280	1350	1416	1466
Operating weight	kg	884	948	1262	1284	1356	1422	1472
<b>Dimensions</b>								
Length	mm	1660	1660	2590	2590	2590	2590	2590
Width	mm	1370	1370	1370	1370	1370	1370	1370
Height	mm	2420	2420	2420	2420	2420	2420	2420
<b>Sound data</b>								
Total LWA <sup>(4)</sup>	dB(A)	84,3	84,6	84,8	88,6	91,0	93,2	93,2
Total SPL 10m <sup>(5)</sup>	dB(A)	52,4	52,7	52,9	56,6	59,0	61,2	61,2
<b>Power supply</b>								
Voltage/phase/frequency	V/ph/Hz	400/3/50+N+PE	400/3/50+N+PE	400/3/50+N+PE	400/3/50+N+PE	400/3/50+N+PE	400/3/50+N+PE	400/3/50+N+PE
<b>General electrical data</b>								
Maximum input power	[kW]	16,9	17,8	21,2	25,2	29,9	37,9	45,9
Maximum input current	[A]	32,6	34,1	42,3	49,4	54,8	68,8	82,4
Inrush current	[A]	121	150	208	230	247	281	329

(1) Air temperature 35°C

(2) Fluid: water - in/out temperature: 12/7°C

(3) Air temperature 7°C, RH 87%, water 40/45°C

(4) Sound power level in accordance with ISO 3744.

(5) Sound pressure level at 10 mt from the unit in free field conditions in accordance with ISO 3744.

PAS Kp		1502	1702	2102	2502	2902	3402
Cooling capacity	kW	129,7	148,4	180,6	209,5	248,2	296,8
Total input power	kW	40,0	47,5	58,7	70,9	78,4	96,0
Nominal input current	A	74,8	83,6	104,0	128,2	145,5	169,8
EER		3,24	3,13	3,08	2,96	3,17	3,09
Circuits	n°	2	2	2	2	2	2
Compressors	n°	2	2	2	2	4	4
<b>Refrigerant R290</b>							
Refrigerant charge	kg	14,5	19,5	37,5	38	45	57
Global warming potential (GWP)	-	0,02	0,02	0,02	0,02	0,02	0,02
Equivalent CO <sub>2</sub> charge	kg	0,29	0,39	0,75	0,76	0,9	1,14
<b>Axial fans <sup>(1)</sup></b>							
Quantity	n°	3	3	4	4	5	5
Total air flow	m <sup>3</sup> /h	21570	20860	20850	20850	20850	25050
Total power input	kW	5,7	5,7	7,6	7,6	9,5	12,4
Total input current	A	11,7	11,7	15,6	15,6	19,5	25,8
<b>Evaporator <sup>(2)</sup></b>							
Quantity	n°	1	1	1	1	1	1
Water flow	m <sup>3</sup> /h	22,3	25,5	31,1	36,0	42,7	51,1
Pressure drop	kPa	15	19	27	24	32	26
<b>Heat pump mode <sup>(3)</sup></b>							
Nominal heating capacity	kW	142,2	168,0	209,3	239,8	280,1	333,8
Total input power	kW	38,7	46,2	58,8	68,0	76,7	94,2
Total nominal current	A	73,6	82,2	104,5	123,9	144,1	168,4
SCOP	-	3,30	3,25	3,29	3,29	3,38	3,27
COP	-	3,68	3,63	3,56	3,53	3,65	3,54
<b>Weight</b>							
Transport weight	kg	1798	1876	2246	2366	2918	3106
Operating weight	kg	1812	1890	2260	2388	2940	3138
<b>Dimensions</b>							
Length	mm	3630	3630	4990	4990	6030	6030
Width	mm	1370	1370	1370	1370	1370	1370
Height	mm	2420	2420	2420	2420	2420	2420
<b>Sound data</b>							
Total LWA <sup>(4)</sup>	dB(A)	93,7	93,7	95,2	95,2	95,2	95,5
Total SPL 10m <sup>(5)</sup>	dB(A)	61,6	61,6	63,0	63,0	62,9	63,1
<b>Power supply</b>							
Voltage/phase/frequency	V/ph/Hz	400/3/50+N+PE	400/3/50+N+PE	400/3/50+N+PE	400/3/50+N+PE	400/3/50+N+PE	400/3/50+N+PE
<b>General electrical data</b>							
Maximum input power	[kW]	53,8	57,8	75,8	91,8	106	116
Maximum input current	[A]	99,7	106	138	165	196	214
Inrush current	[A]	280	298	350	412	376	406

(1) Air temperature 35°C

(2) Fluid: water - in/out temperature: 12/7°C

(3) Air temperature 7°C, RH 87%, water 40/45°C

(4) Sound power level in accordance with ISO 3744.

(5) Sound pressure level at 10 mt from the unit in free field conditions in accordance with ISO 3744.