



## PRODUCT SELECTION DATA

### WATER-COOLED AND CONDENSERLESS LIQUID CHILLERS WATER-SOURCED HEAT PUMPS



30WG optimized for cooling  
61WG optimized for heating  
Compact design  
Plug and play approach  
High efficiency

## 61WG/30WG/30WGA-A

**AQUASNAP**

**AQUASNAP**  
Heating

Nominal cooling capacity 25-190 kW  
Nominal heating capacity 29-230 kW

The 30WG/30WGA and 61WG units are new Carrier chillers and heat pumps designed for commercial (offices, small hotels, leisure facilities), residential and industrial applications. All units offer a unique combination of high performance and functionality in an exceptionally compact chassis.

61WG units are designed for high-temperature heating applications with hot water production possible up to 65 °C.

The 30WG, also available as a condenserless version (30WGA), is designed for air-conditioning applications with a high SEER value. As they can produce chilled water down to -12 °C they are also suitable for process applications.

A large number of options is available for the whole range:

- hydraulic modules with or without variable water flow rate,
- reinforced sound insulation,
- stacking and connection of two units
- low-temperature applications down to -12 °C (30WG only).



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# CUSTOMER BENEFITS

## Features

- Reduced footprint
- Scroll compressors and R-410A refrigerant
- Variable-flow pump
- Low-noise option (-3 dB(A))
- Stacking of two units for increased capacity (up to size 090)
- Several communication protocols available: JBus, BacNet, MS/TP, LON
- Water connection at the top or rear (30WG/61WG only)

## Available versions

### 61WG - optimised for heating

- High temperature up to +65 °C
- Evaporator temperature down to -5 °C
- Control of the three-way diverter valve for domestic hot water and space heating requirements
- System approach - the Heating System Manager maximises the global efficiency of complex systems where the 61WG units are combined with an auxiliary heating source to serve multi-zone space heating and domestic hot water production.

### 30WG - optimised for air conditioning and process Heating & Cooling

- Evaporator temperature down to -12 °C
- Condenser temperature up to +60 °C
- Condensing pressure control devices available

### 30WGA - optimised for air conditioning

- Continuous operation up to 62 °C saturated condensing temperature
- Compatible remote condensers available
- Optimised remote condenser fan control

## The right unit for any application

- The high temperature of the 61WG units makes them compatible with most heating systems, both in new and refurbished buildings and permits domestic hot water production (with a dedicated temperature setpoint).
- Option 153 "Built-in DHW and space heating control" allows control of both domestic hot water and space heating requirements:
  - Domestic hot water production: a built-in three-way valve is directed to divert the heat flow from the space heating loop to the domestic hot water loop and vice versa.
  - Space heating control: the setpoint is adjustable, based on the daily schedule or the outside air temperature (weather compensation function).
  - Control of auxiliary systems: if an alarm is detected at the 61WG/30WG or if there is insufficient heating capacity, a digital signal starts an auxiliary electric heater (1 to 4 stages) or boiler.
  - Pump control: allows control of the built-in pump as well as the pump in the secondary loop (to terminals).
- In 30WG units the pressure control signal ensures safe unit operation and maximised performance at low source-side water temperatures.

- The condenserless 30WGA units are ideal for refurbishment projects where a remote condenser exists on site, and for all projects without geothermal/natural sinks for heat rejection.
- In 61WG/30WG units the Heating System Manager (HSM) accessory allows control of systems with several heat sources and different additional systems: electric heat, boiler or for the most complex systems district heating (see pages 9 to 11).

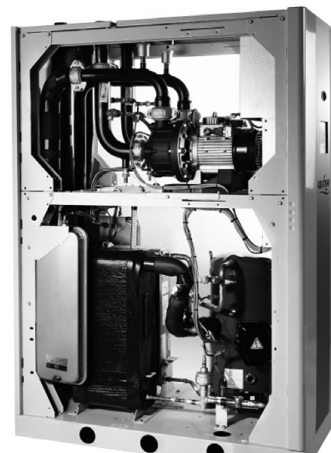
## Adaptability and simple installation

- The 30WG and 61WG units can be provided with several hydraulic module options, both on the evaporator and/or condenser side, with different levels of available pressure and variable or fixed-speed pumps (see page 7).
- If option 153 is selected domestic hot water production is controlled via a built-in three-way diverter valve (not supplied).
- 61WG and 30WG units offer water-side cooling/heating reversibility.
- Remote condenser fan control possible for 30WGA units.

## Water connections at the rear of the unit



## Internal view of 61WG unit with hydraulic module



## CUSTOMER BENEFITS

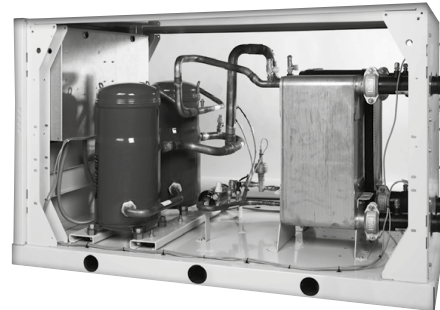
**Internal view of 30WG 170**



**Component accessibility**

See photos below.

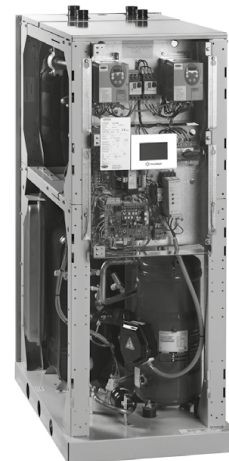
**Access to scroll compressors**



**Water connections at the top of the unit**



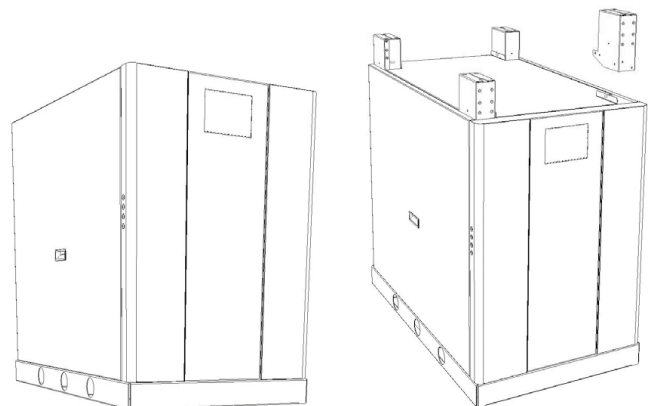
**Access to control panel**



### A compact high-performance product range

- Small footprint, ideal for refurbished buildings, allows access in very tight plant rooms.
- 61WG: High SCOP satisfies even the most stringent standards, with a leaving water temperature of up to 65 °C without supplementary system.
- 30WG: High SEER and SEPR
- Units optimized for process and comfort applications.
- The 30WGA is based on the 30WG design to ensure efficient operation for applications with remote air-cooled condensers.
- Variable-flow pumps reduce system energy consumption.
- The entire range offers low sound levels, allowing installation in any building type. The low-noise option ensures enhanced acoustic comfort (-3 dB(A)).
- 61WG/30WG/30WGA units are equipped with the latest generation R410A scroll compressor, optimised for typical operating conditions for water-sourced units.

### Two-unit stacking option for reduced footprint size 020-090



## CUSTOMER BENEFITS

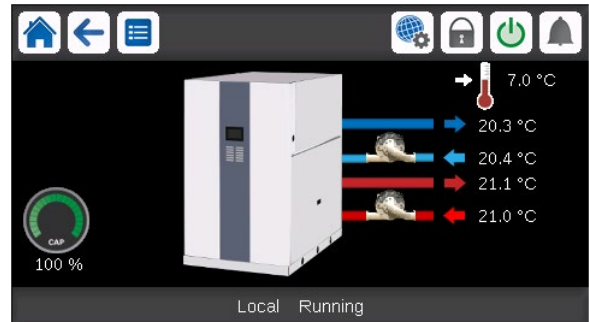
### SmartVu™ control

The SmartVu™ control combines intelligence with operating simplicity. The control constantly monitors all machine parameters and precisely manages the operation of compressors, expansion devices, fans and the evaporator water pump for optimum energy efficiency.

The SmartVu™ control features advanced communication technology over Ethernet (IP) and a user-friendly and intuitive user interface with 4.3-inch colour touch screen.

- Energy management configuration
  - Internal timer: controls chiller on/off times and operation at a second setpoint
  - Setpoint offset based on the outdoor air temperature
  - Master/slave control of two chillers operating in parallel with runtime balancing and automatic changeover in case of a unit fault.
  - Innovative smart energy monitoring, providing users with smart data such as real-time electrical energy consumption and cooling capacity, and instantaneous and average energy efficiency values.
  - For further energy savings, the AquaSnap® can be monitored remotely by Carrier experts for energy consumption diagnosis and optimisation.
- Integrated features
  - Night mode: Capacity and fan speed limitation for reduced noise level
  - With hydraulic module: Water pressure display and water flow rate calculation.
- Advanced communication features
  - Easy and high-speed communication technology over Ethernet (IP) to a centralised building management system
  - Access to multiple unit parameters.
- Maintenance functions
  - F-Gas regulation leak check reminder alert
  - Maintenance alert can be configured to days, months or hours of operation
  - Display of trend curves for the main values
  - Management of a fault memory allowing a log of the last 50 incidents to be accessed, with operating readings taken when the fault occurs
  - Blackbox memory

### ■ 4"3 SmartVu™ user interface



- Intuitive and user-friendly 4"3 inch touch screen interface
- Concise and clear information is available in local languages
- Complete menu, customised for different users (end user, service personnel or Carrier engineers).

### Remote management (standard)

Units with SmartVu™ control can be easily accessed from the internet, using a PC with an Ethernet connection. This makes remote control quick and easy and offers significant advantages for service operations.

The AquaSnap® is equipped with an RS485 serial port that offers multiple remote control, monitoring and diagnostic possibilities. Carrier offers a vast choice of control products, specially designed to control, manage and supervise the operation of an air conditioning system. Please consult your Carrier representative for more information.

The AquaSnap® also communicates with other centralised building management systems via optional communication gateways.

A connection terminal allows the AquaSnap® unit to be remotely controlled by wire:

- Start/stop: Opening of this contact will shut down the unit
- Dual setpoint: closing of this contact activates a second setpoint (e.g.: unoccupied mode).
- Demand limit: Closing of this contact limits the maximum chiller capacity to a predefined value.
- Operation indication: This volt-free contact indicates that the chiller is operating (cooling load).
- Alarm indication: this volt-free contact indicates the presence of a major fault that has led to the shut-down of one or several refrigerant circuits.

## PHYSICAL DATA, 61WG UNITS

61WG			110	120	140	150	170	190	
<b>Heating</b>									
<b>Standard unit</b> Full load performances*	HW1	Nominal capacity	kW	135	151	175	183	204	235
		COP	kW/kW	5,48	5,44	5,44	5,62	5,49	5,48
	HW2	Nominal capacity	kW	131	147	168	176	197	226
		COP	kW/kW	4,56	4,53	4,55	4,63	4,52	4,53
	HW3	Nominal capacity	kW	124,4	140,7	161,3	166,0	186,2	212,5
		COP	kW/kW	3,58	3,48	3,56	3,53	3,42	3,49
	HW4	Nominal capacity	kW	118	131	150	157	174	200
		COP	kW/kW	2,83	2,74	2,85	2,86	2,70	2,85
	HB1	Nominal capacity	kW	102	114	133	135	153	177
		COP	kW/kW	4,42	4,39	4,42	4,40	4,39	4,38
<b>Standard unit</b> Seasonal energy efficiency**	HW1	SCOP <sub>30/35°C</sub>	kW/kW	6,20	6,32	6,24	6,18	6,19	6,03
		η <sub>s heat</sub> <sub>30/35°C</sub>	%	241	245	242	240	240	234
	HW3	SCOP <sub>47/55°C</sub>	kW/kW	<b>5,03</b>	<b>5,03</b>	<b>5,03</b>	<b>5,02</b>	<b>5,05</b>	<b>4,93</b>
		η <sub>s heat</sub> <sub>47/55°C</sub>	%	<b>194</b>	<b>193</b>	<b>193</b>	<b>194</b>	<b>194</b>	<b>190</b>
		P <sub>rated</sub>	kW	144	162	185	193	215	247
<b>Operating weight (1)</b>			kg	707	733	758	841	877	908
<b>Sound levels (2)</b>									
Sound power level, standard unit			dB(A)	76	77	78	76	77	78
Sound power level, option 257			dB(A)	73	74	75	73	74	75
<b>Dimensions, standard unit (3)</b>									
Width			mm	880	880	880	880	880	880
Length			mm	1583	1583	1583	1583	1583	1583
Height			mm	1574	1574	1574	1574	1574	1574
<b>Compressors</b>				Hermetic scroll 48.3 r/s					
Quantity				3	3	3	4	4	4
Number of capacity stages				3	3	3	4	4	4
Minimum capacity			%	33	33	33	25	25	25
<b>Refrigerant(1)</b>				R410A (GWP=2088 Following ARI4)					
Charge, standard unit			kg	13,3	14,5	15,6	21,0	23,0	24,2
			teqCO <sub>2</sub>	27,8	30,3	32,6	43,8	48,0	50,5
<b>Capacity control</b>				SmartVu™					

\* In accordance with standard EN14511-3:2013

\*\* In accordance with standard EN14825:2016, average climate

HW1 Heating mode conditions: Evaporator entering/leaving water temperature 10°C/7°C, condenser entering/leaving water temperature 30°C/35°C, evaporator and condenser fouling factor 0 m<sup>2</sup>. k/W

HW2 Heating mode conditions: Evaporator entering/leaving water temperature 10°C/7°C, condenser entering/leaving water temperature 40°C/45°C, evaporator and condenser fouling factor 0 m<sup>2</sup>. k/W

HW3 Heating mode conditions: Evaporator entering/leaving water temperature 10°C/7°C, condenser entering/leaving water temperature 47°C/55°C, evaporator and condenser fouling factor 0 m<sup>2</sup>. k/W

HW4 Heating mode conditions: Evaporator entering/leaving water temperature 10°C/7°C, condenser entering/leaving water temperature 55°C/65°C, evaporator and condenser fouling factor 0 m<sup>2</sup>. k/W

HB1 Heating mode conditions: Evaporator entering/leaving water temperature 0°C/-3°C, condenser entering/leaving water temperature 30°C/35°C, evaporator and condenser fouling factor 0 m<sup>2</sup>.K/W, evaporator fluid: 30% ethylene glycol.

η<sub>s heat</sub><sub>30/35°C</sub> & SCOP<sub>30/35°C</sub>  
η<sub>s heat</sub><sub>47/55°C</sub> & SCOP<sub>47/55°C</sub>  
Values calculated in accordance with EN14825:2016

**Bold values compliant to Ecodesign regulation: (EU) No 813/2013 for Heat Pump application**

(1) Weight shown is a guideline only. Please refer to the unit nameplate

(2) In dB ref=10<sup>-12</sup> W, (A) weighting. Declared dualnumber noise emission values in accordance with ISO 4871 (with an associated uncertainty of +/-3dB(A)). Measured in accordance with ISO 9614-1.

(3) The dimensions shown are for the standard unit. For other unit types please refer to the dimensional drawings



Eurovent certified values

## PHYSICAL DATA, 61WG UNITS

61WG		110	120	140	150	170	190
<b>Evaporator</b>		Direct-expansion plate heat exchanger					
Water volume	l	15,18	17,35	19,04	23,16	26,52	29,05
Water connections		Victaulic					
Inlet/outlet	in	2 1/2	2 1/2	2 1/2	3	3	3
Max. water-side operating pressure without hydraulic module	kPa	1000	1000	1000	1000	1000	1000
<b>Condenser</b>		Plate heat exchanger					
Net water volume	l	15,18	17,35	19,04	23,16	26,52	29,05
Water connections		Victaulic					
Inlet/outlet	in	2 1/2	2 1/2	2 1/2	3	3	3
Max. water-side operating pressure without hydraulic module	kPa	1000	1000	1000	1000	1000	1000
<b>Chassis paint color</b>		Color code: RAL7035					

## ELECTRICAL DATA

61WG without hydraulic module		020	025	030	035	040	045	050	060	070	080	090	
<b>Power circuit</b>													
Nominal voltage	V-ph-Hz	400-3-50											
Voltage range	V	360-440											
<b>Control circuit supply</b>													
24 V, via internal transformer													
<b>Maximum start-up current draw (Un)<sup>(1)</sup></b>													
Standard unit	A	98	142	142	147	158	197	161,6	163	171,4	184,7	227,9	
Unit with electronic starter option	A	53,9	78,1	78,1	80,9	86,9	108,4	97,7	99,2	105,2	113,6	139,2	
<b>Unit power factor at maximum capacity<sup>(2)</sup></b>													
		0,9	0,8	0,9	0,9	0,9	0,9	0,8	0,9	0,9	0,9	0,9	
<b>Maximum operating power input<sup>(2)</sup></b>													
		kW	9,5	11,3	12,4	14,4	15,9	18,2	22,5	24,9	28,7	31,8	36,4
<b>Nominal unit operating current draw<sup>(3)</sup></b>													
		A	10,6	12,9	13,3	15,2	16,5	19,7	25,8	26,6	30,4	33,0	39,4
<b>Maximum operating current draw (Un)<sup>(4)</sup></b>													
		A	16,1	19,6	21,1	24,4	26,7	30,9	39,2	42,2	48,8	53,4	61,8
<b>Maximum operating current draw (Un-10%)*</b>													
		A	17,9	21,8	23,4	27,1	29,7	34,3	43,6	46,9	54,2	59,3	68,7
<b>Customer-side unit power reserve</b>													
Customer reserve at the 24 V control power circuit													
<b>Short-circuit stability and protection</b>													
See table below "Short-circuit stability current"													

61WG without hydraulic module		110	120	140	150	170	190
<b>Power circuit</b>							
Nominal voltage	V-ph-Hz	400-3-50					
Voltage range	V	360-440					
<b>Control circuit supply</b>							
24 V, via internal transformer							
<b>Maximum start-up current draw (Un)<sup>(1)</sup></b>							
Standard unit	A	195,8	211,4	258,8	220,2	238,1	289,7
Unit with electronic starter option	A	129,7	140,3	170,2	154,1	167	201,1
<b>Unit power factor at maximum capacity<sup>(2)</sup></b>							
		0,87	0,85	0,85	0,87	0,85	0,85
<b>Maximum operating power input<sup>(2)</sup></b>							
		kW	44	47	55	59	73
<b>Nominal unit operating current draw<sup>(3)</sup></b>							
		A	45,6	49,5	59,1	60,8	78,8
<b>Maximum operating current draw (Un)<sup>(4)</sup></b>							
		A	73,2	80,1	92,7	97,6	123,6
<b>Maximum operating current draw (Un-10%)*</b>							
		A	81,3	89	103	108,4	137,3
<b>Customer-side unit power reserve</b>							
Customer reserve at the 24 V control power circuit							
<b>Short-circuit stability and protection</b>							
See table below "Short-circuit stability current"							

- (1) Maximum instantaneous start-up current at operating limit values (maximum operating current of the smallest compressor(s) + locked rotor current or limited start-up current of the largest compressor).
- (2) Maximum power input at the unit operating limits.
- (3) Values obtained at standardised Eurovent conditions: evaporator entering/leaving water temperature 10 °C/7 °C, condenser entering/leaving water temperature 30 °C/35 °C.
- (4) Maximum unit operating current at maximum unit power input and 400 V.
- \* Maximum unit operating current at maximum unit power input and 360 V.

30WG without hydraulic module		020	025	030	035	040	045	050	060	070	080	090	
<b>Power circuit</b>													
Nominal voltage	V-ph-Hz	400-3-50											
Voltage range	V	360-440											
<b>Control circuit supply</b>													
24 V, via internal transformer													
<b>Maximum start-up current draw (Un)<sup>(1)</sup></b>													
Standard unit	A	98	142	142	147	158	197	161	162	170	183	226	
Unit with electronic starter option	A	53,9	78,1	78,1	80,9	86,9	108,4	96,8	97,9	104,1	112,3	137,4	
<b>Unit power factor at maximum capacity<sup>(2)</sup></b>													
		0,9	0,8	0,9	0,9	0,9	0,9	0,8	0,9	0,9	0,9	0,9	
<b>Maximum operating power input<sup>(2)</sup></b>													
		kW	9,2	10,8	11,7	13,7	15,1	17,1	21,5	23,3	27,3	30,3	34,2
<b>Nominal unit operating current draw<sup>(3)</sup></b>													
		A	10,5	13,2	13,8	15,6	16,2	20,2	26,4	27,6	31,2	32,4	40,4
<b>Maximum operating current draw (Un)<sup>(4)</sup></b>													
		A	15,6	18,7	19,8	23,2	25,4	29	37,4	39,6	46,4	50,8	58
<b>Maximum operating current draw (Un-10%)*</b>													
		A	17,3	20,8	22	25,8	28,2	32,2	41,6	44	51,6	56,4	64,4
<b>Customer-side unit power reserve</b>													
Customer reserve at the 24 V control power circuit													
<b>Short-circuit stability and protection</b>													
See table below "Short-circuit stability current"													

- (1) Maximum instantaneous start-up current at operating limit values (maximum operating current of the smallest compressor(s) + locked rotor current or limited start-up current of the largest compressor).
- (2) Maximum power input at the unit operating limits.
- (3) Values obtained at standardised Eurovent conditions: evaporator entering/leaving water temperature 12 °C/7 °C, condenser entering/leaving water temperature 30 °C/ 35 °C.
- (4) Maximum unit operating current at maximum unit power input and 400 V.
- \* Maximum unit operating current at maximum unit power input and 360 V.

# ELECTRICAL DATA

## Short-circuit stability current (TN system<sup>(1)</sup>) - standard unit (with main disconnect switch)

61WG/30WG/30WGA		020	025	030	035	040	045	050	060	070	080	090
<b>Value with non-specified upstream protection</b>												
Short-term current at 1 s - I <sub>cw</sub>	kA rms	3	3	3	3	3	3	3	3	3	3	3
Admissible peak current - I <sub>pk</sub>	kA pk	6	6	6	6	6	6	6	6	6	6	6
<b>Maximum value with upstream protection (by circuit breaker)</b>												
Conditional short-circuit current I <sub>cc</sub>	kA rms	40	40	40	40	40	40	40	40	40	40	40
Schneider circuit breaker - Compact series		NSX 100N										
Reference number <sup>(2)</sup>		LV429795										

(1) Earthing system type

(2) If another current limitation protection system is used, its time-current and thermal constraint (I<sup>2t</sup>) trip characteristics must be at least equivalent to those of the recommended Schneider circuit breaker.  
The short-circuit stability current values above are suitable with the TN system.

61WG/30WG/30WGA		110	120	140	150	170	190
<b>Value with non-specified upstream protection</b>							
Short-term current at 1 s - I <sub>cw</sub>	kA rms	5,5	5,5	5,5	5,5	5,5	5,5
Admissible peak current - I <sub>pk</sub>	kA pk	20	20	20	20	20	20
<b>Maximum value with upstream protection (by circuit breaker)</b>							
Conditional short-circuit current I <sub>cc</sub>	kA rms	154	154	154	154	154	154
Schneider circuit breaker - Compact series		NSX 100N					
Reference number <sup>(2)</sup>		LV429795					

(1) Earthing system type

(2) If another current limitation protection system is used, its time-current and thermal constraint (I<sup>2t</sup>) trip characteristics must be at least equivalent to those of the recommended Schneider circuit breaker.  
The short-circuit stability current values above are suitable with the TN system.

### Electrical data notes and operating conditions:

- 61WG/30WG/30WGA units have a single power connection point, located immediately upstream of the main disconnect switch.
- The control box includes the following standard features:
  - a main disconnect switch,
  - the starter and motor protection devices for each compressor and the pumps
  - the control devices
- Field connections:
  - All connections to the system and the electrical installations must be in full accordance with all applicable local codes.
- The Carrier 61WG/30WG/30WGA units are designed and built to ensure conformance with these codes. The recommendations of European standard EN 60204-1 (machine safety - electrical machine components - part 1: general regulations - corresponds to IEC 60204-1) are specifically taken into account, when designing the electrical unit equipment.

### Notes:

- Generally the recommendations of IEC 60364 are accepted as compliance with the requirements of the installation directives. Conformance with EN 60204-1 is the best means of ensuring compliance with the Machines Directive § 1.5.1.
- Annex B of EN 60204-1 describes the electrical characteristics used for the operation of the machines.
- The operating conditions for the units are specified below:
  1. Environment<sup>(1)</sup> - Environment as classified in EN 60721 (equivalent to CEI60721):
    - Indoor installation,
    - ambient temperature range: +5 °C for the temperature minimum to +40 °C, class 4K4H,
    - humidity range (non-condensing)<sup>(1)</sup>:
      - 50% relative humidity at 40 °C
      - 90% relative humidity at 20 °C

- altitude: ≤ 2000 m (see note for table 4.7 in the IOM) indoor installation<sup>(1)</sup>
  - presence of water: class AD2 (possibility of water droplets)
  - presence of hard solids, class 4S2 (no significant dust present)
  - presence of corrosive and polluting substances, class 4C2 (negligible)
  - vibration and shock, class AG2, AH2
  - competence of personnel, class BA4<sup>(1)</sup> (trained personnel - IEC 60364)
2. Power supply frequency variation: ± 2 Hz.
  3. The neutral (N) conductor must not be connected directly to the unit (if necessary use a transformer).
  4. Over-current protection of the power supply conductors is not provided with the unit.
  5. The factory-installed disconnect switch(es)/circuit breaker(s) is (are) of a type suitable for power interruption in accordance with EN 60947.
  6. The units are designed for simplified connection on TN(s) networks (IEC 60364). For IT networks provide a local earth and consult competent local organisations to complete the electrical installation. Units delivered with speed drive are not compatible with IT network.
  7. Derived currents: If protection by monitoring of derived currents is necessary to ensure the safety of the installation, the control of the cut-out value must take the presence of leak currents into consideration that result from the use of frequency converters in the unit. A value of at least 150 mA is recommended to control differential protection devices.

**NOTE: If particular aspects of an actual installation do not conform to the conditions described above, or if there are other conditions which should be considered, always contact your local Carrier representative.**

(1) The protection level of the control boxes required to conform to this class is IPX1B (according to reference document IEC 60529). All 61WG/30WG/30WGA units fulfil this protection condition. Units equipped with front casing panel meet class IP23. If the casing panel has been removed, access to energised components is protected to level IPXXB.

## SEASONAL PERFORMANCES

With the rapid increase in energy costs and the care about environmental impacts of electricity production, power consumption of air conditioning equipment has become an important topic. The energy efficiency of a unit at full load is rarely representative of the actual performance of the units, as on average a unit works less than 5% of the time at full load.

### IPLV.SI (in accordance with AHRI 551-591)

The IPLV (integrated part load value) allows evaluation of the average energy efficiency based on four operating conditions defined by the AHRI (Air Conditioning, Heating and Refrigeration Institute). The IPLV.SI is the average weighted value of the cooling coefficient of performance (COP<sub>R</sub>) at different operating conditions, weighted by the operating time.

### IPLV (integrated part load value)

Load %	Condenser entering water temperature, °C	Energy efficiency	Operating time, %
100	30	A=COP <sub>R</sub> at 100%	1
75	24.5	B=COP <sub>R</sub> at 75%	42
50	19	C=COP <sub>R</sub> at 50%	45
25	19	D=COP <sub>R</sub> at 25%	12

$$IPLV.SI=A^{(1)}1\%+B^{(1)}42\%+C^{(1)}45\%+D^{(1)}12\%$$

Note: Constant leaving water temperature: 7 °C

### SEER for comfort chillers (in accordance with EU ECODESIGN)

The **SEER** (Seasonal Energy Efficiency Ratio) measures the seasonal energy efficiency of comfort **chillers** by calculating the ratio between annual cooling demand of the building and annual energy demand of the chiller. It takes into account the energy efficiency achieved for each outdoor temperature weighted by the number of hours observed for each of these temperatures, using actual climate data.

**SEER** is a new way of measuring the true energy efficiency of chillers for **comfort cooling** over an entire year.

This new indicator gives a more realistic indication of the real energy efficiency and environmental impact of a cooling system (Ecodesign Regulation 2016/2281).

The heat load of a building depends on many factors, such as the outside air temperature, the exposure to the sun and its occupation.

Consequently it is preferable to use the average energy efficiency, calculated at several operating points that are representative for the unit utilisation.

### SCOP (In accordance with EU ECODESIGN)

The **SCOP** (Seasonal Coefficient of Performance) permit evaluation of the average energy efficiency at part load, based on multipoint conditions (16°C to -10°C for average climate) and number of hours occurring at each air temperature (Bin hours).

To be able to compare the energy efficiency of boilers using a primary energy source (gas or fuel) with heat pumps using a final energy source (electricity), the seasonal efficiency criteria used by the Ecodesign regulations is known as  $\eta_s$  it is based on the use of primary energy sources and expressed in % (Ecodesign Regulation 813/2013)

### SEPR for process chillers (in accordance with EU ECODESIGN)

The **SEPR** (Seasonal Energy Performance Ratio) measures the seasonal energy efficiency of **process chillers** by calculating the ratio between annual cooling demand of the process and annual energy demand of the chiller. It takes into account the energy efficiency achieved at each outdoor temperature of an average climate weighted by the number of hours observed for each of these temperatures.

**SEPR** is a new way of measuring the true energy efficiency of chillers for **process cooling** over an entire year. This new indicator gives a more realistic indication of the real energy efficiency and environmental impact of the cooling system (Ecodesign Regulation 2015/1095 or 2016/2281).

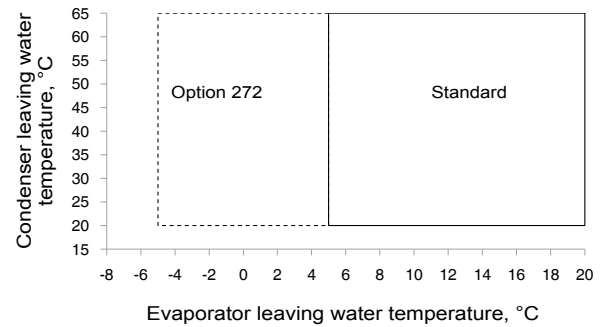
## OPERATING LIMITS, 61WG

61WG	Minimum	Maximum
<b>Evaporator</b>		
Entering water temperature at start-up °C	7,5 <sup>(1)</sup>	27
Leaving water temperature during operation °C	5 <sup>(2)</sup>	20
Entering/leaving water temperature difference K	2,5	7
<b>Condenser</b>		
Entering water temperature at start-up °C	15 <sup>(3)</sup>	60 <sup>(4)</sup>
Leaving water temperature during operation °C	20	65
Entering/leaving water temperature difference K	2,5	18

- (1) For entering water temperatures below 7.5 °C at start-up, contact Carrier.
- (2) If the leaving water temperature is below 5 °C, a frost protection solution must be used. Please refer to option 6 for evaporator leaving water low-temperature applications (< 5 °C).
- (3) For applications with a condenser entering temperature below 15 °C the use of a three-way valve is recommended. This three-way valve can be controlled by the 0-10 V analogue output of the SmartVu™ control.
- (4) For a water flow rate that corresponds to a maximum water-side temperature difference of 5 K.

61WG + option 272 (geothermal application)	Minimum	Maximum
<b>Evaporator</b>		
Entering water temperature at start-up °C	-2,5 <sup>(1)</sup>	25
Leaving water temperature during operation °C	-5 <sup>(1)</sup>	20
Entering/leaving water temperature difference K	2,5	5
<b>Condenser</b>		
Entering water temperature at start-up °C	15 <sup>(2)</sup>	60 <sup>(3)</sup>
Leaving water temperature during operation °C	20	65
Entering/leaving water temperature difference K	2,5	18

- (1) A frost protection solution must be used.
- (2) For applications with a condenser entering temperature below 15 °C the use of a three-way valve is recommended. This three-way valve can be controlled by the 0-10 V analogue output of the SmartVu™.
- (3) For a water flow rate that corresponds to a maximum water-side temperature difference of 5 K.

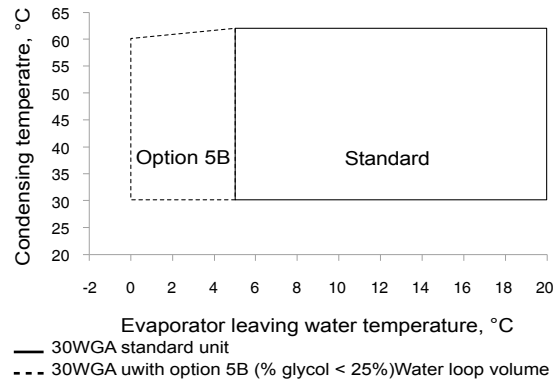


- 61WG standard unit
- - - 61WG unit with option 272 (brine to water)  
Option 272: Condenser-side high-temperature water production, with glycol solution on the evaporator side

## OPERATING LIMITS, 30WGA

30WGA	Minimum	Maximum
<b>Evaporator</b>		
Entering water temperature at start-up °C	7,5 <sup>(1)</sup>	27
Leaving water temperature during operation °C	5 <sup>(2)</sup>	20
Entering/leaving water temperature difference K	2,5	7
<b>Air entering temperature (at start-up and during operation)<sup>(3)</sup></b>		
Air entering temperature (fixed-speed fan) °C	0 <sup>(3)</sup>	35 to 48 <sup>(5)</sup>
Air entering temperature (variable-speed fan) °C	-10 to -20 <sup>(4)</sup>	35 to 48 <sup>(5)</sup>

- (1) For entering water temperatures below 7.5 °C at start-up, contact Carrier.
- (2) 30WGA unit can operate down to 0 °C if the configuration of the fluid type used is modified. If the leaving water temperature is below 5 °C, a frost protection solution must be used.
- (3) The minimum temperature range is based on the condenser selected. If the condenser only has a few fan stages, the use of variable-speed fans is recommended from 10 °C.
- (4) The minimum temperature range is based on the condenser selected.
- (5) The maximum temperature range is based on the condenser selected.



## WATER LOOP VOLUME

### Evaporator and condenser

#### ■ Minimum volume

A minimum water volume is required for correct unit operation. The minimum water loop volume can be calculated in accordance with the following formula:

Volume = CAP(kW) x N<sup>(1)</sup> = litres, where CAP is the cooling capacity at nominal operating conditions.

Air conditioning application	N <sup>(1)</sup>
61WG/30WG/30WGA 020-090	2,5

Minimum water loop volume (evaporator and condenser side)

61WG/30WG/30WGA	size	110	120	140	150	170	190
Pure water	l	269	323	366	192	231	261

The water volume in the condenser loop has no impact on the operation of the unit.

**Note:** In the heat pump mode (unit control based on the hot-water temperature) the minimum volume of the condenser loop must be calculated the same way as for the evaporator loop, replacing the cooling capacity with the heating capacity.

#### ■ Industrial process cooling

Certain industrial process applications may require high stability of the leaving water temperature levels. In this case the values above must be increased.

#### ■ Maximum volume

Units with hydraulic module incorporate an expansion tank sized for the maximum water loop volume.

The table below gives the maximum water loop volume (in litres) for pure water or ethylene glycol with various concentrations.

61WG/30WG/30WGA		020-045			060-090		
Static pressure	kPa	100	200	300	100	200	300
	bar	1	2	3	1	2	3
Pure water	l	220	450	75	340	225	115
10% ethylene glycol	l	165	110	53	255	170	85
20% ethylene glycol	l	100	70	35	150	100	50
35% ethylene glycol	l	85	55	30	130	85	45

Maximum water loop volume (evaporator and condenser side)

61WG/30WG/30WGA		110-140			150-190		
Static pressure	kPa	150	200	150	200	200	300
	bar	1,5	2	1,5	2	2	3
Pure water	l	894	655	1376	918	225	115
10% ethylene glycol	l	678	498	1045	697	170	85
20% ethylene glycol	l	561	412	864	576	100	50
35% ethylene glycol	l	483	354	744	496	85	45

# WATER FLOW RATES

## Standard Unit

61WG/ 30WG/ 30WGA	Condenser water flow rate, l/s			
	Minimum <sup>(1)</sup>	Maximum <sup>(2)</sup>		Maximum <sup>(3)</sup>
		Low pressure	High pressure	
20	0,3	3,5	3,6	3,8
25	0,3	3,7	3,9	4,1
30	0,3	3,7	3,9	4,1
35	0,4	4	4,2	4,7
40	0,4	4,2	4,4	5,0
45	0,4	4,4	4,6	5,4
50	0,4	5,4	6,9	7,0
60	0,5	5,6	7,1	7,5
70	0,5	5,7	7,3	7,8
80	0,6	5,8	7,5	8,2
90	0,6	7,4	8	9,3
110	0,5	11,4	11,7	13,1
120	0,5	12,5	12,4	15,0
140	0,6	13,2	12,9	16,7
150	0,5	12,6	13,8	16,4
170	0,5	13,6	14,4	18,9
190	0,6	14,0	14,7	20,6

- (1) Units with or without hydraulic module  
Minimum flow rate for a water temperature difference of 18 K-  
**Note:** Operation permitted up to a value of 20 K.
- (2) Units without hydraulic module  
Maximum flow rate for an available pressure of 20 kPa (unit with low-pressure hydraulic module) or 50 kPa (unit with high-pressure hydraulic module)
- (3) Units without hydraulic module  
Maximum flow rate for a pressure drop of 100 kPa in the plate heat exchanger  
Maximum flow rate for a pressure drop of 100 kPa in the plate heat exchanger.

## 30WG with option 272

30WG	Minimum evaporator glycol solution flow rate, l/s		
	Minimum <sup>(2)</sup>		Minimum <sup>T</sup>
	Low pressure	High pressure	
20	1,4	1,3	0,5
25	1,5	1,3	0,5
30	1,5	1,3	0,5
35	1,6	1,5	0,6
40	1,7	1,5	0,6
45	1,8	1,5	0,8
50	2,5	2,2	0,8
60	2,2	2,3	1,0
70	2,2	2,4	1,1
80	2,3	2,4	1,3
90	2,5	2,5	1,5
110	2	1,4	1,5
120	2	1,4	1,5
140	2	1,4	1,5
150	2	1,4	1,5
170	2	1,4	1,5
190	2	1,4	1,5

- (1) Option 6: Glycol solution production, very low temperature  
(2) Option 5B: Glycol solution down to 0°C  
(3) Option 272: Glycol solution down to -5°C  
(4) Units with hydraulic module  
Minimum flow rate for a maximum permitted temperature difference at the minimum leaving water temperature  
T Units without hydraulic module Minimum flow rate for a maximum permitted temperature difference at the minimum leaving water temperature

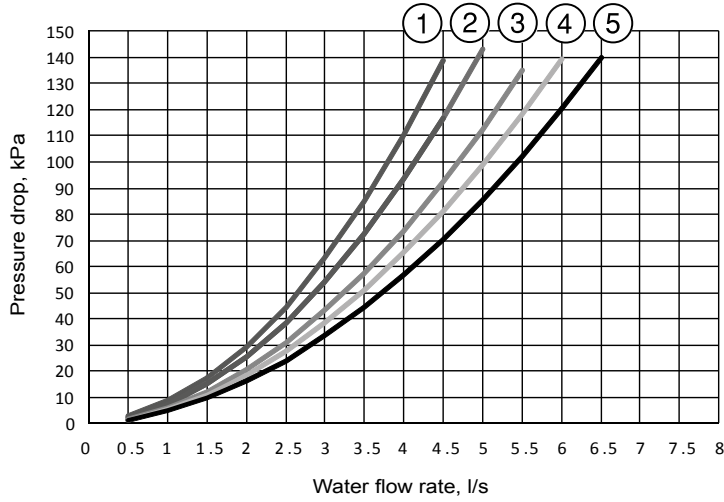
61WG/30WG/30WGA	Evaporator water flow rate, l/s					
	Minimum <sup>(1)</sup>		Minimum <sup>(2)</sup>	Maximum <sup>(3)</sup>		Maximum <sup>(4)</sup>
	Low pressure	High pressure		Low pressure	High pressure	
20	1,0	0,9	0,5	3,5	3,7	3,8
25	1,0	1,0	0,5	3,8	3,9	4,1
30	1,0	1,0	0,5	3,8	3,9	4,1
35	1,1	1,1	0,6	4,1	4,3	4,7
40	1,2	1,1	0,6	4,3	4,5	5,0
45	1,2	1,1	0,8	4,5	4,8	5,4
50	1,6	1,4	0,8	6,1	7,9	9,2
60	1,5	1,6	1,0	6,2	8,1	9,9
70	1,6	1,5	1,1	6,3	8,3	10,3
80	1,6	1,5	1,3	6,4	8,4	10,9
90	2,0	1,6	1,5	8,1	8,8	12,5
110	2,0	1,3	0,8	7,5	11,8	14,4
120	2,0	1,3	0,9	7,6	12,5	16,7
140	2,0	1,3	1	8,6	12,8	18,3
150	2,0	1,3	0,8	8,6	12,5	16,1
170	2,0	1,3	0,9	13,6	13,1	18,3
190	2,0	1,3	1	14,0	13,3	20,3

- (1) Units with hydraulic module  
Flow rate for a maximum permitted temperature difference at the minimum leaving water temperature  
(2) Units without hydraulic module  
Flow rate for a maximum permitted temperature difference at the minimum leaving water temperature  
(3) Units with hydraulic module  
Maximum flow rate for an available pressure of 20 kPa (unit with low-pressure hydraulic module) or 50 kPa (unit with high-pressure hydraulic module)  
(4) Units without hydraulic module

# PLATE HEAT EXCHANGER PRESSURE DROP (INCLUDES INTERNAL PIPING)

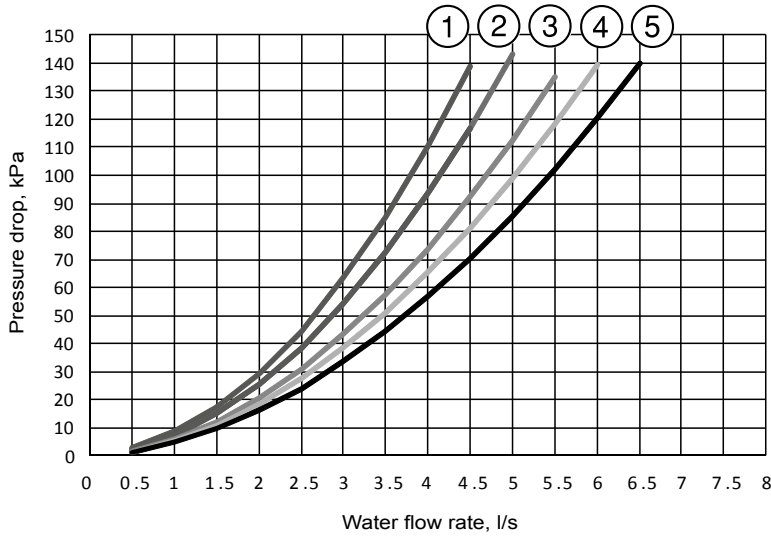
Evaporator - standard unit without hydraulic module - Water only

## 61WG/30WG/30WGA 020-045



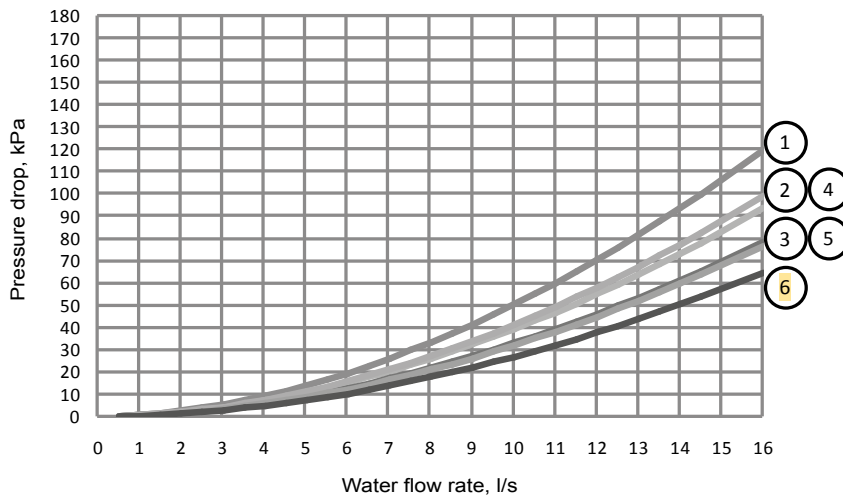
- 1 61WG/30WG/30WGA 020
- 2 61WG/30WG/30WGA 025 to 030
- 3 61WG/30WG/30WGA 035
- 4 61WG/30WG/30WGA 040
- 5 61WG/30WG/30WGA 045

## 61WG/30WG/30WGA 050-090



- 6 61WG/30WG/30WGA 050
- 7 61WG/30WG/30WGA 060
- 8 61WG/30WG/30WGA 070
- 9 61WG/30WG/30WGA 080
- 10 61WG/30WG/30WGA 090

## 61WG/30WG/30WGA 110-190

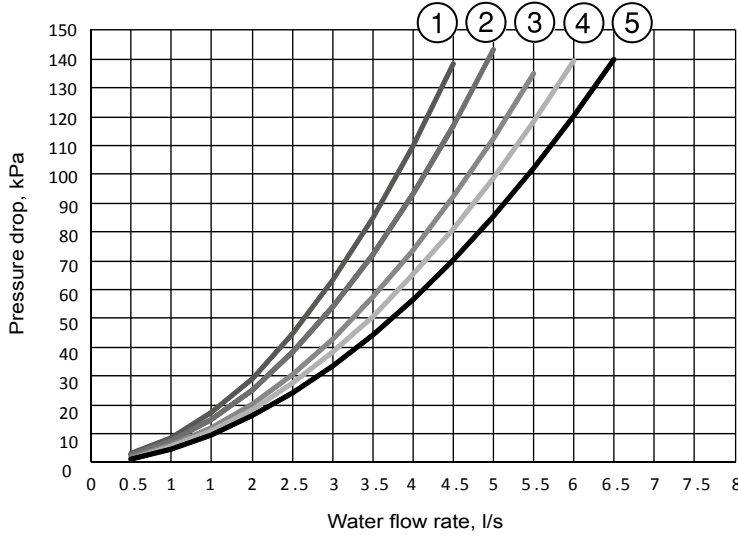


- 1 61WG/30WG/30WGA 110
- 2 61WG/30WG/30WGA 120
- 3 61WG/30WG/30WGA 140
- 4 61WG/30WG/30WGA 150
- 5 61WG/30WG/30WGA 170
- 6 61WG/30WG/30WGA 190

# PLATE HEAT EXCHANGER PRESSURE DROP (INCLUDES INTERNAL PIPING)

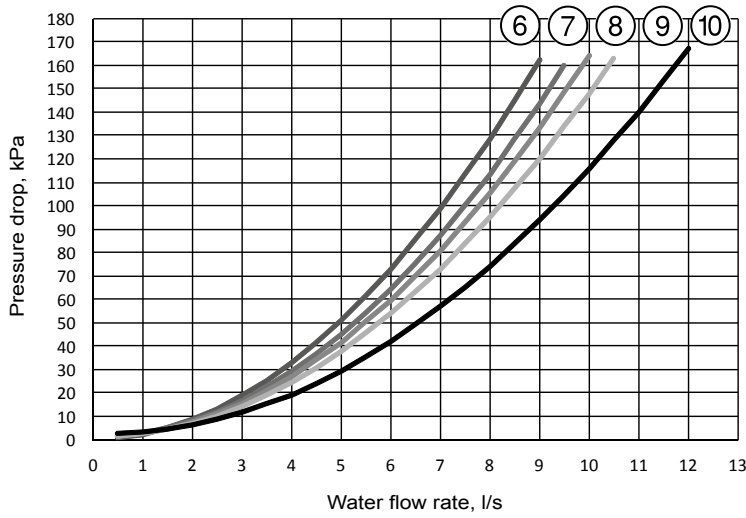
Condenser - standard unit without hydraulic module - Water only

## 61WG/30WG 020-045



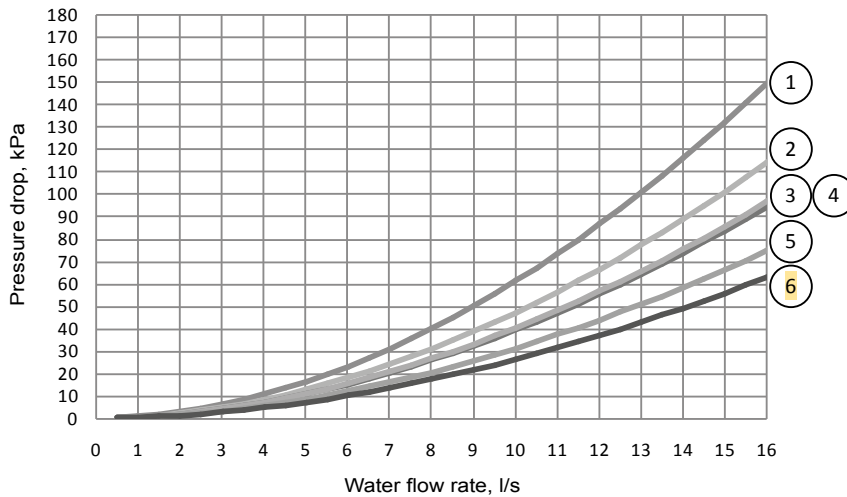
- 1 61WG/30WG 020
- 2 61WG/30WG 025 to 030
- 3 61WG/30WG 035
- 4 61WG/30WG 040
- 5 61WG/30WG 045

## 61WG/30WG 050-090



- 6 61WG/30WG 050
- 7 61WG/30WG 060
- 8 61WG/30WG 070
- 9 61WG/30WG 080
- 10 61WG/30WG 090

## 61WG/30WG 110-190



- 1 61WG/30WG 110
- 2 61WG/30WG 120
- 3 61WG/30WG 140
- 4 61WG/30WG 150
- 5 61WG/30WG 170
- 6 61WG/30WG 190