AQUA Link™

Advanced hydronic module

The cover image is refers to the outdoor version, with the accessory panels.

General

AQUA Link is a pioneering hydronic module designed to optimise connection between the chiller and the users in plants featuring both an air handling unit (for air ventilation and humidity control) and chilled beams (for ambient temperature control).

AQUA Link always produces and distributes the exact right amount of water at the exact required temperature to both cooling coils and for example chilled beams.

AQUA Link contains all you need in a water circuit between a Swegon chiller and GOLD air handling unit. The former time-consuming and expensive process is now replaced with Plug and Play!

Quick facts

- One single interlocutor for the entire plant eliminates possible inconveniences relating to identification of responsibilities and difficult communications with the various parties involved;
- The system only requires hydronic and electrical connection between the chiller, the users and the AQUA Link to operate.
- All equipment and components are condensed in one unique volume and AQUA Link can be placed outdoor.
- Energy efficient through demand controlled operation and energy efficient pumps.

Swegon

Contents

Features and operating principle

The hydronic module AQUA Link is designed to optimise connection between the chiller and the users in plants featuring both an air handling unit (for air ventilation and humidity control) and chilled beams (for ambient temperature control). AQUA Link is the hardware part of a System composed by AQUA Link + SMART Link in which SMART Link controls different parameters in the chiller, in the Air Handling Unit and in the Chilled Beams plant. Then the AQUA Link Accessory always needs SMART Link to work properly.

The control algorithm gives high benefits in terms of energy consumption, which is minimised through the control of several parameters at a time. These parameters are: temperature setpoint of chilled water produced by the chiller, pump rotation (both in primary and secondary circuits, if any), opening of the water flow control valves.

Some additional benefits are granted at installation: the module, in fact, already features all the required elements, which consequently do not need to be provided for separately and are governed by one single controller.

Temperature setpoint modulation

The temperature at which chilled water is produced to the chiller, that is directly connected to the refrigerant evaporation temperature, is essential for the determination of the energy efficiency coefficient of the chiller (EER or ESEER when considered in seasonal terms).

In traditional plants where one chiller feeds both the air handling units and the chilled beams, water is supplied at one temperature only (typically 7°C) and is blended with the fluid returning from the chilled beams so that the correct water supply temperature is guaranteed.

Actually, the production of water at such low temperature is not always required. Consider, for instance, that the correct water supply temperature to the chilled beams is normally around 14°C: forced dehumidification is not always necessary in air handling units, especially in climate conditions such as those in Northern European countries, and free cooling may be adopted frequently.

This enables feeding the users with water at a temperature that is often above 7°C, which consequently leads to a direct increase in the chiller energy efficiency.

The variable chiller setpoint and continuous transfer of operating parameter data between the controllers on the users' side and the chiller keep the water production temperature as high as possible and, in any case, such as to fully meet the users' requirements.

This operating logic offers a substantial benefit in terms of energy consumption minimisation thanks to enhanced chiller operating efficiency.

Water flow rate modulation

The amount of energy used to pump the water is linked to the flow rate required by the users. A decrease in the amount of pumped water causes a proportional reduction of the energy spent for this purpose.

The water flow rate required to the users basically depends on the water load to be supplied. This is substantially variable according to, for instance, the number of chilled beams to be fed against the total number of chilled beams installed, which need to be served in full load conditions.

The water flow rate is modulated, and energy consumption for pumping is consequently reduced, thanks to inverters and variable pumps which are operated by a pressure signal detected by a probe fitted in the hydronic piping.

2-way valve opening modulation

The primary circuit features two 2-way valves that control the water flow to the AHU and to the plate heat exchanger respectively. This arrangement allows for the use of one single pump in the primary circuit, which leads to a reduction in both installation and plant management costs. The valves are modulated according to the actual requirements of each user. The modulation speed of these valves is such as to provide a quick and accurate response to the users' requirements.

Technical characteristics

Evolved hydronic module for only cold water distribution designed for optimized energy efficiency in plants featuring both a primary air handling unit and internal terminal elements for secondary air treatment.

Body

Body for indoor applications

The self-supporting frame is made with polished pickled steel sheet painted in RAL 7035 with epoxy polyester powders. Stainless steel screws and bolts.

Body for outdoor applications

The self-supporting frame is made with galvanised steel sheet painted in RAL 7035 with polyester powder at 180°C, to offer high weather resistance. Stainless steel screws and bolts.

Panels

Removable panels are made with steel sheet painted in RAL 7035 and are internally insulated with a noise-absorbing coating made of open-cell, flexible, self-extinguishing expanded polyurethane foam (30 kg/cu.m in density), class F1. These panels are provided with handles for easier removal.

Hydronic circuit

The hydronic circuit features the following standard components: inertial tank, primary circuit pump, 2-way control valve on plate heat exchanger side, plate heat exchanger, shut-off gate valves, expansion vessel, air valve and bypass valve.

NB: the wording "primary circuit" and "secondary circuit" in this technical book are always referred to the AQUA Link unit. The hydronic circuit from the chiller to the storage tank in AQUA Link is a separated circuit referred to the chiller which has its own pump.

Heat exchanger

Braze-welded stainless steel AISI 316 plates insulated with a shroud of closed-cell insulating material.

The unit may feature one or two heat exchangers. In the version with two exchangers is supplied complete with a manifold to provide for one single hydronic connection.

Electric circulation pump in primary circuit

"Air handling unit + Plate exchanger"

Monoblock electric centrifugal pump featuring a direct motor-pump coupling through a chromium-plated steel shaft. Body and propeller made of cast iron, mechanical seal, 2-pole 3-phase electric motor with IP54 protection level.

Variable pump controlled by an externally-fitted inverter. Optional possibility to select between version with single or double circulation pump, the latter being controlled by a rotation logic that enables take over of a pump when the other experiences a malfunction. The pumping unit is suitable for operation with high glycol contents (up to 40%).

Electric circulation pump in secondary circuit

"Chilled beams" (optional)

Monoblock electric centrifugal pump featuring a direct motor-pump coupling through a chromium-plated steel shaft. Body and propeller made of cast iron, mechanical seal, 2-pole 3-phase electric motor with IP54 protection level.

Variable pump controlled by an externally-fitted inverter. Optional possibility to select between version with single or double circulation pump, the latter being controlled by a rotation logic that enables take over of a pump when the other experiences a malfunction.

Inverter controlled circulation pump rotation

Each pump (or each pair of pumps) is controlled by a dedicated inverter, which is commanded by a customised control logic.

Inverters are class IP54 and are, therefore, suitable for installation outdoors. Despite this, provision for a metal box is made to provide for greater inverter protection.

2-way modulation valve on plate heat exchanger side

Automatic, motor-driven, valve designed to control the water flow to the plate heat exchanger. The valve is operated by the temperature signal received from a probe installed on the water delivery pipe downline of the plate heat exchanger.

Bypass valve

The primary circuit is supplied with a mechanically-controlled pressure bypass valve. The valve is intended to provide for min. water flow to the pump even when the 2-way control valve is almost completely closed.

Electric switchgear

The switchgear features:

- Power switch
- Circuit breakers for pump protection
- Pump contactors
- Automatic switch for inverter protection
- Arrangement for remotely-controlled inverter on/off
- Clean contact for inverter alarm
- Clean contact for pump alarm
- 400V/3~/50Hz power supply

Controls and safety devices

- Temperature probe on water delivery line to Chilled Beams circuit.
- Pressure probe for pump operating pressure control in primary circuit.
- 2-way motor-driven valve at heat exchanger inlet.

Testing

Units are factory tested for hydronic tightness (leak test) and correct wiring of components.

Standard packaging

The standard packaging features: pallet to allow a comfortable handling and nylon film to protect the unit during transportation

Versions and accessories

Primary circuit featuring single circulation pump (standard- AQUA Link)

This version features one circulation pump in the primary circuit. This pump feeds both the heat exchanger coil in the air handling unit and the plate exchanger on the chilled beams side. The circulation pump is controlled by an inverter which adjusts the rotation speed according to the actual requirements by the users.

Two options can be selected for the pump head: “standard” and “increased”.

The standard version is realised for indoor installation (without external panels and with IP 55 electrical panel) and features: 1 single pump in the primary circuit, a plate heat exchanger for the secondary circuit to Chilled Beams, a two way valve to regulate the temperature of the water to Chilled Beams, a storage tank on the primary circuit for the glycole mixture.

NB: the primary circuit pump is dedicated to the AHU and to the plate heat exchanger. It doesn’t serve the chiller which needs its own dedicated fixed flow pump.

Primary circuit featuring double circulation pump (option - AQUA Link 2P)

This version features two circulation pumps in the primary circuit. The operating logic in this version is such that the two pumps rotate alternatively, controlled by a timer: if one of the pumps fails, the other takes over.

Two options can be selected for the pump head: “standard” and “increased”.

Circulation pumps to secondary circuit on chilled beams side (option - AQUA Link 1P-1P/2P-2P)

The standard unit does not include the circulation pumps feeding the chilled beams. The possibility is given to select either a single or a double circulation pump to be fitted in the secondary circuit. Two options can be selected for the pump head: “standard” and “increased”.

The double pump configuration can be selected for the secondary circuit only if a double pump is fitted in the primary circuit.

The possible options in terms of number of pumps are:

- 1 pump in primary circuit (AQUA Link);
- 1 pump in primary circuit and 1 in secondary circuit (AQUA Link 1P-1P);
- 2 pumps in primary circuit (AQUA Link 2P);
- 2 pumps in primary circuit and 2 in secondary circuit (AQUA Link 2P-2P).

Version for indoor applications (standard)

This version does not feature any guards on the unit perimeter (supplied as options upon request).

Version for outdoor applications (option - AQUA Link OD)

This version features guards on the entire unit perimeter.

The plate heat exchanger and the circulation pumps on the chilled beams side (if any) shall be protected against low temperatures by a heating cable to prevent problems due to freezing of the water-filled secondary circuit. The fitter shall protect against frost any sections of piping used to deliver feed water to the secondary circuit from the AQUA Link unit to the building.

Technical data

				AQUA Link size			
				110	140	220	300
		Chiller reference capacity	**[kW]**	from 90 to 110	from 111 to 143	from 144 to 224	from 225 to 293
STANDARD PRIMARY PUMP	(1)	Nominal absorbed power	[kW]	3	3	5,5	7,5
		Nominal absorbed current	[A]	6,2	6,2	10,6	17,5
OVERSIZED PRIMARY PUMP	(1)	Nominal absorbed power	[kW]	4	4	7,5	9,2
		Nominal absorbed current	[A]	7,8	7,8	17,5	17,3
STANDARD SECONDARY PUMP	(1)	Nominal absorbed power	[kW]	2,2	2,2	4	5,5
		Nominal absorbed current	[A]	4,6	4,6	7,8	10,6
OVERSIZED SECONDARY PUMP	(1)	Nominal absorbed power	[kW]	4	4	5,5	7,5
		Nominal absorbed current	[A]	7,8	7,8	10,6	14,5
DIMENSIONS AND WEIGHT	(2) (3)	Length	[mm]	3342	3342	3342	3342
		Height	[mm]	1880	1880	1880	1880
		Depth	[mm]	870	870	870	870
		Weight	[kg]	530	532	583	625
WATER GLYCOL MIXTURE TANK VOLUME			[l]	500	500	500	500

The values in the table are valid for primary loop glycol percentages from 20% to 40%
(1) Values valid for versions with a single pump, for double pump versions the values must be doubled
(2) (3) Approximate dimensions (actual length and height may differ a few centimeters from those shown). The weight is valid for the standard version AQUA Link IN 1PR

Operating limits

Standard units for indoor installation are designed and built to work with minimum room air temperature between 0°C and +45°C.

Units for outdoor installation are equipped with electrical heaters to protect the main components from freezing. The minimum operating temperature depends on the glycole amount in the hydronic circuit as follow:

- Glycole amount 20%: min. operating temperature -5°C
- Glycole amount 30%: min. operating temperature -10°C
- Glycole amount 40%: min. operating temperature -20°C

To check for the possibility to operate with different temperatures please contact the Technical Support.

Technical data

					AQUA Link size			
					110	140	220	300
		Maximum cooling capacity of combined chiller		**[kW]**	110,7	143,5	224,5	293,1
STANDARD PRIMARY PUMP	100% capacity (12/7°C) - 40% ethylen glycol	Maximum head pressure 2P	(1) (2)	[kPa]	118,9	98,3	96,6	117,8
		Maximum head pressure 1P	(1) (2)	[kPa]	128,8	115	115,3	149,4
		Power consumption at the maximum available pressure	(3)	[kW]	1,7	1,78	3,47	4,39
	100% capacity (12/7°C) - 30% ethylen glycol	Maximum head pressure 2P	(1) (2)	[kPa]	132,7	106,8	119,7	131,8
		Maximum head pressure 1P	(1) (2)	[kPa]	141,7	121,8	136,5	160,4
		Power consumption at the maximum available pressure	(3)	[kW]	1,65	1,72	3,38	4,22
	100% capacity (12/7°C) - 20% ethylen glycol	Maximum head pressure 2P	(1) (2)	[kPa]	144,1	113,8	128,2	143,1
		Maximum head pressure 1P	(1) (2)	[kPa]	152,2	127,5	153,6	169,2
		Power consumption at the maximum available pressure	(3)	[kW]	1,59	1,65	3,28	4,07
OVERSIZED PRIMARY PUMP	100% capacity (12/7°C) - 40% ethylen glycol	Maximum head pressure 2P	(1) (2)	[kPa]	186,6	154,9	175,2	168,9
		Maximum head pressure 1P	(1) (2)	[kPa]	195,6	171,5	193,8	200,5
		Power consumption at the maximum available pressure	(3)	[kW]	2,41	2,59	4,02	5,98
	100% capacity (12/7°C) - 30% ethylen glycol	Maximum head pressure 2P	(1) (2)	[kPa]	201,3	163,5	182,4	185,6
		Maximum head pressure 1P	(1) (2)	[kPa]	210,3	178,5	199,2	214,2
		Power consumption at the maximum available pressure	(3)	[kW]	2,33	2,49	3,86	5,76
	100% capacity (12/7°C) - 20% ethylen glycol	Maximum head pressure 2P	(1) (2)	[kPa]	213,7	170,6	188,2	199,1
		Maximum head pressure 1P	(1) (2)	[kPa]	221,9	184,3	203,5	225,2
		Power consumption at the maximum available pressure	(3)	[kW]	2,24	2,4	3,7	5,55
STANDARD SECONDARY PUMP	60% capacity (14/17°C) - Water	Maximum head pressure 2P	(1) (4)	[kPa]	185,3	161,1	161,4	200,5
		Maximum head pressure 1P	(1) (4)	[kPa]	191,9	172,2	174,8	221,6
		Power consumption at the maximum available pressure	(5)	[kW]	1,98	2,14	3,37	5,07
	70% capacity (14/17°C) - Water	Maximum head pressure 2P	(1) (4)	[kPa]	163,7	131,3	132,2	151,8
		Maximum head pressure 1P	(1) (4)	[kPa]	172,7	146,3	149,1	180,5
		Power consumption at the maximum available pressure	(5)	[kW]	2,08	2,23	3,57	5,3
	80% capacity (14/17°C) - Water	Maximum head pressure 2P	(1) (4)	[kPa]	139,1	97,1	96,1	93,4
		Maximum head pressure 1P	(1) (4)	[kPa]	150,9	116,8	118,2	130,8
		Power consumption at the maximum available pressure	(5)	[kW]	2,16	2,3	3,74	5,44
OVERSIZED SECONDARY PUMP	60% capacity (14/17°C) - Water	Maximum head pressure 2P	(1) (4)	[kPa]	251,4	293,9	231,2	283,4
		Maximum head pressure 1P	(1) (4)	[kPa]	258	305	243,5	304,5
		Power consumption at the maximum available pressure	(5)	[kW]	2,47	3,44	4,59	6,5
	70% capacity (14/17°C) - Water	Maximum head pressure 2P	(1) (4)	[kPa]	228,9	261,9	196,7	237,3
		Maximum head pressure 1P	(1) (4)	[kPa]	237,9	277	213,5	266
		Power consumption at the maximum available pressure	(5)	[kW]	2,61	3,64	4,88	6,87
	80% capacity (14/17°C) - Water	Maximum head pressure 2P	(1) (4)	[kPa]	202,8	224,6	155,8	181,5
		Maximum head pressure 1P	(1) (4)	[kPa]	214,5	244,3	177,8	219
		Power consumption at the maximum available pressure	(5)	[kW]	2,73	3,79	5,11	7,17
INTERMEDIATE HEAT EXCHANGER WATER PRES-SURE DROP	60% capacity (14/17°C)	Pressure drop on water side heat exchanger		[kPa]	24,3	23,7	36,9	24,6
	70% capacity (14/17°C)	Pressure drop on water side heat exchanger		[kPa]	32,6	31,9	49,9	33,2
	80% capacity (14/17°C)	Pressure drop on water side heat exchanger		[kPa]	42,1	41,2	64,7	42,9

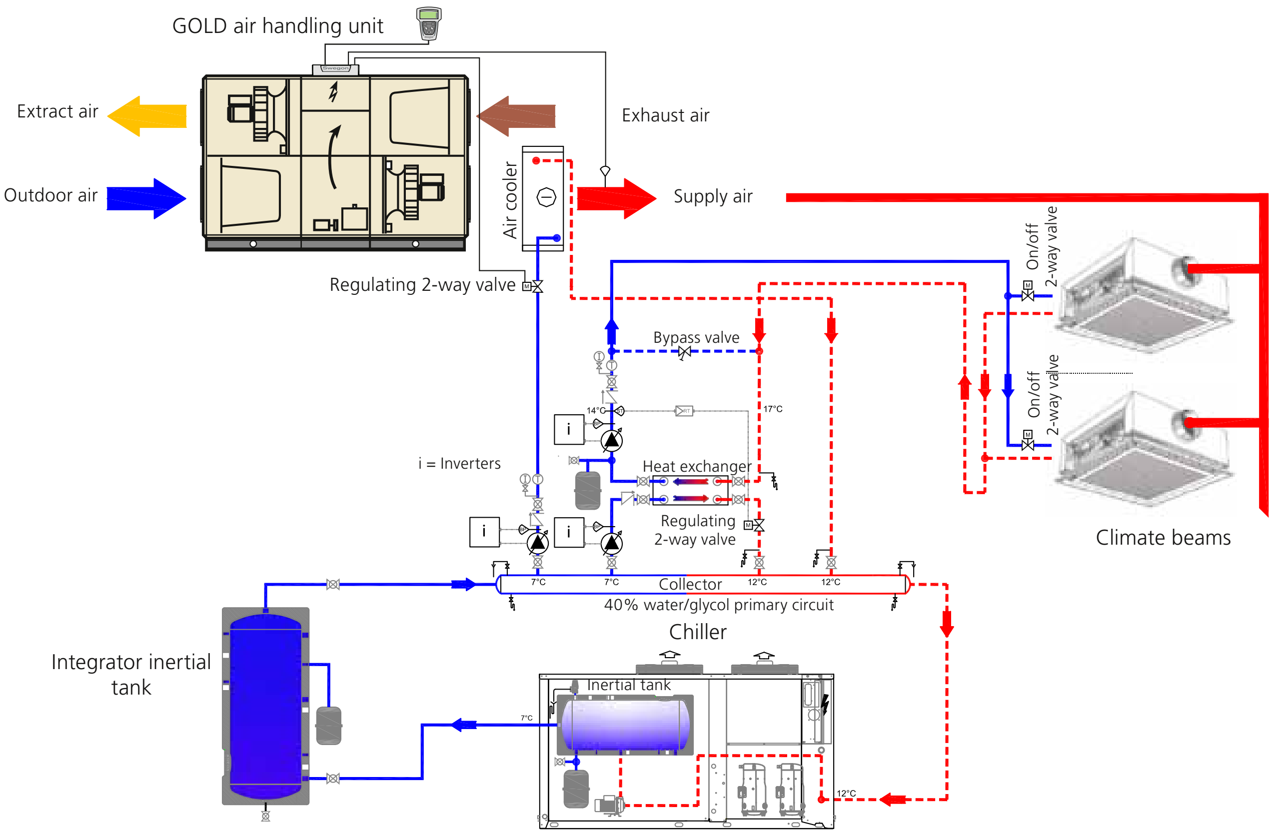
(1) Maximum allowable frequency: 50 Hz
(2) Available pressure that can be obtained if the pump should transfer to the users the maximum permissible power for that size with water temperature in / out from the chiller 12 / 7 ° C
(3) Power absorbed by the pump if it should transfer to the users the maximum permissible power for that size with water temperature in / out from the chiller 12 / 7 ° C and the maximum static pressure under the same conditions
(4) Static pressure that can be obtained if the pump should transfer to the Chilled Beams the indicated percent capacity with water temperature in / out 14/17 ° C from Chilled Beams
(5) Power absorbed by the pump if it should transfer to the Chilled Beams the indicated percent capacity with water temperature in / out 14/17 ° C from Chilled Beams and the maximum static pressure under the same conditions

Energy analysis

Two different types of plants have been used to simulate system operation with a view to quantifying the benefits that can be obtained through advanced management of the system elements.

1. Traditonal system

(see diagram below)

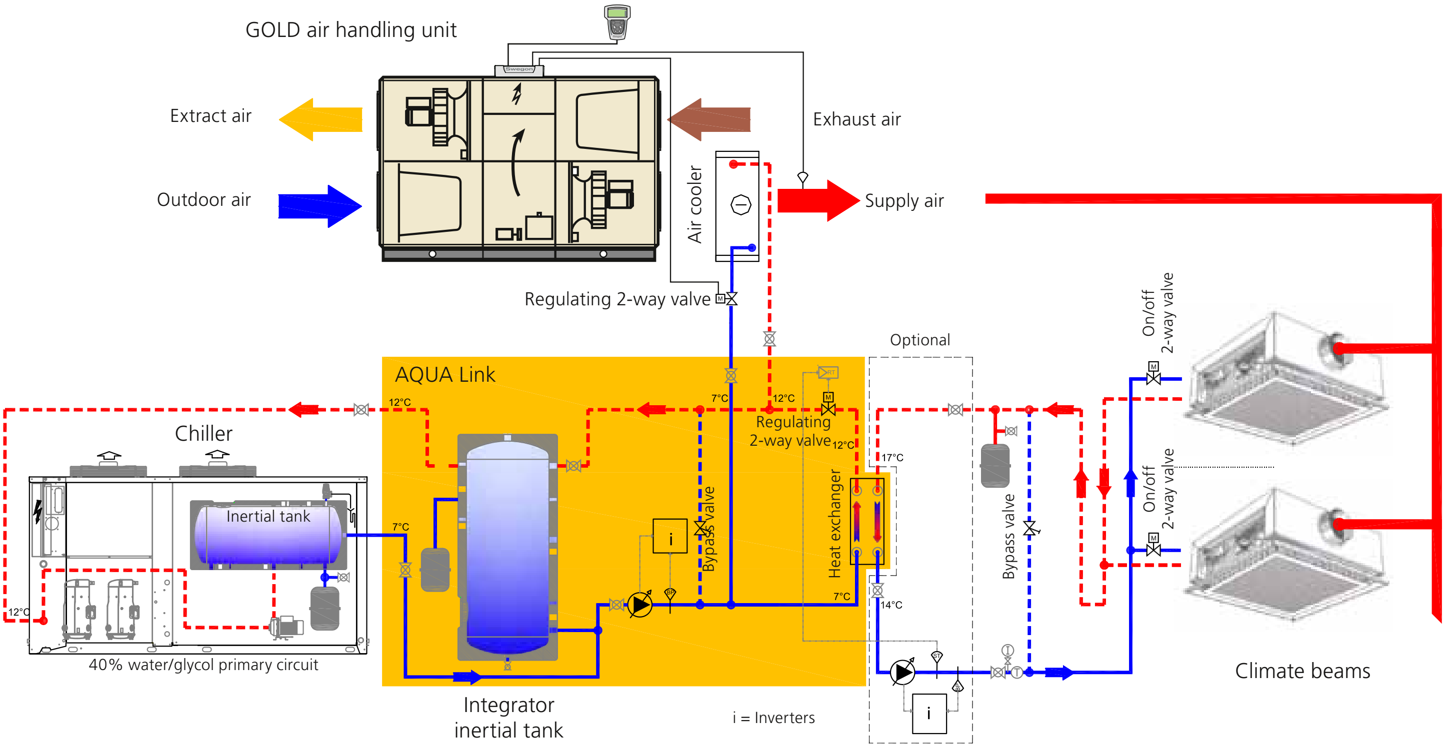


This system consists of the following components:

1. A fixed setpoint chiller with a known total power. The chiller is supplied with a water-glycol blend circulation pump and a small capacity inertial tank complete with an expansion vessel. In addition, the chiller features multiple compressors giving the possibility to reduce the supplied power according to the required power, still producing water at the same temperature;
2. An inertial tank complete with an expansion vessel to achieve the min. volume required in the plant proportionally to the chiller capacity and number of steps;
3. A manifold used to mismatch the users' feeding circuits;
4. A variable pump feeding the air handling unit coil;
5. A variable feed pump on the glycol side of the plate heat exchanger;
6. An inspectable plate heat exchanger to mismatch the section working with a blend of water and glycol from the section fed with pure water;
7. A variable feed pump to the chilled beams;
8. A complete air handling unit with a rotary heat exchanger (enthalpy rotor) and a air cooler complete with a 2-way modulating control valve;
9. A chilled beam system equipped with a 2-way valve to shut off the water supply;
10. Taps, valves and hydronic piping to connect the various components.

2. AQUA Link system

(see diagram below)



This system consists of the following components:

1. A variable setpoint chiller with a known total power. The chiller is supplied with a circulation pump for water-glycol blending and a small capacity inertial tank. In addition, the chiller features multiple compressors giving the possibility to reduce the supplied power according to the required power. The temperature of the output chilled water is connected to the user's requirements and may vary continuously between two setpoints.

2. The AQUA Link module, which comprises:

- An additional inertial tank complete with an expansion vessel to achieve the min. volume required in the plant proportionally to the chiller capacity and number of capacity steps;
- A variable circulation pump feeding the primary circuit;
- A pressure probe for pump rotation speed control;
- A plate heat exchanger to mismatch the section working with a blend of water and glycol from the section fed with pure water;
- A 2-way motor-driven modulating valve designed to control the flow rate to the users;
- A bypass valve for pressure containment in the primary circuit;
- Taps, valves and hydronic piping to connect the various components;

3. A complete air handling unit with a rotary heat exchanger (enthalpy rotor) and an air cooler complete with a 2-way modulating control valve;

4. A variable feed pump to the chilled beams;

5. A chilled beam system equipped with a 2-way valve to shut off the water supply.

The simulation was made keeping the same operating conditions in both systems. Below is a list of operating conditions that are fundamental to identify the test context.

Location of installation	Stockholm
Max. total required power	200 kW
Power distribution to 2 users: Air handling unit Chilled Beams	 60 kW (30%) 140 kW (70%)
Temperature below which the chilled beams do not require feeding with chilled water	0°C
Temperature below which the air handling unit can operate in free cooling conditions	16°C
Air delivery temperature to chilled beams	16°C
Outdoor temperature	from weather file covering 8760 hours
Outdoor enthalpy	from weather file covering 8760 hours
Outdoor air volume treated by the AHU	3,6 m^3/s (13 000 m^3/h)
No. of chilled beams	241

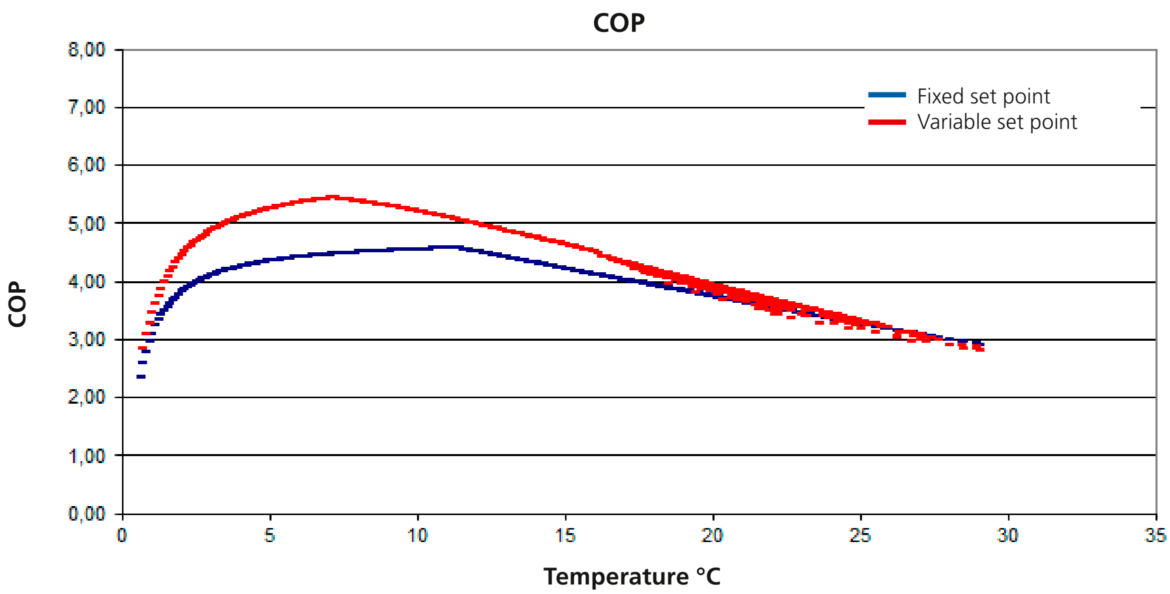
An iterative method was used to calculate the following values for each hour of operation of the chiller serving the plant:

- The hourly COP values;
- The power absorbed on an hourly basis and the absorbed energy, as a consequence.

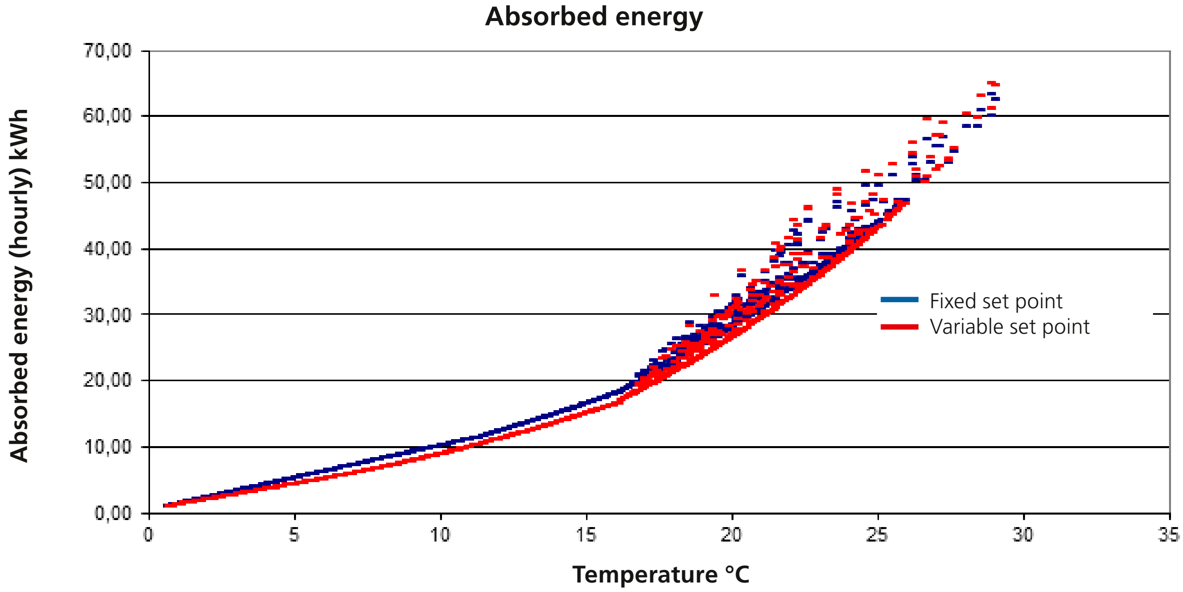
The analysis has enabled identification of:

- The energy consumed by the variable setpoint system (supposing that the water temperature delivered by the chiller varies according to the chill request);
- The energy consumed by the same system, but with a fixed setpoint, producing water at a constant temperature of 7°C for the GOLD air handling unit and chilled beams regardless of fluctuations in the required power.

The trends of the COP value measured every hour throughout the annual 8760 hours is illustrated below.

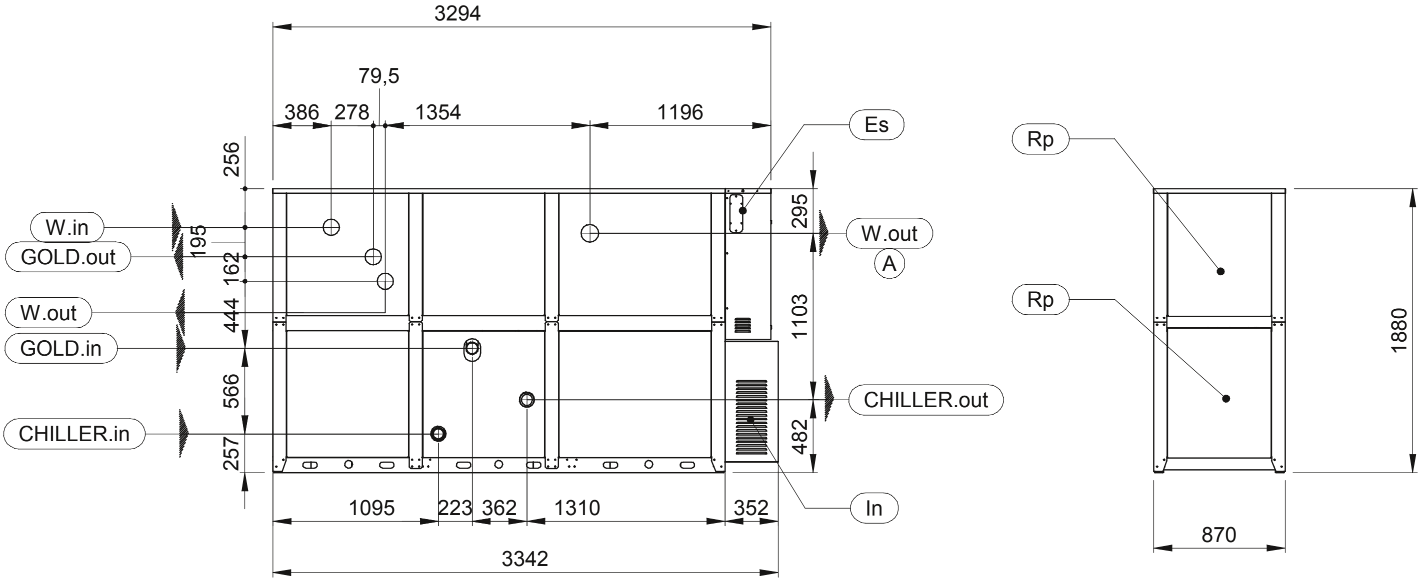


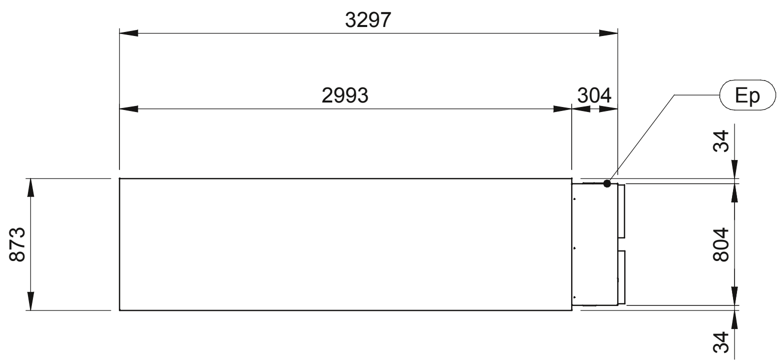
The analysis was conducted considering real chiller operating conditions and the actual energy consumption of the axial fans serving the condensing section.

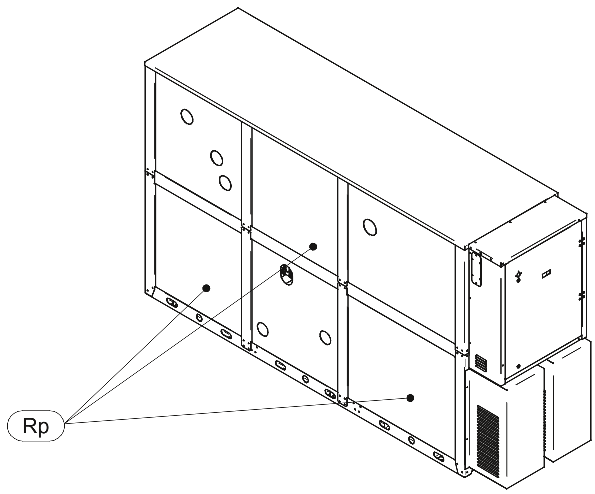


Reduction coefficient fans		Fixed set point chiller	Variable set point chiller
Absorbed energy (annual)	[kWh]	81,659	74,709
Consumption reduction	[kWh]	0	6,949
Consumption reduction	%	0,0%	8,5%

Overall dimensions, weights and hydronic connections AQUA Link 100/140





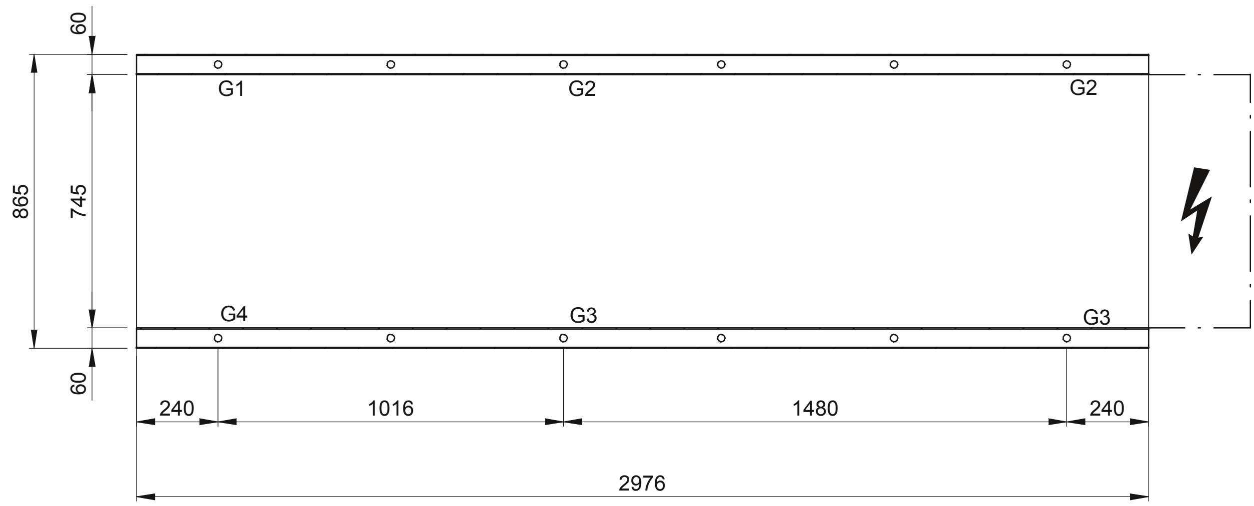


Chiller in	G 2"1/2 F
Chiller out	G 2"1/2 F
W in	G 2"1/2 F
W out	G 2"1/2 F
GOLD in	G 2"1/2 F
GOLD out	G 2"1/2 F

(A) With optional water pump

In	Inverter
Es	Electrical supply inlet
Rp	Removable panel

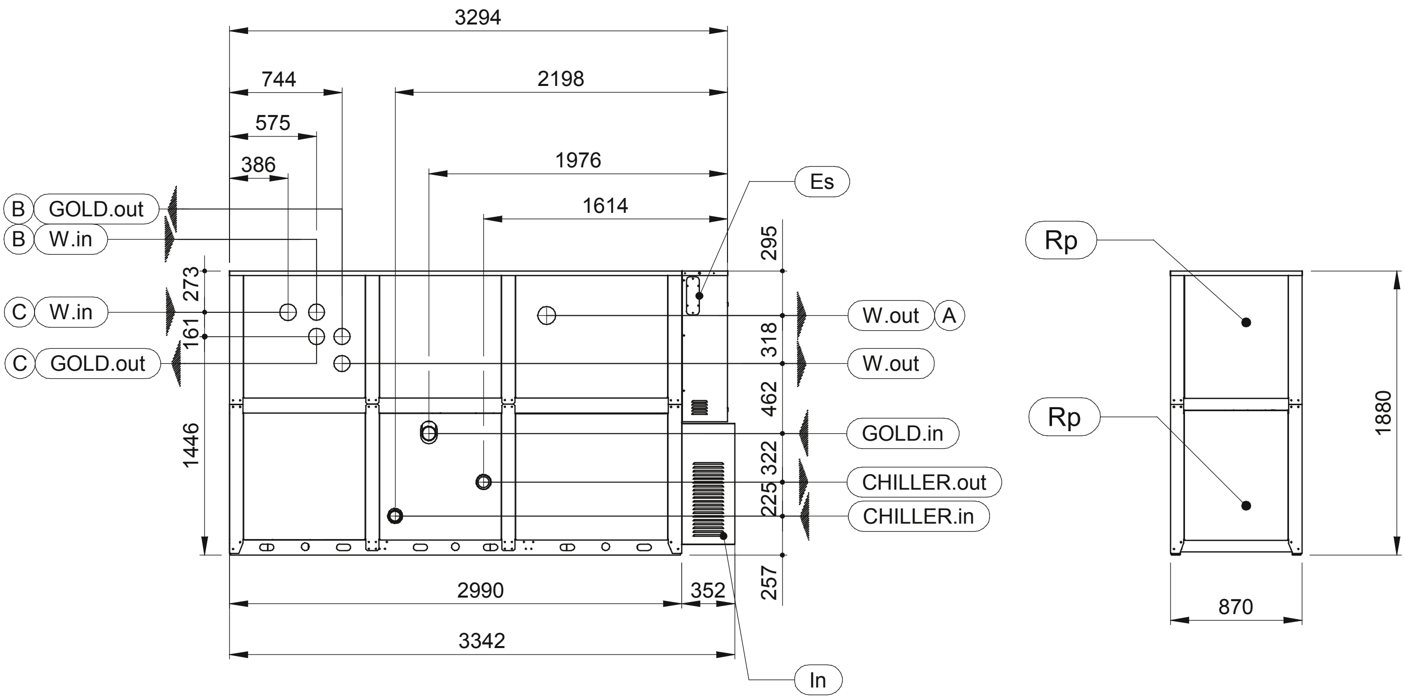
Overall dimensions, weights and hydronic connections AQUA Link 100/140

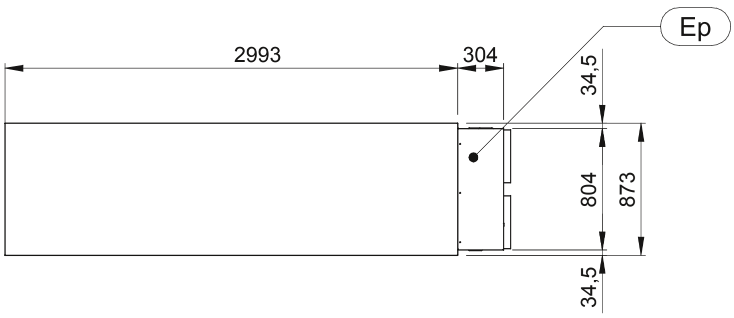


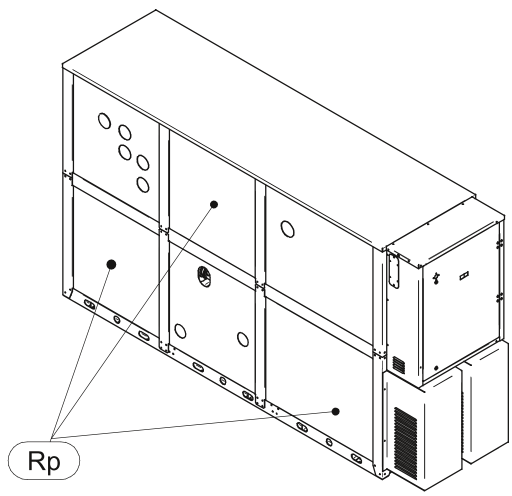
Model	Weight (kg)	Operating weight (kg)	G1 (kg)	G2 (kg)	G3 (kg)	G4 (kg)
AQUALink 110 2P2P	659	1159	349	146	118	282
AQUALink 140 2P2P	654	1154	361	151	112	267
AQUALink 110 2P2P_LN	847	1347	370	183	152	307
AQUALink 140 2P2P_LN	840	1340	381	188	145	293
AQUALink 110 1P	530	1030	341	112	92	281
AQUALink 140 1P	532	1032	358	117	87	266
AQUALink 110 1P_LN	718	1218	362	149	126	306
AQUALink 140 1P_LN	722	1222	377	155	121	293
AQUALink 110 1P1P	570	1070	340	128	102	270
AQUALink 140 1P1P	574	1074	356	134	97	256
AQUALink 110 1P1P_LN	758	1258	360	165	136	296
AQUALink 140 1P1P_LN	760	1260	375	171	130	283
AQUALink 110 2P	565	1065	317	139	110	250
AQUALink 140 2P	573	1073	377	122	89	274
AQUALink 110 2P_LN	752	1252	337	176	144	275
AQUALink 140 2P_LN	760	1260	395	160	122	301

Fh	Fixing hole
G	Vibration damper foot hold

Overall dimensions, weights and hydronic connections AQUA Link 220/300





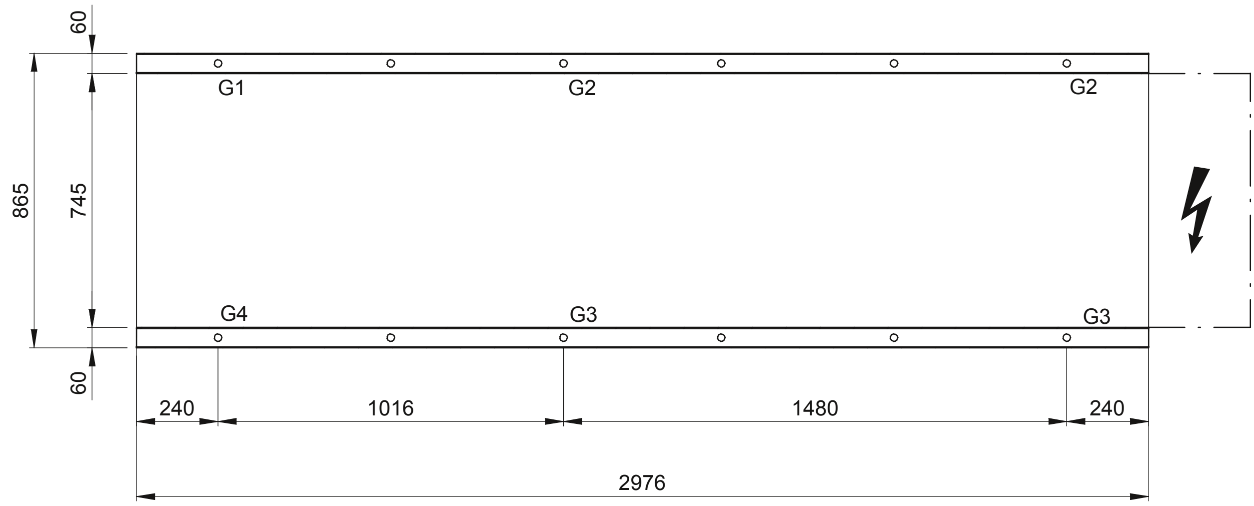


Chiller in	G 3" F
Chiller out	G 3" F
W in	G 3" F
W out	G 3" F
GOLD in	G 3" F
GOLD out	G 3" F

In	Inverter
Ep	Electrical panel
Es	Electrical supply inlet
Rp	Removable panel

(A) AQUA Link size 300
(B) AQUA Link size 220
(C) With optional water pump

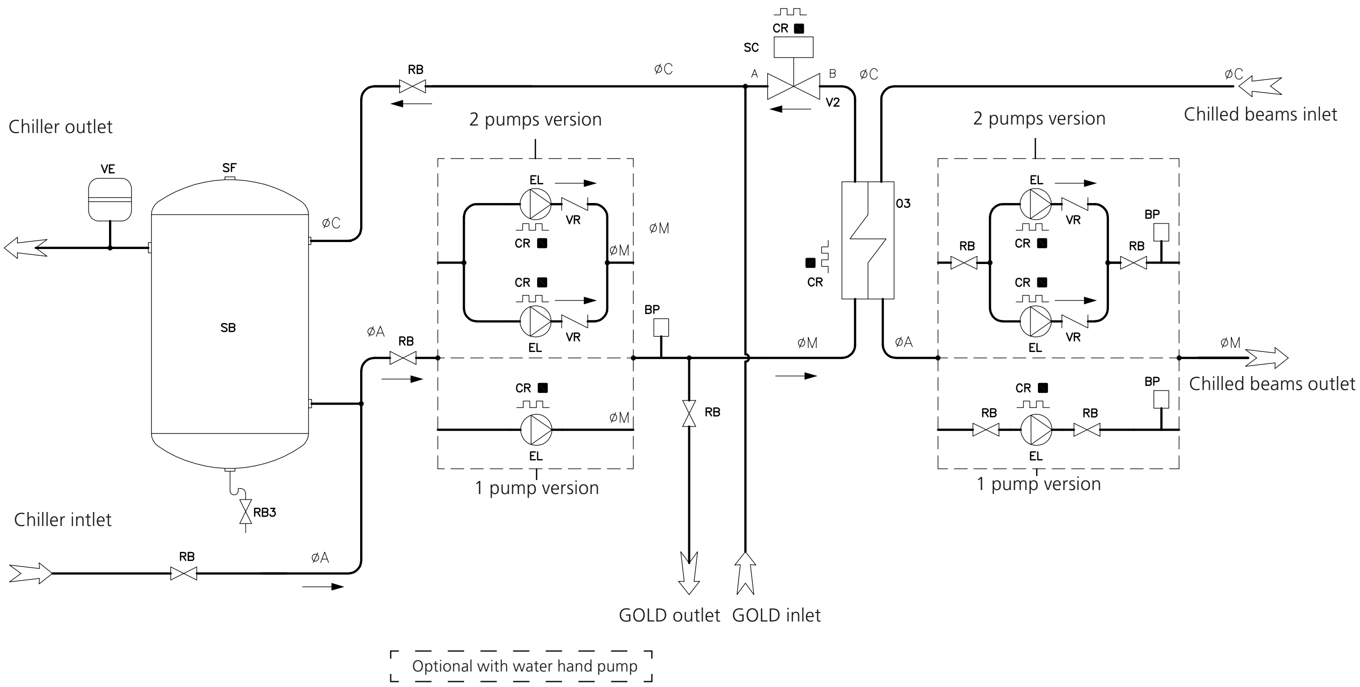
Overall dimensions, weights and hydronic connections AQUA Link 220/300



Model	Weight (kg)	Operating weight (kg)	G1 (kg)	G2 (kg)	G3 (kg)	G4 (kg)
AQUALink 220 1P	583	1083	395	125	85	268
AQUALink 300 1P	625	1125	461	139	73	240
AQUALink 220 1P_LN	770	1270	412	164	117	296
AQUALink 300 1P_LN	810	1310	474	179	103	272
AQUALink 220 2P2P	796	1296	398	186	127	272
AQUALink 300 2P2P	884	1384	457	217	120	253
AQUALink 220 2P2P_LN	984	1484	417	224	160	299
AQUALink 300 2P2P_LN	1072	1572	474	256	152	282
AQUALink 220 1P1P	796	1296	398	186	127	272
AQUALink 300 1P1P	884	1384	457	217	120	253
AQUALink 220 1P1P_LN	984	1484	417	224	160	299
AQUALink 300 1P1P_LN	1072	1572	474	256	152	282
AQUALink 220 2P	583	1083	395	125	85	268
AQUALink 300 2P	625	1125	461	139	73	240
AQUALink 220 2P_LN	770	1270	412	164	117	296
AQUALink 300 2P_LN	810	1310	474	179	103	272

Fh	Fixing hole
G	Vibration damper foot hold

Single-Line hydronic diagram



Pos.	Description
VR	Check valve
CR	Heating electric cable
03	Evaporator
BP	Pressure transducer
RB	Shut-off valve
EL	Electric pump
V2	2-way valve
SC	2-way valve actuator
VE	Expansion vessel
SB	Tank
SF	Bleed valve
V2	2-way valve

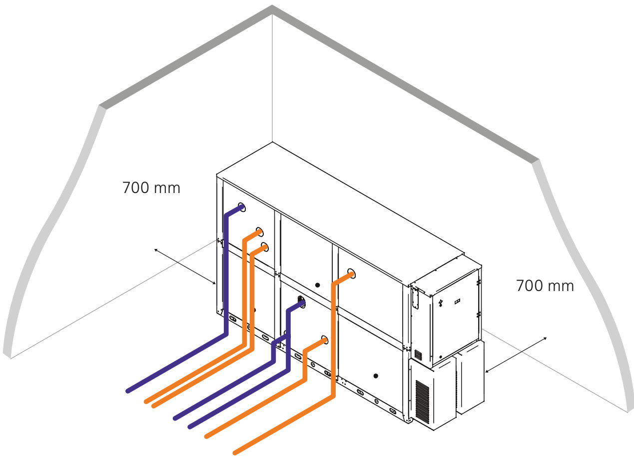
Model	Ø M	Ø A	Ø C
110	2”1/2	2”1/2	2”1/2
140	3”	2”1/2	2”1/2
220	3”	2”1/2	3”
300	3”	2”1/2	3”

Installation tips

Check that the location where the unit is installed provides for easy connection of the hydronic piping coming from the chiller and the terminal units. Refer to the dimension drawings attached to this Technical Booklet to locate the connections.

Place the unit so that a minimum distance is left, as shown in the dimension drawings.

Place the unit in a manner that assures the lowest environmental impact (noise emissions, integration with nearby structures, etc.).



Summary

Advantages for the fitter

The construction of a hydronic system serving the air conditioning unit in a building is undoubtedly a complex operation both hydronically and in terms of easy management and control, first of all because the main elements making up the system (chiller, UTA, chilled beams) must be selected and, secondly, because they must be networked.

Besides the main parts mentioned above, a hydronic system also comprises a series of “accessory” components such as pumps, tanks, shut-off valves, control valves, filling units, manifolds for circuit mismatching, etc. that must be selected, installed in a dedicated compartment (distribution box) and interconnected.

The operating logic at the design stage may be affected by the features of these components and their capacity to respond to control signals originating from the system constituting elements.

AQUA Link was designed to simplify commissioning of the plant, thus reducing both installation and plant management costs.

This is why it is complete with all the elements required for the hydronic circuit, which are normally excluded from the supply of the main units and must be procured from the fitter.

Provision of these elements in one single shell, that is sized by the manufacturer at earlier stages, offers a number of advantages:

- One single interlocutor for the entire plant eliminates possible inconveniences relating to identification of responsibilities and difficult communications with the various parties involved;
- Accurate sizing that can be tested at any time against complete documentation;
- Quick commissioning compared to other solutions: the system only requires hydronic and electrical connection between the chiller, the users and AQUA Link to operate;
- One individual standardised communication protocol between the various elements;
- Well-organised, compact and easy-to-find location of components;
- No dedicated compartment required to contain all the featured elements (when the outdoor version is selected);
- Operating options to adapt AQUA Link to the different plant engineering requirements (high heads, mismatching of primary and secondary circuits, installation outdoors or indoors, etc.);
- A dedicated selection software to check the performances of the unit according to the features of the served plant.

Advantages for the end user

After implementation, the system must operate smoothly without downtimes and with minimised energy consumption, yet meeting the users’ requirements.

High chiller and terminal unit performances are no guarantee that the second objective above be achieved, especially if, as is the case with all traditional plants, the production temperature of chilled water is established univocally at the design stage and is determined according to the heaviest work conditions envisaged for system operation.

As a matter of fact, the operating conditions of the system vary according to different parameters:

- indoor temperature;
- outdoor temperature;
- outdoor air humidity;
- number of people in the room(s);
- exposure of various areas to sun radiation;
- possibility to go for free cooling;
- etc.

This said, it is fundamental that the system responds to the users’ requirements in real time.

Thanks to this option, for instance, the unit heavily consumes energy only when the operating conditions are heavy. This results into a decrease in global energy consumption that derives from improved energy efficiency for the chiller and reduced energy requirements for water-glycol blend pumping.

The awareness of the end user on matters regarding energy consumption is undeniable and self-evident. AQUA Link can play a major role in this thanks to:

- Reduced indirect consumption: the consumption of energy supplied to the chiller and used to produce chilled water is reduced through a setpoint that varies continuously and according to the users’ requirements;
- Reduced direct consumption: the consumption of energy used to pump water to the primary and secondary circuits (version 1P-1P or 2P-2P) is reduced through inverter-controlled variable pumps that only absorb the min. amount of energy required by the plant;
- Reduced indirect consumption: the consumption of energy required for water pumping is reduced through the use of one single pump to the primary circuit to serve both users.
- Decreasing of footprint: all equipment and components are condensed in one unique volume, AQUA Link can be placed outdoor.