Full INVERTER R-290 chillers

- Full INVERTER compressors.
- Natural refrigerant R-290.
- High energy efficiency.
- Easy installation.

Water or glycol chillers for commercial and industrial refrigeration applications with reduced R-290 load and full INVERTER compressors.

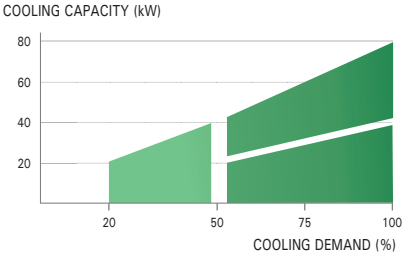
Features

- 400V 3 50Hz power supply. Available in 60Hz. Others voltages by request.
- Reduce refrigerant charge of R-290.
- Self-supporting body made of galvanised sheet steel with polyester weatherproof paint.
- Separate compressor compartment with leak detector and ATEX extraction fan (optional in WW series).
- Semihermetic R-290 compressors with unloaded start-up, with ATEX class crankcase heater, with Inverter drive in each compressor (Full INVERTER).
- Cooling circuit made of annealed copper tube with soldered connections, filter drier, ATEX high and low pressure switches, pressure transducers and temperature probes, and ducted safety valve by cooling circuit with common discharge.
- In WW without acoustic panel, one leak detector is equipped in sizes 1 and 2, two detectors in sizes 3 and 4, and three detectors in size 5. In WW with acoustic panel, a single detector and an ATEX centrifugal exhaust fan in continuous operation are equipped. In WT, a single detector and ATEX axial extraction fans in continuous operation are equipped.
- Microchannel condenser coils with Polyester Powder Coating treatment.
- Variable flow electronic fans.
- Stainless steel plate evaporators with electronic expansion valve.
- Hydraulic circuit made of copper pipe with threaded connections, fill/drain valve, air vent, flow switch, thermometers and inlet/outlet pressure gauges.
- Single electrical panel in WT, WW-1, WW-2, WW-3. Double electrical panel with independent electrical connection in WW-4 and WW-5. Watertight electrical control and power panel, with differential switch and magneto-thermal switch for manoeuvre. In WW-1: Differential switch and circuit breaker for each compressor and each fan. In WT, WW-2, WW-3, WW-4, WW-5: Common differential switch for compressor and fans, and circuit breaker for each compressor and for each condenser fan.
- Independent electrical connection to the extraction fan and leak detector, with differential and circuit breaker protection.
- Can be combined with external primary or secondary hydraulic groups GV series for WT units, or GW series (with connection possibility) for WW units.
- Programmable Emerson electronic control unit with refrigeration control with floating set point (external signal 0-10 V), condensing fan control with floating set point, pump control, external signal for Silence mode, alarm light and acoustic leak detection light. Independent electrical panel for the hydraulic unit.

Full INVERTER

The Full INVERTER system provides precise control over the glycol supply temperature, in the face of a variable refrigeration demand.

This system controls sequentially and simultaneously the capacity of the compressors, varying the motor speed from 30 to 70Hz, and avoiding starts and stops, with significant energy savings.



Reduced refrigerant charge

Full INVERTER WT series
R-290 < 5 kg/circ.

Full INVERTER WW series
R-290 < 10 kg/circ.

The R-290 chiller units are designed with multiple refrigerant circuits in parallel, with independent condensers.
Each circuit has a reduced refrigerant charge of R-290, to comply with the charge limits of the European standard EN378, to allow the chillers to be installed even outdoors in commercial establishment.

Category of the establishment	Location of equipment	
	Indoor (type 1)	Outdoor (type 3)
A. Public access	1.5 kg	5 kg
B. Supervised access	2.5 kg	10 kg
C. Restricted access	10 kg	No limit

400V 3 50Hz | High temperature | Semihermetic compressor Full INVERTER | R-290

Refrigerant	Compressor	Series / Model	Compressor HP	Compressor Model	Cooling capacity (kW) [1] I/O water temperature 12/7 °C [1]	Input power (kW)	Ecodesign SEPR [3]	Max. input current (A)	Condenser Fan Ø (mm)	Condenser Air flow (m³/h)	Water flow (m³/h)	Hydraulic connection	Weight (kg)	SPL dB(A) [4]
R-290	1x Semiherm.	AWT-FD-1 0121	12i	S12-42AXH Full Inverter	37	13.7	5.6	25	1x Ø 800	17 000	6.3	2"	790	48
		AWT-FD-1 0151	15i	S15-52AXH Full Inverter	44	16.7	5.8	32	1x Ø 800	17 000	7.5	2"	800	49
		AWT-FD-1 0201	20i	S20-56AXH Full Inverter	48	19.1	5.9	39	1x Ø 800	17 000	8.2	2"	805	50
		AWT-FD-1 0251	25i	V25-71AXH Full Inverter	56	23.5	5.9	40	1x Ø 800	17 000	9.6	2 1/2"	860	50
	2x Semihermetic	AWT-FD-2 0242	24i	2x S12-42AXH Full Inverter	73	27.6	5.6	50	2x Ø 800	34 000	12.5	2 1/2"	1 130	51
		AWT-FD-2 0302	30i	2x S15-52AXH Full Inverter	87	33.6	5.8	64	2x Ø 800	34 000	14.9	3"	1 140	52
		AWT-FD-2 0402	40i	2x S20-56AXH Full Inverter	96	38.3	5.9	79	2x Ø 800	34 000	16.4	3"	1 150	53
		AWT-FD-2 0502	50i	2x V25-71AXH Full Inverter	112	47.1	5.9	81	2x Ø 800	34 000	19.2	3"	1 260	53
		AWW-FD-1 0502	50i	2x V25-71AXH Full Inverter	115	45.5	6.4	82	2x Ø 800	46 000	19.7	DN80	1 525	51
		AWW-FD-1 0702	70i	2x V35-103AXH Full Inverter	156	64.2	6.4	102	2x Ø 800	44 000	26.7	DN80	1 540	53
		AWW-FD-2 0802	80i	2x Z40-126AXH Full Inverter	213	75.4	6.8	138	4x Ø 800	92 000	36.5	DN100	2 780	56
		AWW-FD-2 1002	100i	2x Z50-168AXH Full Inverter	267	103.0	6.6	165	4x Ø 800	88 000	45.7	DN100	2 785	58
		AWW-FD-2 1502	150i	2x W75-228AXH Full Inverter	340	141.3	6.2	231	4x Ø 800	88 000	58.4	DN125	2 953	61
	3x Sh.	AWW-FD-3 1203	120i	3x Z40-126AXH Full Inverter	320	113.0	6.4	207	6x Ø 800	138 000	54.7	DN125	4 160	58
		AWW-FD-3 1503	150i	3x Z50-168AXH Full Inverter	401	155.0	6.8	248	6x Ø 800	132 000	68.5	DN125	4 170	60
		AWW-FD-3 2253	225i	3x W75-228AXH Full Inverter	513	212.4	6.2	347	6x Ø 800	132 000	88.0	DN125	4 421	63
	4x Sh.	AWW-FD-4 2004	200i	4x Z50-168AXH Full Inverter	534	206.0	6.8	330	8x Ø 800	176 000	91.4	DN125	5 550	61
		AWW-FD-4 3004	300i	4x W75-228AXH Full Inverter	684	283.2	6.2	463	8x Ø 800	176 000	117.3	DN150	5 889	64
	5x	AWW-FD-5 3755	375i	5x W75-228AXH Full Inverter	855	354.0	6.2	579	10x Ø 800	220 000	146.6	DN150	7 357	65

400V 3 50Hz | Positive temperature | Semihermetic compressor Full INVERTER | R-290

Refrigerant	Compressor	Series / Model	Compressor HP	Compressor Model	Cooling capacity (kW) [1] I/O 35 % propylene glycol temperature -2/-8 °C [2]	Input power (kW)	Ecodesign SEPR [3]	Max. input current (A)	Condenser Fan Ø (mm)	Condenser Air flow (m³/h)	Glycol flow (m³/h)	Hydraulic connection	Weight (kg)	SPL dB(A) [4]
R-290	1x Semiherm.	MWT-FD-1 0121	12i	S12-42AXH Full Inverter	24	13.2	3.2	26	1x Ø 800	17 000	3.7	2"	790	48
		MWT-FD-1 0151	15i	S15-52AXH Full Inverter	29	15.6	3.4	33	1x Ø 800	17 000	4.5	2"	800	49
		MWT-FD-1 0201	20i	S20-56AXH Full Inverter	32	17.6	3.4	41	1x Ø 800	17 000	4.9	2"	805	50
		MWT-FD-1 0251	25i	V25-71AXH Full Inverter	37	21.3	3.5	42	1x Ø 800	17 000	5.7	2"	860	50
	2x Semihermetic	MWT-FD-2 0242	24i	2x S12-42AXH Full Inverter	48	26.6	3.2	52	2x Ø 800	34 000	7.4	2 1/2"	1 130	51
		MWT-FD-2 0302	30i	2x S15-52AXH Full Inverter	58	31.3	3.4	67	2x Ø 800	34 000	8.8	2 1/2"	1 140	52
		MWT-FD-2 0402	40i	2x S20-56AXH Full Inverter	62	35.6	3.4	81	2x Ø 800	34 000	9.5	2 1/2"	1 150	53
		MWT-FD-2 0502	50i	2x V25-71AXH Full Inverter	74	42.7	3.5	83	2x Ø 800	34 000	11.3	2 1/2"	1 260	53
		MWW-FD-1 0502	50i	2x V25-71AXH Full Inverter	77	41.2	3.8	82	2x Ø 800	46 000	11.8	DN80	1 525	51
		MWW-FD-1 0702	70i	2x V35-103AXH Full Inverter	109	56.7	4.1	102	2x Ø 800	44 000	16.7	DN80	1 540	53
		MWW-FD-2 0802	80i	2x Z40-126AXH Full Inverter	141	70.5	3.9	138	4x Ø 800	92 000	21.6	DN100	2 780	56
		MWW-FD-2 1002	100i	2x Z50-168AXH Full Inverter	180	92.8	4.0	165	4x Ø 800	88 000	27.6	DN100	2 785	58
		MWW-FD-2 1502	150i	2x W75-228AXH Full Inverter	227	125.9	4.0	231	4x Ø 800	88 000	34.9	DN100	2 953	61
	3x Sh.	MWW-FD-3 1203	120i	3x Z40-126AXH Full Inverter	212	106.0	3.9	206	6x Ø 800	138 000	32.5	DN100	4 160	58
		MWW-FD-3 1503	150i	3x Z50-168AXH Full Inverter	270	139.0	4.0	247	6x Ø 800	132 000	41.3	DN100	4 170	60
		MWW-FD-3 2253	225i	3x W75-228AXH Full Inverter	342	189.3	4.0	347	6x Ø 800	132 000	52.6	DN125	4 421	63
	4x Sh.	MWW-FD-4 2004	200i	4x Z50-168AXH Full Inverter	360	186.0	4.0	330	8x Ø 800	176 000	55.1	DN125	5 550	61
		MWW-FD-4 3004	300i	4x W75-228AXH Full Inverter	455	251.8	4.0	463	8x Ø 800	176 000	69.8	DN125	5 889	64
	5x	MWW-FD-5 3755	375i	5x W75-228AXH Full Inverter	568	314.8	4.0	579	10x Ø 800	220 000	87.3	DN150	7 357	65

Options

- Change to Bitzer Full INVERTER compressor, except 75HP models (on request).
- Partial (20 %) or total (100 %) heat recovery.
- Kit for low outdoor temperature operation (< -15°C) with pressure control valves, liquid receiver, electrical panel heating.
- Coil made of copper microtube and aluminium fins, with optional polyurethane corrosion protection.
- WT series only: Integrated primary hydraulic unit with glycol circulating pump, expansion tank, safety valve, mesh filter, thermometers and pressure gauges, air vent, drain port and service valves, with the possibility of a reserve pump.
- Electronic radial fans.
- Trigger coil in magneto-thermal control switch.
- Electronic controller and spare driver.

[1] Nominal performance high temperature: 35 °C ambient temperature with water inlet/outlet at 12/7 °C.

[2] Nominal performance positive temperature: 35 °C ambient temperature with glycol inlet/outlet at -2/-8 °C, with a propylene glycol concentration of 35 %.

[3] Seasonal performance factor (SEPR) according to Commission Regulation (EU) 2015/1095 and (EU) 2016/2281.

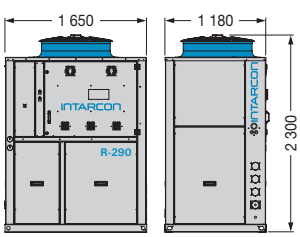
[4] Sound pressure level with compressor(s) operating at 50 Hz, directivity 1, measured at 10 m from the source (non-binding value calculated from sound power).

Dimensions WW (mm)	A
1 series	1 947
2 series	3 422
3 series	4 899
4 series	6 848
5 series	8 329

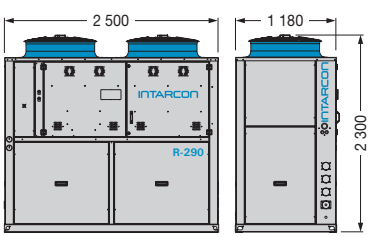
[*] Dimension of the additional module according to the configuration of the pump set of the equipment.

Dimensions

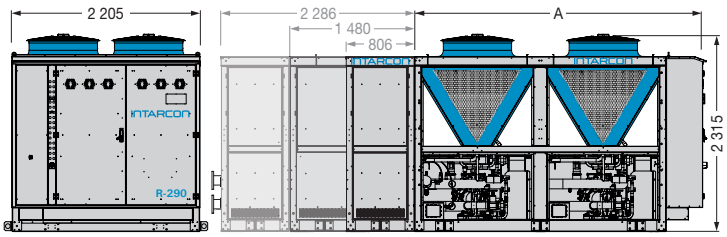
WT-1 series



WT-2 series



WW series



Dimensions in mm.

Pump set [*]

Pump sets for WV series

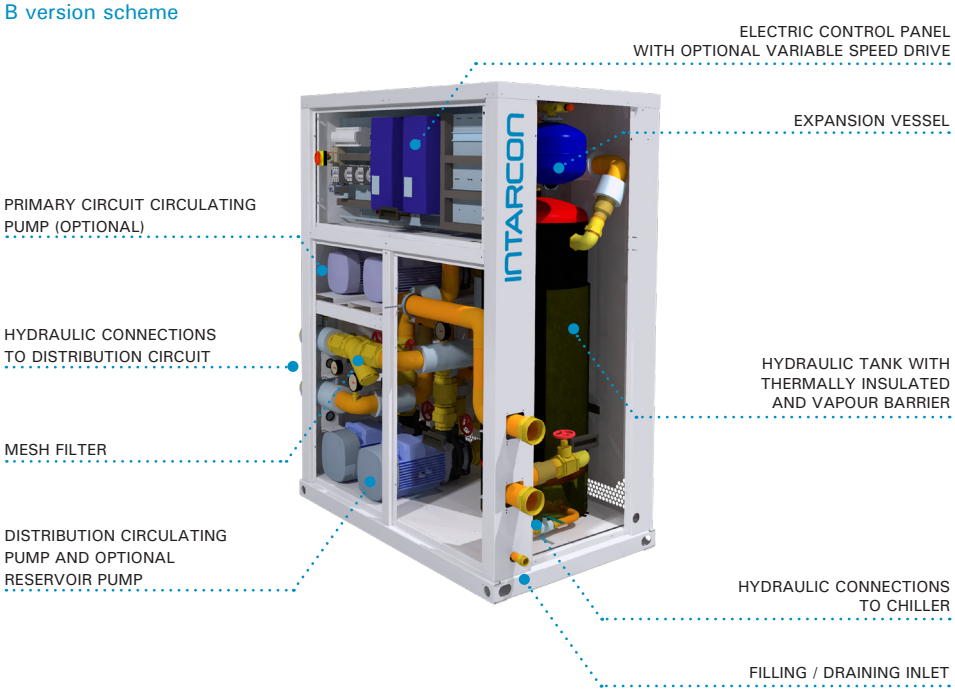
- Easily integrated modular construction.
- Optimised water and glycol assemblies.
- Reduced footprint.

Closed-circuit pump sets glycol, assembled in galvanised sheet steel bodywork and structure with polyester paint for outdoor installation.

Features

- 400V 3N 50Hz power supply. Available in 60Hz. Others voltages by request.
- Glycol circulating pump with stainless steel impeller and optional back-up pump.
- Buffer tank with high density polyurethane foam insulation and vapour barrier (AH-2 and B series).
- Closed membrane expansion tank and safety valve calibrated to 4 bar.
- Mesh filter.
- Glycerine thermometers and pressure gauges.
- Air vent.
- Drain connection.
- Threaded hydraulic connections.
- Electrical control and power panel with magneto-thermal protection and independent differential for each pump, and electronic control unit for the management and rotation of secondary circuit pumps.

B version scheme

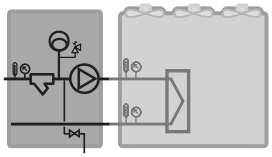


Versions

- A version

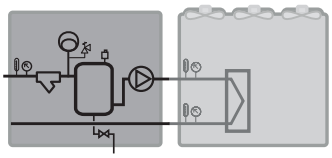
GV-AH-1: Primary pump set

Simple hydraulic unit with circulating pump, mesh filter and expansion vessel.



GV-AH-2: Primary pump set unit with buffer tank

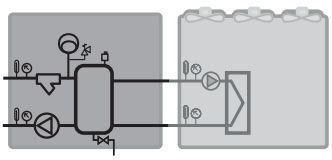
Pump set with medium or high pressure circulating pump at constant flow rate, for connection to one or more chillers.



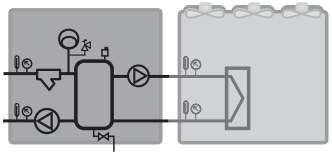
- B version

GV-BH-2: Secondary circuit pump set

Secondary circuit hydraulic unit, with buffer tank and medium or high pressure circulating pump at constant or variable flow rate (optional), for connection to one or more chiller equipped with primary circuit pump.



Optional: low-pressure primary pump in hydraulic unit, for connection to a chillers.



400V 3N 50Hz | High temperature | Water

	Series / Model	Water flow (m^3/h) 7 °C [1]	Main pump (kW)	Available pressure (kPa) [3]	Inertia tank except 1 series (litres)	Expansion vessel (litres)	Hydraulic connection	Auxiliary primary pump B version (kW)	Service weight (kg)
WATER	AGV-AH-2 006 AGV-BH-2 006	3 to 6	1.1	300 to 200	100	5	2"	0.65	655
	AGV-AH-2 009 AGV-BH-2 009	6 to 9	1.5	250 to 200	100	5	2"	0.65	670
	AGV-AH-2 012 AGV-BH-2 012	9 to 12	1.5	230 to 160	100	5	2 1/2"	0.65	680
	AGV-AH-2 015 AGV-BH-2 015	12 to 15	2.2	280 to 230	200	8	2 1/2"	0.65	800
	AGV-AH-2 020 AGV-BH-2 020	15 to 20	2.2	270 to 180	200	8	3"	1.10	805
	AGV-AH-2 025 AGV-BH-2 025	20 to 25	4.0	240 to 170	200	15	3"	2.20	860

400V 3N 50Hz | Positive temperature | Glycol

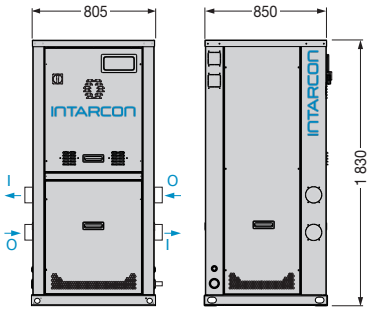
	Series / Model	Flow MPG 35 % (m^3/h) -8 °C [2]	Main pump (kW)	Available pressure (kPa) [3]	Inertia tank except 1 series (litres)	Expansion vessel (litres)	Hydraulic connection	Auxiliary primary pump B version (kW)	Service weight (kg)
GLYCOL	MGV-AH-2 003 MGV-BH-2 003	2 to 4	0.65	220 to 150	100	5	1 1/2"	0.46	600
	MGV-AH-2 004 MGV-BH-2 004	2 to 4	1.1	320 to 230	100	5	1 1/2"	0.46	615
	MGV-AH-2 005 MGV-BH-2 005	4 to 6	1.1	270 to 150	100	5	2"	0.65	650
	MGV-AH-2 006 MGV-BH-2 006	4 to 6	1.5	290 to 230	100	5	2"	0.65	675
	MGV-AH-2 008 MGV-BH-2 008	6 to 9	1.5	240 to 150	100	8	2"	0.65	680
	MGV-AH-2 009 MGV-BH-2 009	6 to 9	2.2	290 to 220	100	8	2"	0.65	690
	MGV-AH-2 012 MGV-BH-2 012	9 to 12	2.2	270 to 200	200	15	2 1/2"	1.10	800
	MGV-AH-2 015 MGV-BH-2 015	12 to 15	4.0	230 to 200	200	15	2 1/2"	1.10	840

Options

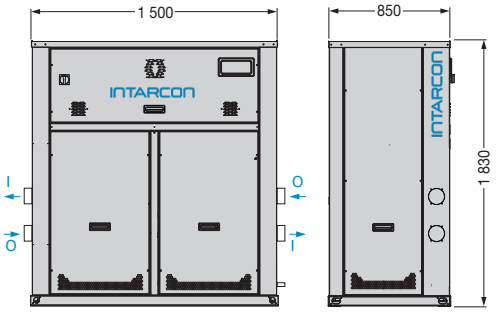
- Back-up main pump.
- Variable speed drive on main pump.
- Auxiliary back-up pump.
- Electronic control for heat recovery.

Dimensions

1 series



2 series



Dimensions in mm.

[1] Performance calculated for pumping water at 7°C.

[2] Performance calculated for pumping 35 % propylene glycol concentration at -8°C.

[3] Hydraulic pressure available for the distribution circuit and the chiller.

Primary circuit auxiliary pump

Auxiliary pump in the primary circuit is a low-pressure pump sized with an available pressure of about 100 kPa, enough to overcome the pressure drop of he exchanger of the chiller and a small section of piping.

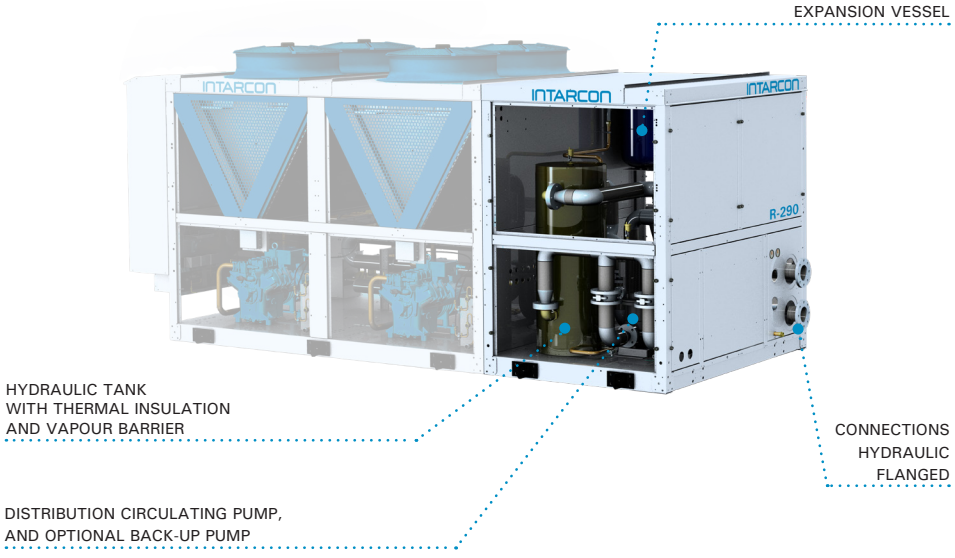
Pump sets for WW series

- Integrated modular construction.
- Optimised assemblies for water and glycol.
- Reduced footprint.

Pump sets for water or glycol in closed circuit, assembled in galvanised sheet steel bodywork and structure with polyester paint for outdoor installation and coupled to the chillers.

Features

- 400V 3N 50Hz power supply. Available in 60Hz. Others voltages by request.
- Glycol circulating pumps with stainless steel impeller and optional reserve pump.
- Buffer tank with high density polyurethane foam insulation and vapour barrier (depending on version).
- Closed membrane expansion vessel.
- Mesh filter.
- Glycerine thermometers and pressure gauges.
- Air vent.
- Drain inlet.
- Flanged hydraulic connections.
- Electrical control and power panel with magneto-thermal protection and independent differential for each pump, and electronic control unit for pump management and rotation.
- Pump sets incorporated in WW series, except WW-FD 4 and 5.

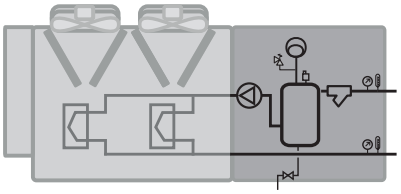


Versions

- A versions

  GW-AH: Primary pump set with tank

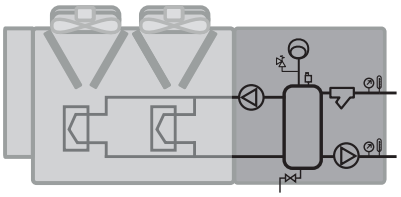
  Pump set with medium or high pressure circulating pump at constant flow rate, assembled together with the chiller.



- B versions

  GW-BH: Secondary pump set

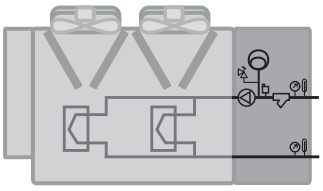
  Pump set with secondary circuit, buffer tank and medium or high pressure circulating pump at constant or variable flow rate (optional), with primary circuit pumps, assembled together with the chiller.



- N versions

  GW-NH: Pumping group

  Hydraulic unit with constant flow circulating pump.



400V 3N 50Hz | High temperature | Water

	Series / Model	Water flow (m^3/h) 7 °C [1]	Main pump (kW)	Available pressure (kPa) [3]	Inertia tank except N version (litres)	Expansion vessel (litres)	Hydraulic connection	Auxiliary primary pump B version (kW)
WATER	AGW-AH-0 025 AGW-BH-1 025	10 to 30	3.0	250 to 150	200	8	DN80	1.1
	AGW-AH-0 030 AGW-BH-1 030	20 to 30	4.0	300 to 200	200	8	DN80	1.1
	AGW-AH-1 040 AGW-BH-1 040	25 to 40	4.0	200 to 150	200	15	DN100	1.5
	AGW-AH-1 050 AGW-BH-1 050	30 to 50	5.5	300 to 150	200	15	DN100	1.5
	AGW-AH-1 055 AGW-BH-1 055	40 to 55	7.5	300 to 200	200	24	DN100	2.2
	AGW-AH-1 070 AGW-BH-2 070	50 to 75	7.5	200 to 150	200	24	DN125	4.0
	AGW-AH-1 090 AGW-BH-2 090	60 to 90	11	250 to 150	500	35	DN125	4.0

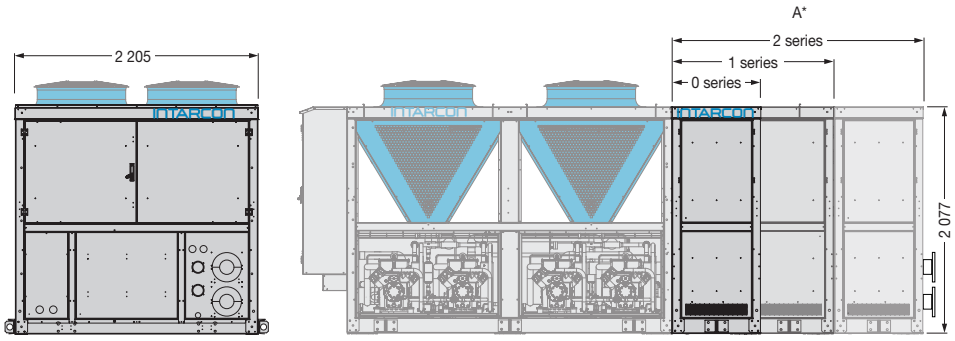
400V 3N 50Hz | Positive temperature | Glycol

	Series / Model	Flow MPG 35 % (m^3/h) -8 °C [2]	Main pump (kW)	Available pressure (kPa) [3]	Inertia tank except N version (litres)	Expansion vessel (litres)	Hydraulic connection	Auxiliary primary pump B version (kW)
GLYCOL	MGW-AH-0 015 MGW-BH-1 015	10 to 15	4.0	300 to 200	200	24	2 1/2"	0.75
	MGW-AH-0 025 MGW-BH-1 025	10 to 25	3.0	250 to 150	200	24	DN80	1.1
	MGW-AH-1 030 MGW-BH-1 030	20 to 30	4.0	250 to 150	200	35	DN100	1.1
	MGW-AH-1 035 MGW-BH-1 035	25 to 35	4.0	200 to 150	200	35	DN100	1.5
	MGW-AH-1 045 MGW-BH-1 045	30 to 45	5.5	250 to 150	200	50	DN100	1.5
	MGW-AH-1 050 MGW-BH-1 050	35 to 50	7.5	300 to 200	200	50	DN100	2.2
	MGW-AH-1 060 MGW-BH-2 060	40 to 60	7.5	200 to 150	200	50	DN125	3.0
	MGW-AH-1 070 MGW-BH-2 070	50 to 70	11.0	250 to 150	500	50	DN125	3.0
	MGW-AH-1 085 MGW-BH-2 085	65 to 85	15.0	250 to 150	500	50	DN125	3.0

Options

- Back-up main pump.
- Variable speed drive on main pump.
- Auxiliary back-up pump.

Dimensions



Dimensions (mm)	A
0 series	806
1 series	1 480
2 series	2 286

* Pump set according to configuration.

Dimensions in mm.

[1] Performance calculated for pumping water at 7°C.

[2] Performance calculated for pumping 35 % propylene glycol concentration at -8°C.

[3] Hydraulic pressure available for the distribution circuit and the chiller.

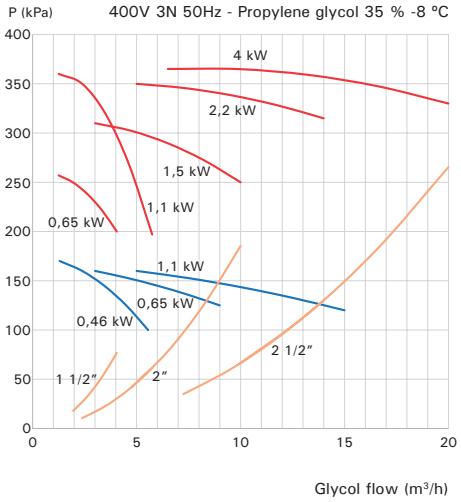
Auxiliary pump in the primary circuit

The auxiliary pump in the primary circuit is a low-pressure pump sized with an available pressure of about 50 to 100 kPa, enough to overcome the pressure drop of the exchanger of the chiller and a small section of piping.

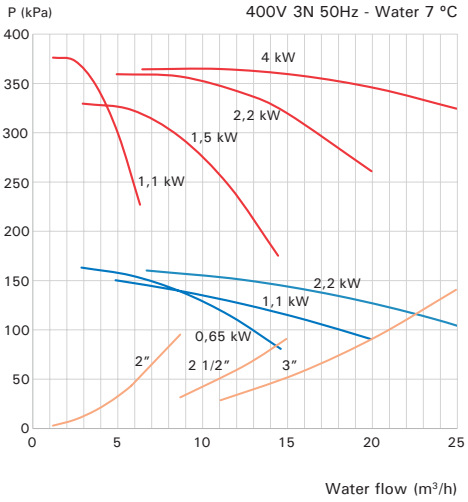
Pump sets

Characteristic curves

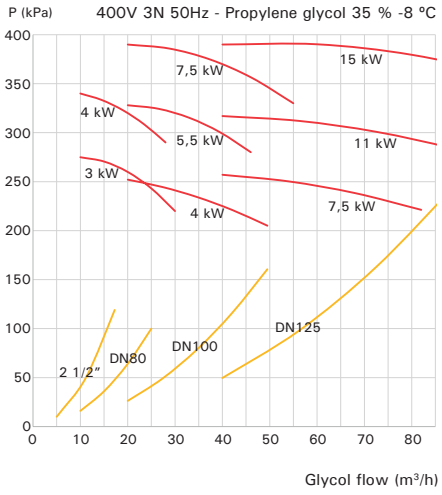
MWV series



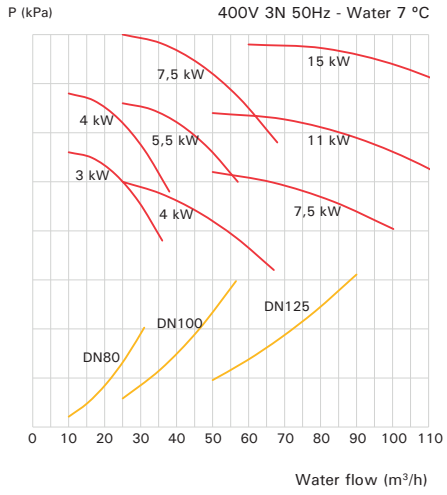
Serie AWV



MWW series



AWW series



— Main pump.

— Primary circuit booster pump.

— Pressure drop characteristic of the hydraulic unit.

The attached curves allow the operating point of the system to be checked on the basis of the pump characteristic curve and taking into account the internal pressure drop curve of the hydraulic unit.

In pump set with primary and secondary circuit (GV-BH and GW-BH versions), the hydraulic resistor of the chiller is compensated by the primary circuit pump.

For units with a single pumping unit (GV-AH and GW-AH version), the heater of the chiller must be taken into account and added to the available pressure required for the distribution circuit. The following values are recommended:

- WV series: 30-40 kPa.
- WW series: 40-50 kPa.

Example of selection

It is intended to select a pump set to be combined with the 35 % propylene glycol chiller, model MWW-FD-3 1503, with a cooling capacity of 260 kW at a temperature range of -2/-8 °C, it a glycol flow rate of 47.5 m³/h and an available pressure for the distribution circuit of 200 kPa.

For the required flow rate we are looking for the pump that results in a water column of 20 m between the characteristic curves of the pump and the DN100 pipe pump set, which corresponds to the hydraulic connections of the chiller. The 7.5 kW pump and DN100 connections characterise the pump set model MGW-BH-1 050.

Optionally, this hydraulic unit can be equipped with a primary circuit pump.