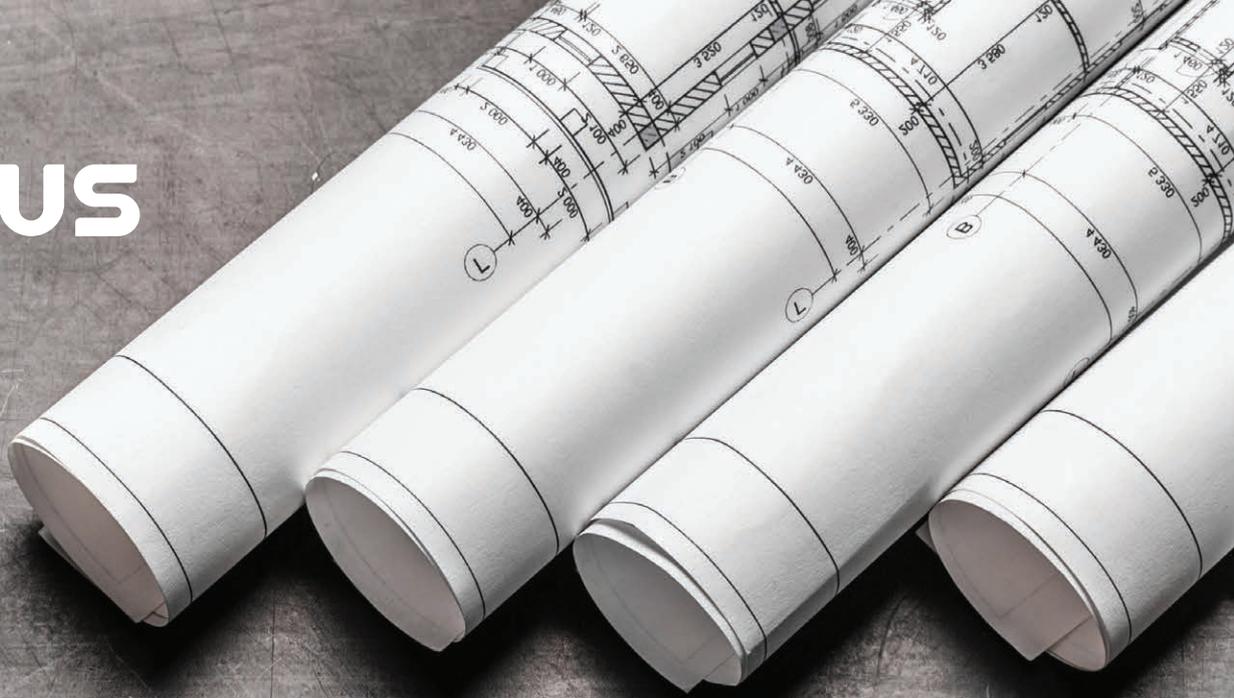


Gplus



چیلر اسکرو هواخنک تروپیکال جی پلاس
Air-Cooled Screw chiller 2023



Features

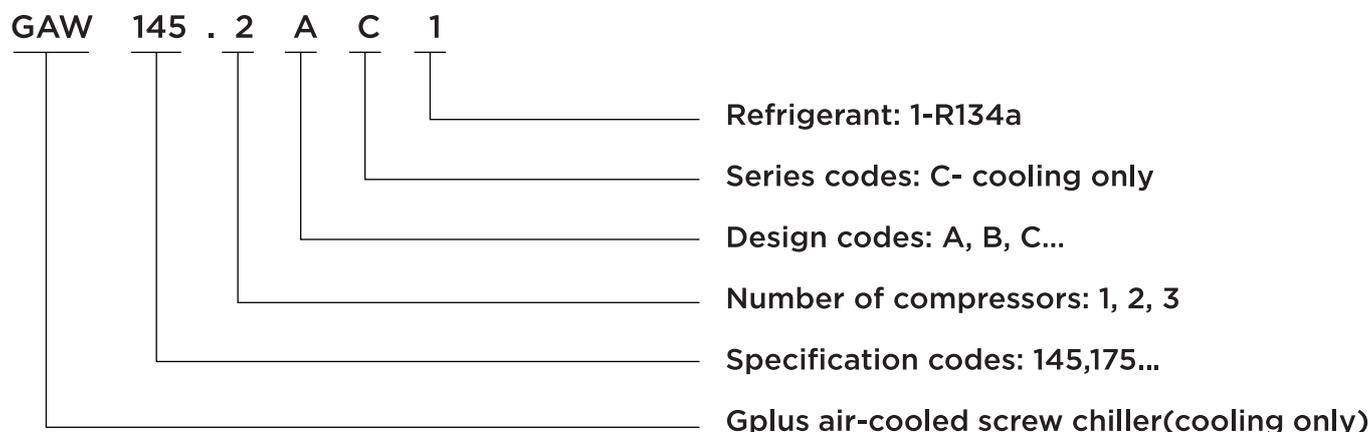
- High Efficiency (IPLV = 3.1)
- Operation Range +5°C to +52°C
- High Ambient (suitable for tropical regions)
- Equipped with two high efficiency Bitzer screw compressors
- Dual-circuit refrigeration
- Electronic Expansion Valve
- AHRI and CE Standards
- Shell and Tube Heat Exchanger
- Environmental Friendly Refrigerant - R134a
- Low noise and high efficiency condenser axial fan
- Module 8 units to expand capacities
- Touch screen display
- BMS support function
- Goldiran company guarantee

Air-Cooled Screw Chiller



The G.A.W series air-cooled screw chiller adopts the modular design to provide chilled water to air side products of central air conditioners. Selective cooling parts and control components provided by world-famous manufacturers, together with the most cutting-edge intelligent control system, contribute to the high efficiency, energy conservation, stability and reliability of this air-conditioning. The standard multi-unit control function supports the control over up also be connected to the building automation system (BMS) to easily meet various air-conditioning requirements in different places. The unit can be applied to various situations for comfortableness and arts and crafts, such as, hotel, hospital, office building, shopping mall, apartment, and factory.

Nomenclature



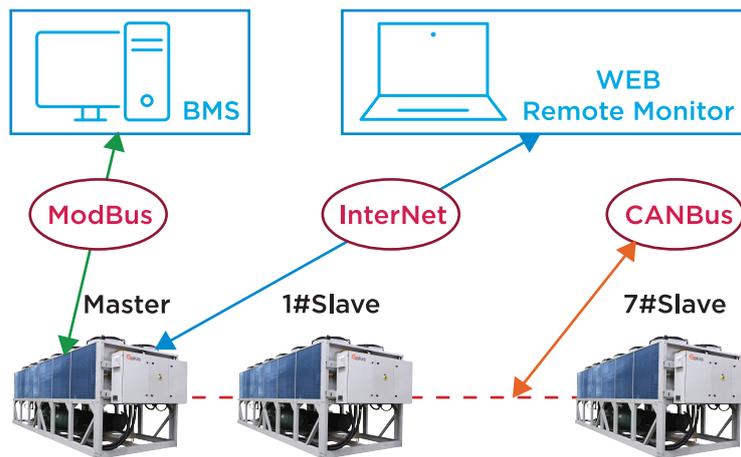
Stable and reliable operation

- The unit compressor adopts the high-efficiency semi-hermetical twin-screw design. Therefore, it can be used without concern for refrigerant leakage, when compared to the hermetical compressor, it boasts easier maintenance and less pay for any repairs; and when compared to the single-screw compressor, it features fewer vulnerable parts, zero energy loss, and higher reliability.
- The compressor motor directly connects to the rotor with no gearbox involved, which avoids energy loss caused by gear transmission; moreover, fewer moving parts can ensure lower noise and a more reliable operation.
- The unit uses the stand-alone pass and in particular, the two stand-alone passes for twin-compressor units. In this way, the unit can guarantee reliable operations, and there is no requirement for the oil balance pipeline between units, ensuring better backup and substantially improving the unit reliability.
- The unit control system features high efficiency, reliability, and intelligence through constant optimization by engineers. All cooling parts and control components of the unit are provided by world-famous reliable suppliers to make the unit compact, highly efficient, energy saving, and reliable.
- The performance, reliability and structure of the unit are verified and optimized by the long-term simulation tests under various changing conditions and extreme conditions, as well as transportation experiment on actual tertiary roads.



Modular design

- The unit adopts the modular design. Each microcomputer controller of the unit reserves the interface for connecting the combined control module. Networking control between units can be implemented by cable connection and simple master-slave settings. **A maximum of 8 main units can be controlled in a combined manner**, which means that the unit capacity can be easily expanded to meet various air-conditioning requirements in different places.
- The main unit can be used to manage all modules in a centralized manner, select the number of modules, and monitor the operating data and status.
- Modules are independent of each other. A single failure of a module in a unit does not affect the operation of the other modules.
- The unit is provided with standard RS485 interface and supports the **MODBUS-RTU protocol**. It can implement centralized control and remote monitoring of the unit, and regulate other chiller auxiliaries as required by the BMS.



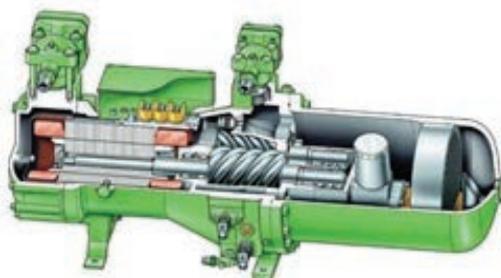
Electronic expansion valve

- The unit uses the world's most advanced electronic expansion valve, which ensures excellent performance both under full load or partial load and higher control accuracy.
- When compared with the thermal expansion valve, electronic expansion valve reacts more quickly when the unit is partly loaded. In addition, the evaporator can be fully used in any condition, which ensures more adequate and higher efficient heat exchange.



High-efficiency compressor

- The highly efficient semi-hermetical twin-screw compressor adopts the world-class latest generation 5:6 patented asymmetric tooth-type rotor to greatly improve the adiabatic efficiency. This type of high-efficiency motor with large capacity can significantly enhance the energy efficiency.
- The compressor motor directly connects to the rotor with no gearbox involved, which avoids energy loss caused by gear transmission; moreover, fewer moving parts can ensure lower noise and a more reliable operation.
- The high-precision filter screen built in the compressor increases the oil separation efficiency up to 99.5%
- The unit adopts the semi-enclosed twin-screw compressor and air suction cooling motor to ensure that the motor is fully cooled.
- The compressor adopts the slide valve for adjustment. A single compressor can precisely match 25% - 100% load changes, and dual-compressor up to 12.5% - 100% load changes, which reduces operating expenditure to the greatest extent.



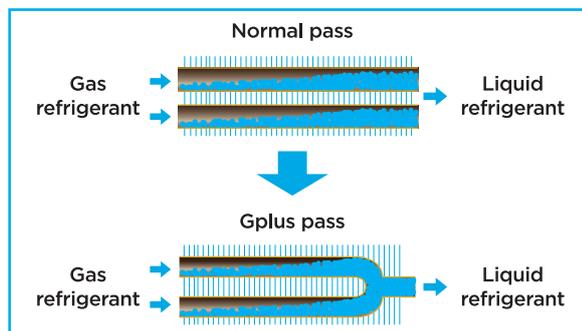
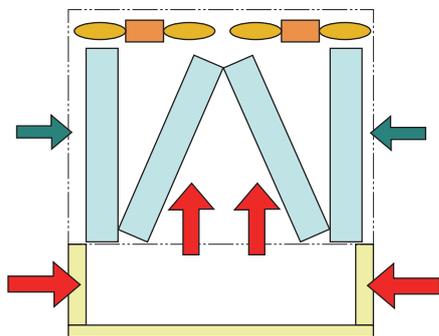
Low-noise operation

- The unit adopts the low-noise type outer rotor axial flow fan with long type air duct for diversion to effectively reduce the airflow noise. Before delivery, the fan has undergone strict tests for static and dynamic equilibrium to ensure stable and low-noise operation.
- The silencer built in the compressor reduces noise effectively.
- The compressor uses the precision machined rotor and the surface of the rotor is hardened by laser. The correction of static and dynamic equilibrium can minimize the vibration.
- The compressor feet are equipped with shock pads to reduce unit vibration and substantially lower the unit noise.



High-efficiency heat exchanger

- The patented counter-current water-side heat exchanger, combined with the inner-threaded efficient exchange pipe, can increase heat exchange efficiency by 20% to 30%.
- The wind-side heat exchanger adopts a unique process design to ensure that the refrigerant is in the best flow rate in any condition. In this way, the refrigerant pressure in the wind-side heat exchange copper pipe can be reduced to minimum, which effectively decreases the power consumption of the compressor and improves the energy efficiency of the unit.
- The use of inverted “M” type heat exchanger reduces ventilation resistance, improves air flow velocity distribution, and increases heat exchange efficiency.
- The use of large air volume silent fan increases the air flow through the tube fins, which improves the heat exchange efficiency of the wind-side heat exchanger.
- The graded control of the unit fan effectively reduces the fan power consumption of the unit in the transitional ambient temperature.
- The use of new open-window aluminium fin greatly enhances the gas turbulence of the wind-side heat exchange tube and the surface of fin. In this way, the heat exchange efficiency is increased by about 8%.



Unit microcomputer control center

The industrial-level microcomputer controller, together with the LCD touch screen, constitutes the control unit of the unit. While Gplus's unique self-control technology and up-to-edge control technology in the world create powerful control functions of our controller.

The leading intelligent control program ensures accurate management of water temperature under any condition and guarantees energy-saving, safe, and stable operation of the unit by automatic control.

Meanwhile, the advanced pre-control function enables measures to be taken timely before actual failure occurs to avoid frequent shutdown of the unit.

The unit supports the compiling of weekly operating schedules to implement comprehensive automatic start and stop control of the unit, which truly implements unattended and automatic operation.



Main functions:

- Local and remote automatic control
- Start and stop control of the unit
- Real-time display of the operating status and parameters
- Display and settings of control parameters
- Self-test upon unit startup
- Adjustment and control of the energy
- Control of the balanced operation of the compressor
- Control to prevent frequent startup of the compressor
- Graded energy-saving control of the fan
- Water pump interlock control
- Multi-unit control
- Real-time displaying operation permission grading function
- Automatic shutdown upon alarm and failure display function
- Historical fault memory function
- RS485 communication interface (communication function)

Protection functions:

- Power overvoltage and under-voltage protection
- Protection of power supply default phase, reverse phase, and unbalanced phase
- Compressor oil level protection
- Compressor motor overheat protection
- Compressor motor overload protection
- Compressor overload protection
- Compressor start failure protection
- Protection of over high condensation pressure (exhaust)
- Protection of over low evaporation pressure (suction)
- Protection of air suction/exhaust pressure difference
- System pressure warning protection
- Protection of over low cooling outlet water temperature
- Water flow switch protection
- Protection of over high air exhaust temperature
- Communication failure protection
- EVD electronic expansion valve protection

Reliable performance

- Gplus designers conduct optimal design for critical components and system pipelines of the chiller on the basis of existing theories and in combination with internationally advanced design concepts and always put the stability of the chiller in the first place.
- The chiller adopts compressor of international famous brand with high stability.
- Original control by electronic expansion valve effectively solves problems of carrying liquid, throwing oil and system oscillation, etc. during defrosting and enables stable operation of the chiller.
- Balanced design of high precision for distribution pipe of refrigerant in heat exchanger on air side of the chiller guarantees uniform distribution of refrigerant in heat exchanger on air side, enhances heating capacity and improves frosting condition.
- External oil cooler controls oil temperature of compressor and enables more stable and reliable heating operation of the chiller at low temperature.
- Long-term simulation tests: including tests for various variable working conditions, extreme working conditions, defrosting of heat pump and practical tertiary highway transportation, etc. to verify and optimize performance, reliability and structure of the chiller.

Technical Specification

Model			GAW-145.2AC1	GAW-175.2AC1	GAW-200.2AC1
Rated Cooling Performance	Cooling Cap (GB-CN)	kW	512	602	679
		kCal/h	440320	517720	583854
		RT	145.6	171.2	193.1
	Cooling Cap (AHRI)	kW	513	605	687
		kCal/h	441077	520416	590873
		RT	145.9	172.1	195.4
Rated Power		kW	164.7	207	230.6
Rated Current		A	308	367	433
Max. Running Current (A)		A	451	555	609
Max. Starting Current (A)		A	584	668	719
Power Supply		/	380V-3N-50Hz	380V-3N-50Hz	380V-3N-50Hz
Refrigerant	Type	/	R134a	R134a	R134a
	Amount Of Refrigerant	Kg	67.5*2	95*2	100*2
	Refrigerant Circuit Number	/	2	2	2
Compressor Type	Type	/	Semi-Hermetic Screw	Semi-Hermetic Screw	Semi-Hermetic Screw
	Energy regulation	/	12.5-100%	12.5-100%	12.5-100%
	Start Type	/	Y-Δ	Y-Δ	Y-Δ
Fan Motor	Air Volumn	m ³ /h	250000	250000	250000
	Qty	PC	10	10	10
Water Side Heat Exchanger	Type	/	High Efficiency	High Efficiency	High Efficiency
	Water in/out	°C/°C	12/7	12/7	12/7
	Water Flow	m ³ /h	88.2	103.7	116.9
	Inlet-Outlet	DN	DN125	DN150	DN150
	Water Drop	kPa	51	57	70
	Water side pressure	MPa	1	1	1
size	L	mm	5797	5797	5797
	W	mm	2250	2250	2250
	H	mm	2420	2420	2420
weight	Shipping Weight	kg	5660	6290	6430
	Operation Weight	kg	5860	6490	6720

Model			GAW-230.2AC1	GAW-260.2AC1	GAW-285.2AC1	GAW-345.2AC1	GAW-405.2AC1
Capacity		kW	808	909	1001	1210	1425
Power Input		kW	254	285	319	379	464
Rated Current		A	479	507	578	690	840
Max.Starter Current		A	1102	1264	1358	1358	1486
Max.Running Current		A	900	932	1026	1026	1042
Power Supply			380-415V3N-50Hz				
Evaporator	Type		shell-and-tube evaporator				
	Water flow	m ³ /h	139	156	172	208	245
	Inlet/Outlet DN	DN	150	150	150	200	200
	Pressure Drop	kPa	68	72	73	70	68
	Water-side Pressure	MPa	1.0				
Connection Type			victaulic coupling				
Compressor	Type		Semi-hermetical screw compressor				
	Energy control		12.5%-100% eigh step control				
	Starter Mode		Y-Δ				
Fan	Air Flow	m ³ /h	350000	350000	400000	400000	500000
	Quantity	Piece	14	14	16	16	20
Refrigerant	Type		R134a				
	System Quantity		2				
Dimension	Length	mm	8707	8707	9712	9712	11700
	Width	mm	2250				
	Height	mm	2480				
Net Weight		kg	7850	7980	9200	9550	11800
Running Weight		kg	8190	8340	9590	9980	12400

1. Cooling conditions: water inlet/outlet temperature 12/7°C , ambient temperature 35°C
2. Allowable voltage fluctuation: +-10%
3. If you need low ambient temperature cooling function, please contact with sales representatives.
4. When choose built-in hydraulic kit, please remark pump lifting.
5. Due to possible product improvement, Gplus reserves the right to make changes in design and construction at any time without notice.
6. For more details, please contact with Gplus headquarter.

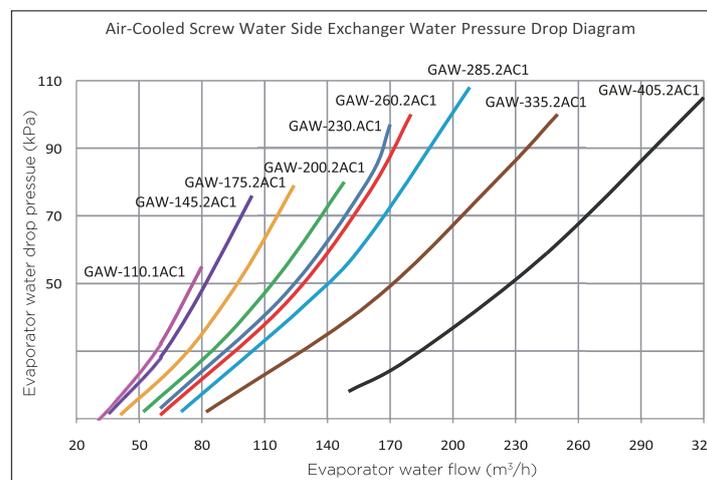
Water flow - Water drop pressure curve

Balance the chilled water flow through the evaporator. The flow rates must fall between the minimum and maximum values shown in the below table. Flow rates below the minimum values shown will result in laminar flow which will reduce efficiency, cause erratic operation of the electronic expansion valve and could cause low temperature cutouts. On the other hand, flow rates exceeding the maximum values shown can cause erosion on the evaporator water connections and tubes, even piping breaking.

Variable chilled water flow through the evaporator while the compressor(s) are operating is not recommended. The chiller control set points are based upon a constant flow and variable temperature.

Unit Model	MIN. FLOW RATE		MAX. FLOW RATE	
	m ³ /h	GPM	m ³ /h	GPM
GAW145.2AC1	52	229	113	495
GAW175.2AC1	62	272	135	589
GAW200.2AC1	75	330	163	716
GAW230.2AC1	83	365	181	795
GAW260.2AC1	94	411	204	892
GAW285.2AC1	103	453	224	982
GAW345.2AC1	125	548	271	1187
GAW405.2AC1	147	645	319	1398

Unit water pressure drop diagram



Cooling capacity correction factor diagram

Water Outlet Temperature °C	15		20		25		30		35		40		45		50	
	Cooling Capacity kW	Input Power kW														
5	1.16	0.75	1.11	0.79	1.06	0.83	1.00	0.89	0.94	0.97	0.88	1.05	0.80	1.17	0.74	1.28
7	1.23	0.76	1.18	0.80	1.12	0.86	1.06	0.92	1.00	1.00	0.94	1.08	0.86	1.21	0.79	1.32
8	1.27	0.76	1.22	0.81	1.16	0.87	1.10	0.93	1.03	1.02	0.96	1.10	0.89	1.22	0.82	1.34
10	1.34	0.80	1.29	0.84	1.23	0.89	1.16	0.96	1.09	1.05	1.02	1.14	0.95	1.26	0.87	1.38
12	1.42	0.82	1.36	0.87	1.30	0.92	1.23	1.00	1.16	1.08	1.08	1.17	1.02	1.30	0.93	1.42
15	1.54	0.85	1.48	0.91	1.41	0.97	1.33	1.04	1.25	1.13	1.17	1.24	1.12	1.37	1.02	1.49

Unit operation condition range

Shell and Tube Heat Exchanger(Evaporator)	Minimum Temperature	Maximum Temperature
Inlet Water Temperature(Starting)	—	35
Outlet Water Temperature(Operating)	5	15
Fin Heat Exchanger (Condenser)	Minimum Temperature	Maximum Temperature
Inlet Air Temperature	15	52°C (GAW-AC1)

Unit Dimensions

GAW-145.2AC1 & GAW-175.2AC1

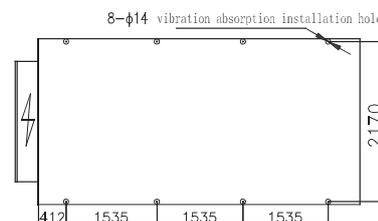
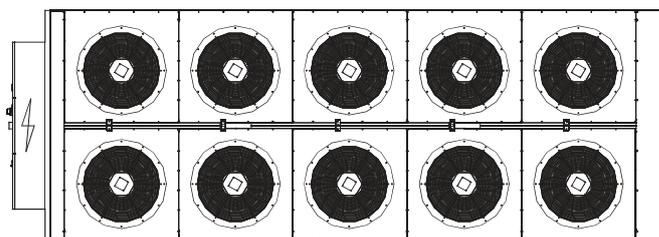
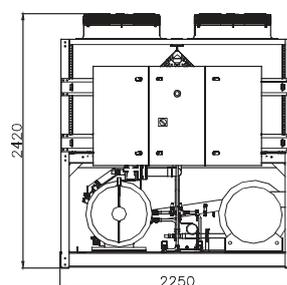
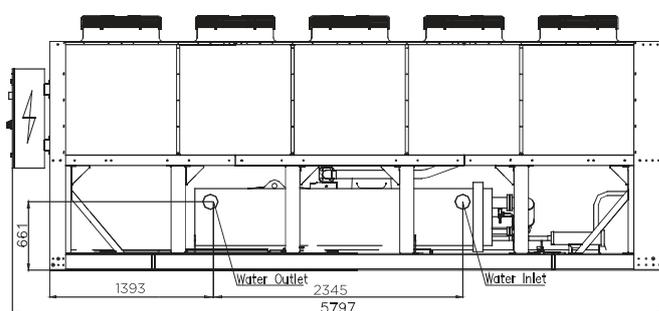


Diagram of base shock absorber installation distribution (Not In Scale)

GAW-200.2AC1

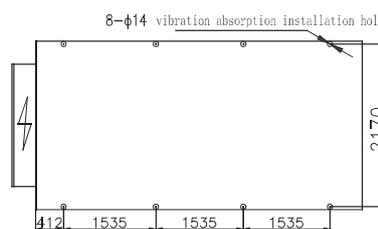
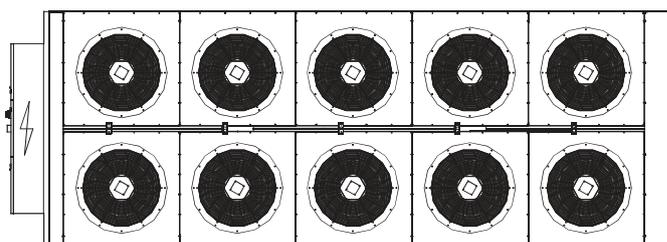
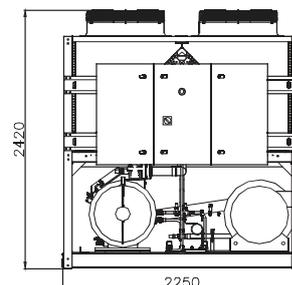
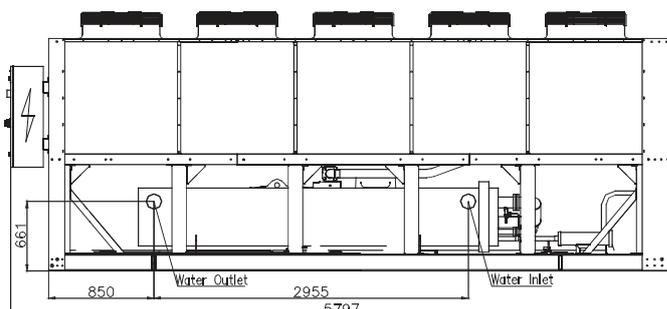


Diagram of base shock absorber installation distribution (Not In Scale)

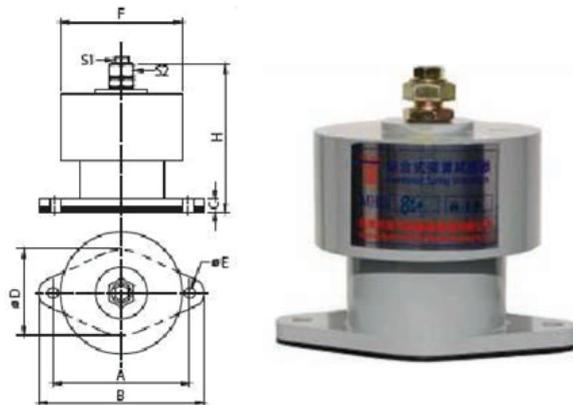
Installation Dimensions & Vibration Isolators

Vibration isolators are recommended for all roof mounted installations or wherever vibration transmission is a consideration.

Neoprene Isolation is optional, it is recommended for normal installations and provides good performance in most applications for the least cost.

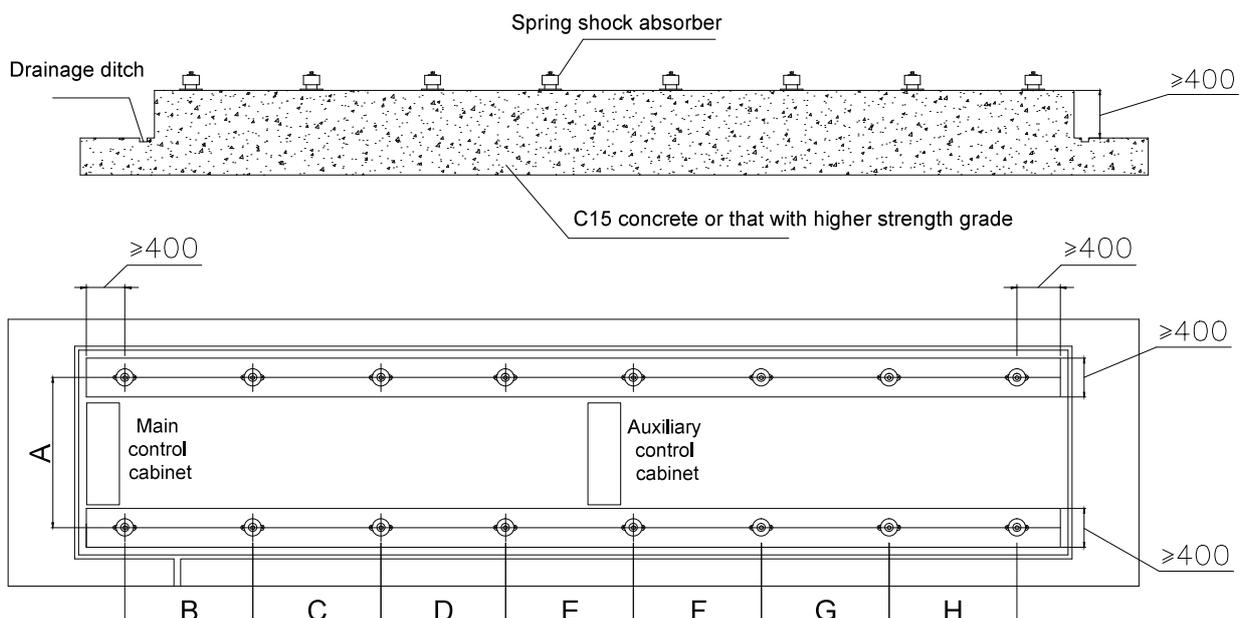
Spring isolators are level adjustable, spring and cage type isolators, mounted under the unit base rails. Deflection may vary slightly by application.

The housing of MHD series with aluminum-magnesium alloy material could prevent the vibration isolator from rustiness forever and enlarge the use life. The structure also has new improvement with an anti-side-force function for better stability and safety of unit. It can be freely adjusted as per balancing situation of unit to guarantee its work under all situations.



MODEL	LOAD (kg)	LOAD (N)	DEFLECTION (mm)	VERTICAL (kg/mm)
MHD-850	850	8330	25	34

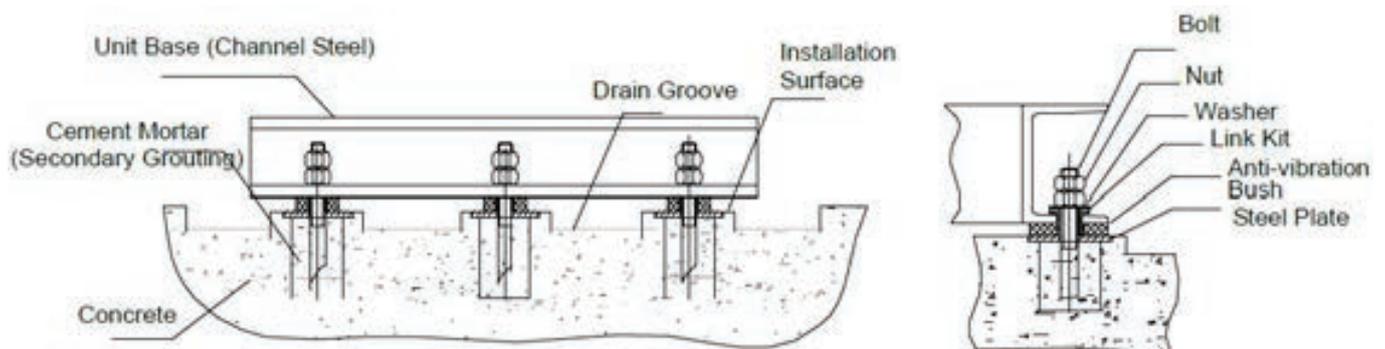
MODEL	OUTER SIZE (mm)								
	A	B	C	φE	F	H	S1	S2	φD
MHD-850	165	200	13	12.5	147	165	M12*25	M20*60	104



Model	Unit (mm)								Spring isolators	Spring isolators
	A	B	C	D	E	F	G	H	model	volume
GAW145.2AC1	2150	1200	1200	1200	-	-	-	-	MHD-850	8
GAW175.2AC1	2150	1535	1535	1535	-	-	-	-	MHD-850	8
GAW200.2AC1	2150	1535	1535	1535	-	-	-	-	MHD-850	8
GAW230.2AC1	2150	1575	1575	1575	1575	1575	-	-	MHD-850	12
GAW260.2AC1	2150	1575	1575	1575	1575	1575	-	-	MHD-850	12
GAW285.2AC1	2150	1480	1480	1480	1480	1480	1480	-	MHD-850	14
GAW345.2AC1	2150	1480	1480	1480	1480	1480	1480	-	MHD-850	14
GAW405.2AC1	2150	1500	1500	1500	1500	1500	1500	1500	MHD-850	16

Installation Foundation

- The installation foundation shall be designed by professionals according to the site conditions.
- The installation foundation of the unit must be of a cement or steel structure, and shall bear the operating weight of the machine, and this face must be horizontal.
- Please refer to the Diagram for Installation Foundation of Unit, place the steel plate and anti-vibration bush on the foundation accurately, and execute secondary grouting after installing the unit and foundation bolts together. The foundation bolts are generally 60 mm higher than the installation surface .
- If the unit will be installed on the top of the building which vibration level should be restricted.



شرکت مهندسی و مشاوره صنایع مبتکران گلدیران
آدرس: بلوار میرداماد - ضلع شمال شرقی پل مدرس
خیابان البرز - نبش تابان شرقی - پلاک 46
دفتر مرکزی: +9821-23008
فکس: +9821-22223451
ایمیل: MBT@goldiran.ir
آدرس سایت: www.goldiranac.net



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روی خونتس زندگی

