

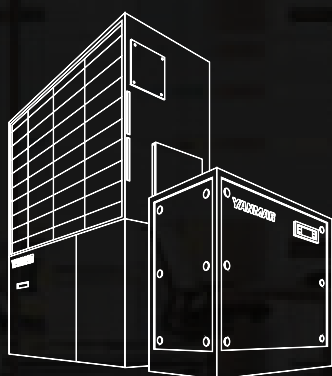


YANMAR

***PRODUCT CATALOGUE
AND PLANNING ASSISTANCE***

GAS ENGINE HEAT PUMP | GAS DRIVEN REFRIGERATOR | ACCESSORIES

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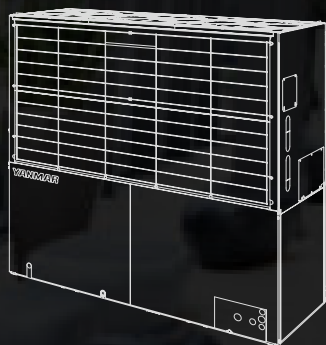
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**AIR-TO-WATER SYSTEM
COMPACT**

GAS ENGINE HEAT PUMP

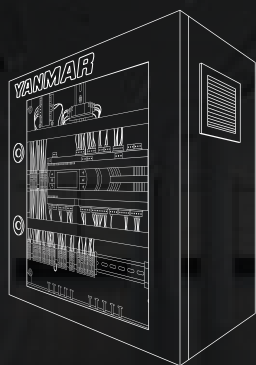
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AT A GLANCE

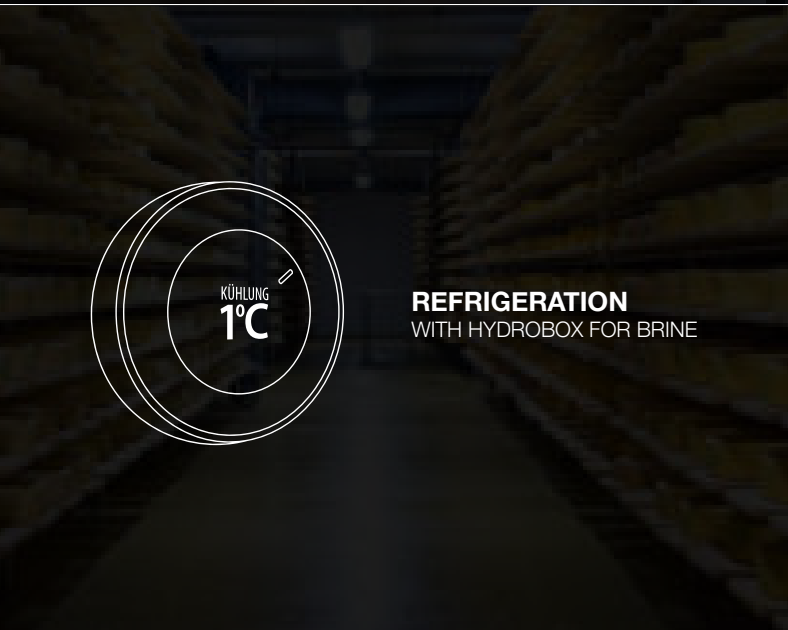
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SYSTEM DIAGRAM EXAMPLE

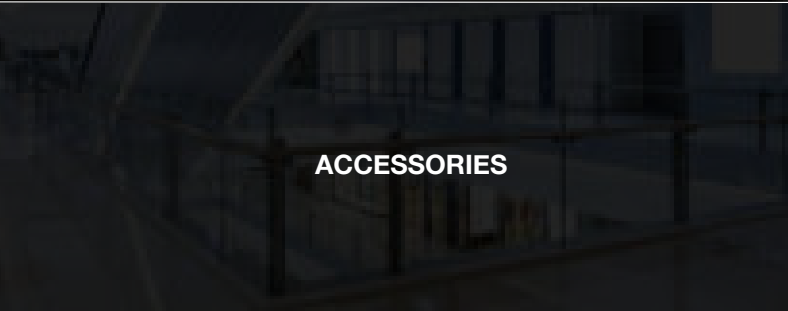
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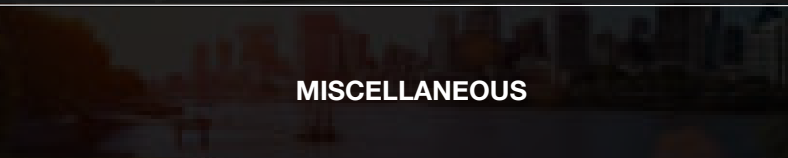
AIR-TO-AIR SYSTEM
VRF



REFRIGERATION
WITH HYDROBOX FOR BRINE



ACCESSORIES



MISCELLANEOUS

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SYSTEM DIAGRAM EXAMPLE

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FOR GAS ENGINE HEAT PUMP /
GAS DRIVEN REFRIGERATOR

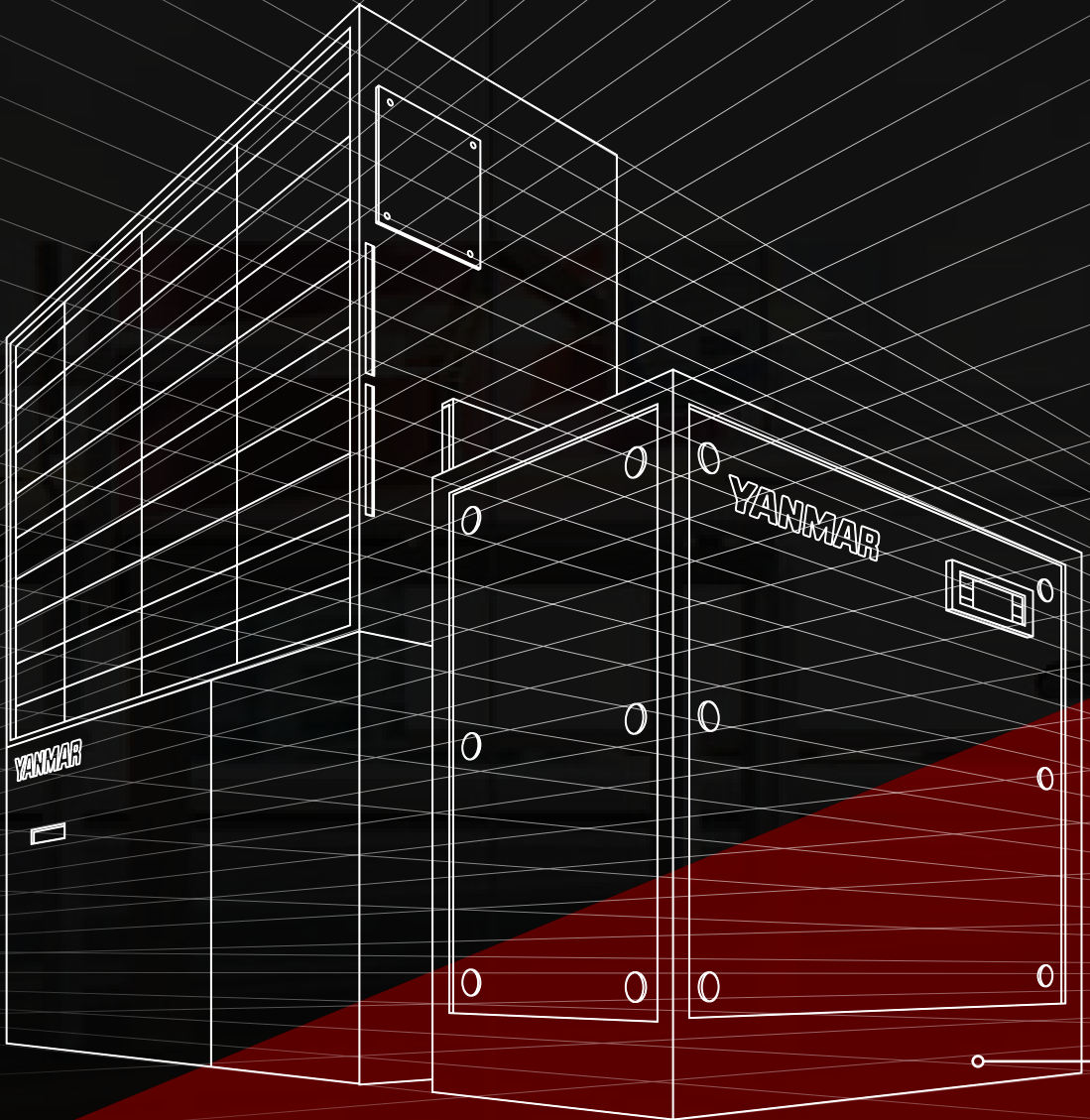
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YANMAR

AIR-TO-WATER / HYDROBOX

AIR-TO-WATER SYSTEM

A decorative white line graphic consisting of a horizontal line that extends from the right edge of the page, then turns 90 degrees down to the left, then 90 degrees up to the right, and finally 90 degrees down to the left, ending at the left edge of the page. The background is a dark red gradient with a subtle grid pattern.

GAS ENGINE HEAT PUMP

WITH HYDROBOX



As an air-to-water system, the gas engine heat pump situated in the outside area is connected in classic split construction with the Hydrobox positioned inside the building. Frost protection measures can thus be dispensed with.

The system is suitable for monovalent operation as a result of the internal use of the engine and exhaust heat. Moreover, this heat is used for defrosting the registers without heating interruption.

This system solution is used in new and existing buildings and is not just suitable for commercial applications but also for industrial and process applications.



- ✓ Simultaneous heating and cooling with integrated heat recovery
- ✓ Power adjustment by means of modulating operation
- ✓ Meets all requirements of the renewable energy laws
- ✓ High efficiency due to use of condensing technology
- ✓ Lower operating costs compared to boilers and electric water chillers
- ✓ Low noise emissions
- ✓ Eligible for subsidies and exempt from energy tax
- ✓ Engine waste heat can be recovered and reused in cooling mode, allowing simultaneous cooling and heating e.g. for domestic hot water heating (heat recovery optional)
- ✓ Cascadable up to the MW range
- ✓ No frost protection measures necessary for the lines between the gas engine heat pump (outdoor unit) and Hydrobox (indoor unit)
- ✓ Optionally, a complete input of parameters is possible via remote monitoring
- ✓ No heating interruption in defrost mode

GAS ENGINE HEAT PUMP

TECHNICAL DATA



ENCP...J			450	560	710	850	
Rated heating capacity (with Hydrobox) ¹⁾	A7 / W35	kW	46	52	70	81	
Heating capacity (with Hydrobox) ¹⁾	A-10 / W45	kW	43	48	55	64	
Rated cooling capacity (with Hydrobox) ¹⁾	A35 / W7	kW	36	45	53	64	
Cooling capacity (with Hydrobox) ¹⁾	A35 / W15	kW	46	57	68	82	
Dimensions ²⁾	H x W x D	mm	2,170 x 1,690 x 800		2,170 x 2,100 x 800		
Weight (without optional heat recovery)		kg	880	890	1,080	1,080	
Electrical characteristics	Power supply	V / Ph / Hz	230 / 1 / 50				
	Starting current	A	20	20	25	25	
	Operating current heating / cooling	A	3.69 / 4.16	4.40 / 4.73	6.50 / 6.93	7.21 / 7.93	
	Power consumption heating / cooling	kW	0.77 / 0.87	0.92 / 0.99	1.36 / 1.45	1.51 / 1.66	
Fuel data	Gas type		Natural gas group II				
	Rated gas consumption (LHV) heating / cooling	kW	36 / 34	40 / 42	55 / 51	59 / 62	
	Max. gas consumption (LHV)	kW	69	75	77	86	
	Gas supply pressure	mbar	17–25				
Engine	Type		YANMAR four-stroke engine, water-cooled				
	Cylinder		3	3	4	4	
	Cubic capacity	cm ³	1,642	1,642	2,190	2,190	
	Speed range	Heating	1 / min	650–2,750	650–2,800	725–2,800	650–2,800
		Cooling	1 / min	650–2,100	650–2,200	725–2,300	650–2,300
	Lubricant oil	Type		YANMAR genuine GEHP oil			
Quantity		l	34	38	50	50	
Cooling water engine	Type		YANMAR genuine LLC				
	Quantity	l	23	23	29	29	
	Concentration	%	50				
Compressors	Type		Scroll				
	Quantity		2				
	Power transmission		Poly-V flat belt				
Refrigerant	Type		R410A				
	Quantity	kg	11.8				
Fans	Type		Axial				
	Quantity		2	2	3	3	
	Related air flow	m ³ / h	21,600	22,800	32,400	34,200	
	External pressure (max.)	Pa	5 (30)				
Sound pressure level ³⁾	Nominal	dB(A)	57	58	61	62	
	Quiet mode	dB(A)	54	55	58	59	
	Maximum (heating mode)	dB(A)	62	62	66	66	
Pipe connections	Refrigeration gas / liquid pipe	mm	28 / 12	28 / 16	35 / 18	35 / 18	
	Exhaust pipe (outside diameter)	mm	60.5				
	Fuel gas pipe	Inch	R 3 / 4				
	Drain pipe (inside diameter)	mm	15				
	Exhaust drain pipe (inside diameter)	mm	15				
Maintenance interval engine / engine oil ⁴⁾		h	10,000 / 20,000				
Heating capacity heat recovery (optional, in cooling mode)		kW	16	20	25	30	

1) Capacities, electrical characteristics and fuel consumptions are calculated for a standard indoor/outdoor unit combination with a 7.5 m piping length and 0 m level difference.

These are Hydrobox water outlet temperatures.

2) See accessories for dimensions with vibration dampers

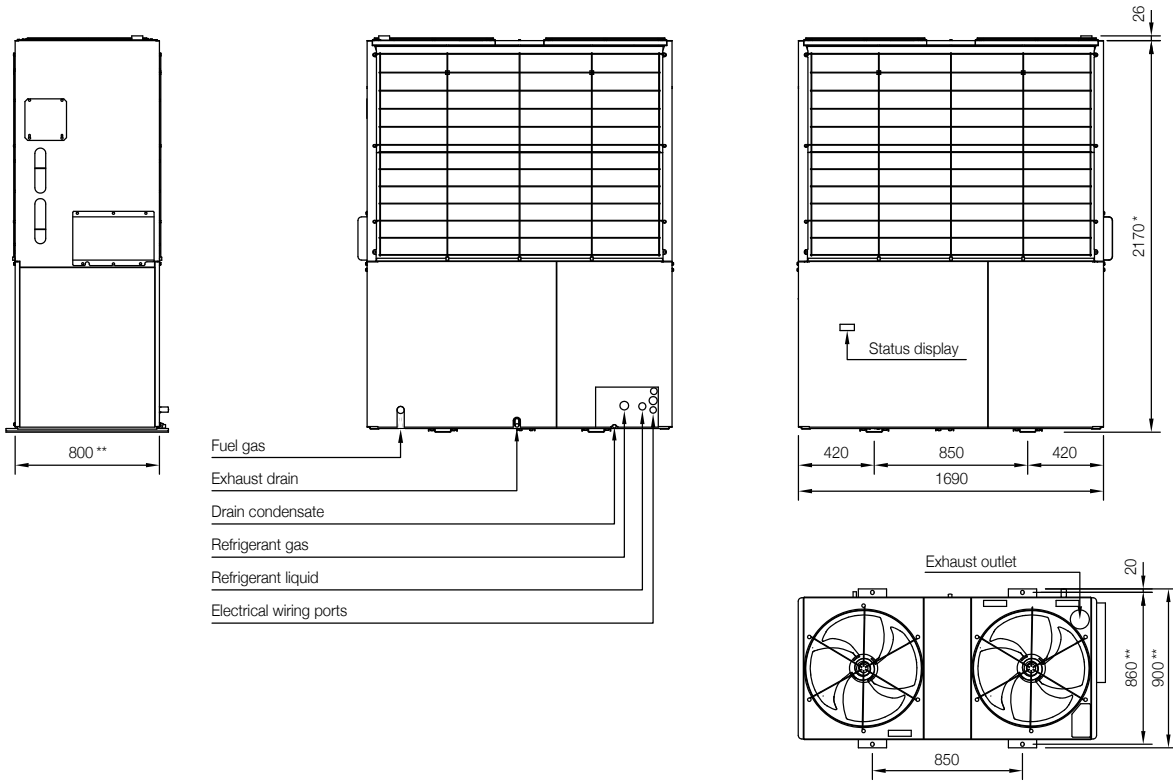
3) The operating noise levels shown above were measured at a distance of 1 m to the front face of each unit and at a height of 1.5 m and then converted into an anechoic room equivalent level. The noise level of the actually installed unit is usually higher than the indicated value due to influences of ambient noise and echo.

4) Depending on working and operating conditions

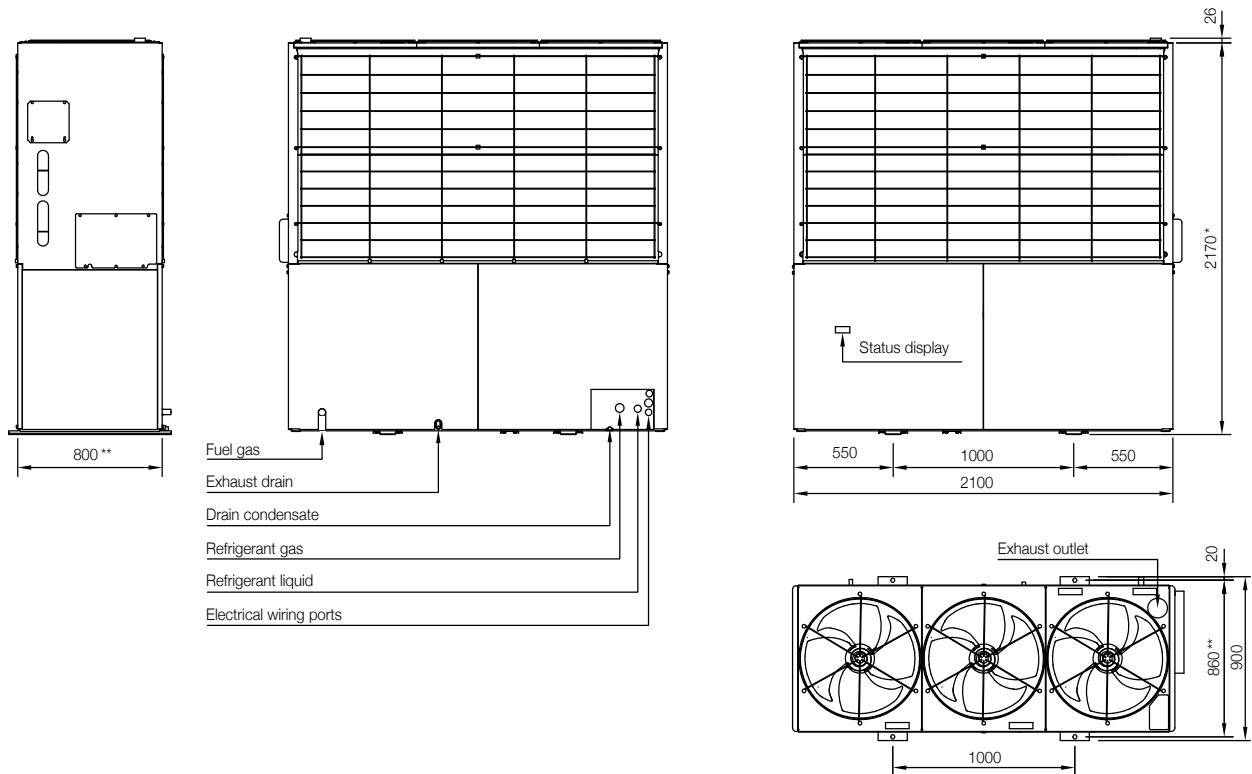
GAS ENGINE HEAT PUMP

DIMENSIONS

ENCP 450 / 560 J



ENCP 710 / 850 J



* See page 88 for dimensions with vibration dampers

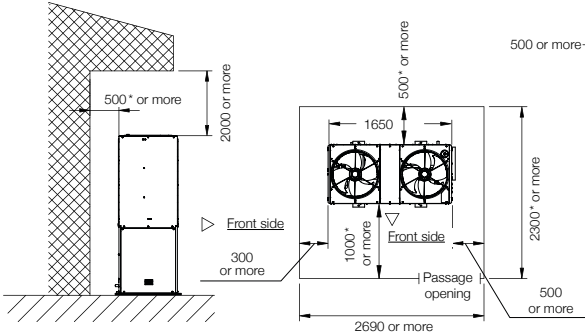
** See page 86 for dimensions with air guards

GAS ENGINE HEAT PUMP

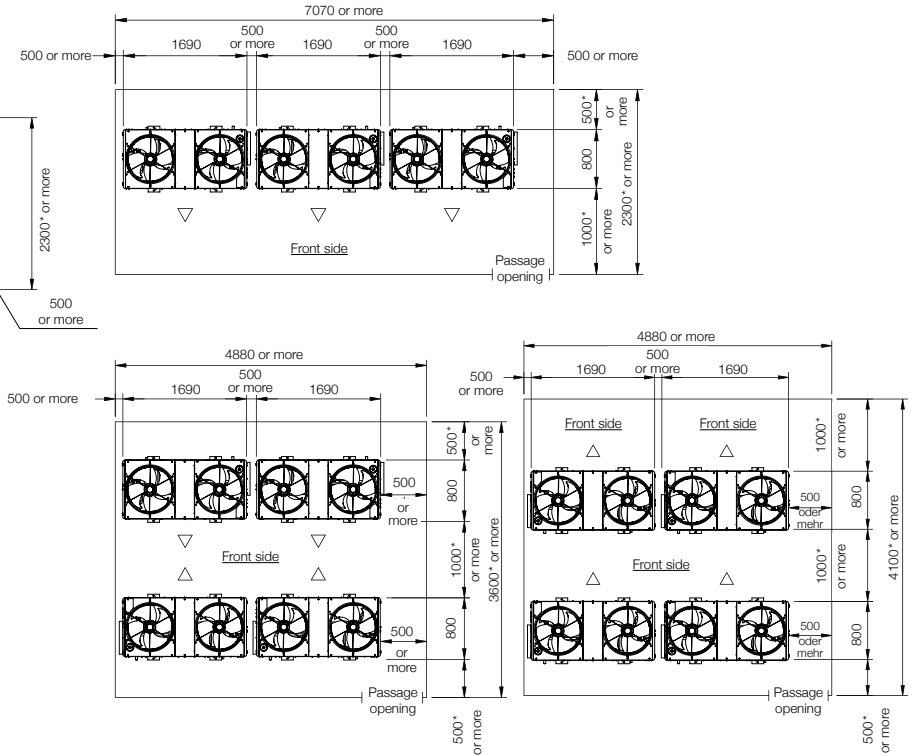
SERVICING SPACE REQUIREMENTS

ENCP 450 / 560 J

Single unit installation

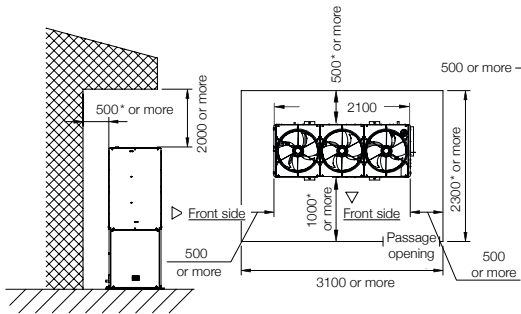


Multiple unit installation

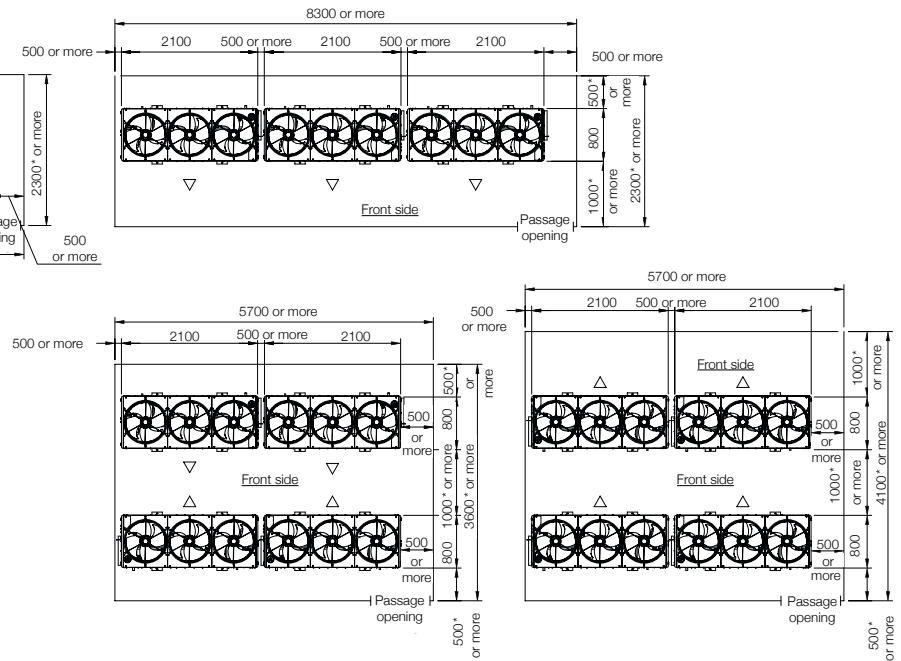


ENCP 710 / 850 J

Single unit installation



Multiple unit installation



* See page 86 for clearances with air guards

HYDROBOX

HYDRAULIC MODULE



The Hydrobox installed in the interior area transfers the required heat output and cooling capacity as a link to the water-guided heating and cooling system.

As a result of the internal control, both the gas engine heat pump and the integrated water circulation pump are operated in an energy efficient manner. In addition, the internal control can control the system up to the buffer tanks including control of the optional heat recovery as well as cooling-side and heating-side peak-load generators.



- ✓ The controller forms the interface between the BCS and the gas engine heat pump
- ✓ Energy efficient pump (cl. A) integrated
- ✓ No frost protection measures necessary for the lines between the gas engine heat pump (outdoor unit) and Hydrobox (indoor unit)

- ✓ The integrated buffer management of the Hydrobox controls the gas engine heat pump, preventing low partial load ranges and increasing the COP
- ✓ The Hydrobox can be adjusted to different requirements using 18 input configurations and additional options
- ✓ Optionally, a complete input of parameters is possible via remote monitoring



TÜV certified

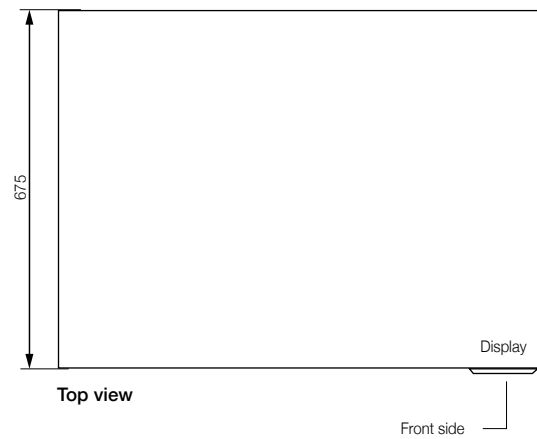
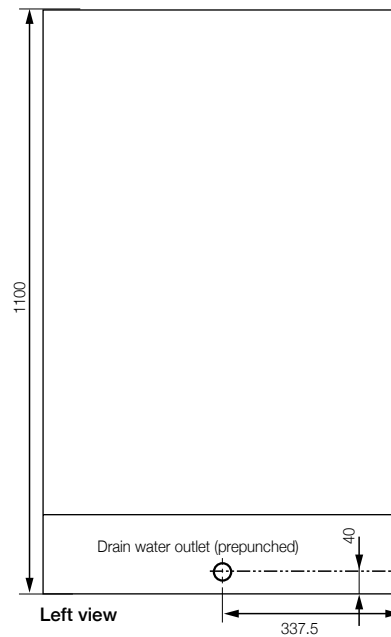
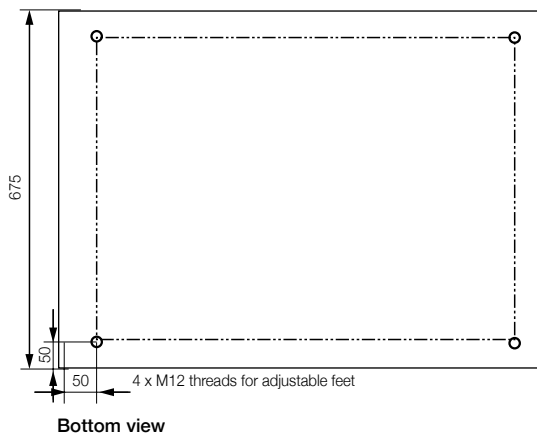
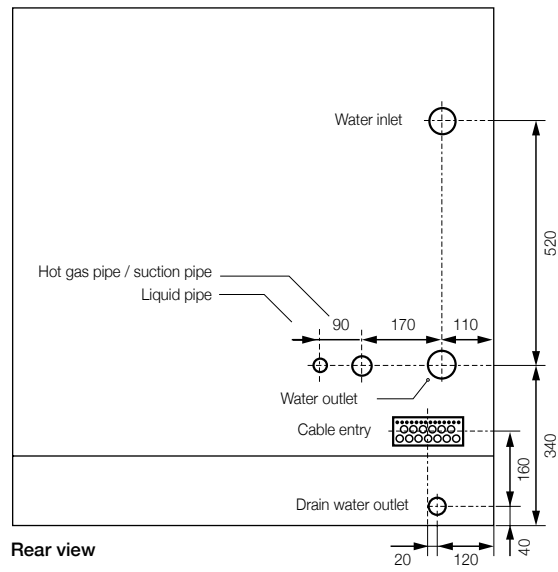
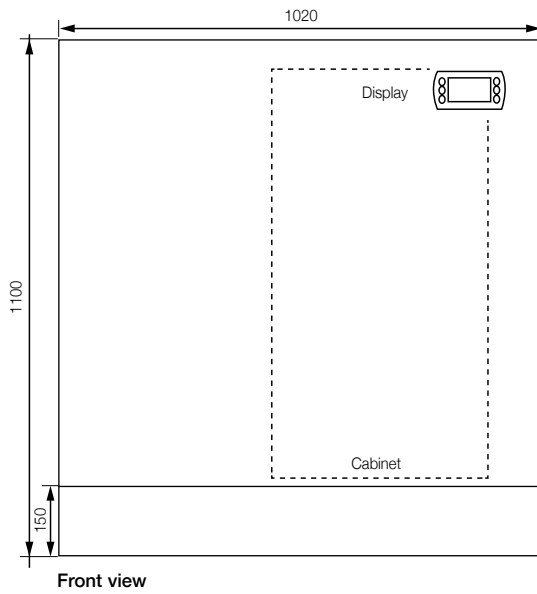
HB...V(P)J3.1			450	560	710	850
Rated heating capacity (with Hydrobox) ¹⁾	A7 / W35	kW	46	52	70	81
Heating capacity (with Hydrobox) ¹⁾	A-10 / W45	kW	43	48	55	64
Rated cooling capacity (with Hydrobox) ¹⁾	A35 / W7	kW	36	45	53	64
Cooling capacity (with Hydrobox) ¹⁾	A35 / W15	kW	46	57	68	82
Dimensions (without feet)	L x W x H	mm	1,100 x 1,020 x 675			
Weight		kg	190	190	210	210
Rated volume flow	Heating, 5 K spread ²⁾	m ³ /h	8,0	9,0	12,0	14,0
Rated pressure loss	Version VJ	kPa	15	19	22	30
External pressure increase	Version VPJ	kPa	90	80	60	40
Power consumption	Version VPJ	kW	0.7	0.7	0.9	0.9
Electrical connection	Power supply	V / Ph / Hz	230 / 1 / 50			
Control range		-	20-100 %			
Water outlet temperature	Heating / cooling	°C	27-50 / 6-18			
Water inlet temperature	Max. / Min.	°C	45 / 10			
Environmental conditions	Temperature	°C	+5 to +35			
	Max. humidity	% r.h.	90			
Pipe connections	Water pipes	Inch	2			
	Refrigerant gas / liquid pipe	mm	35 / 18			
Sound pressure level		dB(A)	33	35	33	35
Scope of delivery						
Standard	2 cable temperature sensors, type Y-HB-NTC (immersion sensors for buffer tank)					
Optional accessories	Outside temperature sensor, type Y-HB-DPUT Cable temperature sensor, type Y-HB-NTC-WS (pipe-mounted sensor) Combined Modbus / BACnet card, type Y-HB-BAC					

1) Capacities are calculated for a standard indoor/outdoor unit combination with a 7.5 m piping length and 0 m level difference. These are Hydrobox water outlet temperatures.

2) The spread can be adjusted in the range 5-15 K.

HYDROBOX

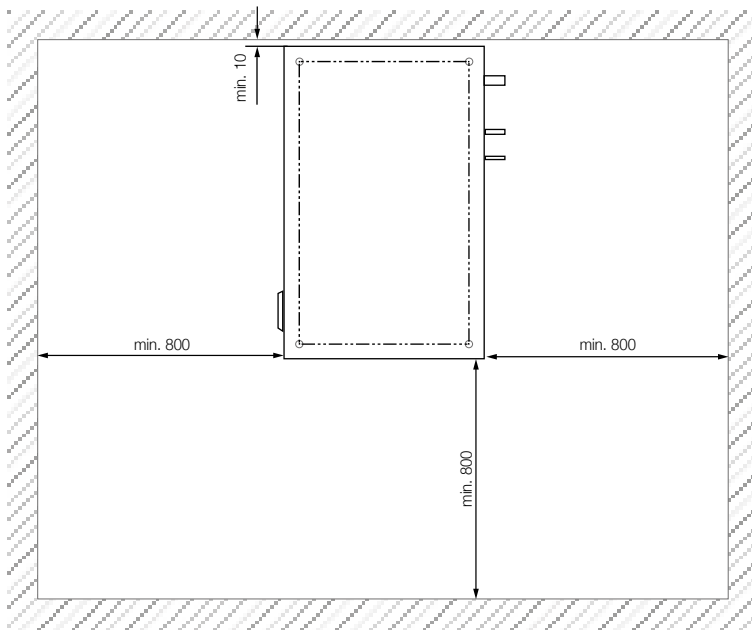
DIMENSIONS



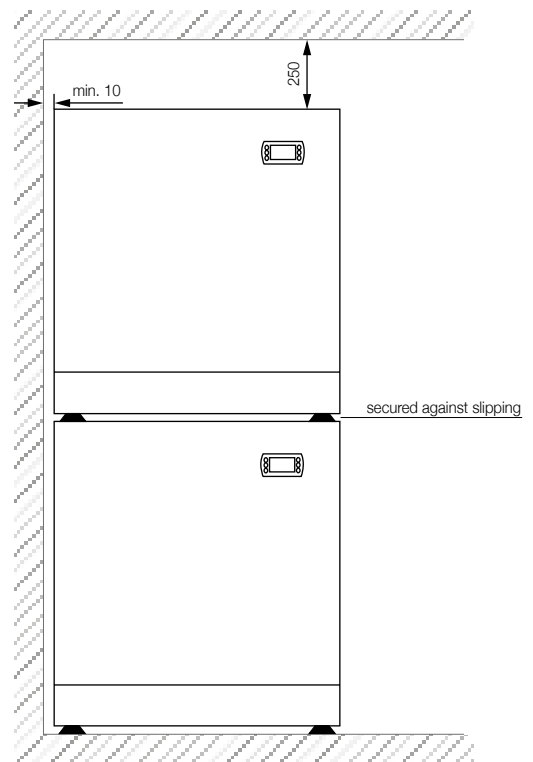
NOTES: Hydrobox with feet approx. 26 to 35 mm higher!
 Pipe outlets on the left side, above or below on request.

SERVICING SPACE REQUIREMENTS

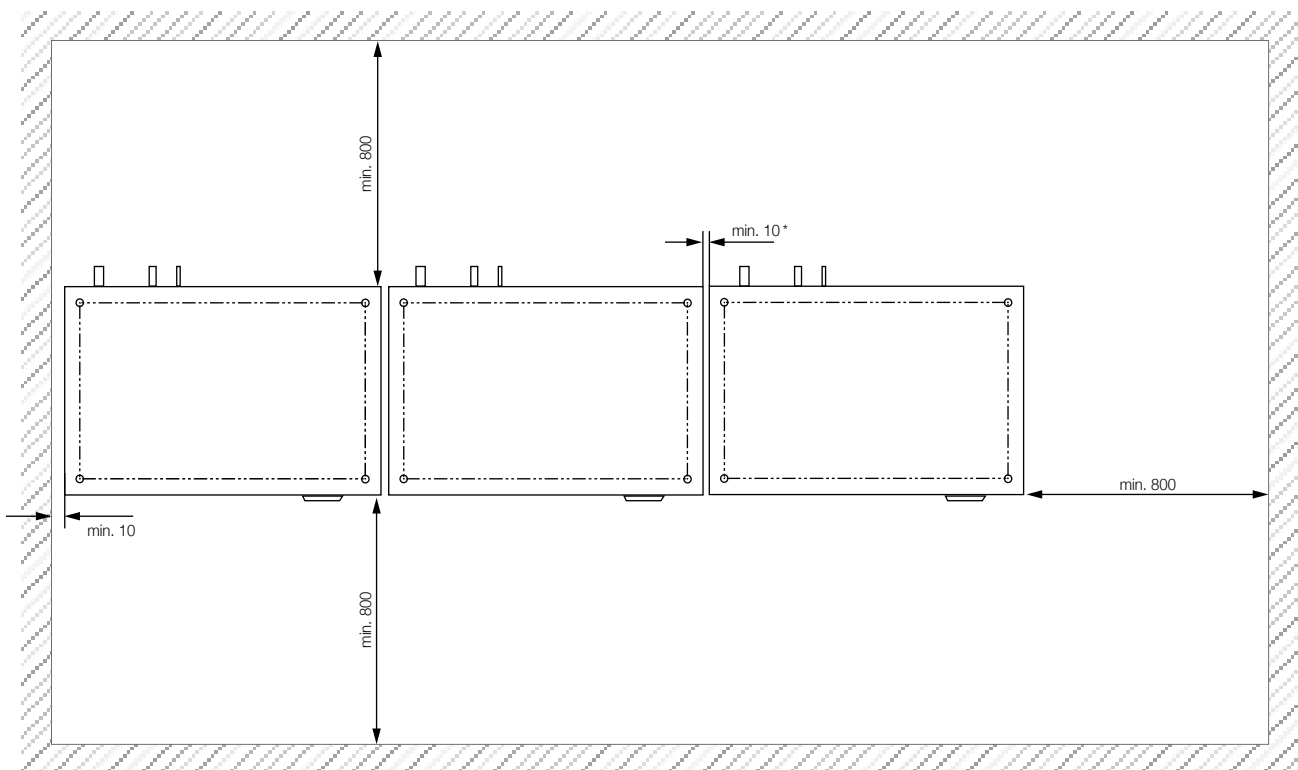
Single unit installation (standard design - connections back left)



Multiple unit installation (above one another)



Multiple unit installation (next to one another) *



* This type of installation is associated with increased maintenance

REFRIGERANT PIPEWORK

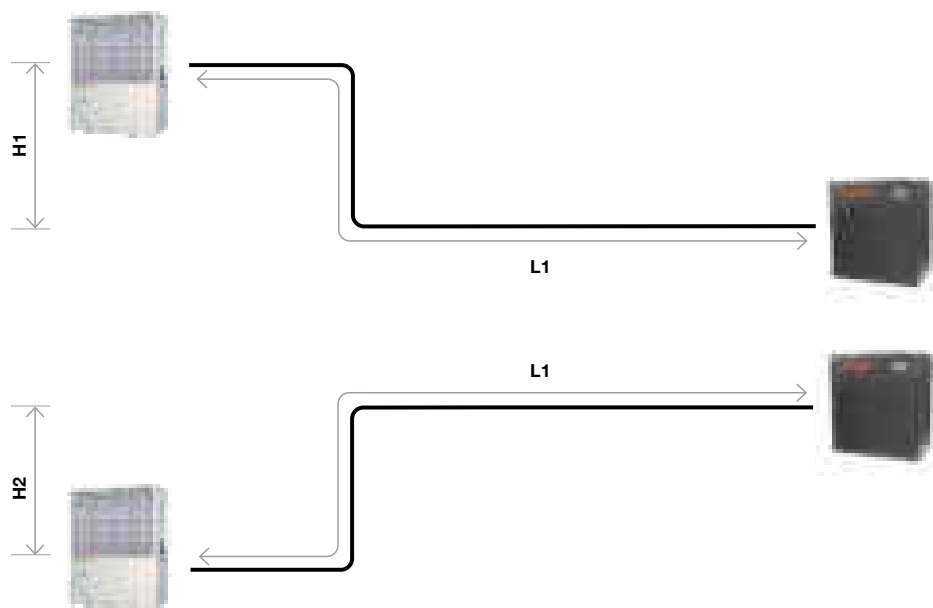
DIMENSIONS AND PIPE LENGTHS

Pipe dimensions

ENCP + HB		Connection pipes	
		Liquid pipe *	Refrigerant gas pipe *
450	mm	12	28
560	mm	16	28
710	mm	18	35
850	mm	18	35

* Larger dimensions possible depending on the pipe length

Length and height differences



ENCP + HB		Connection pipes		
L1	Maximum permitted pipeline length	actual	m	55
		equivalent *	m	67
H1	Maximum permitted height difference		m	25
H2			m	25

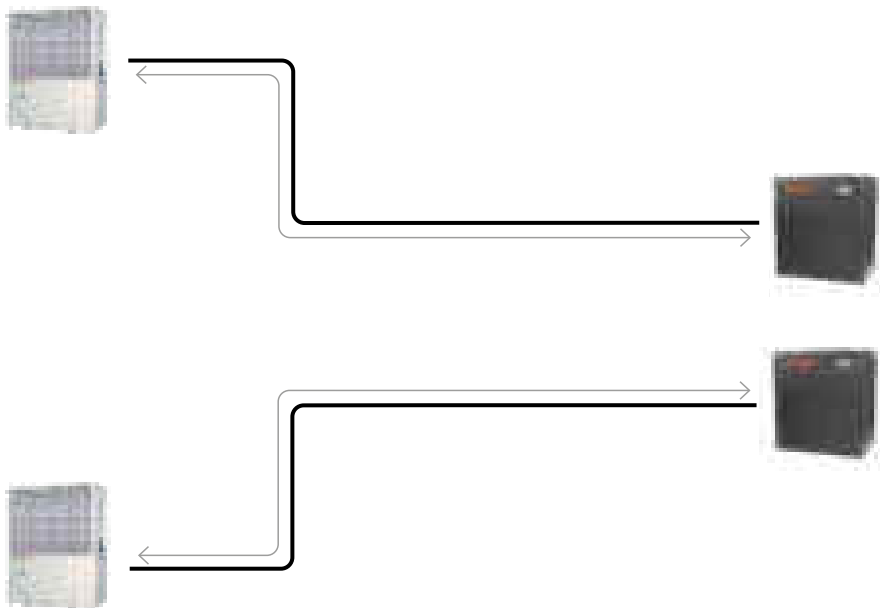
* Taking into consideration installed fittings, valves, bends, T-pieces, reductions etc.

NOTES: The Hydrobox and VRF indoor units cannot be operated simultaneously on a gas engine heat pump.
The models HB 450–850 V(P)J3.1 can only be operated in single operation.
Exceeding the maximum permitted pipe length invalidates the warranty of the gas engine heat pump and the Hydrobox.

REFRIGERANT PIPEWORK

CORRECTION FACTORS AND REFRIGERANT CHARGE

Correction factors heating and cooling mode



Variations in performance arise owing to the length of the refrigerant connection pipes and the height difference between the gas engine heat pump and the Hydrobox. The correction factors for heating and cooling mode can be found in the manuals.

Calculation of the additional refrigerant charge

The additional refrigerant charge R should be calculated on the basis of the diameter and length of the liquid pipelines and rounded up or down to 0.1 kg.

Additional refrigerant charge

ENCP + HB		450	560	710	850
R410A factory charge	kg	11.8	11.8	11.8	11.8
Correction quantity A	kg	4	4	9.5	9.5
Correction factor f*	kg/m	0.11	0.17	0.25	0.25

*Relative to standard dimensioning

Additional refrigerant charge

$$R \text{ [kg]} = A + (L \times f)$$

L: Pipe length

Example calculation for ENCP 710 J with HB 710 V(P)J3.1 with piping length of 10 m:

$$R = 9.50 \text{ kg} + (10 \text{ m} \times 0.25 \text{ kg} / \text{m}) = 12.00 \text{ kg}$$

Legal notices	<p>✓ Obligation to indicate the overall refrigerant charge on the outdoor unit If partly fluorinated hydrocarbon (HFC) refrigerant is filled, the type and quantity must be permanently indicated on the sticker provided for this purpose on the outdoor unit (in proximity of the fuel gas connection), e.g. with a wipe-proof permanent marker.</p>
	<p>✓ Released refrigerant must be collected and disposed of It is forbidden to deliberately let refrigerant escape into the atmosphere. Released refrigerant must be collected and disposed of by authorised authorities or companies.</p>

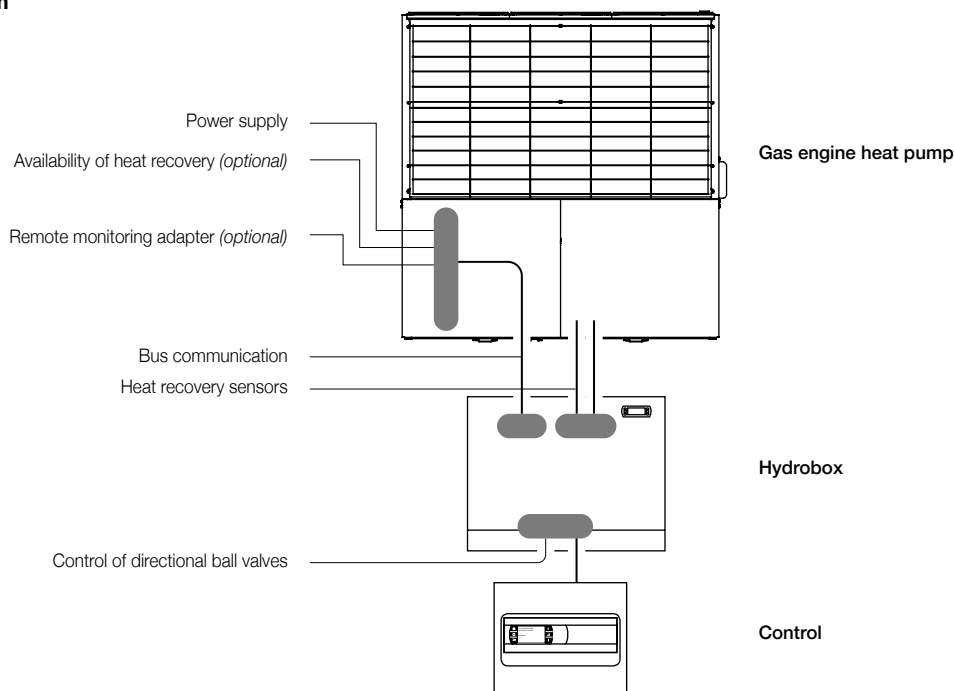
WIRING

GAS ENGINE HEAT PUMP + HYDROBOX

Item	Name	Start	Cable type *	Voltage	Objective	Comments
Gas engine heat pump						
1	Power supply	Switch cabinet	YSLY-JZ 3 x 2.5 mm ²	AC 230 V	GEHP	ENCP 450 / 560: 0.87 / 0.99 kW, fuse 20 A slow blow* ENCP 710 / 850: 1.45 / 1.66 kW, fuse 20 A slow blow*
2	Remote monitoring	Remote monitoring adapter	LiYCY 2 x 0.75 mm ²		GEHP	Optional component: see accessories
3	Availability of heat recovery	GEHP	YSLY 3 x 1.0 mm ²	max. 440 V, 4 A	BCS	Thermostatic release (only in case of installed heat recovery)
Connection gas engine heat pump / Hydrobox						
4	Communication	GEHP	LiYCY 2 x 0.75 mm ²		HB	Bus communication
5	Temperature sensor Engine outlet	GEHP	YSLY 5 x 0.75 mm ²		HB	Sensor pre-installed in GEHP (only in case of installed heat recovery)
6	Temperature sensor Heat recovery outlet	GEHP			HB	Sensor pre-installed in GEHP (only in case of installed heat recovery)
Hydrobox						
7	Power supply	Switch cabinet	NYM-J 3 x 1.5 mm ²	AC 230 V	HB	Fuse 10 A*
8	Communication cascade	HB	LiYCY 2 x 0.75 mm ²		HB	Bus communication
9	Speed control of the external circulation pump	HB	LiYCY 2 x 0.75 mm ²		Pump	Only in the version without pump (VJ3.1)
Further cables depending on the selected input configuration (see technical installation manual Hydrobox), minimum capacity request however (input configuration 1):						
10	Capacity request	BCS	LiYCY 2 x 0.75 mm ²	DC 0–10 V	HB	Analogue signal 1 x 0–10 V
11	Operation signal	BCS	YSLY 5 x 0.75 mm ²	AC 24 V	HB	open = off
12	Mode specification Cooling / heating	BCS			HB	Closed = cooling, open = heating
13	Quiet mode	BCS			HB	
14	Acknowledgement	BCS			HB	Remote acknowledgement
15	Operation notification 1	HB	YSLY 5 x 1.5 mm ²	max. 250 V, 2 A cos. ph. 0.6	BCS	potential-free (configurable)
16	Operation notification 2	HB			BCS	potential-free (configurable)
17	General error notification	HB			BCS	Collective error message (closed = error-free)
18	Directional ball valves cooling / heating	HB	NYM-J 5 x 1.5 mm ²	AC 230 V	Ball valves	Closed = cooling

* These are recommendations. The dimensioning and implementation must be carried out in accordance with local regulations.

Diagram

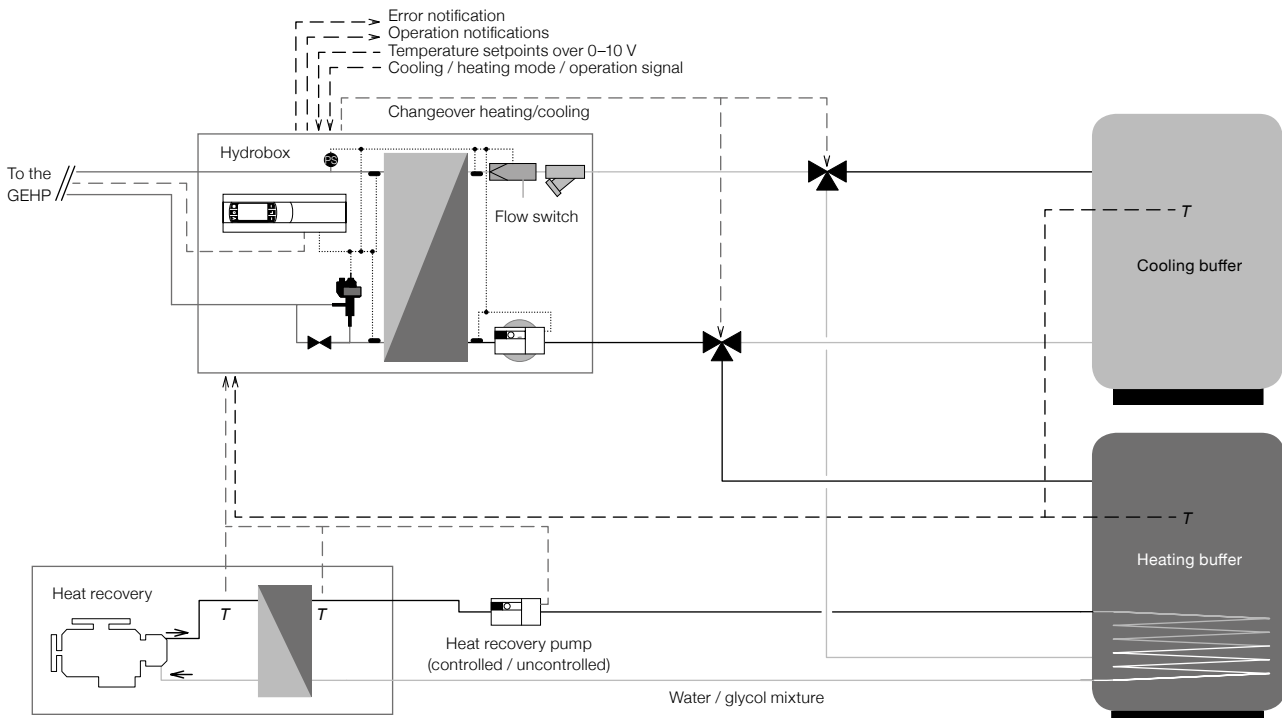


CONTROL

INPUT CONFIGURATIONS

Input configur.	Description	Control	Additional options
1	External capacity request over 0–10 V	External BCS	
2	External capacity request over 4–20 mA	External BCS	
3	External temperature setpoints over 1 x 0–10 V (1 buffer tank)	External BCS	Request for extra device (boiler/chiller)
4	External temperature setpoints over 1 x 4–20 mA (1 buffer tank)	External BCS	Request for extra device (boiler/chiller)
5	External temperature setpoints over 1 x 0–10 V (2 buffer tanks)	External BCS	Heat recovery control control Request for extra device (boiler/chiller)
6	External temperature setpoints over 1 x 4–20 mA (2 buffer tanks)	External BCS	Heat recovery control control Request for extra device (boiler/chiller)
7	External temperature setpoints over 2 x 0–10 V (1 buffer tank)	External BCS	Request for extra device (boiler/chiller)
8	External temperature setpoints over 2 x 4–20 mA (1 buffer tank)	External BCS	Request for extra device (boiler/chiller)
9	Internally calculated, sliding temperature (1 buffer tank)	Outside temperature sensor	Request for extra device (boiler/chiller)
10	Internally calculated, sliding temperature setpoints (2 buffer tanks)	Outside temperature sensor	Heat recovery control control Request for extra device (boiler/chiller)
11	Fixed temperature setpoints (1 buffer tank)	Internal	Request for extra device (boiler/chiller)
12	Fixed temperature setpoints (2 buffer tanks)	Internal	Heat recovery control control Request for extra device (boiler/chiller)
13	Internally calculated, sliding temperature setpoints via HPM (1 buffer tank)	HPM + outside temperature sensor	Request for extra device (boiler/chiller)
14	Internally calculated, sliding temperature setpoints via HPM (2 buffer tanks)	HPM + outside temperature sensor	Heat recovery control control Request for extra device (boiler/chiller)
15	External capacity request and external outlet temperature setpoint over 0–10 V	External BCS	(Pump control)
16	External capacity request and external outlet temperature setpoint over 4–20 mA	External BCS	(Pump control)
17	External temperature setpoints and external outlet temperature setpoint over 0–10 V	External BCS	(Pump control)
18	External temperature setpoints and external outlet temperature setpoint over 4–20 mA	External BCS	(Pump control)

Example: Input configuration 5 - external temperature setpoints over 0–10 V with optional heat recovery



CONTROL

CASCADE MANAGER AND CONNECTION

Cascade manager

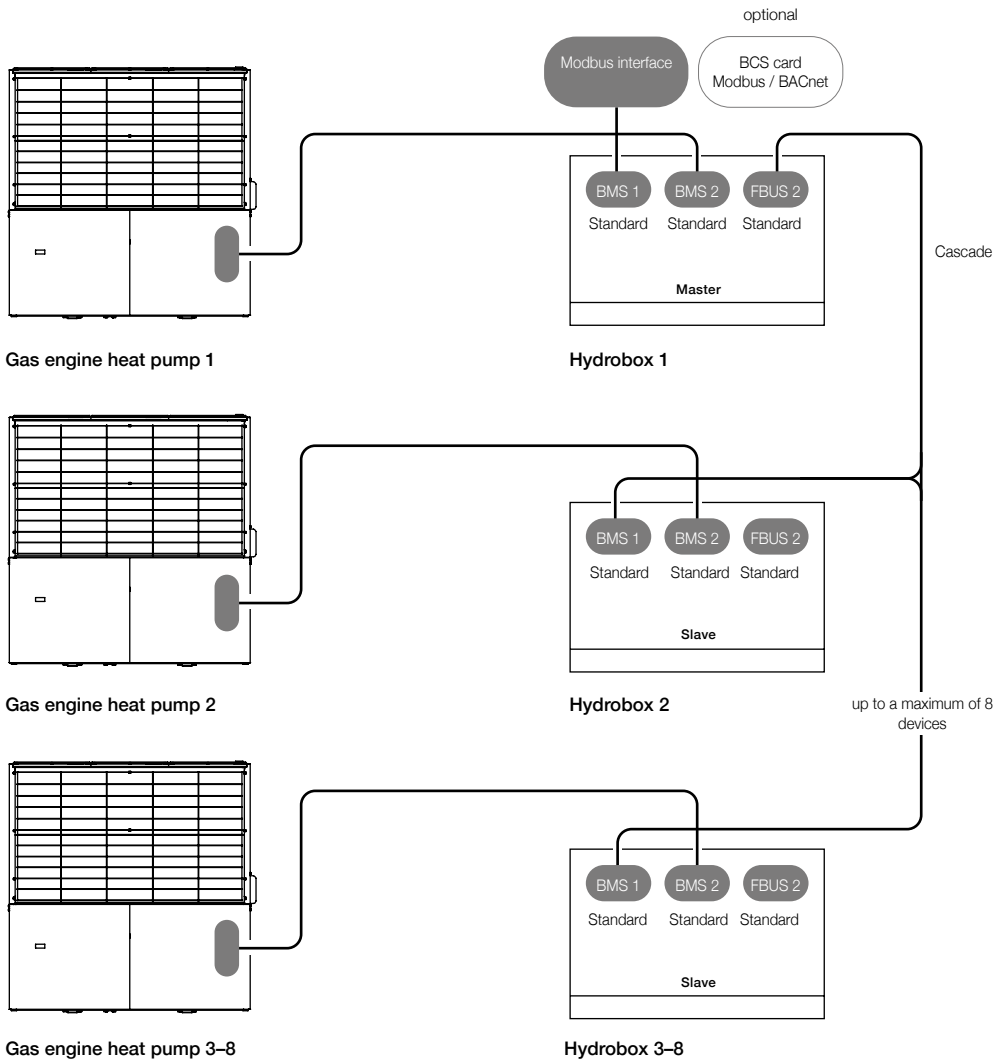
Up to eight gas engine heat pumps can be controlled with the cascade manager which is already integrated. The base load changes which can be switched off are managed automatically according to the “First in - first out” principle. All requests can be made via external capacity request and temperature setpoints with a mode preselection or via the internal control. In addition, simultaneous heating and cooling mode is possible with a corresponding input configuration.

Note: The cascade management can also function via the superordinate building control system – every Hydrobox can then be controlled independently.

Connection of the components

The cascade is controlled as standard, just like every Hydrobox in general, as previously described, via analogue and digital signals. In addition, the management Hydrobox (Master) has a Modbus interface (see next page).

Connection GEHP to HB



INTERFACES

BACNET AND MODBUS

Bus interfaces

The control and parameter transfer to a superordinate building control system can occur via the integrated Modbus interface (Modbus RTU). When using the interface in combination with the cascade manager, only the management of the Hydrobox (Master) can be controlled and read out. In this case, only selected information is transferred by the subordinate Hydroboxes (Slaves) to this Master via the internal bus.

An interface module is optionally available for Modbus TCP/IP, Bacnet and SNMP.

The table only shows a selection of the available parameters. The complete list is available as an Excel file upon request.

Variable	Description	Direction	UOM	Min	Max	Default	Data Type	BCS Type	BCS Ofc	BCS Idx	BCS Dir	BCS Dir2
OU B release	Compressor may be released	Only Output	-	0	1	0	B	Digital		152	Output	Output
OU B setpoint output	Temperature setpoint	Only Output	-	0	1	0	B	Digital		82	Output	Output
OU B setpoint temperature	Temperature setpoint	Only Output	-	0	1	0	B	Digital		81	Output	Output
OU setpoint Heating limited	Temperature setpoint	Only Output	-	-99.9	99.9	0.0	A	Ana-logue	0.1	45	Output	Output
OU setpoint Cooling limited	Temperature setpoint	Only Output	-	-99.9	99.9	0.0	A	Ana-logue	0.1	46	Output	Output
A001 output	Output value analogue output 1	Only Output	-	0	9999	0	I	Integer		11	Output	Output
...

HEAT PUMP MANAGER

HEATING / COOLING CIRCUIT CONTROL



The heat pump manager is a control extension to the Hydrobox internal controller. While this controls the primary side up to the buffer tank, the heat pump manager takes over the secondary side, that is the control of up to six heating and cooling circuits.

As a result of so-called applications already programmed in the factory, most common hydraulic systems can be put into operation quickly and easily.

A superordinate building control system can thus be dispensed with!

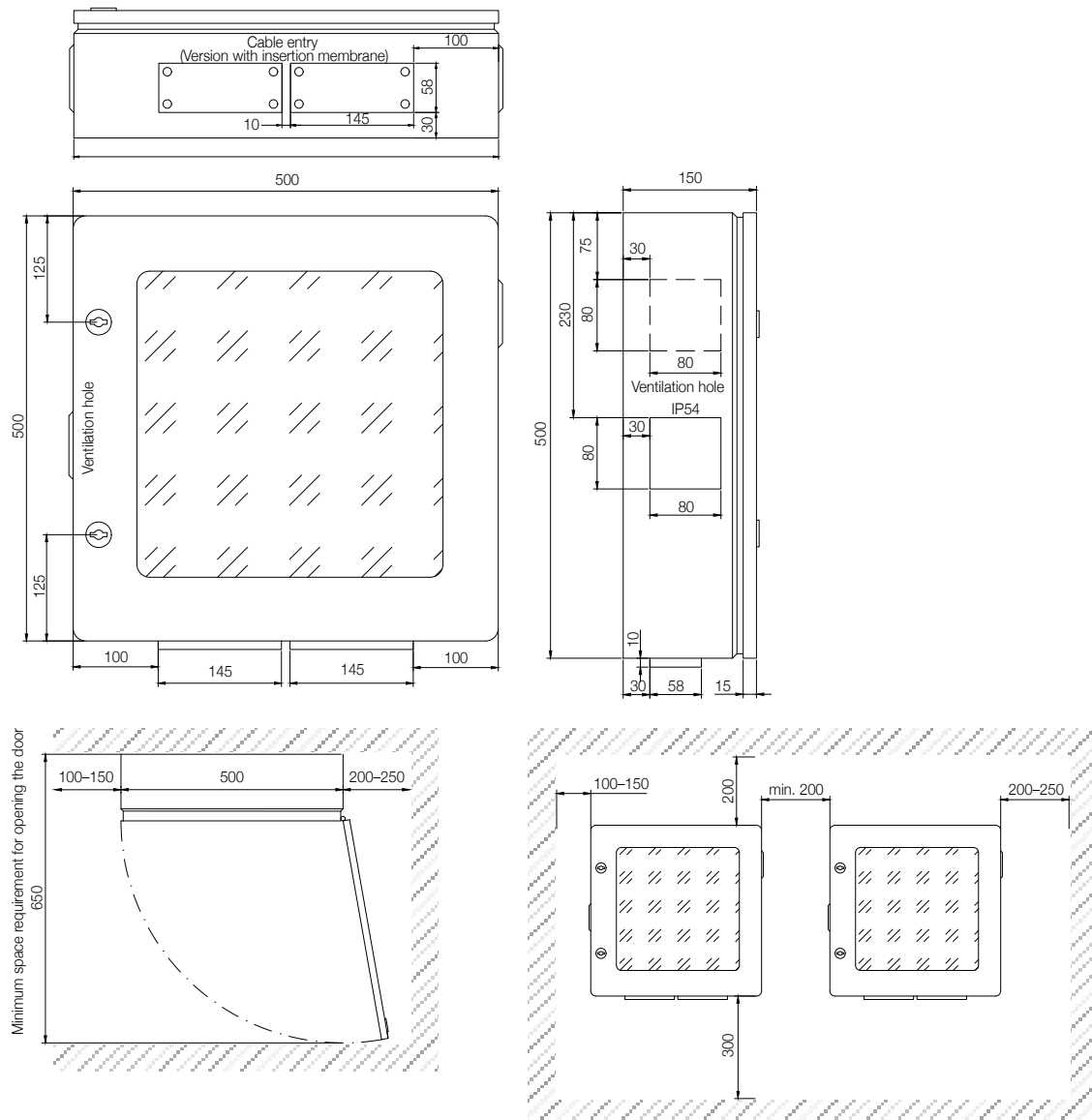


- ✓ Self-explanatory simple operation
- ✓ Web connection via Modbus or optionally via Ethernet
- ✓ Modbus connection for BCS systems available
- ✓ Clear display of operating states and setpoints or actual values
- ✓ External BCS can be saved
- ✓ Different applications available
- ✓ Dew point control possible
- ✓ All main functions are preset

HEAT PUMP MANAGER

TECHNICAL DATA / DIMENSIONS / INSTALLATION

HPM-3K-V2			
Dimensions	L x W x H	mm	500 x 500 x 150
Weight		kg	10
Electrical connection	Power supply	V / Ph / Hz	230 / 1 / 50
Environmental conditions	Temperature	°C	-20 to +30
	Max. humidity	% r.h.	90
Installation location	Only suitable for indoor installation! Keep out of direct sunlight		
Scope of delivery			
Standard	1 outside temperature sensor, type Y-WPM-DPUT 1 cable temperature sensor, type Y-WPM-NTC (immersion sensor for heating / cooling circuit)		
Optional accessories	Combined outside temperature / humidity sensor, type Y-WPM-DPUC Combined inside temperature / humidity sensor, type Y-WPM-DPWC Combined industrial temperature / humidity sensor, type Y-WPM-DPPC Cable temperature sensor, type Y-WPM-NTC (immersion sensor for further heating / cooling circuits) Cable temperature sensor, type Y-WPM-NTC-WS (pipe-mounted sensor) Modbus card, type Y-WPM-MODBUS Combined Modbus / BACnet card, type Y-WPM-BAC		



NOTE: There must be enough space to insert the cables!

WIRING

HEAT PUMP MANAGER

Item	Name	Start	Cable type *	Voltage	Objective	Comments
Heat pump manager						
1	Power supply	Switch cabinet	NYM-J 3 x 1.5 mm ²	230 V / 1~ / 50 Hz	HPM	Fuse 10 A slow blow*
2**	Communication HPM 1 / 2	HPM 1	LiYCY 2 x 0.75 mm ²		HPM 2	Bus communication***
3**	Operation notification 1	HPM	LiYCY 5 x 1.5 mm ²	250 V, 2 A cos. ph. 0.6	BCS	potential-free (configurable)
4**	Operation notification 2					potential-free (configurable)
5**	General error notification					potential-free
6**	Pressure switch system	Pressure switch	YSLY 2 x 0.75 mm ²	AC 24 V	HPM 1	Pressure switch on site
7**	Acknowledgement	BCS	YSLY 2 x 0.75 mm ²	AC 24 V	HPM 1	Remote acknowledgement by BCS / ext. button
8**	External temperature setpoint	BCS	LiYCY 2 x 0.75 mm ²	DC 0–10 V	HPM 1	Only 1 external specification possible
9	Temperature sensor Outside temperature	DPUT (DPUC)	YSLY 2 x 0.75 mm ²		HPM 1	Accessories: Y-WPM-DPUT / DPUC, DPUC available alternatively to DPUT****
10**	Combined sensor Inside temperature	DPWC (DPPC)	JY(St)Y 2 x 2 x 0.8 mm ²		HPM	Accessories: Y-WPM-DPWT / DPPC, only 1 combined sensor per HPM possible, installation in the reference room, DPPC available alternatively to DPWC
11**	Combined sensor Inside humidity					
Connection heat pump manager / Hydrobox						
12	Communication	HPM 1	LiYCY 2 x 0.75 mm ²		HB 1	Bus communication***
Connection heat pump manager / sensor and field devices (depending on the selected application)						
See heating / cooling circuit applications						

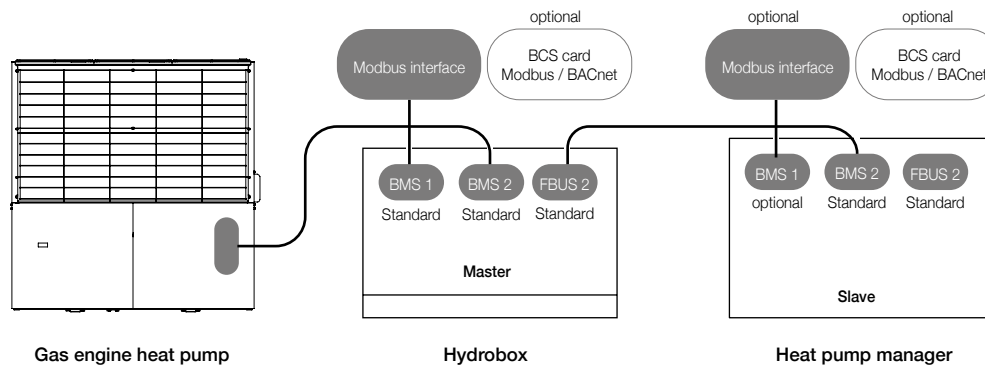
* These are recommendations! The dimensioning and implementation must be carried out in accordance with local regulations

** Optional

*** Up to 50 m 1 x LiYCY 2 x 0.75 mm², shielded, up to 70 m 1 x LiYCY 2 x 1.00 mm², shielded

**** The sensor must be installed sheltered from the wind and sun

Diagram

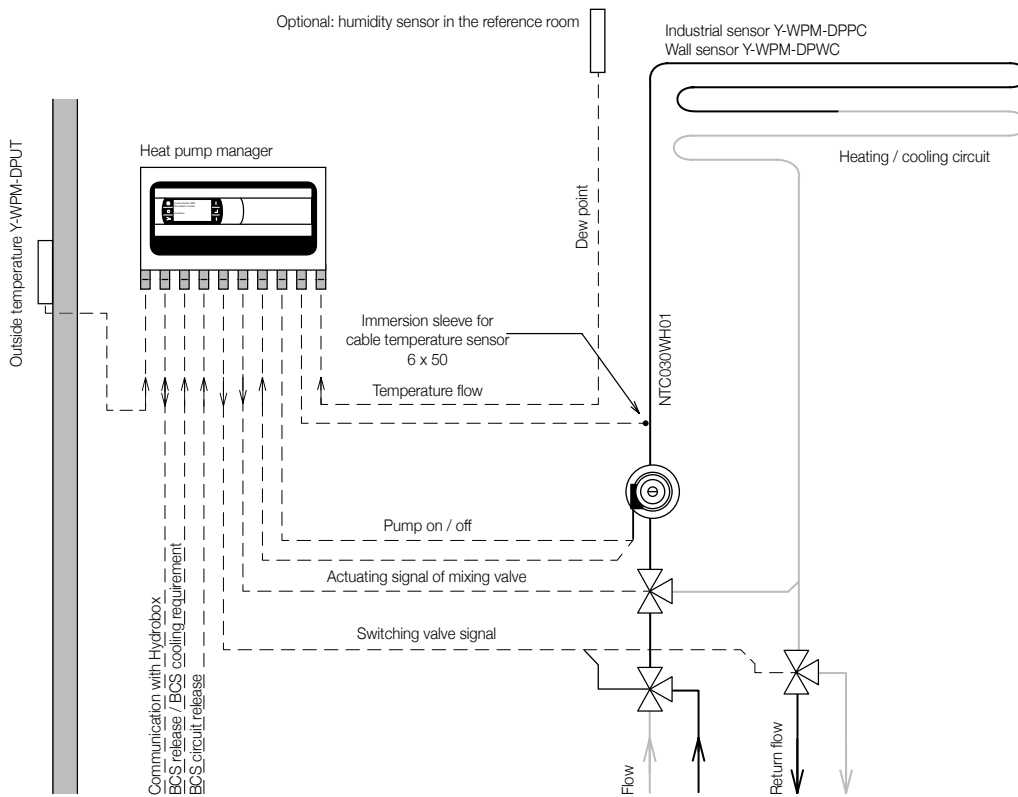


CONTROL

APPLICATIONS

App	Description	Setpoint	Mode	Mode change	Release
1	Pump circuit	Outside temperature	Heating	-	BCS, automatic, manual
2	Pump circuit	Outside temperature	Cooling	-	BCS, automatic, manual
3	Pump circuit	Outside temperature	Heating / cooling	BCS, autom., manual, ext. switch	BCS, automatic, manual
4	Pump circuit	External, 0–10 V	Heating / cooling	BCS, autom., manual, ext. switch	BCS
5	Pump circuit	External, 4–20 mA	Heating / cooling	BCS, autom., manual, ext. switch	BCS
6	Mixed heating circuit	Outside temperature	Heating	-	BCS, automatic, manual
7	Mixed heating circuit	Outside temperature	Heating	-	automatic
8	Mixed heating circuit	External, 0–10 V	Heating	-	BCS
9	Mixed heating circuit	External, 4–20 mA	Heating	-	BCS
10	Mixed cooling circuit	Outside temperature	Cooling	-	BCS, automatic, manual
11	Mixed cooling circuit	Outside temperature	Cooling	-	automatic
12	Mixed cooling circuit	External, 0–10 V	Cooling	-	BCS
13	Mixed cooling circuit	External, 4–20 mA	Cooling	-	BCS
14	Mixed heating / cooling circuit	Outside temperature	Heating / cooling	BCS, autom., manual, ext. switch	BCS, automatic, manual
15	Mixed heating / cooling circuit	Outside temperature	Heating / cooling	BCS, autom., manual, ext. switch	automatic
16	Mixed heating / cooling circuit	External, 0–10 V	Heating / cooling	BCS, autom., manual, ext. switch	BCS
17	Mixed heating / cooling circuit	External, 4–20 mA	Heating / cooling	BCS, autom., manual, ext. switch	BCS

Example: Application 14: Mixed heating / cooling circuit (via outside temperature)





TÜV certified

System index			450	560	710	850
Overall system						
Heating capacity	A-10 / W45 ¹⁾	kW	43	48	55	64
Cooling capacity	A35 / W7 ¹⁾	kW	36	45	53	64
$\eta_{s,h}$ ²⁾		%	127	130	130	132
Energy efficiency class ³⁾	Heating (W35)		A+	A+	A+	A+
Gas engine heat pump						
Dimensions ⁴⁾	H x W x D	mm	2,170 x 1,690 x 800		2,170 x 2,100 x 800	
Weight	(without optional heat recovery)	kg	880	890	1,080	1,080
Electrical connection	Power supply	V / Ph / Hz	230 / 1 / 50			
	Fuse ⁵⁾	A	20, slow blow (C-Automat or Neozed)			
Fuel data	Gas type		Natural gas group II			
	Max. gas consumption (LHV)	kW	69	75	77	86
	Gas supply pressure	mbar	20			
	Gas connection	Inch	R 3 / 4			
			on site: flexible gas tube, filter			
Refrigerant pipes	Refrigeration gas / liquid pipe	mm	28 / 12	28 / 16	35 / 18	35 / 18
Exhaust drain pipe ⁶⁾		mm	15			
Sound level	Sound pressure level (max.)	dB(A)	62	62	66	66
	Sound power level (max.)	dB(A)	82	82	84	85
Operation range	Outside temperature heating	°C DB	-20 to +35			
	Outside temperature cooling	°C DB	+0 to +46 (-10 to +46) ⁷⁾			
Hydrobox						
Dimensions	L (+feet) x W x H	mm	1,100 (+30) x 1,020 x 675			
Weight		kg	190	190	210	210
Rated volume flow	Heating, 5 K spread	m ³ /h	8.0	9.0	12.0	14.0
Rated pressure loss	Version VJ	kPa	15	19	22	30
External pressure increase	Version VPJ	kPa	90	80	60	40
Electrical connection	Power supply	V / Ph / Hz	230 / 1 / 50			
	Fuse ⁵⁾	A	10			
Pipe connections	Water pipes	Inch	2			
	Refrigerant gas / liquid pipe	mm	35 / 18			
Sound level	Sound pressure level (max.)	dB(A)	33	35	33	35
Water outlet temperature	Heating / cooling	°C	+27 to +50 / +6 to +18			
Water inlet temperature	Max. / Min.	°C	45 / 10			
Connection GEHP + Hydrobox						
Refrigerant pipes	Refrigerant gas / liquid pipe	mm	28 / 12	28 / 16	35 / 18	35 / 18
Max. distances	Length	m	55			
	Height	m	25			
Bus communication	(also for cascade HB - HB)	mm ²	LiCY 2 x 0.75			
Heat pump manager						
Dimensions	L x W x H	mm	500 x 500 x 150			
Weight		kg	10			
Electrical connection	Power supply	V / Ph / Hz	230 / 1 / 50			
	Fuse ^{5) 8)}	A	10			
Bus communication		mm ²	LiCY 2 x 0.75			

1) These are water outlet temperatures

2) In accordance with EU Regulation 813 / 2013 (LOT1)

3) In accordance with EU Regulation 811 / 2013

4) See accessories for dimensions with vibration dampers, air guards or air direction adjuster

5) These are recommendations; the dimensioning must be carried out in accordance with local regulations

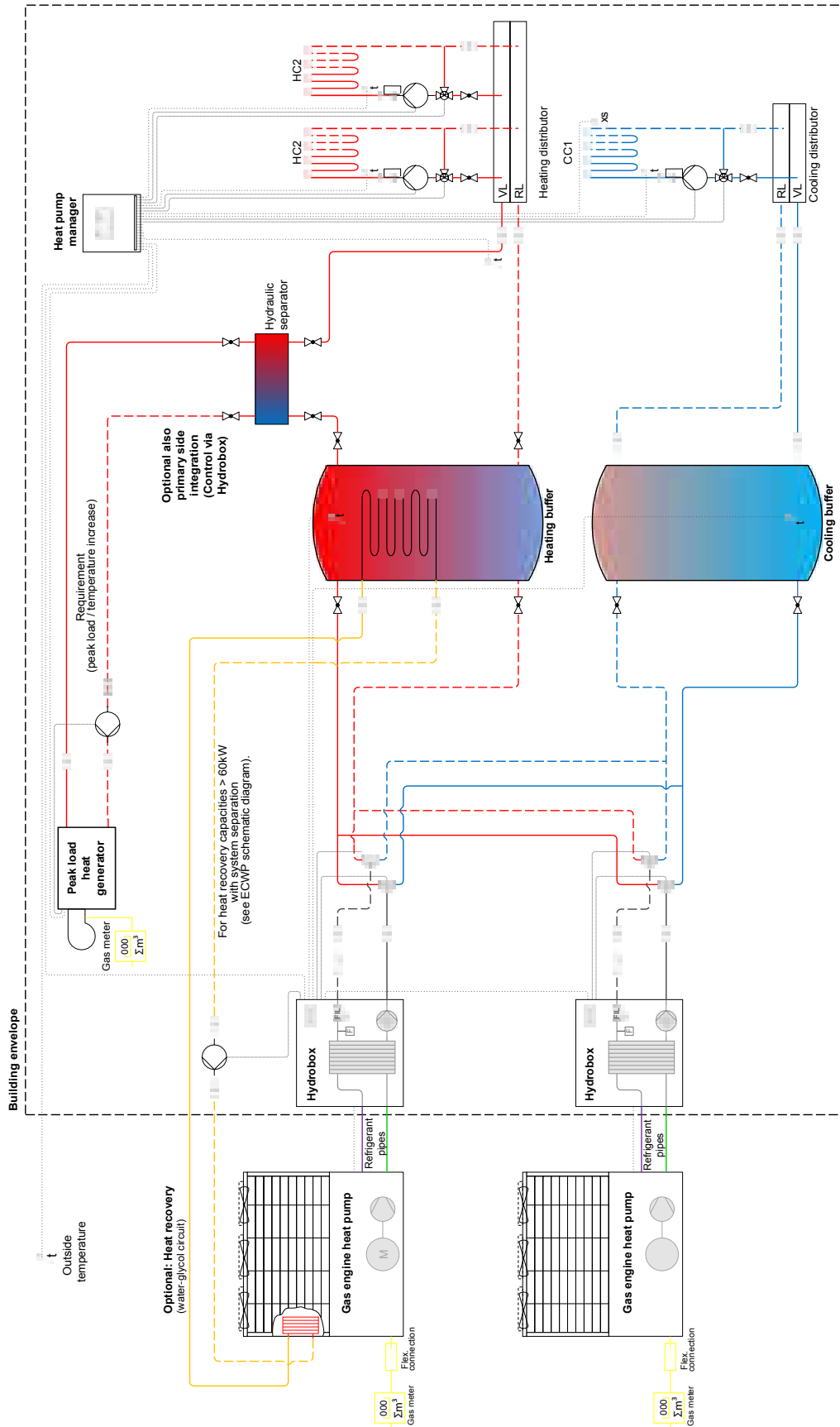
6) The exhaust drain must be removed

7) See accessories with air guards

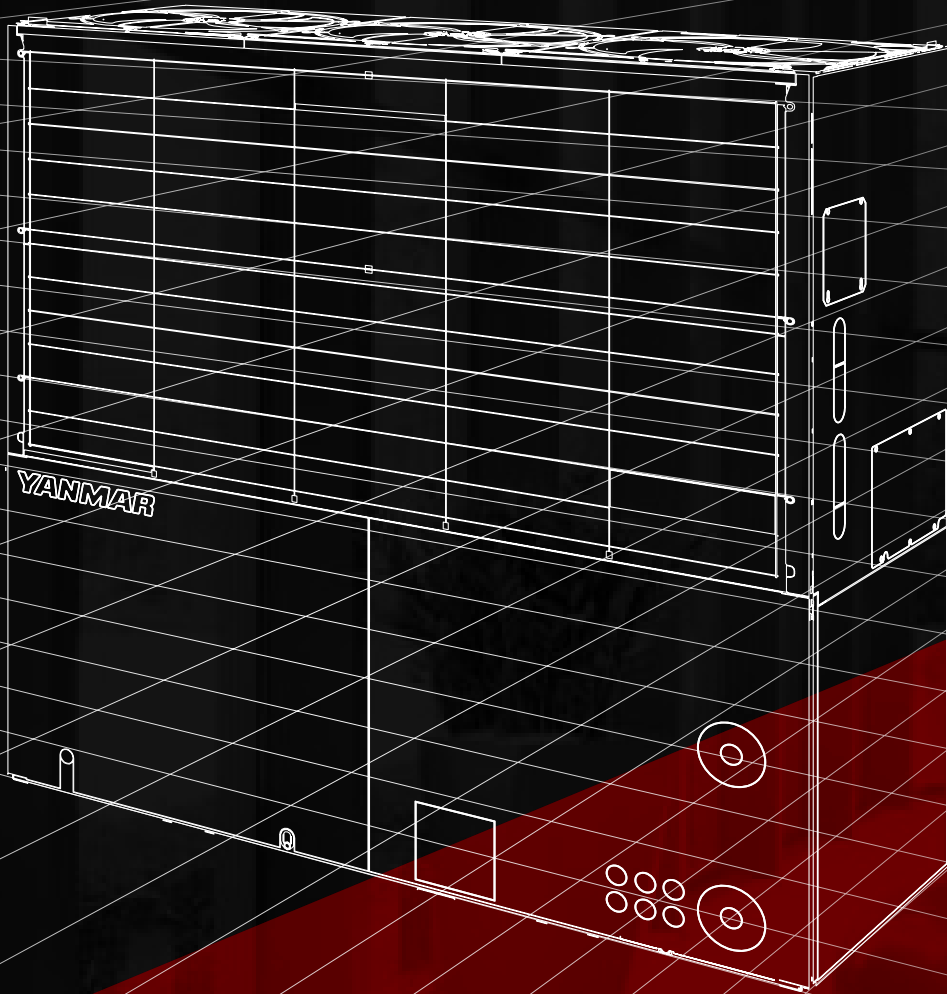
8) Depending on the field devices connected

SYSTEM DIAGRAM EXAMPLE

GAS ENGINE HEAT PUMP + HYDROBOX + HEAT PUMP MANAGER



NOTE: This example diagram is not a replacement for specialist planning and is not an implementation plan. Some necessary mounting parts and components have been dispensed with for the sake of clarity. The example diagram should by no means be considered complete! Errors expected.



YANMAR

YANMAR

COMPACT MACHINE

GAS ENGINE HEAT PUMP COMPACT



The gas engine heat pump installed outside with an already integrated water heat exchanger is used as an air-to-water system. As a result of the compact design, refrigerant-conducting lines are not necessary, which enables direct integration into the heating and cooling water system.

The system is suitable for monovalent operation as a result of the internal use of the engine and exhaust heat. Moreover, this heat is used for the rapid defrosting of the registers.

Used in new and existing buildings, this system solution is not just suitable for commercial applications but also for industrial and process applications.



- ✓ Engine waste heat can be recovered and reused in cooling mode (heat recovery optional)
- ✓ Simultaneous heating and cooling (using heat recovery)
- ✓ Direct connection to water-bearing systems
- ✓ Low refrigerant charge (only in the gas engine heat pump)
- ✓ Cascadable up to the MW range
- ✓ Gas prices are lower in comparison to electricity prices
- ✓ Meets all requirements of the renewable energy laws
- ✓ High efficiency due to use of condensing technology
- ✓ Lower noise emission than electric chillers
- ✓ Eligible for subsidies and exempt from energy tax
- ✓ Simple and cost-effective installation
- ✓ High efficiency in partial load range

COMPACT GAS ENGINE HEAT PUMP



TECHNICAL DATA

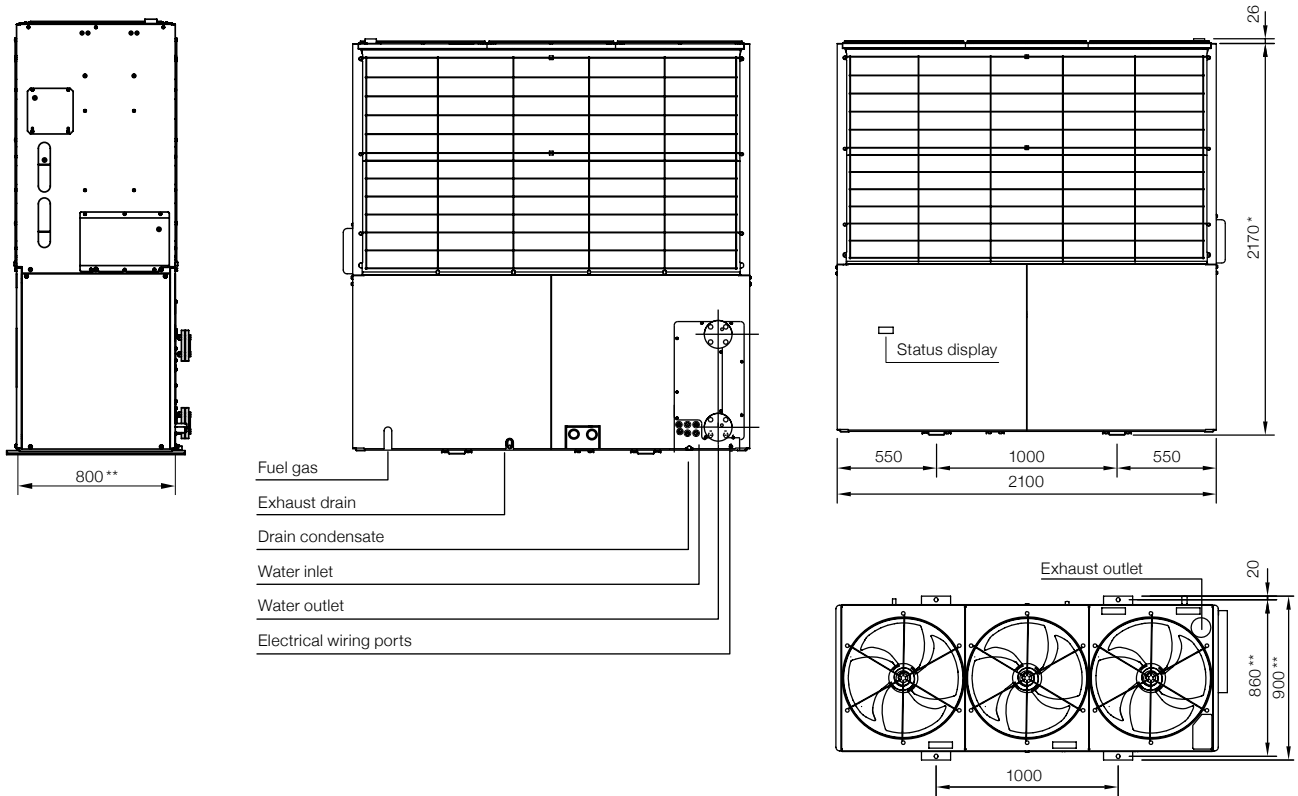
ECWP ... J			710	
Rated heating capacity	A7 / W35	kW	82	
Heating capacity	A-10 / W45	kW	67	
Rated cooling capacity	A35 / W7	kW	71	
Cooling capacity	A35 / W15	kW	84	
Dimensions ¹⁾	L x W x H	mm	2,170 x 2,100 x 800	
Weight (with optional heat recovery)		kg	1,080	
Electrical characteristics	Power supply	V / Ph / Hz	230 / 1 / 50	
	Starting current	A	25	
	Operation current heating / cooling	A	7.21 / 7.93	
	Power consumption heating / cooling	kW	1.51 / 1.66	
Fuel data	Gas type		Natural gas group II	
	Rated gas consumption (LHV) heating / cooling	kW	53 / 61	
	Max. gas consumption (LHV)	kW	79	
	Gas supply pressure	mbar	17–25	
Engine	Type		YANMAR four-stroke engine, water-cooled	
	Cylinder		4	
	Cubic capacity	cm ³	2,190	
	Speed range	Heating	1 / min	650–2,800
		Cooling	1 / min	650–2,300
	Lubricant oil	Type		YANMAR genuine GEHP oil
Quantity		l	50	
Cooling water engine	Type		YANMAR genuine LLC	
	Quantity	l	30.5	
	Concentration	%	50	
Compressors	Type		Scroll	
	Quantity		2	
	Power transmission		Poly-V flat belt	
Refrigerant	Type		R410A	
	Quantity	kg	11.8	
Water	Nominal volume flow	m ³ / h	12.2	
	Water content	l	10.4	
	Nominal pressure loss	kPa	24	
Fans	Type		Axial	
	Quantity		3	
	Related air flow	m ³ / h	34,200	
	External pressure (max.)	Pa	5 (30)	
Sound pressure level ²⁾	Nominal	dB(A)	62	
	Quiet mode	dB(A)	59	
	Maximum (heating mode)	dB(A)	66	
Pipe connections	Water pipes	Inch	2	
	Exhaust pipe (outside diameter)	mm	60.5	
	Fuel gas pipe	Inch	R 3 / 4	
	Drain pipe (inside diameter)	mm	15	
	Exhaust drain pipe (inside diameter)	mm	15	
Maintenance interval engine / engine Lubricant oil ³⁾		h	10,000 / 20,000	
Heating capacity heat recovery (optional, in cooling mode)		kW	30	

1) See accessories for dimensions with vibration dampers

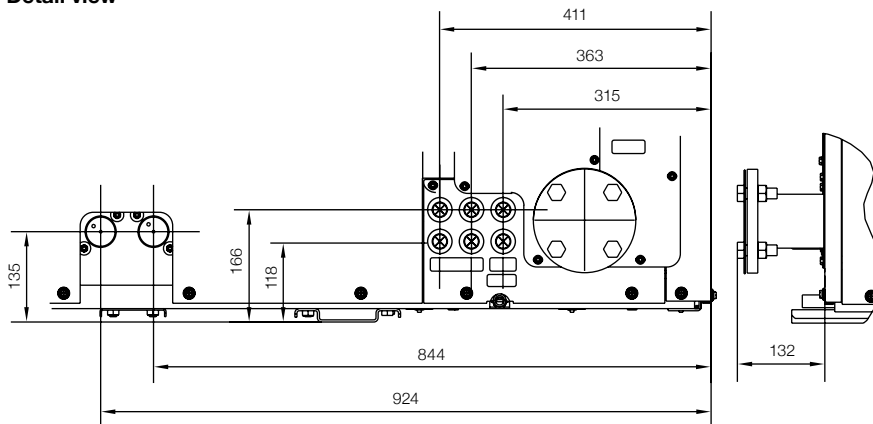
2) The operating noise levels shown above were measured at a distance of 1 m to the front face of each unit and at a height of 1.5 m and then converted into an anechoic room equivalent level. The noise level of the actually installed unit is usually higher than the indicated value due to influences of ambient noise and echo.

COMPACT GAS ENGINE HEAT PUMP

DIMENSIONS



Detail view



* See page 88 for dimensions with vibration dampers

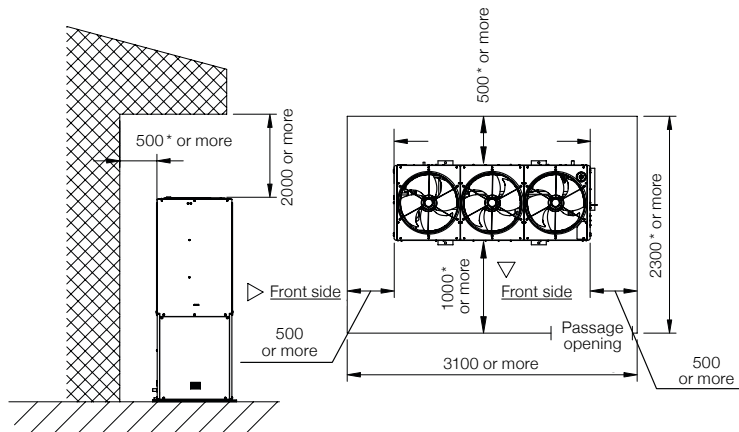
** See page 86 for dimensions with air guards

COMPACT GAS ENGINE HEAT PUMP

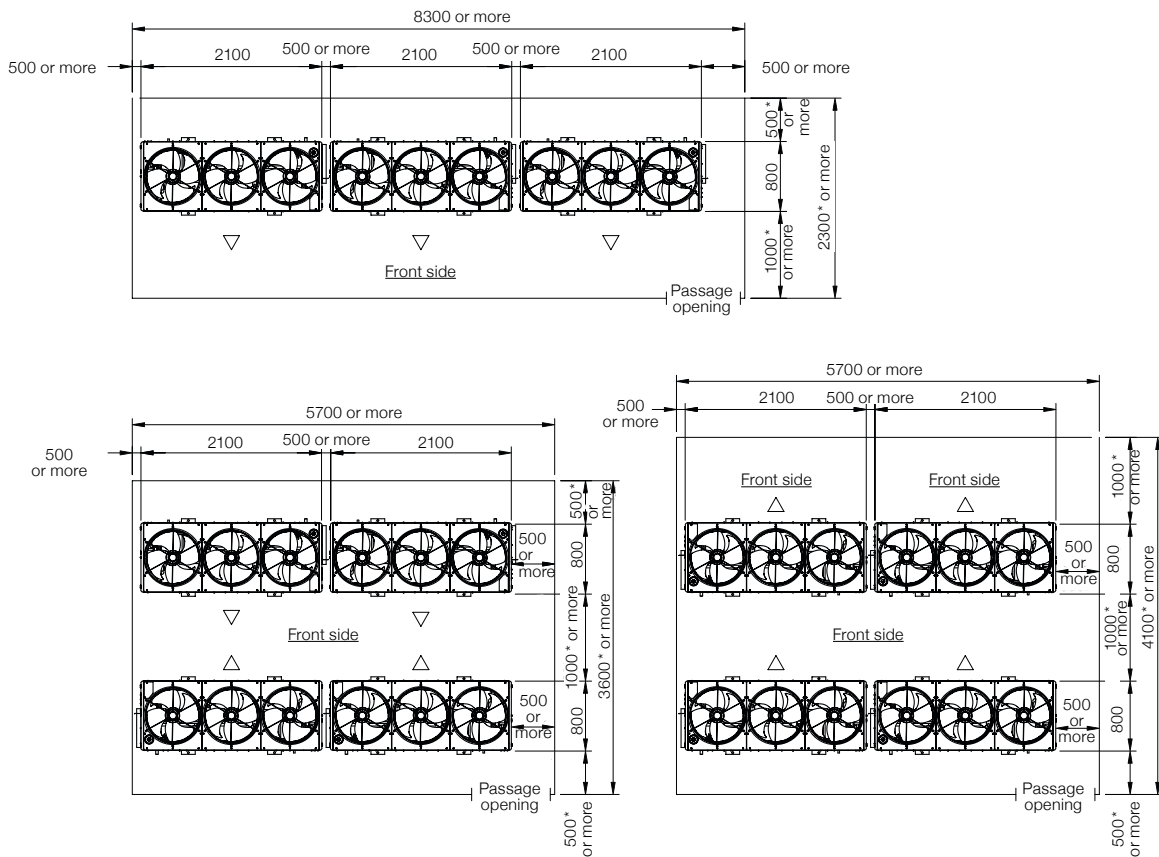
SERVICING SPACE REQUIREMENTS

ECWP 710 J

Single unit installation



Multiple unit installation



* See page 86 for clearances with air guards

WIRING

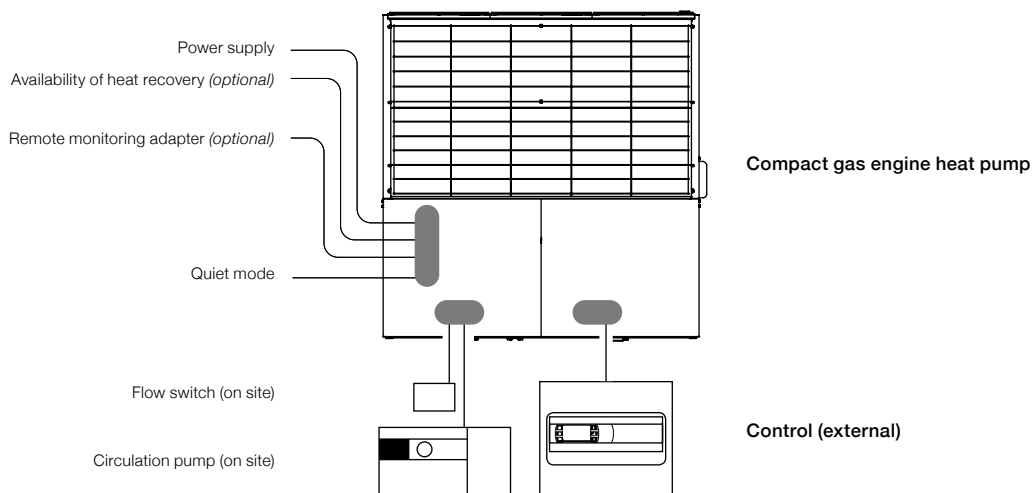
COMPACT GAS ENGINE HEAT PUMP

Item	Name	Start	Cable type **	Voltage	Objective	Comments
Gas engine heat pump						
1	Power supply	Switch cabinet	YSLY-JZ 3 x 2.5 mm ²	AC 230 V	GEHP	1.66 kW, fuse 20 A slow blow **
2 *	Circuit breaker pump	GEHP (CTO710J-2)	YSLY-JZ 3 x 1.5 mm ²	AC 230 V	Pump	Max. 750 W pump performance, single phase (over 750 W via external circuit breaker)
3 *	Release pump	GEHP (CTO710J-2)	YSLY 2 x 0.75 mm ²		Pump	Potential-free release contact for external pump
4	Quiet mode	BCS	YSLY 3 x 1.0 mm ²		GEHP	Optional using an accessory cable
5	Remote monitoring	Remote monitoring adapter	LiYCY 2 x 0.75 mm ²		GEHP	Optional component: see accessories (pg. 149)
6	Communication	GEHP	LiYCY 2 x 0.75 mm ²		GEHP	Only with Master / Slave applications
7 *	Flow switch (on site)	Flow switch	YSLY 3 x 1.0 mm ²		GEHP	potential-free
8 *	Operating signal on / off	GEHP	YSLY 4 x 0.75 mm ²		GEHP	Potential-free, closed = on
9	Cooling / heating request					Potential-free, closed = heating
10	Setpoint water outlet temperature	BCS	LiYCY 2 x 0.75 mm ²		GEHP (CVO710J)	Analogue signal DC 1-5 V / 0-5 V / 0-10 V / 4-20 mA
11	Entire flow sensor (group sensor)	Sensor PT100 (3-pipe)	YSLY 3 x 0.75 mm ²		GEHP (CVO710J)	Only with cascading
12	System message on / off	GEHP	YSLY 5 x 0.75 mm ²		BCS	Potential-free, closed = engine running
13	Operating mode status heating / cooling					Potential-free, closed = heating mode
14	Alarm status					Potential-free, open = no fault
15	Availability heat recovery					Potential-free, closed = heat recovery available
16	Optionally with electric plate heating via separate supply line 230 V, 54 W.					

* NOTE: Operation of the GEHP is not possible without placing these positions

** These are recommendations; the dimensioning and implementation must be carried out in accordance with local regulations

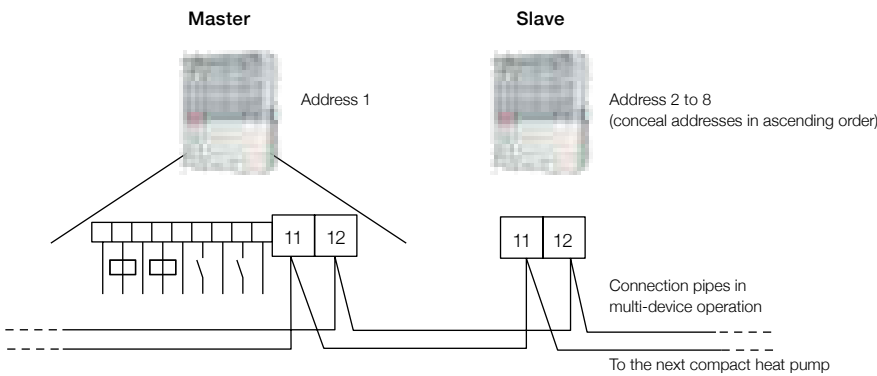
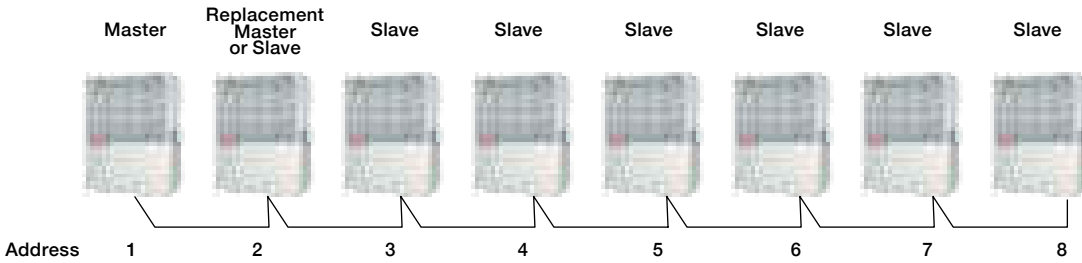
Diagram



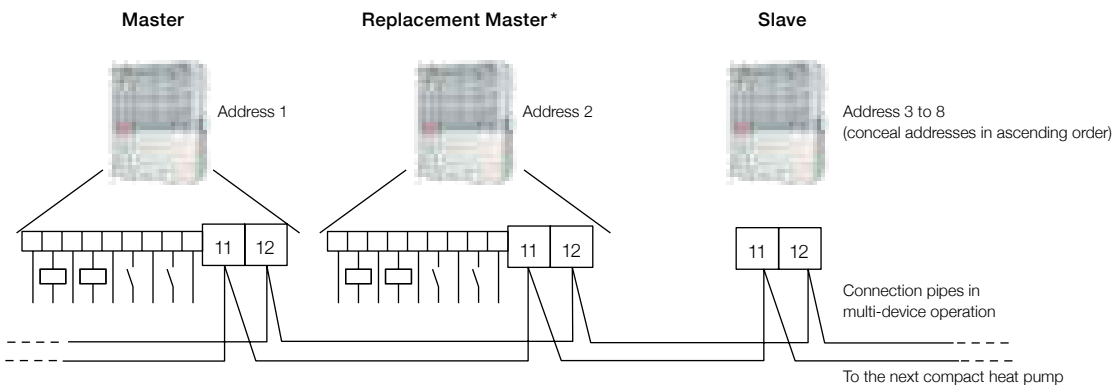
CONTROL

CASCADE MANAGER

Up to eight gas engine heat pumps can be controlled with the cascade manager which is already integrated.



Approach with replacement Master



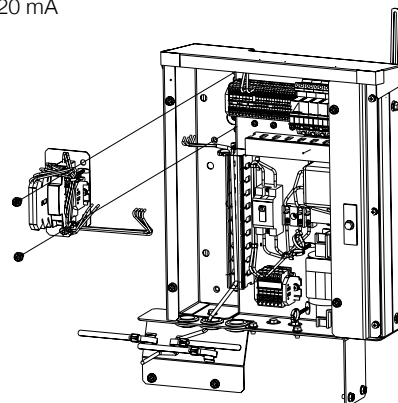
* Replacement Master heat pump: The replacement Master assumes the Master function if the Master has failed or is being serviced. In fault-free normal operation, this compact heat pump works in multi-device operation as the Slave.

NOTE: The wiring for remote monitoring and control signals have to be connected to the Master and to the replacement Master heat pump. The mains voltage must never be connected to the signal terminals, as this can cause damage to sensitive electronics.

COMPACT MACHINE ACCESSORIES

CONVERTER SET CVO710J

The converter set CVO710 J is required when cascading the compact gas engine heat pump and also enables the temperature specification by means of 0–5 V, 0–10 V or 4–20 mA (Standard: 1–5 V).

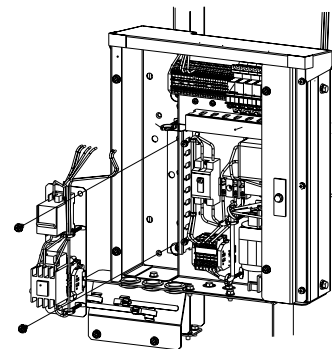


Scope of delivery	Description	Details	Quantity
1	Signal converter	857–400 (WAGO)	1
2	Temperature converter	857–800 (WAGO)	1
3	Voltage converter	STEP-PS / 1 AC / 24 DC / 1 (Phoenix Contact)	1
4	Mounting material	Mounting plate, harness, bolts	1 set

Included in the delivery as standard (delivered loose)

PUMP CONNECTION SET CTO710J-2

The pump connection set CTO710 J-2 simplifies the connection of the external circulation pump in the case of the compact gas engine heat pump ECWP 710 J.



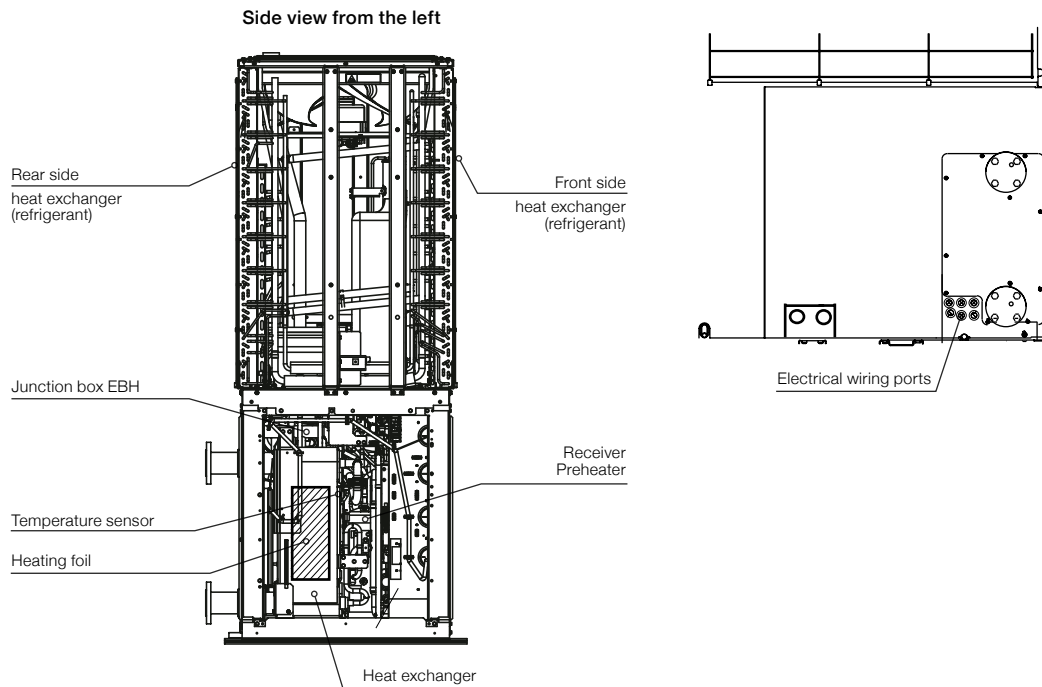
Scope of delivery	Description	Details	Quantity
1	Release relay	potential-free	1
2	Circuit breaker	Nominal switch-off current 6 A (230 V)	1
3	Mounting material	Mounting plate, harness, bolts	1 set

Included in the delivery as standard (delivered loose)

COMPACT MACHINE ACCESSORIES

PLATE HEATER ECWP-EBH

The electrical, thermostatically controlled trace heating heats the internal main plate heat exchanger and is used as anti-freeze when using water without the addition of glycol.



TECHNICAL DATA

Power consumption		W	50
Electrical connection	Power supply	V / Ph / Hz	230 / 1 / 50
	Fuse	A	6
Maximum temperature		°C	140

AT A GLANCE

COMPACT GAS ENGINE HEAT PUMP



TÜV certified

ECWP ... J			710
Overall system			
Heating capacity	A-10 / W45 ¹⁾	kW	67
Cooling capacity	A35 / W7 ¹⁾	kW	71
$\eta_{s,h}$ ²⁾		%	134
Energy efficiency class ³⁾	Heating (W35)		A+
Gas engine heat pump			
Dimensions ⁴⁾	H x W x D	mm	2,170 x 2,100 x 800
Weight (with optional heat recovery)		kg	1,080
Electrical connection	Power supply	V / Ph / Hz	230 / 1 / 50
	Fuse ⁵⁾	A	20, slow blow (C-Automat or Neozed)
Fuel data	Gas type		Natural gas group II
	Max. gas consumption (LHV)	kW	79
	Gas supply pressure	mbar	17–25
	Fuel gas	Inch	R 3 / 4 on site: flexible gas tube, filter
Water connection	Rated volume flow	m ³ /h	12.2
	Rated pressure loss	kPa	24
	Water pipes	Inch	2
Heat recovery (optional)	Rated volume flow	m ³ /h	2.6
	Rated pressure loss	kPa	17
	Heat recovery pipes	Inch	1
Exhaust drain pipe ⁶⁾		mm	15
Sound level	Sound pressure level (max.)	dB(A)	66
	Sound power level (max.)	dB(A)	85
Operation range	Outside temperature heating	°C DB	-20 to +26
	Outside temperature cooling	°C DB	+10 to +46 (-10 to +46) ⁷⁾
	Water outlet temperature heating	°C	+35 to +45 ⁸⁾
	Water outlet temperature cooling	°C	+5 to +15
	Water outlet temperature heat recovery	°C	+70

1) These are water outlet temperatures

2) In accordance with EU Regulation 813 / 2013 (LOT1)

3) In accordance with EU Regulation 811 / 2013

4) See accessories for dimensions with vibration dampers, air guards or air direction adjuster

5) These are recommendations; the dimensioning must be carried out in accordance with local regulations

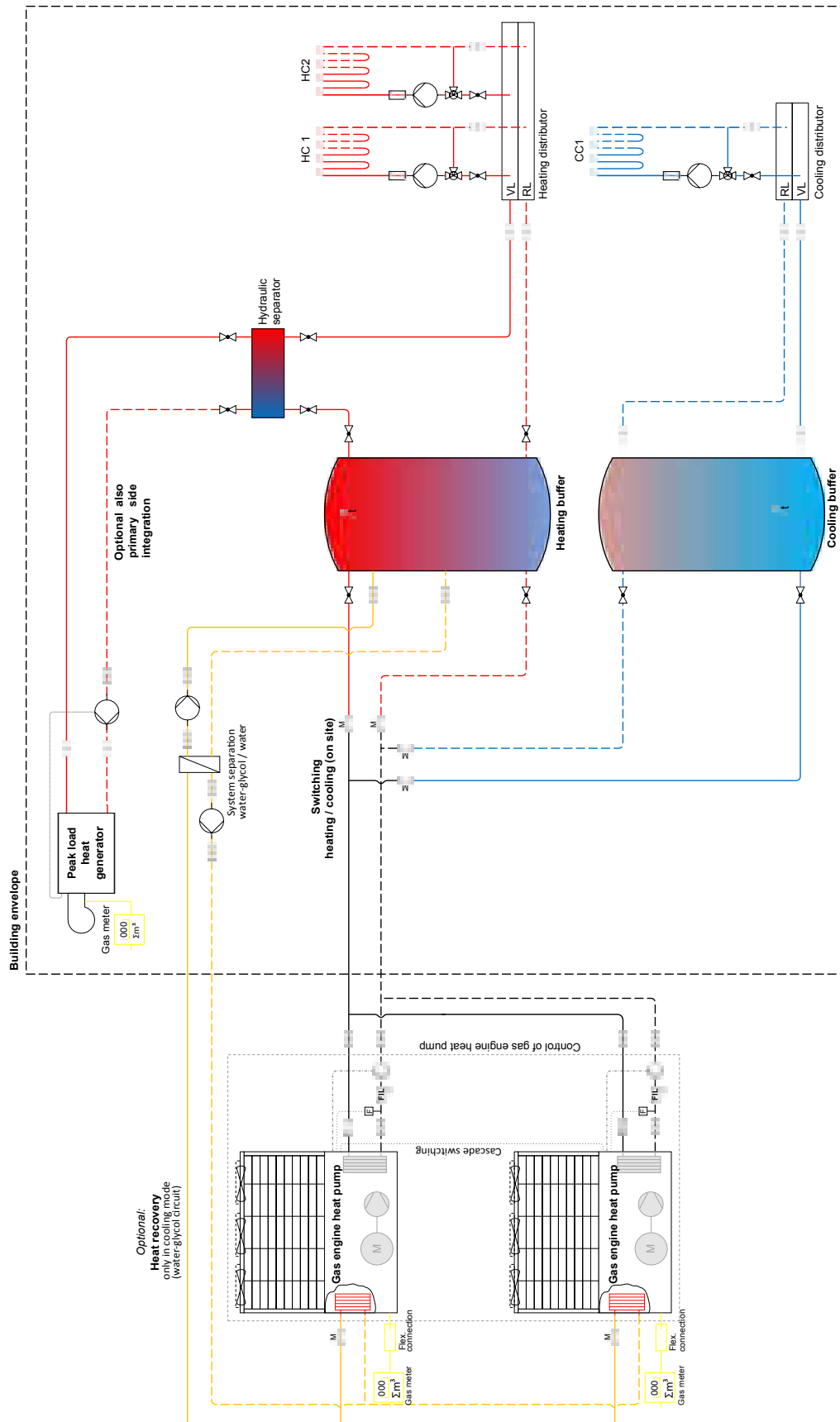
6) The exhaust drain must be removed

7) See accessories with air guards

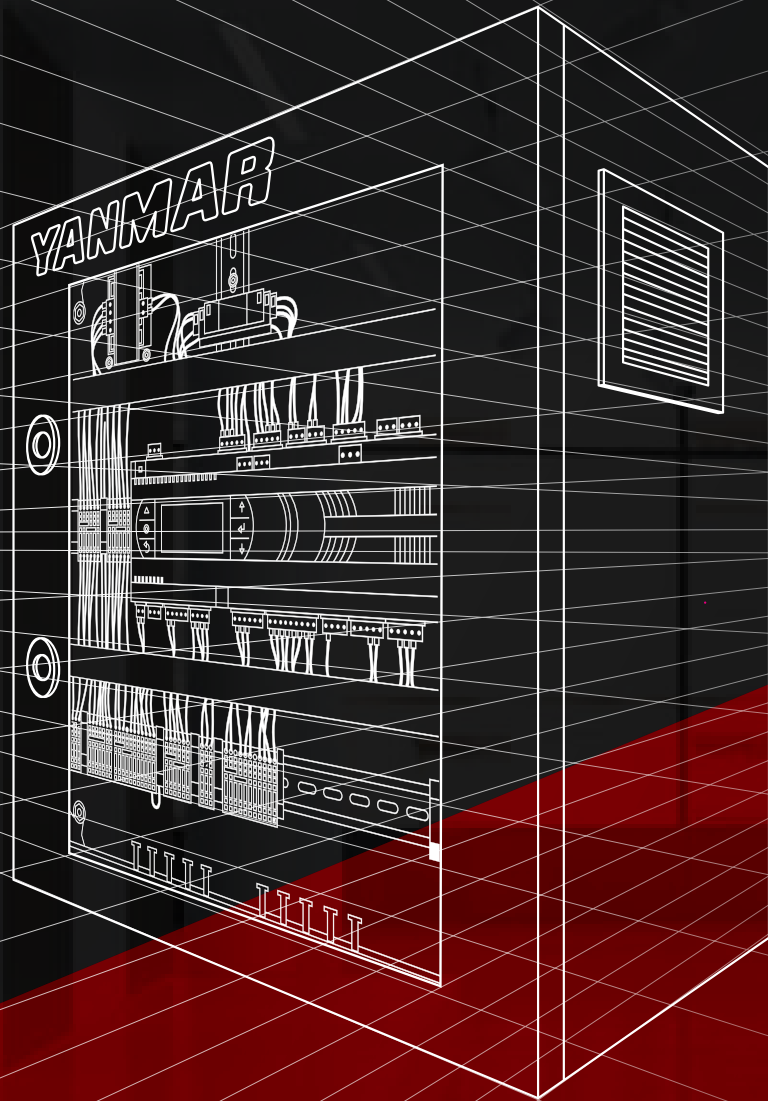
8) Up to outside temperature +2 °C water outlet 50 °C, up to outside temperature +7 °C water outlet 55 °C

SYSTEM DIAGRAM EXAMPLE

COMPACT GAS ENGINE HEAT PUMP



NOTE: This example diagram is not a replacement for specialist planning and is not an implementation plan. Some necessary mounting parts and components have been dispensed with for the sake of clarity. The example diagram should by no means be considered complete! Errors expected.



YANMAR

AIR-TO-AIR SYSTEM

GAS ENGINE HEAT PUMP

WITH AHU KIT



As an air-to-air system, the gas engine heat pump situated in the outside area is connected in classic split construction with a refrigerant-bearing register in a ventilation unit. As a result of the direct connection of the gas engine heat pump and the AHU kit on the ventilation unit, complex installations can be avoided and frost protection measures dispensed with.

The system is suitable for monovalent operation as a result of the internal use of the engine and exhaust heat. Moreover, this heat is used for defrosting the registers without heating interruption.



- ✓ Low electrical power consumption, thus relieving the load on the power grids
- ✓ Transformer stations or emergency power systems may be dimensioned smaller or can be omitted completely
- ✓ Meets all requirements of the renewable energy laws
- ✓ Cascades are easy to create and promote operational safety
- ✓ Lower CO₂ emissions compared to boilers and electric chillers
- ✓ Universal use for heating, cooling and dehumidifying, as well as post-heating via the engine heat recovery

- ✓ Up to 85 kW cooling capacity and 95 kW heating capacity via a single-circuit register
- ✓ Power adjustment by means of modulation
- ✓ Engine waste heat can be recovered and reused in cooling mode
- ✓ No frost protection measures necessary
- ✓ Direct heating and cooling transfer from refrigerant to air, thus hardly any conversion losses
- ✓ No heating interruption in defrost mode

GAS ENGINE HEAT PUMP

TECHNICAL DATA

ENCP ... J			450	560	710	850	
Rated heating capacity (with AHU kit) ¹⁾	A7 DB / L20	kW	50	63	80	95	
Heating capacity (with AHU kit) ¹⁾	A-7 DB / L20	kW	53	67	78	95	
Rated cooling capacity (with AHU kit) ¹⁾	A35 / L19	kW	45	56	71	85	
Dimensions ²⁾	H x W x D	mm	2,170 x 1,690 x 800		2,170 x 2,100 x 800		
Weight (without optional heat recovery)		kg	880	890	1,080	1,080	
Electrical characteristics	Power supply	V / Ph / Hz	230 / 1 / 50				
	Starting current	A	20	20	25	25	
	Operating current heating / cooling	A	3.69 / 4.16	4.40 / 4.73	6.50 / 6.93	7.21 / 7.93	
	Power consumption heating / cooling	kW	0.77 / 0.87	0.92 / 0.99	1.36 / 1.45	1.51 / 1.66	
Fuel data	Gas type		Natural gas group II				
	Rated gas consumption (LHV) heating / cooling	kW	29 / 31	39 / 41	51 / 51	60 / 61	
	Max. gas consumption (LHV)	kW	57	70	75	90	
	Gas supply pressure	mbar	17-25				
Engine	Type		YANMAR four-stroke engine, water-cooled				
	Cylinder		3		4		
	Cubic capacity	cm ³	1,642	1,642	2,190	2,190	
	Speed range	Heating	1 / min	650-2,750	650-2,800	725-2,800	650-2,800
		Cooling	1 / min	650-2,100	650-2,200	725-2,300	650-2,300
	Lubricant oil	Type		YANMAR genuine GEHP oil			
Quantity		l	34	38	50	50	
Cooling water engine	Type		YANMAR genuine LLC				
	Quantity	l	23		29		
	Concentration	%	50				
Compressors	Type		Scroll				
	Quantity		2				
	Power transmission		Poly-V flat belt				
Refrigerant	Type		R410A				
	Quantity	kg	11.8				
Fans	Type		Axial				
	Quantity		2		3		
	Related air flow	m ³ / h	21,600	22,800	32,400	34,200	
	External pressure (max.)	Pa	5 (30)				
Sound pressure level ³⁾	Nominal	dB(A)	57	58	61	62	
	Quiet mode	dB(A)	54	55	58	59	
	Maximum (heating mode)	dB(A)	62	62	66	66	
Pipe connections	Refrigeration gas / liquid pipe	mm	28 / 12	28 / 16	35 / 18	35 / 18	
	Exhaust pipe (outside diameter)	mm	60.5				
	Fuel gas pipe	Inch	R 3 / 4				
	Drain pipe (inside diameter)	mm	15				
	Exhaust drain pipe (inside diameter)	mm	15				
Maintenance interval engine / engine oil ⁴⁾		h	10,000 / 20,000				
Heating capacity heat recovery (optional, in cooling mode)		kW	16	20	25	30	

1) Capacities, electrical characteristics and fuel consumptions are calculated for a standard indoor/outdoor unit combination with a 7.5 m piping length and 0 m level difference.

2) See accessories for dimensions with vibration dampers

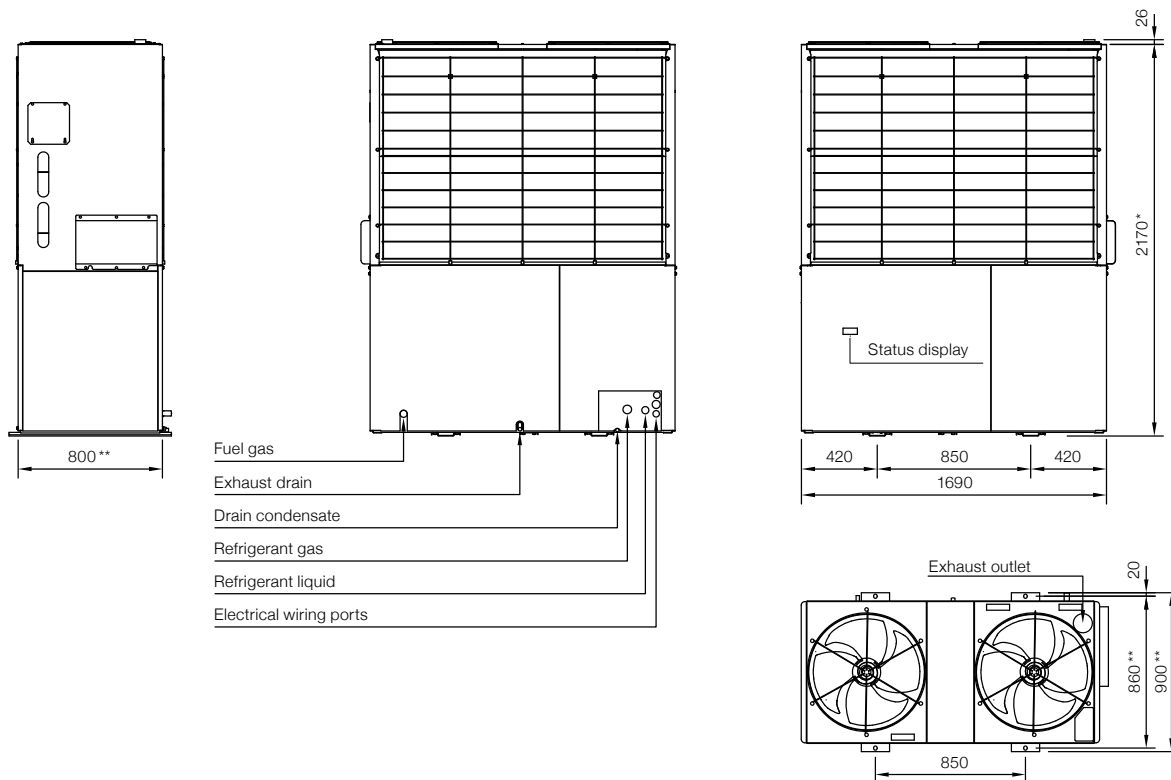
3) The operating noise levels shown above were measured at a distance of 1 m to the front face of each unit and at a height of 1.5 m and then converted into an anechoic room equivalent level. The noise level of the actually installed unit is usually higher than the indicated value due to influences of ambient noise and echo.

4) Depending on working and operating conditions

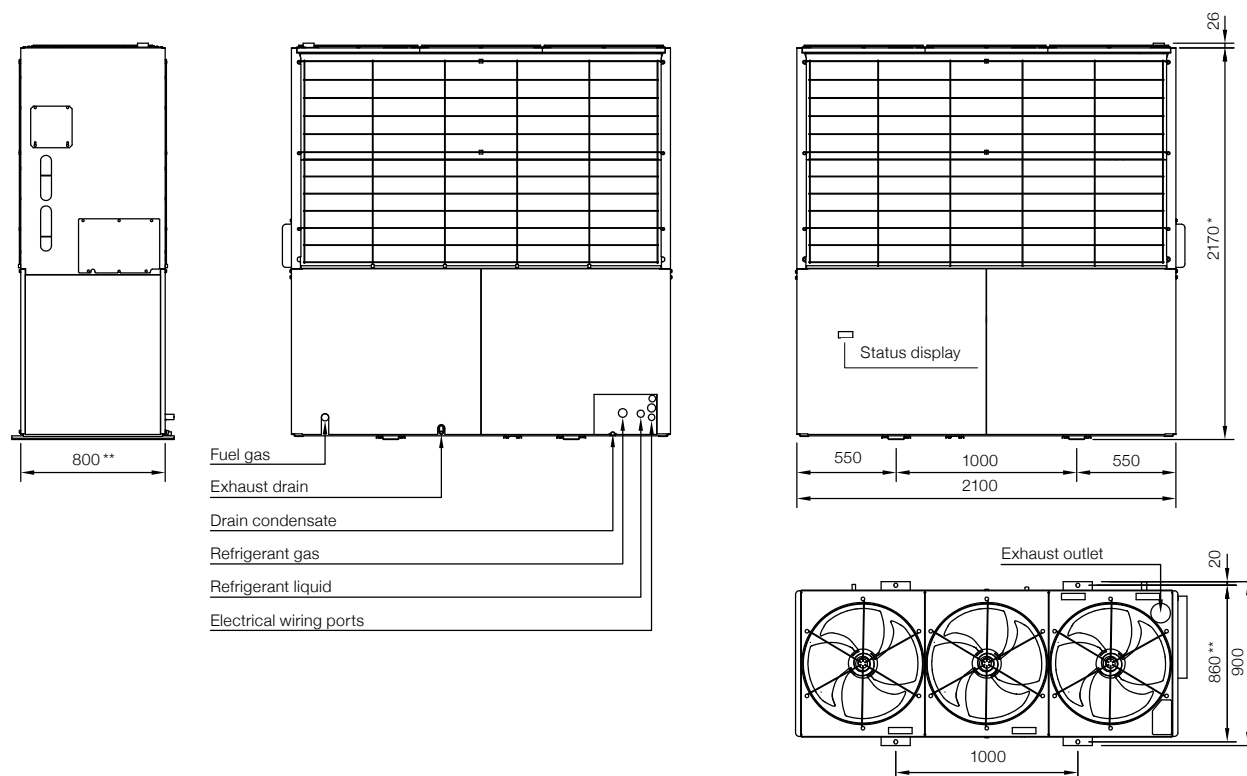
GAS ENGINE HEAT PUMP

DIMENSIONS

ENCP 450 / 560 J



ENCP 710 / 850 J



* See page 88 for dimensions with vibration dampers

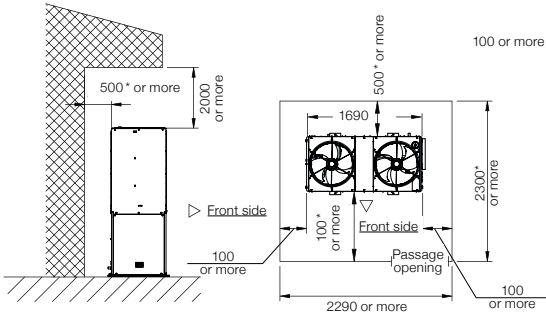
** See page 86 for dimensions with air guards

GAS ENGINE HEAT PUMP

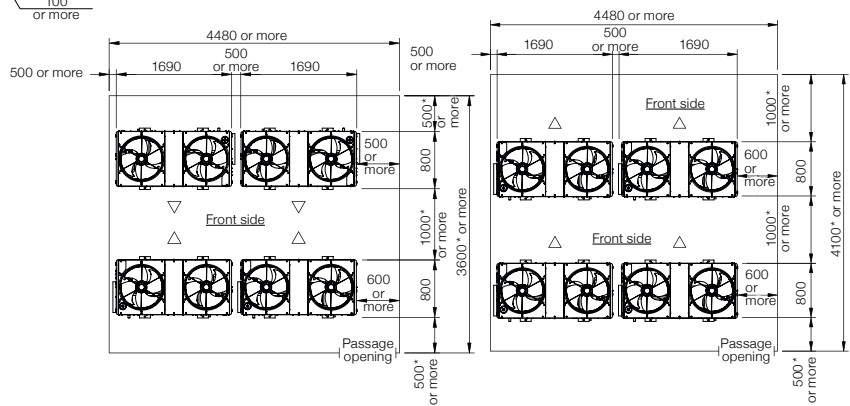
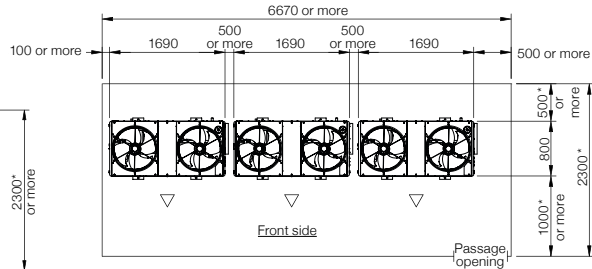
SERVICING SPACE REQUIREMENTS

ENCP 450 / 560 J

Single unit installation

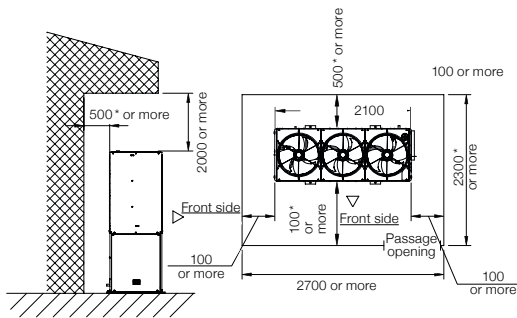


Multiple unit installation

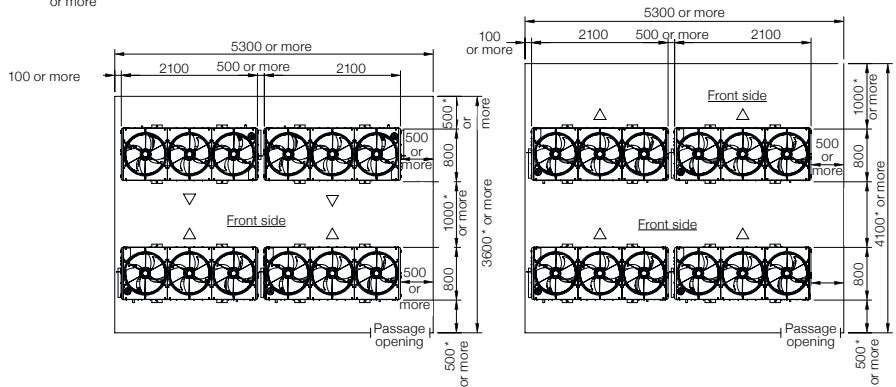
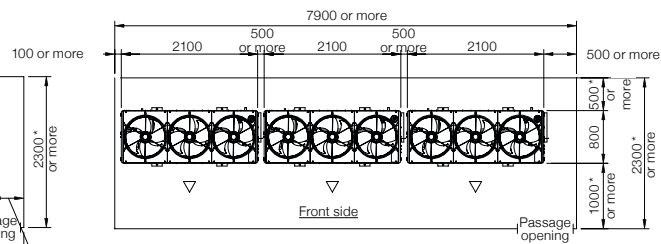


ENCP 710 / 850 J

Single unit installation



Multiple unit installation



* See page 96 for clearances with air guards

AHU KIT

VENTILATION KIT



The AHU kit forms the interface between the superordinate controller of a ventilation system or building control system and the gas engine heat pump.

As a result of specifying the type of operation and an infinitely variable capacity request, the gas engine heat pump is controlled in an energy efficient manner via the AHU kit.

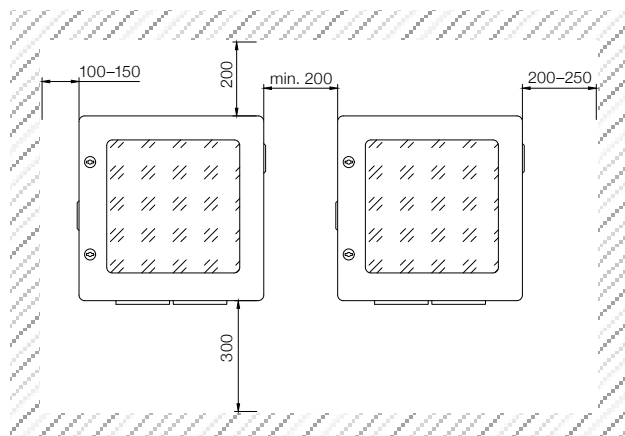
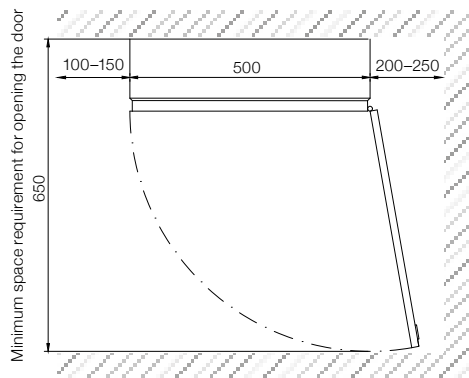
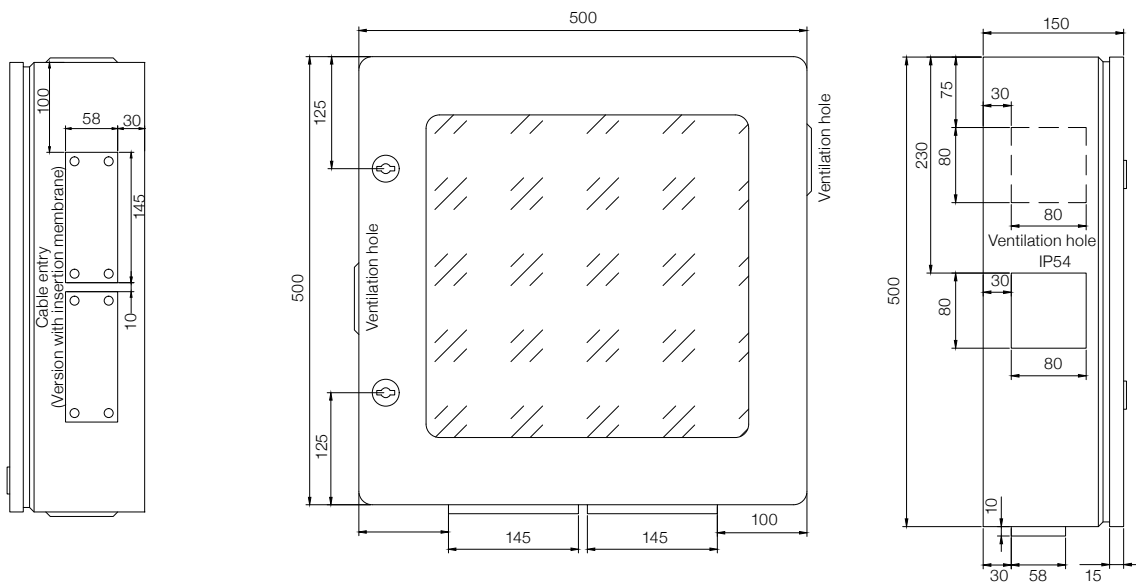


- ✓ Self-explanatory simple operation
- ✓ Web connection via Modbus or optionally via Ethernet
- ✓ Modbus connection for BCS already available, BACnet optional
- ✓ Clear display of operating states and setpoints or actual values
- ✓ All main functions are preset
- ✓ Cascade connection of up to eight gas engine heat pumps

AHU KIT

TECHNICAL DATA / DIMENSIONS / INSTALLATION

RLT-Kit ... VJ2		450	560	710	850	
Heating capacity	A-7 DB	kW	53	67	78	95
Cooling capacity	A35	kW	45	56	71	85
Dimensions	L x W x H	mm	500 x 500 x 150			
Weight		kg	10			
Electrical connection	Power supply	V / Ph / Hz	230 / 1 / 50			
Air inlet temperatures	Heating	°C	+10 to +27			
	Cooling	°C	+14 to +32			
Environmental conditions	Temperature	°C	-20 to +35			
	Protection class		IP 54			
Control range		%	10-100	15-100		
Control (capacity request)		V	0-10, infinitely variable			
Scope of delivery						
Standard	Switch cabinet / control unit, expansion valve, check valve, pressure transmitter, 2 temperature sensors NTC					
Optional accessories	Combined Modbus / BACnet card, type Y-RLT-BAC					



NOTES: There must be enough space to insert the cables!
An empty part is recommended in the ventilation unit to accommodate the control cabinet and the expansion valve.

REFRIGERANT PIPEWORK

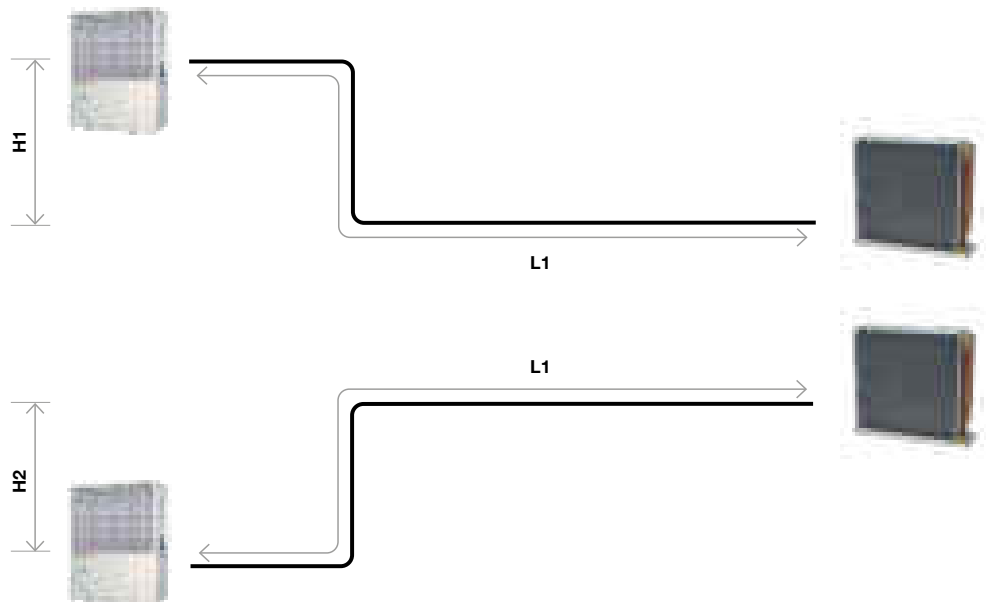
DIMENSIONS AND PIPE LENGTHS

Pipe dimensions

ENCP + ventilation unit		Connection pipes	
		Liquid pipe *	Refrigerant gas pipe *
450	mm	12	28
560	mm	16	28
710	mm	18	35
850	mm	18	35

* Larger dimensions possible depending on the pipe length

Length and height differences



ENCP + ventilation unit		Connection pipes		
L1	Maximum permitted pipeline length	actual	m	55
		equivalent *	m	67
H1	Maximum permitted height difference		m	25
H2			m	25

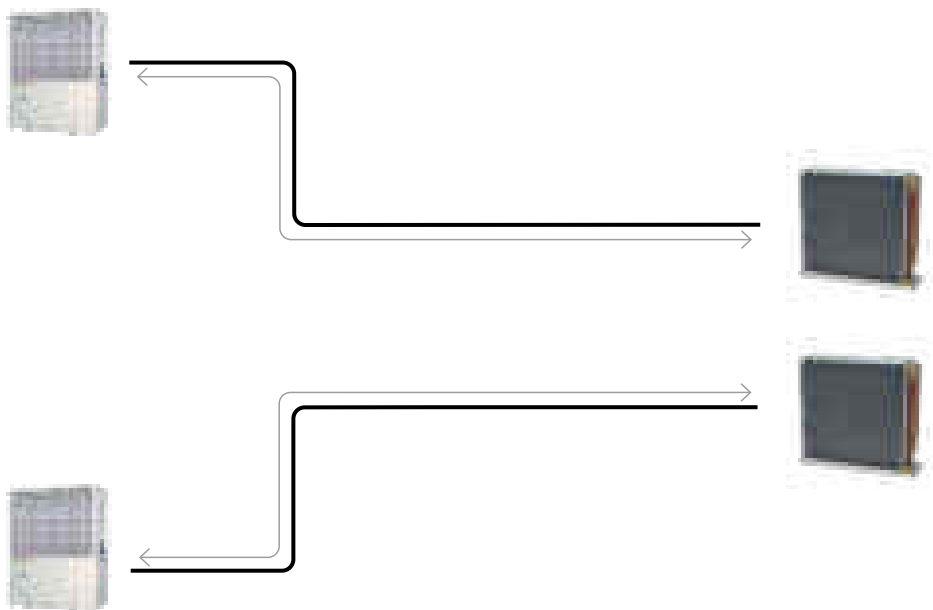
* Taking into consideration installed fittings, valves, bends, T-pieces, reductions etc.

NOTES: The AHU kit and VRF indoor units cannot be operated simultaneously on a gas engine heat pump. The AHU kit can only be operated in single operation. Exceeding the maximum permitted pipe length invalidates the warranty of the gas engine heat pump and the AHU kit.

REFRIGERANT PIPEWORK

CORRECTION FACTORS AND REFRIGERANT CHARGE

Correction factors heating and cooling mode



Variations in performance arise owing to the length of the refrigerant connection pipes and the height difference between the gas engine heat pump and the refrigerant register in the ventilation unit. The correction factors for heating and cooling mode can be found in the technical manuals.

Calculation of the additional refrigerant charge

The additional refrigerant charge R should be calculated on the basis of the diameter and length of the liquid pipelines and rounded up or down to 0.1 kg.

Additional refrigerant charge

ENCP + ventilation kit		450	560	710	850
R410A factory charge	kg	11.8	11.8	11.8	11.8
Correction quantity A	kg	4.0	4.0	9.5	9.5
Correction factor a	only cooling	kg / l	0,2		
	Heating + cooling	kg / l	0.3		
Correction factor f*	kg/m	0.11	0.17	0.25	0.25

* Relative to standard dimensioning

Additional refrigerant charge

$$R \text{ [kg]} = A + (V \times a) + (L \times f)$$

L: Pipe length

V: Heat exchanger content

Example calculation for ENCP 710 J with AHU kit 710 VJ2, heating and cooling with pipeline length of 10 m, heat exchanger content 21 l.

$$R = 9.5 \text{ kg} + (21 \text{ l} \times 0.3 \text{ kg/l}) + (10 \text{ m} \times 0.25 \text{ kg/m}) = 18.3 \text{ kg}$$

Legal notices	
	<p>✓ Obligation to indicate the overall refrigerant charge on the outdoor unit If partly fluorinated hydrocarbon (HFC) refrigerant is filled, the type and quantity must be permanently indicated on the sticker provided for this purpose on the outdoor unit (in proximity of the fuel gas connection), e.g. with a wipe-proof permanent marker.</p>
	<p>✓ Released refrigerant must be collected and disposed of It is forbidden to deliberately let refrigerant escape into the atmosphere. Released refrigerant must be collected and disposed of by authorised authorities or companies.</p>

WIRING

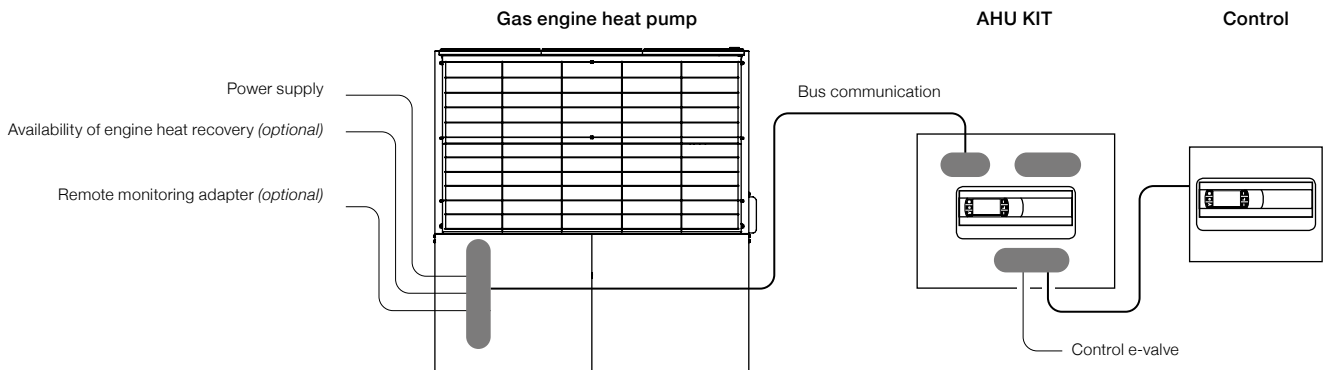
GAS ENGINE HEAT PUMP + AHU KIT

Item	Name	Start	Cable type **	Voltage	Objective	Comments
Gas engine heat pump						
1 *	Power supply	Switch cabinet	YSLY-JZ 3 x 2.5 mm ²	AC 230 V	GEHP	ENCP 450 / 560: 0.87 / 0.99 kW, fuse 20 A slow blow ** ENCP 710 / 850: 1.45 / 1.66 kW, fuse 20 A slow blow **
2	Remote monitoring	Remote monitoring adapter	LiYCY 2 x 0.75 mm ²		GEHP	Optional component: see accessories
3	Availability of engine heat recovery	GEHP	YSLY 3 x 1.0 mm ²	max. 440 V, 4 A	BCS	Thermostatic release (only in case of installed heat recovery)
Connection gas engine heat pump / AHU kit						
4 *	Communication	GEHP	LiYCY 2 x 0.75 mm ²		AHU kit	Bus communication
AHU kit						
5 *	Power supply	Switch cabinet	NYM-J 3 x 1.5 mm ²	AC 230 V	AHU kit	Fuse 6 A **
6 *	Capacity request	BCS	LiYCY 2 x 0.75 mm ²	DC 0–10 V	AHU kit	1 input cooling / heating or 2 separate inputs cooling / heating Capacity request adjustable: 0–10 V
7 *	Operation signal	BCS	YSLY 7 x 0.75 mm ²	AC 24 V	AHU kit	Note: Time-delayed switching off of the GEHP
8 *	External request cooling (operating mode)	BCS			AHU kit	Closed: cooling, open: heating
9	External request quiet mode	BCS			AHU kit	Alternative to pos. 4
10	Acknowledgement	BCS			AHU kit	Remote acknowledgement
11 **	AHU response	BCS			AHU kit	Important: Ventilation is in operation!
12	FDL release	BCS			AHU kit	System STOP, open: Off "forced shut-off"
13	Operation notification 1	AHU kit	YSLY 7 x 1.5 mm ²		BCS	Operation message
14	Operation notification 2	AHU kit			BCS	Defrost mode message
15	Operation notification 3	AHU kit			BCS	System fault-free message
16 *	Forced switch-on AHU (fan)	AHU kit			BCS	For pump-down, defrost and maintenance mode
17 *	Pressure transmitter Suction / discharge pipe	Heat exchanger	LiYCY 3 x 0.75 mm ²		AHU kit	
18 *	Temperature sensor Suction / discharge pipe	Heat exchanger	YSLY 2 x 0.75 mm ²		AHU kit	
19 *	Temperature sensor Injection / liquid pipe	Heat exchanger	YSLY 2 x 0.75 mm ²		AHU kit	
20 *	Expansion valve	Heat exchanger	LiYCY 4 x 1.5 mm ²		AHU kit	Important: Place shield on terminal 12!
21	Communication cascade	AHU kit	LiYCY 2 x 0.75 mm ²		AHU kit	Bus communication

* Mandatory!

** These are recommendations; the dimensioning and implementation must be carried out in accordance with local regulations

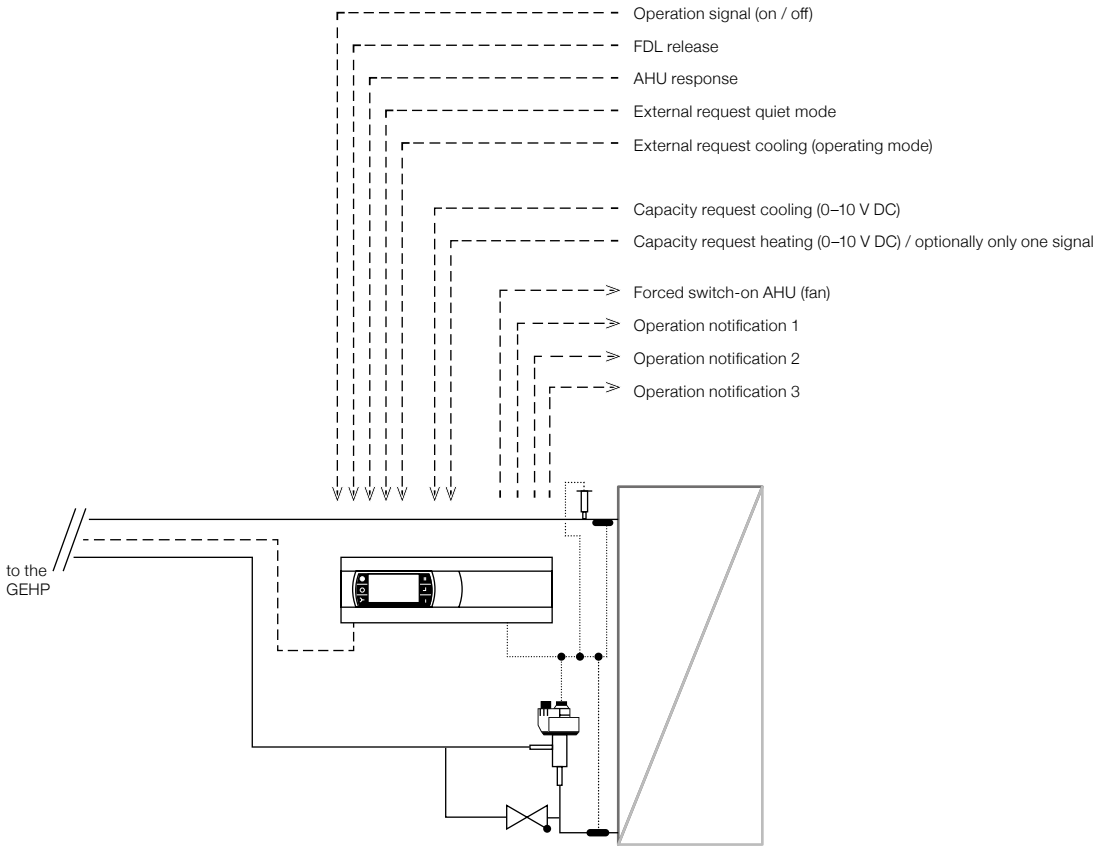
Diagram



CONTROL

EXTERNAL CONTROL

AHU kit: Capacity request over 0–10 V



CONTROL

CASCADE MANAGER AND CONNECTION

Cascade manager

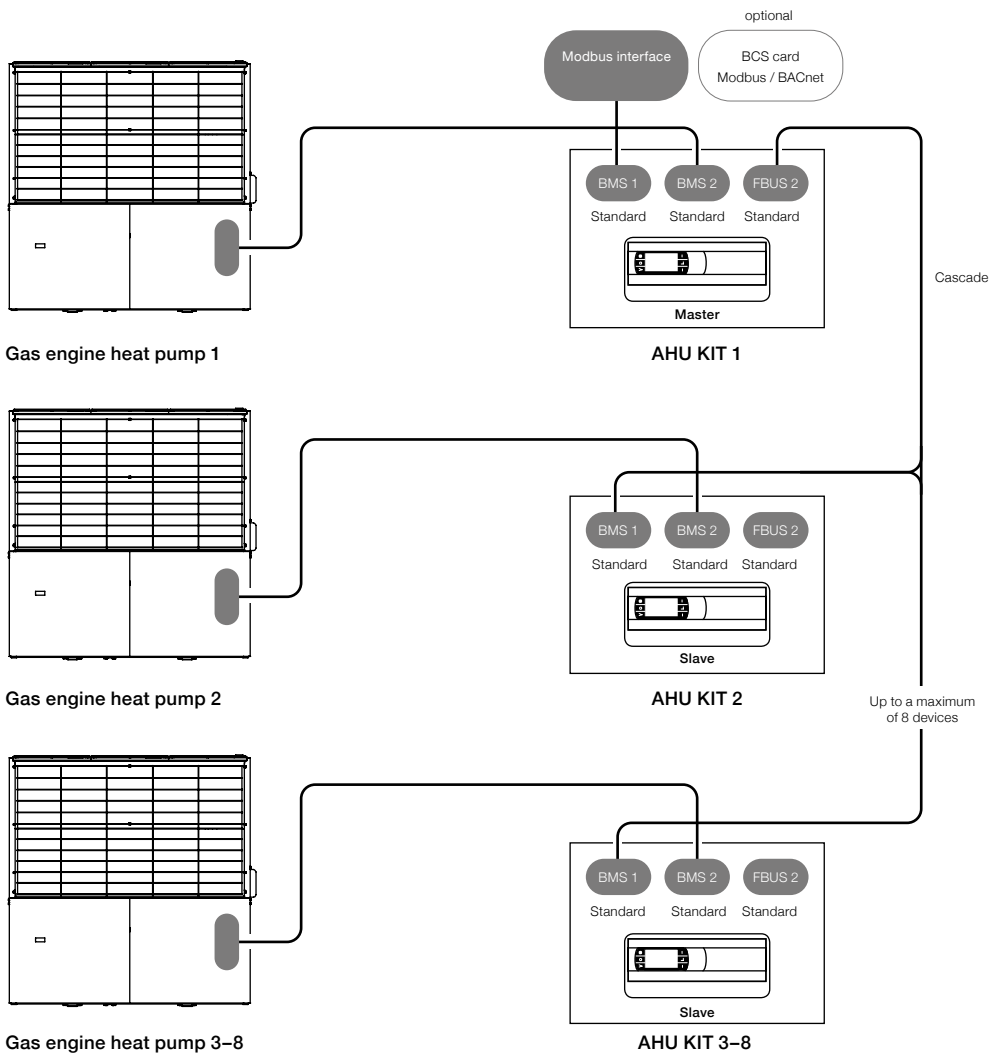
Up to eight gas engine heat pumps can be controlled with the cascade manager which is already integrated. The cascade manager generates a capacity request from the BCS signal and controls the gas engine heat pumps via this.

Note: The cascade management can also function via the superordinate building control system – every AHU kit can then be controlled independently.

Connection of the components

The cascade is controlled as standard, just like every AHU kit in general, as previously described, via analogue and digital signals. In addition, the so-called Master (the management ventilation kit) has a Modbus interface (see next page).

Connection GEHP to AHU kit



INTERFACES

BACNET AND MODBUS

Bus interfaces

The control and parameter transfer to a superordinate building control system can occur via the integrated Modbus interface (Modbus RTU). When using the interface in combination with the cascade manager, only the management AHU kit (Master) can be controlled and read out. In this case, only selected information is transferred by the subordinate AHU kits (Slaves) to this Master via the internal bus.

An interface module is optionally available for Modbus TCP/IP, Bacnet and SNMP.

The table only shows a selection of the available parameters. The complete list is available as an Excel file upon request.

Variable	Description	Direction	UOM	Min	Max	Default	Data Type	BCS Type	BCS Ofs	BCS Idx	BCS Dir	BCS Dir2
OU B release	Compressor may be released	Only Output	-	0	1	0	B	Digital		152	Output	Output
OU B setpoint output	Specified setpoint	Only Output	-	0	1	0	B	Digital		82	Output	Output
OU B setpoint temperature	Specified setpoint	Only Output	-	0	1	0	B	Digital		81	Output	Output
OU heating setpoint limited	Specified setpoint	Only Output	-	-99.9	99.9	0.0	A	Ana-logue	0.1	45	Output	Output
OU cooling setpoint limited	Specified setpoint	Only Output	-	-99.9	99.9	0.0	A	Ana-logue	0.1	46	Output	Output
A001 output	Output value analogue output 1	Only Output	-	0	9999	0	I	Integer		11	Output	Output
...

AT A GLANCE

GAS ENGINE HEAT PUMP + AHU KIT

System index			450	560	710	850
Overall system						
Heating capacity	A7 DB / L20	kW	53	58	78	95
$\eta_{sh}^{1)}$		%	150	147	144	140
Cooling capacity	A35 / L19	kW	45	56	71	85
$\eta_{s,c}^{2)}$		%	157 (185)	165 (194)	162 (190)	175 (205)
Gas engine heat pump						
Dimensions ³⁾	H x W x D	mm	2,170 x 1,690 x 800		2,170 x 2,100 x 800	
Weight	(without optional heat recovery)	kg	880	890	1,080	1,080
Electrical connection	Power supply	V / Ph / Hz	230 / 1 / 50			
	Fuse ⁴⁾	A	20, slow blow (C-Automat or Neozed)			
Fuel data	Gas type		Natural gas group II			
	Max. gas consumption (LHV)	kW	57	70	75	90
	Gas supply pressure	mbar	20			
	Gas connection	Inch	R 3 / 4			
			on site: flexible gas tube, filter			
Refrigerant pipes	Refrigeration gas / liquid pipe	mm	28 / 12	28 / 16	35 / 18	35 / 18
Exhaust drain pipe ⁵⁾		mm	15			
Sound level	Sound pressure level (max.)	dB(A)	62	62	66	66
	Sound power level (max.)	dB(A)	82	82	84	85
Operation range	Heating	°C DB	-20 to +35			
	Cooling	°C DB	+0 to +46 (-10 to +46) ⁶⁾			
AHU kit						
Dimensions	L x W x H	mm	500 x 500 x 150			
Weight		kg	10			
Electrical connection	Power supply	V / Ph / Hz	230 / 1 / 50			
	Fuse ⁴⁾	A	6			
Control	Capacity request (infinitely variable)	V	0-10			
Connection GEHP + AHU kit						
Bus communication	(also for cascade AHU kit 1 / 2)	mm ²	LiYCY 2 x 0.75			
Heat exchanger in the ventilation unit						
Refrigerant pipes	Refrigerant gas / liquid pipe	mm	28 / 12	28 / 16	35 / 18	35 / 18
Max. distances	Length	m	55			
	Height	m	25			
Refrigerant			R410A			
Distance from the e-valve ⁷⁾	Max.	m	1			
Average condensation temperature	Heating	°C	48			
Average evaporation temperature	Cooling	°C	6			
Heat exchanger content	Min.	dm ³	11.9	14.8	18.8	22.5
	Max.	dm ³	20.0	25.0	28.8	34.7
Reference air volume flow		m ³ /h	13,500	16,500	21,000	25,500
Pressure loss on refrigerant side		bar	0.3			

1) In accordance with EU Regulation 2281 / 2016 (LOT21)

2) In accordance with EU Regulation 2281 / 2016 (LOT21), value in brackets: incl. engine heat recovery use (heat recovery kit optional)

3) See accessories for dimensions with vibration dampers, air guards or air direction adjuster

4) These are recommendations; the dimensioning must be carried out in accordance with local regulations

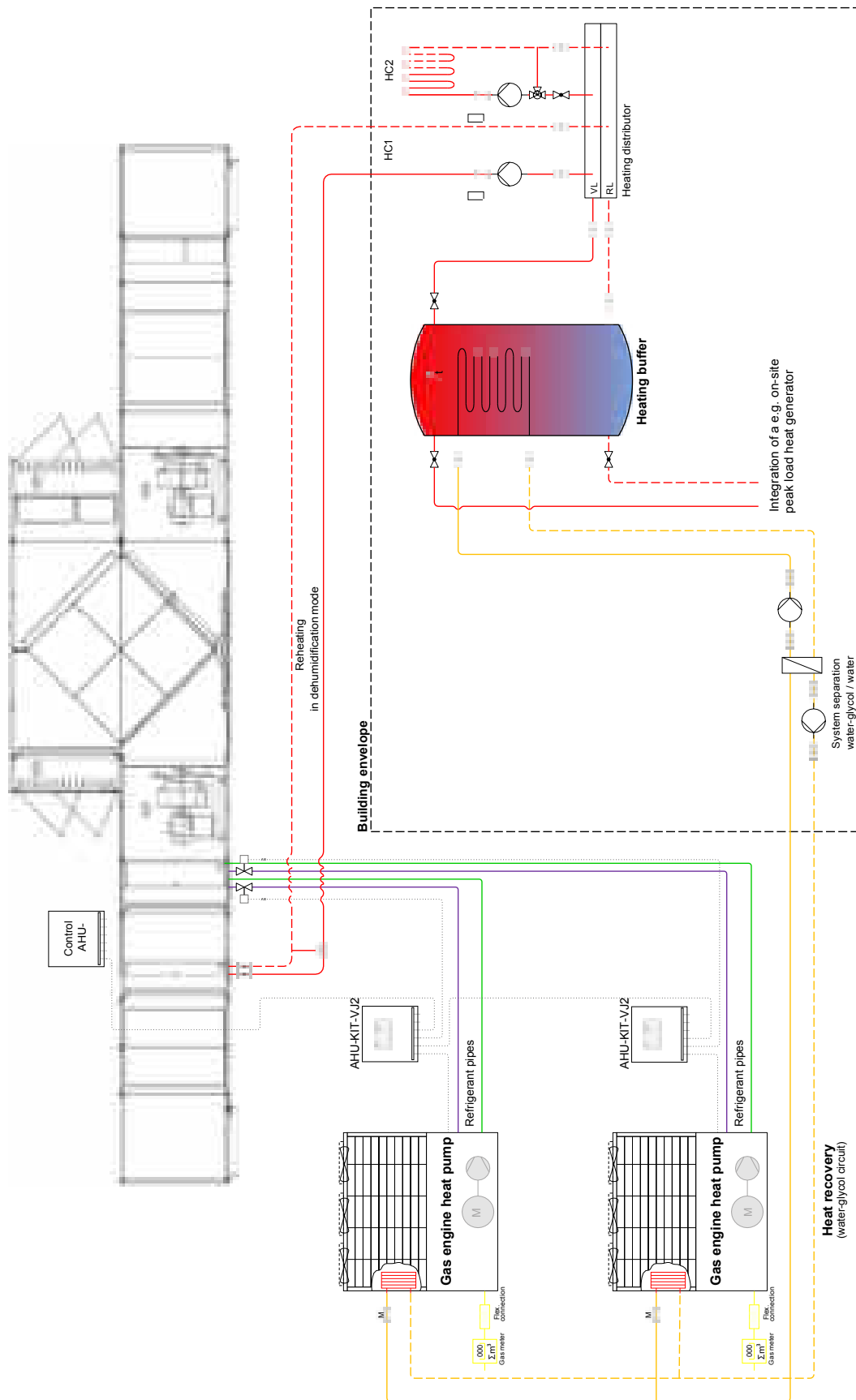
5) The exhaust drain must be removed

6) See accessories with air guards

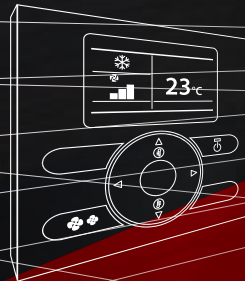
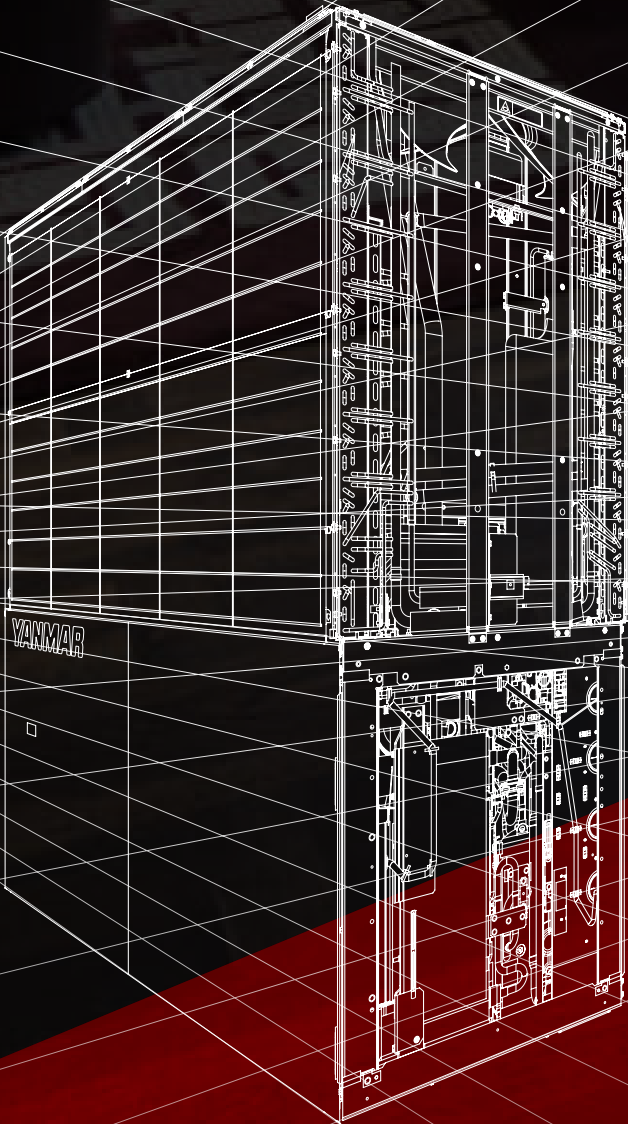
7) The valve must be physically positioned directly on the evaporator in the case of electrical wiring

SYSTEM DIAGRAM EXAMPLE

GAS ENGINE HEAT PUMP + AHU KIT



NOTE: This example diagram is not a replacement for specialist planning and is not an implementation plan. Some necessary mounting parts and components have been dispensed with for the sake of clarity. The example diagram should by no means be considered complete! Errors expected.



YANMAR

VRF SYSTEM

GAS ENGINE HEAT PUMP

VRF SYSTEM



As an air-to-air system, the gas engine heat pump situated in the outside area is connected in classic split construction with up to 48 indoor units. The diverse designs of connectable indoor units on this refrigerant-bearing VRF system enable an application-oriented and quick adjustment to changing heating and cooling requirements.

The system is suitable for monovalent operation as a result of the internal use of the engine and exhaust heat. Moreover, this heat is used for defrosting the registers without heating interruption.



- ✓ Capacity adjustment by means of modulation (VRF)
- ✓ Up to 48 indoor units of different design types can be connected to one gas engine heat pump
- ✓ Full gas engine heat pump capacity up to 85 kW cooling capacity and 95 kW heating capacity
- ✓ Refrigerant circulates in the pipe network to the indoor units and transfers the heating and cooling capacity directly to the room where the temperature is to be regulated
- ✓ Individual room and superordinate control possible
- ✓ No frost protection measures necessary
- ✓ Use of primary energy
- ✓ Low electrical power consumption, thus relieving the load on the power grids
- ✓ Meets all requirements of the renewable energy laws
- ✓ High efficiency due to use of condensing technology
- ✓ Lower noise emissions
- ✓ Eligible for subsidies and exempt from energy tax

GAS ENGINE HEAT PUMP 2-PIPE

TECHNICAL DATA

ENCP ... J			450	560	710	850	
Rated heating capacity ¹⁾⁴⁾	A7 DB / L20	kW	50	63	80	95	
Heating capacity ¹⁾	A-7 DB / L20	kW	53	67	78	95	
Rated cooling capacity ¹⁾⁴⁾	A35 / L27 DB (19 WB)	kW	45	56	71	85	
Dimensions ²⁾	H x W x D	mm	2,170 x 1,690 x 800		2,170 x 2,100 x 800		
Weight		kg	880	890	1,080	1,080	
Connectable indoor units ³⁾	Design factor IU to OU	%	50-130				
	Min. capacity IU	kW	2.2				
	Max. number IU		26	32	40	48	
Electrical characteristics	Power supply	V / Ph / Hz	230 / 1 / 50				
	Starting current	A	20		25		
	Operating current heating / cooling	A	3.69 / 4.16	4.40 / 4.73	6.50 / 6.93	7.21 / 7.93	
	Power consumption heating / cooling	kW	0.77 / 0.87	0.92 / 0.99	1.36 / 1.45	1.51 / 1.66	
Fuel data	Gas type		Natural gas group II				
	Rated gas consumption (LHV) heating / cooling	kW	29 / 31	39 / 41	51 / 51	60 / 61	
	Max. gas consumption (LHV)	kW	57	70	75	90	
	Gas supply pressure	mbar	17-25				
Engine	Type		YANMAR four-stroke engine, water-cooled				
	Cylinder		3	3	4	4	
	Cubic capacity	cm ³	1,642	1,642	2,190	2,190	
	Speed range	heating	1 / min	650-2,750	650-2,800	725-2,800	650-2,800
		Cooling	1 / min	650-2,100	650-2,200	725-2,300	650-2,300
	Lubricant oil	Type		Yanmar genuine GEHP oil			
Quantity		l	34	38	50	50	
Cooling water engine	Type		Yanmar genuine LLC				
	Quantity	l	23	23	29	29	
	Concentration	%	50				
Compressors	Type		Scroll				
	Quantity		2				
	Power transmission		Poly-V flat belt				
Refrigerant	Type		R410A				
	Quantity	kg	11.8				
Fans	Type		Axial				
	Quantity		2	2	3	3	
	Related air flow	m ³ /h	21,600	22,800	32,400	34,200	
	External pressure (max.)	Pa	5 (30)				
Sound pressure level ⁵⁾	Nominal	dB(A)	57	58	61	62	
	Quiet mode	dB(A)	54	55	58	59	
	Maximum (heating mode)	dB(A)	62	62	66	66	
Pipe connections	Refrigeration gas / liquid pipe	mm	28 / 12	28 / 16	35 / 18	35 / 18	
	Exhaust pipe (outside diameter)	mm	60.5				
	Fuel gas pipe	Inch	R 3/4				
	Drain pipe (inside diameter)	mm	15				
	Exhaust drain pipe (inside diameter)	mm	15				
Maintenance interval engine / engine oil		h	10,000 / 20,000				
Heating capacity heat recovery (optional, in cooling mode)		kW	16	20	25	30	

1) Capacities, electrical characteristics and fuel consumptions are calculated for a standard indoor/outdoor unit combination with a 7.5 m piping length and 0 m level difference.

2) See accessories for dimensions with vibration dampers

3) The operating noise levels shown above were measured at a distance of 1 m to the front face of each unit and at a height of 1.5 m and then converted into an anechoic room equivalent level. The noise level of the actually installed unit is usually higher than the indicated value due to influences of ambient noise and echo.

4) Depending on working and operating conditions

GAS ENGINE HEAT PUMP 3-PIPE

TECHNICAL DATA

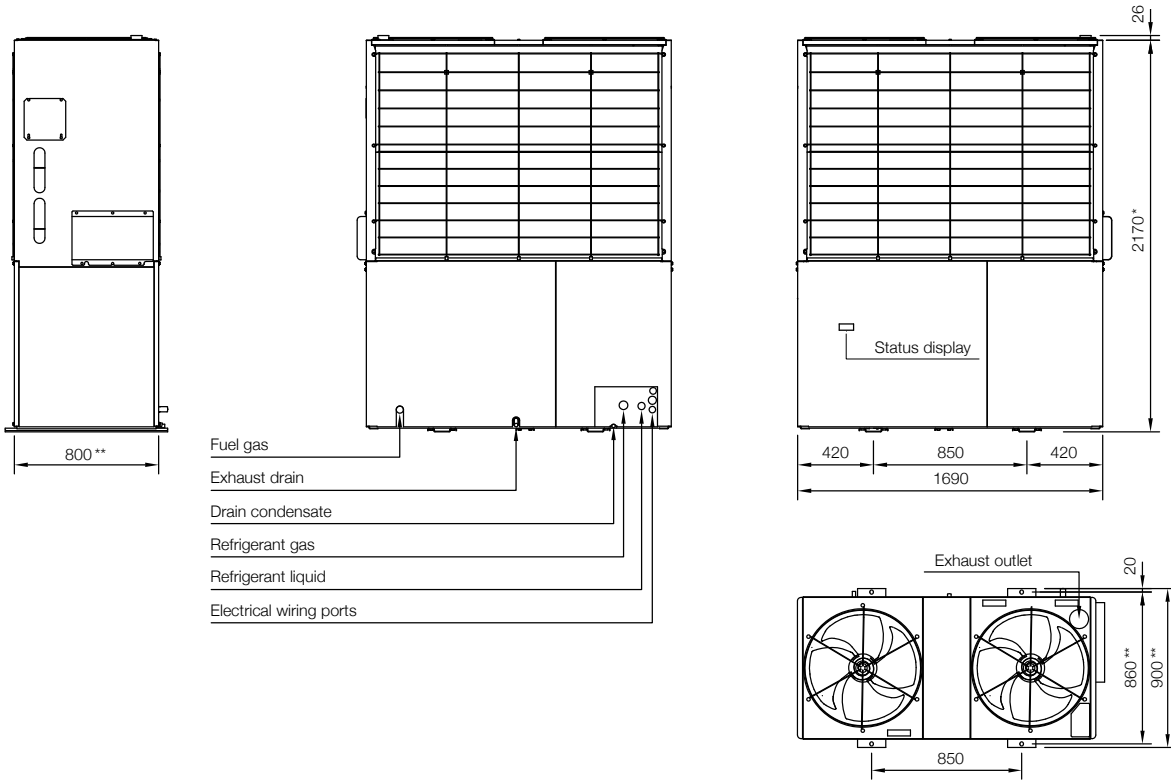
EFZP ... JC			560	850	
Rated heating capacity ^{1,4)}	A7 DB / L20	kW	63	95	
Heating capacity ¹⁾	A-7 DB / L20	kW	67	95	
Rated cooling capacity ^{1,4)}	A35 / L27 DB (19 WB)	kW	56	85	
Dimensions ²⁾	H x W x D	mm	2,170 x 1,690 x 800	2,170 x 2,100 x 800	
Weight		kg	890	1,070	
Connectable indoor units ³⁾	Design factor IU to OU	%	50–130		
	Min. capacity IU	kW	2.2		
	Max. number IU		32	48	
Electrical connection	Power supply	V / Ph / Hz	230 / 1 / 50		
	Starting current	A	20	25	
	Operating current heating / cooling	A	4.40 / 4.73	7.21 / 7.93	
	Power consumption heating / cooling	kW	0.92 / 0.99	1.51 / 1.66	
Fuel data	Gas type		Natural gas group II		
	Rated gas consumption (LHV) heating / cooling	kW	39 / 41	60 / 61	
	Max. gas consumption (LHV)	kW	70	90	
	Gas supply pressure	mbar	17–25		
Engine	Type		YANMAR four-stroke engine, water-cooled		
	Cylinder		3	4	
	Cubic capacity	cm ³	1,642	2,190	
	Speed range	heating	1 / min	650–2,800	650–2,800
		Cooling	1 / min	650–2,200	650–2,300
	Lubricant oil	Type		YANMAR genuine GEHP oil	
Quantity		l	38	50	
Cooling water engine	Type		YANMAR genuine LLC		
	Quantity	l	23	29	
	Concentration	%	50		
Compressors	Type		Scroll		
	Quantity		2		
	Power transmission		Poly-V flat belt		
Refrigerant	Type		R410A		
	Quantity	kg	11.8		
Fans	Type		Axial		
	Quantity		2	3	
	Related air flow	m ³ / h	21,600	32,400	
	External pressure (max.)	Pa	5 (30)		
Sound pressure level ⁵⁾	Nominal	dB(A)	58	62	
	Quiet mode	dB(A)	55	59	
	Maximum (heating)	dB(A)	62	66	
Pipe connections	Refrigeration gas / hot gas / liquid pipe	mm	28 / 22 / 16	35 / 28 / 18	
	Exhaust pipe (outside diameter)	mm	60.5		
	Fuel gas pipe	Inch	R 3/4		
	Drain pipe (inside diameter)	mm	15		
	Exhaust drain pipe (inside diameter)	mm	15		
Maintenance interval engine / engine oil		h	10,000 / 20,000		

- 1) Capacities, electrical characteristics and fuel consumptions are calculated for a standard indoor/outdoor unit combination with a 7.5 m piping length and 0 m level difference.
- 2) See accessories for dimensions with vibration dampers
- 3) When using the indoor unit and outdoor unit, the total of the performance index for the indoor units must be approximately as great or as small as the performance index of the outdoor unit. In light of this, the performance index must not exceed 130 %.
- 4) The operating noise levels shown above were measured at a distance of 1 m to the front face of each unit and at a height of 1.5 m and then converted into an anechoic room equivalent level. The noise level of the actually installed unit is usually higher than the indicated value due to influences of ambient noise and echo.
- 5) Depending on working and operating conditions

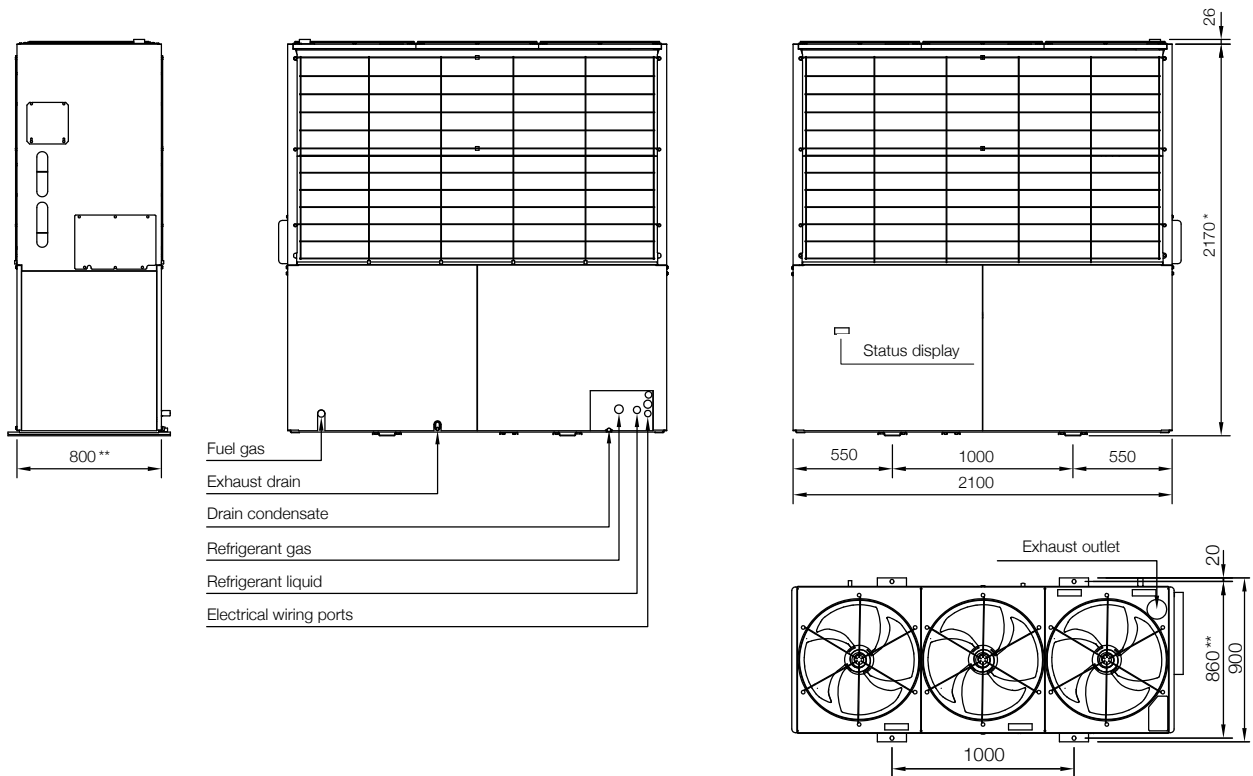
GAS ENGINE HEAT PUMP

DIMENSIONS

ENCP 450 / 560 J + EFZP 560 JC **



ENCP 710 / 850 J + EFZP 850 JC **



* See page 88 for dimensions with vibration dampers

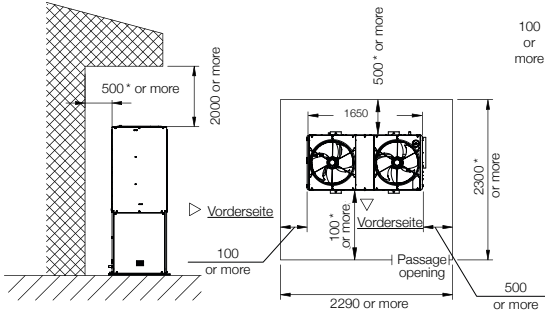
** See page 86 for dimensions with air guards

GAS ENGINE HEAT PUMP

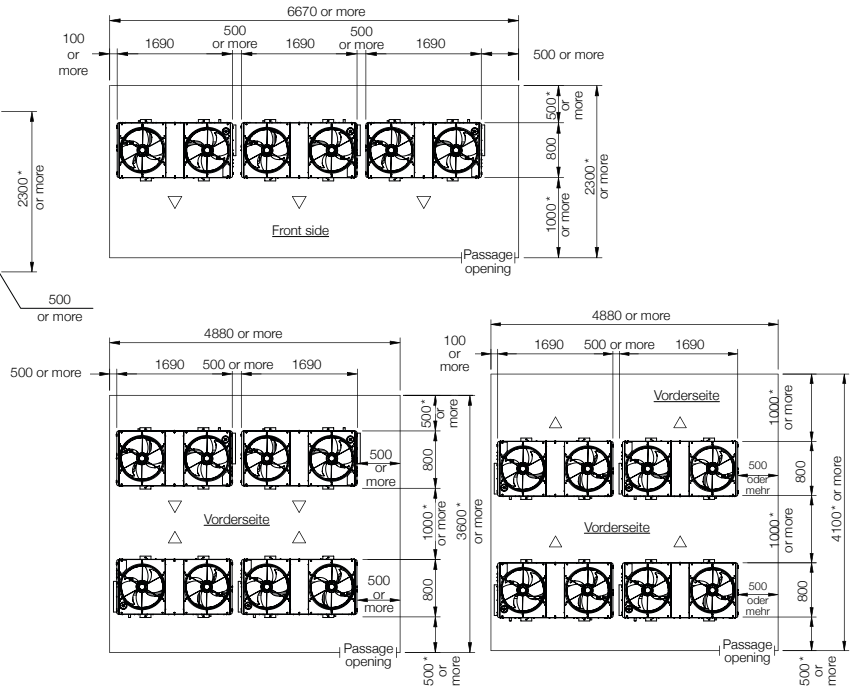
SERVICING SPACE REQUIREMENTS

ENCP 450 / 560 J + EFZP 560 JC

Single unit installation

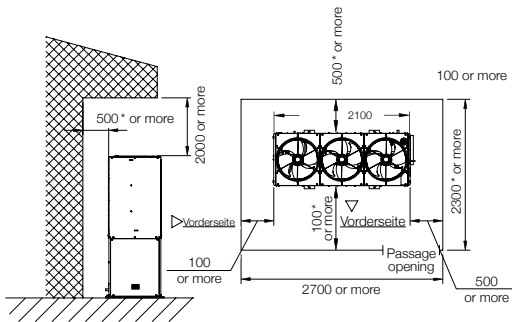


Multiple unit installation

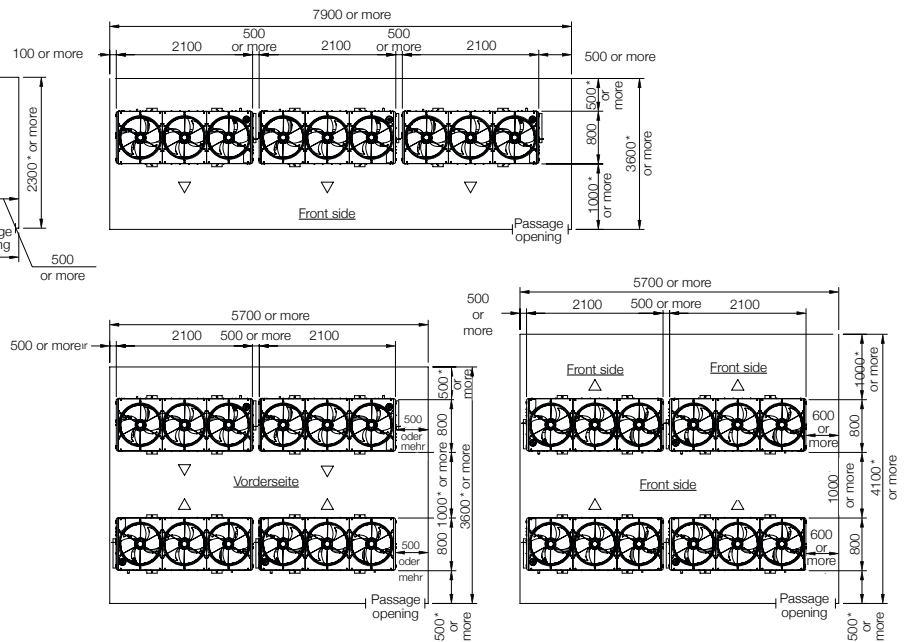


ENCP 710 / 850 J + EFZP 850 JC

Single unit installation



Multiple unit installation



* See page 88 for clearances with air guards

VRF INDOOR UNITS

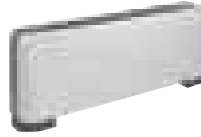
OVERVIEW



Y/FXAQ-A

WALL MOUNTED UNIT

Cooling: 2.2–7.1 kW
Heating: 2.5–8.0 kW



Y/FXLQ-P

FLOOR STANDING UNIT

Cooling: 2.2–7.1 kW
Heating: 2.5–8.0 kW



Y/FXHQ-A

CEILING SUSPENDED UNIT

Cooling: 3.6–11.2 kW
Heating: 4.0–12.5 kW



Y/FXCQ-A

**CEILING MOUNTED CASSETTE
2-WAY BLOW**

Cooling: 2.2–14.0 kW
Heating: 2.5–16.0 kW



Y/FXZQ-A

**CEILING MOUNTED CASSETTE
4-WAY BLOW**

Cooling: 2.2–5.6 kW
Heating: 2.5–6.3 kW



Y/FXFQ-B

**ROUNDFLOW CEILING
MOUNTED CASSETTE**

Cooling: 2.2–14.0 kW
Heating: 2.5–16.0 kW



Y/FXSQ-A

**CONCEALED CEILING UNIT
WITH MEDIUM ESP**

Cooling: 2.2–16.0 kW
Heating: 2.5–18.0 kW



Y/FXMQ-P7

**CONCEALED CEILING UNIT
WITH HIGH ESP**

Cooling: 5.6–14.0 kW
Heating: 6.3–16.0 kW



Y/FXMQ-MB

**CONCEALED CEILING UNIT
WITH HIGH ESP**

Cooling: 22.4–28.0 kW
Heating: 25.0–31.5 kW



Y/CYV-L

AIR CURTAIN

Heating: 15.6–31.1 kW
 ΔT Room temperature: 12–15 K



Y/VAM

**ENERGY RECLAIM
VENTILATION**

Air performance: 150–2,000 m³/h



Y/EKEQ MCBA

**COMMUNICATION KIT
FOR EXTERNAL
HEAT EXCHANGER**

Cooling: 5.0–30.8 kW
Heating: 5.6–34.7 kW

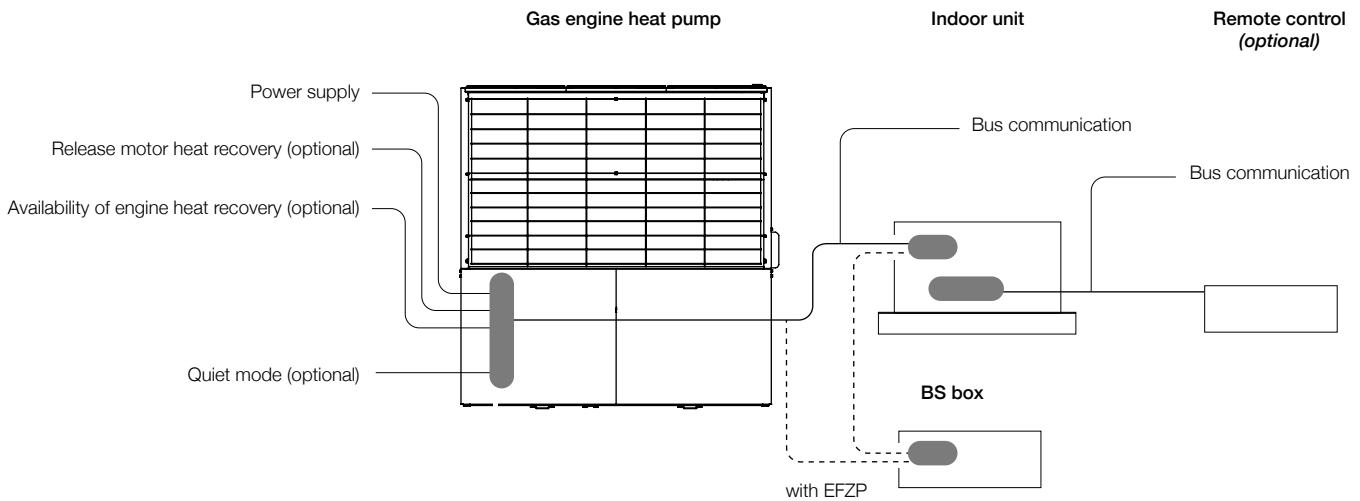
WIRING

GAS ENGINE HEAT PUMP + INDOOR UNITS

Item	Name	Start	Cable type *	Voltage	Objective	Comments
Gas engine heat pump						
1	Power supply	Switch cabinet	YSLY-JZ 3 x 2.5 mm ²	AC 230 V	GEHP	ENCP 450 / 560: 0.87 / 0.99 kW, fuse 20 A slow blow * ENCP 710 / 850: 1.45 / 1.66 kW, fuse 20 A slow blow * EFZP 560: 0.92 / 0.99 kW, fuse 20 A slow blow * EFZP 850: 1.51 / 1.66 kW, fuse 20 A slow blow *
2	Remote monitoring	Remote monitoring adapter	LIYCY 2 x 0.75 mm ²	-	GEHP	Optional component: see accessories
3	Availability of engine heat recovery	GEHP	YSLY 3 x 1.0 mm ²	-	BCS	Potential-free, thermostatic release (only in case of installed heat recovery)
4	Quiet mode	BCS	YSLY 3 x 1.0 mm ²	-	GEHP	Optional using an accessory cable
Connection gas engine heat pump / indoor units						
5	Communication	GEHP	LIYCY 2 x 0.75 mm ²	-	IU	Bus communication
BS box (only 3-pipe)						
6	Power supply	Switch cabinet	NYM-J 3 x 1.5 mm ²	AC 230 V	BS box	Fuse max. 15 A *
Indoor units						
7	Cable depending on indoor unit type					

* These are recommendations; the dimensioning must be carried out in accordance with local regulations

Diagram



REFRIGERANT PIPEWORK

REFRIGERANT CHARGE

Calculation of the refrigerant charge

The outdoor units are filled with the refrigerant quantity listed in the following table upon delivery. Depending on the pipe network installed, an additional refrigerant quantity has to be added.

ENCP ... J		450	560	710	850
R410A factory charge	[kg]	11.8	11.8	11.8	11.8
Correction quantity A	[kg]	4.4	5.7	14.1	14.3
Correction factor f		1.0			

EFZP ... J		560	850
R410A factory charge	[kg]	11.8	11.8
Correction quantity A	[kg]	6.4	13.9
Correction factor f		1.15	

Calculation of the additional refrigerant charge

The additional refrigerant charge R should be calculated on the basis of the diameter and length of the liquid pipelines and rounded up or down to 0.1 kg.

Additional refrigerant charge

$$R \text{ [kg]} = A + ((L1 \times 0.25 \text{ kg/m}) + (L2 \times 0.17 \text{ kg/m}) + (L3 \times 0.11 \text{ kg/m}) + (L4 \times 0.054 \text{ kg/m}) + (L5 \times 0.022 \text{ kg/m})) \times f$$

L1: Total of all pipes Ø 18 mm (m)

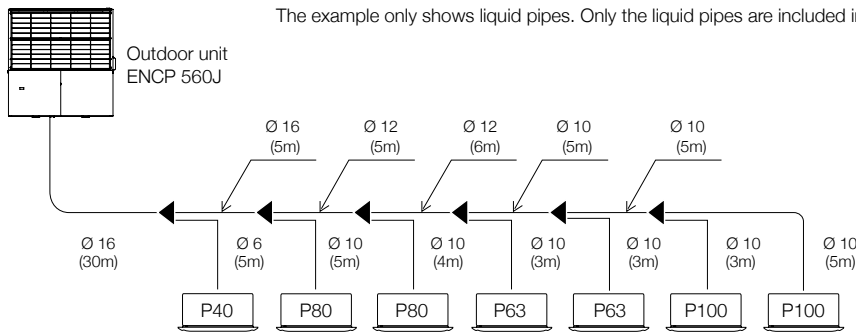
L2: Total of all pipes Ø 16 mm (m)

L3: Total of all pipes Ø 12 mm (m)

L4: Total of all pipes Ø 10 mm (m)

L5: Total of all pipes Ø 6 mm (m)

Example



Liquid pipes:

Total of all pipes Ø 16 mm (m): 35 m = (30 + 5) m

Total of all pipes Ø 12 mm (m): 11 m = (5 + 6) m

Total of all pipes Ø 10 mm (m): 33 m = (5 + 5 + 5 + 4 + 3 + 3 + 3 + 5) m

Total of all pipes Ø 6 mm (m): 5 m

Correction quantity A: 5.7 kg

Correction factor f 1.0

$$R \text{ [kg]} = [5.7 + ((35 \times 0.17) + (11 \times 0.11) + (33 \times 0.054) + (5 \times 0.022))] \times 1.0 \text{ kg}$$

$$R = 14.752 \text{ kg} \rightarrow \text{additional refrigerant charge : 14.8 kg}$$

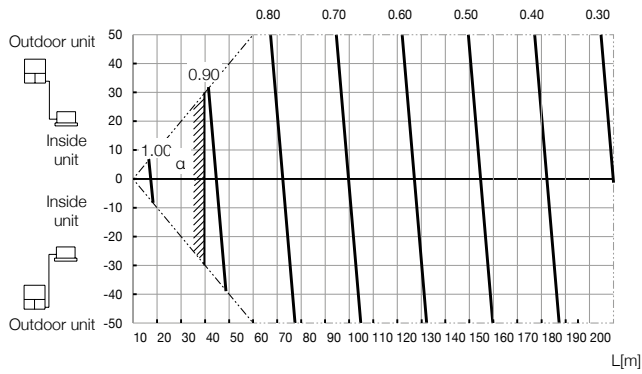
Legal notices	<p>✓ Obligation to indicate the overall refrigerant charge on the outdoor unit</p> <p>If partly fluorinated hydrocarbon (HFC) refrigerant is filled, the type and quantity must be permanently indicated on the sticker provided for this purpose on the outdoor unit (in proximity of the fuel gas connection), e.g. with a wipe-proof permanent marker.</p>
	<p>✓ Released refrigerant must be collected and disposed of</p> <p>It is forbidden to deliberately let refrigerant escape into the atmosphere. Released refrigerant must be collected and disposed of by authorised authorities or companies.</p>

REFRIGERANT PIPEWORK

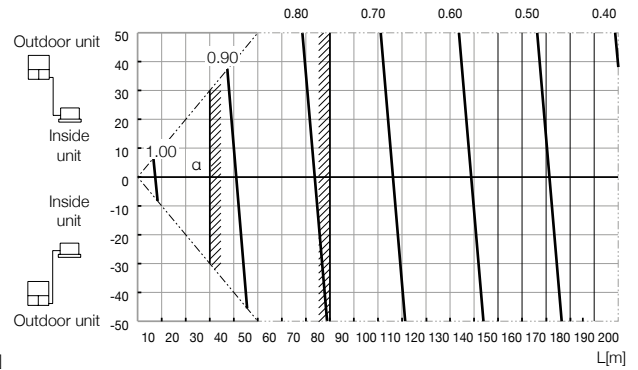
CORRECTION FACTORS

Cooling mode correction factor

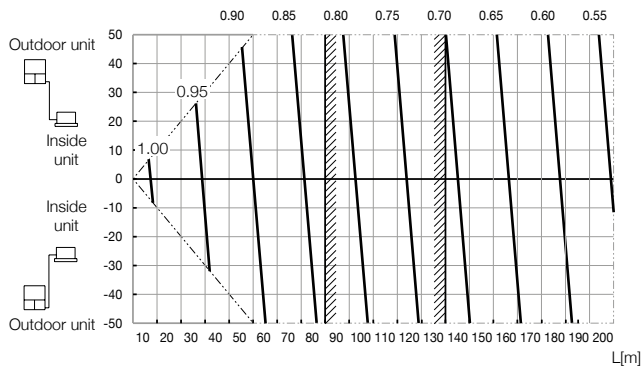
S-Setup



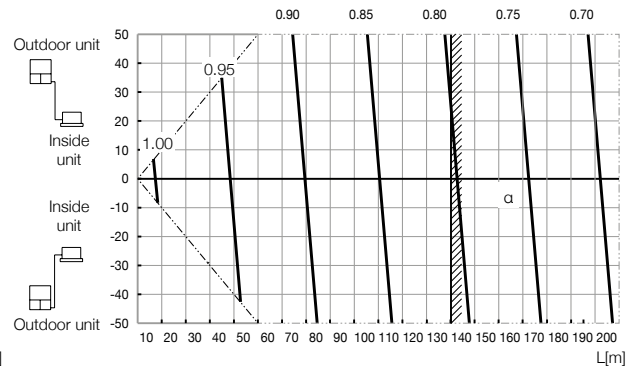
M-Setup



L-Setup



LL-Setup



Pipe length

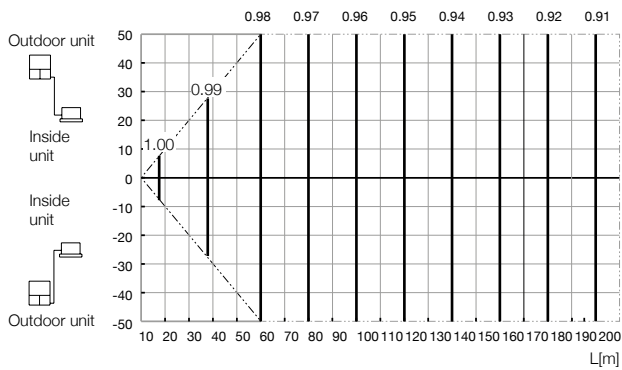
S-Setup: 30 m or less

M-Setup: 30–80 m

L-Setup: 80–130 m

LL-Setup: 130 m or more

Heating mode correction factor



AT A GLANCE

2-PIPE / 3-PIPE GAS ENGINE HEAT PUMP + INDOOR UNITS

System index 2-pipe			450	560	710	850
Overall system						
Heating capacity	A-7 DB / L20	kW	53	67	78	95
$\eta_{s,h}^{1)}$		%	150	147	144	140
Cooling capacity	A35 / L27 DB (19 WB)	kW	45	56	71	85
$\eta_{s,c}^{2)}$		%	157 (185)	165 (194)	162 (190)	175 (205)
Gas engine heat pump ENCP ... J						
Dimensions ³⁾	H x W x D	mm	2,170 x 1,690 x 800		2,170 x 2,100 x 800	
Weight (without optional heat recovery)		kg	880	890	1,080	1,080
Max. number of indoor units			26	32	40	48
Electrical connection	Power supply	V / Ph / Hz	230 / 1 / 50			
	Fuse ⁴⁾	A	20, slow blow (C-Automat or Neozed)			
Fuel data	Gas type		Natural gas group II			
	Max. gas consumption (LHV)	kW	57	70	75	90
	Gas supply pressure	mbar	20			
	Gas connection	Inch	R 3 / 4			
			on site: flexible gas tube, filter			
Refrigerant pipes	Refrigerant gas / liquid line	mm	28 / 12	28 / 16	35 / 18	35 / 18
Exhaust drain pipe ⁵⁾		mm	15			
Sound level	Sound pressure level (max.)	dB(A)	62	62	66	66
	Sound power level (max.)	dB(A)	82	82	84	85
Operating range	Outside temperature heating	°C DB	-20 to +35			
	Outside temperature cooling	°C DB	+0 to +46 (-10 to +46) ⁶⁾			
Connection ENCP + IU						
Max. Distances	Length OU - IU / according to 1st distributor / total	m	170 / 90 / 640			
	Height OU - IU / IU - IU	m	50 / 15			

System index 3-pipe			560	850		
Overall system						
Heating capacity	A-10 DB / L20	kW	67	95		
$\eta_{s,h}^{1)}$		%	147	140		
Cooling capacity	A35 / L27 DB (19 WB)	kW	56	85		
$\eta_{s,c}^{1)}$		%	165	175		
Gas engine heat pump EFZP ... JC						
Dimensions ³⁾	H x W x D	mm	2,170 x 1,690 x 800		2,170 x 2,100 x 800	
Weight		kg	890		1,080	
Max. number of indoor units			32		48	
Electrical connection	Power supply	V / Ph / Hz	230 / 1 / 50			
	Fuse ⁴⁾	A	20, slow blow (C-Automat or Neozed)			
Fuel data	Gas type		Natural gas group II			
	Max. gas consumption (LHV)	kW	70	90		
	Gas supply pressure	mbar	20			
	Gas connection	Inch	R 3 / 4			
			on site: flexible gas tube, filter			
Refrigerant pipes	Refrigeration gas / hot gas / liquid pipe	mm	28 / 22 / 16		35 / 28 / 18	
Exhaust drain pipe ⁵⁾		mm	15			
Sound level	Sound pressure level (max.)	dB(A)	62		66	
	Sound power level (max.)	dB(A)	82		85	
Operating range	Outside temperature heating / cooling	°C TK	-20 to +35 / 0 to +46 (-10 to +46) ⁶⁾			
Connection EFZP + IU						
Max. Distances	Length OU - IU / according to 1st distributor / total	m	170 / 90 / 640			
	Height OU - IU / IU - IU	m	50 / 15			

1) In accordance with EU Regulation 2281 / 2016 (LOT21)

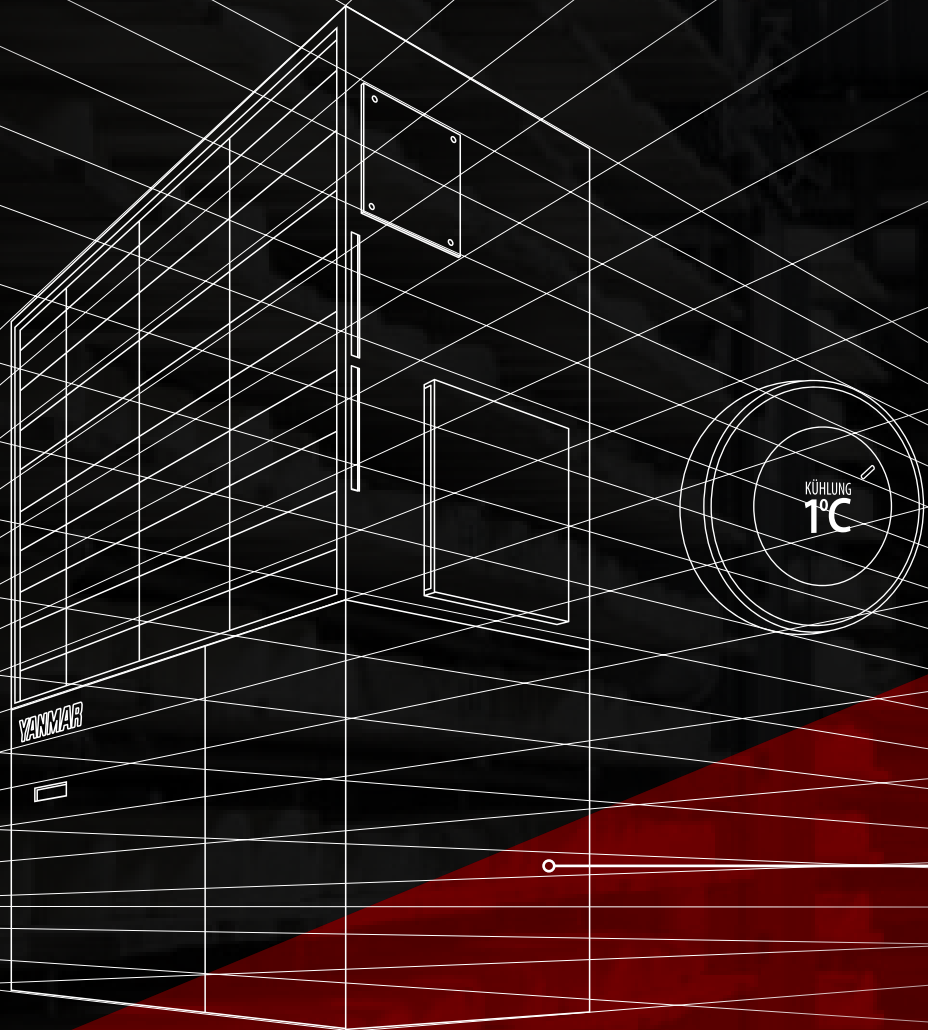
2) In accordance with EU Regulation 2281 / 2016 (LOT21), value in brackets: incl. engine heat recovery use (heat recovery kit optional)

3) See accessories for dimensions with vibration dampers, air guards and air direction adjuster

4) These are recommendations; the dimensioning must be carried out in accordance with local regulations

5) The exhaust drain must be removed

6) See accessories with air guards



YANMAR

KÜHLUNG
1°C

YANMAR

REFRIGERATION

GAS DRIVEN REFRIGERATOR

WITH HYDROBOX FOR BRINE



As an air-to-brine system, the gas driven refrigerator situated in the outside area is connected in split construction with the brine Hydrobox positioned inside the building. This design type is a modified gas engine heat pump and can only be operated in cooling mode.

As a result of the engine heat and exhaust heat that can be extracted, heat can be recovered during cooling mode and used for defrosting on-site, water-bearing evaporator or for heating domestic hot water.



- ✓ Cooling with integrated heat recovery
- ✓ Capacity adjustment by means of modulating operation
- ✓ Lower operating costs compared to electric chillers
- ✓ Lower noise emissions
- ✓ Lower CO₂ emissions
- ✓ Optionally, a complete input of parameters is possible via remote monitoring

GAS DRIVEN REFRIGERATOR

TECHNICAL DATA

ENCP ... J-R			450	560	710	850	
Rated cooling capacity (with Hydrobox brine) ¹⁾	A35 / B0	kW	26	36	42	51	
Cooling capacity (with Hydrobox brine) ¹⁾	A35 / B5	kW	32	43	51	61	
Dimensions ²⁾	H x W x D	mm	2,170 x 1,690 x 1,900		2,170 x 2,100 x 1,900		
Weight (with air guards)		kg	890	900	1,095	1,095	
Electrical characteristics	Power supply	V/Ph/Hz	230 / 1 / 50				
	Starting current	A	20		25		
	Operating current	A	4.16	4.73	6.93	7.93	
	Power consumption	kW	0.87	0.99	1.45	1.66	
Fuel data	Gas type		Natural gas group II				
	Rated gas consumption (LHV)	kW	29	38	48	58	
	Max. gas consumption (LHV)	kW	34	45	58	73	
	Gas supply pressure	mbar	17–25				
Engine	Type		YANMAR four-stroke engine, water-cooled				
	Cylinder		3		4		
	Cubic capacity	cm ³	1,642		2,190		
	Speed range	1 / min	650–2,200		650–2,300		
	Lubricant oil	Type		YANMAR genuine GEHP oil			
		Quantity	l	34	38	50	50
Cooling water engine	Type		YANMAR genuine LLC				
	Quantity	l	23	23	29	29	
	Concentration	%	50				
Compressors	Type		Scroll				
	Quantity		2				
	Power transmission		Poly-V flat belt				
Refrigerant	Type		R410A				
	Quantity	kg	11.8				
Fans	Type		Axial				
	Quantity		2		3		
	Related air flow	m ³ /h	21,600	22,800	32,400	34,200	
	External pressure (max.)	Pa	5 (30)				
Sound pressure level ³⁾	Nominal	dB(A)	57	58	61	62	
	Quiet mode	dB(A)	54	55	58	59	
Pipe connections	Refrigeration gas / liquid pipe	mm	28 / 12	28 / 16	35 / 18	35 / 18	
	Exhaust pipe (outside diameter)	mm	60.5				
	Fuel gas pipe	Inch	R 3 / 4				
	Drain pipe (inside diameter)	mm	15				
	Exhaust drain pipe (inside diameter)	mm	15				
Heat recovery ⁴⁾	Max. heating capacity	kW	16	20	25	30	
	Outlet temperature	°C	70				
	Rated volume flow	m ³ /h	1.09	1.36	1.70	2.04	
	Rated pressure loss	kPa	1.5	2.5	1.5	2.5	
	Glycol proportion	%	35				
	Connections input / output	mm	35				
Maintenance interval engine / engine oil ⁵⁾		h	10,000 / 20,000				

1) Capacities, electrical characteristics and fuel consumptions are calculated for a standard indoor/outdoor unit combination with a 7.5 m piping length and 0 m level difference. These are Hydrobox brine outlet temperatures.

2) See accessories for dimensions with vibration dampers

3) The operating noise levels shown above were measured at a distance of 1 m to the front face of each unit and at a height of 1.5 m and then converted into an anechoic room equivalent level. The noise level of the actually installed unit is usually higher than the indicated value due to influences of ambient noise and echo.

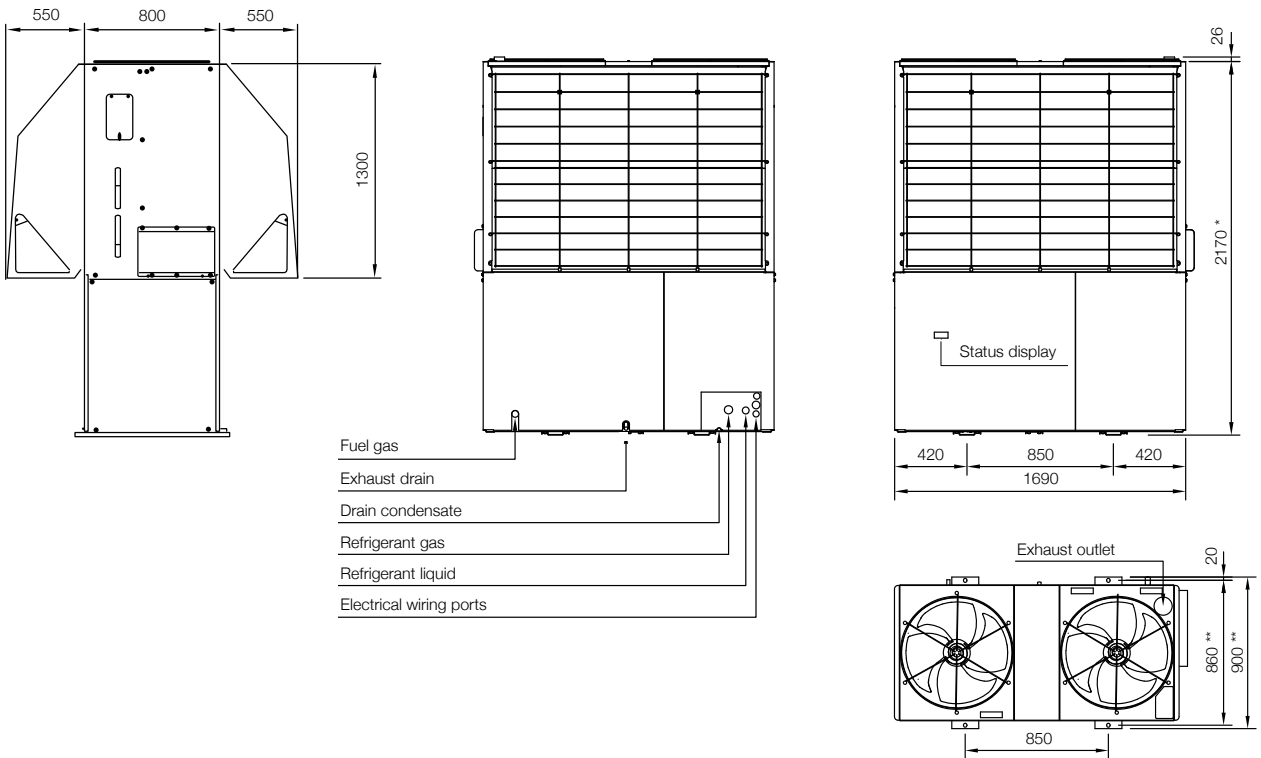
4) The specified value relates to 100 % full load operation. Depending on the actual load and outside temperature, the heating capacity can vary between 0 kW and the maximum value.

5) Depending on working and operating conditions

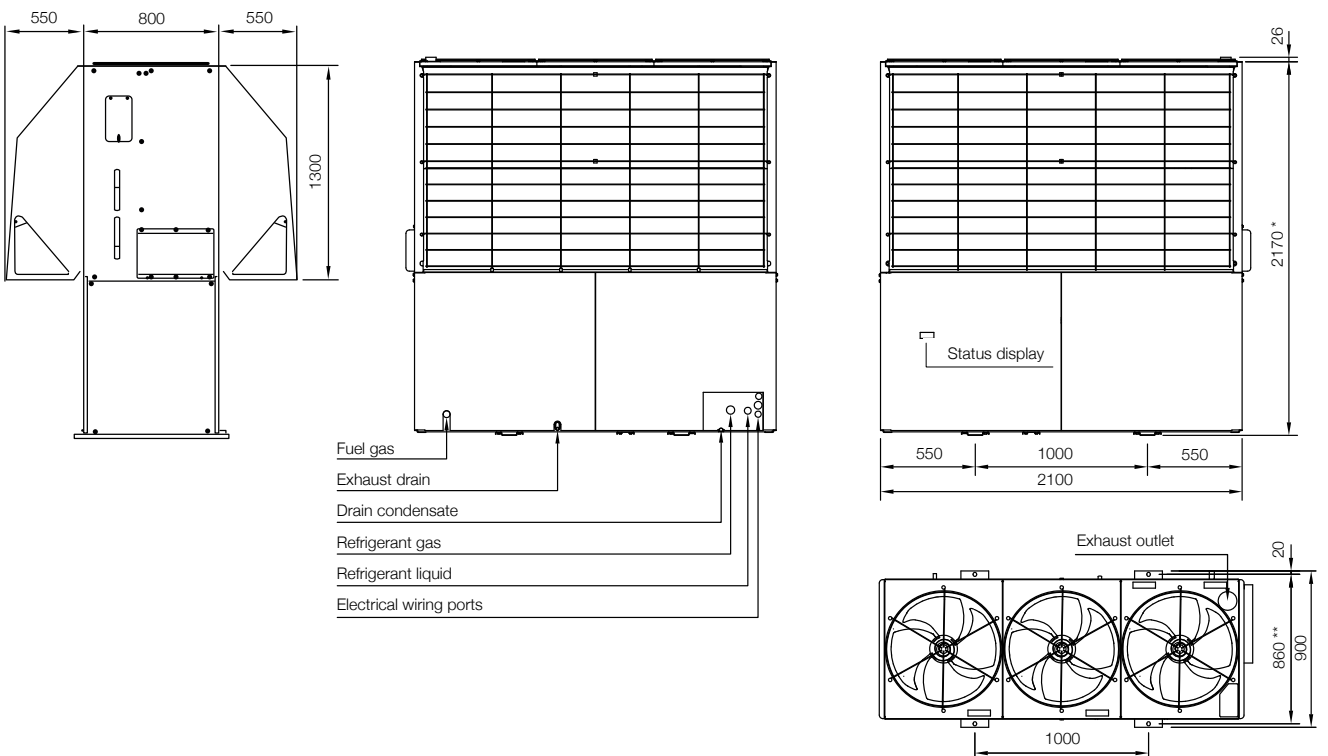
GAS DRIVEN REFRIGERATOR

DIMENSIONS

ENCP 450 / 560 J-R



ENCP 710 / 850 J-R



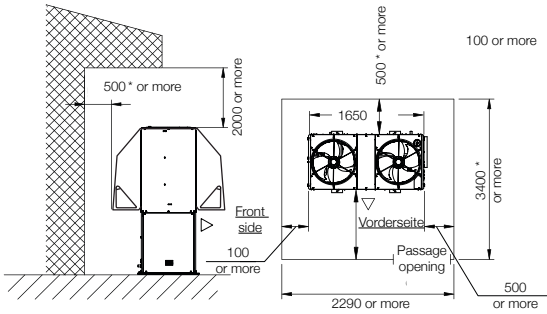
NOTES: See page 88 for dimensions with vibration dampers
Air guards are mandatory for cooling mode with outside temperatures below 0 °C (see page 96)

GAS DRIVEN REFRIGERATOR

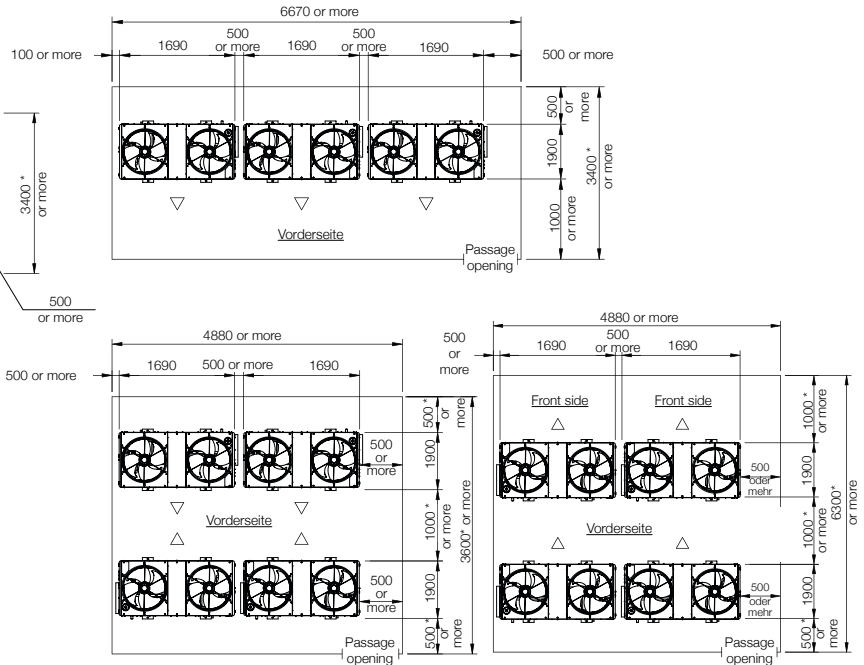
SERVICING SPACE REQUIREMENTS

ENCP 450 / 560 J-R

Single unit installation

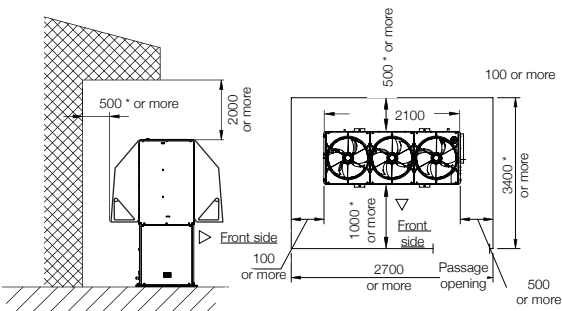


Multiple unit installation

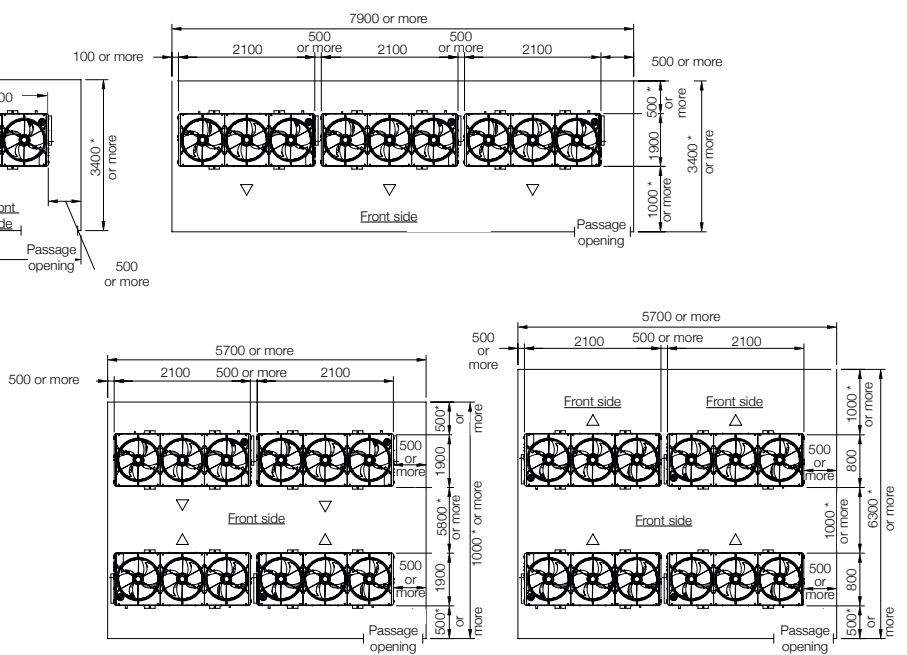


ENCP 710 / 850 J-R

Single unit installation



Multiple unit installation



HYDROBOX FOR BRINE

HYDRAULIC MODULE

The Hydrobox installed in the interior area transfers the required cooling capacity as a link to the brine-bearing cooling system.

As a result of the internal control, both the gas driven refrigerator and the integrated brine circulation pump are operated in an energy efficient manner. In addition, the internal control can control the system up to the buffer tank including control of the heat recovery as well as a cooling-side peak-load generator.



- ✓ The controller forms the interface between the BCS and the gas driven refrigerator
- ✓ Energy efficient pump (cl. A) integrated
- ✓ No frost protection measures necessary for the lines between the gas driven refrigerator (outdoor unit) and Hydrobox (indoor unit)
- ✓ The integrated buffer management of the Hydrobox controls the gas driven refrigerator, preventing low partial load ranges and increasing the EER
- ✓ The Hydrobox can be adjusted to different conditions using various input configurations and additional options
- ✓ Optionally, a complete input of parameters is possible via remote monitoring

HYDROBOX FOR BRINE

TECHNICAL SPECIFICATIONS

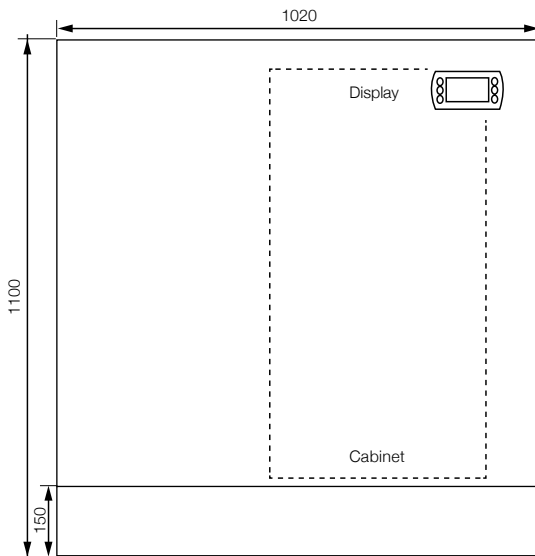
HB-S...V(P)J1			450	560	710	850
Rated cooling capacity	A35 / B0 ¹⁾	kW	26	36	42	51
Cooling capacity	A35 / B5 ¹⁾	kW	32	43	51	61
Dimensions (without feet)	L x W x H	mm	1,100 x 1,020 x 675			
Weight		kg	190	190	210	210
Rated volume flow	5 K spread ²⁾	m ³ /h	5.1	7.1	8.4	10.2
Rated pressure loss	Version VJ	kPa	16	31	27	38
External pressure increase	Version VPJ	kPa	100	80	80	60
Power consumption	Version VPJ	kW	0.7	0.7	0.9	0.9
Electrical connection	Power supply	V / Ph / Hz	230 / 1 / 50			
Control range		%	20–100			
Brine outlet temperature		°C	-5 to +18			
Environmental conditions	Temperature	°C	+5 to +35			
	Max. humidity	% r.h	90			
Pipe connections	Brine pipes	Inch	2			
	Refrigerant gas / liquid line	mm	35 / 18			
Sound pressure level		dB(A)	33	35	33	35
Scope of delivery						
Standard	1 cable temperature sensor, type Y-HB-S-NTC (immersion sensor for buffer tank)					
Optional accessories	Outside temperature sensor, type Y-HB-S-DPUT Cable temperature sensor, type Y-HB-S-NTC-WS (pipe-mounted sensor) Combined Modbus / BACnet card, type Y-HB-S-BAC					

1) Capacities are calculated for a standard indoor/outdoor unit combination with a 7.5 m piping length and 0 m level difference. These are Hydrobox brine outlet temperatures.

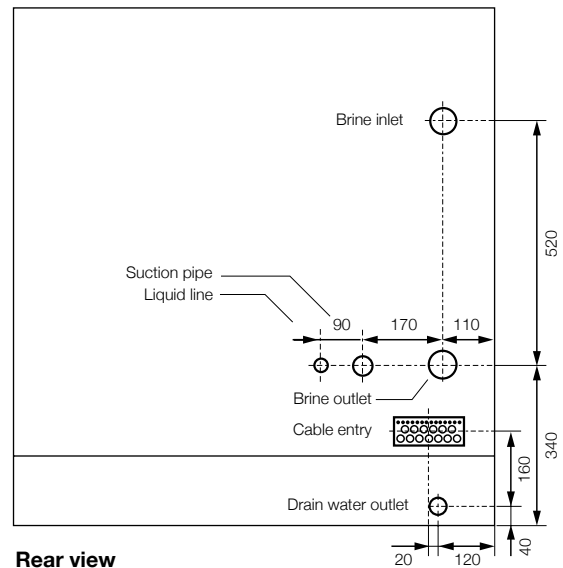
2) The spread can be adjusted in the range 5–15 K.

HYDROBOX FOR BRINE

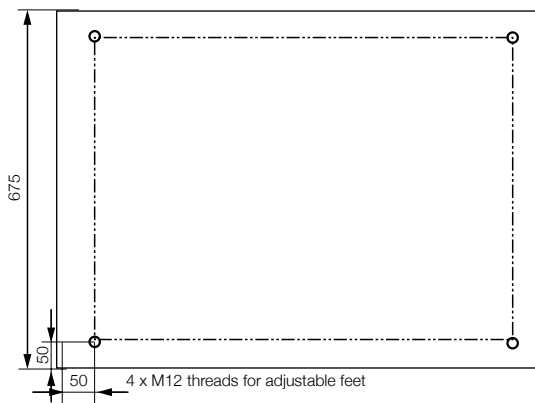
DIMENSIONS



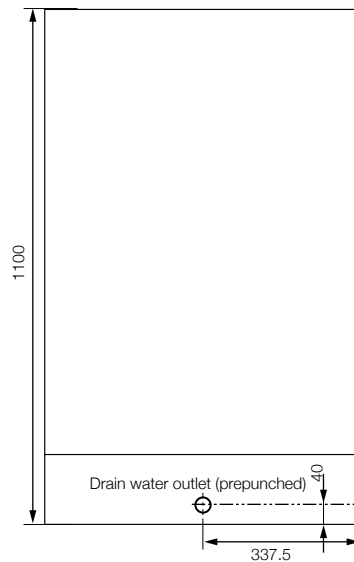
Front view



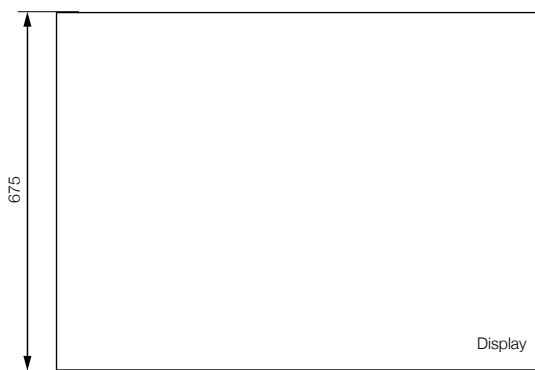
Rear view



Bottom view



Left view



Top view

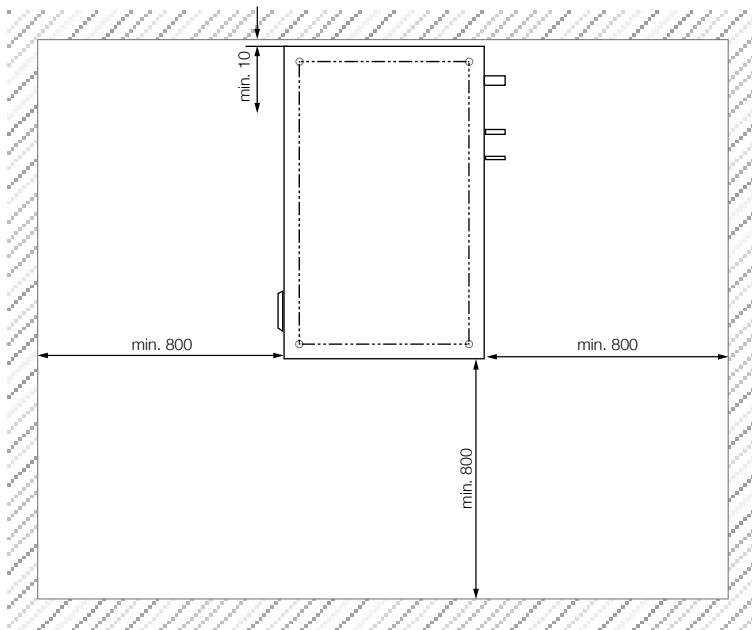
Front side

- NOTES:
- Hydrobox with feet approx. 26 to 35 mm higher!
 - Pipe outlets optional on the left side, above or below (see price list)
 - The drain water may have to be drained off.

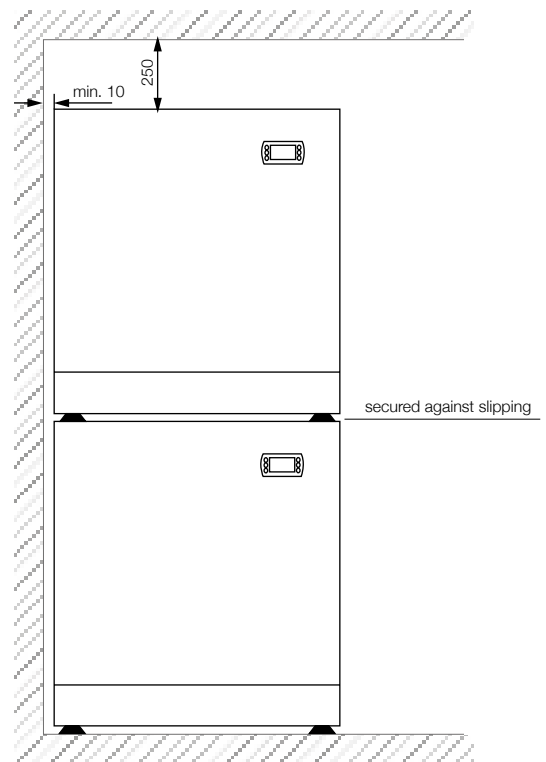
HYDROBOX FOR BRINE

SERVICING SPACE REQUIREMENTS

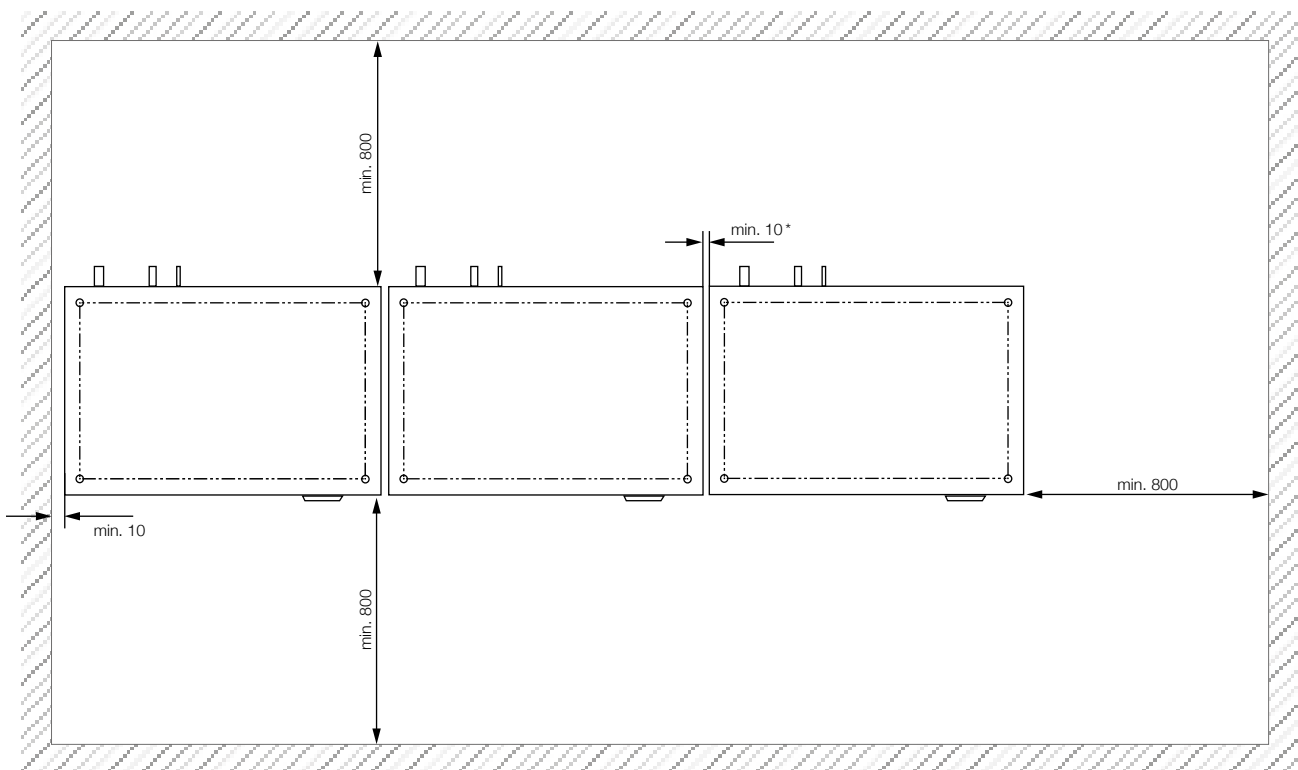
Single unit installation (standard design - connections back left)



Multiple unit installation (above one another)



Multiple unit (next to one another)*



*NOTE: This installation is associated with increased maintenance.

REFRIGERANT PIPEWORK

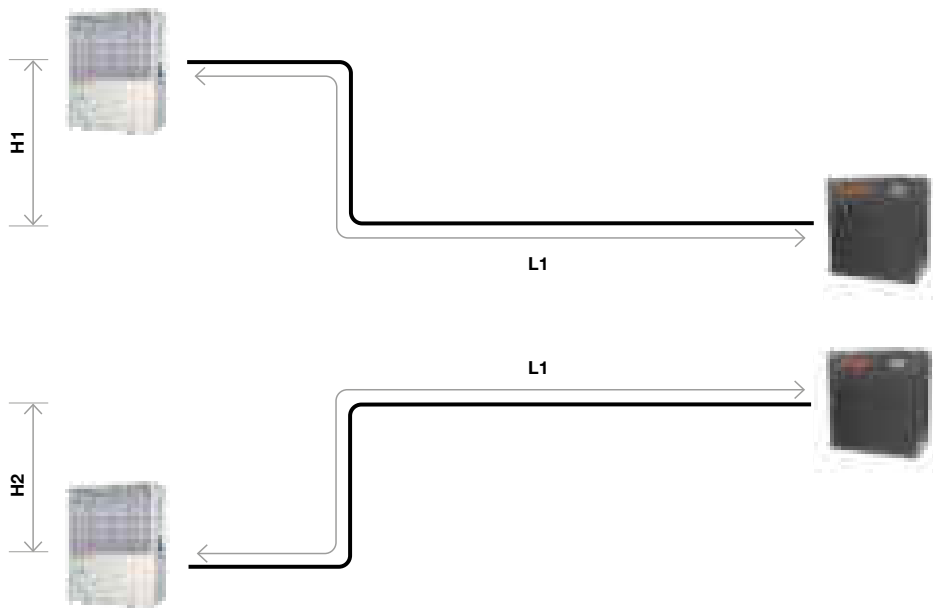
DIMENSIONS AND PIPE LENGTHS

Pipe dimensions

ENCP-R + HB-S		Connection pipes	
		Liquid pipe*	Refrigerant gas pipe*
450	mm	12	28
560	mm	16	28
710	mm	18	35
850	mm	18	35

* Larger dimensions possible depending on the pipe length

Length and height differences



ENCP-R + HB-S		Connection pipes		
L1	Maximum permitted pipeline length	actual	m	55
		equivalent*	m	67
H1	Maximum permitted height difference		m	25
H2			m	25

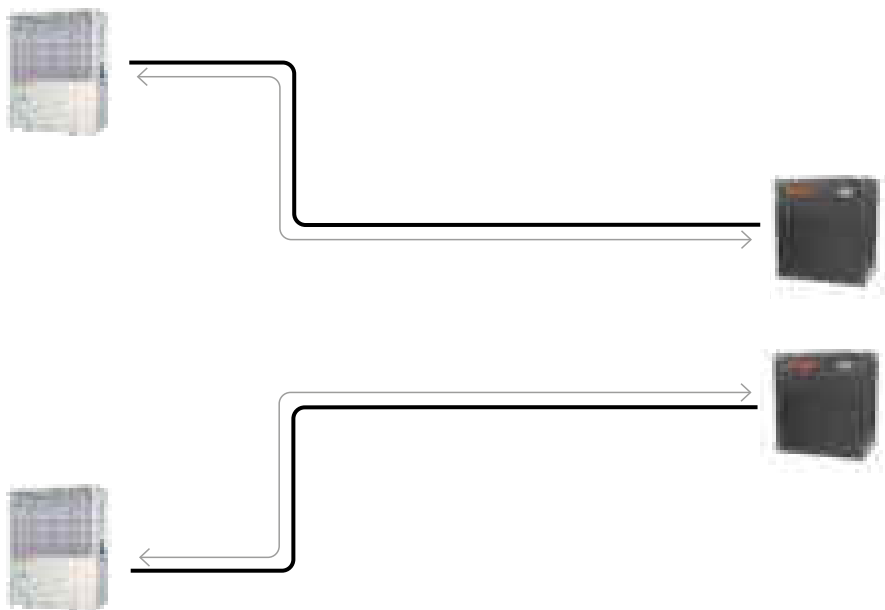
* Taking into consideration installed fittings, valves, bends, T-pieces, reductions etc.

NOTES: The Hydrobox and other components cannot be operated at the same time on a gas driven refrigerator.
The models HB-S 450–850 VP(J)1 can only be operated in single operation.
Exceeding the maximum permitted pipe length invalidates the warranty of the gas driven refrigerator and the Hydrobox.

REFRIGERANT PIPEWORK

CORRECTION FACTOR AND REFRIGERANT CHARGE

Correction factor



Variations in performance arise owing to the length of the refrigerant connection pipes and the height difference between the gas driven refrigerator and the Hydrobox. The correction factor for cooling mode can be found in the technical manuals.

Calculation of the additional refrigerant charge

The additional refrigerant charge R should be calculated on the basis of the diameter and length of the liquid pipelines and rounded up or down to 0.1 kg.

Additional refrigerant charge

ENCP-R + HB-S		450	560	710	850
R410A factory charge	kg	11.8	11.8	11.8	11.8
Correction quantity A	kg	4.4	5.7	14.1	14.3
Correction factor f*	kg/m	0.11	0.17	0.25	0.25

* Relative to standard dimensioning

Additional refrigerant charge
 $R \text{ [kg]} = A + (L \times f)$
 L: Pipe length

Example calculation for ENCP 710 J-R with HB-S 710 V(P)J1 with pipeline length of 10 m:
 $R = 14.1 \text{ kg} + (10 \text{ m} \times 0.25 \text{ kg / m}) = 16.6 \text{ kg}$

Legal notices	<p>✓ Obligation to indicate the overall refrigerant charge on the outdoor unit If partly fluorinated hydrocarbon (HFC) refrigerant is filled, the type and quantity must be permanently indicated on the sticker provided for this purpose on the outdoor unit (in proximity of the fuel gas connection), e.g. with a wipe-proof permanent marker.</p>
	<p>✓ Released refrigerant must be collected and disposed of It is forbidden to deliberately let refrigerant escape into the atmosphere. Released refrigerant must be collected and disposed of by authorised authorities or companies.</p>

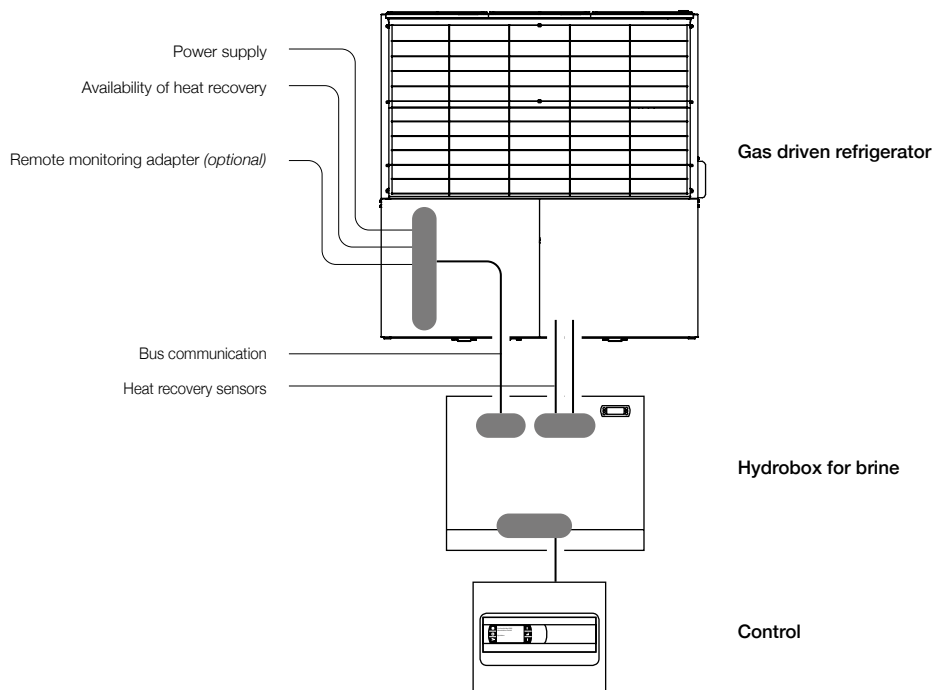
WIRING

GAS DRIVEN REFRIGERATOR + HYDROBOX FOR BRINE

Item	Name	Start	Cable type *	Voltage	Objective	Comments
Gas driven refrigerator						
1	Power supply	Switch cabinet	YSLY-JZ 3 x 2.5 mm ²	AC 230 V	GDR	ENCP 450 / 560: 0.87 / 0.99 kW, fuse 20 A slow blow* ENCP 710 / 850: 1.45 / 1.66 kW, fuse 20 A slow blow*
2	Remote monitoring	Remote monitoring adapter	LIYCY 2 x 0.75 mm ²		GDR	Optional component: see accessories
3	Availability of heat recovery	GDR	YSLY 3 x 1.0 mm ²	max. 440 V, 4 A	BCS	Thermostatic release
Connection driven refrigerator / Hydrobox						
4	Communication	GDR	LIYCY 2 x 0.75 mm ²		HB-S	Bus communication
5	Temperature sensor Engine outlet	GDR	YSLY 5 x 0.75 mm ²		HB-S	Sensor pre-installed in GDR (only in case of installed heat recovery)
6	Temperature sensor Heat recovery outlet	GDR			HB-S	Sensor pre-installed in GDR (only in case of installed heat recovery)
Hydrobox						
7	Power supply	Switch cabinet	NYM-J 3 x 1.5 mm ²	AC 230 V	HB-S	Fuse 10 A *
8	Communication cascade	HB-S	LIYCY 2 x 0.75 mm ²		HB-S	Bus communication
9	Speed control of the external circulation pump	HB-S	LIYCY 2 x 0.75 mm ²		Pump	Only in the version without pump (VJ1)
Further cables depending on the selected input configuration (see technical installation manual Hydrobox brine), minimum capacity request however (input configuration 1):						
10	Capacity request	BCS	LIYCY 2 x 0.75 mm ²	DC 0–10 V	HB-S	Analogue signal 1 x 0–10 V
11	Operation signal	BCS	YSLY 5 x 0.75 mm ²	AC 24 V	HB-S	open = off
12	Quiet mode	BCS			HB-S	
13	Acknowledgement	BCS			HB-S	Remote acknowledgement
14	Operation notification 1	HB-S	YSLY 5 x 1.5 mm ²	max. 250 V, 2 A, cos.ph. 0.6	BCS	potential-free (configurable)
15	Operation notification 2	HB-S			BCS	potential-free (configurable)
16	General error notification	HB-S			BCS	Collective error message (closed = error-free)

* These are recommendations. The dimensioning must be carried out in accordance with local regulations.

Diagram

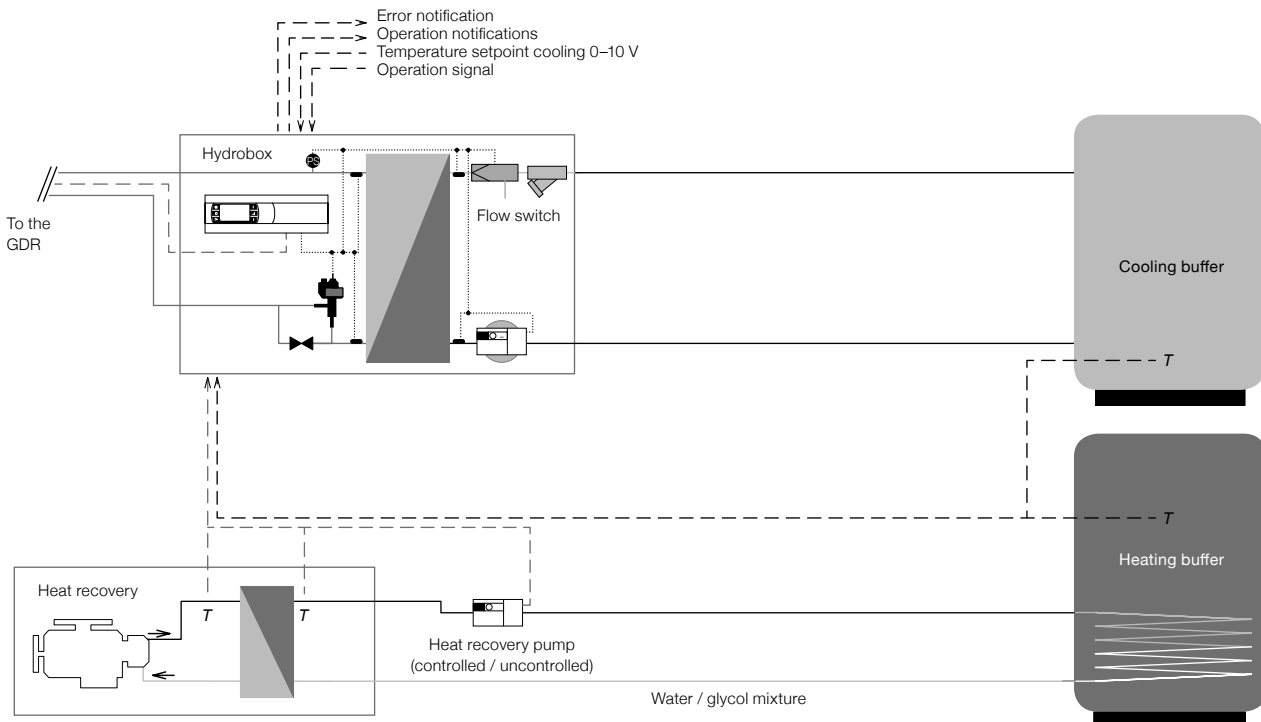


CONTROL

INPUT CONFIGURATIONS

HB-EK	Description	Control	Additional options
1	External capacity request over 0–10 V	External BCS	
2	External capacity request over 4–20 mA	External BCS	
3	External temperature setpoint over 1 x 0–10 V	External BCS	Request for extra device (chiller)
4	External temperature setpoint over 1 x 4–20 mA	External BCS	Request for extra device (chiller)
5	Not available		
6	Not available		
7	Not available		
8	Not available		
9	Internally calculated, sliding temperature setpoint	Outside temperature sensor	Request for extra device (chiller)
10	Not available		
11	Not available		
12	Not available		
13	Not available		
14	Not available		
15	External capacity request and external outlet temperature setpoint over 0–10 V	External BCS	(Pump control)
16	External capacity request and external outlet temperature setpoint over 4–20 mA	External BCS	(Pump control)
17	External temperature setpoint and external outlet temperature setpoint over 0–10 V	External BCS	(Pump control)
18	External temperature setpoint and external outlet temperature setpoint over 4–20 mA	External BCS	(Pump control)

Example: Input configuration 3 - external temperature setpoint over 0–10 V with heat recovery



CONTROL

CASCADE MANAGER AND CONNECTION

Cascade manager

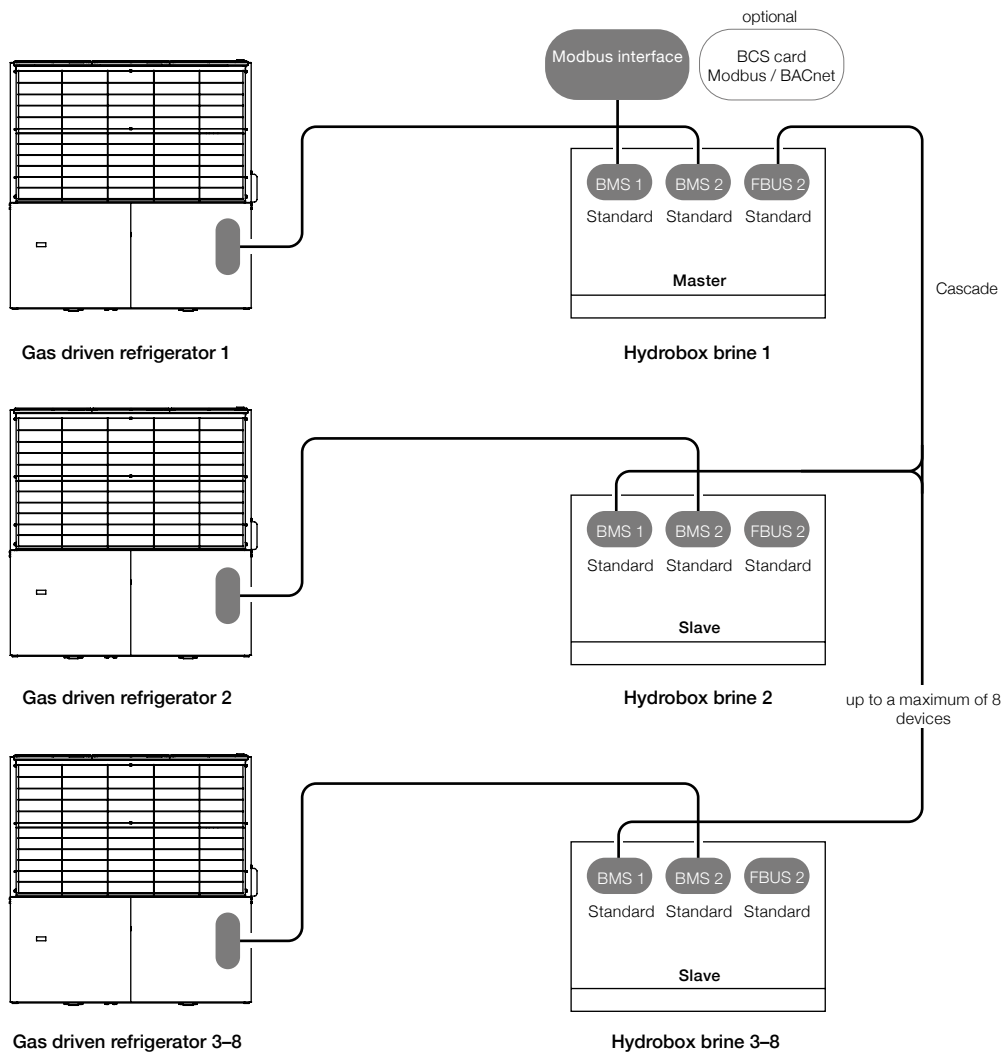
Up to eight gas driven refrigerators can be controlled with the cascade manager which is already integrated. The base load changes which can be switched off are managed automatically according to the "First in - first out" principle. All requests can be made via external power and temperature requests or via the internal control.

Note: The cascade management can also function via the superordinate building control system – every Hydrobox can then be controlled independently.

Connection of the components

The cascade is controlled as standard, just like every Hydrobox in general, as previously described, via analogue and digital signals. In addition, the management Hydrobox (Master) has a Modbus interface (see next page).

Connection GDR to HB-S



INTERFACES

BACNET AND MODBUS

Bus interfaces

The control and parameter transfer to a superordinate building control system can occur via the integrated Modbus interface (Modbus RTU). When using the interface in combination with the cascade manager, only the management Hydrobox (Master) can be controlled and read out. In this case, only selected information is transferred by the subordinate Hydroboxes (Slaves) to this Master via the internal bus.

An interface module is optionally available for Modbus TCP/IP, Bacnet and SNMP.

The table only shows a selection of the available parameters. The complete list is available as an Excel file upon request!

Variable	Description	Direction	UOM	Min	Max	Default	Data Type	BCS Type	BCS Ofs	BCS Idx	BCS Dir	BCS Dir2
OU B release	Compressor may be released	Only Output	-	0	1	0	B	Digital		152	Output	Output
OU B setpoint output	Specified set-point	Only Output	-	0	1	0	B	Digital		82	Output	Output
OU B setpoint temperature	Specified set-point	Only Output	-	0	1	0	B	Digital		81	Output	Output
OU setpoint	Specified set-point	Only Output	-	-99.9	99.9	0.0	A	Analogue	0.1	46	Output	Output
A001 output	Output value analogue output 1	Only Output	-	0	9999	0	I	Integer		11	Output	Output
...

AT A GLANCE

GAS DRIVEN REFRIGERATOR + HYDROBOX FOR BRINE

System index		450	560	710	850	
Overall system						
Rated cooling capacity	A35 / B0 ¹⁾	kW	26	36	42	51
Cooling capacity	A35 / B5 ¹⁾	kW	32	43	51	61
Gas driven refrigerator						
Dimensions (with air guards) ²⁾	H x W x D	mm	2,170 x 1,690 x 1,900		2,170 x 2,100 x 1,900	
Weight (with heat recovery / air guards)		kg	940	950	1,155	1,155
Electrical connection	Power supply	V / Ph / Hz	230 / 1 / 50			
	Fuse ⁴⁾	A	20, slow blow (C-Automat or Neozed)			
Fuel data	Gas type		Natural gas group II			
	Max. gas consumption (LHV)	kW	43	57	74	90
	Gas supply pressure	mbar	20			
	Gas connection	Inch	R 3 / 4			
			on site: flexible gas tube, filter			
Refrigerant pipes	Refrigerant gas / liquid pipe	mm	28 / 12	28 / 16	35 / 18	35 / 18
Exhaust drain pipe ³⁾		mm	15			
Sound level	Sound pressure level (max.)	dB(A)	57	58	61	62
	Sound power level (max.)	dB(A)	77	78	81	81
Operating range		°C DB	-20 to +46			
Hydrobox for brine						
Dimensions	L (+feet) x W x H	mm	1,100 (+30) x 1,020 x 675			
Weight		kg	190	190	210	210
Rated volume flow	5 K spread ²⁾	m ³ /h	5.1	7.1	8.4	10.2
Rated pressure loss	Version VJ	kPa	16	31	27	38
External pressure increase	Version VPJ	kPa	100	80	80	60
Electrical connection	Power supply	V / Ph / Hz	230 / 1 / 50			
	Fuse ⁴⁾	A	10			
Pipe connections	Brine pipes	Inch	2			
	Refrigerant gas / liquid line	mm	35 / 18			
Sound level	Sound pressure (max.)	dB(A)	33	35	33	35
Brine outlet temperature		°C	-5 to +18			
Connection GDR + Hydrobox						
Refrigerant pipes	Refrigerant gas / liquid pipe	mm	28 / 12	28 / 16	35 / 18	35 / 18
Max. distances	Length	m	55			
	Height	m	25			
Bus communication	(also for cascade HB-S - HB-S)	mm ²	LiYCY 2 x 0.75			

1) These are brine outlet temperatures

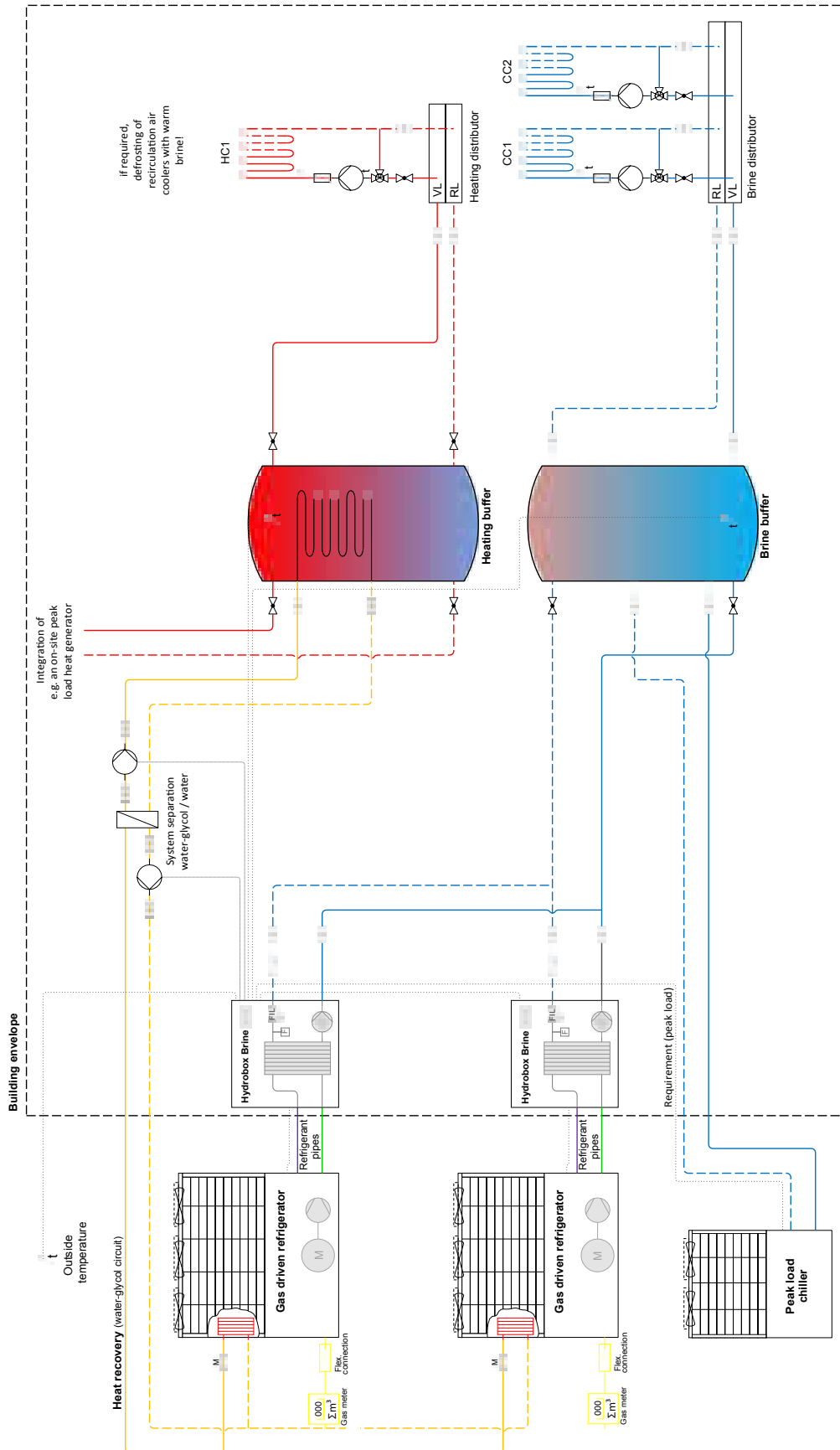
2) See accessories for dimensions with vibration dampers or air direction adjuster

3) The exhaust drain must be removed

4) These are recommendations; the dimensioning must be carried out in accordance with and local regulations

SYSTEM DIAGRAM EXAMPLE

GAS DRIVEN REFRIGERATOR + HYDROBOX FOR BRINE



NOTE: This example diagram is not a replacement for specialist planning and is not an implementation plan. Some necessary mounting parts and components have been dispensed with for the sake of clarity. The example diagram should by no means be considered complete! Errors excepted.

ACCESSORIES

FOR GAS ENGINE HEAT PUMPS / GAS DRIVEN REFRIGERATORS

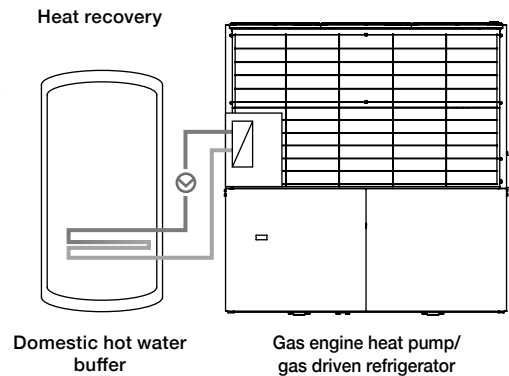
HEAT RECOVERY KIT	HEAT RECOVERY KIT ... J - HEATING DURING COOLING MODE For ENCP ... J (-R)	PAGE 85
AIR GUARDS	ARD ... H - FOR COOLING MODE AT OUTSIDE TEMPERATURE. < 10 °C For ENCP ... J (-R) / ECWP ... J / EZFP ... J	PAGE 86
AIR DIRECTION ADJUSTERS	FKA ... H - FOR OPERATION UNDER PROJECTIONS For ENCP ... J (-R) / ECWP ... J / EZFP ... J	PAGE 87
VIBRATION DAMPERS	SD / SDS / SDI ... - FOR DECOUPLING FROM THE BUILDING For ENCP ... J (-R) / ECWP ... J / EZFP ... J	PAGE 88
CONDENSATE TRAYS	RGA850H1 - FOR COLLECTING THE DEFROST DRAIN For ENCP ... J (-R) / ECWP ... J / EZFP ... J	PAGE 89
EXHAUST EXTENSION ADAPTER + EXTERNAL DRAIN FILTER	HA850H / DFB19E - WHEN USING AN EXHAUST SYSTEM For ENCP ... J (-R) / ECWP ... J / EZFP ... J	PAGE 90
REMOTE MONITORING ADAPTER	CLCW2B1 - FOR REMOTE MONITORING For ENCP ... J (-R) / ECWP ... J / EZFP ... JC	PAGE 91
ANTI-CORROSION TREATMENT	AKS-L1 / L2 - CORROSION PROTECTION COATING For ENCP ... J (-R) / ECWP ... J / EZFP ... J	PAGE 92

HEAT RECOVERY KIT

HEAT RECOVERY KIT 450 / 560 / 710 / 850 J

While the engine waste heat of the gas engine heat pump is used in heating mode primarily for defrosting phases or monovalent heating operation, this energy is freely available in cooling mode. This heat can be used externally via an integrated heat exchanger, for example for heat storage or for heating domestic hot water. This is also the case for excess engine waste heat which arises during heating mode.

- ✓ Extraction of engine waste heat in cooling mode - temperature level 65–70 °C
- ✓ Simultaneous heating and cooling
- ✓ Improving energy efficiency



Heat recovery kit ... J		450	560	710	850
Rated heating capacity *	kW	16	20	25	30
Min. water outlet temperature	°C	70	70	70	70
Rated volume flow **	m ³ /h	1.09	1.36	1.70	2.04
Rated pressure loss	kPa	0.6	0.8	1.1	1.4
Water content	l	3.3	3.3	4.0	4.0
Glycol proportion	%	35	35	35	35
Connections inlet / outlet (CU)	mm	35 x 1.5	35 x 1.5	35 x 1.5	35 x 1.5
Available ex-works as standard with ECWP 710 J and ENCP 450–850 J-R					
Not available for EFZP 560 / 850 JC					

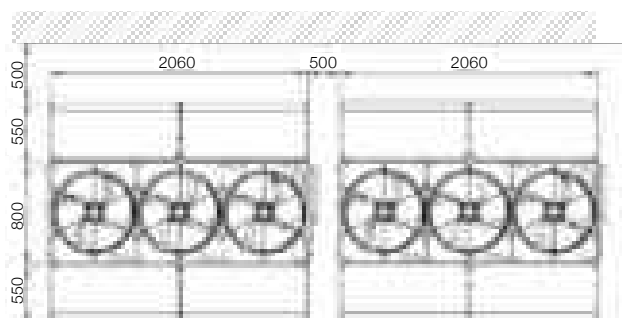
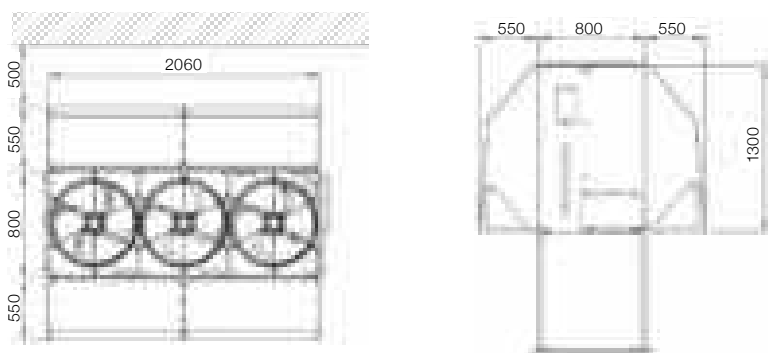
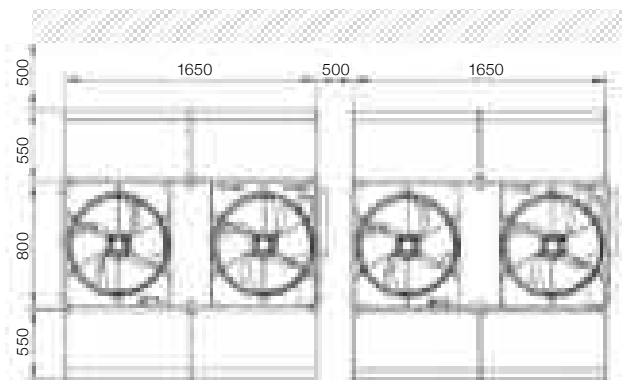
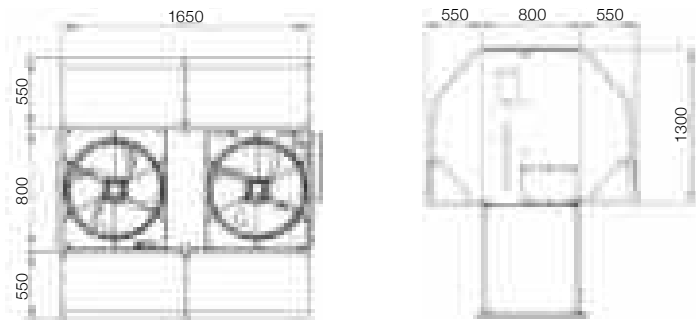
* The nominal heating capacity is based on 100 % full load operation cooling mode and can vary depending on the load and outside temperature between 0 kW and the specified value.
 ** Outlet temperature 65 °C / Inlet temperature 55 °C

AIR GUARDS

ARD 560 / 850 H

The air guards enable cooling mode in the case of low outside temperatures (see technical data).

ARD ... H		560	850
Suitable for outdoor unit		ENCP 450 / 560 J // EFZP 560 JC	ENCP 710 / 850J // ECWP 710 J // EFZP 850 JC
Weight	kg	2 x 25	2 x 29.5
Mandatory with ENCP 450–850 J-R.			

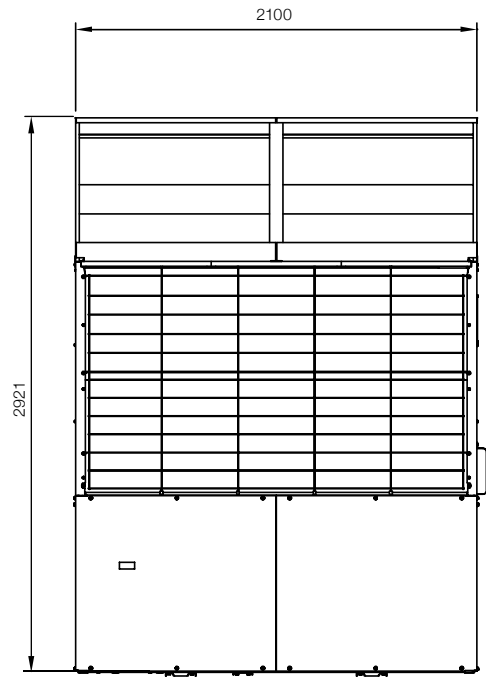
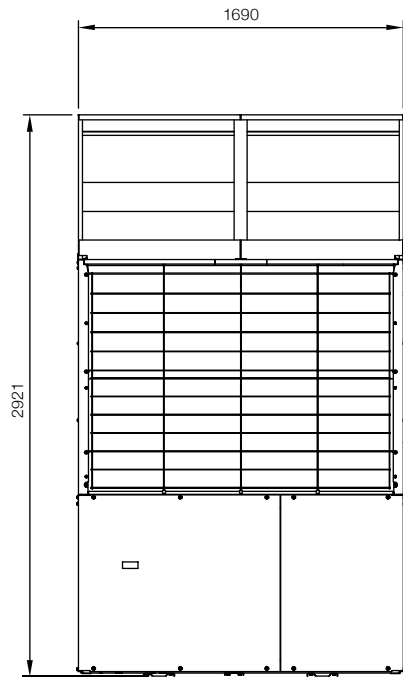
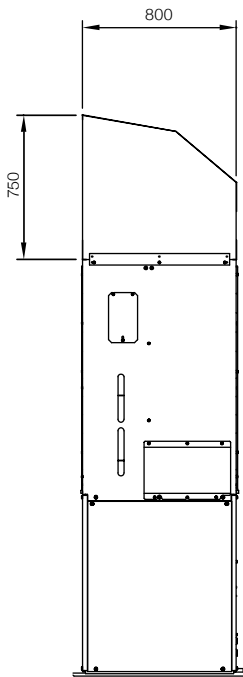


AIR DIRECTION ADJUSTER

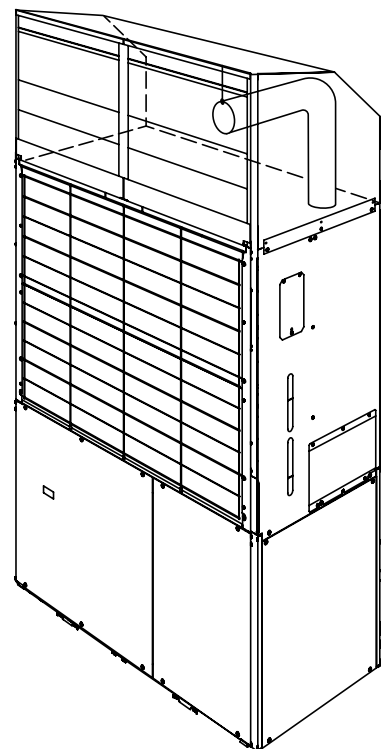
FKA 560 / 850 H

The air direction adjuster directs the outgoing air forwards in a targeted manner.

FKA ... H		560	850
Suitable for outdoor unit		ENCP 450 / 560 J (-R) // EFZP 560 JC	ENCP 710 / 850 J (-R) // ECWP 710 J / EFZP 850 JC
Weight	kg	29	33



In order to prevent exhaust gases freezing within the air direction adjuster, the exhaust pipe should be extended according to the following diagram (components on site).



NOTE: Please observe the exhaust gas evacuation.

VIBRATION DAMPERS

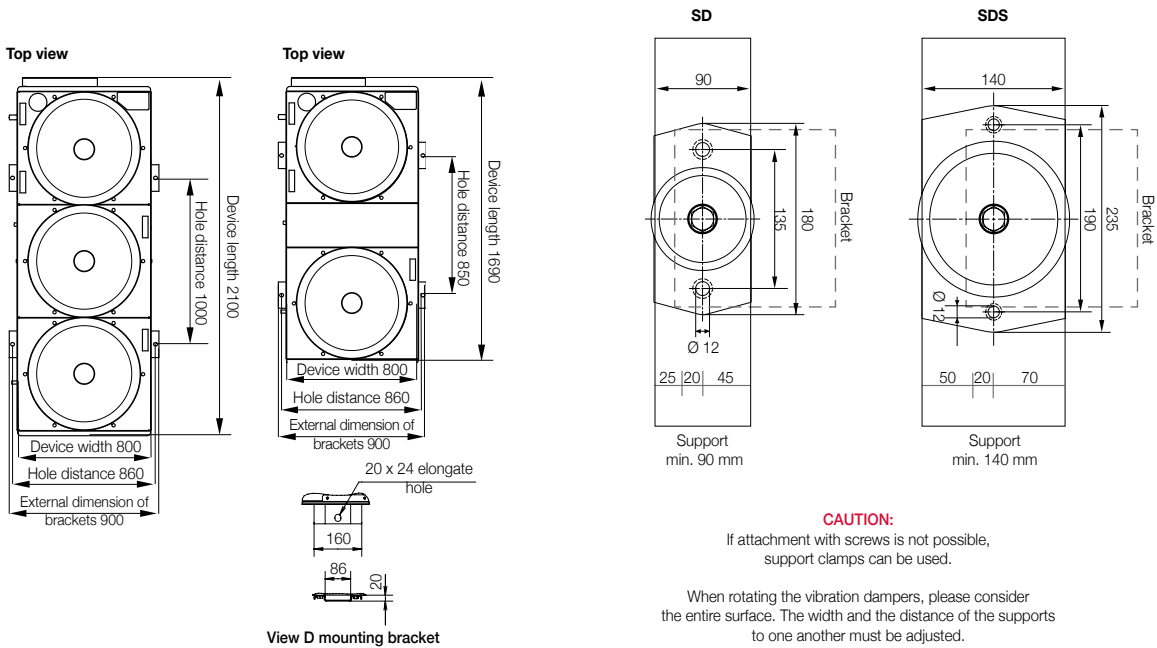
SD / SDS / SDI 450 / 560 / 710 / 850

The vibration dampers reduce the transfer of structure-borne noise to the installation surface.

SD ...		450 / 560	710 / 850
Suitable for outdoor units		ENCP 450 / 560 J (-R) // EFZP 560 J	ENCP 710 / 850 J (-R) // ECWP 710 J // EFZP 850 J
Degree of insulation	%	79.6 to 99.1	76.2 to 99.0
	dB	13.8 to 40.9	12.5 to 40.0

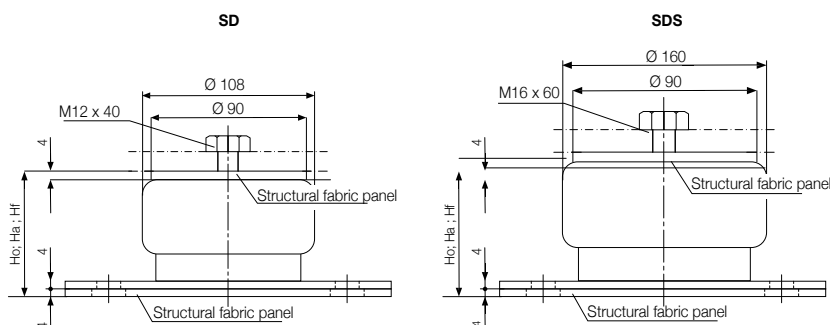
ENCP 710 / 850 J (-R)
ECWP 710 J
EFZP 850 J

ENCP 450 / 560 J (-R)
EFZP 560 J



Type	Nominal load capacity F	Spring constant k_v	Spring constant k_h	Natural frequency	Height H_0	Height H_A	Height H_F
	kN	kN / mm	kN / mm	Hz	mm	mm	mm
SD 450 / 560	2.64	0.176	0.259	4.0	72	65	57
SD 710 / 850	3.16	0.243	0.361	4.4	71	65	58
SDS 450 / 560	4.10	0.079	0.069	2.2	156	153	104
SDS 710 / 850	4.10	0.079	0.069	2.2	156	153	104

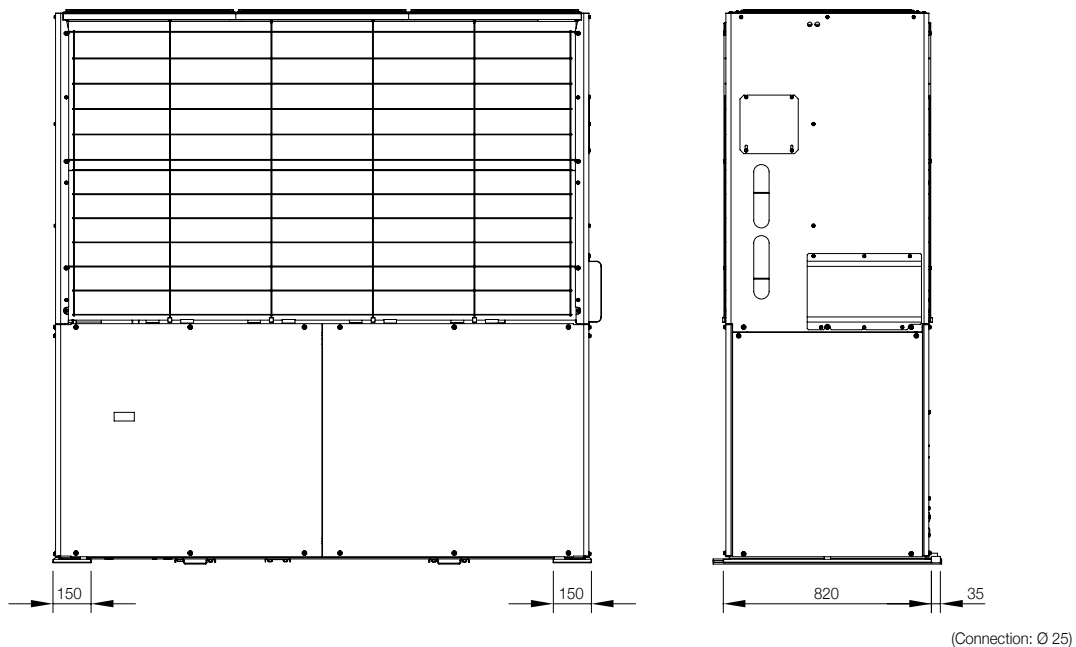
H_0 : Height without pre-stressing
 H_A : Delivery height
 H_F : Height with nominal load



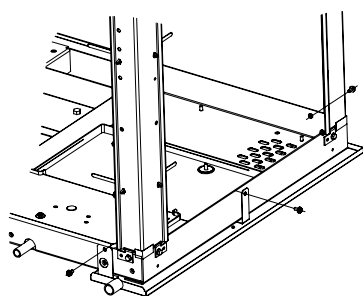
CONDENSATE TRAYS

RGA850H1

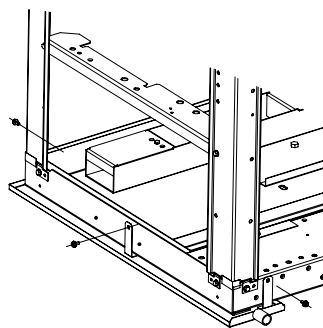
The drain trays collect the drain formed in defrost mode so that it can be removed in a controlled manner.



Assembly drawing



(Outdoor unit, left side)



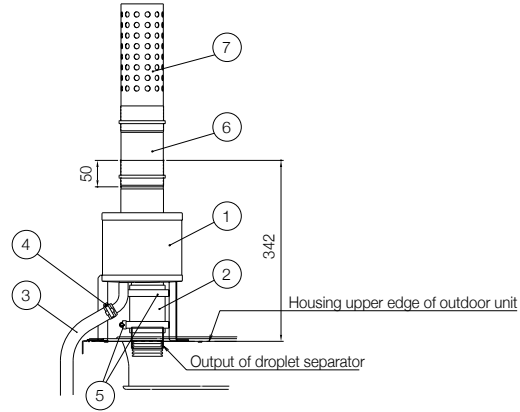
(Outdoor unit, right side)

Part no.	Name	Material	Quantity
1	Tray (left)	Stainless steel	1
2	Tray (right)	Stainless steel	1

EXHAUST EXTENSION ADAPTER + EXTERNAL DRAIN FILTER

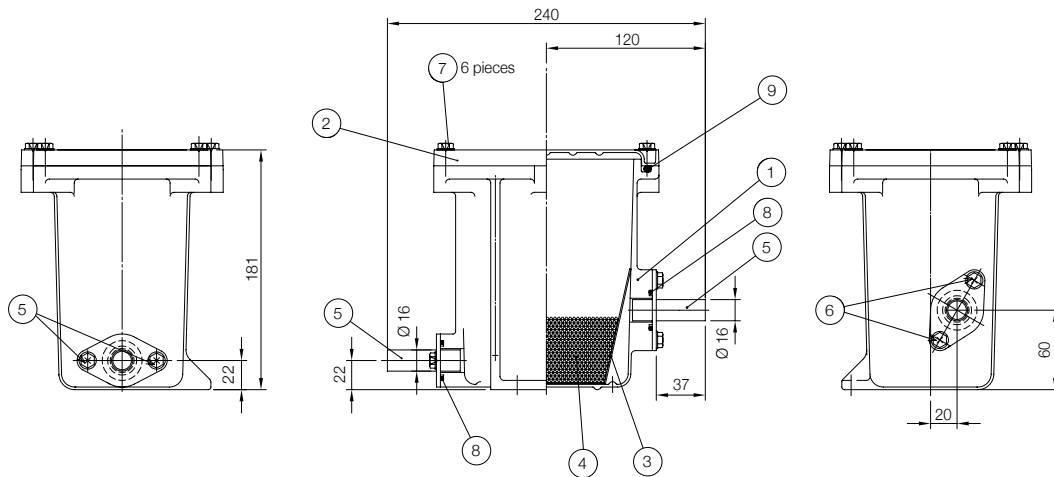
AKS-L1 / L2

The exhaust extension adapter connects an exhaust pipe system to the gas engine heat pump; the external drain filter neutralises the additionally resulting exhaust drain, which has to be removed separately.



Exhaust extension adapter HA850H

Part no.	Name	Quantity
1	Adapter (for extension pipe)	1
2	Tube (extension A)	1
3	Tube (extension B)	1
4	Tube clamp Ø 25 mm	1
5	Tube clamp Ø 80 mm	2
6	Exhaust pipe sleeve (adapter)	1
7	Exhaust pipe end piece (extension)	1



External drain filter DFB19E

Part no.	Name	Quantity
1	Housing (drain filter)	1
2	Cover (drain filter)	1
3	Baffle plate (filter stones)	1
4	Filter stones (drain filter)	1
5	Pipeline (drain)	2
6	Screw (+ hole 6 x 12)	4
7	Screw (+ hole 6 x 20)	6
8	O-ring 1AG25	2
9	O-ring 1AG150	1

REMOTE MONITORING ADAPTER

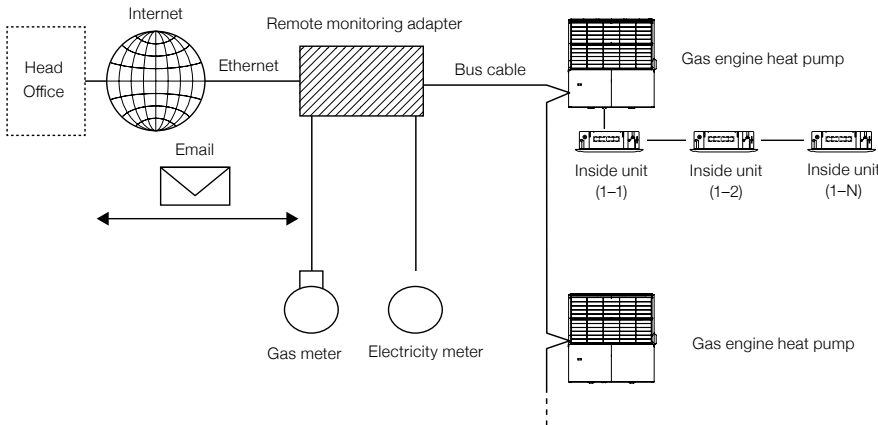
CLCW2B1

The Remote Energy Support-System (RESS) is a combination of hardware and software which monitors the status of the gas engine heat pumps. The information can be consulted on the internet, which enables YANMAR and certified partners to offer efficient customer support, produce timely maintenance plans, analyse energy data and optimise the system's efficiency.

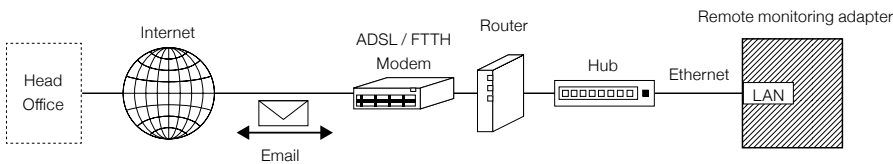
Up to 16 gas engine heat pumps with up to 128 VRF indoor units can be monitored.

Connections:

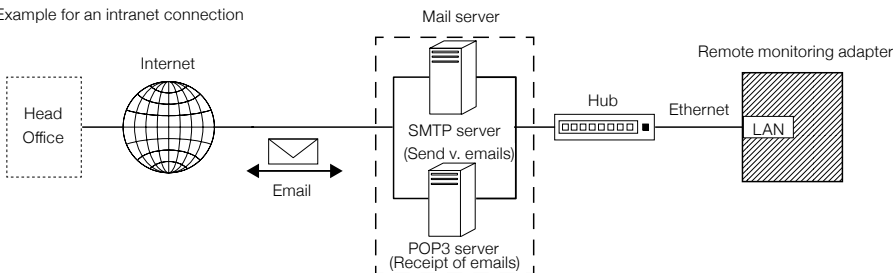
- Communication connection to the gas engine heat pump (RS-485, 1-channel)
- LAN connection (100BASE-TX / 10BASE-T)
- Service connection (RS232C, 1-channel)
- Pulse input for gas or electricity meters (2-channel, min. 100 ms)



Example for an internet connection



Example for an intranet connection



CLCW2B1			
Dimensions	L x W x H	mm	225 x 350 x 99
Weight		kg	2
Electrical connection	Power supply	V DC	24
Internal battery			Lithium manganese dioxide battery CR123A, 3V, 1,500 mAh
Environmental conditions (only indoor installation)	Temperature	°C	20-55
	Humidity	% r.h.	25-85

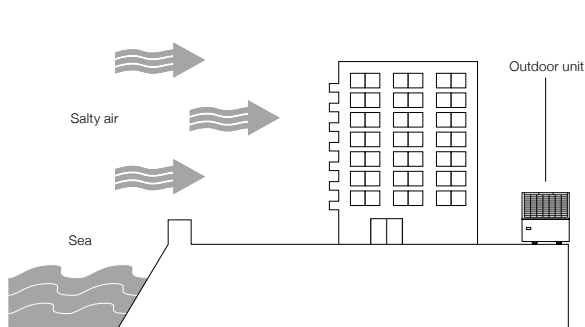
ANTI-CORROSION COATING

TREATMENT

The optimal anti-corrosion treatment enables the installation of the gas engine heat pumps in areas with salty air. It is available in two protection levels: the level is determined by whether the device is in a saline atmosphere (Level 1) or is directly exposed to salty air (Level 2).

Corrosion protection Level 1

The outdoor unit is installed so as to be protected behind a building in proximity to the sea.

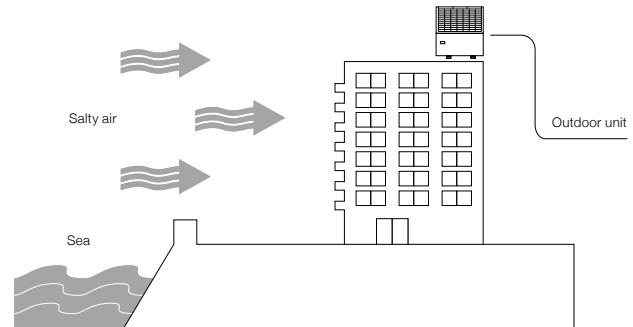


Location characteristics

1. The location is between 300 m and 1,000 m away from the coast.
2. The location is in the lee of a building.
3. The location allows natural cleaning by rain.

Corrosion protection Level 2

The outdoor unit must not be exposed to the direct sea breeze without protection!



Location characteristics

1. The location is less than 300 m away from the coast.
2. The location is not in the lee of a building.
3. Iron cladding and support structures at the location often have to be repainted.
4. The location only rarely allows natural cleaning by rain.

Anti-corrosion coating		Standard	Corrosion protection Level 1	Corrosion protection Level 2
Cover	Surface	Galvanised sheet steel SGCD F08, acrylic baked enamel finish (40–60µ) or polyester powder coating (60–80µ)	As under "standard"	Galvanised sheet steel SGCC F08 + epoxy resin coating (100µ) "silver"
	Rear side			Galvanised sheet steel SGCC F08 + wax-like coating (150µ) "black"
Side parts	Surface	Galvanised sheet steel SGCD F08, acrylic baked enamel finish (40–60µ) or polyester powder coating (60–80µ)	As under "standard"	Galvanised sheet steel SGCC F08 + epoxy resin coating (100µ) "silver"
	Rear side			Galvanised sheet steel SGCC F08 + wax-like coating (150µ) "black"
Base	Surface	Galvanised sheet steel SGHC Z18 without coating	As under "standard"	Galvanised sheet steel SGHC Z18 + wax-like coating (150µ)
	Side and rear side			Galvanised sheet steel SGHC Z18 + epoxy resin coating (40µ)
Centre cladding	Surface	Galvanised sheet steel SGHC Z18 without coating	Galvanised sheet steel SGHC Z18 + wax-like or acrylic resin coating	Galvanised sheet steel SGHC Z18 + wax-like coating (150µ)
	Side		Galvanised sheet steel SGHC Z18 + epoxy resin coating (40µ)	Galvanised sheet steel SGHC Z18 + wax-like coating (40µ)
	Rear side		As under "standard"	As under "standard"
Frame and framework	Upper part	Galvanised sheet steel SGHC Z18 without coating	Galvanised sheet steel SGHC Z18 + wax-like or acrylic resin coating	Galvanised sheet steel SGHC Z18 + wax-like coating (150µ)
	Lower part		Galvanised sheet steel SGHC Z18 + epoxy resin coating (40µ), inside parts as under "standard"	Galvanised sheet steel SGHC Z18 + epoxy resin coating (40µ)
Struts and air duct		Galvanised sheet steel SGHC Z18 / SGCC Z18 without coating	Galvanised sheet steel SGHC Z18 + wax-like or acrylic resin coating	Galvanised sheet steel SGHC Z18 + wax-like coating (150µ)
Heat exchanger		Without coating	PVC coating (7µ)	PVC coating (7µ)
Bolts, screws and washers of the cladding		Stainless steel	Stainless steel with protective coat	Stainless steel with protective coat
Fan guard		Low-carbon steel wire with polyethylene coating	As under "standard"	Low-carbon steel wire with Polyethylene and epoxy resin coating

ACCESSORIES

COLD WATER INDOOR UNITS

ROUNDFLOW CEILING MOUNTED CASSETTE	FWC-BT / BF Cooling: 4.1–8.7 kW / Heating: 5.5–12.1 kW (2-pipe) Cooling: 4.0–8.7 kW / Heating: 5.5–11.0 kW (4-pipe)	PAGE 94
EURORASTER CEILING MOUNTED CASSETTE 4-WAY BLOW	FWF-BT / BF Cooling: 1.5–5.2 kW / Heating: 2.3–6.7 kW (2-pipe) Cooling: 1.4–4.5 kW / Heating: 2.3–6.1 kW (4-pipe)	PAGE 95
CONCEALED CEILING UNIT	FWS-AAT / AAF Cooling: 0.6–10.1 kW / Heating: 0.7–11.2 kW (2-pipe) Cooling: 0.6–10.1 kW / Heating: 0.8–10.1 kW (4-pipe)	PAGE 96
AIR CURTAIN	HX GREEN LINE Heating: 6.0–23.0 kW	PAGE 97

ROUNDFLOW CEILING MOUNTED CASSETTE

FWC-BT / BF

- ✓ 360° air discharge
- ✓ Integrated fresh air intake
- ✓ Individual control of the flaps
- ✓ Draughtfree operation



FWC				06BT	07BT	08BT	09BT	06BF	07BF	08BF	09BF
				2-pipe ¹⁾²⁾				4-pipe ¹⁾³⁾			
Capacity	Cooling	High	kW	5.5	6.1	7.2	8.1	5.9	6.3	7.2	8.3
		Average	kW	4.7	5.3	5.9	6.8	5.1	5.6	6.2	6.9
		Low	kW	3.9	4.5	4.8	5.4	4.3	4.6	4.8	5.7
	Heating ⁴⁾	High	kW	6.8	7.7	9.2	10.6	6.9	7.8	9.2	10.4
		Average	kW	5.8	6.6	7.6	8.8	6.1	6.7	7.6	8.7
		Low	kW	4.8	5.5	5.8	7.0	5.2	5.5	5.8	6.8
Sensible capacity	Cooling	High	kW	4.2	4.7	5.7	6.5	4.2	4.6	5.4	6.4
		Average	kW	3.5	4.0	4.5	5.3	3.6	4.0	4.5	5.2
		Low	kW	2.8	3.3	3.5	4.1	3.1	3.3	3.5	4.0
Power input	Cooling	Max.	kW	0.045	0.054	0.077	0.107	0.046	0.055	0.077	0.107
	Heating	Max.	kW	0.045	0.054	0.077	0.107	0.046	0.055	0.077	0.107
Dimensions	L x W x H		mm	288 x 840 x 840				288 x 840 x 840			
Weight			kg	26				29			
Air flow rate		High	m ³ /h	1,068	1,236	1,518	1,776	1,032	1200	1,476	1,746
		Low	m ³ /h	720	834	888	1,044	708	804	852	1,014
Water-side pressure loss	Cooling		kPa	15	18	24	30	15	18	23	30
	Heating		kPa	17	22	29	37	18	22	30	38
Sound pressure level		H / L	dB(A)	29 / 24	33 / 28	39 / 32	43 / 37	29 / 24	33 / 28	39 / 32	43 / 37
Power supply			V / Ph / Hz	230 / 1 / 50							
Piping connections	Drain		mm	VP25 (outside diameter 32, outside diameter 25)							
	Water		Inch	3 / 4							
Device panel white (grey slats / white slats)	Model			BYCQ140C / BYCQ140CW							
	Colour			Grey / white (RAL 9010)							
	L x W x H		mm	50 x 950 x 950							
	Weight		kg	5.5							

1) Cooling: Indoor temperature 27 °C DB, 19 °C WB; inlet water 7 °C; outlet water 12 °C

2) Heating: 2-pipe: Indoor temperature 20 °C DB, 15 °C WB; inlet water 45 °C; outlet water 40 °C

3) Heating: 4-pipe: Indoor temperature 20 °C DB, 15 °C WB; inlet water 65 °C; outlet water 55 °C

4) Ingress of water below 5 °C or above 50 °C / 70 °C could damage the device

EURORASTER CEILING MOUNTED CASSETTE 4-WAY BLOW

FWF-BT / BF

- ✓ Suitable for Euroraster ceiling mounted cassettes
- ✓ Standard drain lifting pump 750 mm
- ✓ Integrated fresh air intake
- ✓ 1 to 2 flaps can be individually closed



FWF				02BT	03BT	04BT	05BT	02BF	03BF	04BF	05BF
				2-pipe ¹⁾²⁾				4-pipe ¹⁾³⁾			
Capacity	Cooling	High	kW	1.7	3.0	4.0	4.9	1,8	2.9	3.8	4.6
		Average	kW	1.5	2.7	3.1	4.0	1.5	2.4	3.1	3.8
		Low	kW	1.3	2.4	2.4	2.8	1.3	1.6	1.6	2.6
	Heating ⁴⁾	High	kW	2.4	3.3	4.5	5.6	3.3	3.6	4.7	5.7
		Average	kW	2.1	2.9	3.5	4.4	2.9	3.1	3.7	4.7
		Low	kW	1.9	2.7	2.7	3.0	2.4	2.6	2.6	3.2
Sensible capacity	Cooling	High	kW	1.4	2.0	2.7	3.5	1.5	1.8	2.5	3.2
		Average	kW	1.2	1.7	2.0	2.7	1.2	1.5	1.9	2.5
		Low	kW	1.0	1.4	1.4	1.8	1.0	1.0	1.0	1.6
Power input	Cooling	Max.	kW	0.074	0.074	0.090	0.118	0.067	0.062	0.074	0.093
	Heating	Max.	kW	0.074	0.074	0.090	0.118	0.067	0.062	0.074	0.093
Dimensions	L x W x H ⁵⁾	mm	285 x 575 x 575				285 x 575 x 575				
Weight		kg	19				20				
Air flow rate		High	m ³ /h	956	468	660	876	468	438	618	822
		Low	m ³ /h	300	318	318	420	318	300	300	330
Water-side pressure loss	Cooling		kPa	5	17	29	40	6	16	26	38
	Heating		kPa	7	18	30	43	9	5	9	13
Sound pressure level		High	dB(A)	31	31	40	45	31	33	42	47
Power supply			V / Ph / Hz	230 / 1 / 50							
Piping connections	Drain		mm	VP25 (outside diameter 26, outside diameter 20)							
	Water		Inch	3/4							
Device panel white (RAL 9010)	Model			BYFQ60B							
	L x W x H		mm	55 x 700 x 700							
	Weight		kg	2.7							

1) Cooling: Indoor temperature 27 °C DB, 19 °C WB; inlet water 7 °C; outlet water 12 °C
 2) Heating: 2-pipe: Indoor temperature 20 °C DB, 15 °C WB; inlet water 45 °C; outlet water 40 °C
 3) Heating: 4-pipe: Indoor temperature 20 °C DB, 15 °C WB; inlet water 65 °C; outlet water 55 °C
 4) Ingress of water below 5 °C or above 50 °C / 70 °C could damage the device
 5) Height including switch cabinet

CONCEALED CEILING UNIT

FWS-AAT / AAF



- ✓ Only the suction and discharge grills visible
- ✓ Energy savings of up to 70 %
- ✓ Automatically adjusts to any room temperature and relative humidity
- ✓ Quiet operation
- ✓ Great flexibility when planning as a result of many device sizes



FWS- ...				02AAT	03AAT	06AAT	08AAT	02AAF	03AAF	06AAF	08AAF
				2-pipe ¹⁾²⁾				4-pipe ¹⁾³⁾			
Capacity	Cooling	Max.	kW	1.94	2.91	4.48	7.93	1.77	2.86	4.64	7.79
		Min.	kW	1.35	1.75	2.99	4.10	1.25	1.72	3.10	4.06
	Heating	Max.	kW	2.15	2.94	4.88	8.37	1.76	2.68	4.64	7.35
		Min.	kW	1.81	2.37	4.11	6.53	1.56	2.31	4.07	6.29
Sensible capacity	Cooling	Max.	kW	1.49	2.09	3.62	5.87	1.44	2.06	3.54	5.76
		Min.	kW	1.04	1.25	2.31	3.04	0.97	1.23	2.27	3.01
Power input		Max.	W	19	16	33	87	19	16	33	87
		Min.	W	10	10	10	13	10	10	10	13
Dimensions		Height	mm	535							
		Width	mm	584	574	1,000	1,214	584	794	1,000	1,214
		Depth	mm	224			249	224			249
Weight		kg	16.9	22.1	26.6	35.4	16.9	22.1	26.6	35.4	
Heat exchanger	Water volume	l	1	1	1	1.43	1	1	1	1.43	
Additional heat exchanger	Water volume	l	-	-	-	-	0	0	0	0.53	
Fan	Type		Radial engine								
	Quantity	Unit	1	2	2	2	1	2	2	2	
	Air flow rate	Max.	m ³ /h	334	442	785	1,393	327	431	763	1,362
Min.		m ³ /h	211	241	470	642	205	237	460	636	
Sound power level ⁴⁾		Max.	dB(A)	50	48	56	67	50	47	58	66
Water flow rate	Cooling	l / h	454	853	1,084	1,728	454	853	1084	1728	
	Heating	l / h	454	853	1,084	1,728	216	367	565	882	
Water-side pressure loss	Cooling	kPa	12	11	14	20	13	11	14	16	
	Heating	kPa	12	11	14	18	6	4	8	29	
Power supply		V / Ph / Hz	230 / 1 / 50								
Piping connections	Drain	AD	mm	16							
	Water	Inch	1/2	3/4			1/2	3/4			

1) Cooling: Indoor temperature 27 °C DB, 19 °C WB; inlet water 7 °C; water temperature rise 5 K

2) Heating: 2-pipe: Indoor temperature 20 °C DB, 15 °C WB; inlet water 45 °C; water temperature rise 5 K

3) Heating: 4-pipe: air 20 °C DB, 15 °C WB; inlet water 65 °C; water temperature rise 10 K

4) Sound power level according to ISO3741

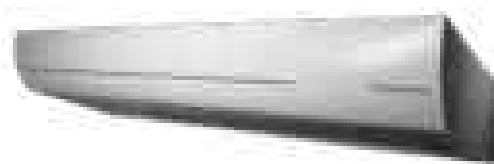
AIR CURTAIN

HX2 ENERGY SAVING LINE



The air curtain HX2 can be used flexibly for different areas of application in wholesale and retail as well as in industry. The devices can be installed free hanging, integrated into the ceiling or as cassettes and are available in different sizes and for different water temperatures.

The newly developed air outlet principle ensures that the stream of air is particularly homogenous with optimal depth effect – the door is reliably and effectively shielded.



Included in the scope of delivery:

- ✓ Ecopower circuit board V9
- ✓ 3 way valve
- ✓ Control cable 6.00 m

Optional accessories:

- ✓ RAL colours available on request
- ✓ Modbus interface card incl. Ecobus software
- ✓ Door contact switch
- ✓ Outside temperature sensor

Free-hanging HX2 ...		1000W4		1500W4		2000W4		2500W4	
Size		S / M / L		S / M / L		S / M / L		S / M / L	
Water temperature	°C	45 / 35	60 / 40	45 / 35	60 / 40	45 / 35	60 / 40	45 / 35	60 / 40
Heating capacity ¹⁾	kW	41 / 4.4 / 5.2	6.1 / 6.5 / 7.6	6.9 / 7.3 / 8.3	10.2 / 10.8 / 12.3	9.6 / 10.2 / 12.2	14.2 / 15.1 / 18.0	12.4 / 13.6 / 15.6	18.3 / 20.1 / 23.0
Operating current	A	1 / 1.4 / 2.5		1.4 / 1.9 / 3.4		1.9 / 2.9 / 5		2.4 / 3.4 / 5.9	
Power supply	V / Ph / Hz	230 / 1 / 50							
Max. air flow rate	m ³ /h	1,285 / 1,412 / 1,877		1,927 / 2,131 / 2,633		2,570 / 2,824 / 3,754		3,213 / 3,729 / 4,608	
Weight free-hanging	kg	33 / 37 / 35		49 / 53 / 50		64 / 72 / 67		81 / 89 / 84	
Weight of ceiling suspended unit	kg	32 / 36 / 33		48 / 52 / 49		62 / 70 / 65		79 / 87 / 81	
Weight of cassette	kg	36 / 40 / 38		54 / 58 / 55		70 / 78 / 73		89 / 97 / 91	
Dimensions (L x W x H) free-hanging	mm	1,000 x 622 x 240		1,500 x 622 x 240		2,000 x 622 x 240		2,500 x 622 x 240	
Dimensions (L x W x H) ceiling suspended unit	mm	1,000 x 465 x 270		1,500 x 465 x 270		2,000 x 465 x 270		2,500 x 465 x 270	
Dimensions (L x W x H) cassette	mm	1,000 x 693 x 270		1,500 x 693 x 270		2,000 x 693 x 270		2,500 x 693 x 270	
Noise level in 3.0 m	dB(A)	50 / 50 / 54		52 / 52 / 53		53 / 53 / 57		54 / 56 / 57	

1) Room temperature +20 °C

SOFTWARE - TOOLS

CHECKER-TOOL / DESIGN-TOOL / MERIT-SOFTWARE

CHECKER-TOOL

Software updates can be installed onto the gas engine heat pump or gas driven refrigerator using the Checker-Tool. The program also enables the system to be analysed (only for trained specialist partners).



DESIGN-TOOL

VRF systems from YANMAR can be designed with the Design-Tool. The software delivers detailed wiring diagrams and material lists.

MERIT-SOFTWARE

The Merit software enables energy cost estimates and economic feasibility calculations.



ONLINE TROUBLESHOOTING

Registered specialist partners have the option of receiving detailed information about error messages via the website.

YANMAR CITY

Future-oriented cooling, air-conditioning and heating solutions for various applications are shown in the virtual YANMAR City.

www.yanmar-city.eu



CHECKLIST

FOR YOUR NEXT PROJECT

Customer/property data

Customer _____ Project title _____
Town/city _____ Period of execution _____
Gas price _____ €/kWh Electricity price _____ €/kWh

Building data

New building Renovation Extension
 Commercial area Mixed area Residential area

Shop Office/administration Hotel Warehouse / logistics
 Data processing centre Trade/industry Residential construction Miscellaneous

Year of construction _____ Surface to be heated _____ m² Surface to be cooled _____ m²
Heating capacity _____ kW Cooling capacity _____ kW Floor height _____ m
AHU system yes no Air flow rate _____ m³/h Heating / cooling capacity _____ / _____ kW
Domestic hot water centralised decentralised Capacity _____ kW

System and design data

Number of heating/cooling circuits _____ / _____ units
Temperatures of heating/cooling circuits _____ / _____ °C
Which heating and cooling surfaces are used? _____

Bivalent yes no _____ System Dew point control yes no
Design temperature heating (OT) _____ °C Cooling (OT) _____ °C

Gas engine heat pump system

Air-to-water system 2-pipe Yanmar controlled
 Air-to-air system (AHU) 3-pipe BCS

Installation location

Outside Roof Ground level
Distance of GHP from building _____ m
Distance of GHP from neighbouring building _____ m

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