1 SPECIFICATION OF SUPPLY

1.1 SPECIFICATION OF SUPPLY

Thanks to the possibility of combining several individual gas-fired heating/refrigeration modules (GAHP/GA/AY modules) on the same Link, a large number of configurations can be realised, with the aim of meeting the specific requirements of the system to be served while avoiding oversizing and consequent energy wastage.
The specifications of supply and the technical data of each Link must therefore be customised to the specific module combination required.
The specification of supply and the data sheet for the Link are available:

- on the product configurator (available from the Robur portal)
- in the documentation supplied with the commercial offer
- on demand, from the Robur technical service or the sales network

From the code of the Link it is possible to trace its composition, as detailed in Paragraph 1.2 *p. 4*.
Examples of specifications of supply for the main families of Link are given below.

To be specified in the specification of supply

- The exact composition of the Link.
- Details of any versions of the modules making up the Link, if more than one version is available.
- The plumbing configuration (2, 4 or 6-pipe).
- The type and number of modules on the separate circuit.
- Water pumps configuration (with *or* without).
- For aerothermal Link, the choice of standard *or* low-noise fans (S or S1).
- Main technical data for the Link, extracted from the relevant data sheet.

1.1.1 RTA

Preassembled hydronic modular absorption group, fed with natural gas or LPG, for high-efficiency heating and domestic hot water production, for outdoor installation.
The group consists of water-ammonia absorption heat pumps, fed with natural gas or LPG, air-water version, modulating and condensing, for hot water production up to a delivery temperature of 65 °C (70 °C at 50% of maximum thermal input).
The modules that make up the group are preassembled on hot-dip galvanised steel support beams and complete with stainless steel hydraulic manifolds insulated by a rigid jacket lined with an external aluminium plate covering, galvanised steel gas distribution piping and condensate drain manifold, positioned under the base, flexible couplings for connection to the manifolds and outdoor electrical panel with safety switches.

1.1.2 RTAH

Preassembled hydronic modular absorption group, fed with natural gas or LPG, for high-efficiency heating and cooling with heat recovery, for outdoor installation.
The group consists of water-ammonia absorption heat pumps, fed with natural gas or LPG, air-water version, reversible, for hot water production up to a delivery temperature of 60 °C and alternatively cold water down to a delivery temperature of 3 °C, and of water-ammonia absorption chiller-heaters, fed with natural gas or LPG, air-water version with heat recovery, for cold water production down to a delivery temperature of 3 °C and simultaneously hot water up to a delivery temperature of 75 °C.
The modules that make up the group are preassembled on hot-dip galvanised steel support beams and complete with stainless steel hydraulic manifolds insulated by a rigid jacket lined with an external aluminium plate covering and galvanised steel gas distribution piping, positioned under the base, flexible couplings for connection to the manifolds and outdoor electrical panel with safety switches.

1.1.3 RTAR

Preassembled hydronic modular absorption group, fed with natural gas or LPG, for high-efficiency heating and cooling, for outdoor installation.
The group consists of water-ammonia absorption heat pumps, fed with natural gas or LPG, air-water version, reversible, for hot water production up to a delivery temperature of 60 °C and alternatively cold water down to a delivery temperature of 3 °C.
The modules that make up the group are preassembled on hot-dip galvanised steel support beams and complete with stainless steel hydraulic manifolds insulated by a rigid jacket lined with an external aluminium plate covering and galvanised steel gas distribution piping, positioned under the base, flexible couplings for connection to the manifolds and outdoor electrical panel with safety switches.

1.1.4 RTAY

Preassembled hydronic modular absorption group, fed with natural gas or LPG, for high-efficiency heating and domestic hot water production, for outdoor installation.
The group consists of water-ammonia absorption heat pumps, fed with natural gas or LPG, air-water version, modulating and condensing, for hot water production up to a delivery temperature of 65 °C (70 °C at 50% of maximum thermal input), and of modulating condensing boilers with sealed chamber, fed with natural gas or LPG, for hot water production up to a delivery temperature of 88 °C.
The modules that make up the group are preassembled on hot-dip galvanised steel support beams, provided with independent oversized water pumps, provided with check valves, complete with stainless steel hydraulic manifolds insulated by a rigid jacket lined with an external aluminium plate covering, galvanised steel gas distribution piping and condensate drain manifold, positioned under the base, flexible couplings for connection to the manifolds and outdoor electrical panel with safety switches.

1.1.5 RTCF

Preassembled hydronic modular absorption group, fed with natural gas or LPG, for cooling, for outdoor installation.
The group consists of water-ammonia absorption chillers, fed with natural gas or LPG, air-water version, for cold water production down to a delivery temperature of 3 °C.
The modules that make up the group are preassembled on hot-dip galvanised steel support beams and complete with stainless steel hydraulic manifolds insulated by a rigid jacket lined with an external aluminium plate covering and galvanised steel gas distribution piping, positioned under the base, flexible couplings for connection to the manifolds and outdoor electrical panel with safety switches.

1.1.6 RTCF HR

Preassembled hydronic modular absorption group, fed with natural gas or LPG, for cooling and simultaneous heat recovery, for outdoor installation.
The group consists of water-ammonia absorption chiller-heaters, fed with natural gas or LPG, air-water version with heat recovery, for cold water production down to a delivery temperature of 3 °C and simultaneously hot water up to a delivery temperature of 75 °C.
The modules that make up the group are preassembled on hot-dip galvanised steel support beams and complete with stainless steel hydraulic manifolds insulated by a rigid jacket lined with an external aluminium plate covering, separated for the cooling circuit and the heat recovery circuit, and galvanised steel gas distribution piping, positioned under the base, flexible couplings for connection to the manifolds and outdoor electrical panel with safety switches.

1.1.7 RTCF TK

Preassembled hydronic modular absorption group, fed with natural gas or LPG, for cooling, for outdoor installation.
The group consists of water-ammonia absorption chillers, fed with natural gas or LPG, air-water version for process applications, for cold water production down to a delivery temperature of 3 °C.
The modules that make up the group are preassembled on hot-dip galvanised steel support beams and complete with stainless steel hydraulic manifolds insulated by a rigid jacket lined with an external aluminium plate covering and galvanised steel gas distribution piping, positioned under the base, flexible couplings for connection to the manifolds and outdoor electrical panel with safety switches.

1.1.8 RTCF HT

Preassembled hydronic modular absorption group, fed with natural gas or LPG, for cooling, for outdoor installation.
The group consists of water-ammonia absorption chillers, fed with natural gas or LPG, air-water version for use in areas with high ambient temperature and humidity, for cold water production down to a delivery temperature of 5 °C.
The modules that make up the group are preassembled on hot-dip galvanised steel support beams and complete with stainless steel hydraulic manifolds insulated by a rigid jacket lined with an external aluminium plate covering and galvanised steel gas distribution piping, positioned under the base, flexible couplings for connection to the manifolds and outdoor electrical panel with safety switches.

1.1.9 RTCF LB

Preassembled hydronic modular absorption group, fed with natural gas or LPG, for cooling, for outdoor installation.
The group consists of water-ammonia absorption chillers, fed with natural gas or LPG, air-water version for refrigeration, for cold water production down to a delivery temperature of -10 °C.
The modules that make up the group are preassembled on hot-dip galvanised steel support beams and complete with stainless steel hydraulic manifolds insulated by a rigid jacket lined with an external aluminium plate covering and galvanised steel gas distribution piping, positioned under the base, flexible couplings for connection to the manifolds and outdoor electrical panel with safety switches.

1.1.10 RTCR

Preassembled hydronic modular absorption group, fed with natural gas or LPG, for high-efficiency heating and cooling, for outdoor installation.
The group consists of water-ammonia absorption heat pumps, fed with natural gas or LPG, air-water version, reversible, for hot water production up to a delivery temperature of 60 °C and alternatively cold water down to a delivery temperature of 3 °C, and of water-ammonia absorption chillers, fed with natural gas or LPG, air-water version, for cold water production down to a delivery temperature of 3 °C.
The modules that make up the group are preassembled on hot-dip galvanised steel support beams and complete with stainless steel hydraulic manifolds insulated by a rigid jacket lined with an external aluminium plate covering and galvanised steel gas distribution piping, positioned under the base, flexible couplings for connection to the manifolds and outdoor electrical panel with safety switches.

1.1.11 RTGS (outdoor version)

Preassembled hydronic modular absorption group, fed with natural gas or LPG, for alternate or simultaneous production of chilled water even at negative temperatures, for geothermal applications, for outdoor installation.
The group consists of water-ammonia absorption heat pumps, fed with natural gas or LPG, brine-water version, modulating and condensing, for alternate or simultaneous production of hot water up to a delivery temperature of 65 °C (70 °C at 50% of maximum thermal input) and cold water even at negative temperatures (minimum delivery temperature -5 °C).
The modules that make up the group are preassembled on hot-dip galvanised steel support beams and complete with stainless steel hydraulic manifolds insulated by a rigid jacket lined with an external aluminium plate covering, separated for the system circuit and the geothermal probes circuit, positioned behind the modules, galvanised steel gas distribution piping and condensate drain manifold, positioned under the base, flexible couplings for connection to the manifolds and outdoor electrical panel with safety switches.

1.1.12 RTGS (indoor version)

Preassembled hydronic modular absorption group, fed with natural gas or LPG, for alternate or simultaneous production of chilled water even at negative temperatures, for geothermal applications, for indoor installation.
The group consists of water-ammonia absorption heat pumps, fed with natural gas or LPG, brine-water version, modulating and condensing, for alternate or simultaneous production of hot water up to a delivery temperature of 65 °C (70 °C at 50% of maximum thermal input) and cold water even at negative temperatures (minimum delivery temperature -5 °C).
The modules that make up the group are preassembled on hot-dip galvanised steel support beams and complete with stainless steel hydraulic manifolds insulated by a rigid jacket lined with an external aluminium plate covering, separated for the system circuit and the geothermal probes circuit, positioned behind the modules, galvanised steel gas distribution piping and condensate drain manifold, positioned under the base, flexible couplings for connection to the manifolds and outdoor electrical panel with safety switches.

1.1.13 RTHF

Preassembled hydronic modular absorption group, fed with natural gas or LPG, for cooling and simultaneous heat recovery, for outdoor installation.
The group consists of water-ammonia absorption chillers, fed with natural gas or LPG, air-water version, for cold water production down to a delivery temperature of 3 °C, and of water-ammonia absorption chiller-heaters, fed with natural gas or LPG, air-water version with heat recovery, for cold water production down to a delivery temperature of 3 °C and simultaneously hot

water up to a delivery temperature of 75 °C.
The modules that make up the group are preassembled on hot-dip galvanised steel support beams and complete with stainless steel hydraulic manifolds insulated by a rigid jacket lined with an external aluminium plate covering, separated for the cooling circuit and the heat recovery circuit, and galvanised steel gas distribution piping, positioned under the base, flexible couplings for connection to the manifolds and outdoor electrical panel with safety switches.

1.1.14 RTRC

Preassembled hydronic modular absorption group, fed with natural gas or LPG, for high-efficiency heating, cooling and domestic hot water production, for outdoor installation.
The group consists of water-ammonia absorption heat pumps, fed with natural gas or LPG, air-water version, reversible, for hot water production up to a delivery temperature of 60 °C and alternatively cold water down to a delivery temperature of 3 °C, of water-ammonia absorption chillers, fed with natural gas or LPG, air-water version, for cold water production down to a delivery temperature of 3 °C, and of modulating condensing boilers with sealed chamber, fed with natural gas or LPG, for hot water production up to a delivery temperature of 88 °C.
The modules that make up the group are preassembled on hot-dip galvanised steel support beams, provided with independent oversized water pumps, provided with check valves, complete with stainless steel hydraulic manifolds insulated by a rigid jacket lined with an external aluminium plate covering and galvanised steel gas distribution piping, positioned under the base, flexible couplings for connection to the manifolds and outdoor electrical panel with safety switches.

1.1.15 RTRH

Preassembled hydronic modular absorption unit, fed with natural gas or LPG, for high-efficiency heating, cooling and simultaneous heat recovery, and domestic hot water production, for outdoor installation.
The group consists of water-ammonia absorption heat pumps, fed with natural gas or LPG, air-water version, reversible, for hot water production up to a delivery temperature of 60 °C and alternatively cold water down to a delivery temperature of 3 °C, of water-ammonia absorption chiller-heaters, fed with natural gas or LPG, air-water version with heat recovery, for cold water production down to a delivery temperature of 3 °C and simultaneously hot water up to a delivery temperature of 75 °C, and of modulating condensing boilers with sealed chamber, fed with natural gas or LPG, for hot water production up to a delivery temperature of 88 °C.
The modules that make up the group are preassembled on hot-dip galvanised steel support beams, provided with independent oversized water pumps on the system and domestic hot water circuits, provided with check valves, complete with stainless steel hydraulic manifolds insulated by a rigid jacket lined with an external aluminium plate covering, separated for the system circuit, the heat recovery circuit and the domestic hot water circuit, and galvanised steel gas distribution piping, positioned under the base, flexible couplings for connection to the manifolds and outdoor electrical panel with safety switches.

1.1.16 RTWS (outdoor version)

Preassembled hydronic modular absorption group, fed with natural gas or LPG, for alternate or simultaneous production of chilled water, for outdoor installation.
The group consists of water-ammonia absorption heat pumps, fed with natural gas or LPG, water-water version, modulating and condensing, for alternate or simultaneous production of hot water up to a delivery temperature of 65 °C (70 °C at 50% of maximum thermal input) and cold water down to a delivery temperature of 3 °C.
The modules that make up the group are preassembled on hot-dip galvanised steel support beams and complete with stainless steel hydraulic manifolds insulated by a rigid jacket lined with an external aluminium plate covering, separated for the system circuit and the renewable source circuit, positioned behind the modules, galvanised steel gas distribution piping and condensate drain manifold, positioned under the base, flexible couplings for connection to the manifolds and outdoor electrical panel with safety switches.

1.1.17 RTWS (indoor version)

Preassembled hydronic modular absorption group, fed with natural gas or LPG, for alternating or simultaneous production of chilled water, for indoor installation.
The group consists of water-ammonia absorption heat pumps, fed with natural gas or LPG, water-water version, modulating and condensing, for alternate or simultaneous production of hot water up to a delivery temperature of 65 °C (70 °C at 50% of maximum thermal input) and cold water down to a delivery temperature of 3 °C.
The modules that make up the group are preassembled on hot-dip galvanised steel support beams and complete with stainless steel hydraulic manifolds insulated by a rigid jacket lined with an external aluminium plate covering, separated for the system circuit and the renewable source circuit, positioned behind the modules, galvanised steel gas distribution piping and condensate drain manifold, positioned under the base, flexible couplings for connection to the manifolds and outdoor electrical panel with safety switches.

1.1.18 RTY

Preassembled hydronic modular absorption group, fed with natural gas or LPG, for heating and domestic hot water production, for indoor or outdoor installation.
The group consists of modulating condensing boilers with sealed chamber, fed with natural gas or LPG, for hot water production up to a delivery temperature of 88 °C.
The modules that make up the group are preassembled on hot-dip galvanised steel support beams, provided with independent oversized water pumps, provided with check valves, complete with stainless steel hydraulic manifolds insulated by a rigid jacket lined with an external aluminium plate covering, galvanised steel gas distribution piping and condensate drain manifold, positioned under the base, flexible couplings for connection to the manifolds and outdoor electrical panel with safety switches.

1.1.19 RTYF

Preassembled hydronic modular absorption group, fed with natural gas or LPG, for heating, cooling and domestic hot water production, for outdoor installation.
The group consists of water-ammonia absorption chillers, fed with natural gas or LPG, air-water version, for cold water production down to a delivery temperature of 3 °C, and of modulating condensing boilers with sealed chamber, fed with natural gas or LPG, for hot water production up to a delivery temperature of 88 °C.
The modules that make up the group are preassembled on hot-dip galvanised steel support beams, provided with independent oversized water pumps, provided with check valves, complete with stainless steel hydraulic manifolds insulated by a rigid jacket lined with an external aluminium plate covering and galvanised steel gas distribution piping, positioned under the base, flexible couplings for connection to the manifolds and outdoor

electrical panel with safety switches.

1.1.20 RTYH

Preassembled hydronic modular absorption group, fed with natural gas or LPG, for heating, cooling and simultaneous heat recovery, and domestic hot water production, for outdoor installation.
The group consists of water-ammonia absorption chillers, fed with natural gas or LPG, air-water version, for cold water production down to a delivery temperature of 3 °C, of water-ammonia absorption chiller-heaters, fed with natural gas or LPG, air-water version with heat recovery, for cold water production down to a delivery temperature of 3 °C and simultaneously hot water up to a delivery temperature of 75 °C, and of modulating condensing boilers with sealed chamber, fed with natural gas or LPG, for hot water production up to a delivery temperature of 88 °C.
The modules that make up the group are preassembled on hot-dip galvanised steel support beams, provided with independent oversized water pumps on the heating and cooling circuits, provided with check valves, complete with stainless steel hydraulic manifolds insulated by a rigid jacket lined with an external aluminium plate covering, separated for the heating circuit, the cooling circuit and the heat recovery circuit, and galvanised steel gas distribution piping, positioned under the base, flexible couplings for connection to the manifolds and outdoor electrical panel with safety switches.

1.1.21 RTYR

Preassembled hydronic modular absorption group, fed with natural gas or LPG, for high-efficiency heating, cooling and domestic hot water production, for outdoor installation.
The group consists of water-ammonia absorption heat pumps, fed with natural gas or LPG, air-water version, reversible, for hot water production up to a delivery temperature of 60 °C and alternatively cold water down to a delivery temperature of 3 °C, and of modulating condensing boilers with sealed chamber, fed with natural gas or LPG, for hot water production up to a delivery temperature of 88 °C.
The modules that make up the group are preassembled on hot-dip galvanised steel support beams, provided with independent oversized water pumps, provided with check valves, complete with stainless steel hydraulic manifolds insulated by a rigid jacket lined with an external aluminium plate covering and galvanised steel gas distribution piping, positioned under the base, flexible couplings for connection to the manifolds and outdoor electrical panel with safety switches.

1.2 CODING

Each Link is encoded with a series of letters and digits that distinguish its composition and configuration. In order:
1. first (3 or 4 letters) = type of Link (e.g. RTAR, RTCF, RTAY, RTA, RTY, ...), based on the modules that make it up (GAHP/GA/AY)
2. first (2 or 3 digits) = cooling power, given by the sum of the cooling powers of the individual modules
3. next (2 or 3 digits) = heat output, given by the sum of the heat outputs of the individual modules
4. (, /4 or /6) = number of pipes, i.e. outlet/inlet manifold pairs (1, 2 or 3)
5. next (2 letters) = module type (TK/LB/HR/HT/LT)
6. (, S, S1) = fans, standard, silenced or silenced brushless (only for aerothermal units)
7. (MET/NAT, G25, GPL/LPG) = fuel gas (natural gas or LPG)
8. next (2 or 3 letters) = country of destination
9. next (2 letters) = water pumps (with or without)
10. last (1 letter) = any special versions

Table 1.1 *p. 5* exemplifies the meaning of the encoding in detail, providing the key for reading any possible composition and configuration, starting from an example.
It should be noted that the number of modules of a specific type on the Link is determined indirectly via the heating and cooling output value, which always identifies only one possible module combination.
The example shows a Link RTRH118/313 /6 HR S MET/NAT ITA WN which is decoded as follows:
1. first 4 letters (RTRH) = Link composed of GAHP-AR, GA ACF HR and AY modules
2. first 3 digits (118) = cooling output expressed in thousands BTU/h, resulting from the sum of 58 for the GAHP-AR module and 60 for the GA ACF HR module
3. next 3 digits (313) = heat output expressed in thousands of BTU/h, resulting from the sum of 120 for the GAHP-AR module, 121 for the AY 35 module and 72 for the GA ACF HR chiller heat recovery
4. number of pipes (/6) = hydraulic circuit with three separate pipe pairs (heating/cooling, DHW and heat recovery)
5. next 2 letters (HR) = on the Link there is at least one GA ACF HR module
6. fans (S) = GAHP/GA modules are equipped with a silenced fan
7. fuel (MET/NAT) = the Link is preset for natural gas supply
8. next 3 letters (ITA) = the country of destination is Italy
9. next 2 letters (WN) = the Link is equipped with oversize water pumps for each module on the heating/cooling/DHW circuit and without water pumps on the heat recovery circuit
10. last letter () = the Link has no special characteristics

Figure 1.1 *Link encoding matrix*

RTRH										Series	Code	Composition
1										RTA	F-GAA	A
										RTAR	F-GAR	AR
										RTCF	F-GCF	ACF
										RTY	F-EEC	AY
										RTRH	F-HRE	HR-AR-AY
										RTAH	F-HAR	HR-AR
										RHRY	F-FRE	HR-AR-ACF-AY
										RTCR	F-ARC	AR-ACF
										RTYR	F-ARE	AR-AY
										RTYH	F-HFE	HR-ACF-AY
										RTHF	F-HCF	HR-ACF
										RTYF	F-GFE	ACF-AY
										RTWS	F-GWS	WS
										RTGS	F-GGS	GS
										RRAY	F-RAE	AR-A-AY
										RTRC	F-RFE	ACF-AR-AY
										RTHA	F-GHA	HR-A
										RTRA	F-AAR	A-AR
										RTAY	F-AAE	A-AY
										RTHY	F-GHE	HR-AY
	118								Cooling output	Unit	kBTU/h	
	2									GA ACF	60	
										GA ACF HR	60	
										GAHP-AR	58	
										GAHP A HT	0	
										GAHP A LT	0	
										AY	0	
		313							Heating output	Unit	kBTU/h	
		3								GA ACF	0	
										GA ACF HR	72	
										GAHP-AR	120	
										GAHP A HT	133	
										GAHP A LT	141	
										AY 35	121	
										AY 50	175	
										AY 100	350	
										GAHP WS	142	
										GAHP GS HT	128	
										GAHP GS LT	145	
			/6							Pipes	Description	
			4							2 pipes		
										4 pipes	/4	
										4+2 (HR+AY)	/6	
				HR						Unit type	Description	
				5						GAHP-AR		
										AY		
										GA ACF		
										GA ACF TK	TK	
										GA ACF LB	LB	
										GA ACF HR	HR	
										GA ACF HT	HT	
										GAHP A HT	HT	
										GAHP A LT	LT	
					S					Version	Description	
					6					standard		
										low-noise	S	
										brushless	S1	
						MET/NAT				Gas type	Description	
						7				MET/NAT	MET/NAT	
										G25	G25	
										GPL/LPG	GPL/LPG	
							ITA			Description	Country of destination	
							8			ITA	Italy	
										DE	Germany	
										CH	Switzerland	
										AT	Austria	
										DK	Denmark	
										HU	Hungary	
										RO	Romania	
										RU	Russia	
										FRAIR	France AIR	
										FR	France	
										KR	Croatia	
										ES	Spain	
										CZ	Czech Republic	
										PL	Poland	
										UK	Generic	
										BE	Belgium	
										NL	Netherlands	
										GB	United Kingdom	
								WN	Water pumps	Type	Description	
								9			Link without HR	Link with HR or GS/WS
											hot/cold	hot/cold / recovery/source
										without pumps	SC	N / N
										oversize	CW	W / W
1	2	3	4	5	6	7	8	9		= FIELD		
RTRH	118	313	/6	HR	S	MET/NAT	ITA	WN		= NAME		

2 FEATURES AND TECHNICAL DATA

2.1 FEATURES

The Link are gas-fired (natural gas or LPG) heating/cooling groups, to supply hot and/or chilled water. Each Link consists of a number of individual gas-fired heating/cooling modules (GAHP/GA/AY modules). The set of appliances and components is preassembled at the factory, forming a complete hydronic group already prepared to be connected to the system.

2.1.1 Application

Each Link, according to its configuration (Link RTAR, RTCF, RTY, RTAY, RTYR, RTA, ...) is able to simultaneously or alternatively provide space heating, cooling, DHW production and heat recovery, according to the needs of each individual installation, with a considerable extension of heating and cooling output. The various hydronic models are suitable for all heating and cooling systems operating with hot and/or chilled water, with common terminals (e.g. radiators, fan coils, radiant panels, fan heaters, air handling units, DHW buffer tanks, swimming pool heat exchangers, ...), including process systems (industrial heat exchangers).

2.1.2 Manufacturing features

Each Link, in addition to the GAHP/GA/AY gas-fired heating/cooling modules, consists of:

- ► delivery/return stainless steel hydraulic manifolds, insulated with rigid cups lined with aluminum sheet
- ► galvanized steel gas outlet manifold
- ► flexible couplings of individual modules to hydraulic and gas manifolds
- ► condensate drain manifold (only if there are at least two condensing appliances GAHP A/GAHP GS/WS/AY)
- ► electrical panel with protection devices (2 electrical panels with more than 6 modules)
- ► bearing structure with galvanized steel sections

The Link equipped with water pumps are also equipped with a check valve, mounted downstream of each water pump, and a protection for the pump body.

2.1.3 Composition (GAHP/GA/AY modules)

The gas heating/cooling modules that make up a Link can be:

- ► GAHP units, versions A/AR/GS/WS, gas absorption heat pumps
- ► GA units, versions ACF/HR/TK/HT/LB, gas absorption chillers
- ► AY units, versions AY 35/AY 50/AY 100, condensing boilers

distinguished in:

- ► aerothermal units (A, AR, ACF, HR, TK, HT, LB)
- ► hydrothermal (WS) and geothermal (GS) units

in variable number:

- ► from 2 to 5 in the case of GAHP/GA only
- ► from 2 to 7 in the case of GAHP/GA and AY

The Link with aerothermal units must be installed exclusively outdoors, while others may be installed either outdoors or indoors (using the specific indoor versions).
The aerothermal modules of Links may be in configuration:

- ► with standard fans
- ► with silenced fans (S or S1)

2.1.4 Configurations

- ► Without water pumps or with oversize water pumps.
- ► 2, 4 or 6 pipes, ie 1, 2 or 3 pairs of delivery/return hydraulic collectors/connections for hot and/or cold water, connected as needed.

2.2 LINK COMPOSITION RULES

Online product configurator

The optimal tool for configuring the Link for your project is the online product configurator, which can be found on the Robur website .

The rules according to which the individual GAHP/GA/AY modules are assembled on the Link are defined below.

- ► It is not possible to have more than 5 GAHP/GA modules on the Link.
- ► It is not possible to have more than 4 AY boilers on the Link.
- ► The total heat output of the AY boilers on the Link may not exceed 200 kW.
- ► GAHP A Indoor appliances cannot be mounted on Link.
- ► It is not possible to have GAHP GS/WS modules and other types of modules on the same Link.
- ► If two or more condensing modules (GAHP A, GAHP GS/WS, AY) are included in the Link, the Link is equipped with a condensate drain manifold.
- ► WIth more than 6 GAHP/GA/AY modules on the Link there are two electrical panels, of which the main one (the one in which the electrical connections for power supply and control are to be made) is the one on the left, while the one on the right is dedicated to the AY boilers only.
- ► With GA ACF HR chiller-heater modules with heat recovery the Link will necessarily be a 4-pipe version (if there are no modules on the separate circuit) or a 6-pipe version (if there are modules on the separate circuit). The connections for the heat recovery circuit of the GA ACF HR chiller-heater modules are located on the left (Paragraph 2.4 *p. 8*).
- ► For Link equipped with water pumps, these are always mounted on the inlet pipes and are equipped with check valves.
- ► Only GAHP A heat pumps or AY boilers can be provided on the separate circuit.
- ► È possibile scegliere la tipologia e il numero di moduli da collegare sul circuito separato (ad esempio se sul Link sono previste due caldaie AY 50, si può scegliere di collegarne una sola sul circuito separato, mentre l'altra sarà collegata sul circuito base).
- ► In the case of a Link with only one AY boiler on the separate circuit, this will be mounted on the front side of the Link and connected directly to the connections of the separate circuit, without a dedicated manifold (Paragraph 2.4 *p. 8*).
- ► In the case of several AY boilers on the separate circuit, these will be connected to a dedicated manifold (Paragraph 2.4 *p. 8*).
- ► If there is a AY 100 boiler on the Link, this is always the first boiler at the front after the GAHP/GA modules, except if there is another AY boiler on the separate circuit. In the latter case, the AY 100 boiler is mounted to the rear of the boiler on the separate circuit.
- ► The AY 100 is also mounted at the rear when there is another AY boiler connected to the same manifold, on the 3610 mm and 4936 mm long Link.
- ► AY boilers can be assembled in a back-to-back configuration up to a maximum of 150 kW (i.e. 1 AY 100 + AY 50) if the hydraulic connection is to be 2-pipe. Above 150 kW (i.e. in the case of 2 AY 100 boilers), each of the two boilers must be

connected to a separate circuit.
► With RTY Link with a maximum of 2 AY boilers, reduced depth bases (530 mm) are used, while standard bases (1245 mm) are used beyond that.

If the configuration you are interested in is not possible via the online product configurator, you should contact Robur technical service to assess the possibility of a customised configuration.

2.3 CIRCULATING PUMPS

2.3.1 Link without water pumps

If the Link is without circulators, It must be installed on the hydraulic/primary circuit at least one circulation pump, suitably selected and rated (by the designer/installer).
The circulation pump (flow and head) must be selected and installed based on pressure drops of plumbing/primary circuit (piping + components + exchange terminals + appliance).
For the appliance pressure drops refer to Paragraph 2.7.3 *p. 21*.
Link without independent water pumps that are made up of mixed modules are equipped with an isolation valve on the inlet of each module that cannot always operate simultaneously with the other modules.
More in detail, the Link RTAH (GAHP-AR + GA ACF HR) and RTCR (GAHP-AR + GA ACF) have the isolation valves on the GA ACF modules, as in heating mode these must be excluded.

If the Link also includes AY boilers, it is not possible to implement the Link without independent water pumps for each of the modules.

2.3.2 Link with water pumps

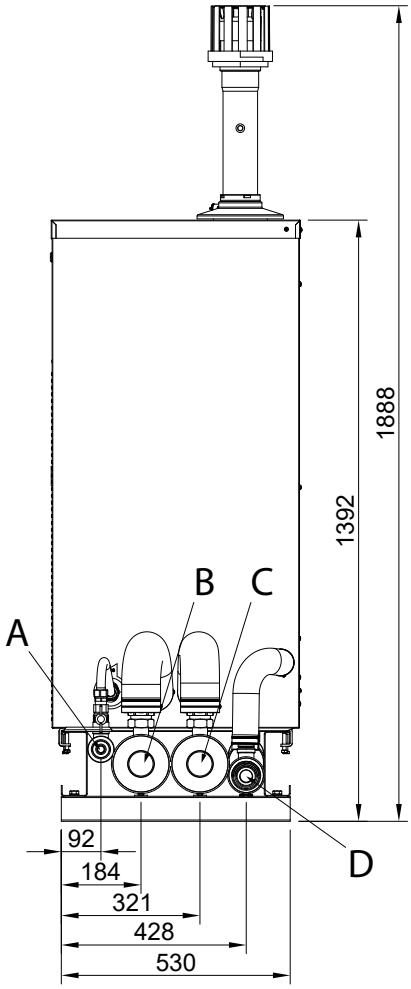
In Link already equipped with water pumps, each individual GAHP/GA/AY module that is part of the Link has (at least) one individual independent fixed-flow, high-efficiency water pump (F01).

The water pumps are installed externally to the GAHP/GA modules, and are provided with a suitable protective cover, while for AY modules the water pumps are installed internally to the unit itself.

For the characteristics of the water pumps available for Link, please refer to Section C01.04.

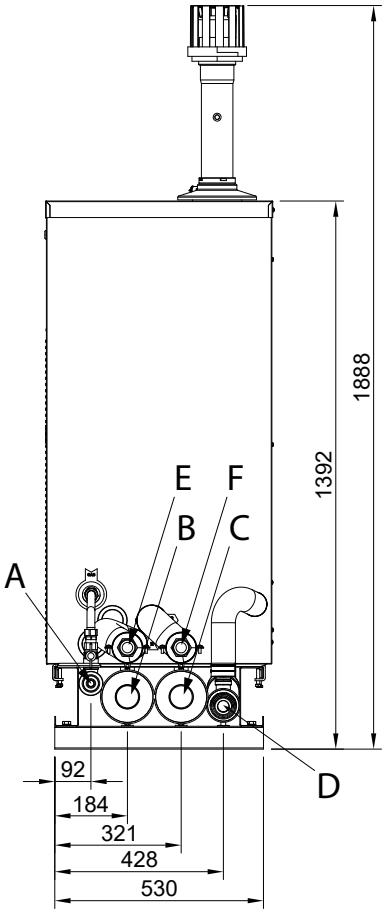
2.4 HYDRAULIC/GAS CONNECTIONS

Figure 2.1 *Position of connections for a 2-pipe RTY Link - Right-hand side view*



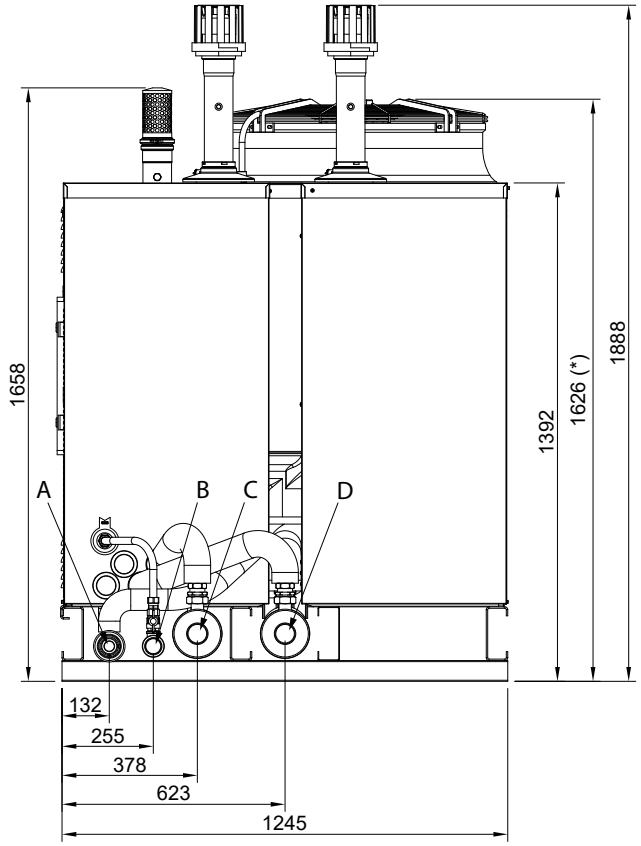
A	Gas connection [1 1/2" F]	D	Condensate drain connection [1" F]. Sloping manifold, strictly connect on right side
B	Hot return [2" M]		
C	Hot delivery [2" M]		

Figure 2.2 *Position of connections for a 4-pipe RTY Link - Right-hand side view*



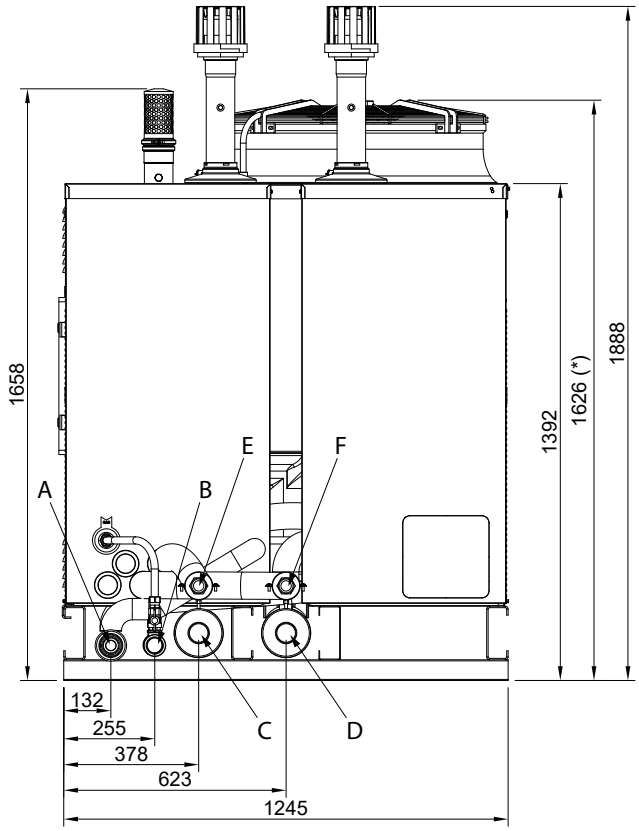
A	Gas connection [1 1/2" F]	E	Separate boiler hot water inlet [1 1/4" F for AY 35 and AY 50, 1 1/2" F for AY 100]
B	Hot return [2" M]	F	Separate boiler hot water outlet [1 1/4" F for AY 35 and AY 50, 1 1/2" F for AY 100]
C	Hot delivery [2" M]		
D	Condensate drain connection [1" F]. Sloping manifold, strictly connect on right side		

Figure 2.3 *Position of connections for a 2-pipe Link - Right-hand side view*



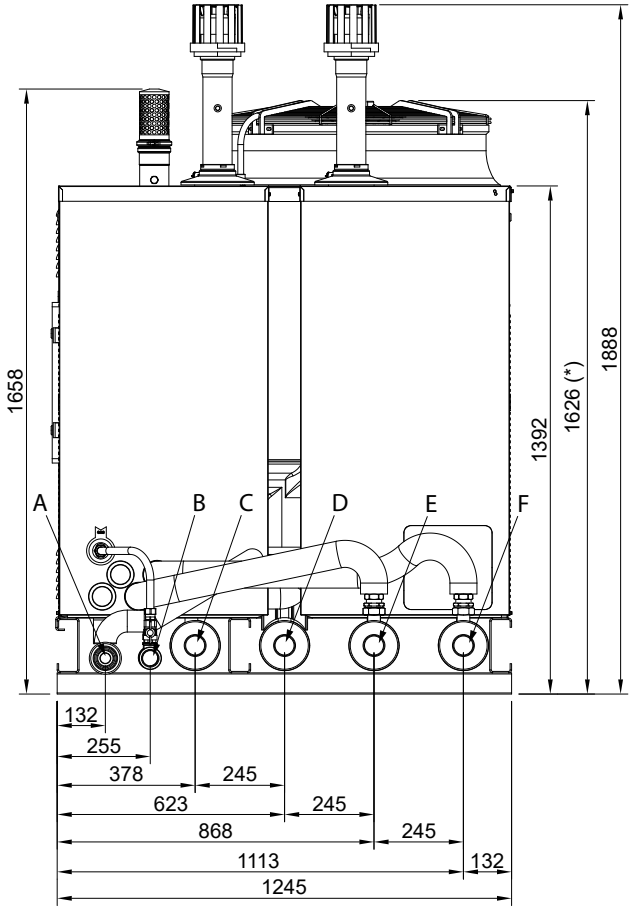
A Condensate drain connection [1" F] (only for Link with more than one condensing module). Sloping manifold, strictly connect on right side
B Gas connection [1 1/2" F]
C Hot delivery [2" M]
D Hot return [2" M]
* The height of standard models is 1562 mm

Figure 2.4 *Position of connections for a 4-pipe Link with a single AY boiler on the separate circuit - Right-hand side view*



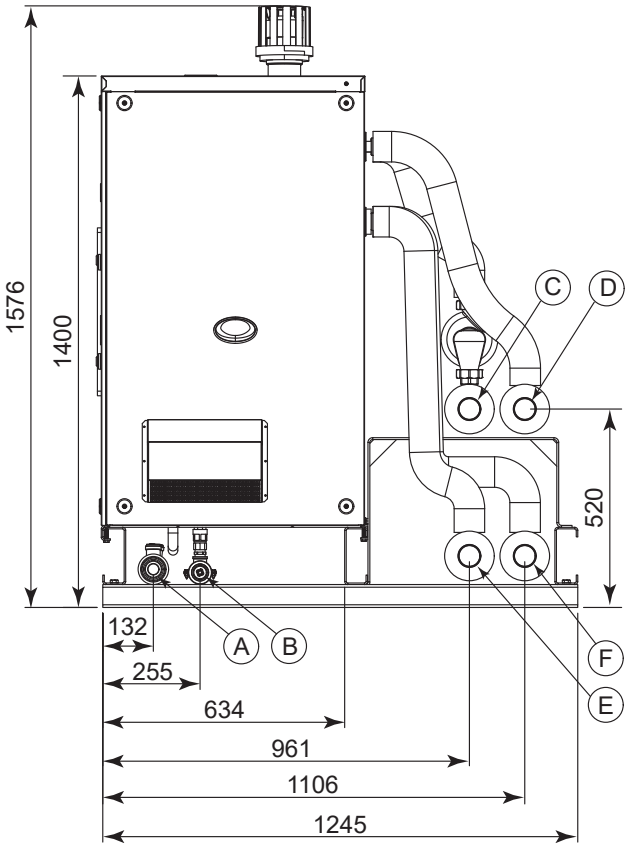
A Condensate drain connection [1" F] (only for Link with more than one condensing module). Sloping manifold, strictly connect on right side
B Gas connection [1 1/2" F]
C Cold/hot water outlet [2" M]
D Cold/hot water inlet [2" M]
E Separate boiler hot water outlet [1 1/4" F for AY 35 and AY 50, 1 1/2" F for AY 100]
F Separate boiler hot water inlet [1 1/4" F for AY 35 and AY 50, 1 1/2" F for AY 100]
* The height of standard models is 1562 mm

Figure 2.5 *Position of connections for a 4-pipe Link with several AY boilers on the separate circuit - Right-hand side view*



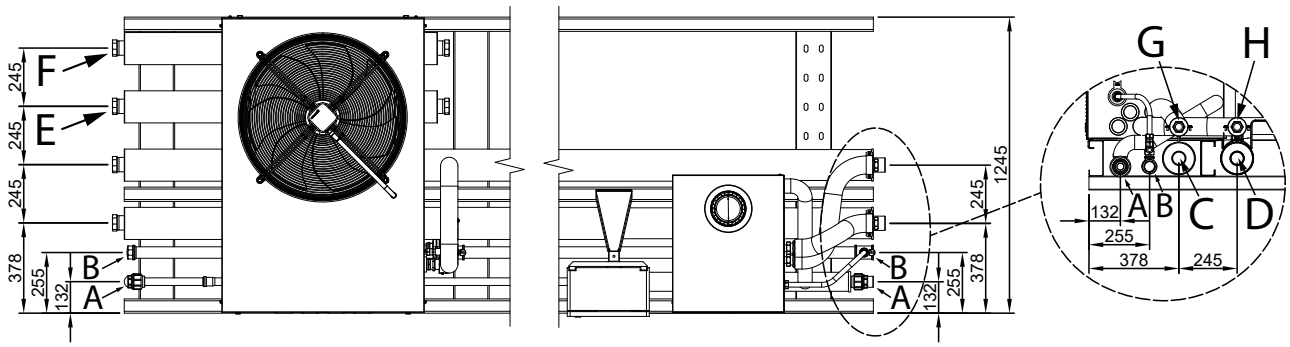
A Condensate drain connection [1" F]. Sloping manifold, strictly connect on right side
B Gas connection [1 1/2" F]
C Cold/hot water outlet [2" M]
D Cold/hot water inlet [2" M]
E Separate boilers hot water inlet [2" M]
F Separate boilers hot water outlet [2" M]
* The height of standard models is 1562 mm

Figure 2.6 *Position of connections for a RTGS/WS Link - Right-hand side view*



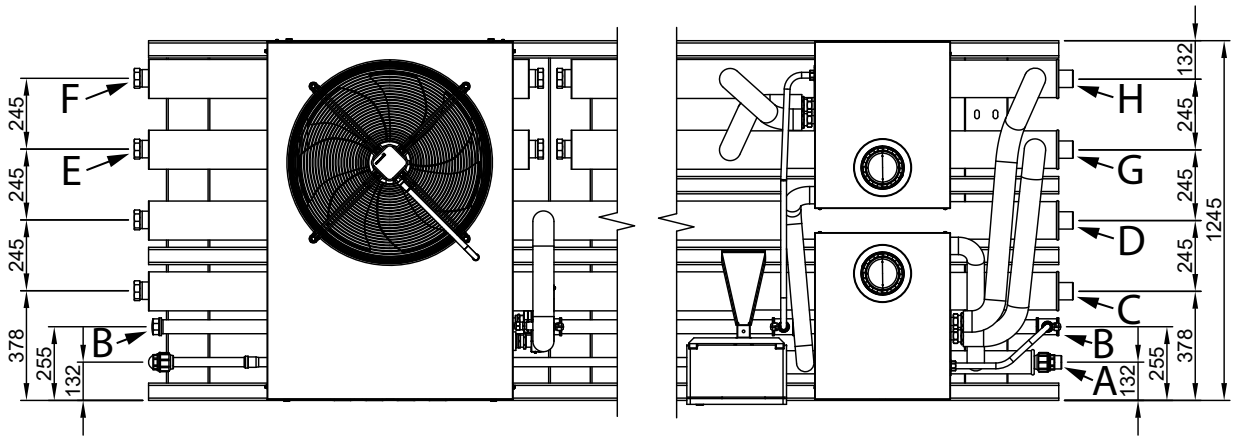
A Condensate drain connection [1" F]. Sloping manifold, strictly connect on right side
B Gas connection [1 1/2" F]
C Hot return [2" M]
D Cold return [2" M]
E Hot delivery [2" M]
F Cold delivery [2" M]

Figure 2.7 *Position of connections for a 6-pipe Link with a single AY boiler on the separate circuit - Upper view*



A Condensate drain connection [1" F] (only for Link with more than one condensing module). Sloping manifold, strictly connect on right side
B Gas connection [1 1/2" F]
C Cold/hot water outlet [2" M]
D Cold/hot water inlet [2" M]
E ACF HR recovery hot return (only left connection) [2" M]
F ACF HR recovery hot delivery (only left connection) [2" M]
G Separate boiler hot water inlet [1 1/4" F for AY 35 and AY 50, 1 1/2" F for AY 100]
H Separate boiler hot water outlet [1 1/4" F for AY 35 and AY 50, 1 1/2" F for AY 100]

Figure 2.8 *Position of connections for a 6-pipe Link - Upper view*



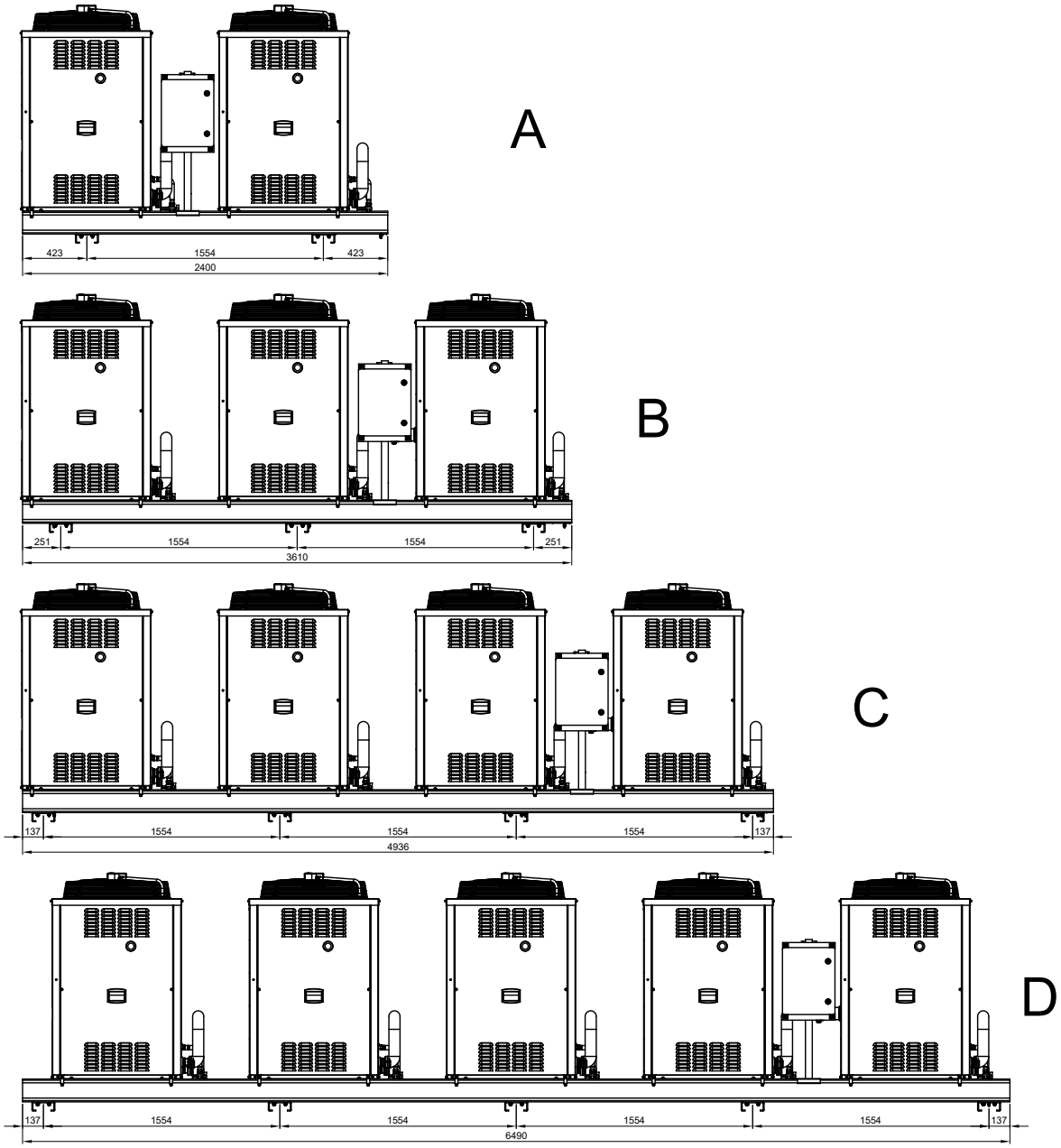
A Condensate drain connection [1" F] (only for Link with more than one condensing module). Sloping manifold, strictly connect on right side
B Gas connection [1 1/2" F]
C Cold/hot water outlet [2" M]
D Cold/hot water inlet [2" M]
E ACF HR recovery hot return (only left connection) [2" M]
F ACF HR recovery hot delivery (only left connection) [2" M]
G Separate boilers hot water inlet (right-hand connection only) [2" M]
H Separate boilers hot water outlet (right-hand connection only) [2" M]

2.5 DIMENSIONS AND WEIGHTS

The dimensions are given for the maximum footprint configuration.

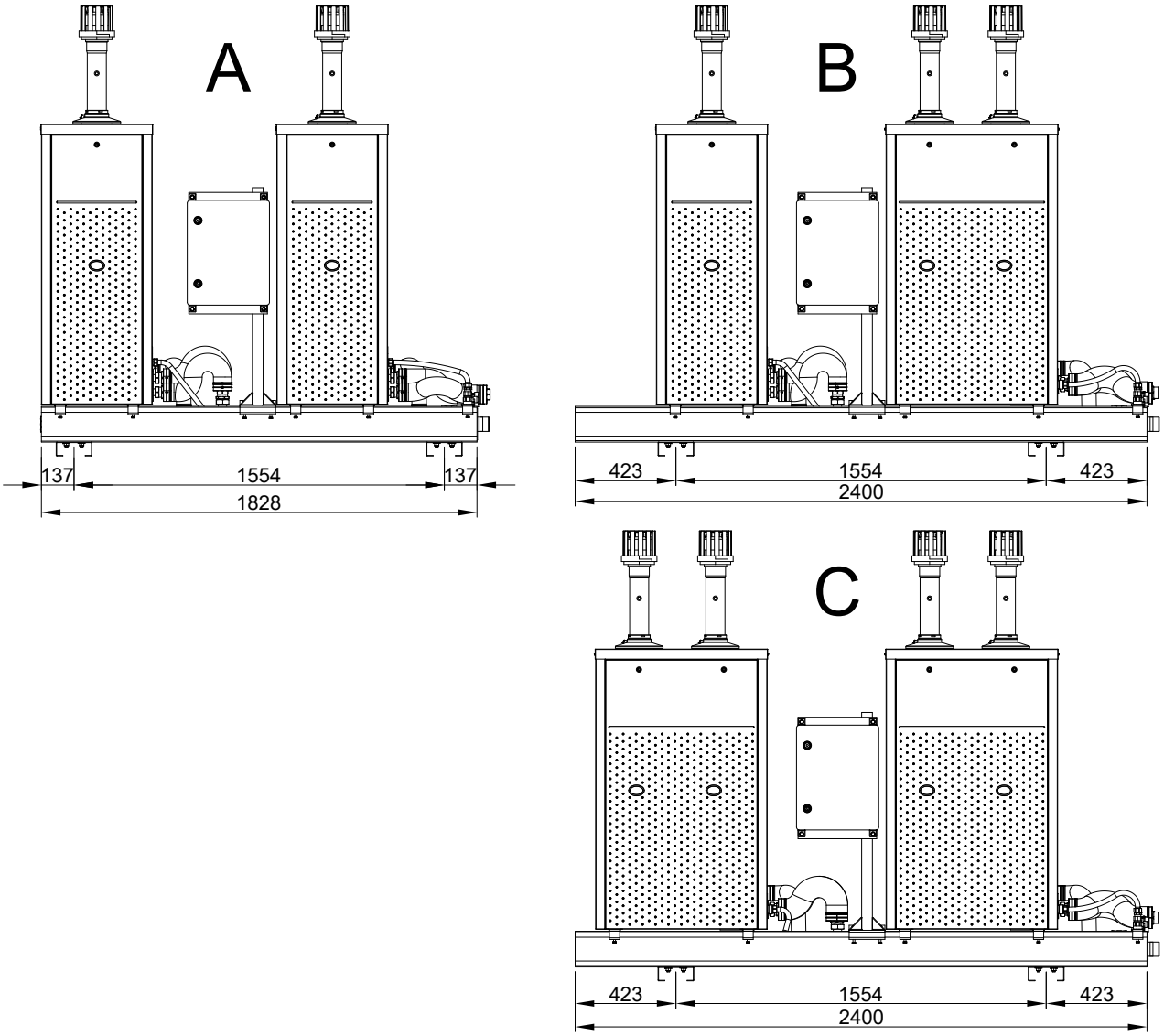
The weights are given for the maximum weight configuration.

Figure 2.9 *Dimensions and weights of a Link with ACF/A/AR (with 2, 3, 4 and 5 units) - front view*



A 980 kg
B 1440 kg
C 1920 kg
D 2410 kg

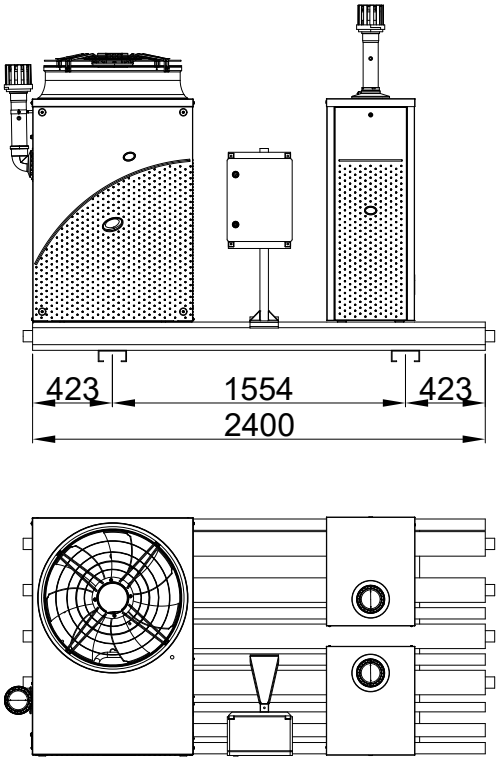
Figure 2.10 *Dimensions and weights of a Link with AY (with 2 units) - front view*



A 255
B 340
C 375

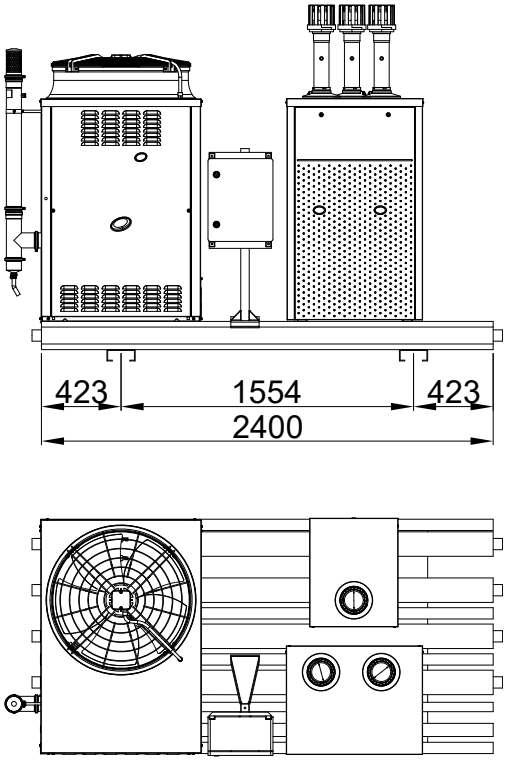
Configurations 1 GAHP A + 1 AY 35/AY 50 can be replaced by Gitié 2.0 AHAY35/AHAY50 appliances. Configurations 1 GAHP-AR + 1 AY 35/AY 50 can be replaced by Gitié 2.0 ARAY35/ARAY50 appliances. Configurations 1 GA ACF + 1 AY 35/AY 50 can be replaced by Gitié 2.0 ACAY35/ACAY50 appliances.

Figure 2.11 *Dimensions and weights of a Link with 1 ACF/A/AR + 1 or 2 AY 35/50 - front and top view*



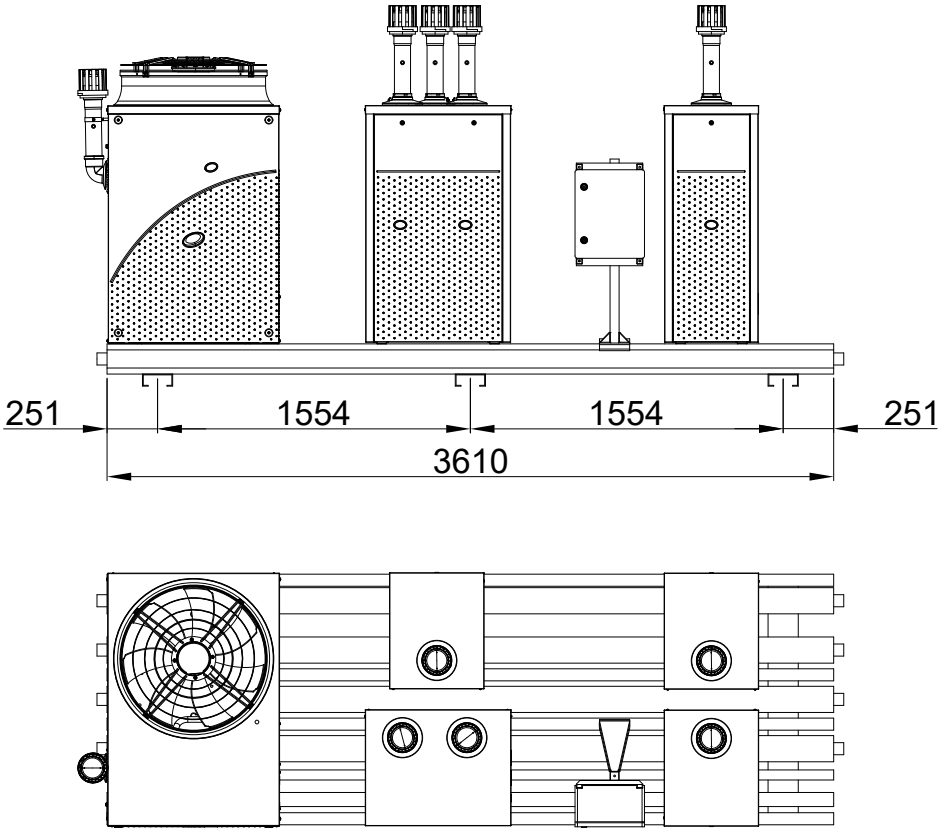
750 kg

Figure 2.12 *Dimensions and weights of a Link with 1 ACF/A/AR + 1 AY 100 + 1 AY 35/50 - front and top view*



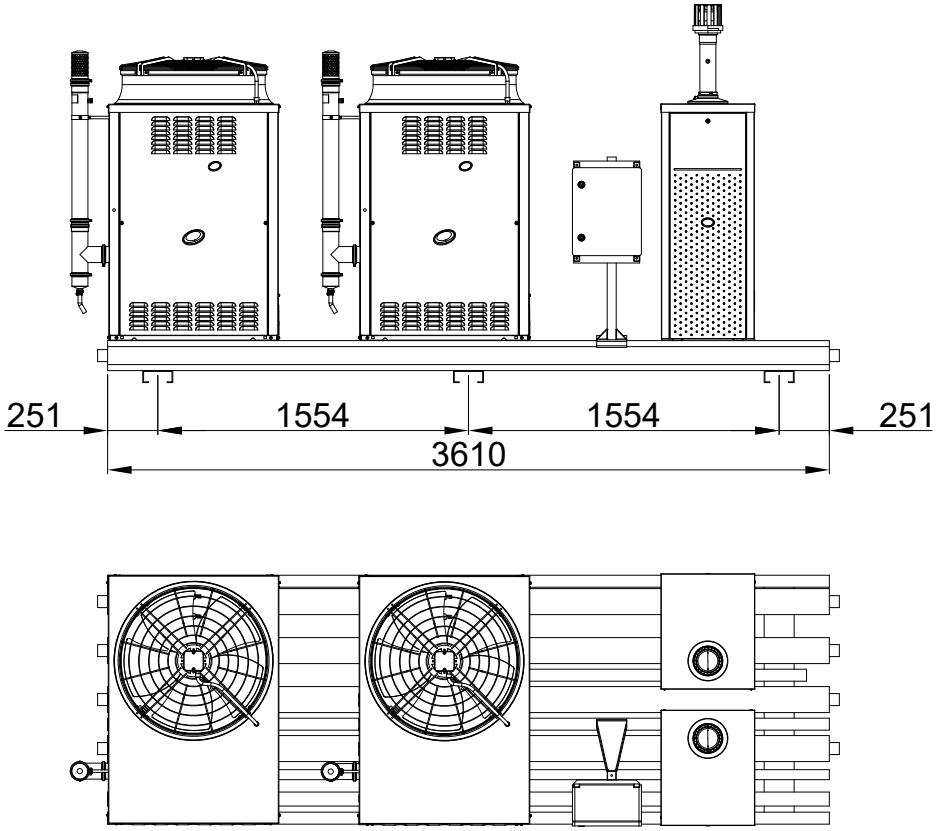
785 kg

Figure 2.13 *Dimensions and weights of a Link with 1 ACF/A/AR + 1 AY 100 + 2 or 3 AY 35/50 - front and top view*



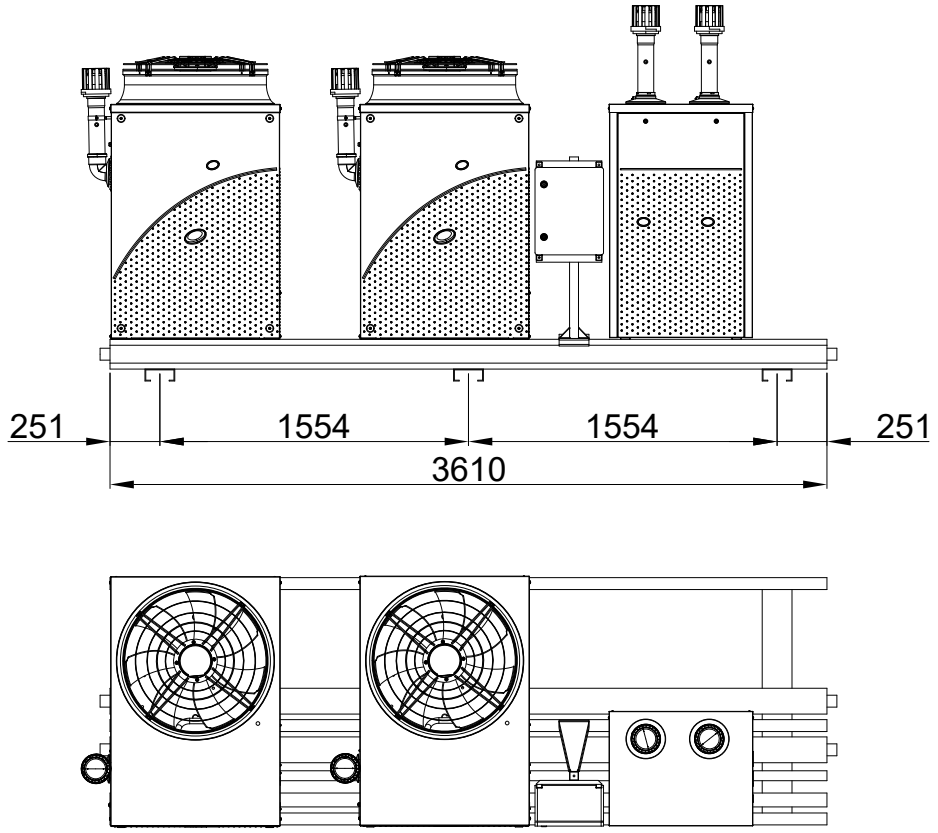
1015 kg

Figure 2.14 *Dimensions and weights of a Link with 2 ACF/A/AR + 1 or 2 AY 35/50 - front and top view*



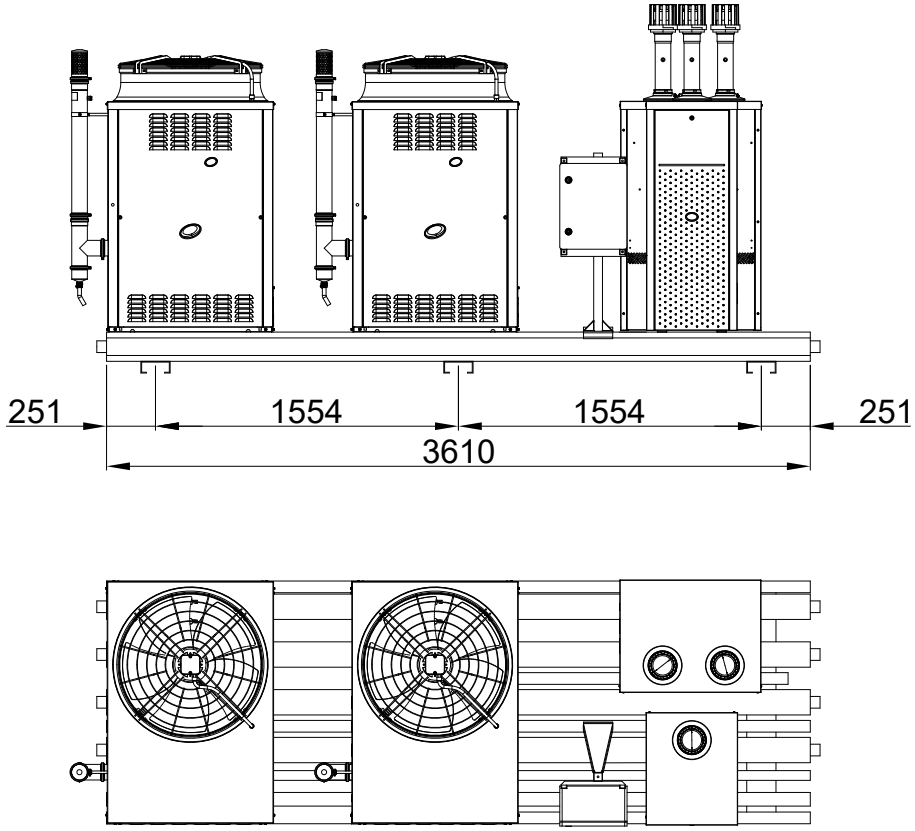
1210 kg

Figure 2.15 *Dimensions and weights of a Link with 2 ACF/A/AR + 1 AY 100 - front and top view*



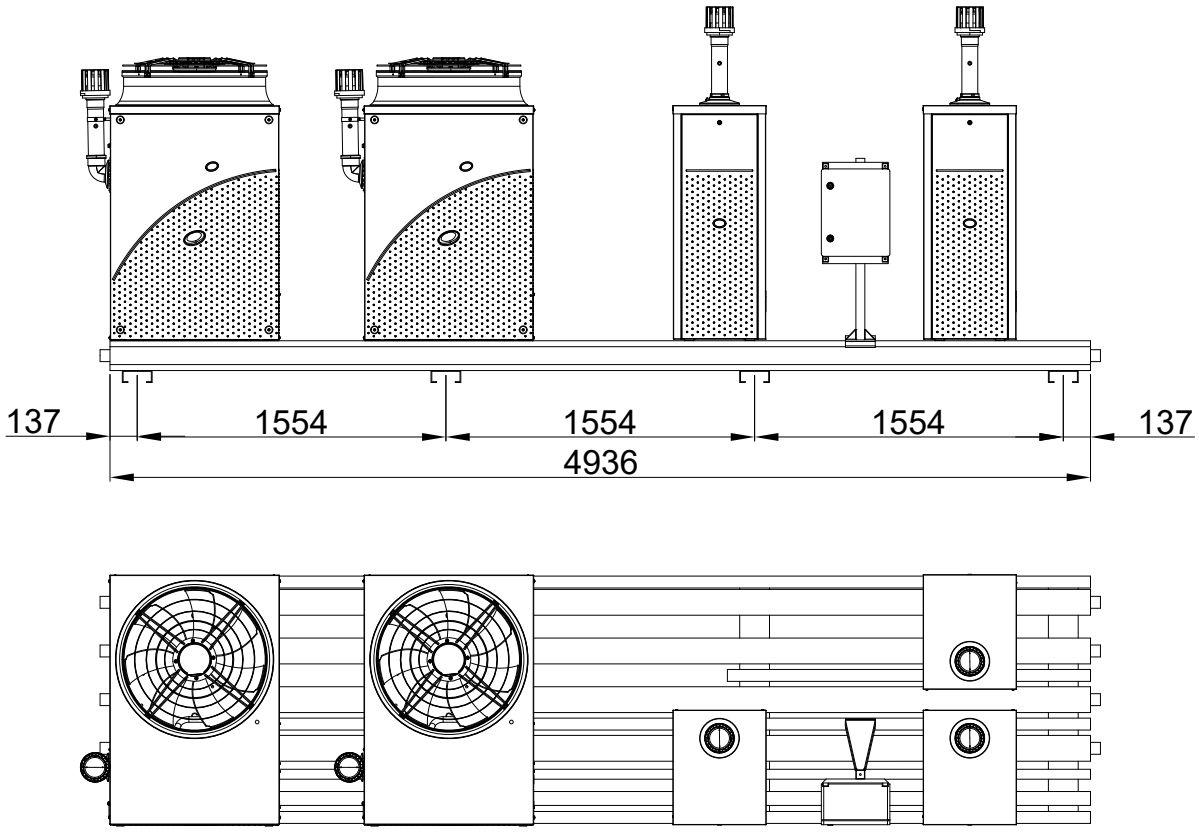
1160 kg

Figure 2.16 *Dimensions and weights of a Link with 2 ACF/A/AR + 1 AY 35/50 + 1 AY 100 - front and top view*



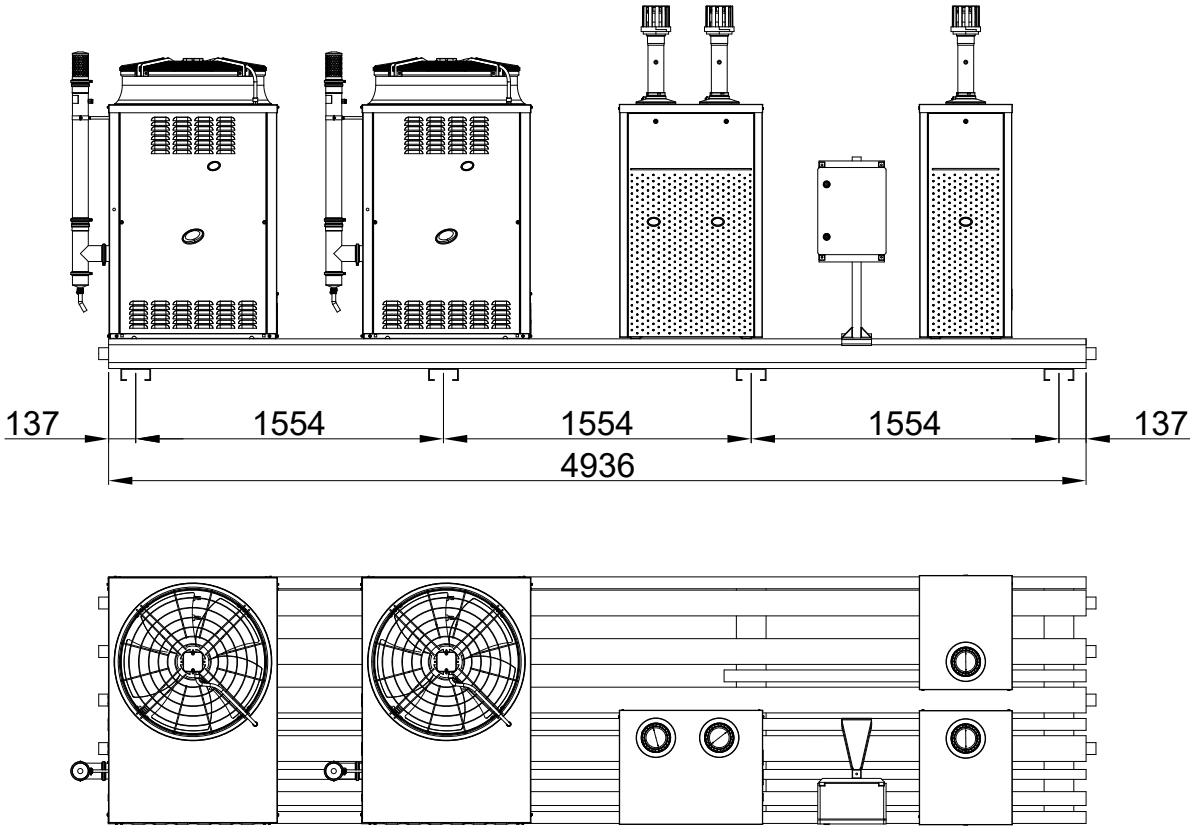
1245 kg

Figure 2.17 *Dimensions and weights of a Link with 2 ACF/A/AR + 3 AY 35/50 - front and top view*



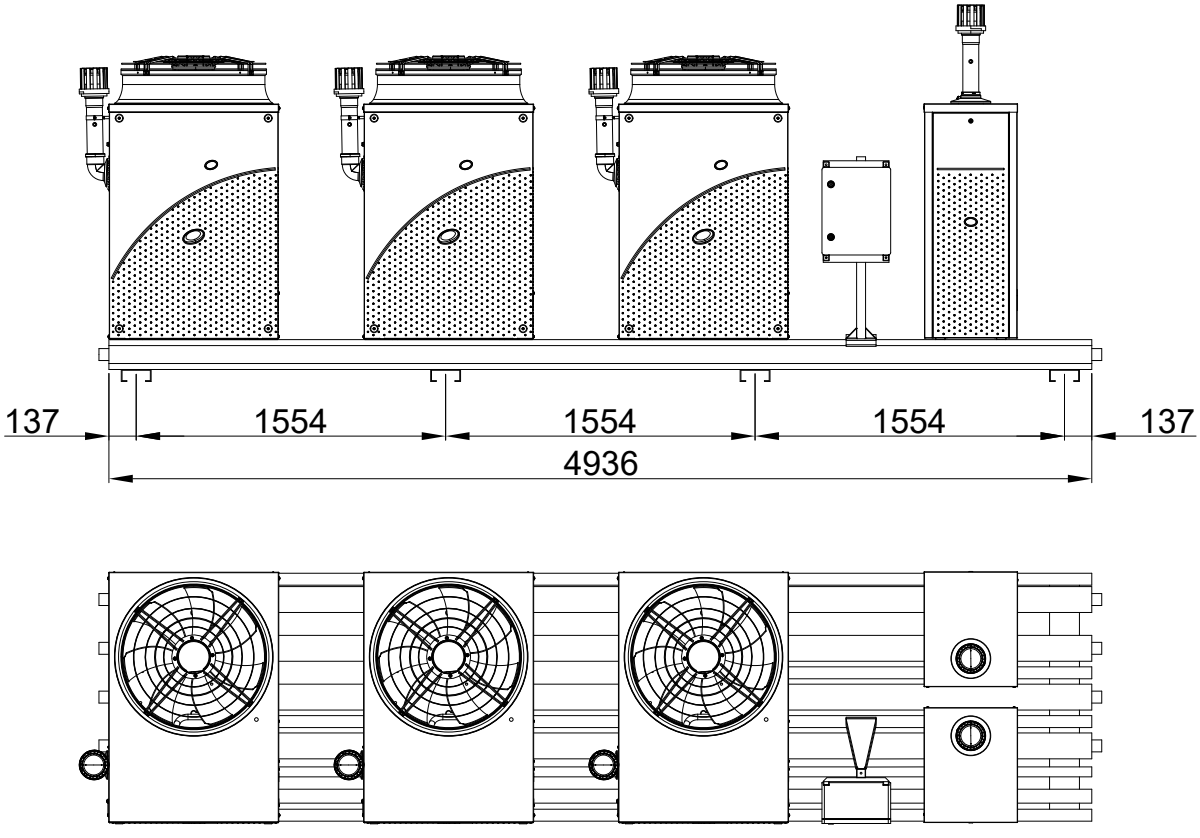
1375 kg

Figure 2.18 *Dimensions and weights of a Link with 2 ACF/A/AR + 1 AY 100 + 2 AY 35/50 - front and top view*



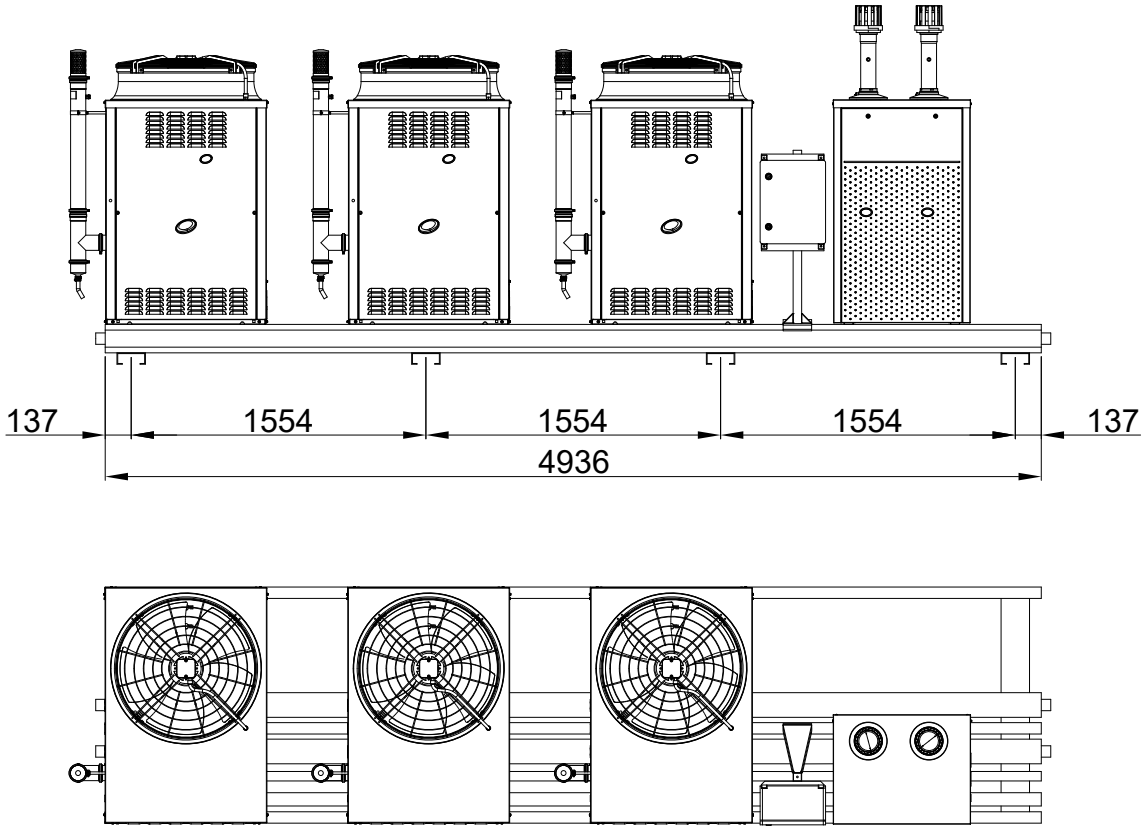
1410 kg

Figure 2.19 *Dimensions and weights of a Link with 3 ACF/A/AR + 1 or 2 AY 35/50 - front and top view*



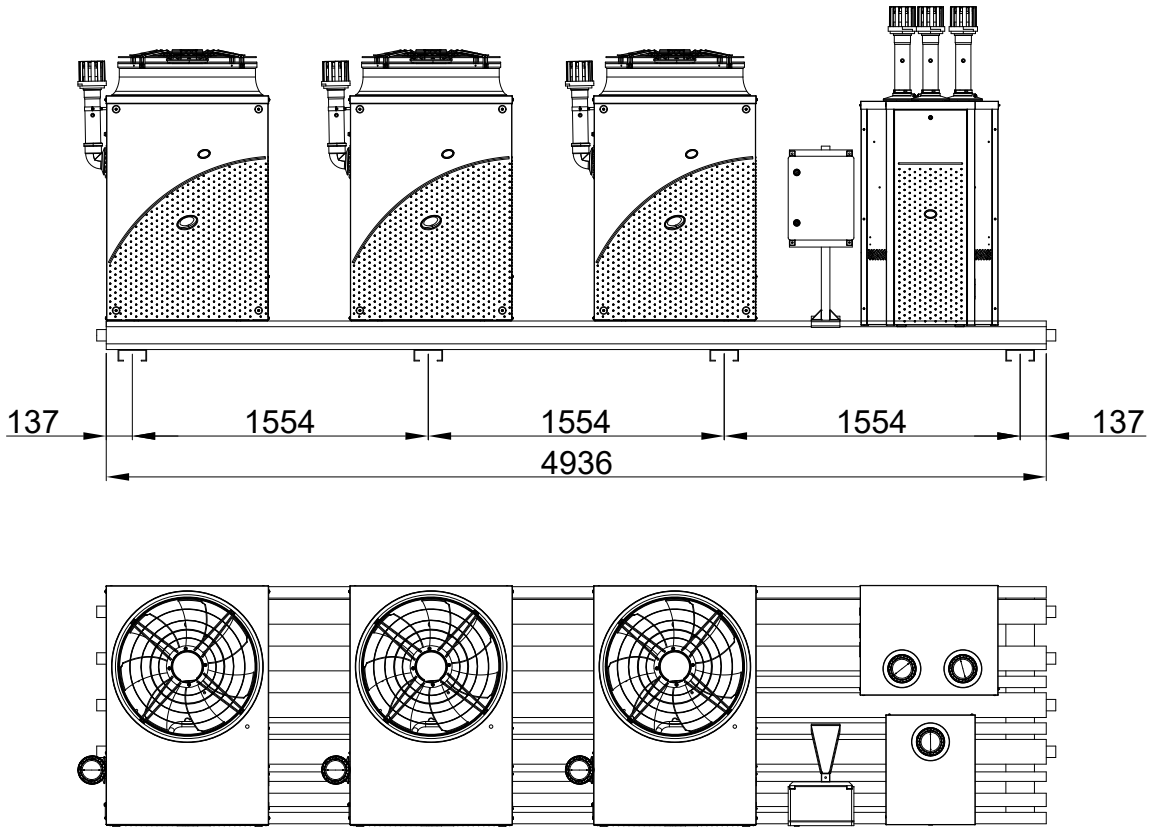
1690 kg

Figure 2.20 *Dimensions and weights of a Link with 3 ACF/A/AR + 1 AY 100 - front and top view*



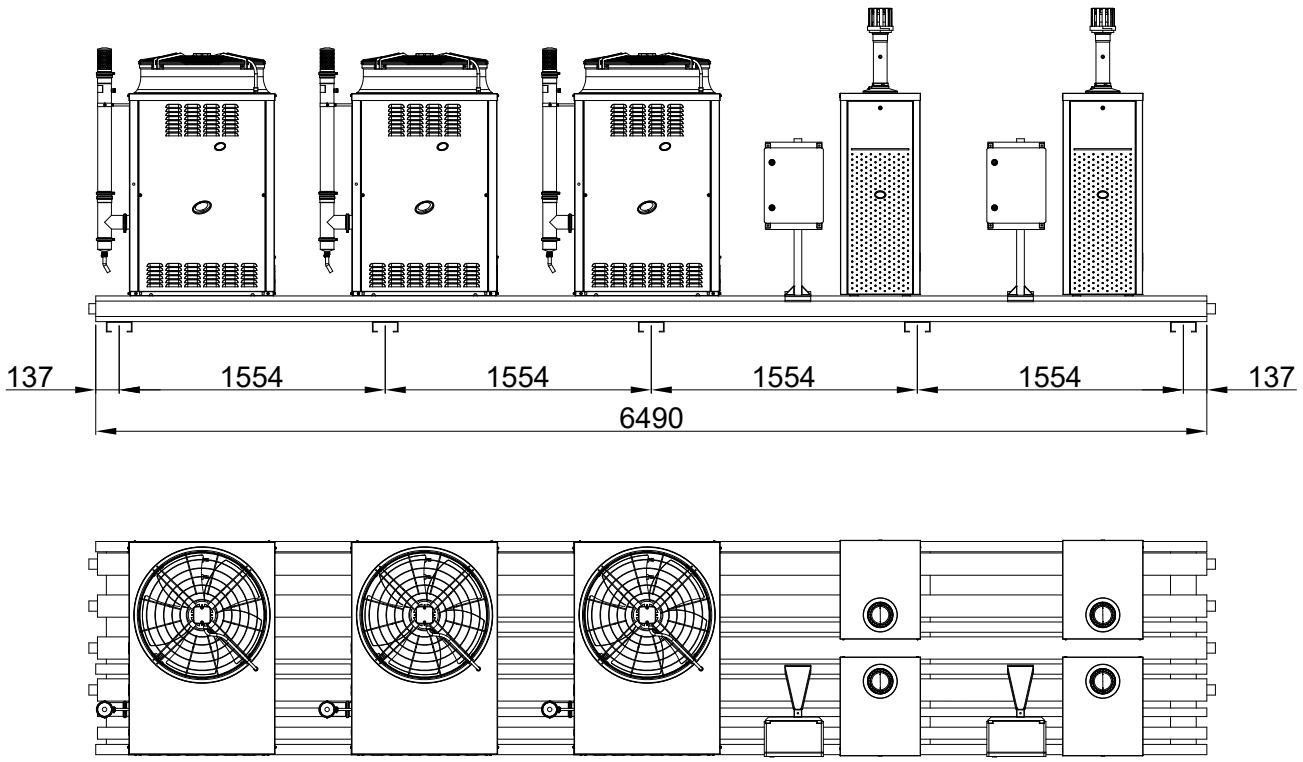
1640 kg

Figure 2.21 *Dimensions and weights of a Link with 3 ACF/A/AR + 1 AY 35/50 + 1 AY 100 - front and top view*



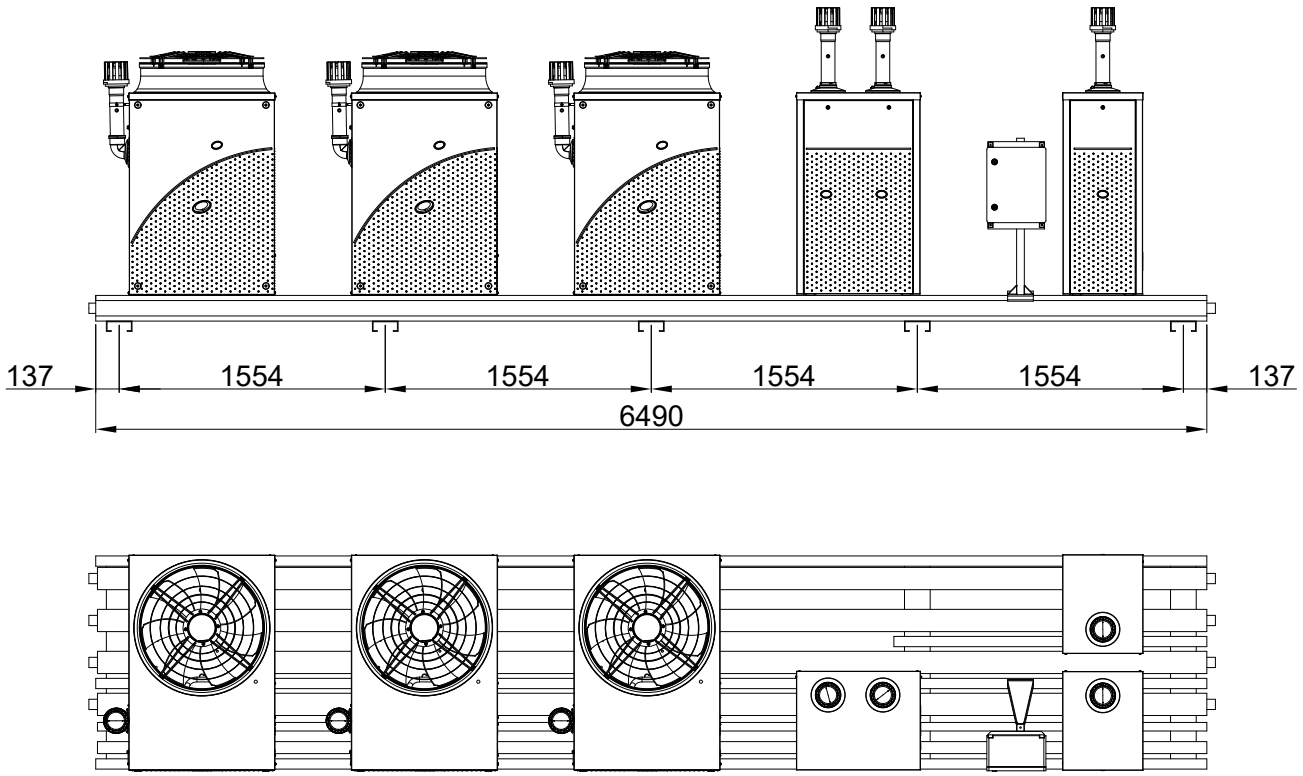
1725 kg

Figure 2.22 *Dimensions and weights of a Link with 3 ACF/A/AR + 3 or 4 AY 35/50 - front and top view*



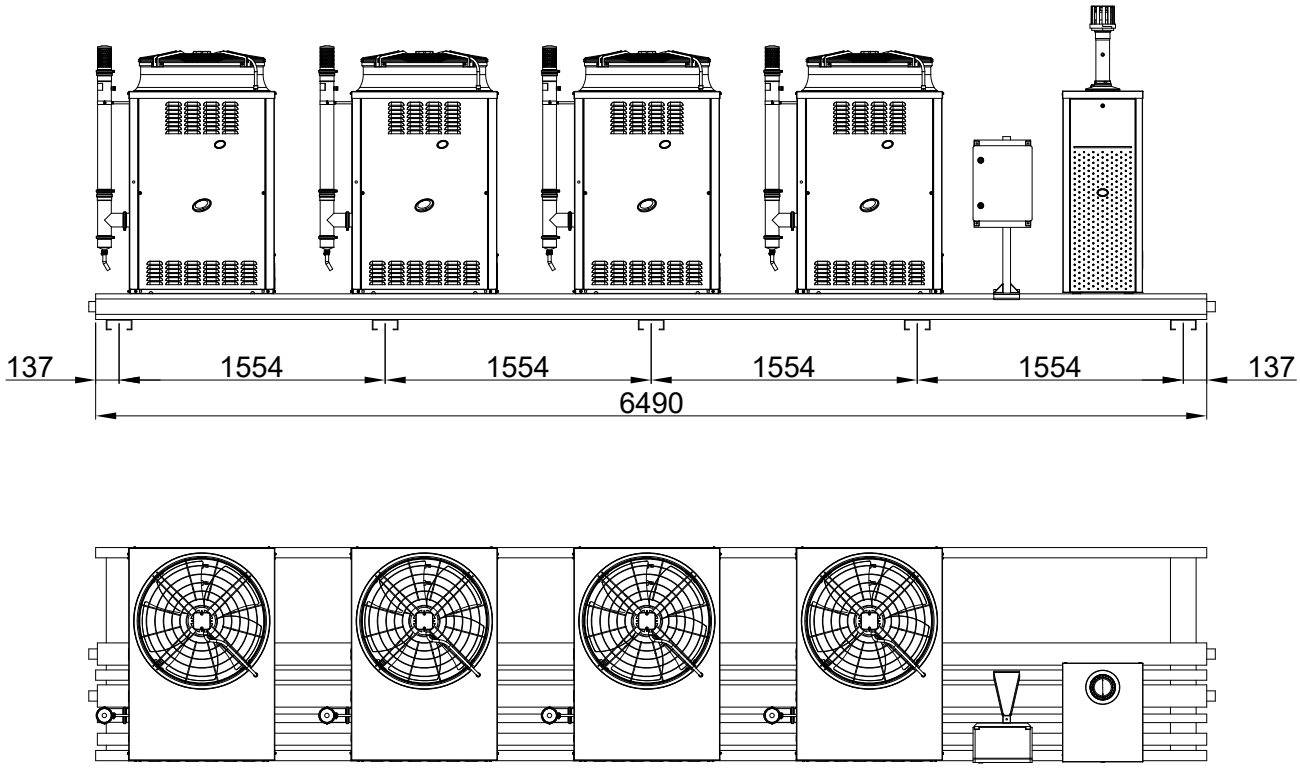
1950 kg

Figure 2.23 *Dimensions and weights of a Link with 3 ACF/A/AR + 1 AY 100 + 2 AY 35/50 - front and top view*



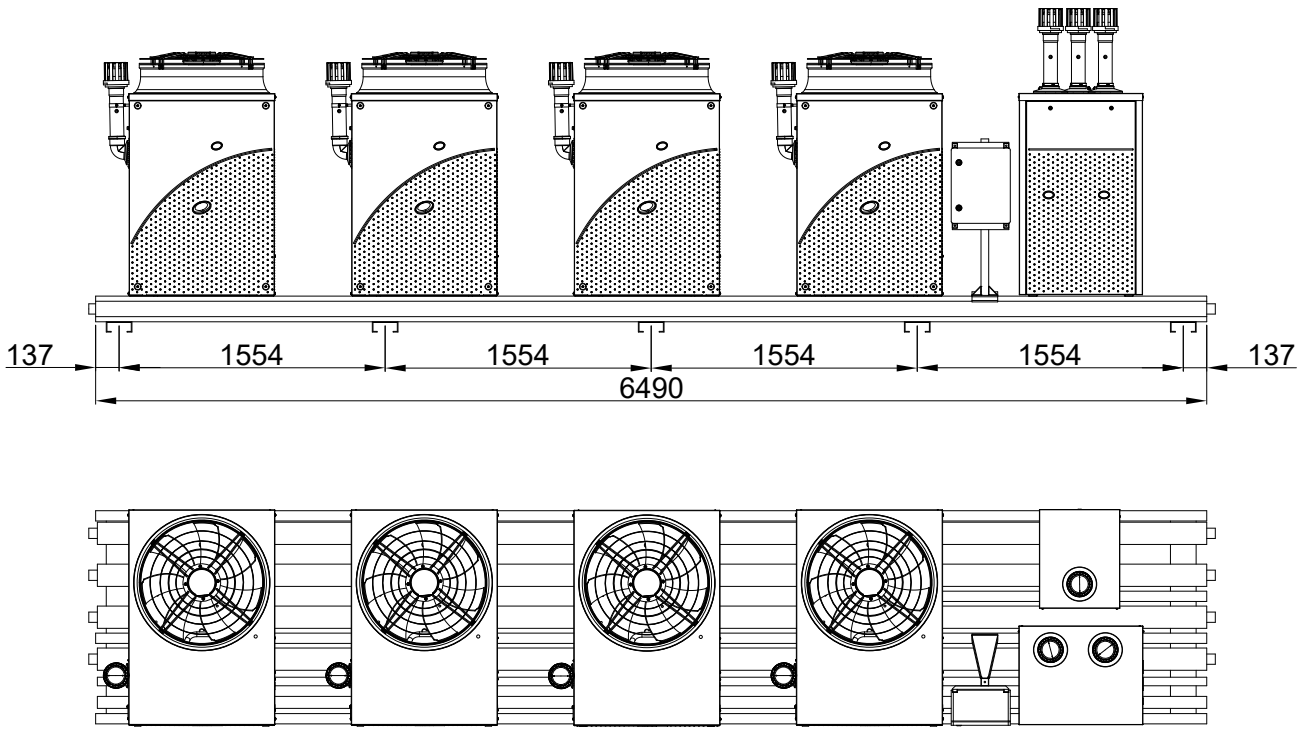
1900 kg

Figure 2.24 *Dimensions and weights of a Link with 4 ACF/A/AR + 1 AY 35/50 - front and top view*



2095 kg

Figure 2.25 *Dimensions and weights of a Link with 4 ACF/A/AR + 1 AY 100 + 1 AY 35/50 - front and top view*



2215 kg

2.6 CONTROLS

2.6.1 Control device

The Link may only work if it is connected to a control device, selected from:
- ► DDC control
- ► CCI control

2.6.2 DDC Controller

The DDC control is able to manage one or more Robur appliances in ON/OFF mode (GAHP heat pumps, GA chillers) or modulating mode (AY boilers).
DDC functionality may be extended with auxiliary Robur devices RB100 and RB200 (e.g. service requests, DHW production, third party generator control, probe control, system valves or circulating pumps, ...).

For more details see Section C01.11.

2.6.3 CCI control

The CCI control can manage up to 3 GAHP appliances in modulating mode (only GAHP A/GAHP GS/WS).

For more details see Section C01.11.

2.7 TECHNICAL DATA

Technical data for each Link are customised to the specific module combination required.
The Link data sheet is available:
- ► on the product configurator (available from the Robur portal)
- ► in the documentation supplied with the commercial offer
- ► on demand, from the Robur technical service or the sales network

Please refer to the technical data of the individual GAHP/GA/AY modules making up the Link (available in Section B of the manual) for more details on the characteristics of each individual module.

2.7.1 Protection rating

The Link have degree of protection IP X5D.

2.7.2 Hydraulic connections

The configuration of the hydraulic connections depends on the composition of the Link. Refer to Paragraph 2.4 *p. 8*.
The following Table 2.1 *p. 21* shows the dimensions of the hydraulic and condensate drain connections.

Table 2.1 *Connections diameters*

Gas connection	1 1/2" F
Cold/hot water connections	2" M
Condensate drain connection	1" F
Connection of a single AY on the separate circuit	1 1/4" F for AY 35 and AY 50 1 1/2" F for AY 100
Connection of more AY on the separate circuit	2" M
Recovery circuit connection	2" M
AY safety valve drain	external Ø 20 mm, internal Ø 14 mm

The hydraulic connections are only provided on the right-hand side of the Link, as is any condensate drain.
Gas connection is always possible on both sides of the Link.

Connect the outlet of each safety valve of any boiler on the Link to a suitable drain. The manufacturer is not liable for any damage caused by the opening of the safety valve in the event of system overpressure.

2.7.3 Pressure drops

The available head at the hydraulic connections of the Link is considered net of the internal pressure drops of the appliances and hydraulic manifolds.
Table 2.2 *p. 21* provides the minimum residual head at the nominal flow in the largest configuration.

Table 2.2 *Minimum residual head*

	residual head [bar]
Oversize water pumps	0,34

In this way it is possible to perform an immediate preliminary check of the selected independent circulating pump's suitability with respect to the expected system pressure drops:
- ► If the indicated minimum head is sufficient, no further checks will be necessary.
- ► If the indicated minimum head is not sufficient, it will be necessary to calculate the actual pressure drop of the specific Link, based on Paragraph 2.7.3.1 *p. 21*, and verify the actual head of the water pumps at design conditions. Refer to Section C01.04 for more detailed water pump flow and head data.

In Link without water pumps, the primary circuit water pump must be appropriately selected and sized, taking into account both the pressure drops associated with the individual modules and the pressure drops resulting from the preassembly, calculated on the basis of the following Paragraph 2.7.3.1 *p. 21*.

2.7.3.1 Preassembled group pressure drop calculation

The pressure drop associated with the specific Link is the sum of the pressure drops associated with the individual modules and the pressure drops arising from preassembly.

Please refer to Section B for the pressure drop data of the individual modules in the Link.

Pressure drop associated to preassembly

This figure derives from the pressure drop associated to the water manifolds supplied with the preassembled group, it is constant and equal to 0,02 bar.

Module pressure drop

The pressure drop of individual modules must not be added up, but that referring to the unit with the highest level with respect to operating conditions is simply to be considered. This is because the modules are hydraulically parallel on the manifolds.

2.7.4 Performances

Please refer to Section B for heating/cooling output and GUE efficiency of the individual modules in the Link.

2.8 INAIL SAFETY APPLIANCES

The kit is only available on appliances intended for the Italian market.

3 DESIGN

3.1 APPLIANCE POSITIONING

Please refer to Section C01.02.

3.2 PLUMBING DESIGN

The system must be designed and realized in a congruent way with the features and functionality of the Link.
For the appropriate system design, the following must be considered:

- the properties of the individual heating/cooling appliances (GAHP/GA/AY modules) that make up the Link
- the configuration of manifolds and hydraulic connections
- the presence (or not) of water pumps

Please refer to Section C01.03.

3.3 WATER PUMP

The Link can be supplied in either a configuration without water pumps or with independent oversized water pumps for each module making up the Link.
For further information please refer to Paragraph 2.3 *p. 7*.

3.4 SYSTEM WATER QUALITY

Please refer to Section C01.05.

3.5 ANTIFREEZE PROTECTION

Please refer to Section C01.06.

3.6 FUEL GAS SUPPLY

Please refer to Section C01.08.

3.7 COMBUSTION PRODUCTS EXHAUST

Compliance with standards

The apliances that make up a preassembled group (GAHP/AY modules/units) are approved for connection to a discharge duct of combustion products.

3.7.1 Flue gas exhaust connection

The characteristics of the flue gas exhaust connections of the individual modules making up the Link are summarised in Section C01.09.

Please refer to Section B for the position of the flue gas exhaust connection of the individual modules in the Link.

3.7.2 Flue gas exhaust kit

The individual GAHP/AY modules making up the Link are fitted as standard with a flue gas exhaust kit, to be installed by the installer, with the exception of the indoor versions of GAHP GS/WS modules.
Please refer to Section B for more details on the composition of the flue gas exhaust kit of the individual modules in the Link.

3.7.3 Possible flue

If necessary, the Link can be connected to one or more flue(s).

For more details see Section C01.09.

3.8 FLUE GAS CONDENSATE DRAIN

If condensing modules (GAHP A, GAHP GS/WS, AY) are included in the Link, condensation water is produced from flue gases, which must be evacuated in compliance with current regulations.

Please refer to Section C01.09.

3.9 ELECTRICAL AND CONTROL CONNECTIONS

Please refer to Section C01.10.

3.10 EXAMPLE DIAGRAMS

Please refer to Section C01.13.

3.11 ACOUSTIC

Please refer to Section C01.14.