

versatile  
Enrich your space

Design and  
Technical Description of  
Cooling Interface Unit

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## GENERAL INFORMATION

Dear Customer:

You have selected a high-quality Cooling Interface Unit (CIU) for your cooling needs. The CIU should be used exclusively for cooling applications. Any other or further usage will be considered as improper usage. The manufacturer is not liable for damage or faults resulting from such improper usage.

Please read this manual carefully to avoid injury to people and damage to the product, and keep the manual in a safe place for future reference for the duration of owning the product. The manufacturer is not liable for damage or faults that result from non-compliance with the manual.

The operator is responsible to operate the CIU properly. To operate CIU properly and efficiently, the operator must have read and comprehended the manual and other specific operating instructions thoroughly, reached country-specific legal age, and make sure the CIU is regularly maintained.



**The basic installation instructions, operating conditions, and safety requirements are as follows:**



**1. Authorized personnel only.** The installation, start-up, maintenance work, and repairs must be performed by qualified and authorized personnel only.



**2. Installation.** The installation of the CIU must be performed by qualified and authorized personnel only. The system should be installed in a frost-free room. The temperature and humidity should not exceed 50 °C and 60% respectively. Under no circumstances, these values or any other values specified in this manual should not be exceeded. The CIU should be easily accessible in case of an emergency. Please check the CIU for completeness to make sure that it has not been damaged during transport. Before water is added to the system, make sure all the screw connections are tight, if necessary, loosened screw connections should be tightened. Do not use unauthorized components or replacement parts which may limit the function, safety and warranty of the product.



**3. Observe applicable standards and regulations.** The assembly and operation of the CIU must comply with the recognized standards, rules, requirements, and guidelines. Observe applicable UK standards and regulations.

## GENERAL INFORMATION



**4. Warning of electric shock.** The installation, commissioning, and repairs of the electrical connections of the CIU must be performed by qualified and authorized personnel only. Installation should be made by following the instructions provided by the manufacturer and in accordance with UK standards and regulations. In case of danger and accidents, if possible and not risky, interrupt power supply and separate the cooling system from other energy sources and seek help from qualified and authorized personnel immediately. Possible modifications or alterations to the CIU and its electrical components are only permitted with written permission of the manufacturer. Violation to this may void the warranty and the manufacturer is not liable for damage resulting from misuse of the system.

Risk of fatal or serious injury. When operational, the CIU is connected to mains voltage. Do not touch electrical components with wet or damp body parts. Do not pull on electrical lines. Do not touch live parts. The system should be electrically disconnected for repairs. All repairs must be performed by qualified and authorized personnel only.



**5. Quality and safety of drinking water.** The CIU uses and comes in contact with drinking water. The planning and design of the drinking water system therefore must be in accordance with UK standards and regulations.

A water analysis is recommended for each installation. In the case of warranty claims, a water analysis is mandatory.

The system must be flushed and disinfected before commissioning with the flushing by-pass component and other necessary equipment.



**6. Warning of high pressure and high temperature.** The maximum operating temperature and pressure of the CIU are 90 °C and 16 bar respectively. Therefore, some surfaces or some components of the CIU can be very hot. Do not touch hot surfaces. Hot surface can cause skin burns. If you have to touch or be close proximity to the CIU, check surface temperature of the CIU with a proper equipment before touching any surfaces or part of the system. In case of leaks, close all shut-off valves, and seek help from qualified and authorized personnel immediately.



**7. Storage.** Do store the CIU and any of its components in a cool and dry place before installation.

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## GENERAL INFORMATION



**8. Disposal.** Always follow local disposal regulations and seek expert advice.



**9. Name plate of the CIU.** This manual applies to various designs of the CIU. The type of the CIU is specified on the nameplate which can be seen on the base plate of the CIU. The nameplate contains the following information:

- Product Code
- Art. Number
- Primary Flow
- Max differential pressure
- Production Date
- Contact Information of the Manufacturer

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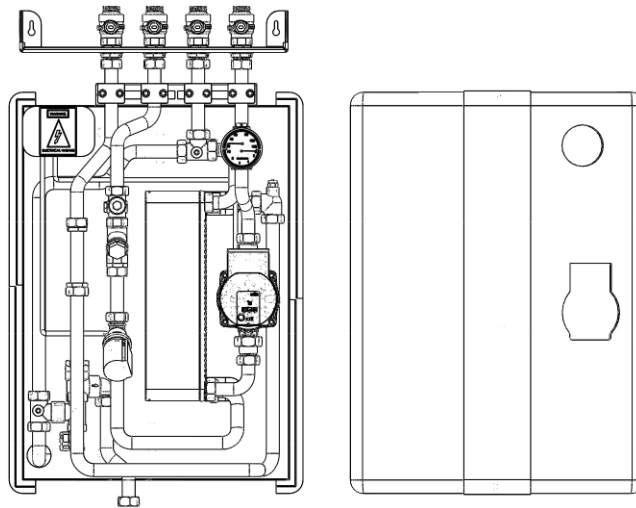
## 1. Functional Description

VERSATILE Cooling Interface Unit (CIU) (Figure 1) product family is designed to satisfy a range of customer demands in terms of cooling. CIU provides cooling solutions for apartments, houses, and offices.

The CIU has all necessary components (e.g. valves, heat exchanger, circulation pump, expansion vessel, pipes, fitting and connections) to deliver convenient and efficient cooling.

The CIU has 4 types based on the heat exchanger specifications. To connect the CIU with the piping system of apartments, houses, or offices, Mounting Plates With 6 Ball Valves are used. The Flushing By-pass component enables flushing and venting the system before commissioning. The CIU is covered with high quality EPP Covers.

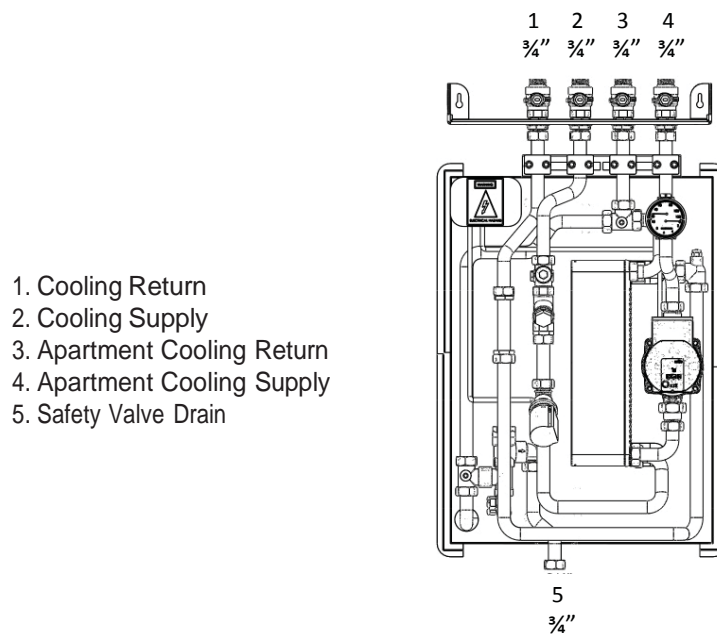
The detail information for components of CIU are provided in the following sections.



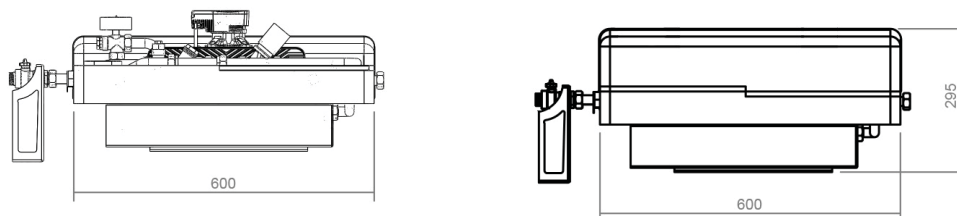
**Figure 1.** The front view of the CIU

## 2.Design and Technical Description of the CIU and Its Components

The CIU is comprised of 9 main components. The components of the CIU are secured on a galvanized steel plate. Each has a balance and control valve, heat exchanger (optionally isolated with EPP), safety valve, combined thermometer/pressure gauge, expansion vessel, circulation pump, filling, EPP cover, and mounting plate with ball valves and flushing by-pass. The 18 mm diameter pipes of the CIU are made from AIS 316L stainless steel and have 9 mm isolation. Figure 2 describes the inlets and outlets of the CIU. Figure 3 shows the dimensions of the CIU.



**Figure 2.** The inlets and outlets of the CIU



**Figure 3.** The dimensions of the CIU

The CIU has 4 types based on the heat exchanger to accommodate varying demands. The types of the CIU are listed in the Table 1.

**Table 1.** The types of the CIU

<b>Type 1</b>	
Heat load	3.15 kW
Flow rate	450 kg/h
Number of heat exchanger plates	32
Art. -Nr.	
<b>Type 2</b>	
Heat load	4.85 kW
Flow rate	644 kg/h
Number of heat exchanger plates	40
Art. -Nr.	
<b>Type 3</b>	
Heat load	6.30 kW
Flow rate	900 kg/h
Number of heat exchanger plates	60
Art. -Nr.	
<b>Type 4</b>	
Heat load	11.90 kW
Flow rate	1700 kg/h
Number of heat exchanger plates	30
Art. -Nr.	

The technical data of the CIU on the general aspects, materials, dimensions, and electrical connections are presented in the Table 2.

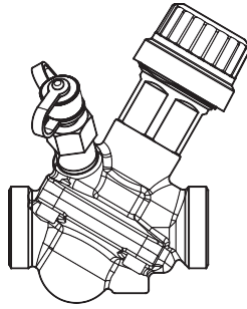
**Table 2.** The technical data of the CIU

<b>GENERAL</b>	
Nominal pressure	PN16
Maximum operating temperature	90 °C
<b>MATERIALS</b>	
Heat exchanger	Plates: 316 stainless steel
Pipes	18 mm AIS 316L stainless steel
Fittings	Brass CW617N
Seals	Aramid Fiber, Mineral Fibre with NBR
Thermal insulation	EPP
<b>DIMENSIONS</b>	
Width x Height x Depth	440 x 600 x 295 mm
Connections	G ¾" union nut, flat seal
<b>ELECTRICAL CONNECTIONS</b>	
Main voltage	230 V AC ± 10%
Power frequency	50 to 60 Hz
Operating voltage	5 V AC ± 10%
Input	0.15 to 3 W
Protection	IP44

## 2.1. Balance and Control Valve

Each CIU is equipped with a balance and control valve (Figure 4) which consists of two different parts: the control valve and the differential pressure controller. It has automatic flow limitation and built-in differential pressure control functioning over the control valve. The valve is also combined with a thermal actuator which ensures the required flow in every unit and maintains hydronic balance in the system. In the CIU, there are four options on the balance and control valve based on the requirements on heat capacity (kW) and flow rate (nominal flow, l/h): (1) DN15, 3.15 kW, 450 l/h, (2) DN20, 4.85 kW, 900 l/h, (3) DN20, 6.30 kW, 900 l/h, and (4) DN20HF, 11.90 kW, 1700 l/h. The technical specifications of the pressure control valve are given in Table 3.





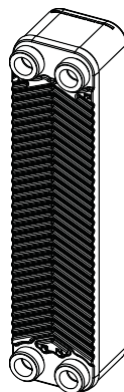
**Figure 4.** The Balance and Control Valve

**Table 3.** The technical specifications of the Balance and Control Valve

DN	Heat capacity (kW)	Flow rate (l/h)
15	3.15	450
20	4.85	900
20	6.30	900
20HF	11.90	1700

## 2.2. Heat Exchanger

Each CIU is equipped with a plate heat exchanger (Figure 5) to exchange heat between supply and the CIU. In the CIU, the heat exchanger has optimized asymmetric plate geometries that combine extraordinary thermal efficiency. The heat exchanger has been selected to satisfy the requirements on the heat load and the flow rate of the system.



**Figure 5.** Heat Exchanger

## 2.3. Safety Valve

The Safety Valve (Figure 6) serves as a fail-safe to protect against overpressure in the CIU. When the system pressure of the CIU exceeds 2.5 bar (factory adjusted opening pressure), it automatically releases water from the draining outlet. The system pressure of the CIU can be monitored by the Combined Thermometer/Pressure Gauge. The safety valve is made from brass and according to the standards established by DIN 4751-3 and EN 12828 regulations. The technical specifications of the Safety Valve are provided in the Table 4.

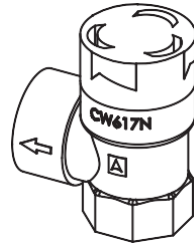


Figure 6. The Safety Valve

Table 4. The technical specifications of the Safety Valve

Connection	MS Rp $\frac{1}{2}$ x Rp $\frac{3}{4}$
Operating temperature range	-20 / +95 °C
Opening pressure	2.5 bar
Dimensions (W x H x D)	35 x 60 x 45 mm
Housing	Brass
Cap	PA6, red

## 2.4. Combined Thermometer/Pressure Gauge

The Combined Thermometer/Pressure Gauge (Figure 7) enables the operator to observe the system temperature and pressure in a single gauge with at a single measuring point. It has a bimetal measuring system for temperature measurement and a Bourdon tube measuring system for simultaneous pressure measurement. Both values are measured and displayed by a single gauge. A self-closing mounting valve enables the gauge to be replaced without the need to drain the system. The technical specifications of the Combined Thermometer/Pressure Gauge are provided in the Table 5.

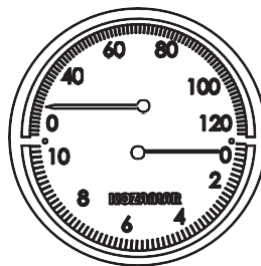


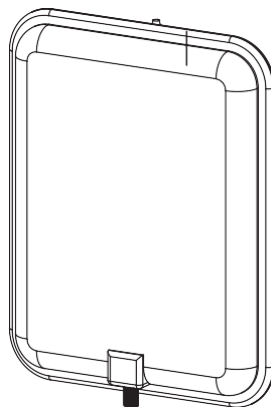
Figure 7. The Combined Thermometer/Pressure Gauge

**Table 5.** The technical specifications of the Combined Thermometer/Pressure Gauge

Type	D1
Nominal size	80
Working ranges	Thermometer: CIU: 0/120 °C Ambient max: 60 °C Pressure gauge: 0/10 bar and 0/60 mWC Static load: 7.5 bar Dynamic load: 6.7 bar Short term: 10 bar (full scale value)
Temperature performance	Pressure gauge: Indication error when the temperature of the measuring system deviates from the normal temperature of 20 °C: rising temperature approx. ±0.4 %/10 K falling temperature approx. ±0.4 %/10 K of the full scale value
Accuracy class of Pressure gauge	2.5 (EN 837-1/6)
Degree of protection	IP 32 (EN 60529)
Connection	Brass, bottom or centre back G¼B with mounting valve G¼ to R½
Measuring element	Temperature: Bimetal element Pressure: Bourdon tube, copper alloy
Dial	Plastic white Dial marking black with red/blue circular arcs
Pointer	Thermometer: plastic, red Pressure gauge: plastic, black
Housing	D1 – plastic (ABS), highly impact resistant
Window	Clip-in plastic with adjustable red mark

## 2.5. Expansion Vessel

The CIU is equipped with an Expansion Vessel (Figure 8) to maintain constant pressure in the system. The Expansion Vessel is made from rubber diaphragm fixed membrane and according to the standards established by PED 2014/68/UE and DIN EN 13831 regulations. The technical specifications of the Expansion Vessel are provided in the Table 6.



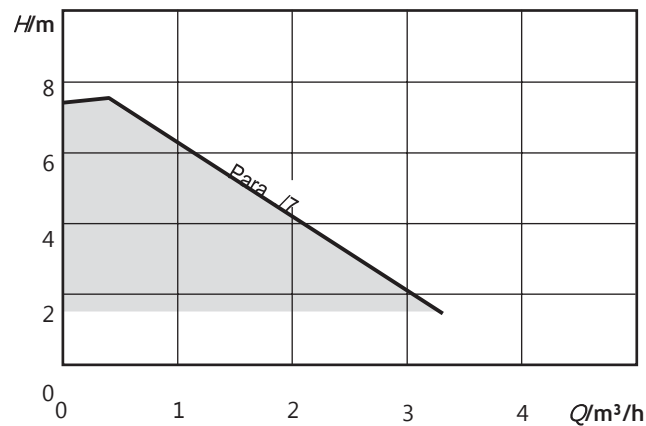
**Figure 8.** The expansion vessel

**Table 6.** The technical specifications of the Expansion Vessel

Capacity	8 liters
Dimensions (W x H x D)	350 x 440 x 73 mm
Water entry connection	M 3/8" Gas
Standard pre-loading pressure	1.5 bar
Maximum working pressure	3.0 bar
Working temperature	-10 / +90 °C
External finishing colour	Red

## 2.6. Electronically-Controlled Circulation Pump

Each CIU has an electronically-controlled circulation pump (DN 15 size and 7 m hydraulic performance) which is exclusively designed for circulating for cooling systems with constantly changing volume flows. The technical data of the pump is presented in Table 7. In Figure 9, pump curve (pump head vs flow rate characteristics) is given.



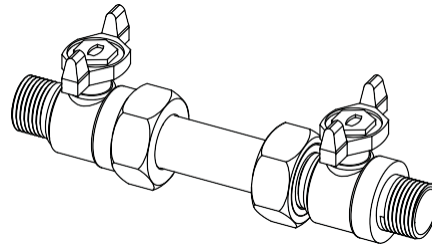
**Figure 9.** The pump curve of the Electronically-Controlled Circulation Pump

**Table 7.** The technical data of Electronically-Controlled Circulation Pump

Fluid temperature	0 °C to +95 °C
Ambient temperature	0 °C to +70 °C
SC, self-controlled, green push button	Δ p-v, Δ p-c, constant speed (manual air venting and manual dejamming function)
External control	iPWM1 signal, LIN bus
Hydraulic performance	7 m
Size	DN 15
EEl	≤ 0.20

## 2.7. Filling

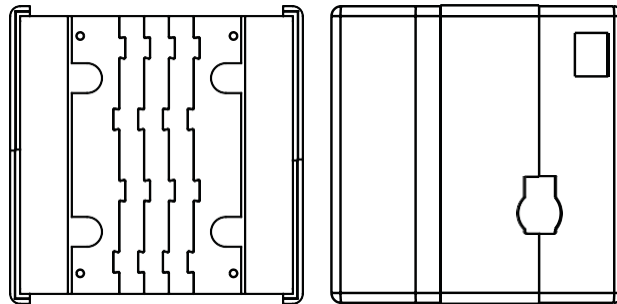
The CIU comes with a Filling (Figure 10) component which is used to fill the heating circuit with water. It should be manually connected to the ball valves of the CIU (marked with “A” and “B” stickers) to start the filling process. The heating circuit should be filled with water until 1.5-2.0 bar pressure read from the Combined Thermometer/Pressure Gauge. Then, those ball valves should be shut-off, and the Filling should be disconnected from the CIU. It is made up of AIS 316L stainless steel pipes with union nuts at both ends. The Filling is marked with “A” and “B” stickers at the ends to correctly connect to the CIU.



**Figure 10.** The Filling

## 2.8. EPP Cover

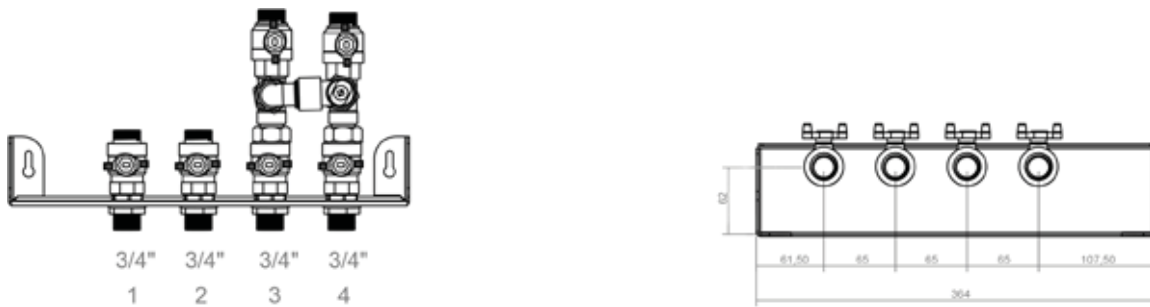
The CIU is covered with EPP Covers which are made from high quality 50 g/L density EPP. The drawing of the EPP Cover is given in Figure 11.



**Figure 11.** The drawing of the EPP Cover of the CIU

## 2.9. Mounting Plate with Ball Valves and Flushing By-pass

To connect the CIU and the piping system of apartment, Mounting Plates are used. These plates have 6 ball valves and a flushing by-pass. Each secured on a galvanized steel plate, ball valves are connected with G 3/4" Male thread connections. Flushing By-pass enables flushing and venting the system before commissioning the CIU. The drawing and dimensions of the Mounting Plate with Ball Valves and Flushing By-pass are given in Figure 12.



**Figure 12.** The drawing and dimensions of the Mounting Plate with Ball Valves and Flushing By-pass of CIU