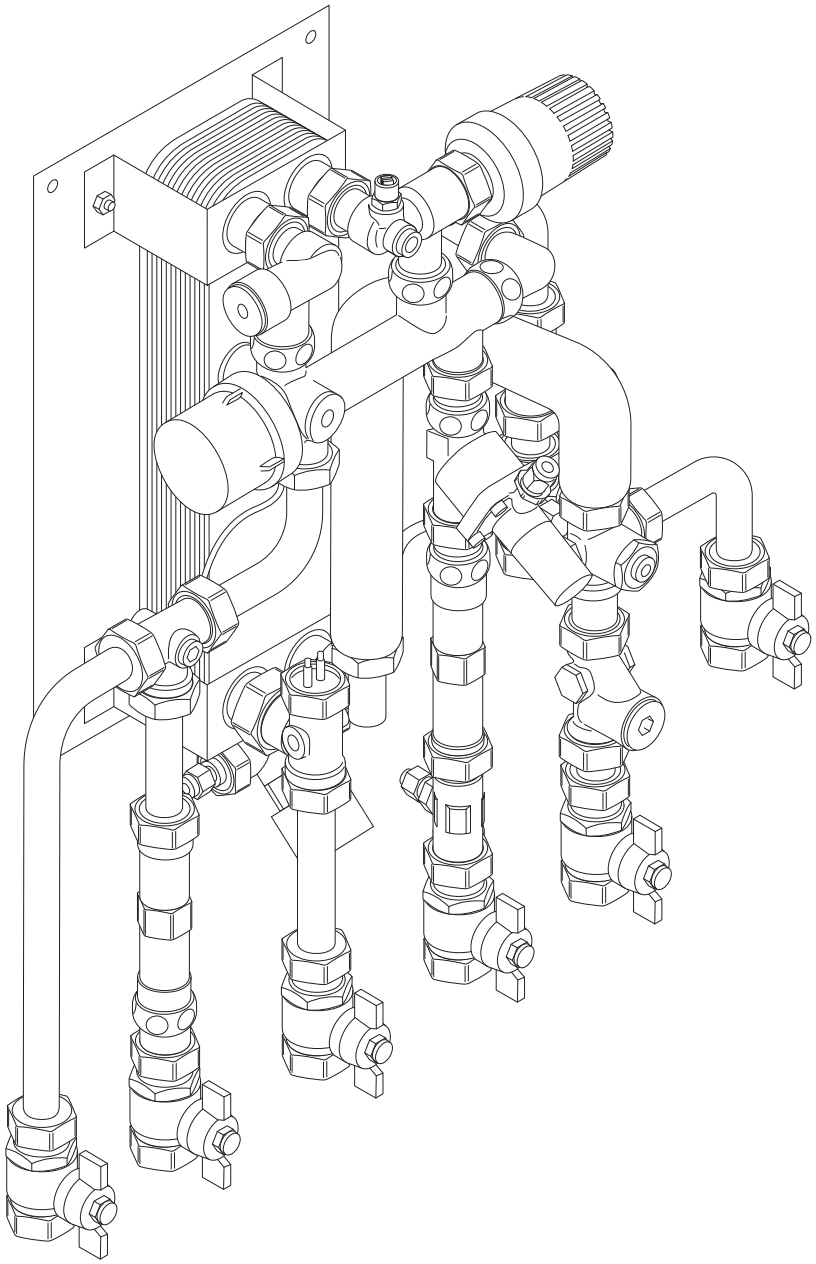
Uponor Combi Port M-XS

EN Installation and operation manual



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2 Preface

This installation and operation manual describes how to install and operate the components of the system.

2.1 Safety instructions

Safety messages used in this document

STOP	**Warning!** Risk of injury and damage. Ignoring warnings can cause personal injury and/or damage to products and other property.
⚠	**Caution!** Risk of malfunctions. Ignoring cautions can cause the product to not operate as intended.
!	**Note** Important information to the section in the manual.

Uponor uses safety messages in the document to indicate special precautions required for the installation and operation of any Uponor product.

Power

STOP	**Warning!** Risk of electric shock if touching the components! The unit operates with a 230 V AC voltage.
STOP	**Warning!** Risk of electrical shock! Electrical installation and service behind secured 230 V AC covers must be carried out under the supervision of a qualified electrician.
STOP	**Warning!** Uponor system power supply: 230 V AC, 50 Hz. In case of emergency, immediately disconnect the power.
STOP	**Warning!** Prior to any work on the controller or the components connected to it, switch off the controller according to the regulations.

Technical constraints

⚠	**Caution!** To avoid interference, keep data cables away from components bearing power of more than 50 V.

Safety measures

!	**Note** For safe and proper use, obey the instructions given in this document. Keep them for future reference.

The installer and operator agree to comply with following measures regarding Uponor products:

- Read and obey the instructions and processes in the document.
- The installation must be performed by a qualified installer in accordance with local regulations.
- Uponor is not liable for modifications not specified in this document.
- Switch off all connected power supplies before starting any wiring work.
- Do not expose the Uponor components to flammable vapours or gases.
- Do not use water to clean electrical Uponor products/ components.

Uponor is not liable for damage caused by ignoring the instructions in this document or the applicable building code.

2.2 Standards and regulations

!	**Note** The installation must be carried out in accordance with current local standards and regulations!

Planning and designing of the heating system must be performed in accordance with applicable global and country-specific standards and guidelines

- Ensure that no aggressive substances, such as acids, lubricants, bleach, flux, strong liquid cleaning agents, contact sprays or concrete including its components, come into contact with the stainless steel manifold and manifold components.
- A water analysis is recommended for each installation. In the event of warranty claims, it is mandatory. It is essential that the heating circuits are regulated on the water side so that a sufficient hydraulic function of the individual heating circuits or the entire underfloor heating system is guaranteed!

For Combi Ports with an assembled water meter, **planning and implementation of the drinking water system** must be done in accordance with the Infection Protection Ordinance.

A few points to be high-lighted:

- Flush and disinfect the system before commissioning and handing over to the user.
- Provide the domestic hot water pipes with required thermal insulation strength.
- Insulate the drinking cold water pipes to secure that no heating in excess of the requirements takes place.

2.3 Correct disposal of this product (Waste Electrical and Electronic Equipment)

!	**Note** Applicable in the European Union and other European countries with waste separation systems.


This icon on the product, or in the related documents indicates that it should not be disposed with household waste.

Please, recycle responsibly to support the sustainable use of resources and prevent possible harm to human health and/or the environment.

Household users should contact the retailer where they purchased this product, or their local government office, for details on where and how they can take it for recycling.

Business users should contact their supplier and check the terms and conditions of the purchase contract. Do not dispose this product with other commercial waste.

3 System description

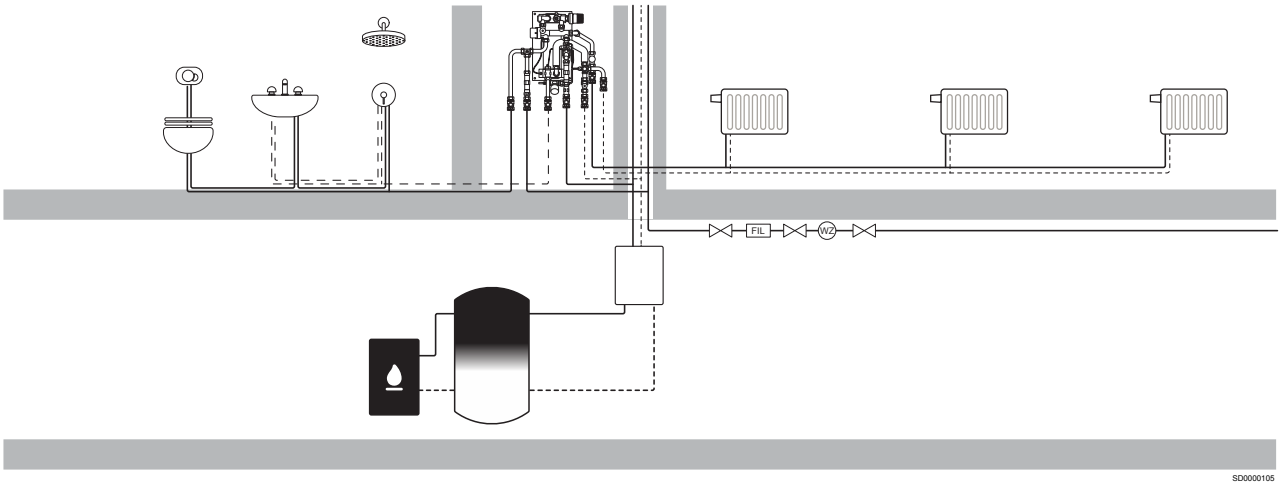
Combi Port M-XS is a prefabricated heat interface unit (HIU) suited for use in single family houses. The ready-to-install unit supplies domestic hot water, controls the domestic heating and measures the heating energy as well as cold water consumption.

In the Combi Port M-XS unit, the cold water is heated only when required following the flow-through principle with a stainless steel high performance plate heat exchanger. This always ensures a low return temperature on the heating water. The energy is supplied by heating water with a flow temperature of at least 55 °C via the heating water flow.

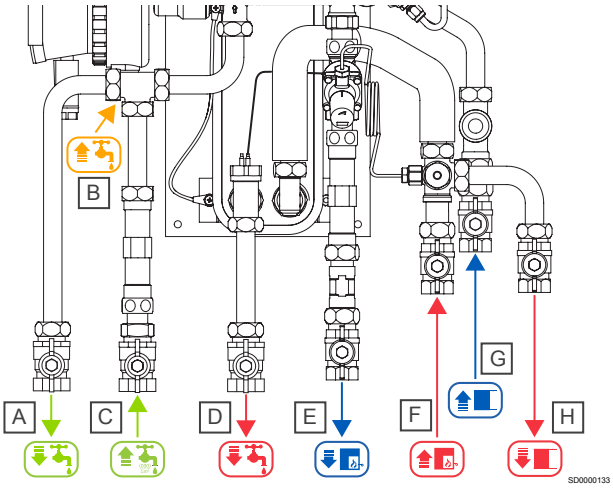
Domestic hot water: The domestic hot water is generated only on demand. A mechanical proportional quantity control valve is controlling the process. When more hot water is required, the valve opens further to increase the flow of the heating water through the heat exchanger. This ensures a constant hot water temperature. If no hot water is needed, the valve stops the supply of heating water through the heat exchanger. It can cool down which is beneficial for the hygiene.

Domestic heating: The Combi Port M-XS manages independently the hydraulic balancing between hot water and heating. The room temperature control is carried out in the heating system.

3.1 Operating principle



3.2 Connection description

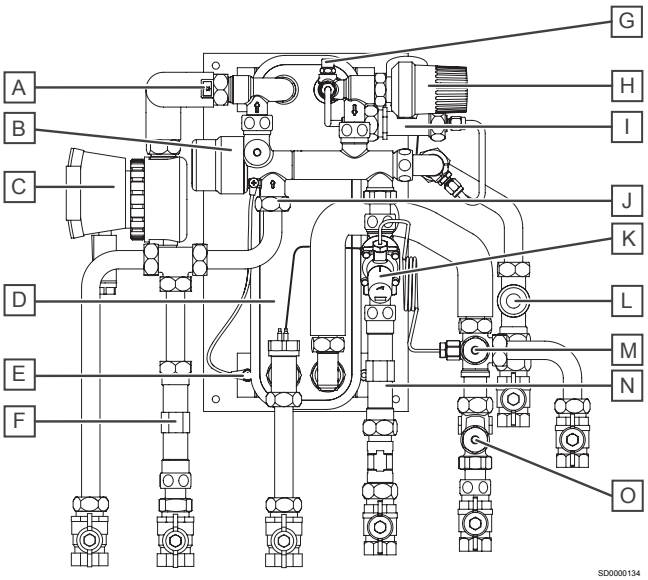


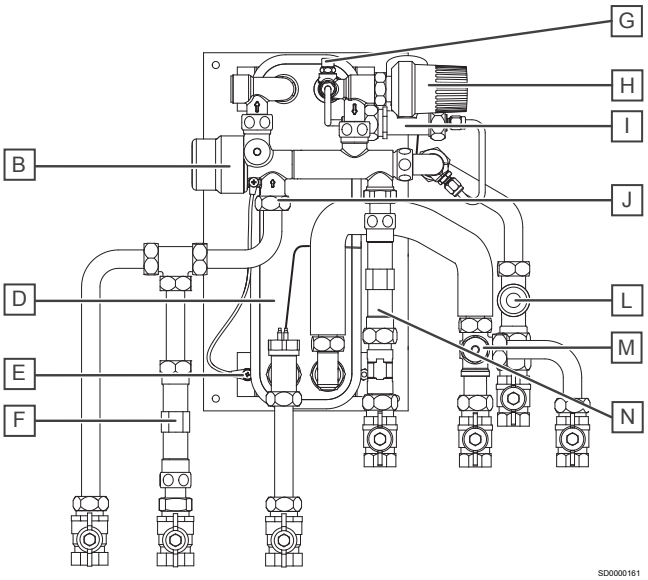
Item	Description
A	Cold water to apartment (CW)
B	Warm tap water with circulation (optional)
C	Cold water from riser (CW) (optional)
D	Domestic hot water to apartment (DHW)
E	Heating return (primary)
F	Heating supply (primary)
G	Heating return (secondary)
H	Heating supply (secondary)

3.3 Components

Note

The following illustrations show example set-ups. Individual modules may vary in appearances.





Item	Description
A	Backflow preventer
B	Proportional volume control (PM)
C	Circulation pump (optional)
D	Plate heat exchanger
E	Earthing on site
F	Cold water meter distance piece (optional)
G	Air vent valve
H	Thermostatic hot water temperature limiter (TL) (optional)
I	Thermostatic lead module (BP) (optional)
J	Cold water throttle disc
K	Differential pressure regulator (optional)
L	Zone valve for limiting heating flow to apartment
M	Sensor pocket heat meter
N	Heat meter distance piece
O	Strainer

3.4 Accessories

Depending on customer requirement the basic module can be equipped with various accessories. The configuration is assembled accordingly and delivered as a complete unit. The available accessories are marked "optional" in the components overview.

The HIU is surface-mounted on the wall. See chapter "Drawings" for the dimension of the base plate and dimensions of the complete HIU in different expansion stages.

Note

Thermostats and remote control modules are not part of the Combi Port delivery. They must be ordered separately.

4 Prepare for installation

4.1 General information

STOP	**Warning!** The fittings are under pressure. Escaping pressurized media can cause serious injury such as scalding or eye damage. Depressurise the system before performing any installation work. For retrofits to an existing system: Drain the system or close the supply lines of the section and depressurise it.
STOP	**Warning!** Risk of injury due to the heavy weight of the unit: Do not perform the installation alone. Always wear safety shoes during the assembly. The unit can be of considerable weight, depending on the configuration. If the station falls over, this could lead to injuries, particularly to the feet.
⚠	**Caution!** Leaks in the unit may occur during transport or installation. Check the nuts to ensure that they are properly tightened before the connection to avoid property damages.

Before installing the heat interface unit ensure that:

- the primary pipes are laid in the building site.
- the primary pipe installation is flushed and checked for leaks
- the power and ground cables are routed to the installation site.
- the unit is installed in a dry and frost-free room with an ambient temperature lower than +40 °C.
- the unit is mounted upright (not inclined, upside down or lying down).
- the unit is always easy to access even after the assembly.

4.2 Water analysis

A water analysis of the tap water must be checked before using the device. The limit values can be found in our technical information. The heating water quality must be in accordance to VDI 2035. In case of warranty claims, the report must be presented.

5 Installation

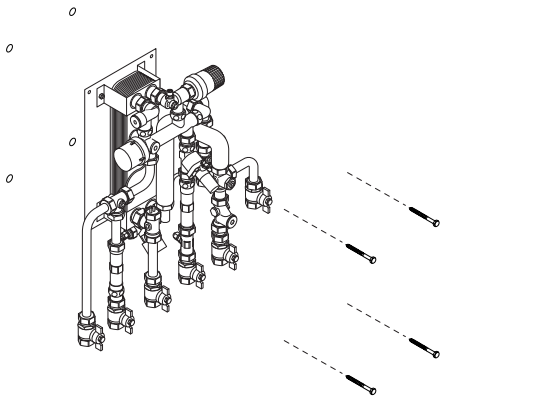
5.1 Mount HIU on the wall

Note

Pay attention to the horizontal alignment.

Note

Check the tightness of the screwed connections after the installation is complete.



1. Mark where to drill the holes.
2. Drill the holes.
3. Fix the HIU to the wall using the provided material.

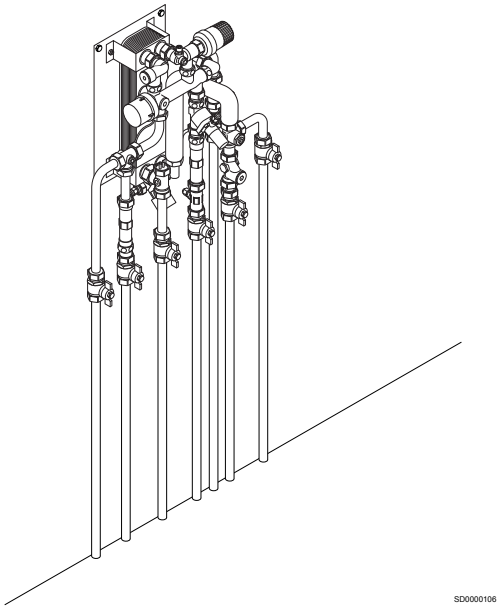
5.2 Mount and connect primary supply lines

Warning!

Leaks can cause personal injury and property damages.

Note

Install the pipes in accordance with the planning documentation.



Connect the primary supply lines with the corresponding ¾" ball valves at the HIU.

5.3 Electrical installation

Warning!

Required work must be performed by a qualified installer in accordance with local regulations. This includes electrical connections and installations, set up for operation and maintenance.

Warning!

Establish equipotential bonding by using a copper equipotential bonding conductor (cross-section at least 6 mm²). Connect the earthling clamp to a suitable equipotential bonding rail in the building.

Connect the HIU as follows:

1. Connect the HIU electrically
2. Connect optional room control if applicable

5.4 Filling and flushing

Fill and flush the system according to local regulations and standards.

5.5 Tightness testing

Warning!

Leaks can cause personal injury and property damages.

Caution!

Pressure leaks may occur even at normal operating pressure and must be repaired immediately.

Minimum 2 hours

According to local standards and regulations

5.6 Finishing the installation and hand over

Caution!

Incorrect finishing of the installation can lead to property damage.

Follow these steps and finish the installation:

1. Check the settings.
2. Complete the acceptance/ finishing protocol.
3. Hand over the documentation and the protocol to the homeowner.

6 Operation

6.1 Cold water throttle disc

Note

Observe the flow direction when replacing the throttle disc!

Note

The installed cold water throttle disc can be replaced if required. The colour indicates the maximum volume flow (see table below).

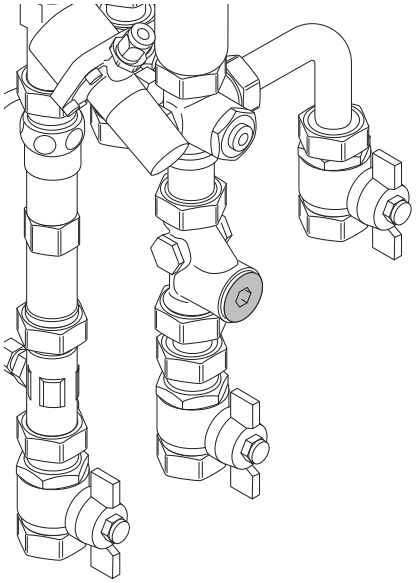
The throttle disc limits the amount of cold water to the heat exchanger and prevents the hot water supply from exceeding the calculated volume.

Flow regulator insert colour	l/min
Black	6
White	8
Orange	9
Blue	10
Red	12
Green	15
Brown	17
Black	19
Purple	22

6.2 Strainer

Caution!

Shut off the water supply to the unit and relieve the pressure before any work with the strainer.



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The strainer collects dirt and its filter can be removed for inspection and cleaning.

6.3 Thermostatic lead module (BP)

Note

The valve flow can also change by connecting to the capillary pipe Ø 6 mm.

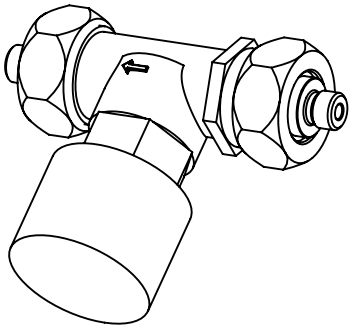
Note

A too high temperature setting can cause the heating water return temperature to rise.

Note

A too low temperature setting can lead to longer waiting times when preparing domestic hot water.

Set the BP line temperature to approximately **15 K** below the network flow temperature.



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The thermostatic temperature lead module (BP) serves the heat retention function of the supply line. It is used on units last or in greater distance from the main line and prevents the risers from cooling down when not dispensing.

The valve is adjustable and the setting range is printed on the cap. The temperature is measured by a sensor inside the valve.

General information	Value
Kvs value	1,55
Max. heating operating pressure	10 bar (PN 10)
Hysteresis	+/- 2-3 K
Kvs value	5
Threaded connection	2 x ¾" FT - conic with cone transitions

6.4 Circulation pump

Note

See the documentation from the circulation pump supplier as well as relevant Uponor wiring diagrams before connecting the pump.

6.5 Cold water meter/ Heat meter distance piece

Note

The distance pieces are not suitable for continuous operation.

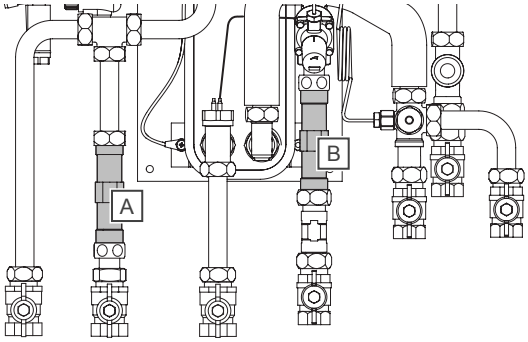
Note

The heat meter to be installed must have following specifications: **Qn = 1,5** 1,5-2 seconds. Construction length of **110 mm** and **¾"** external threaded connection.

A sensor pocket M10x1 is available for the flow sensor. When delivered, you must remove the plug with a hexagon socket wrench (6 mm).

Note

The cold water meter to be installed must have following specifications: Operating pressure: **PN 10**, Construction length of **110 mm** and **¾"** external threaded connection.



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Item	Description
A	Cold water meter distance piece
B	Heat meter distance piece

6.6 Thermostatic hot water temperature limiter (TL)

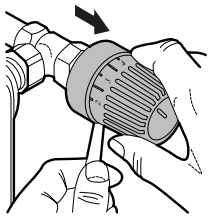
A maximum temperature limitation of the domestic hot water is achieved through a thermostatically controlled hot water limiter.

Scales	1	2	3	4	5	6	7	8
WW temp. (35-70 °C)	35	40	45	50	55	60	65	70

Change default settings

Caution!

Make sure not to bend or break the capillary line.



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The thermostat is equipped with a pin that limits the temperature to 60 °C (setting 6). Slide out the limiting pin with a strong wire in axial direction.

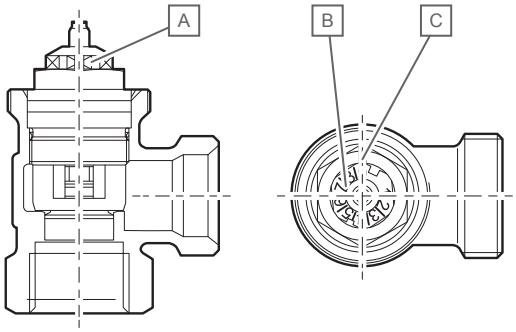
6.7 Zone valve and actuator

Note

It is possible to change the valve setting during operation without leakage.

Note

The required setting value must correspond to the marking. The default setting between **1-9** can be selected. Factory default settings = **7**.



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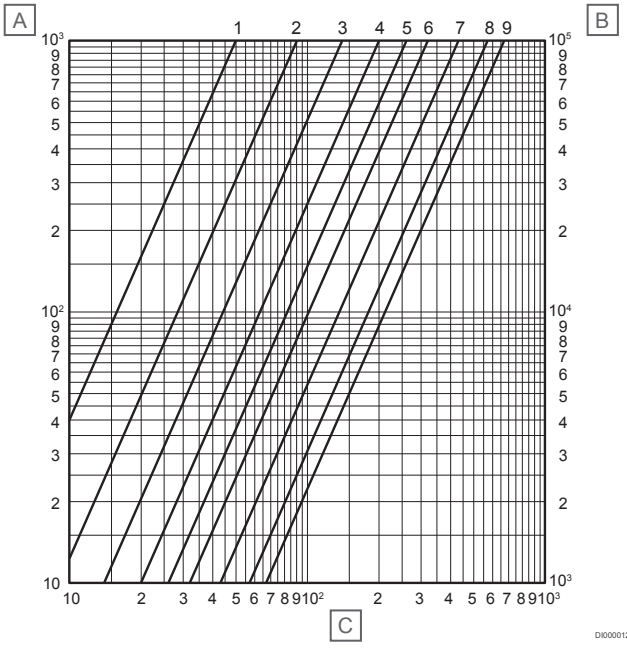
Item	Description
A	Hexagonal 13 mm
B	Setting value
C	Mark

The temperature in the primary heating circuit can be regulated with the zone valve. The housing of this valve has a threaded connection (**30 x 1,5**) for a 2-point actuator.

Change setting value



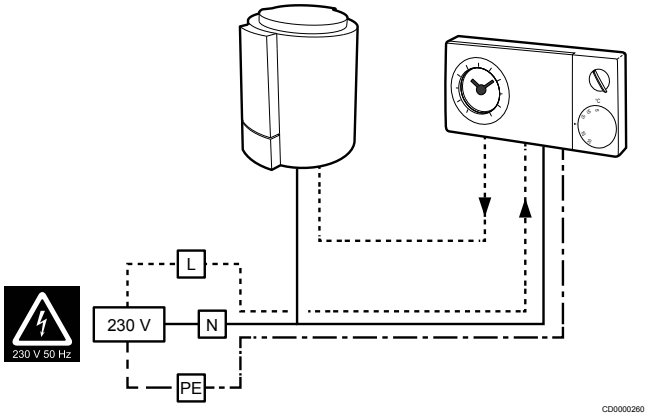
DI0000125

Item	Description
A	Pressure drop Δp [mbar]
B	Pressure drop Δp [Pascal]
C	Mass flux [kg/h]

Pre-setting	1	2	3	4	5	6	7	8	9
Kv value / 2 K P deviation	0,05	0,09	0,14	0,20	0,26	0,32	0,43	0,57	0,67

Adjust from default setting to the desired value using a hexagonal (**SW 13 mm**) open-ended spanner, or with a special key.

Actuator on the zone valve

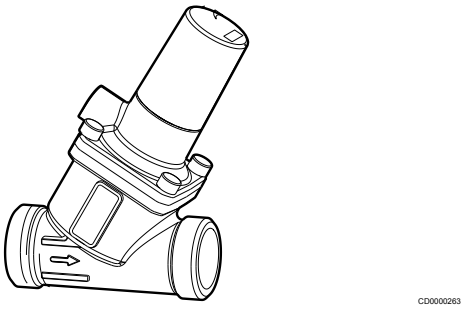


The thermal actuator is mounted on the zone valve and is controlled by a room thermostat.

The actuator can be connected to any thermostat, taking the technical data for compatibility into account.

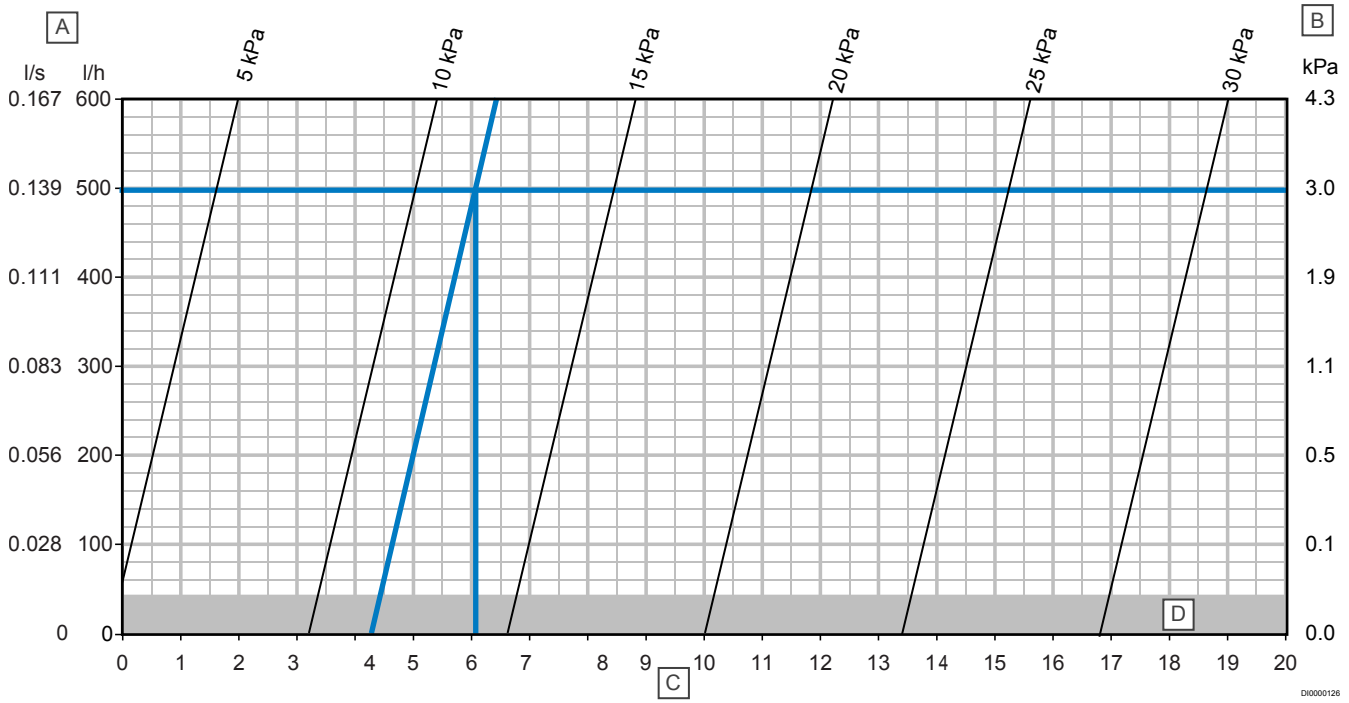
Description	Value
Operating voltage	230 V AC, 50/60 Hz
Operating line	1 W
Line	2 x 0,75 mm² (1 x Blue / 1 x Brown)

6.8 Differential pressure regulator



The differential pressure regulator is optional for assembly in the line and protects other control valves, such as the proportional volume control from the excessive differential pressure that otherwise could cause the fitting to overflow.

Description	Value
Kvs value	2.9 m³/h
Setting range	50-300 mbar (default 300 mbar)
Max. flow volume	3000 kg/h at 300 mbar. Heat resistant up to 80 °C with insulating shells
Ball valve	DN32 MT with pulse power connection, SFE tap and measuring connection (without insulating shells)
Pulse lead	length 1 m with screw connections



Item	Description
A	Mass flow rate
B	Pressure loss regulator
C	Preset [no of turns]
D	Out of mass flow zone

7 Maintenance

7.1 General information

Important information

To ensure the correct and safe operation of the system, this information must be read and followed.

Following these instructions will help avoid hazards and downtime and increase the reliability and life of the system.

A visual inspection of the port unit is required every 3 to 6 months.

Function and energy savings

The heat interface unit is a compact station that can operate in a system with several units or as a supplement to an existing heating system. It is assigned to a residential unit and is used to measure and control central heating and heating of water.

The heat interface unit combines:

- water heating in the flow system via a plate heat exchanger (water heating is controlled without auxiliary energy)
- the recording of the energy consumption for central heating and hot water and, as an option, the amount of cold water
- heating control in the apartment with hydraulic balancing and energy saving by ECO-mode.

Hot water is only prepared when needed and not stored. This is one of the most convenient ways to heat water and enables dispensing of large amounts of hot water. Restrictions are only imposed by the central heating.

Water heating

Caution!

All water pipes are filled and pressurised.

The cold water supply for the apartment is provided via the central house connection and distribution line.

The heat interface unit is equipped with a central shut-off ball valve for cold water (B). As an option there is a shut-off ball valve for installation purposes.

All ball valves should be exercised (open-close) at regular intervals (about once per month).

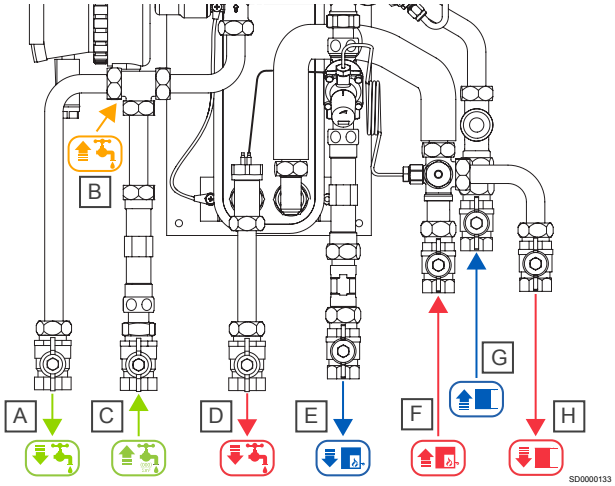
The ball valves (B) and (C) should only be closed for assembly/ disassembly reasons.

Water hygiene

Although the water system follows the flow principle, which is the most hygienic method of water heating, the water pipes should always be flushed if not used for a longer period.

The tapping duration should then be around 1-2 minutes. The water must be allowed to run at least every 7 days for about 1-2 minutes.

7.2 Turning off heat interface unit



Ball valves C, E and F must be closed in the event of a malfunction.

Item	Description
A	Cold water to apartment (CW)
B	Warm tap water with circulation (optional)
C	Cold water from riser (CW) (optional)
D	Domestic hot water to apartment (DHW)
E	Heating return (primary)
F	Heating supply (primary)
G	Heating return (secondary)
H	Heating supply (secondary)

If the system is to be shut down for a longer period:

1. Shut off the cold water tap. Do not close ball valves E, F, G, H.
2. Protect the port unit against frost.
3. At return, let the hot water run for about 5 minutes at start up.

7.3 Setting log heat interface units

Date:	Setting log heat interface units											
Site:					Type:				Serial no:			
Component	**Description**										**Setting range**	**Factory setting**	**Set on site**
Set zone valve for the flow rate	Setting value	1	2	3	4	5	6	7	8	9	1-9 continous	7	
	Kv value / 2 K P deviation	0,05	0,09	0,14	0,20	0,26	0,32	0,49	0,57	0,67			
TL	The thermostatic hot water temperature limiter, infinitely adjustable downwards										35-70 °C (limited to 60 °C)	6	
	Scale value 35-70 °C	1	2	3	4	5	6	7	8				
	Hot water temperature	35 °C	40 °C	45 °C	50 °C	55 °C	60 °C	65 °C	70 °C				
BP	Thermostatic lead module (BP), capillary 6 mm, Kvs 1,55										35-60 °C	45 °C	
DI	Differential pressure regulator the heating circuit										50-150 mbar	100 mbar	

Other components/ devices

Component	Description	Type	Comment
Heat exchanger		GBS 220H-16 Plates	
		GKE 228H-24 Plates	
		GKE 228H-40 Plates	
Installer, signature:	Installer, in capital letters:		Service partner:

8 Troubleshooting

8.1 Fault description

Fault description	Cause	Solution
Hot water function		
Hot water temperature too low or fluctuating	**Central heating**	
	Buffer temperature too low	Buffer temperature must be **5-10 K** above hot water setpoint
	Heating circuit pump type not supported	Check the central heating pump
	Setting for heating circuit pump is not correct	Heating circuit pump setting: Constant pressure
	Pump performance too low	Check the pump performance
	Mixing valve faulty	Check the mixing valve function
	Setting for heating circuit control is not correct	Check the heating circuit control setting
	Heating circuit control faulty	Check the heating control function
	Air trapped in buffer storage	Vent buffer storage tank
	Cold water pressure too low / too high	Cold water pressure at unit: **Min. 2 bar, Max. 4 bar**
	Heat interface unit	
	Strainer in primary flow dirty	Clean the strainer in the primary flow
	Insufficient differential pressure	Clean the capillary of the differential pressure control, check if differential pressure control is working
	Air in the system	Vent/flush the system
	Insufficient heating volume flow passes through the heat exchanger	Check the volume flow using heat meters
	Heat meter type not supported	Use heat meter type with **Qn 1,5** ultrasound
	Insufficient heating volume flow	Increase differential pressure
	Heat exchanger dirty	Clean the heat exchanger
	Thermostatic hot water temperature limiter setting is not correct:	Check the thermostatic hot water temperature limiter (if installed) is working and correctly set
	Proportional volume control does not switch over	Replace the proportional volume controller
Waiting time for hot water is too long	Check the pump setting in the central heating system	Pump setting: Constant pressure
	The temperature setting on the thermostatic lead module (BP) is too low	Increase the temperature setting on the thermostatic lead module (BP) or in the line
	The capillary on the thermostatic lead module (BP) is dirty	Clean the capillary on the thermostatic lead module (BP) or in the line
	No thermostatic lead module (BP) available	Retrofit the thermostatic lead module (BP) or line
Noise generation		
Noise generated in the station	Pipe clamps too tight	Loosen the pipe clamps
	Cold water throttle disc is dirty	Clean the cold water throttle disc
Noise generated in the PM valve	Noise generated via a third route	Replace the inductor disc, spring and locking ring using are placement kit for PM valves, 3rd route
Heating function		
Heating system does not heat up	**General**	
	Supply temperature too low at the heat source	Check the supply temperature at the heat source
	Volumetric flow rate is too low	Check the fittings in the device
	Check the heat meter type	The heat meter type must be **Qn 1,5**
	Air trapped in buffer storage	Vent the buffer storage tank
	Insufficient differential pressure	Clean the capillary of the differential pressure control, check the differential pressure control is working
	Air in the system	Vent/flush the system
	Radiator supply	
	Supply flow rate too low / too high	Check the zone valve setting

Fault description	Cause	Solution
	Room temperature control is not correct	Check the setting for the room temperature controller
	Strainer is dirty	Clean the strainer
	Room temperature controller does not work correctly	Check the wiring for the room temperature controller
	Actuator appears not to work	Actuator closed without current. Connect actuator to zone valve electrically
	Radiator thermostatic valves or return screw connections closed	Check the thermostatic valves and return screw connections on the radiators
No hot water and no heating	Ball valves closed	Open ball valves
	Central heating circuit pump not working	Check that the central heating circuit pump is working and correctly set
	Central strainer is dirty	Clean the central strainer
	Heating system is not working correctly	Check the heating system
	Buffer storage tank is not filled	Check the buffer storage tank filling

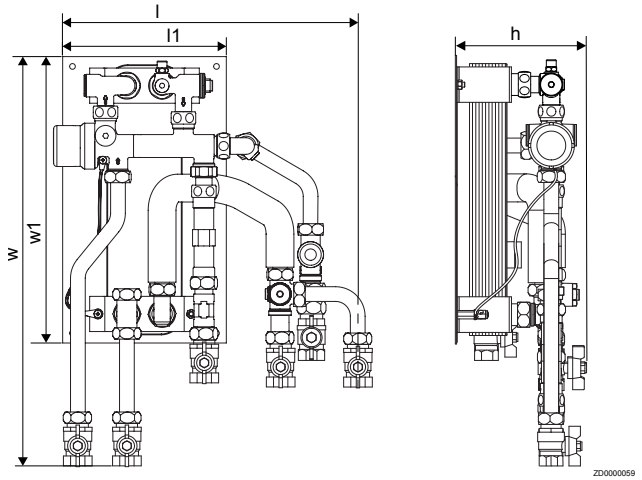
9 Technical data

9.1 Dimensional drawings

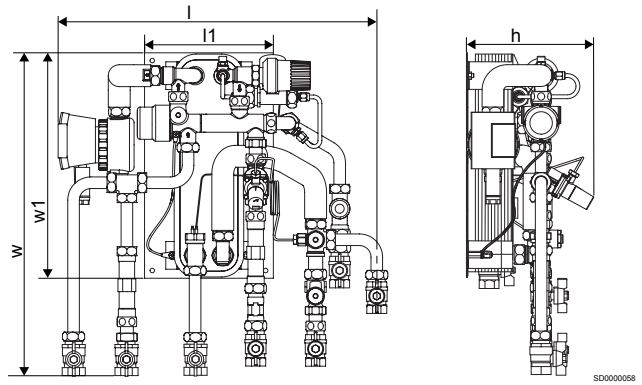
Note

The following illustrations show example set-ups. Individual modules may vary in appearances.

HIU measurements

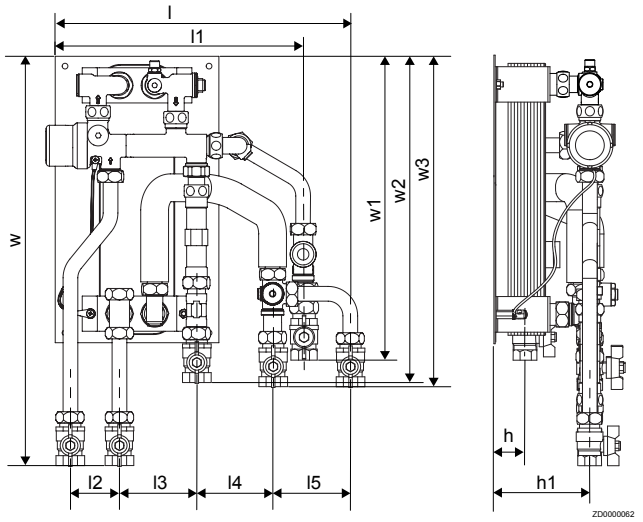


l	l1	w	w1	h
~372 mm	200 mm	501 mm	350 mm	159 mm



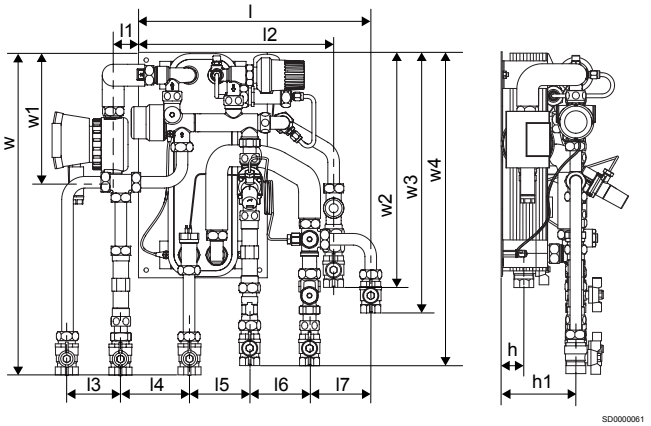
l	l1	w	w1	h
~495 mm	200 mm	501 mm	350 mm	~198 mm

Connection measurements



l	l1	l2	l3	l4	l5
~495 mm	303 mm	60 mm	94 mm	93 mm	95 mm

w	w1	w2	w3	h	h1
501 mm	361 mm	401 mm	406 mm	35 mm	116 mm

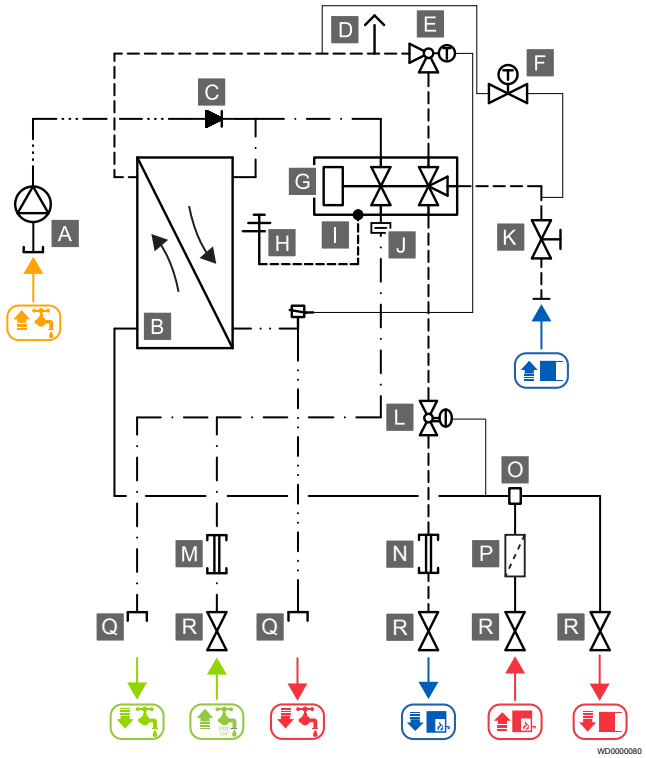


l	l1	l2	l3	l4	l5
~495 mm	39 mm	303 mm	83 mm	106 mm	94 mm

l6	l7	w	w1	w2	w3
93 mm	95 mm	501 mm	201,5 mm	361 mm	405 mm

w4	h	h1			
490 mm	35 mm	116 mm			

9.2 Hydraulic schemes



Item	Description
A	Circulation pump
B	Heat exchanger
C	Backflow preventer
D	Air vent valve
E	Thermostatic hot water temperature limiter (TL)
F	Thermostatic lead module (BP)
G	Proportional volume control (PM)
H	Earthing on site
I	Equipotential bonding connection
J	Cold water throttle disc
K	Zone valve for limiting heating flow to apartment
L	Differential pressure regulator
M	Cold water meter distance piece
N	Heat meter distance piece
O	Sensor pocket heat meter
P	Strainer
Q	Swivel nut
R	Ball valve

9.3 Technical specifications

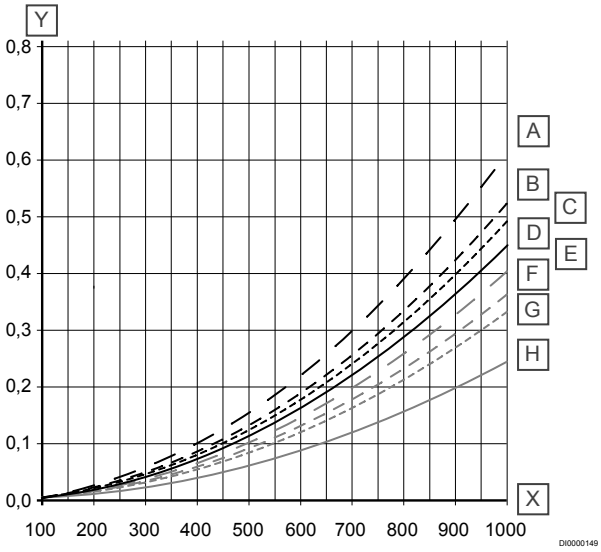
Combi Port M-XS	Value
Medium	Heating water according to VDI 2035
Operating temperature	5-90 °C
Max. operating pressure	10 bar
Differential pressure primary heating	0,6 bar
Min. pressure tap water	2,5 bar

Material	Value
Fittings, Tap water	CW617N
Fittings, Heating	CW617N, CW614N
Seals	According to DVGW KTW, W270
Plate heat exchanger	1.4404
Soldering	Copper, vacinox
Pipes	1.4404

9.4 Performance curves

220H - 16 plates

Heating side (primary)

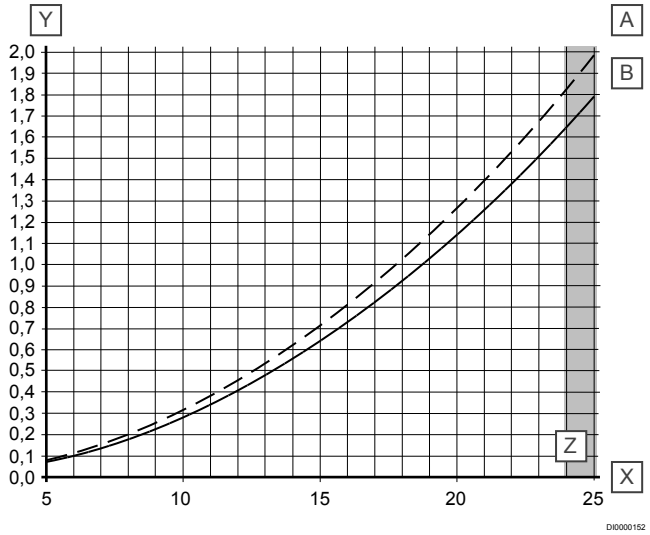


Item	Description
X	Primary heating demand in litres/hour (l/h), max. 1000 l/h
Y	Pressure drop in bar

Item	Description
A	HIU with strainer, differential pressure regulator and TL - kvs = 1,18
B	HIU with strainer, including TL - kvs = 1,30
C	HIU without strainer including differential pressure regulator and TL - kvs = 1,26
D	HIU with strainer and differential pressure regulator - kvs = 1,34
E	HIU without strainer including TL - kvs = 1,40
F	HIU without strainer - kvs = 1,52
G	HIU without strainer including differential pressure regulator - kvs = 1,46
H	HIU without strainer - kvs = 1,70

Pressure drops including ball valve. Additional pressure drops, e.g. heatmeter with **Qn 1,5** of approximately **0,05 bar** and other internal/ external fixtures must be added.

Domestic hot water side (secondary)



Item	Description
X	Tapping capacity in litres/minute (l/min)
Y	Pressure drop in bar
Z	Max range

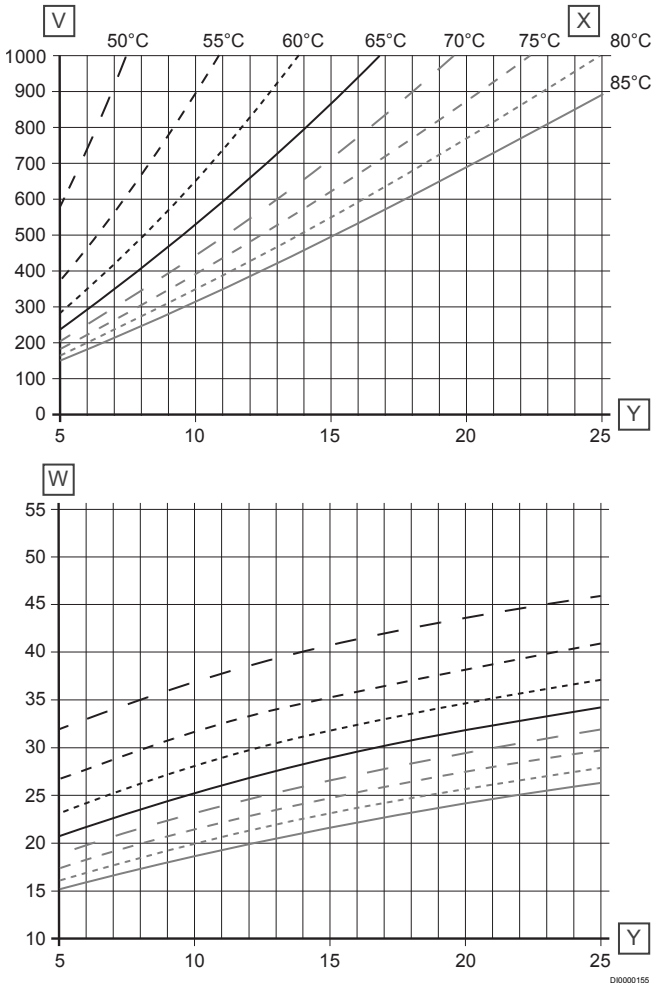
Item	Description
A	HIU without strainer, without throttle disc, including TL - kvs = 1,06
B	HIU without strainer, without throttle disc - kvs = 1,12

The pressure drop at the throttle disc must be added to the calculation.

- 10 l/min = 0,65 - 0,85 bar
- 12 l/min = 0,68 - 0,88 bar
- 15 l/min = 0,70 - 0,90 bar
- 17 l/min = 0,75 - 0,95 bar
- 19 l/min = 1,00 - 1,20 bar

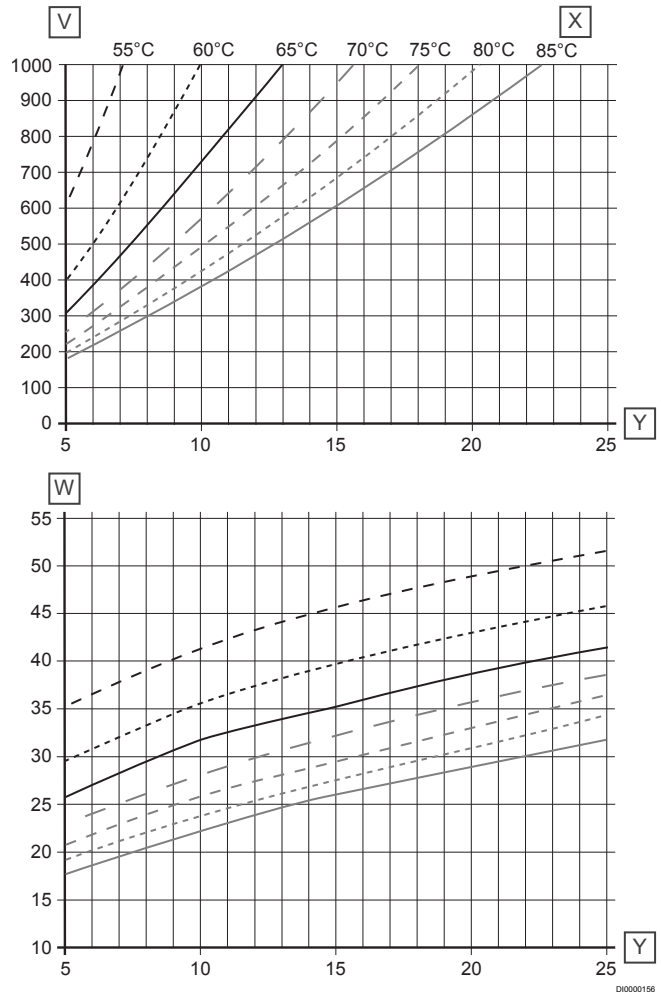
Performance curves and return temperatures

Cold water warming 35 K (10-45 °C)



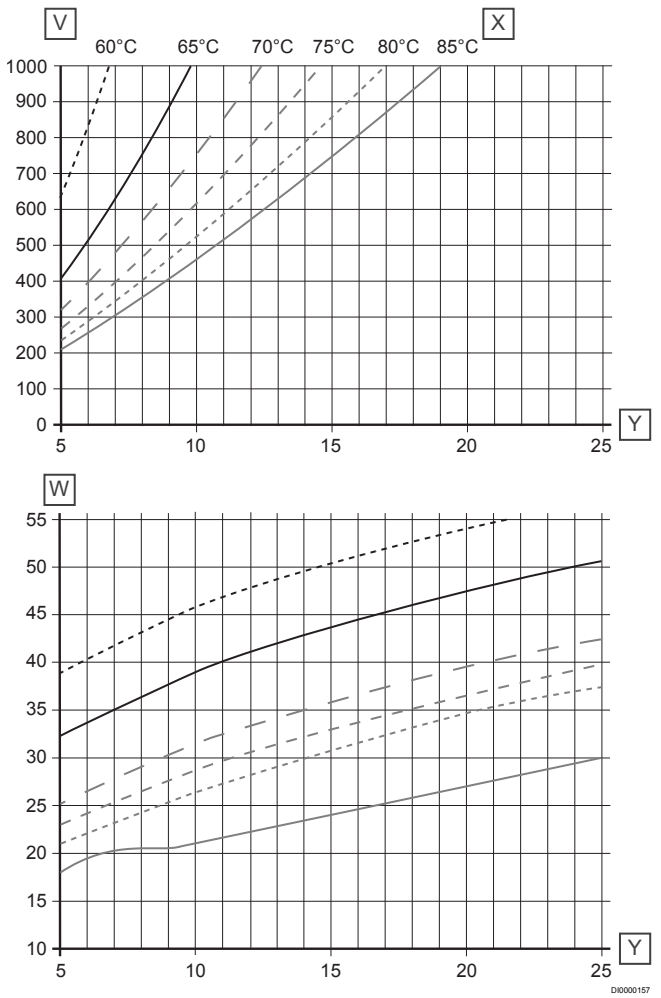
Item	Description
V	Primary heating demand in litres/hour (l/h), max. 1000 l/h
W	Return temperature °C
X	Primary heating supply temperatures
Y	Tapping capacity in litres/minute (l/min)

Cold water warming 40 K (10-50 °C)



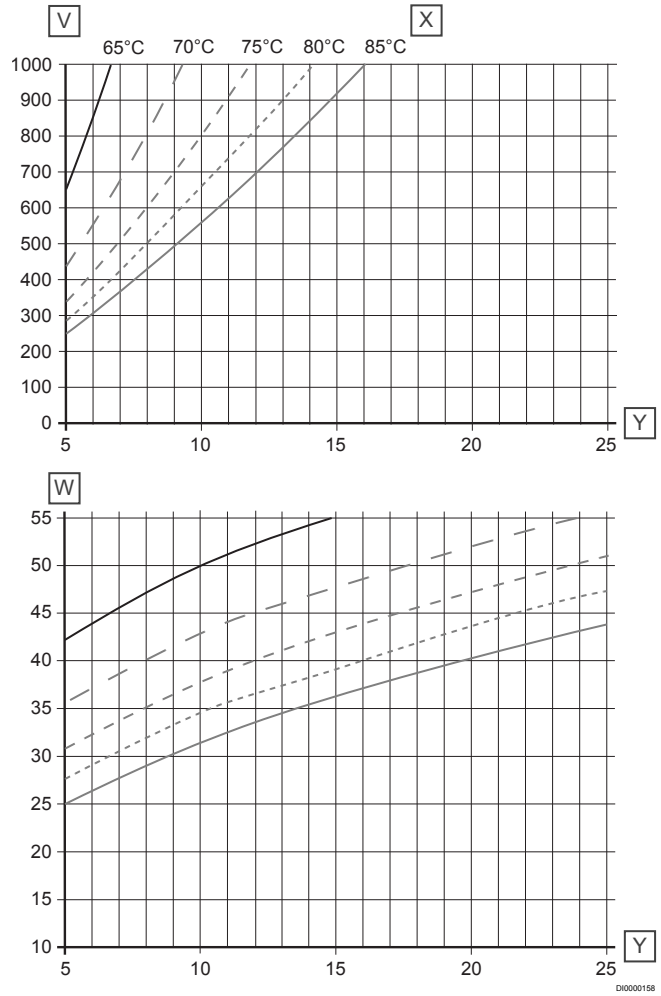
Item	Description
V	Primary heating demand in litres/hour (l/h), max. 1000 l/h
W	Return temperature °C
X	Primary heating supply temperatures
Y	Tapping capacity in litres/minute (l/min)

Cold water warming 45 K (10-55 °C)



Item	Description
V	Primary heating demand in litres/hour (l/h), max. 1000 l/h
W	Return temperature °C
X	Primary heating supply temperatures
Y	Tapping capacity in litres/minute (l/min)

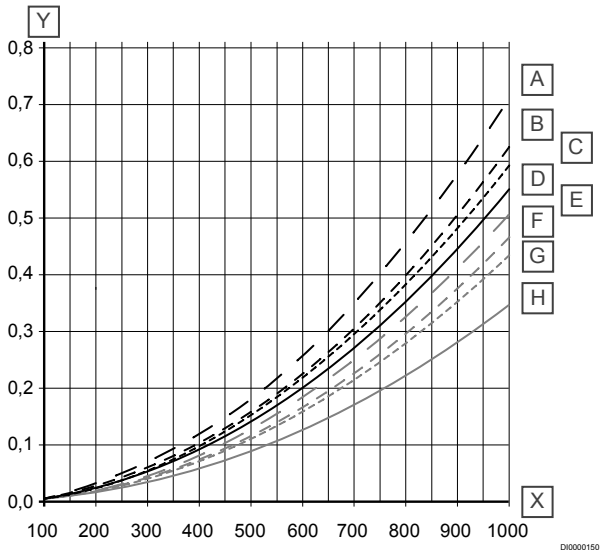
Cold water warming 50 K (10-60°C)



Item	Description
V	Primary heating demand in litres/hour (l/h), max. 1000 l/h
W	Return temperature °C
X	Primary heating supply temperatures
Y	Tapping capacity in litres/minute (l/min)

228H - 24 plates

Heating side (primary)

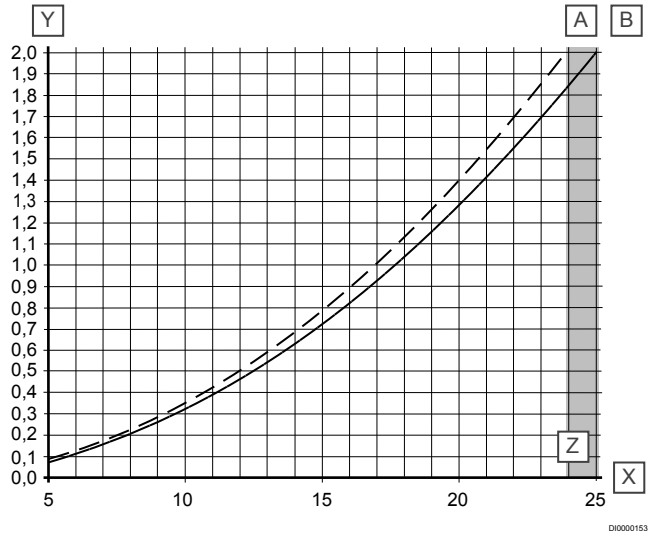


Item	Description
X	Primary heating demand in litres/hour (l/h), max. 1000 l/h
Y	Pressure drop in bar

Item	Description
A	HIU with strainer, differential pressure regulator and TL - kvs = 1,18
B	HIU with strainer, including TL - kvs = 1,30
C	HIU without strainer including differential pressure regulator and TL - kvs = 1,26
D	HIU with strainer and differential pressure regulator - kvs = 1,34
E	HIU without strainer including TL - kvs = 1,40
F	HIU without strainer - kvs = 1,52
G	HIU without strainer including differential pressure regulator - kvs = 1,46
H	HIU without strainer - kvs = 1,70

Pressure drops including ball valve. Additional pressure drops, e.g. heatmeter with **Qn 1,5** of approximately **0,05 bar** and other internal/ external fixtures must be added.

Domestic hot water side (secondary)



Item	Description
X	Tapping capacity in litres/minute (l/min)
Y	Pressure drop in bar
Z	Max range

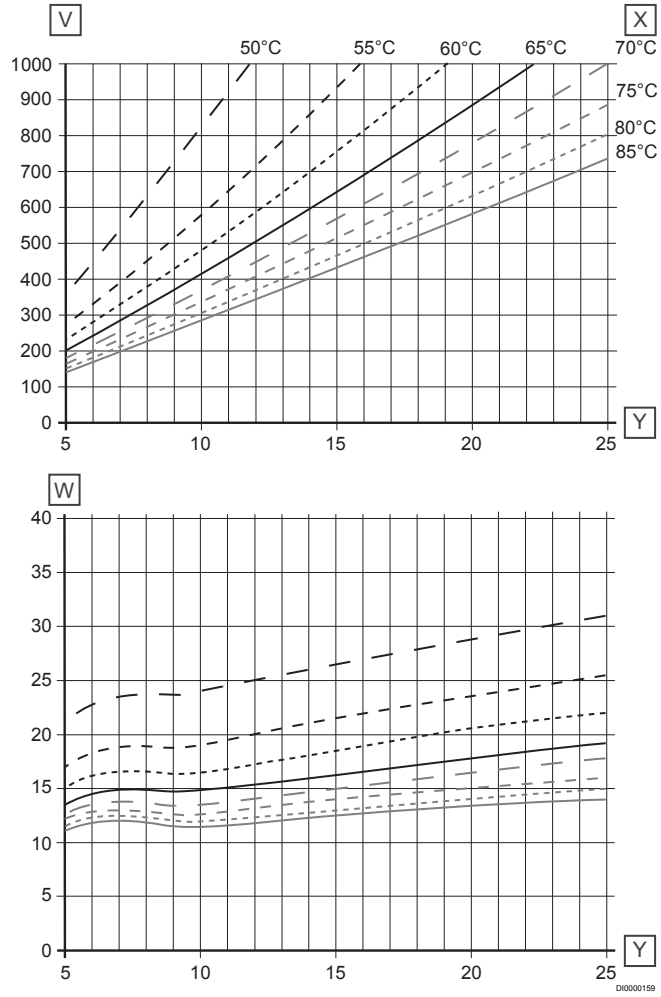
Item	Description
A	HIU without strainer, without throttle disc, including TL - kvs = 1,01
B	HIU without strainer, without throttle disc - kvs = 1,06

The pressure drop at the throttle disc must be added to the calculation.

- 10 l/min = 0,65 - 0,85 bar
- 12 l/min = 0,68 - 0,88 bar
- 15 l/min = 0,70 - 0,90 bar
- 17 l/min = 0,75 - 0,95 bar
- 19 l/min = 1,00 - 1,20 bar

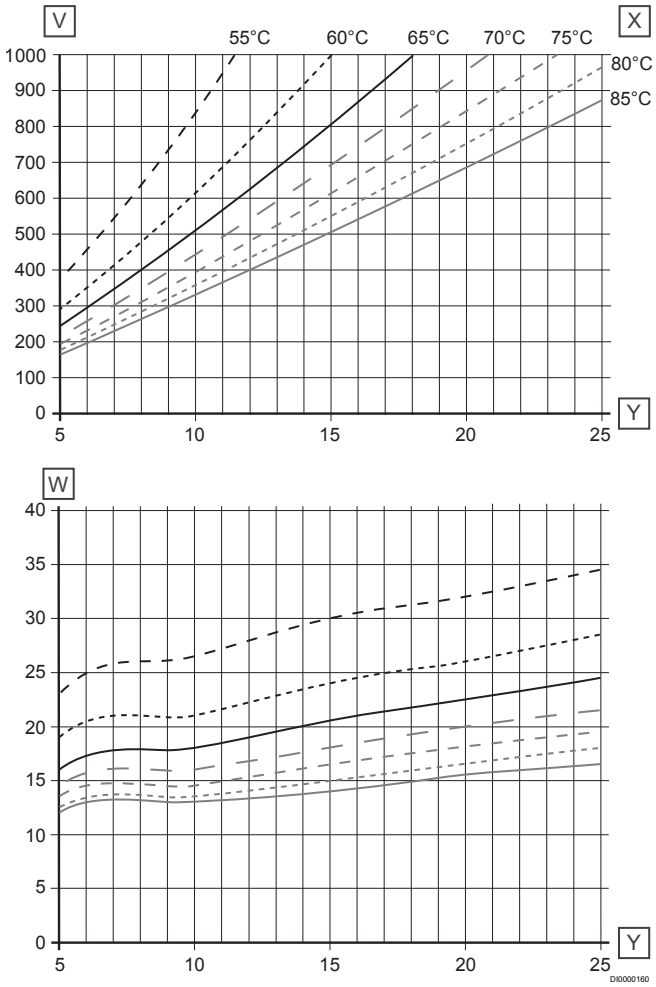
Performance curves and return temperatures

Cold water warming 35 K (10-45 °C)



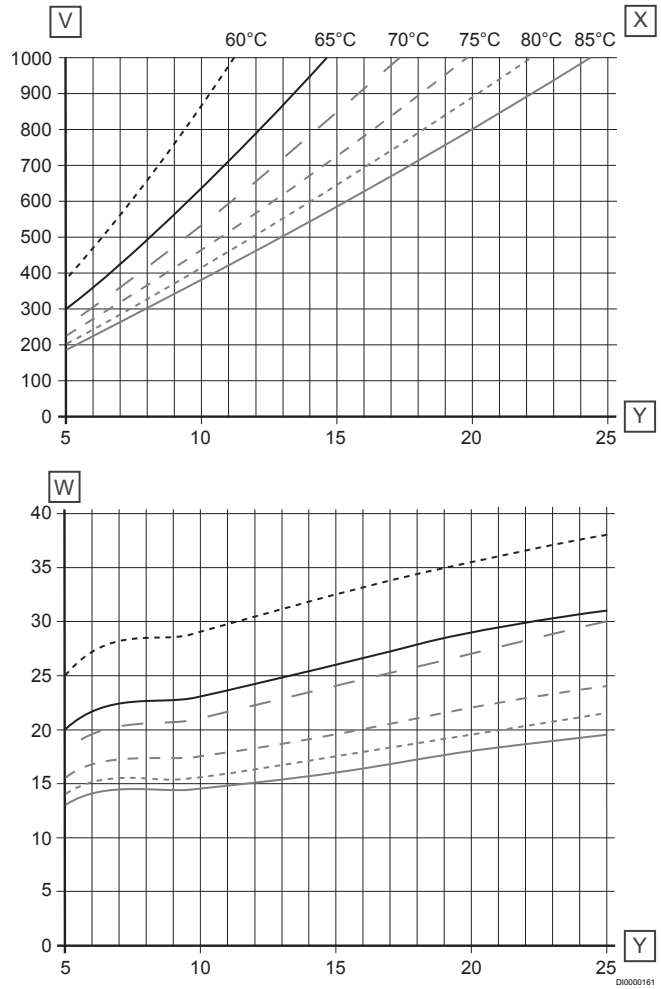
Item	Description
V	Primary heating demand in litres/hour (l/h), max. 1000 l/h
W	Return temperature °C
X	Primary heating supply temperatures
Y	Tapping capacity in litres/minute (l/min)

Cold water warming 40 K (10-50 °C)



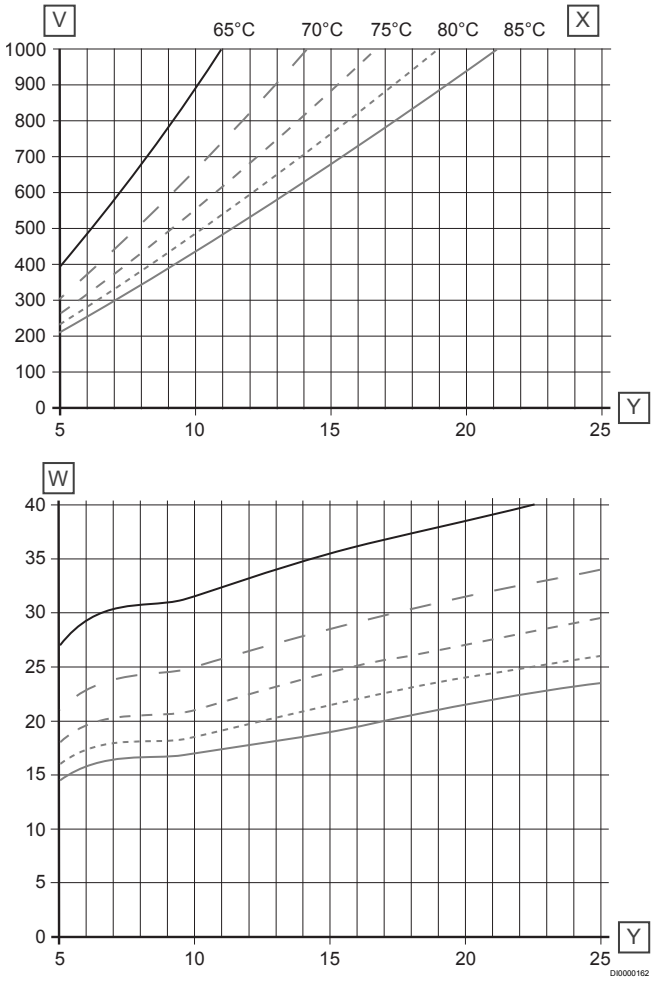
Item	Description
V	Primary heating demand in litres/hour (l/h), max. 1000 l/h
W	Return temperature °C
X	Primary heating supply temperatures
Y	Tapping capacity in litres/minute (l/min)

Cold water warming 45 K (10-55 °C)



Item	Description
V	Primary heating demand in litres/hour (l/h), max. 1000 l/h
W	Return temperature °C
X	Primary heating supply temperatures
Y	Tapping capacity in litres/minute (l/min)

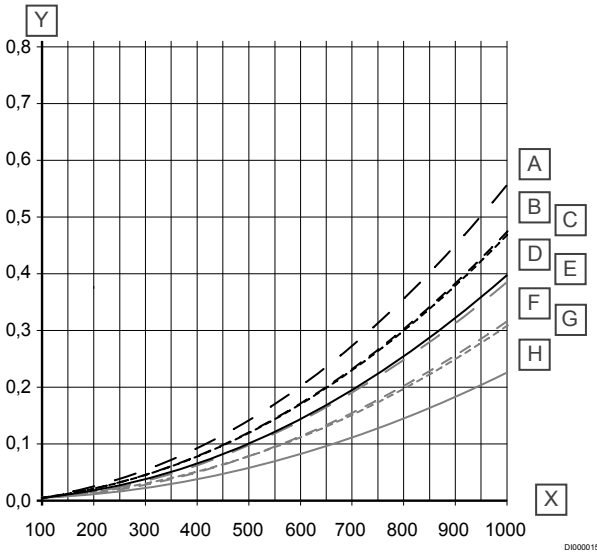
Cold water warming 50 K (10-60°C)



Item	Description
V	Primary heating demand in litres/hour (l/h), max. 1000 l/h
W	Return temperature °C
X	Primary heating supply temperatures
Y	Tapping capacity in litres/minute (l/min)

228H - 40 plates

Heating side (primary)



Item	Description
X	Primary heating demand in litres/hour (l/h), max. 1000 l/h
Y	Pressure drop in bar

Item	Description
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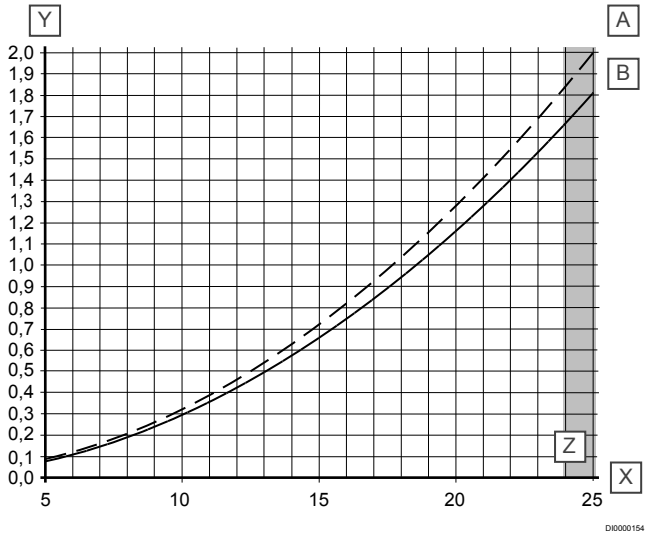
D	HIU with strainer and differential pressure regulator - kvs = 1,34
E	HIU without strainer including TL - kvs = 1,40
F	HIU without strainer - kvs = 1,52
G	HIU without strainer including differential pressure regulator - kvs = 1,46
H	HIU without strainer - kvs = 1,70

Pressure drops including ball valve. Additional pressure drops, e.g. heatmeter with **Qn 1,5** of approximately **0,05 bar** and other internal/ external fixtures must be added.

Domestic hot water side (secondary)



Item	Description
X	Tapping capacity in litres/minute (l/min)
Y	Pressure drop in bar
Z	Max range

Item	Description
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- 17 l/min = 0,75 - 0,95 bar
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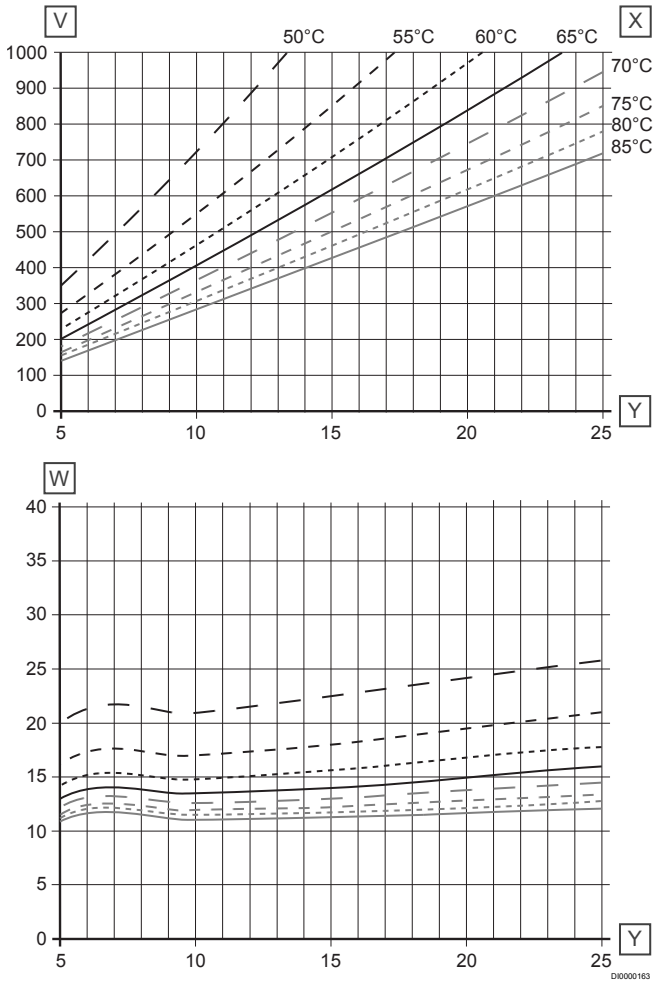
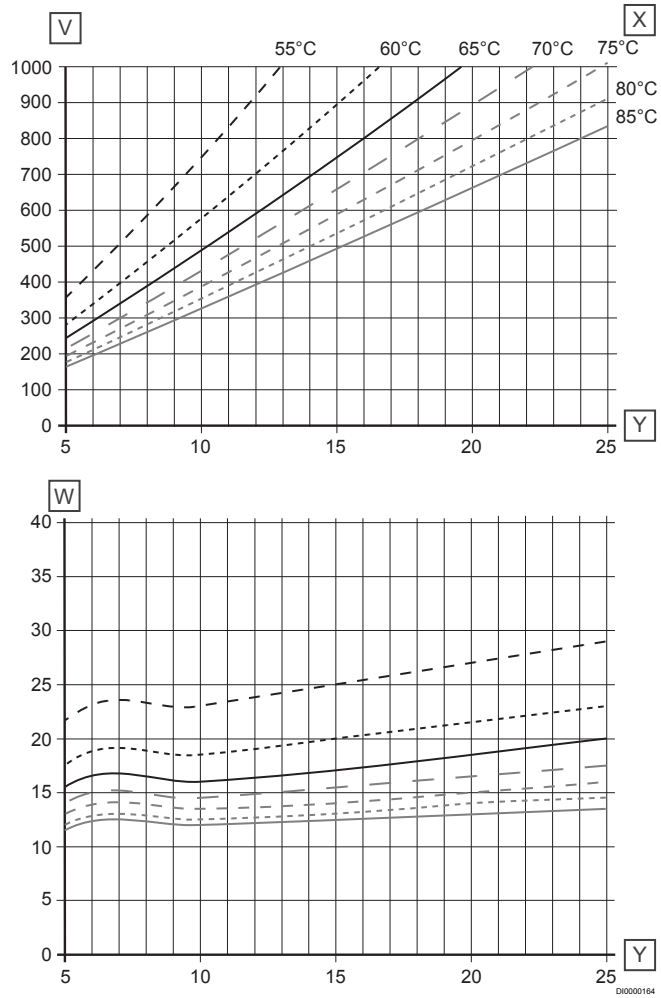


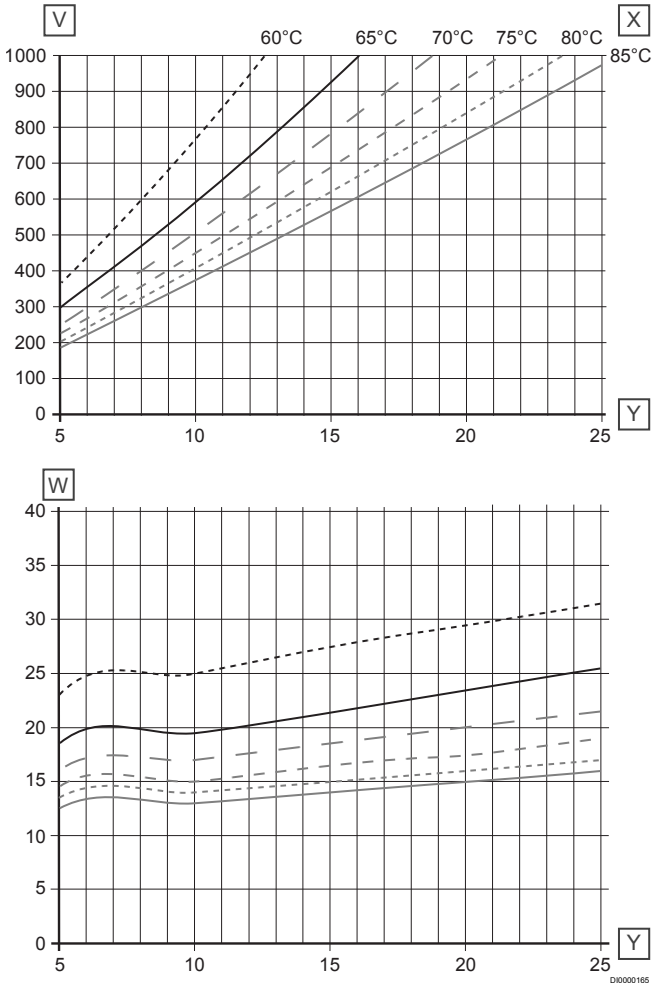
Item	Description
V	Primary heating demand in litres/hour (l/h), max. 1000 l/h
W	Return temperature °C
X	Primary heating supply temperatures
Y	Tapping capacity in litres/minute (l/min)

Cold water warming 40 K (10-50 °C)



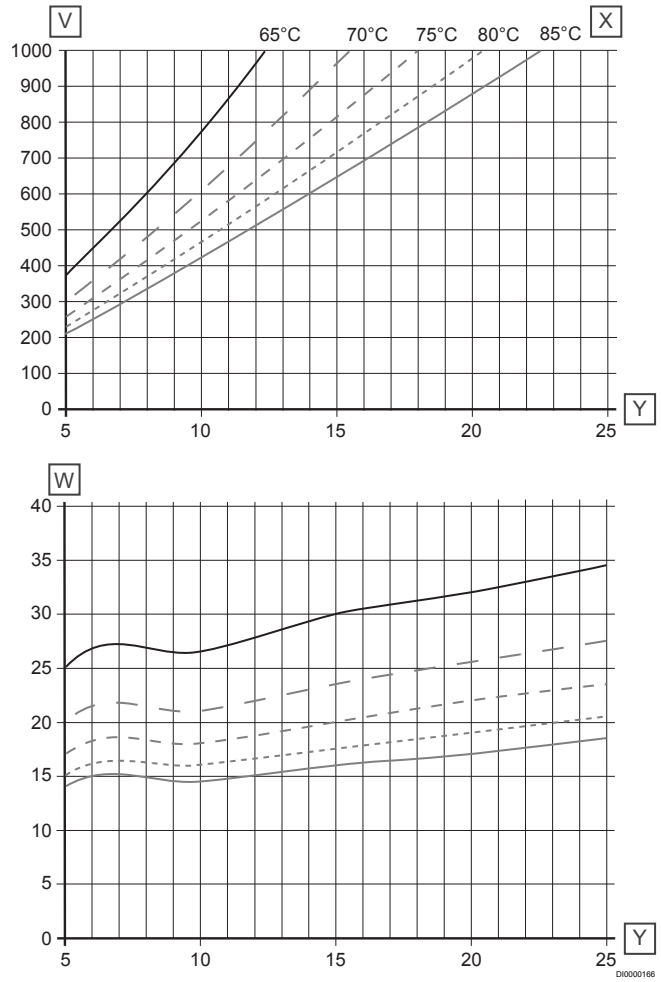
Item	Description
V	Primary heating demand in litres/hour (l/h), max. 1000 l/h
W	Return temperature °C
X	Primary heating supply temperatures
Y	Tapping capacity in litres/minute (l/min)

Cold water warming 45 K (10-55 °C)



Item	Description
V	Primary heating demand in litres/hour (l/h), max. 1000 l/h
W	Return temperature °C
X	Primary heating supply temperatures
Y	Tapping capacity in litres/minute (l/min)

Cold water warming 50 K (10-60°C)



Item	Description
V	Primary heating demand in litres/hour (l/h), max. 1000 l/h
W	Return temperature °C
X	Primary heating supply temperatures
Y	Tapping capacity in litres/minute (l/min)

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