KEMPER hygiene system KHS®

WRAS APPROVED PRODUCT

Potable Water Cold (PWC)

- Good water hygiene by automated maintenance of the intended use
- Significant reduction of flushed water by controlled water change processes

Potable Water Hot (PWH) and Circulation (PWH-C)

- Temperature maintenance up to outlets
- Up to 40% heat loss reduction of PWH-C pipework

KEMPER

Contents

„Water must flow!"

„Water is a friendly element for those who are familiar with it and know how to handle it."

Johann Wolfgang von Goethe (1749 – 1832)

KEMPER Hygiene System KHS®

The innovative valve system

Potable water hygiene, economy, ecology in focus

Already back in the 19th century, Louis Pasteur said: **„We drink 90 % of our illnesses!"**

And that makes it especially astounding that nowadays the maintenance of potable water hygiene in building installations is still often neglected. Maintaining potable water hygiene can have direct impacts on our health.

Even just considering health reasons, establishing operational use as intended, e.g., through forced flow and selective water-change measures in the potable water installation, is recommended in codes and standards.

KEMPER developed the KHS Hygiene System to enable compliance with the hygiene requirements in the potable water installation. This is an innovative valve system to prevent stagnation and the consequential negative impact on the potable water quality. The KEMPER Hygiene System KHS guarantees that fresh potable water is always available at each outlet.

Why does KHS make sense?

Protection of potable water quality

The KEMPER Hygiene System KHS can make a decisive contribution to maintain potable water hygiene in hot and cold water installations of new and existing buildings. Every building is a "prototype" because of its individual usage. Even two buildings of the same kind cannot be compared – they are always specific objects that have to be regarded individually. The "intended usage", which is the basic assumption for the design of potable water installations, should be maintained after installation of the system. KHS technology shows new, innovative ways for potable water installations in the meaning of potable water hygiene, economy and ecology. Installation and operation of KHS is an additional milestone in health and an important contribution to our responsibility caring for our planet earth.

POTABLE WATER

Clean potable water

> Maintains the potable water hygiene (microbiological, chemical and physical)

> Prevention of stagnation by maintaining the "intended usage" at all times

> Maintenance of the correct hot and cold water temperatures to minimize the proliferation of pathogens, such as Legionella (PWC < 25 °C, PWH > 55 °C)

ECONOMY

Saves financial funds and resources

> Prevention of corrosion in the piping system

> Local water usage creates movement in the whole preceding pipework

> Reduction of labour and operating costs by automated processes

> Documentation by hygiene protocol

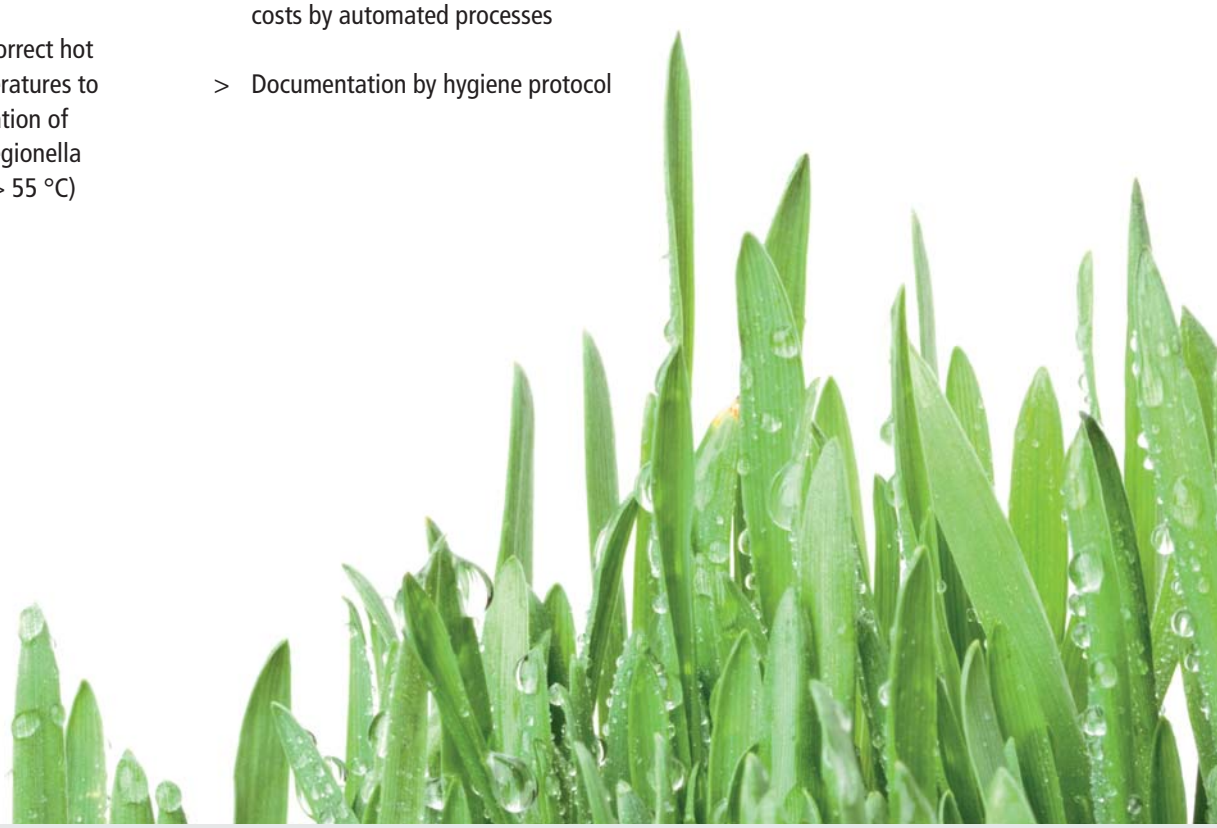
ECOLOGY

Protects the environment and saves energy

> Sustainable water usage

> Providing "natural" water at all outlets

> Reduction of heat losses in hot water circulation systems



Potable water hygiene maintained?

Potable water installation – potential infection reservoir.

Hygienists consistently find inadequate water hygiene in potable water installations.

The problems occur in cold and hot water systems. Professionals claim stagnation to be one of the main reasons for the change of potable water becoming non-potable water. Stagnation is a period of "non-use" of the water. During this time, the water does not flow and is not consumed.

The reason for stagnation can be old, unused pipework or periodically unused rooms of a building. These pipe sections are permanently stagnant and can be the origin of a hygienic problem.

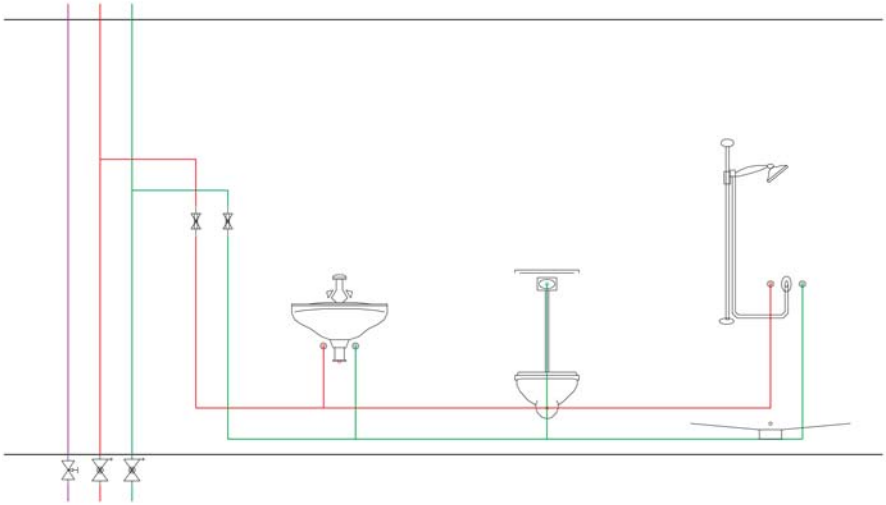
The operator is responsible for the proper function of the water installation of his building. Therefore it is usually recommended to remove the unused pipework from the potable water installation or to ensure that the whole installation is "used as intended".

"Use as intended" means that an assumed frequency of water usage during the design needs to be maintained after the commissioning of the water installation. This originally assumed usage is often not met or the usage changes after a time, so that controlled water changes have to be done to maintain the potable water hygiene. If the potable water consumption is not as designed in certain areas, pathogens can render the entire system unusable.

Unprofessional prevention of stagnation?

The fight against pathogens in hot and cold water is of prime importance for operators of big potable water installations and their daily business.
So far, the T-installation is the common practice for potable water installations in public (hotels, hospitals, schools, etc.) and private buildings. The result is potential stagnant pipework to the single outlets. For a frequent water change, extensive and costly manual measures are performed.

This flushing measures are ineffective because they are neither monitored nor comprehensive. The flushing measures are defined by the technical and hygiene personnel and are carried out by employees. Therefore they have to open and close several valves and outlets manually. This causes high operating and labour costs.

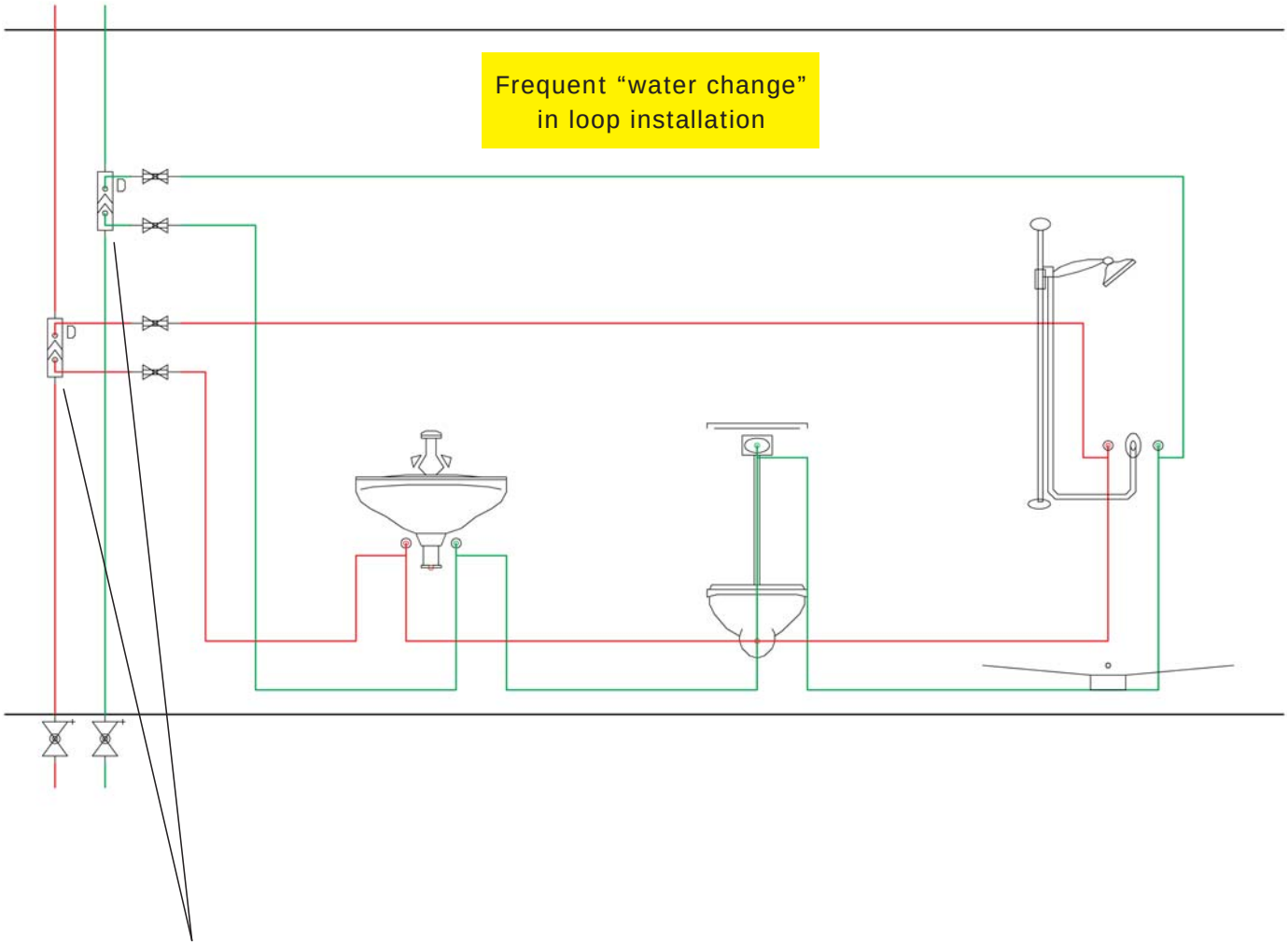


Normal T-installation in the sanitary block. Stagnation areas with high contamination risks arise when there are seldom-used outlets.

Labour-intensive water changing at every terminal point. Nowadays normal, but ineffective and expensive solutions are used to ensure the proper use as intended in buildings.

Professional prevention of stagnation!

With the innovative valve system from KEMPER



KHS Flow Splitter Unit -dynamic-

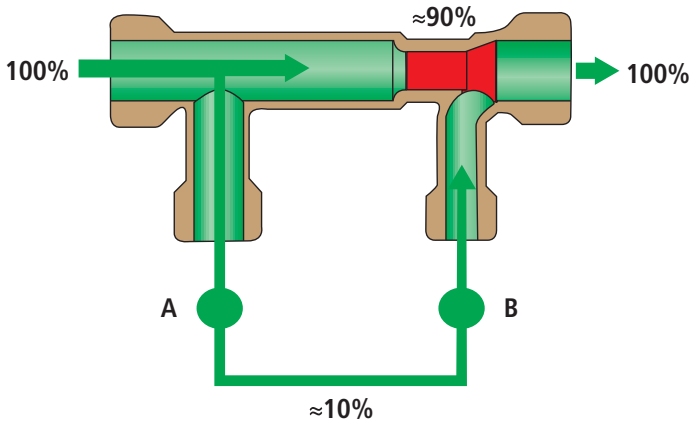
To avoid ineffective and cost intensive measures against stagnation, the above shown type of installation should be considered in the design of potable water installations.

The innovative pipe installation in combination with the KHS Flow Spitter creates a frequent water change in the loop pipework when water is used at a subsequent outlet at the riser – even if there is no frequent use of water in the regarded loop.

KHS Flow Splitter
-static- for PWC

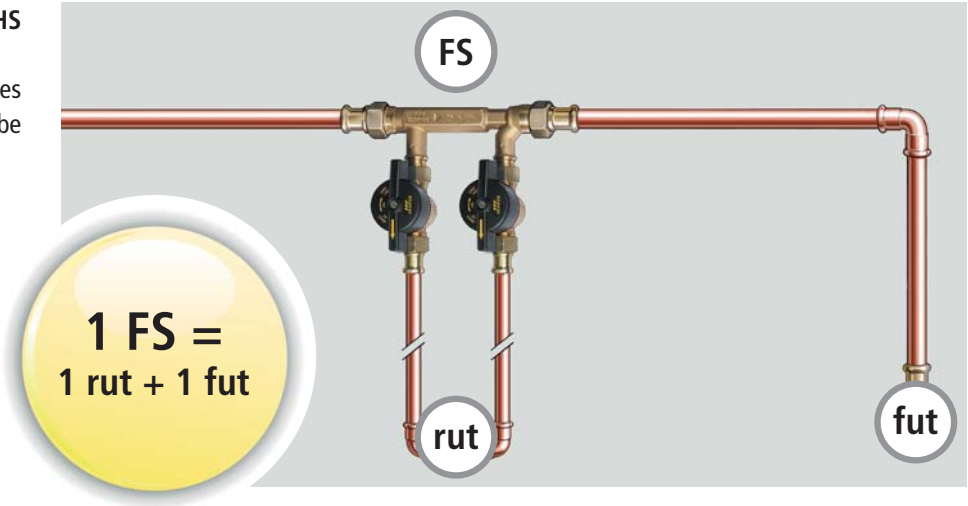
Giovanni Battista Venturi
Simply ingenious - ingeniously simple. The principle discovered by Giovanni Battista Venturi still meets all requirements even today. In his productive period (*1746 in Bibbiano † 1822 in Reggio nell´Émilia) he also developed the venturi pump and the venturi nozzle.

The KHS Flow Splitter's function is based on the principle of the Venturi nozzle. The minimum pressure difference between Supply line A and Return line B causes an induced flow in the branch. The drive comes from water usage after the KHS Flow Splitter Unit. The entire water content in the branch is thus changed, stagnation is prevented and the water temperature is kept low.



When does it make sense to use a KHS Flow Splitter Unit?
A KHS Flow Splitter unit always makes sense when a rarely used outlet can be driven by a frequently used outlet.

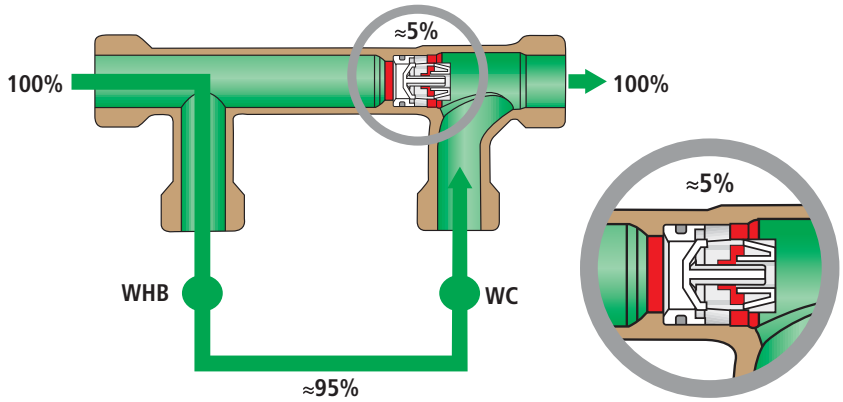
FS: KHS Flow Splitter
rut: rarely used tap
fut: frequently used tap



KHS Flow Splitter
-dynamic- for PWC and PWH

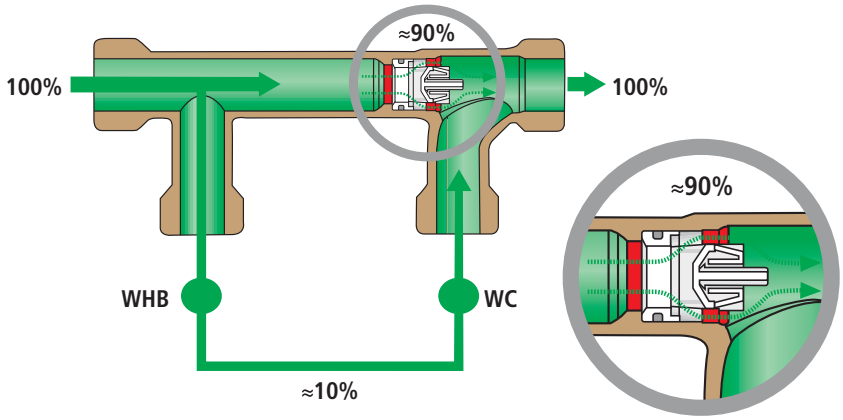
Ingeniously simple – simply dynamic
Small flows in the main – lots of movement in the branch loop.

With the KHS Flow Splitter -dynamic-, another step towards **stagnation prevention** has been achieved. With an additional component in the venturi nozzle, the KHS Flow Splitter is capable of achieving a maximum flow through the connected branch loops; even with the smallest flow rates in the main or in the riser.



Explanation
During small flow in the main, ≈ 95 % flows through the loop!

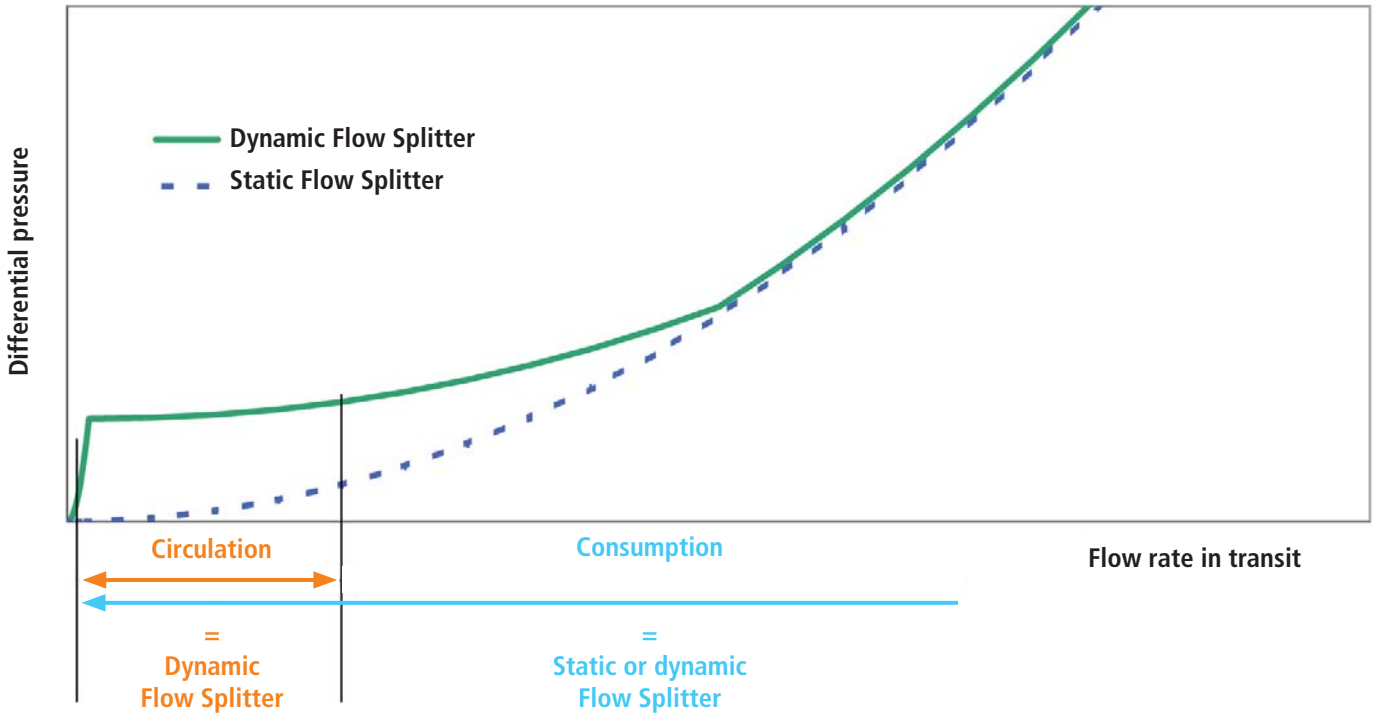
Small volume flow in the main line or in the riser:
The dynamic venturi nozzle remains nearly completely closed - nearly the entire flow needed for supply is driven through the loop. The opening pressure of the dynamic venturi nozzle is not reached.



KHS Flow Splitter -dynamic-

High volume flow in the main line or in the riser:
The dynamic venturi nozzle opens - the majority of the flow passes directly through the flow splitter in the main line and a partial flow is diverted through the loop due to the venturi effect. The opening pressure of the dynamic venturi nozzle is reached.

Characteristics of the KHS Flow Splitter
-static- and -dynamic-



The diagram schematically portrays the pressure difference across the venturi nozzle dependent on the volume flow in the distribution/riser branch (flow) for the KHS Flow Splitter -static and -dynamic-.
Because of the additionally integrated cartridge in the KHS Flow Splitter -dynamic-, even at low volume flows, there is a higher pressure loss across the venturi nozzle as compared to the KHS Flow Splitter -static-. That makes the KHS Flow Splitter -dynamic- also perfectly suited for use in hot potable water installations to give circulation. During circulation mode, a sufficient water change is ensured in the ring lines.

KHS Flow Splitter Unit -static-

Figure 640

KHS Flow Splitter Unit -dynamic-

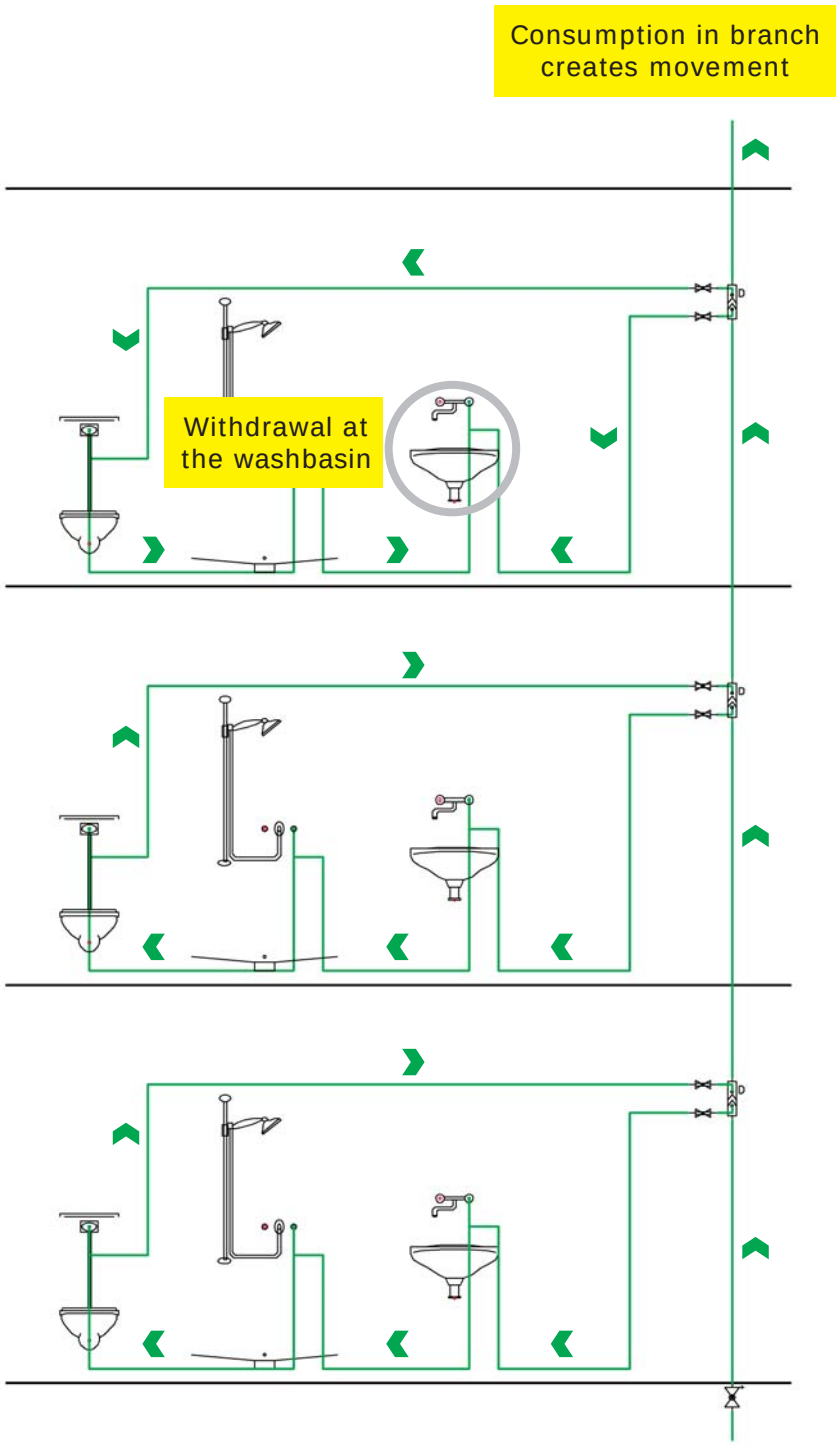
Figure 650

Installation principle of the KHS Flow Splitter
-dynamic- in PWC

Stagnant water in pipes of occasionally unused outlets can be found in many potable water installations. The installation of a KHS Flow Splitter -dynamic- prevents stagnation if a subsequent outlet at the riser is used frequently.

The frequently and occasionally unused outlets need to be identified during the design phase by the operator and the designer to determine the adequate positions for the KHS Flow Splitter.

A hygienically safe installation with KHS Flow Splitter in the riser and an innovative piping in the bath is shown on the right. The frequently used washbasin in the 3rd floor causes a water change in the loops of the lower baths, so that stagnation has no chance!



Principle: Water movement – effectively prevent stagnation

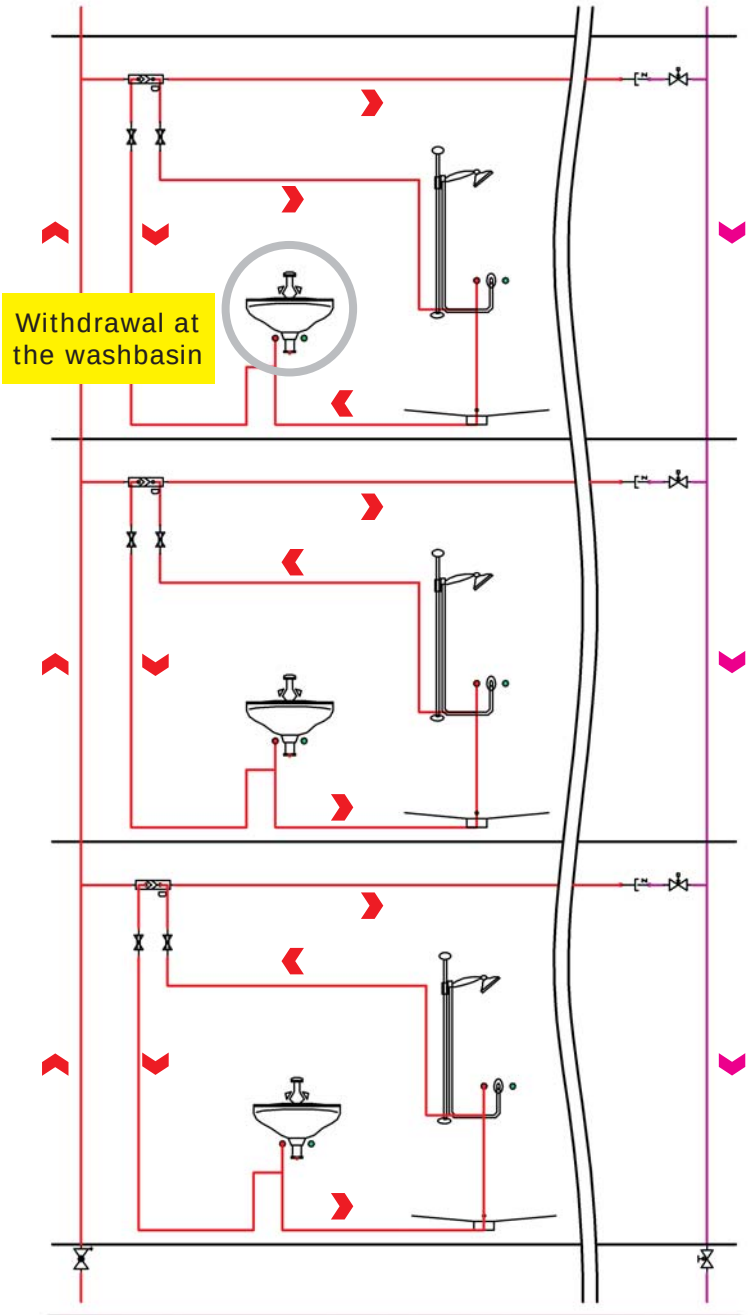
- Frequent water change
- Low cold water temperature
- Water movement in whole pipework

Installation principle of the KHS Flow Splitter
-dynamic- in PWH

Optimised circulation with energy and economy benefits

It is reasonable to use the KHS Flow Splitter -dynamic- in the hot water system of some buildings. This depends on the shape of the building and the routing of the pipework inside. As shown on the right side, outlets in a bathroom are connected via a KHS Flow Splitter -dynamic- and a loop installation in the bathroom. A hot water circulation pipe is not required in the corridor, as a hot water circulation in the room installation is realized by the KHS Flow Splitter and the loop installation. At the end of the corridor, the hot water pipework is connected to a hot water circulation riser via a thermal regulating valve (e.g. Figure 141 0G, Multi-Therm). In periods without hot water consumption, the pump driven circulation volume is led through the whole pipework via the venturi effect of the KHS Flow Splitter to maintain the hot water temperature in all loops.

In case of water consumption at an outlet, e.g. at the washbasin on the 3rd floor, this outlet is supplied from both sides of the loop installation. This improves the supply situation of each outlet.
The reduced hot water circulation pipework can lead to a 15 % heat loss reduction of the circulation pipework.



Prevent stagnation and maintain the temperature effectively

- no stagnation due to KHS Flow Splitters and loop installation
- Temperature maintenance in the hot water pipework during consumption and circulation periods through loop installation

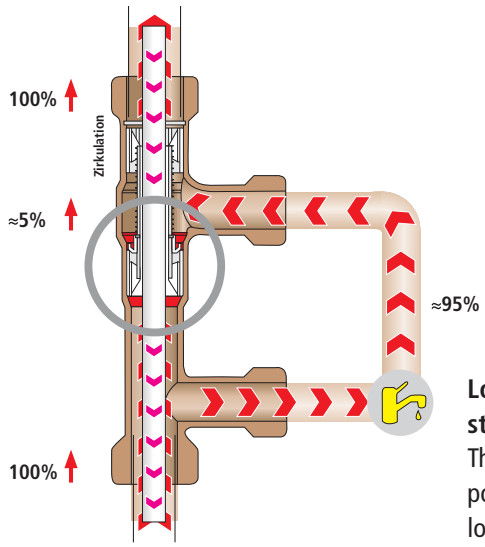
Installation principle of the KHS Flow Splitter
-dynamic- in combination with the Inliner system for PWH

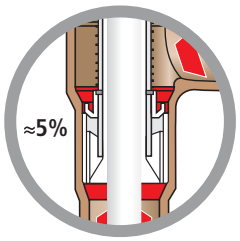
The inliner system is a hot water circulation pipe that is integrated in the hot water pipe. The hot water flows in the main pipe around the circulation pipe. At the top of the riser, a special head piece is installed where the hot water enters the circulation pipe and flows the other direction back to the water heater.

The benefits of this system are that no supports, insulation and wall breakthroughs are needed for a separate circulation pipe. The heat loss of the circulation pipework is reduced too. The combination of inliner system and the KHS Flow Splitter with loop installation maintains the temperature in the whole hot water system till the outlet.

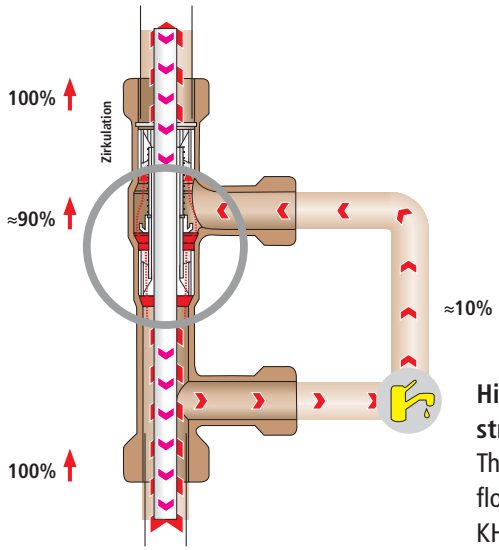
KHS Flow Splitter Unit -dynamic-
for Inliner systems Figure 660 00

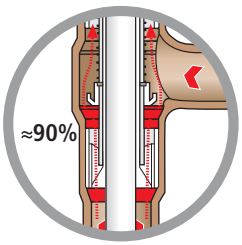
KHS Flow Splitter Unit -dynamic-
for Inliner systems Figure 660 06





Low hot water consumption downstream of the KHS Flow Splitter:
The venture nozzle remains in minimum position. Most hot water flows through the loop pipework of a connected room.

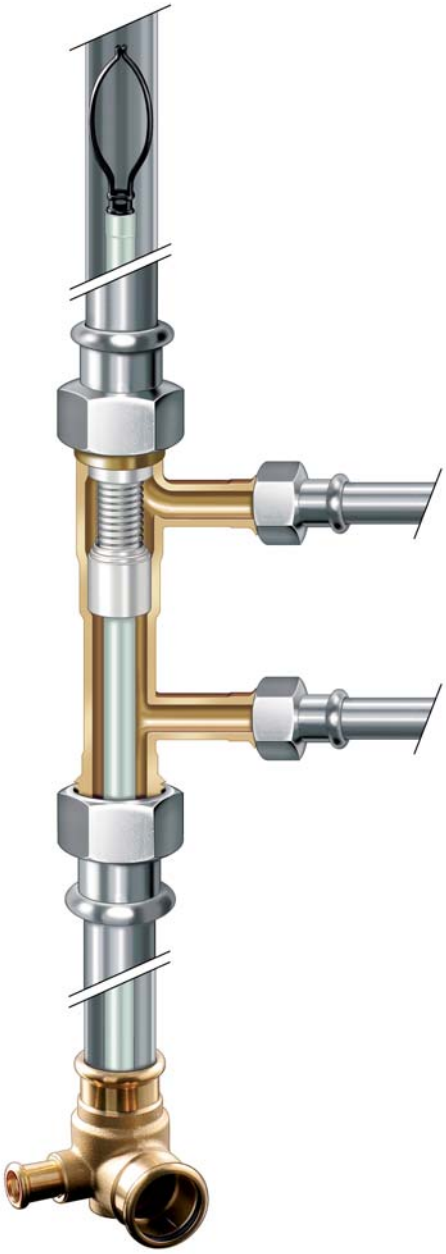


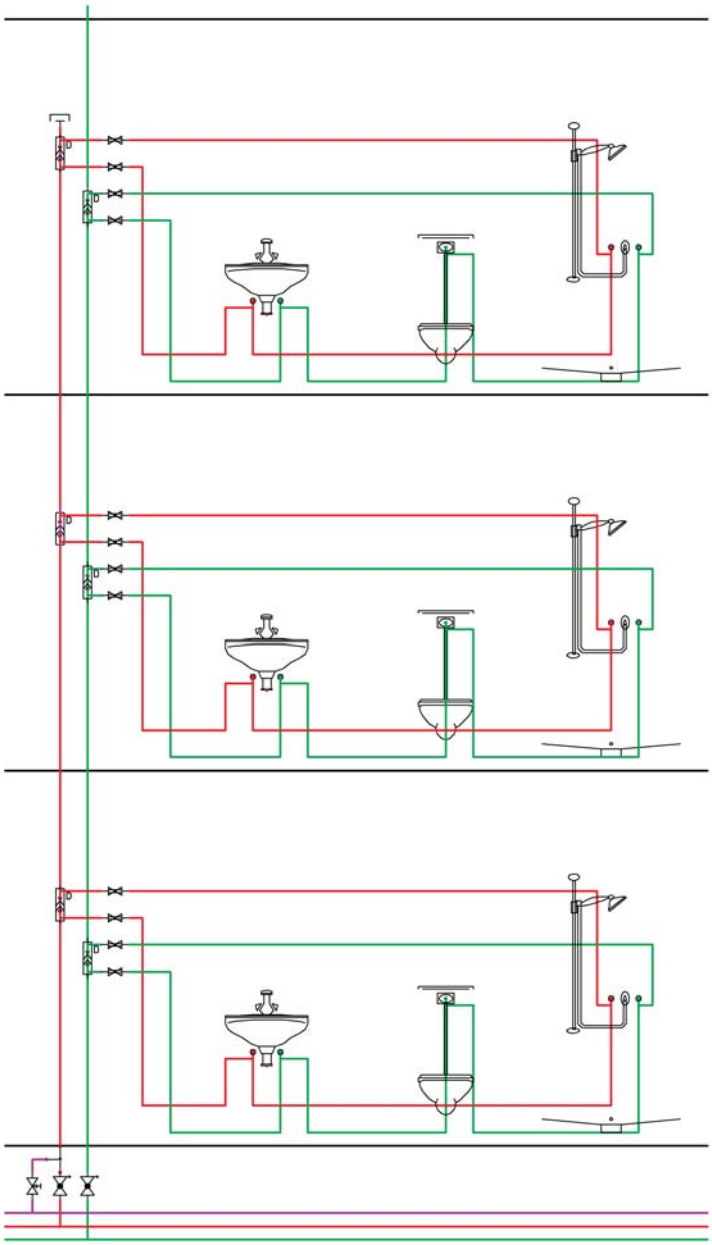


High hot water consumption downstream of the KHS Flow Splitter:
The venture nozzle opens. Most hot water flows through the main direction of the KHS Flow Splitter. A smaller percentage of the higher volume flow is driven through the loop pipework of a connected room.

Successful combination

Inliner-System with KHS Flow Splitter -dynamic-





The KHS Flow Splitter -dynamic- for inliner systems was developed for the Geberit inliner system.

The inliner system can be implemented in buildings (e.g. senior citizens residences, hostels) in which one each sanitary supply unit per floor is placed on a PWH/PWHC riser branch.

KHS Isolating Valve

Valves for water changing

Automatic water change in potable water installations can be realized with the KEMPER KHS Isolating Valve. This valve can be used to avoid stagnation in main pipes of existing systems or to support the frequent water change in new systems that are installed with KHS.

If frequent use of all outlets cannot be guaranteed (e.g. school holidays), this valves in combination with KHS can be used to create a frequent water change in the whole pipework. The KEMPER KHS Isolating Valve is available as 230 V and 24 V version, flow limited or unlimited version and with a servodrive with or without spring return function.

KHS Isolating Valve with servodrive

24 Volt:
Figure 686 00 and Figure 696 00 (max. 2 l/min)
230 Volt:
Figure 686 04 and Figure 696 04 (max. 2 l/min)

KHS Isolating Valve with spring return servodrive

24 Volt:
Figure 686 01 and Figure 696 01 (max. 2 l/min)
230 Volt:
Figure 686 05 and Figure 696 05 (max. 2 l/min)

Controlling the KHS Isolating Valve with servodrive:

- KHS Timer
- KHS Mini Control System
- KHS Logic Control System
- Building management systems (BMS)

The KHS Isolating Valve with servodrive are available for optionally 24 volt and 230 power supply.

24 Volt e.g. for:

- KHS Logic Control System
- Building management systems (BMS)

230 Volt e.g. for:

- KHS Timer
- KHS Logic Control System

Note:

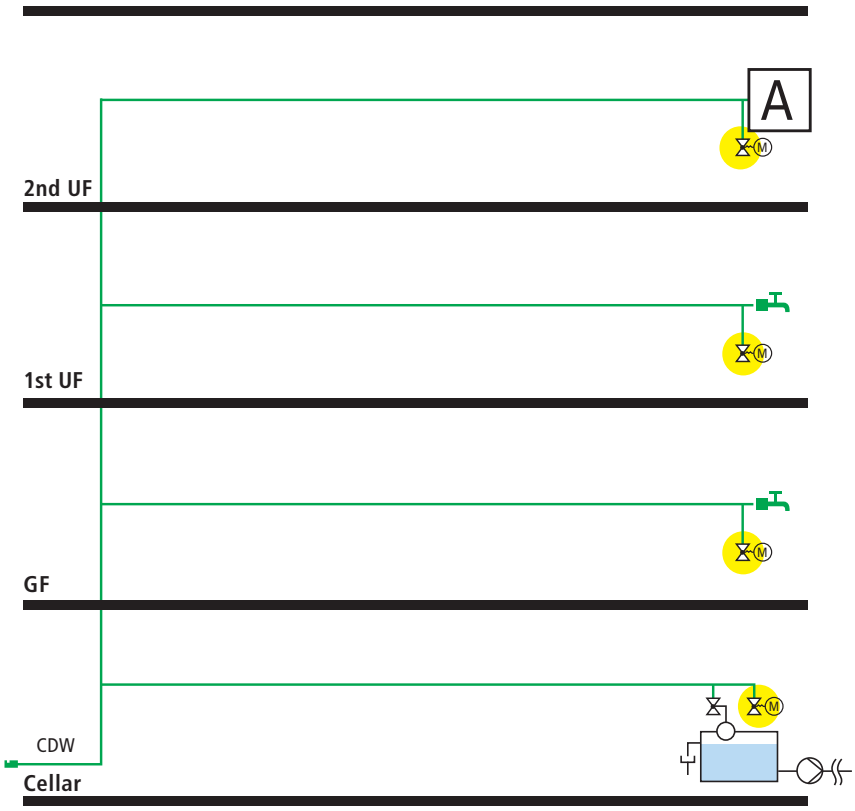
To attain the best-possible water change (low water change volume) in the ring line, use the KHS Isolating Valve with servodrive Figure 696 in combination with the KHS Flow Splitter -dynamic-.

If, due to local circumstances, the heat gain of the PWC line is very high so that it is not possible to maintain a PWC temperature below 25 °C in the mains, it is not possible to maintain the temperature with the KHS Isolating Valve with servodrive (Figure 696 - max 2 l/min) during temperature controlled water changing processes. Either additionally or alternatively to Figure 696, it is then necessary to employ Figure 686. The control of the additional KHS Isolating Valve with servodrive can be undertaken through the KHS-Timer Set or the BMS.

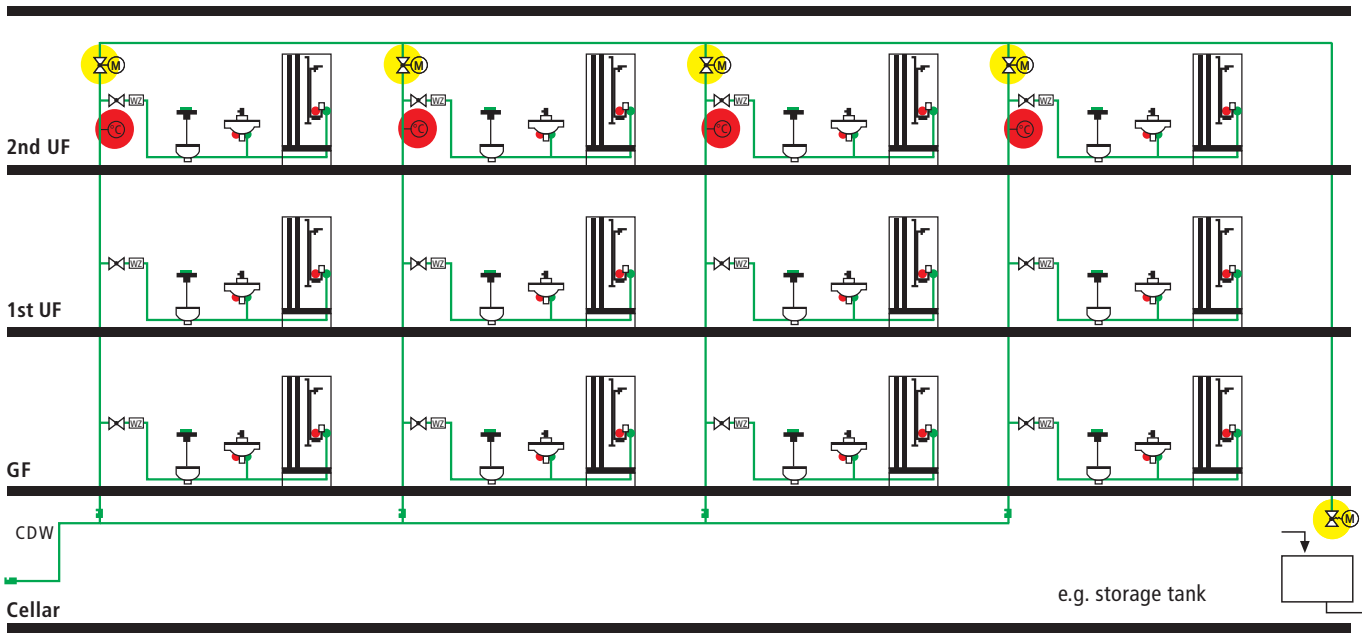
KHS Isolating Valve
Application example

The KHS Isolating Valves can be used as terminals with spring-reset servodrive (example on the right) or in combination with valves with servodrives in the riser branch plus a terminal valve with spring-reset servodrive (example below).
If the second variant is selected, the control must be implemented through the KHS-Logic control system or through the BMS. If there is no permanent consumer in the potable water installation, the KHS-isolating valves can also be used as the drive for the potable water installation.

Recommendation:
Collect the accruing water volumes for use in a storage tank (e.g., rainwater harvesting systems, fire extinguishing tanks, watering outdoor facilities, etc.)



Potable water hygiene maintained by frequent water change in the pipework



CONTROL-PLUS

Hand-held measuring instrument for sensors

The KEMPER CONTROL-PLUS portable measuring instrument is used in combination with volume flow (Figures 138 4G, 638 4G), temperature (Figures 138 00 0033 00, 628 0G) or pressure sensors (Figure 138 00 006 00) to determine the accurate values in the drinking water installation. This can be used for the hydraulic balancing of hot water circulation systems. It is possible to measure the values or to record temperature, volume flow, pressure or velocity. The recorded values can be downloaded via USB interface and software on the customers' notebook. Maximum 4000 values can be recorded.

CONTROL-PLUS hand-held measuring instrument for sensors
Figure 138 00 002

Sensor measurement module
Figure 138 00 011

KEMPER Sensor Measurement Module

This module is used if a sensor is not connected to a BMS or KHS Logic Box. The sensors are usually installed at inaccessible places in the ceiling void. The measurement box can be installed below the ceiling void to connect the portable measuring instrument within seconds to check the operating values of interest.

The Measurement Module has three important functions:

1. It is used as a defined interface between portable measuring instrument and various sensors in addition to CONTROL-PLUS, Pt 100 and Pt 1000. Other sensors with a 4 - 20 mA or 0 - 10 V signal can be connected to this box.

2. The connected sensor and its position can be stored in the portable measuring instrument.

3. The measurement module enables to take measurements from sensors at inaccessible places.

CONTROL-PLUS

Hand-held measuring instrument for sensors

Pt 1000 Temperature sensor
Figure 628 0G

Sensor measurement module
Figure 138 00 011

Control Plus volume flow sensor
Figure 138 4G, 638 4G

CONTROL-PLUS hand-held measuring instrument for sensors
Figure 138 00 002

Pt 1000 portable temperature sensor
Figure 138 00 003

Pressure sensor
Figure 138 000 006

Cable for pressure sensor
Figure 138 00 016

KHS Mini Control System
for small and medium size buildings

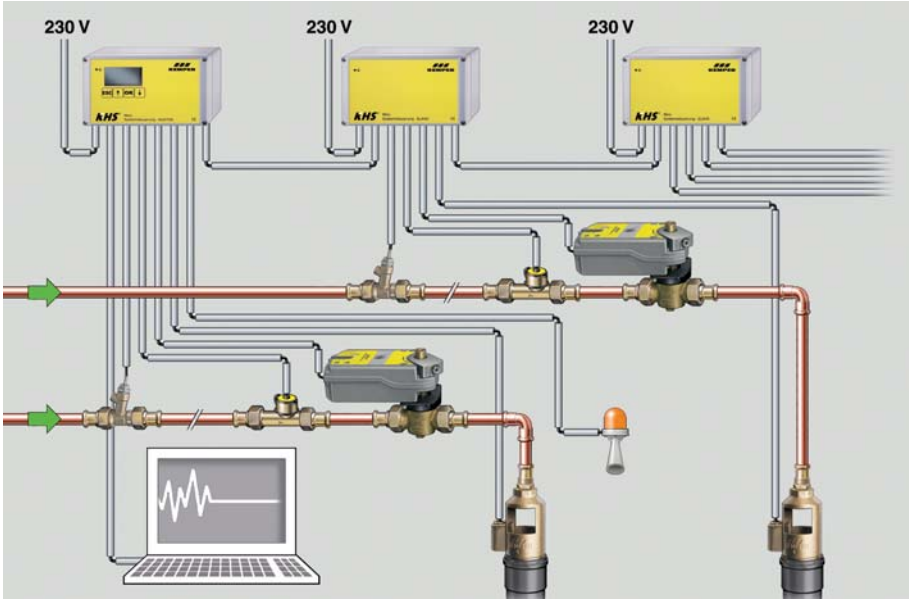
The KEMPER KHS Mini Control System can selectively implement water changing measures to maintain the potable water hygiene in small and medium size building (e.g. schools, kindergartens, small plants, industry, department stores, holiday homes, etc.).

Each box of the KHS Mini Control System can be connected to a temperature sensor, volume flow sensor, KHS isolating valve and a free drain with overflow sensor and can control the frequent water changes by time, temperature or volume.

The three operating modes

- Time controlled water change
- Temperature controlled water change
- Preset water volumes

KHS Mini Control System MASTER Figure 686 02 005 and SLAVE Figure 686 02 006



MASTER/SLAVE technology application
The sophisticated modular principle with the practical accessories facilitates solving complex requirements.

KHS Mini Control System

The MASTER/SLAVE technology

A single MASTER control box is the basic version of the KHS Mini Control System. This is used to control the water change measures at one point in a drinking water installation.The Mini Control System can be extended to a maximum of 1 Master box and 31 Slave boxes, which are connected in a row via CAN-BUS cable. 32 points with flushing valve, temperature and volume flow sensor and free drain with overflow sensor can be controlled with this system. All boxes can be configured over the screen and the buttons on the Master box. As an alternative, the configuration can be done with software on a notebook, which is connected to the Master box via USB cable. The data of all water change processes is stored in the Master box. The log file of all processes can be downloaded and saved as an excel file. The Mini Control System is a decentralized system where the control boxes are installed next to the point of water change. The wiring for the actuator and sensors is kept very short by this kind of installation. Only the CAN-BUS cable has to be installed between the single control boxes.In case of an error, a optical or visual alarm signal occurs and a transfer of the alarm signal to an existing BMS is possible by dry contact.

Detailed instructions for the wiring are available in the table on page 42.

Base unit*		KEMPER KHS Mini Control System MASTER/SLAVE					
		Water change group** with components Any combination of the individual components can be selected					
		Base unit	Individual components				
Summary of functions			+ 	+ 	+ 	+ 	+ 
operating mode	Time controlled water change	X	X	X	X	X	X
	Present water volumes				X	X	X
	Temperature controlled water change			X	X	X	X
Combined operating modes				X	X	X	X
Overflow monitoring with alarm signal and latching			X				X
Number of water change groups with program allocation			1 -MASTER- and max. 31 -SLAVES-				
Configuration and water change log		USB cable + software, connection -MASTER- with customer PC (min. system requirement: Windows XP or higher)					

* Base unit KHS Mini Control System: smallest functional unit is 1 -MASTER- and 1 KHS isolating valve

** Water Change group contains max.: 1 Master or 1 Slave, 1 KHS isolating valve with spring return servodrive, 1 KHS temperature sensor, 1 KHS volume flow sensor, 1 KHS free drain with overflow sensor

KHS Timer Set
Simple control

The KEMPER KHS Timer Set is the smart solution to carry out scheduled water changes in drinking water installations to avoid stagnation. This simple and effective control box is basically installed in small and midsize objects like schools, sports halls and kinder gardens or in existing buildings as basic system to create a frequent water change in the main pipework.

KHS Timer Set
Figure 686 08 and Figure 696 08 (max. 2 l/min)

KHS Timer Set
Figure 686 09 and Figure 696 09 (max. 2 l/min)

KHS Logic Control System
for large buildings

The KEMPER KHS Logic Control System is the intelligent solution for controlling and monitoring water changing measures to maintain the potable water hygiene in large buildings (e.g., hotels, hospitals, etc.). Along with performing the water changing measures and maintaining the temperature < 25 °C in the PWC, the KHS Logic Control System can also monitor the temperature level in the PWH/PWHC. The KHS Logic Control System is equipped with an alarm function to accomplish that. The operating conditions (PWC and PWH) are automatically logged.

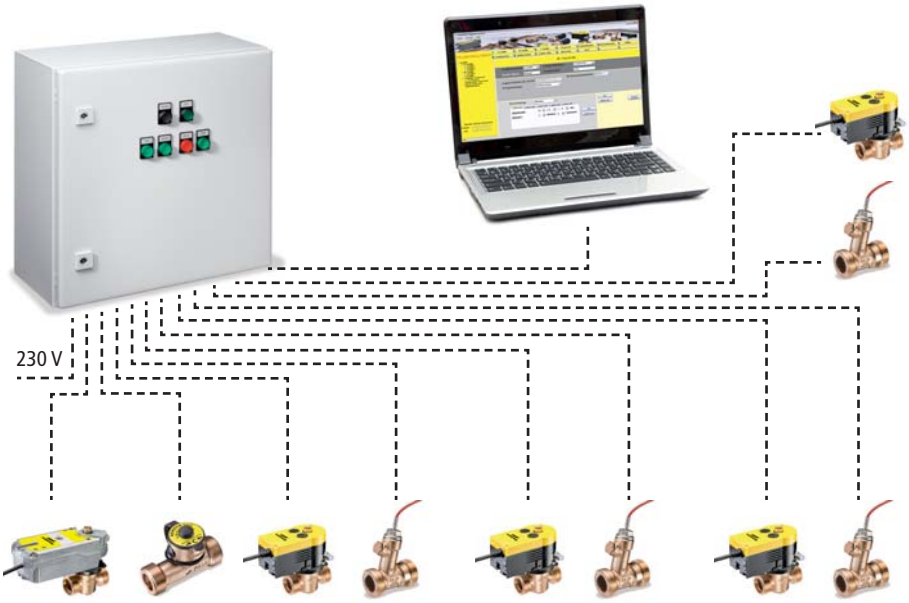
The KHS Logic Control System can be flexibly used and can be centrally operated. Operating and reading out the water change logs requires a customer PC. It includes a programmable controller unit that stores the water change programs. Motor-operated valves, temperature and volume flow sensors, overflow monitors and KHS Hygiene Flushing systems can be connected.

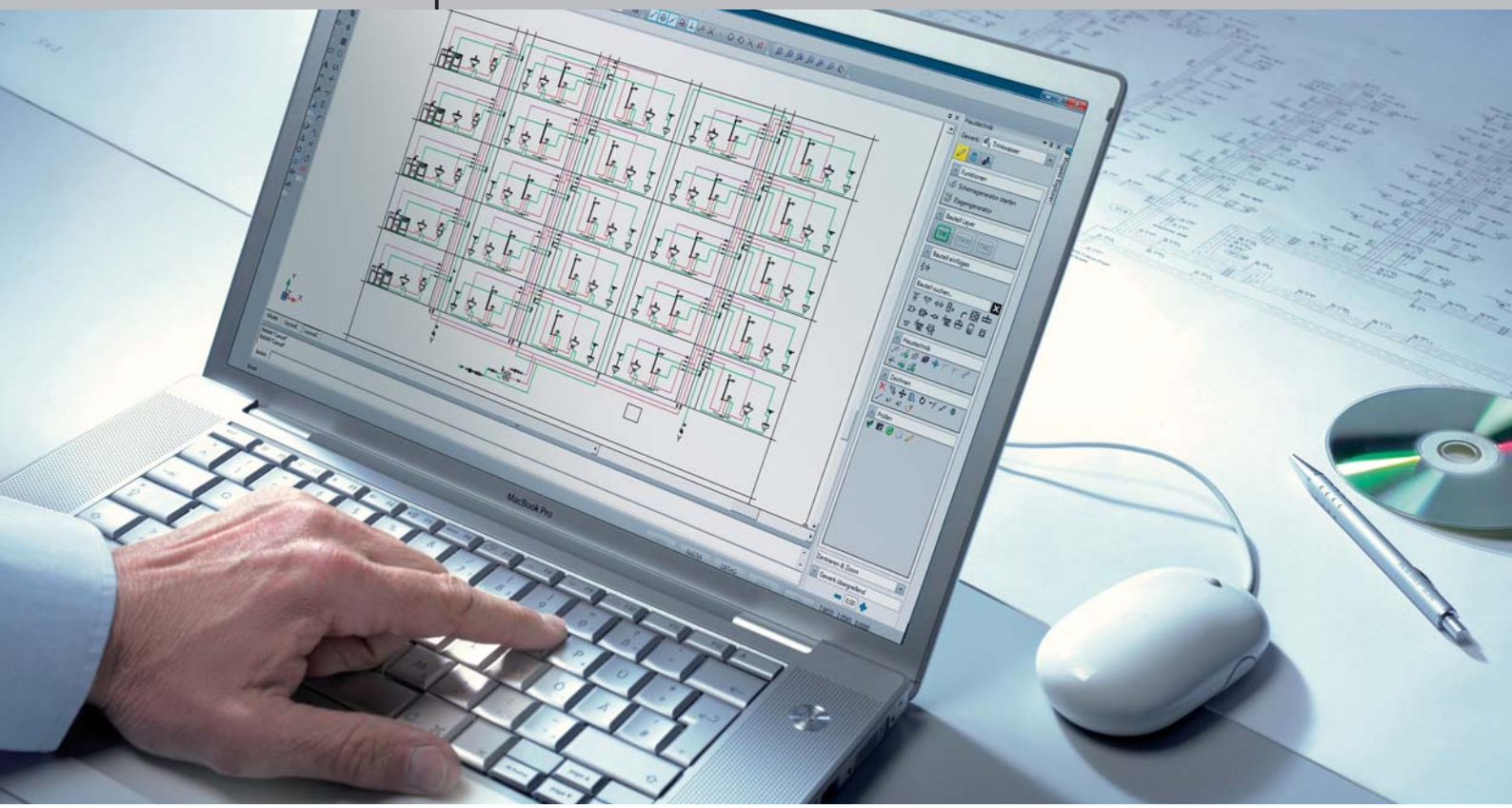
For instructions on wiring, please see the KHS wiring table on page 42.

The user can choose between three operating modes:

- Time controlled water change
- Temperature controlled water change
- Preset water volumes

KHS Logic Control System Figure 686 02 003





KEMPER Dendrit CAD

Innovative software supports planning with KHS

Powerful software is needed to be able to portray, simulate and calculate complex systems.

In cooperation with Dendrit and in collaboration with additional competent market partners, KEMPER has developed a software that meets all the challenges resulting from the technology.

KEMPER Dendrit CAD
KEMPER Dendrit CAD comprehensively provides the planner with all the facilities of building-engineering planning: Selection of the valves and pumps, design and drawing of the pipelines, calculation of the hydraulic conditions, simulation of the complete hot and cold water installation.

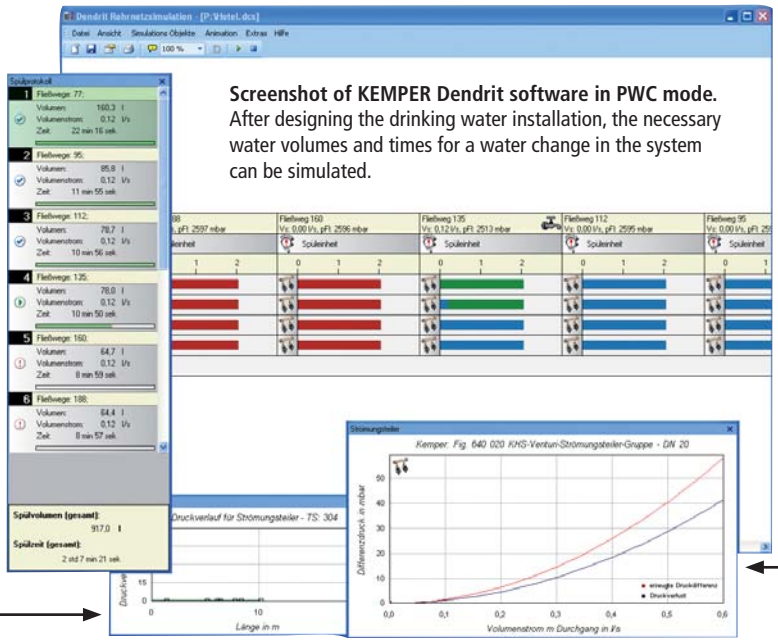
Advantages at a glance

- With the CAD user interface and an innovative plan generator
- Time savings through comprehensive, universal planning
- Global and comprehensive programme for precise calculation and simulation of building engineering plants
- Innovative pipeline conduction plus ring lines in connection with the KEMPER valve range and the KHS hygiene system in the cold potable water segment can be presented, calculated and simulated
- Simulation of the water change in the PWC system using intelligent KHS isolating valve with servodrive
- Permanent support and improvements through the Münster University of Applied Sciences and Prof. Bernd Rickmann

Accurate determination of the volume flows and flushing times for every branch

Total duration for a complete water change in the entire water installation

Pressure curve of the KHS Flow Splitter



Screenshot of KEMPER Dendrit software in PWC mode. After designing the drinking water installation, the necessary water volumes and times for a water change in the system can be simulated.

Display of the proceeding water change in all loops of all KHS Flow Splitters

Diagram of the pressure difference at all KHS Flow Splitters

Planning and operating reliability

The KEMPER Dendrit CAD software is an innovative tool for designers to create an accurate design of drinking water installations and other building services.

It enables to create an installation design in a schematic or floor plan. The software includes a so called "scheme generator" which helps to set up the basic drawing of the water installation in a building without drawing it. A wizard requests some information about the general type of installation and the designer can place the outlets in a grid per drag & drop. This grid can be converted to a schematic drawing.

This easy way to create a basic drawing of the system saves much time that is usually needed to draw. All specific details of the drinking water installation (real pipe length, data of outlets, type of pipework, etc.) can be adjusted after creating a CAD schematic. When all adjustments have been made, the software sizes the whole pipework and gives all information needed.

The results for each pipe section and outlet in the system can be saved as pdf-file. A bill of quantities can also be saved as an excel-file.The complete designed drinking water system can be simulated in the KEMPER Dendrit CAD software. The simulation of the PWC shows the simulation of the necessary water changes that are processed by the KEMPER Hygiene System (KHS). The above shown screenshot shows the simulation of a complete water change in the PWC system that is processed by the KHS.

The results of the simulation are used to set up the KHS Control System (Mini Control System or Logic Control System) according to the required times and volume flows of the simulation. The simulation of the PWH and PWH-C system helps to design a hydraulically balanced hot water circulation system, simulates the thermal disinfection of the hot water system and contains a library of pumps that can be selected for the hot water circulation.

KHS application in large buildings

e.g. hospital (distribution principle: horizontal)

KHS Flow Splitter Unit groups
Figure 650 00 Figure 650 02

In hospitals, it requires great effort for the operator to secure use as intended in the individual rooms. The rooms are not always occupied or the sanitary objects are not constantly used by patients who are confined to bed. Nowadays, building service providers secure the water change in unused rooms by opening the tapping points. One popular variant in the pipe routing is the horizontal distribution with connection of the individual sanitary blocks along the corridors. To accomplish that, the installation in connection with the KEMPER KHS Hygiene System, calculated with the KEMPER Dendrit CAD calculation software, is presented adjacent as an example.

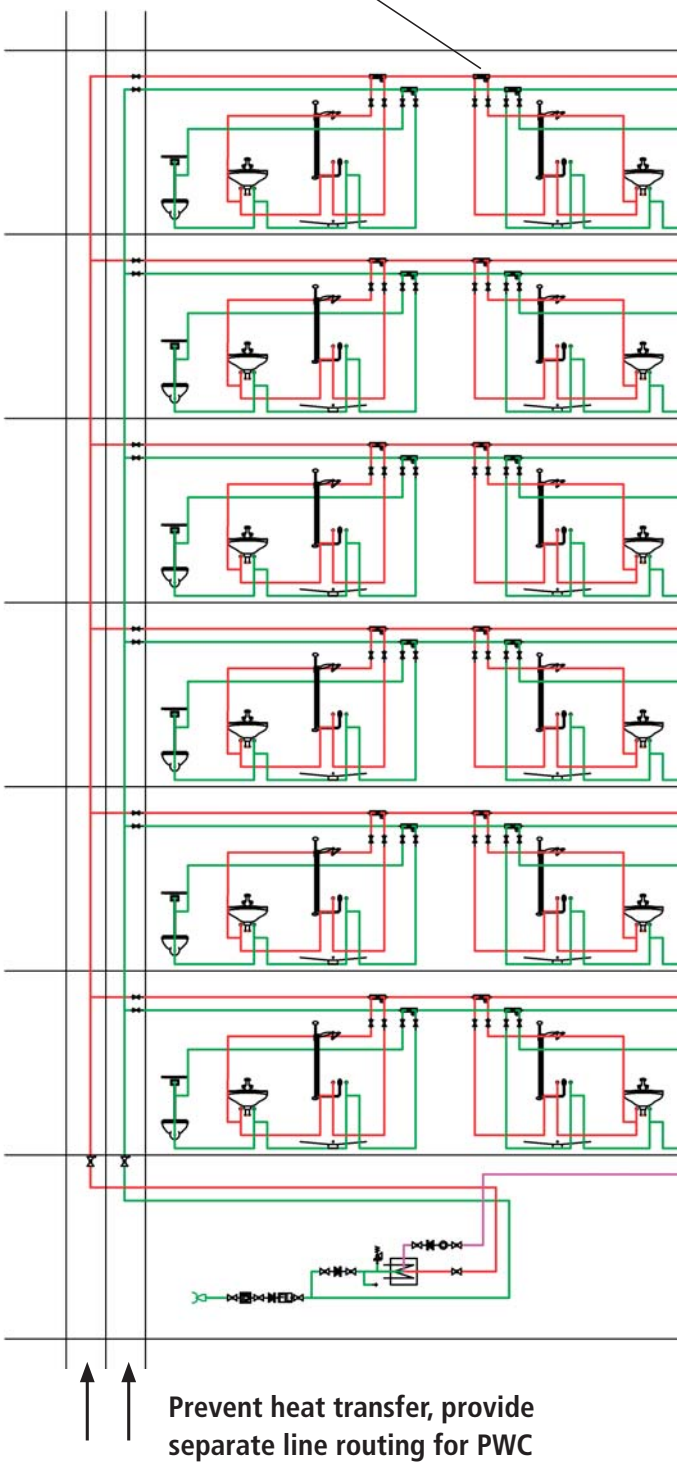
„Periodic flushing[1] in hospitals, doctor's offices and hotels must be ensured, independent of whether a room is occupied or not."[2]

Regular water change with the KEMPER KHS Hygiene System through:

- KHS Flow Splitter Unit -dynamic- in the PWC and PWH
- Sensors for monitoring and documentation (volumetric flow and temperature measurement)
- KHS isolating valve with servodrive
- Water change control using the KHS Logic Control System for large buildings

Reduce the circulation heat losses in the PWH/PWH:

- Reduktion der Rohrleitung für Zirkulation
- Regulation of PWHC through MULTI-THERM automatic circulation regulating valves



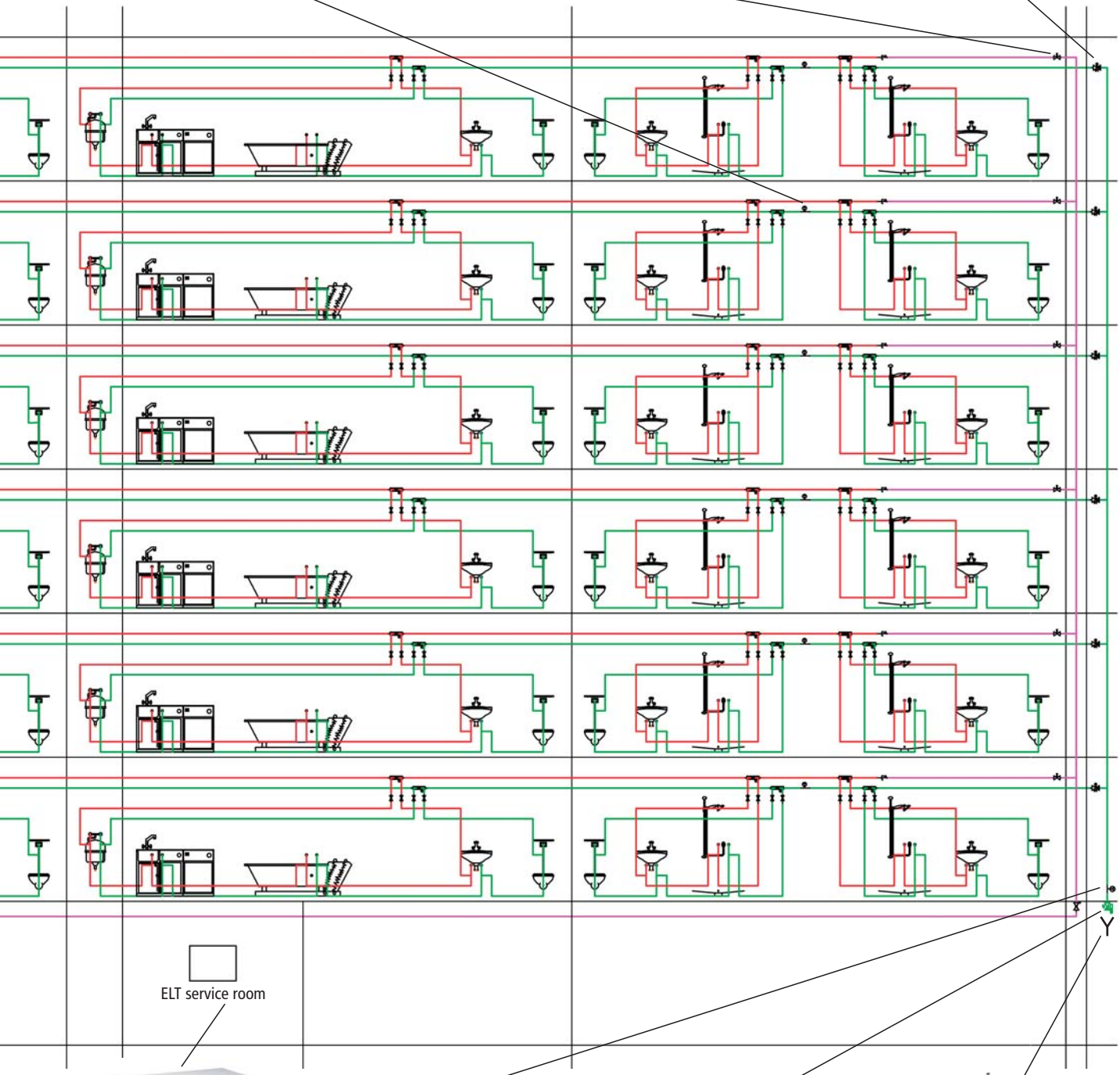
Prevent heat transfer, provide separate line routing for PWC and PWH!

(1) In the sense of „exchanging the body of water through water change".
(2) (German) Federal Department of Health Sheet, Health Research Health Protection 2006, 49:681-686DOI 10.1 007/s001 03-006-1284-X published online: 09/06/2006 © SPRINGER-Medizin Verlag 2006.
(3) Apply the new characteristic curves starting 2010 for DN 20/25 in the KEMPER Dendrit CAD.
(4) Wiring instructions for sensors, valves and controllers on page 42.

KHS Temperature measurement fitting
Pt 1000 Figure 628 0G

MULTI-THERM
Figure 141 0G [3]

KHS isolating valve with servodrive
Figure 686 00



KHS Logic Control System
Figure 686 02 003 [4]

KHS flow measurement fitting
Figure 138 4G 015

KHS isolating valve with spring return servodrive
Figure 696 01

KHS drain with overflow monitor,
Figure 688 00

KHS application in large buildings

e.g. hospital (distribution principle: vertical)

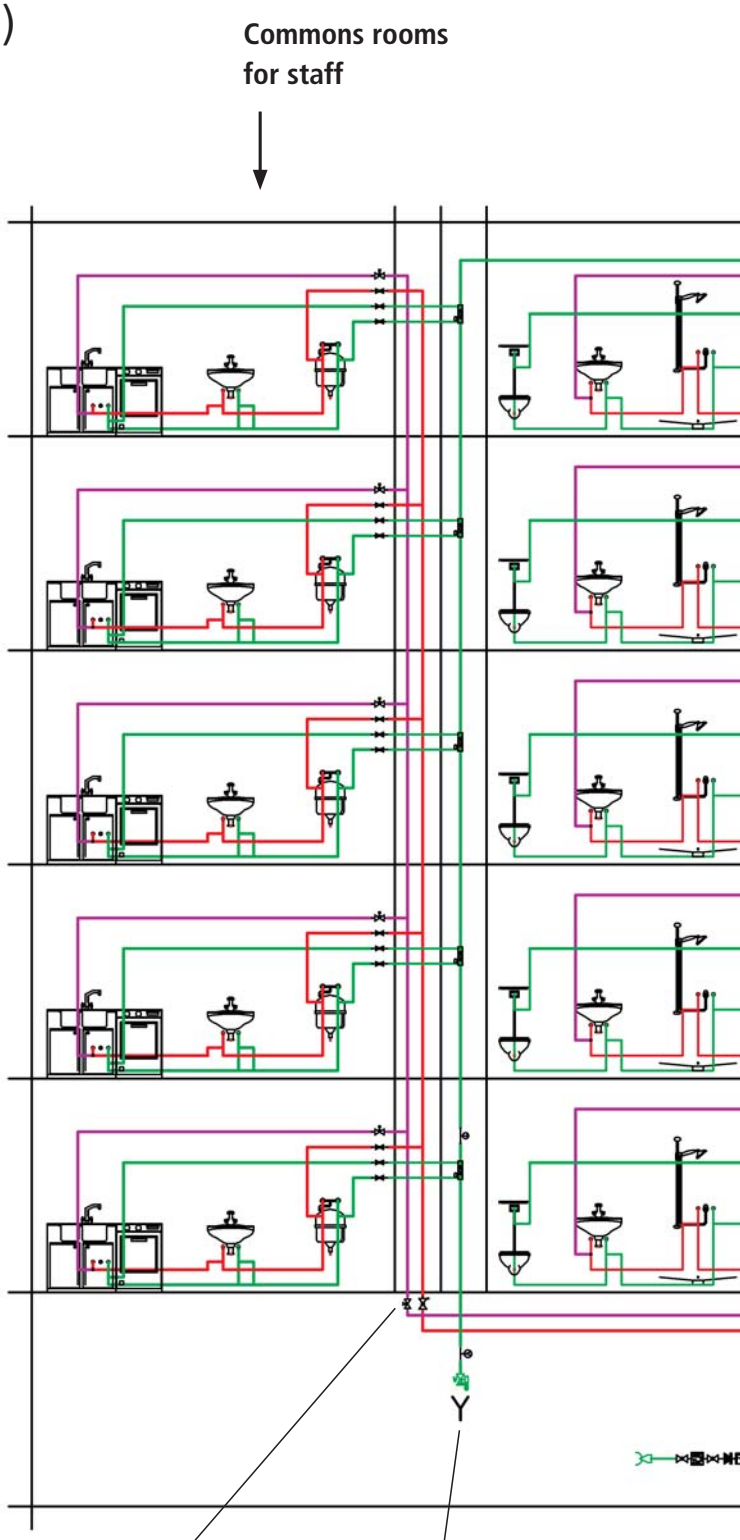
Application example:
> Bed report in a hospital
> 100 rooms (200 beds)
> 5 Floors

Application suitable for additional cases:
> Hospital
> Nursing home
> ...

Implementation:
> Tap valves in the staff commons rooms will be periodically operated as intended
> Top routed distribution for PWC (if possible)
> Terminal KHS-isolating valves in ground floor
> Monitoring and documentation of the water change with sensor systems
> Monitoring of the PWC temperature (< 25 °C)
> Regulation of the PWHC through automatic floor regulating valves and static regulation valves in the riser branch (alternative application with KHS Flow Splitter Unit in the PWH, see hotel planning example)

Components used:
> KHS Flow Splitter Unit -dynamic- in the PWC
> ETA-THERM automatic floor regulating valve
> MULTI-FIX static circulation regulation valve
> KHS isolating valve with servodrive
> KHS flow and temperature measurement fitting
> KHS drain with overflow monitor
> KHS Logic Control System for large buildings

(1) Wiring instructions for sensors, valves and controllers on page 42.

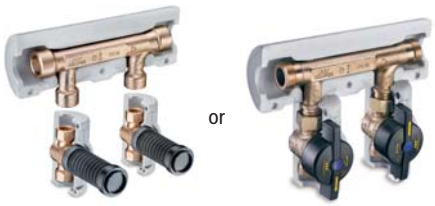


MULTI-FIX
Figure 150 1G

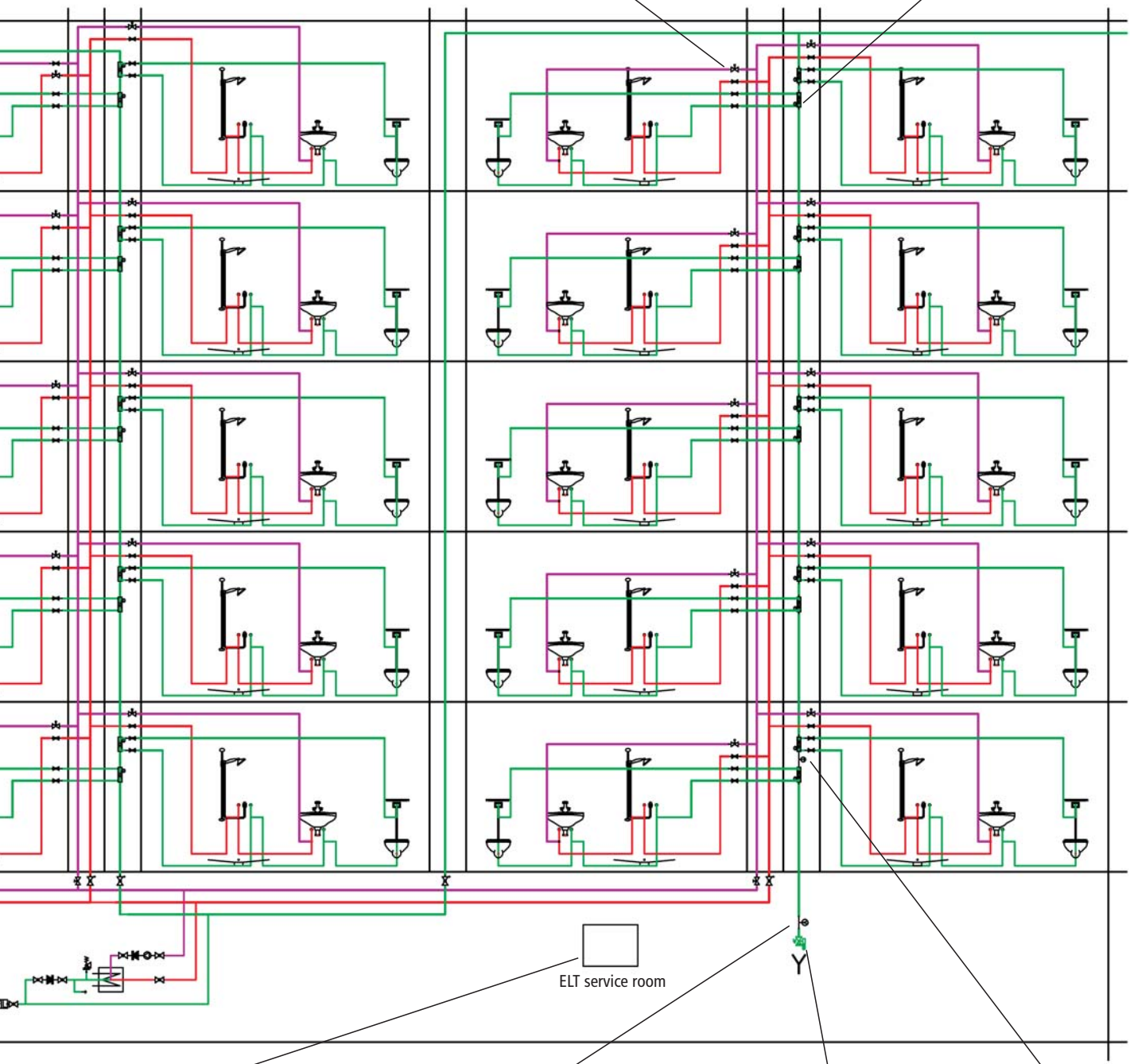
KHS drain with overflow monitor
Figure 688 00

Prevent heat transfer, provide separate line routing for PWC and PWH!

ETA-THERM
Figure 130 or 510



KHS Flow Splitter Unit Groups
Figure 650 00 or Figure 650 02



KHS Logic Control System
Figure 686 02 003 (1)

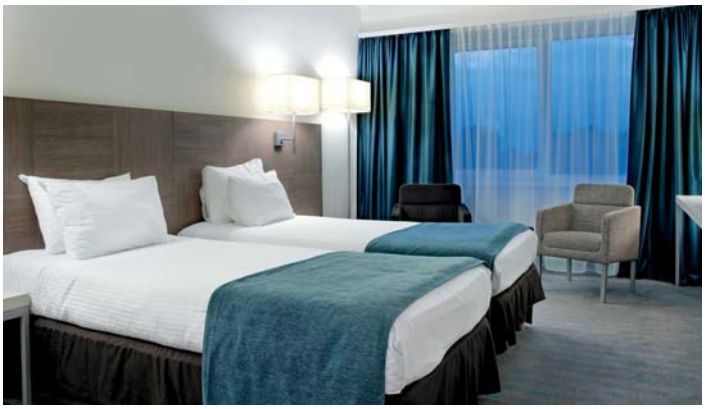
KHS flow measurement fitting
Figure 138 4G

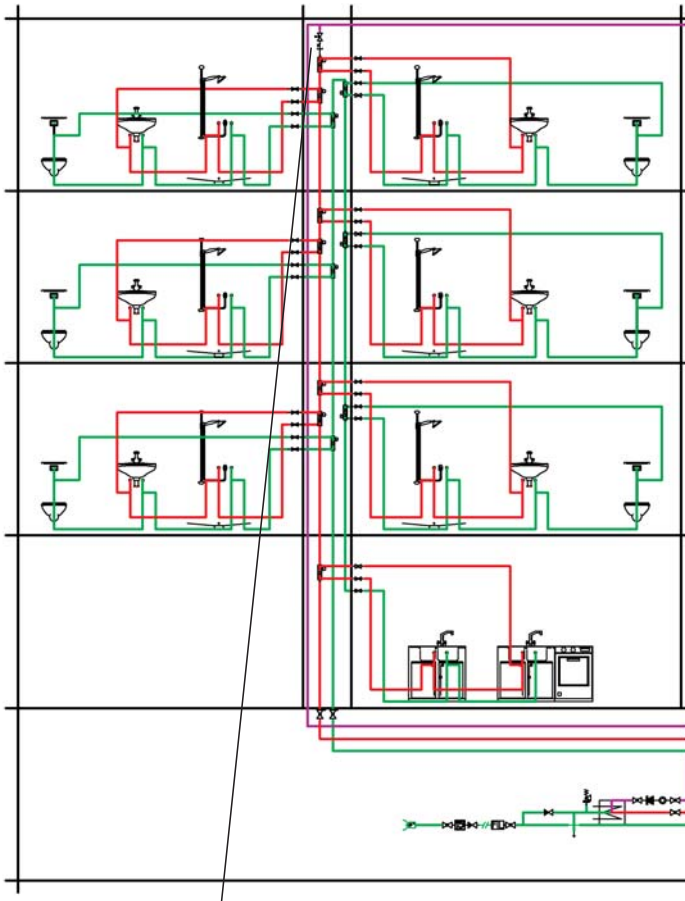
KHS isolating valve with spring return servodrive
Figure 696 01

KHS temperature measurement fitting
Pt 1000 Figure 628 0G

KHS application in large buildings

e.g. Hotel (2) (3)





Application example:
> Hotel with restaurant
> 40 rooms
> 3 Floors
> Swimming pool and sauna area

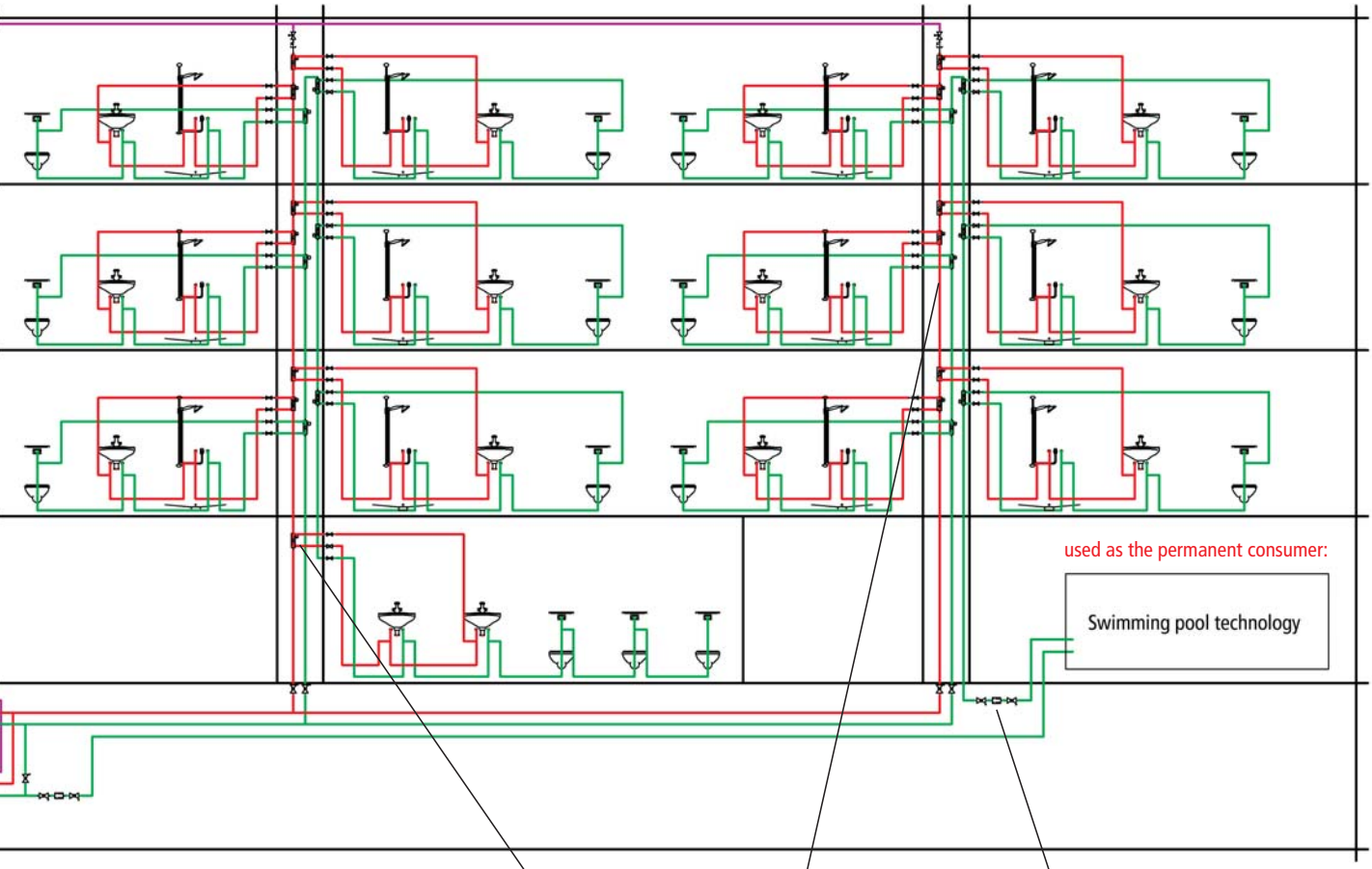
Application suitable for additional cases:
> Senior citizens residences
> Nursing homes
> Barracks
> ...

Implementation:
> Tap valves (permanent consumers) properly used as intended Restaurant kitchen, restaurant toiles, swimming pool and sauna area
> Consumers properly used as intended provide the water movement in the PWC system
> The PWC riser lines are routed from above back down to terminally exclude permanent consumers
> Top routed circulation collectors with automatic branch regulation valves
> KHS Flow Splitter Unit in the PWH (alternative application with automatic floor regulating valve, see planning example of hospital (distribution principal: vertical)

Components used:
> KHS Flow Splitter Unit -dynamic- in the PWC and PWH
> MULTI-THERM automatic circulation regulation valve
> PROTECT Backflow Preventer BA

MULTI-THERM
Figure 141 0G (1)

(1) Apply the new characteristic curves starting 2010 for DN 20/25 in the KEMPER Dendrit CAD.
(2) The example applies to projects that have accommodations, single and double rooms and centralized potable water metering on the building connection.
(3) Can also be barracks, construction measures military accommodations buildings U-Standard planning directive 10/2009.

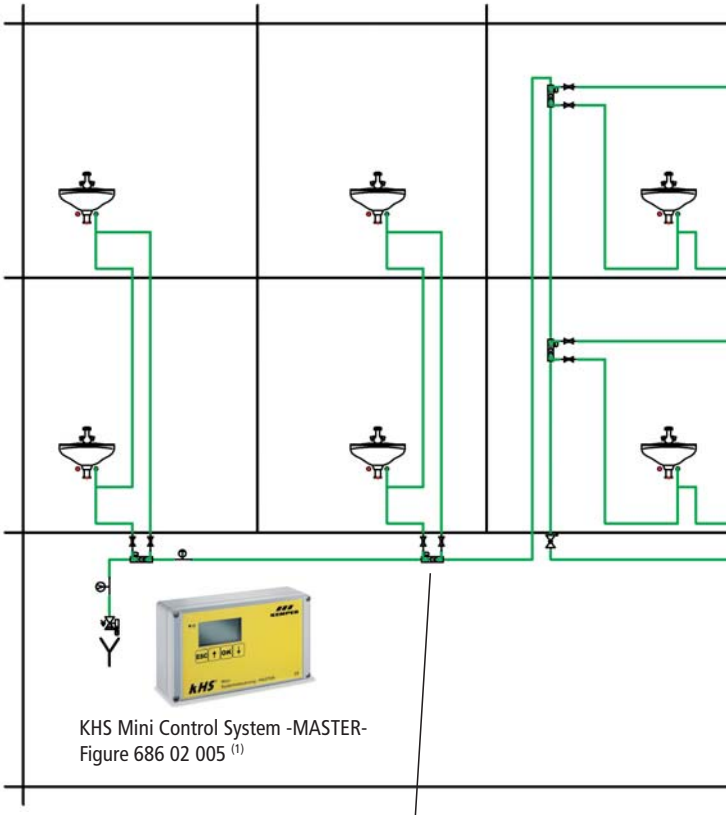


or

KHS Flow Splitter Unit Groups
Figure 650 00 Figure 650 02

PROTECT backflow preventer BA
Figure 360 OG

KHS application in small and medium size buildings
e.g. schools or kindergartens

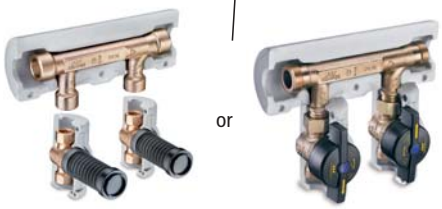


Application example:
> Primary school
> 14 classrooms
> 3 floors

Application suitable for additional cases:
> School
> Vocational school
> Technical University
> University
> ...

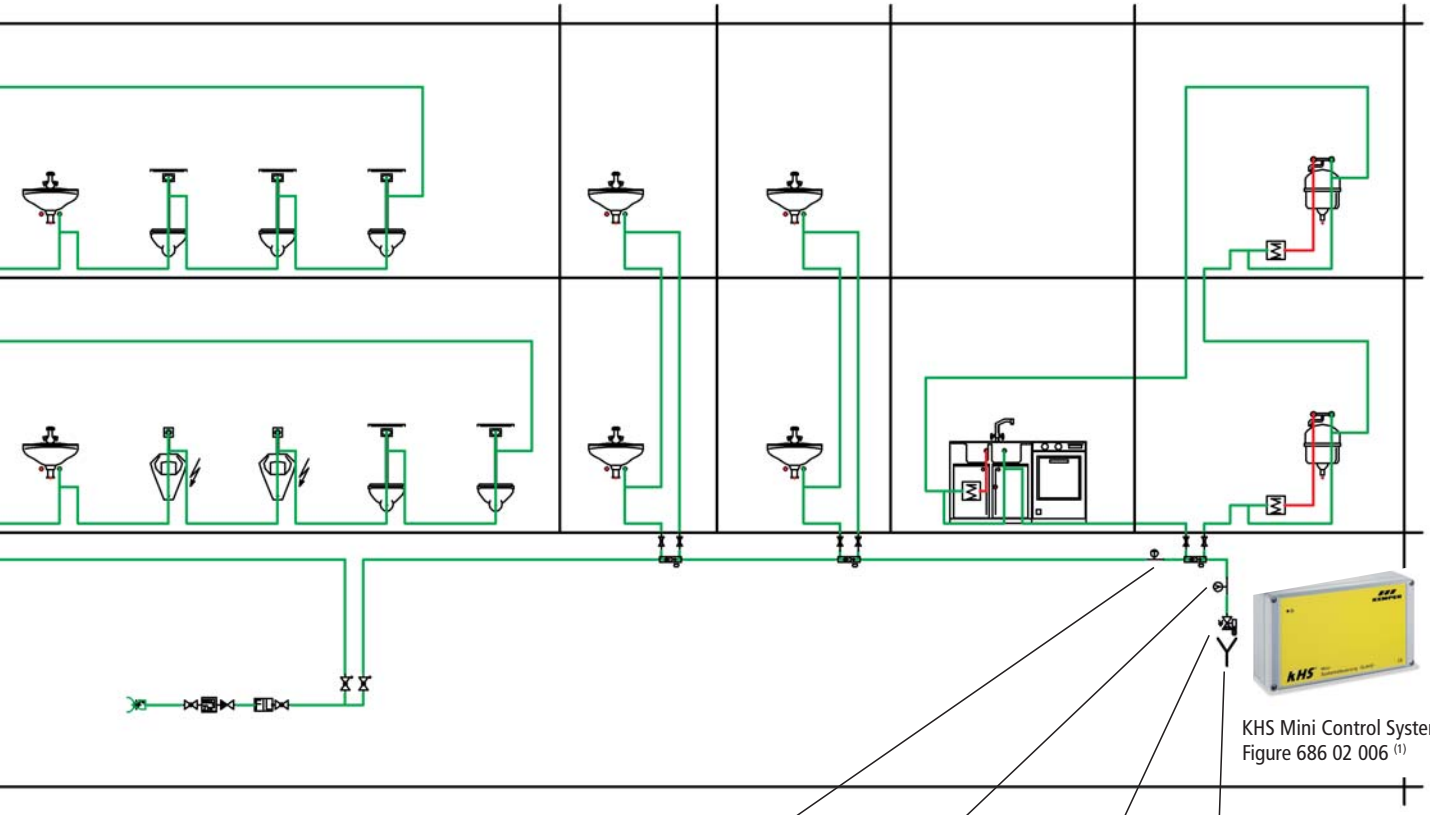
Implementation:
> Pipeline routing with ring lines
> Terminal KHS isolating valves in the ground floor
> Monitoring and documentation of the water change with sensor systems
> Monitoring of the PWC temperature (< 25 °C)
> Decentralised PWH
> Sanitary cells cannot be shut off individually

Components used:
> KHS Flow Splitter Unit -dynamic- in the PWC
> KHS isolating valve with servodrive
> KHS Flow and temperature measurement fitting
> KHS drain with overflow monitor
> KHS Mini Control System MASTER/SLAVE for small and medium size buildings
> KHS Mini Control System -SLAVE- for small and medium size buildings



KHS Flow Splitter Unit Groups
Figure 650 00 Figure 650 02

(1) Wiring instructions for sensors, valves and controllers on page 42.



KHS Mini Control System -SLAVE-
Figure 686 02 006 (1)

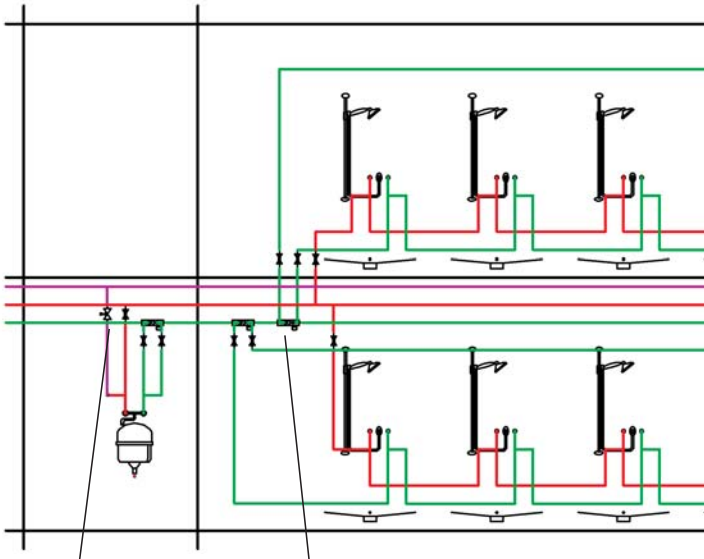
KHS temperature measurement fitting
Pt 1000 Figure 628 0G

KHS flow measurement fitting
Figure 138 4G

KHS isolating valve with spring
return servodrive
Figure 696 05

KHS drain with overflow monitor
Figure 688 00

KHS application in small and medium size buildings
e.g. sports halls



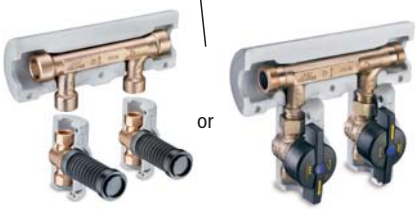
Application example:
> Sports hall
> Shower and sanitary facilities
> Cleansing materials room

Application suitable for additional cases:
> Multi-purpose hall
> Swimming pool
> Exhibition halls
> Stadium
> ...

Implementation:
> Pipeline routing with ring lines
> Periodically used toilets are arranged behind the showers
> Terminal KHS-isolating valves parallel to the bucket sinks in the cleansing materials room
> Time controlled water change
> Regulation of PWHC through automatic regulating valves

Components used:
> KHS Flow Splitter Unit -dynamic- in the PWC
> ETA-THERM automatic floor regulating valve
> MULTI-THERM automatic circulation regulation valve
> KHS isolating valve with servodrive
> KHS drain with overflow monitor
> KHS Timer Set plus

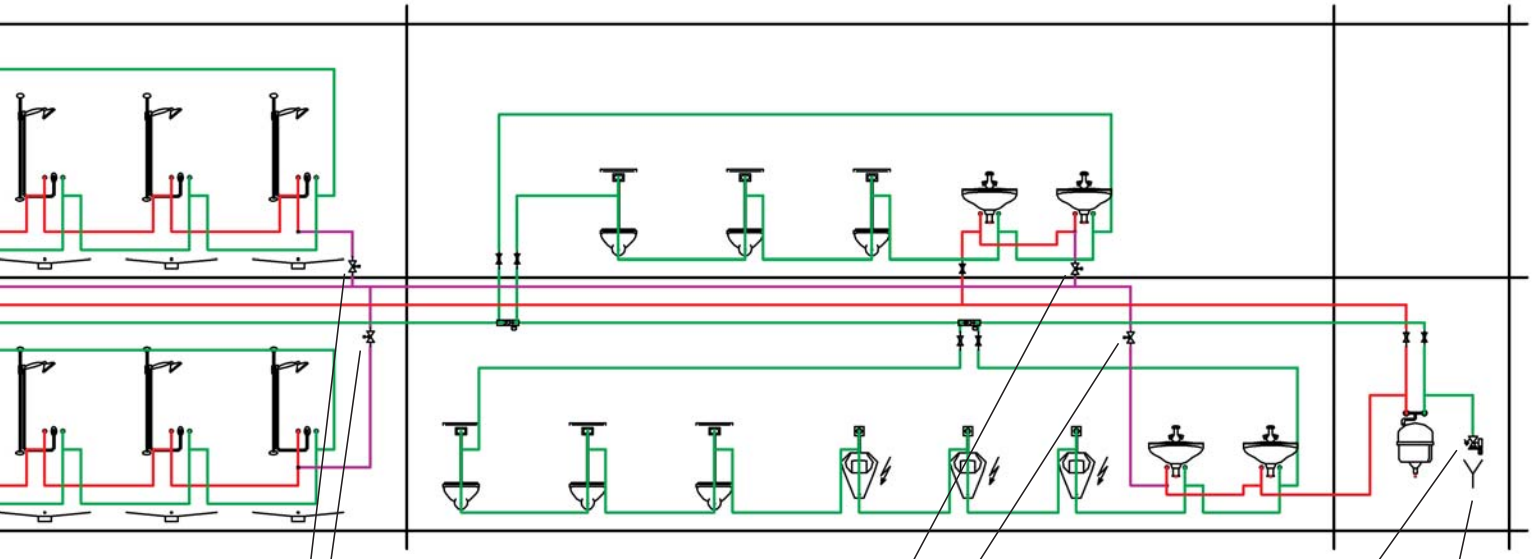
ETA-THERM
Figure 130 or 510



or

KHS Flow Splitter Unit Groups
Figure 650 00 Figure 650 02

(1) Apply the new characteristic curves starting 2010 for DN 20/25 in the KEMPER Dendrit CAD.



MULTI-THERM
Figure 141 0G [1]

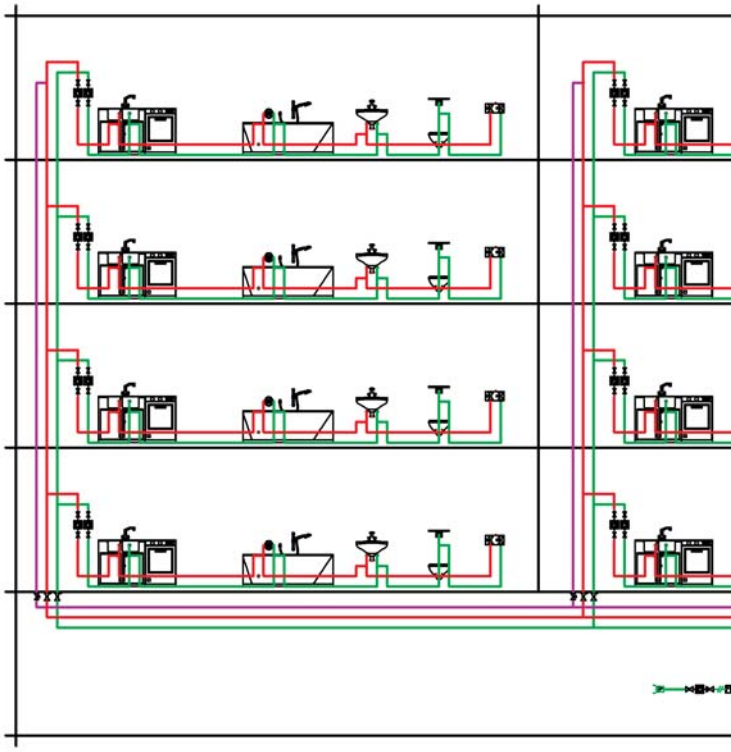
ETA-THERM
Figure 130 or 540

KHS Timer Set plus
Figure 696 07

KHS drain with overflow monitor
Figure 688 00

KHS application in small and medium size buildings

Apartment construction



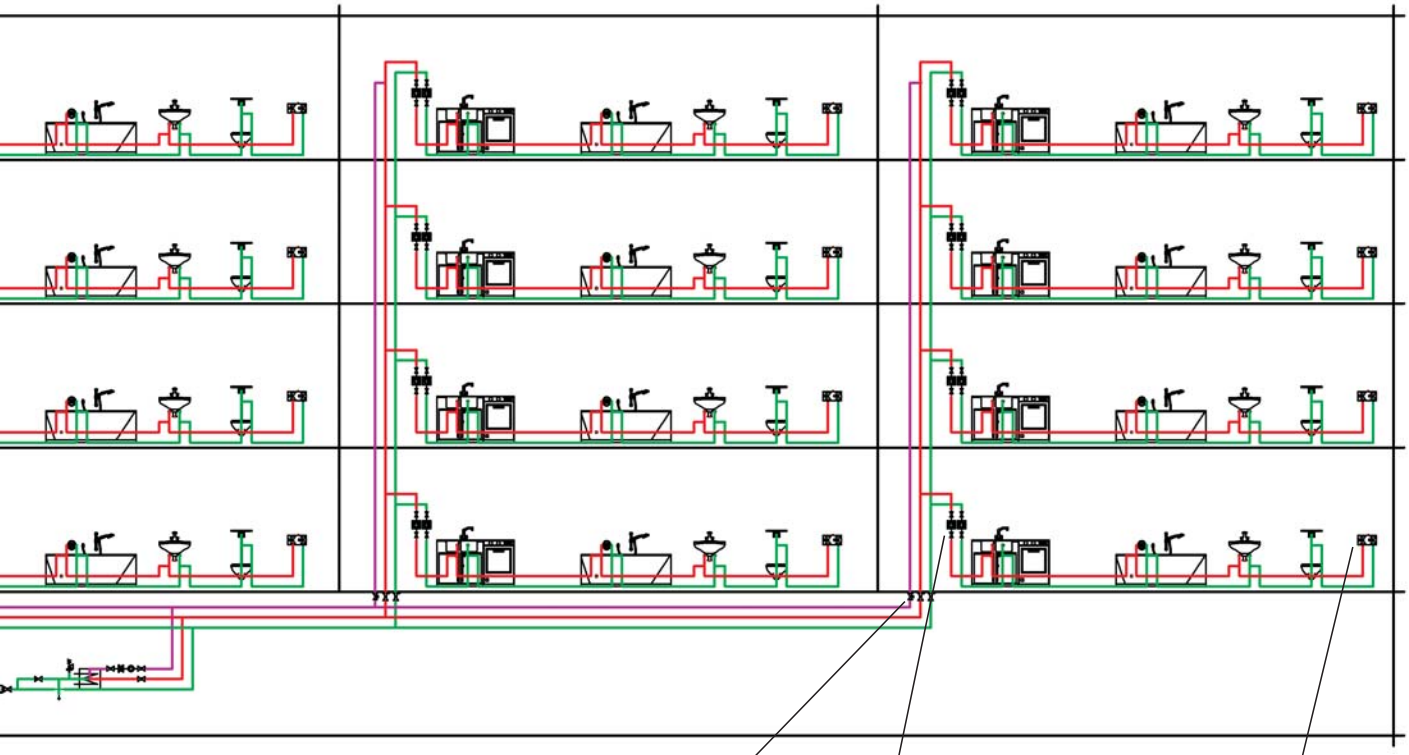
Application example:
> Apartment construction
> 4 floors
> 16 dwellings

Application suitable for additional cases:
> Senior citizens residence
> ...

Implementation:
> Loop the piping system to every consumer
> Terminal hygienic flushing for PWC and PWH
> Water meter block for each dwelling
> Merge circulation in the riser branch
> Hydraulic equalization of the circulation line with thermal regulating valves in the riser branch

Components used:
> KHS hygienic flushing for PWC and PWH
> Stop water mounting block DUO
> MULTI-THERM automatic circulation regulation valve

(1) Apply the new characteristic curves starting 2010 for DN 20/25 in the KEMPER Dendrit CAD.



MULTI-THERM
Figure 141 0G [1]

Stop meter mounting block RG 120 DUO
Figure 854

KHS hygienic flushing for PWC and PWH
Figure 686 03 008

KHS application in large buildings

e.g., football stadium, exhibition hall

Application example:
> Toilet area in a football stadium
> Line lengths > 300 m

Application suitable for additional cases:
> Exhibition hall
> Concert hall
> ...

Implementation:
> Periodic water change in the sanitary facilities through terminal drive
> Control with the time, volume rate and temperature control operating modes
> Monitoring and documentation of the water change with sensor systems
> Due to the line lengths in a ring installation not possible with KHS Flow Splitter Unit

Components used:
> KHS isolating valve with spring return servodrive
> KHS flow and temperature measurement fitting
> KHS drain with overflow monitor
> KHS Mini Control System

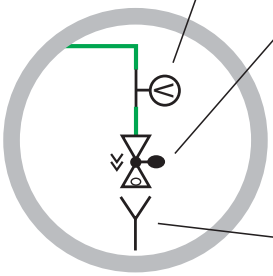
Required KHS components:

KHS Mini Control System -MASTER-
Figure 686 02 005 (2)

KHS flow measurement fitting
Figure 138 4G

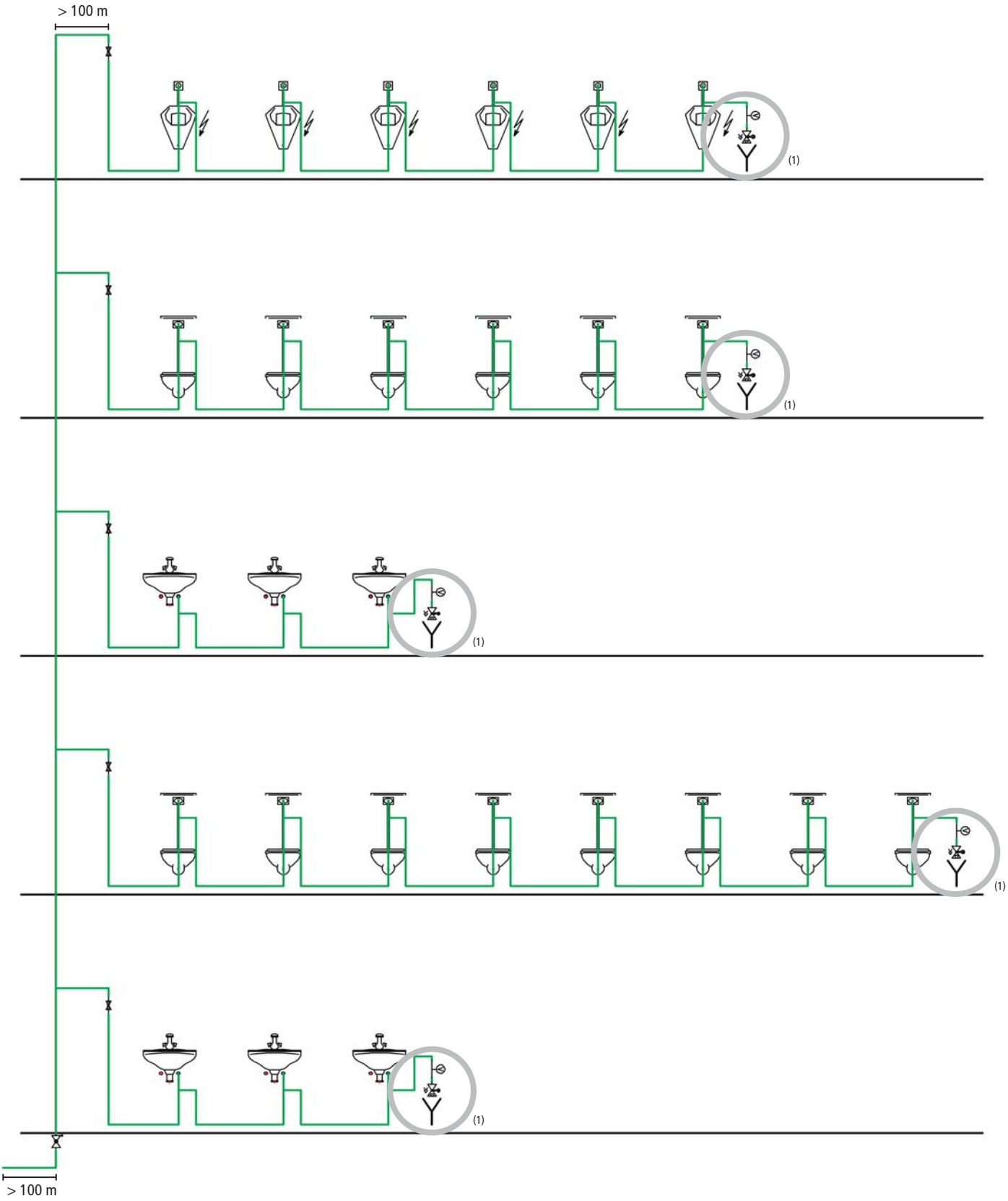
KHS isolating valve with spring return servodrive
Figure 686 05

KHS drain with overflow monitor
Figure 688 00



(1) Required KHS components.
(2) Wiring instructions for sensors, valves and controllers on page 42.

Example: Sanitary core across 5 floors in a football stadium Link is implemented with long link lengths



KHS application with Inliner system

e.g., home for the elderly, barracks [3]

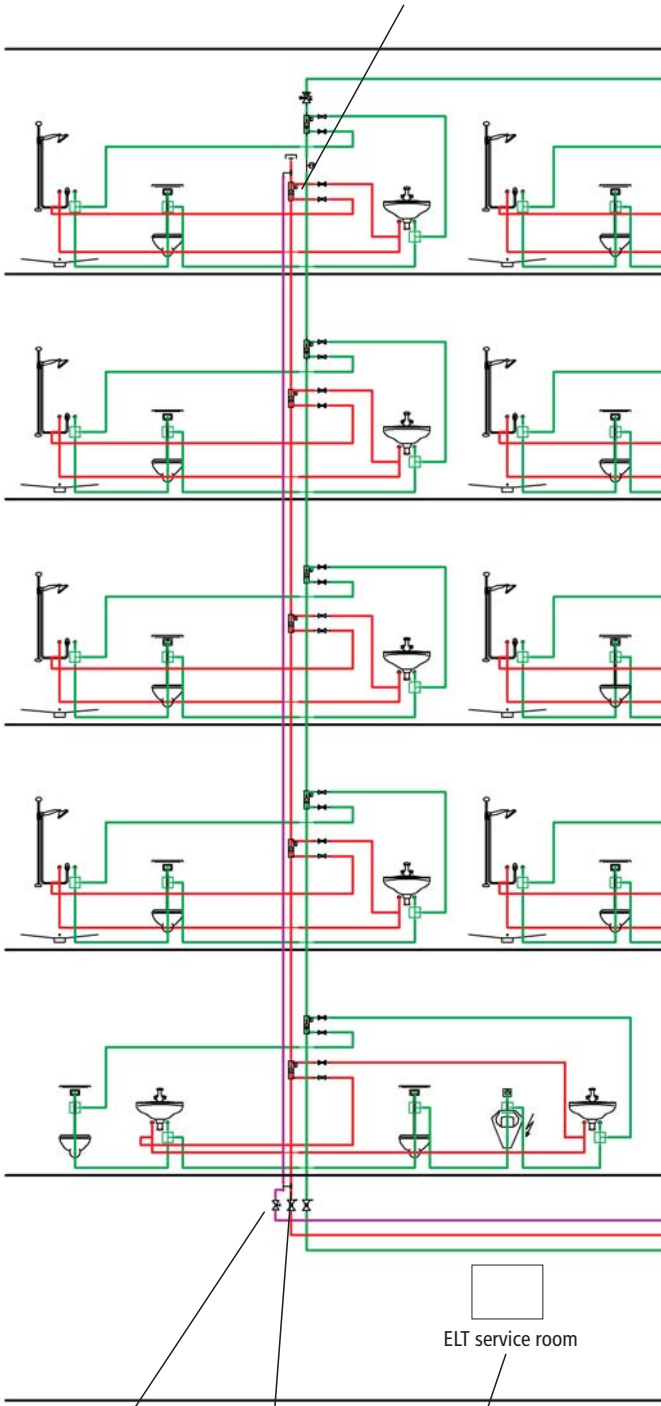
KHS Flow Splitter Unit Groups (inliner)
Figure 660 00 Figure 660 06

Application example:
> Senior citizens residence
> 5 floors

Application suitable for additional cases:
> Apartment construction up to 5 floors
> Barracks [3]

Implementation:
> Inliner circulation in the riser branches
> Regulation of PWHC through automatic regulating valves in the riser branch
> Water change in the PWC system
> Drive of the PWC system through KHS-isolating valves
> Water change with A and B valves (Transition to the wastewater system only once in the cellar)
> Monitoring and documentation of the water change with sensor systems
> Monitoring of the PWC temperature (< 25 °C)

Components used:
> KHS Flow Splitter Unit Unit -dynamic- in the PWC
> KHS Flow Splitter Unit Unit -dynamic- for inliner systems in the PWH
> MULTI-THERM automatic circulation regulation valve
> KHS isolating valve with servodrive
> KHS Flow and temperature measurement fitting
> KHS drain with overflow monitor
> KHS Logic Control System for large buildings



MULTI-THERM
Figure 141 0G [1]

Geberit
Inliner pedestal

KHS Logic Control System
Figure 686 02 003 [2]

(1) Apply the new characteristic curves starting 2010 for DN 20/25 in the KEMPER Dendrit CAD.
(2) Wiring instructions for sensors, valves and controllers on page 42.
(3) Construction measures military accommodations buildings U-Standard planning directive 10/2009.

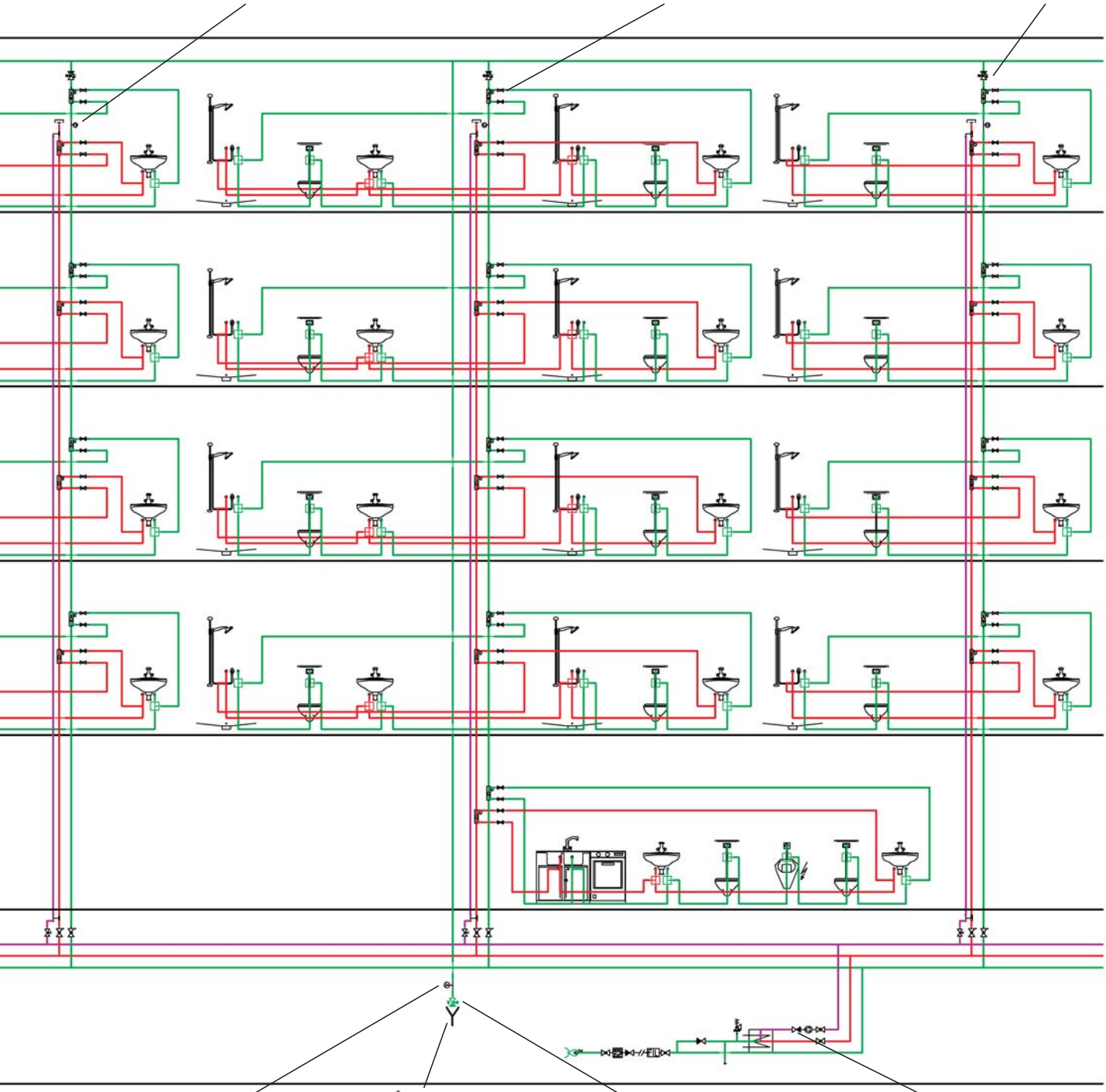
KHS temperature measurement fitting
Pt 1000 Figure 628 0G

KHS Flow Splitter Unit Groups
Figure 660 00

or

Figure 660 06

KHS isolating valve with servodrive
Figure 686 00



KHS flow measurement fitting
Figure 138 4G

KHS drain with overflow monitor
Figure 688 00

KHS isolating valve with spring return servodrive
Figure 696 01

Anti-pollution check-valve
Opening pressure ≥ 10 mbar Figure

Wiring instructions
for KEMPER KHS components with electrical connection

Name	For figure no.	Cable cross-section	max. cable length
	KEMPER	mm^2	m
KHS isolating valve with spring return servodrive (24 V)	686 01 015...032 696 01 015	5 x 0.75 5 x 1.0	229 300
KHS isolating valve with servodrive (24 V)	686 00 015...032 696 00 015	6 x 0.5 6 x 0.75 6 x 1.0 6 x 1.5 6 x 2.5 6 x 4.0	29 43 58 86 144 230
KHS isolating valve with spring return servodrive (230 V)	686 05 015...032 696 05 015	3 x 1.5	9500
KHS isolating valve with servodrive (230 V)	686 04 015...032 696 04 015	4 x 1.5	9500
KHS drain with overflow monitor	688 00 020...032	2 x 0.25	150
KHS flow measurement fitting vortex principle (for BMS connection)	638 4G 015...025 138 4G 015...050	7 x 0.34 *	300
KHS Timer Set, KHS isolating valves, with and without spring return servodrive (230 V) in connection with the KHS Timer	686 06 / 07 696 06 / 07	From voltage source to KHS Timer: 2 x 1.5 From KHS Timer to servodrive: 3 x 1.5	10.000
KHS Logic Control System (based on customer request)	686 02 003	From voltage source to KHS Logic: 3 x 1.5	10.000
KHS temperature sensor fitting Pt 1000	628 0G 015...050 629 0G 015...050	4 x 2 x 0.6	10.000
KHS hygienic flushing unit with control valves and cover for cold water	686 03 007	From voltage source to KHS Hygiene Flushing 3 x 1.5 from KHS Hygiene Flushing to KHS Logic 5 x 0.5	10.000 100
KHS hygienic flushing unit with control valves and cover for cold and hot water	686 03 008	From voltage source to KHS Hygiene Flushing 3 x 1.5 from KHS Hygiene Flushing to KHS Logic 5 x 0.5	10.000 100
CAN bus cable** The application is based on ISO 11898. With increasing length, a larger conductor cross-section is required.	686 02 005 686 02 006	1 x 2 x 0.25 ... 0.34 1 x 2 x 0.34 ... 0.5 1 x 2 x 0.50 ... 0.6 1 x 2 x 0.75 ... 0.8	0 m ... 40 m 40 m ... 300 m 300 m ... 600 m 500 m ... 1000 m

* Shielded cable lead
** (To be provided by construction site)
We reserve the right to make technical changes.

As of: 31.04.2011

Notes

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