

The SPLIT and MIX HIU 's

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Introduction

The SPLIT is our latest twin plate heat interface unit (HIU) and it represents the new standard in twin plate HIU's, combining all the latest technologies into a solid, compact unit that outperforms anything in its class.

The principles behind the control system are well proven in the DATA, DIGI and SLIM products currently available from Thermal Integration however the differentiating feature of the SPLIT HIU is that it is supplied without the central heating expansion vessel, filling loop and safety relief valve, enabling a standard 'off the shelf' sealed system kit to be fitted in a remote location away from the SPLIT HIU.

The benefit of splitting the unit in this way is threefold; it reduces the overall dimensions of the HIU allowing it to fit into a much smaller space, with less requirement for service clearances. It allows the installer to purchase the sealed system kit from their preferred supplier, which may help reduce the cost when purchased alongside other components relevant to the heating system. It also allows the sealed system kit to be situated in a more convenient location for end users to top up their heating system and for connecting safety relief pipework to the soil and vent stack.

The SPLIT is also designed to fit a standardised first fix bracket, capable of accepting HIUs for direct heating connection also.

The SPLIT is an indirect HIU, meaning the central heating system is indirectly connected to the district heating system via a plate heat exchanger. However the clever platform design also makes it possible for the SPLIT to be turned into the MIX HIU which replaces the central heating plate heat exchanger with a small pipe manifold, allowing the central heating system to become directly connected to the district heating system.



Executive Summary

At every step of the way, a district heating system needs to fulfil the wants and needs of all interested parties. An energy efficient system is imperative, and this is directly affected by the HIU to which it is connected.

The HIU must be intelligent but simple and reliable, it must be cost effective but provide outstanding performance & efficiency, and it must be easy to locate within the property and quick to fit. It must be open source to allow connection to any billing system and it must be secure to enable landlords and billing providers to collect their money.

All of the above is the reason why the SPLIT HIU from Thermal Integration was designed and developed.

Below is a table explaining the features we feel are important to each element of the customer chain.

Requirement	End User	Landlord	Building Manager	Billing Provider	M&E Contractor	Building Services Consultant
Adequate DHW and Heating output	✓	✓			✓	✓
Easy to top up heating system	✓	✓			✓	
Easy to read heat meter	✓	✓		✓		
Simple to use	✓	✓	✓			
Pre-set controls		✓	✓	✓	✓	✓
Stable hot water temperature	✓	✓			✓	✓
Reliable / Low maintenance	✓	✓	✓	✓	✓	✓
Efficient operation	✓	✓		✓		✓
Secure access		✓		✓		
Security shut down		✓		✓		
Low primary return temperature			✓	✓	✓	✓
Insulated HIU casing	✓	✓	✓	✓	✓	✓
Open source billing system			✓	✓	✓	✓
Competitive price				✓	✓	
Quick and easy installation				✓	✓	✓
Compact HIU dimensions		✓			✓	✓
Self-learning controls to cope with pressure and temperature fluctuations					✓	✓
Future proof design with standardised first fix bracket		✓	✓		✓	✓

As demonstrated by the table above, the end user wants something different to the landlord, the landlord wants something different to the building manager, the building manager wants something different to the billing provider, and the M&E Contractor often wants something different to the building services consultant.

Everyone wants something different, but the SPLIT HIU from Thermal Integration ticks all the boxes.

Main Features & Benefits

- Compact design with no need for clearance either side for servicing. The unit is small enough to fit into a standard kitchen cupboard with space to spare.
- Instantaneous hot water up to 65kW, with adjustable temperature from 45-60°C
- Indirect central heating up to 20kW (@ 11° Delta T) with adjustable temperature from 50-80°C. (To suit radiators or underfloor heating applications)
- Direct central heating option with the MIX HIU variant
- Heating temperature tracks primary flow temperature allowing central weather compensation to operate across the network.
- Primary return temperature limitation, settable at commissioning.
- Primary differential pressure self-learning and adjustment.
- Heat-up boost, enabling the SPLIT to get up to temperature with maximum power before ramping down to maintain a steady output.
- The latest stepper motor valve technology allows the system to react rapidly, thereby maintaining accurate control over domestic hot water temperatures.
- Pre-install plumbing jig complete with isolation valves to allow pipework on site to be completed prior to HIU installation.
- Primary circuit trickle flow for domestic hot water Eco or Comfort Modes.
- Insulated removable EPP casing with less than 50 Watts standing heat loss.
- Anti-Legionella programme raises the domestic hot water temperature periodically; preventing the growth of Legionella bacteria.
- Casing and Heat Meter anti-tamper fixings.
- Option for built-in landlord security closure system for remote isolation.
- Pump exercise function.
- Built-in control for a Domestic hot water re-circulation pump. (pump to be mounted external to casing)
- Site specific factory calibration of controls to predefined settings.
- Freedom of connection positions, pre-install plumbing jig can be adjusted to allow pipework to route down the back of the HIU casing.
- WRAS approved (components).
- iHIU Option for Inter-networking of all SPLIT units within a development to enable site wide adjustments to match loads to primary circuit heat availability and networked domestic hot water priority. Together with browser based interface and online dashboard for remote commissioning, monitoring, control adjustments, performance visualisation, fault detection and diagnosis using pc, tablet or phone.
- Sensors for temperature, pressure and flow rate allow the system to monitor performance and detect fault conditions locally, or on the district heat network by fitting the optional iHIU electronics package.

What's wrong with Mechanical Technology?

HIU technology using mechanical controls relies on valves being manually setup (and ideally locked) at settings that meet both load requirements, while maintaining low return temperatures. The least efficient (and hence most costly to the user in terms of energy costs) is to use a by-pass that passes a low flow rate of hot water from the flow to the return. The fixed flow must as a minimum cover HIU and pipework losses and results in return temperatures similar to flow temperatures. Across a whole site, where 95% of units are not running taps at the same time, the majority of return water to the plant will be bypass flow, destroying return temperatures.

A thermal bypass, or use of a mechanical temperature control valve on the domestic hot water, relies on the sensor losing temperature to open the valve and allow a small flow of water through. As with nearly all mechanical control loops however, the valve characteristics and rate of sensor response to changes in primary flow and temperature makes a massive difference and it is normal to see cyclic reheating rather than a steady, very low flow equal to the losses. As soon as the smallest cycle is introduced into a mechanical system, the control valve will close in response to higher temperatures. Given heat losses of pipework are greater than the plate heat exchanger (a solid insulated thermal mass), by the time the domestic hot water sensor (mounted into the plate heat exchanger) has cooled enough to open, the pipework is considerably cooler. As this colder water then enters the plate heat exchanger, the valve opens further, flow increases until heated primary water reaches the plate heat exchanger, and continues, now with very hot water flowing fairly rapidly from flow to return, until the sensor reacts - up to 30 seconds later. The system overshoots until the sensor again closes the primary valve in response to the elevated temperatures and the cycle continues.

The vast majority of flow through the system is at temperatures far higher than is required to maintain losses, and the rapid fluctuations in flow and return temperatures can significantly influence heat meter readings.

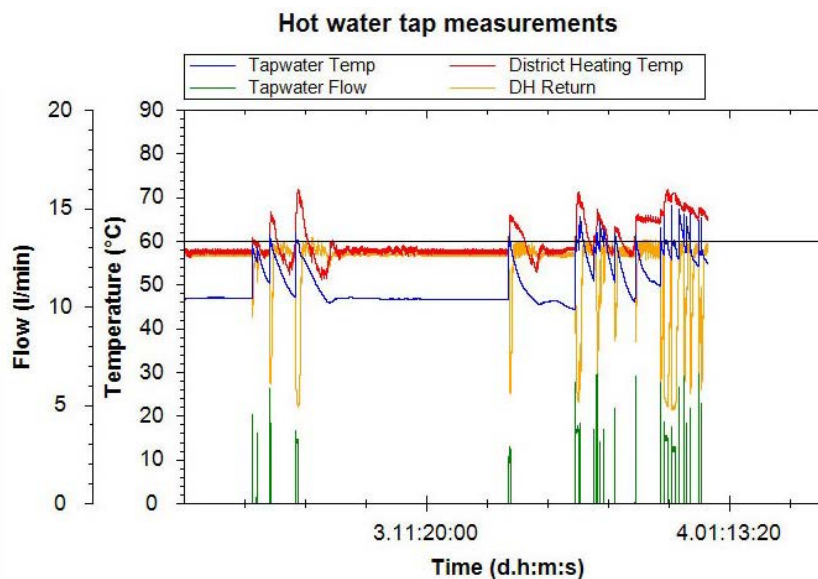
The benefits of Electronic Control

Rather than purely mechanical controls, the SPLIT uses an electronic control system in conjunction with the latest stepper motor technology. This system has the ability to work out the average losses from the pipework and combine this information with the system temperatures to accurately control average flow through the plate heat exchanger and perfectly match heat losses. It has the ability to read sensors and control outputs such as valves and pumps. The big advantage of this approach is it enables every control function desired to be implemented through lines of software code, where a mechanical system requires a separate device to perform each function.

Each plate heat exchanger is fitted with only one control valve (that can be exercised) to perform all functions, where a mechanical system would require a temperature control valve, differential pressure control valve, return temperature limitation valve, and possibly a separate thermal by-pass valve to achieve arguably comparable performance. Each valve is different, requiring space, cost, spares, and introducing extra possibilities of incorrect settings that inadvertently destroys return temperature performance.

This is best demonstrated by the list of functions the SPLIT can perform using just one valve for each heat exchanger, including temperature control, differential pressure compensation, domestic hot water preheat, heat boost, return temperature limitation, flow limitation, legionella sterilisation cycles and security shut-off. To achieve this level of control a mechanical system requires a multitude of valves, and becomes complicated, large, heavy and inefficient. The SPLIT's electronics also enable such functions as smartphone control, network load management, and remote commissioning and fault reporting, by connecting to the optional iHIU Ethernet/WiFi control system.

The graph below best highlights the benefits of an electronic system over any other when it comes to return temperature performance. As you will see, the return temperatures to the heat network remain as low as possible at all times. Even in keep warm mode, between draw offs, the system manages primary flow to ensure the return temperature does not fluctuate, and stays below the domestic hot water setpoint (60°C)



A key point to notice is the primary flow temperature in red during keep warm periods between draw-offs. It remains below the domestic hot water setpoint, very close to the return temperature. This is because the heat losses from the HIU will always be lower than local primary pipework losses, so the unit regulates to a primary flow that just maintains domestic hot water readiness. Lower HIU (and local pipework) temperatures results in even lower heat losses, as well as improved meter accuracy.

Economy / Comfort Mode

It is common for HIU's to include a thermostatic bypass to maintain heat across the domestic hot water plate heat exchanger at all times, this helps minimise delays in hot water supply when a tap is opened.

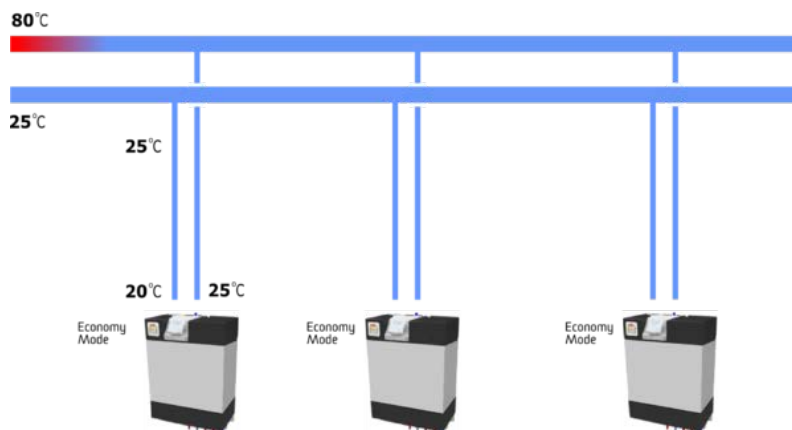
The SPLIT, DATA, DIGI and SLIM HIU's all perform a similar function with the Economy or Comfort mode, by momentarily opening the domestic hot water stepper motor to allow small quantities of primary water to creep into the unit at regular intervals. The primary pipework leading to and from the HIU usually loses heat faster than the HIU itself, hence the unit will typically settle trickling in heat fast enough to keep the primary return at or just below domestic hot water temperature. The SPLIT, DATA, DIGI and SLIM HIU's are the only HIU's capable of this level of control with electronics to ensure that primary return temperatures remain below the domestic hot water setpoint at all times.

Each HIU has two domestic hot water keep hot modes, Economy or Comfort. These can only be selected during commissioning or by a trained engineer.

Economy Mode

The default setting is Eco mode, and this can be specified to run for 0 minutes (which turns the feature off all together), 15, 30, 60 or 120 minutes following the last hot water draw off. In Eco mode the heat exchanger is kept to a specified temperature (between 25-60°C) for the selected period of time and after this period of inactivity has elapsed the stepper motor closes completely and the temperature in the domestic hot water circuit is allowed to drop through natural dissipation to minimize energy consumption. If a hot water draw off is made any time throughout the Eco mode function the unit will deliver hot water as usual and the Eco mode function will begin counting down for the selected time once again.

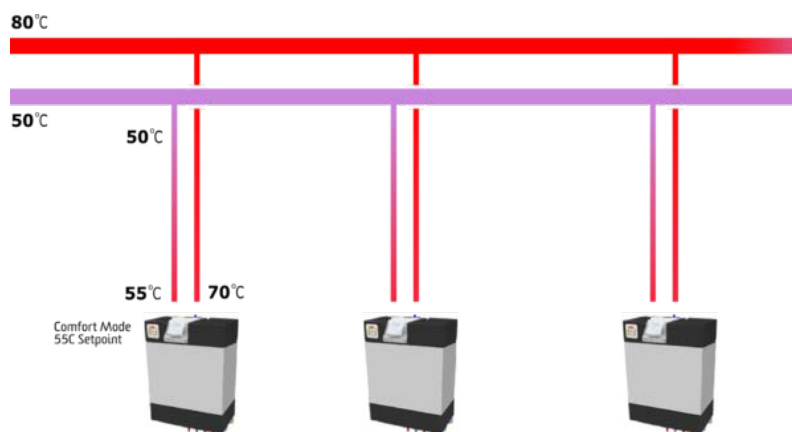
The following diagram shows how the network can go completely cold, however there is a risk that one system may call for hot water overnight, and experience a significant delay before heat can arrive from the plant, as the entire volume of cold primary flow pipework will need to be expelled.



Setting the Eco mode function to operate at just above room temperature enables the primary return temperature to remain low and to achieve unprecedented efficiency levels, but still allows the HIU to deliver hot water in a very short period of time, when compared to other HIU's on the market.

Comfort Mode

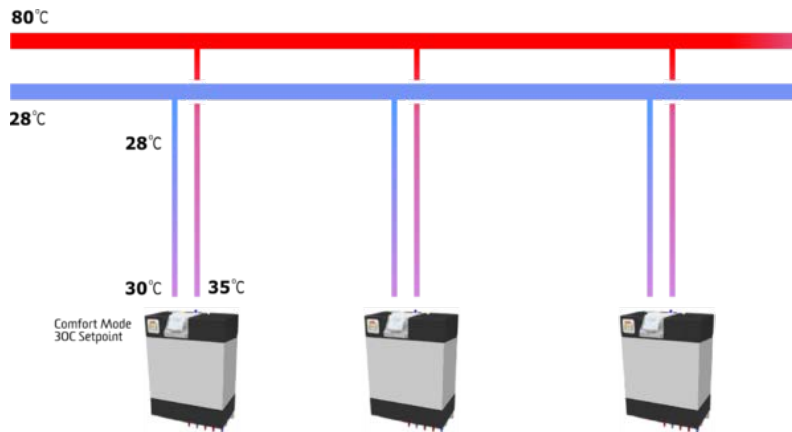
In Comfort Mode, the HIU maintains temperature into the HIU by pulsing in a calculated volume of primary flow water every few minutes. The amount of water let in is very small, and not enough to pass through the plate heat exchanger. The heat then dissipates throughout the plate heat exchanger, however energy consumption will be slightly higher than if the unit was set in Eco mode.



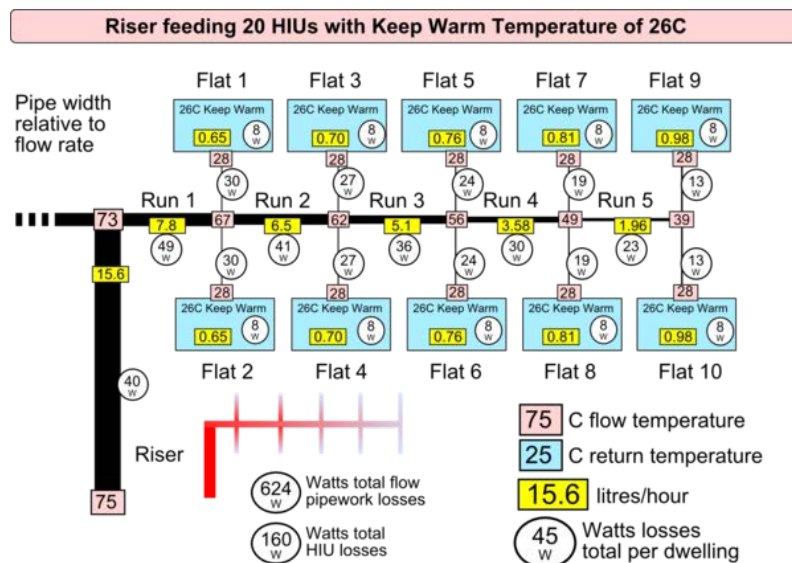
Reduced Comfort Temperature

The latest firmware provides for a separate temperature setpoint for the keep warm mode that can be set lower than the hot water temperature setpoint. This is to allow the system to be setup to maintain heat in main distribution pipework, but let branch pipework drop significantly in temperature.

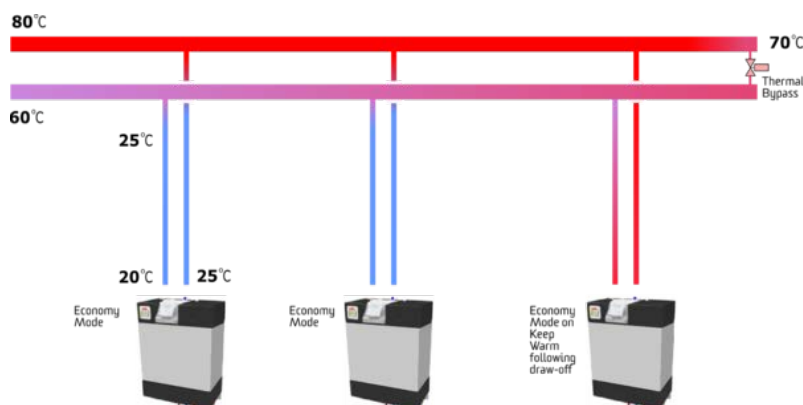
The Comfort temperature setting must be high enough to maintain enough overall flow to maintain heat in the primary flow pipe.



The following shows how the use of reduced comfort mode at 26°C settles to a state where heat is maintained in the main pipework in readiness for a draw-off, however the branches see considerably lower temperatures and lower heat losses. Return temperatures are just above room temperature at all times (outside of heating season and Legionella cycles).



To overcome this, a thermal bypass can be fitted on the end of the primary pipework. Given the main primary branches are well insulated, the heat losses in maintaining them at temperature this way is far lower than if HIUs are kept warm also. The primary return will reflect the setting of the thermal bypass.



Anti-Legionella Function

Every 24 hours, the HIU will bring the domestic hot water plate heat exchanger up to a temperature of 57°C for a period of at least 60 minutes to prevent legionella from growing.

The system is self-learning so it will stop immediately upon a hot water draw off, and resume immediately after. This means it will gradually learn over a few days to function overnight.

Self-learning Differential Pressure Control

With a district heating system operating at 2.5 bar differential pressure or lower, the SPLIT uses its sensors and control valves to calculate the differential pressure of the system and is then able to adjust itself to suit. This eliminates temperature fluctuations due to district heating pressure fluctuations. Where the district heating system is working above 2.5 bar differential pressure, the SPLIT can be fitted with an optional differential pressure control valve to cope with differential pressures up to 4.5 bar.

Return Temperature Performance

Low primary return temperatures are important on district heating systems for three main reasons.

- Efficiency of heat generation - CHP, condensing boilers and heat pumps all benefit greatly from lower return temperatures.
- Heat losses - colder return pipework results in lower network heat losses.
- Pipe and pump sizing - sending hot water back to plant is a waste of available pipework capacity, and greater loads can be transmitted through a network if the overall temperature drop is greater.

The task of achieving low return temperatures is made difficult by the need to maintain high enough temperatures in pipework to respond to immediate domestic hot water demand. This function, referred to as a keep-warm or trickle flow, needs to also satisfy a Legionella duty of care, ensuring water does not remain at low temperatures for lengthy periods.

Moulded EPP Insulated Casing

The best way to reduce heat losses is typically to insulate. In an HIU this is especially important as there is very little water content so even a small heat loss results in temperatures dropping and the controls cycling the primary supplies to reheat. To significantly reduce this, the SPLIT makes use of highly engineered EPP Expanded Polypropylene moulded enclosures that encase individual components preventing any heat bridging to the environment, or to other components within the unit. The resulting heat losses are under 50 Watts, helping to ensure that cupboard temperatures do not rise significantly, and although the finished moulded casing looks good in itself, there is also an option for an outer metal cladding.

Advanced Heat Exchanger Technology

District heating pipework should generally be sized for temperatures as high as the plant can typically generate, to satisfy those days when it is -5°C outside. Most of the time however, there is considerable space to run the network at lower temperatures during periods of reduced demand. In addition, modern heating loads are becoming very small indeed, making it difficult to maintain turbulence (and efficiency) within heat exchangers. The SPLIT makes use of asymmetric plate heat exchangers to best match the characteristics of modern dwellings, while maintaining close temperature approaches and efficiency.

Oversizing a heat exchanger can cause as many problems as under-sizing. The reason is that efficient heat exchange requires turbulence within the water flow, however below a certain flow rate the flow becomes laminar, and the hotter water tends to pass right through the heat exchanger resulting in elevated return temperatures that can destroy the efficiency of a district heating network.

To ensure optimum efficiency we can supply heat exchangers designed to match your heat loads to perfection. Typically we will issue heat exchanger calculations at the customers proposed operating parameters.

Metering & Security

The SPLIT has been designed with pre-pay billing systems in mind, where HIUs need to be fitted with a security shut-off valve, and designed with tampering in mind. The SPLIT includes pipework allowance for both a heat meter and security valve internally. To simplify the process of securing bolts and access points on HIUs, we make use of unique moulded security clips and caps that once assembled, make it impossible to access a bolt head or connection nut without breaking the cap. To secure casings and any bolt on components that one would like secured, we use a Bolt Security Cap. Bolts are inserted through the lower part of the security cap assembly, and screwed into position. The upper part is then pushed into the lower part until it locks, at which point the cap cannot be removed, and the screw head cannot be accessed.

Heat Meter

A selection of heat meters are available to be factory fitted. Heat meters are protected with a security clip to prevent access to connections without breaking the seal permanently. The heat meter display is mounted in a recess in the front of the unit, providing access to buttons, but preventing removal.

Security Valve

Where HIUs are intended to be used in conjunction with pre-pay systems and it is required for utility providers to have the facility to shutdown heat supply, the SPLIT can be supplied with a landlord security closure system. This is typically an electronic function using the valves that are already within the HIU control system, however for those who want a more independent solution an optional security valve can be factory fitted allowing the HIU to close against very high pressures and on loss of power.

Reliability and Confidence

The performance settings on the SPLIT can only be altered by an approved engineer with the right kit and software. Settings are typically setup in the factory and confirmed at commissioning. These settings are locked in software, with a report confirming all settings generated at commissioning. Following setup, nobody can change the settings, override domestic hot water settings, open bypasses, or set the central heating temperatures too high. The whole system actually performs in reality as it does on paper.

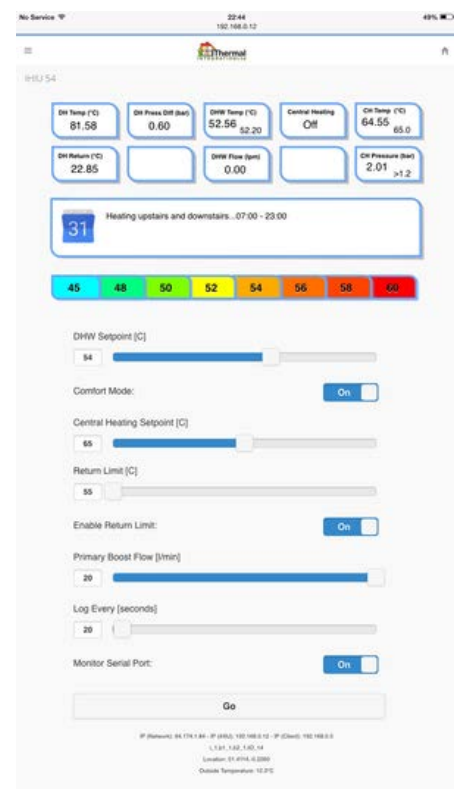
iHIU Network Control and User Interfaces

As an optional extra, the SPLIT can be supplied with an iHIU controller, for Inter-networking of all SPLIT units within a development to enable site wide adjustments to match loads to primary circuit heat availability and networked domestic hot water priority. Together with browser based interface and online dashboard for remote commissioning, monitoring, control adjustments, performance visualisation, fault detection and diagnosis.

- System will generate a local WiFi hotspot that can be used to access the SPLIT controls.
- The system can be logged onto an existing WiFi network to connect it to the internet and other devices. Alternatively, a wired Ethernet connection is provided.
- Provides end users with pc, smartphone or tablet interface, either locally or remotely.
- Enables remote commissioning and fault response.
- Connects system to Google calendar services for control over hot water and central heating.
- Enables sensor and performance data to be logged to remote web servers for analysis, at up to one second resolution.
- Enables data logging to the Energy Saving Trust's EMBED database
- USB port enables connection to other devices via serial, RS232/485, mesh networking, Modbus, and more.



Site Dashboards



Home screen provides operating data, and user controls

So what does the customer want?

First you need to know who your customer is, and then they need to clearly understand the pro's and con's of the different types of HIU. If they don't understand the difference between mechanical and electronic HIUs or the likely knock-on effect of their decisions at the start of a project then the entire system is at risk of failing or long term inefficiency.

The End User

The end user, tenant or owner / occupier wants a heating and hot water system which provides for their needs:-

- It must be convenient to top up the heating system, which is why we've designed the sealed system kit to be placed in a convenient position often away from the HIU.
- It must be easy to read the heat meter, which is why we've designed a pocket to house the meter display on the front of the casing.

- It must be simple to use, which is why we've made all user controls accessible to engineers only, solving the problem of how to set the unit.
- It must have stable hot water temperatures, proven by the published test results of the DATA HIU.
- It must be quick to perform, which is why we've designed the electronics to react as quick as possible to a hot water demand.
- Finally and above all it must be hassle free and value for money, which is why the SPLIT has been designed for mass production, using well tested and reliable technology.

Most people are keen to use energy efficient systems and they expect their bills to reflect some sort of saving from an energy efficient district heating system. It is therefore not acceptable for the end user to carry the burden of overheating risers & communal areas or increased costs due to poorly designed, poorly installed, poorly performing or poorly maintained systems.

The Landlord

The landlord wants a heating and hot water system which keeps the tenant happy with minimum maintenance costs and maximum security:-

- They require restricted access to the internal components but simple access for engineers only, which is why we've designed a number of anti-tamper devices to restrict undetected access.
- They require access to the controls to be minimal so that the unit is protected from unauthorised or ill-educated adjustment, which is why we've designed out all the user controls and made adjustment of the HIU engineer only.
- They need to be able to remotely read energy usage and ultimately shutdown the unit if the bills are not being paid, which is why we've designed in a number of ways for the SPLIT to be remotely isolated, together with networking solutions to suit all needs.

The emphasis is not so much on the cost of using the energy, more the mitigation of risk against over usage and under payment. However the cost of energy is a consideration when advertising the property for rent.

The Building Manager

The building manager wants a district heating system which maximises the efficiency of the heat source and minimises residual energy.

- The system must be able to perform at peak times, but must also work efficiently during low usage periods, which is why the SPLIT is equipped with Eco and Comfort hot water modes, with Eco mode shutting the unit completely during low usage periods.
- The district heating system must have low primary return temperatures, ultimately saving on the cost of fuel, which is why we've made use of modern electronics to enable the HIU to limit the primary return temperature.
- Each and every HIU connected to the system needs to be set-up to work to its most efficient and should be flexible enough to cope with pressure fluctuations in the district heating system, which is made possible with self-learning electronic controls.
- Ideally it should be tamperproof to protect from unauthorised or ill-educated adjustment, hence the anti-tamper devices mentioned above.
- It should be well insulated to help reduce overheating in risers & corridors, which is why the casing is engineered from highly insulated Expanded Polypropylene.
- Each HIU should be metered and an open source billing system should be in place to enable any billing provider to connect, as opposed to being tied in with one provider. This is possible through our recommended network topology, with more advanced functions via our iHIU electronics.
- Finally the building manager needs a reliable system, with very little that can go wrong, and minimal costs for anything which does go wrong. Which is why we use a tried and tested electronic control system, installed in thousands of properties throughout Europe, together with components manufactured by worldwide industry leaders.

The Billing Provider

The billing provider wants to make money from billing:-

- If the system is an open source system then it makes it possible for any provider to connect and begin billing. The network topology recommended by Thermal Integration makes it possible for any billing system to be connected and is future-proofed to allow change of billing provider in the future.
- The billing provider needs to ensure the heat generators are working efficiently, the system losses are kept to a minimum and the HIU's perform efficiently. Which is all possible by fitting the iHIU electronics to monitor not only the HIU but also the entire network.

If an end user wastes energy by using their system incorrectly then the billing provider is within their rights to charge for that energy, however if the entire system is working inefficiently we must ask ourselves is the billing provider within their rights to charge the end users when it maybe completely out of their control?

All being well they can charge the end user a reasonable amount for the energy, but still make a tidy profit.

This is the reason why we need to ensure the end user has the best most efficient HIU available, with all the features necessary to allow the landlord, building manager and billing provider to do their bit.

The M&E Contractor

The M&E Contractor wants to install a system which costs as little as possible but still meets the building services consultants' specification.

- It is important that they purchase and install a simple HIU, with little to go wrong, and the SPLIT HIU is very competitively priced yet it is the simplest but most advanced HIU on the market
- Time costs money and the cost of routing pipes throughout properties can also mount up, therefore the SPLIT can save both time and money, by having the sealed system kit mounted close to the drainage system.
- Installation aids reduce the cost of labour, so with a pre-install plumbing jig to shorten installation times and a sealed system kit which can be fitted way in advance of the HIU, pressure testing of the heating circuit can be carried out before the SPLIT HIU is delivered to site.
- It is important that chosen product has enough features to keep their customer and ultimately the end user happy. It is also important that they purchase carefully, making use of the discount structures offered by their suppliers. We therefore offer the opportunity for the M&E Contractor to purchase the sealed system kit through their own supply channels or from Thermal Integration.

Energy efficiency is not necessarily high on the list, however most M&E Contractors are keen to provide a system that they can put their name to and which will pull in future work, so the more efficient the system the better and this can really only be measured by the cost of running the system, against the revenue taken from the system, i.e. the billing providers profit.

No M&E Contractor wants to be called back to a building time and time again, to sort out problems with overheating, unstable hot water temperatures or badly balanced heating systems. Therefore an HIU which can reduce the risk of any of the above should be high on their list.

The Building Services Consultant

The building services consultant is employed to design the most efficient system possible within the cost constraints put to them by their customer.

- They often have to fit a quart into a pint pot, when it comes to the heating and hot water systems, and sometimes it is simply not feasible to fit the whole system into the one small space. Which is why we have split the HIU into two separate components which each fit into a much more compact space.
- Nevertheless they still require a powerful system and one which has attractive features that the M&E Contractor also deems attractive. We hope that the features of the SPLIT HIU and the possible cost benefits will be attractive to all.

The success of a building services consultant is measured partly by the profits of the billing provider, but will take into account any issues the district heating system is burdened with and the cost to rectify those issues, the cost for which will generally impact on the end user.

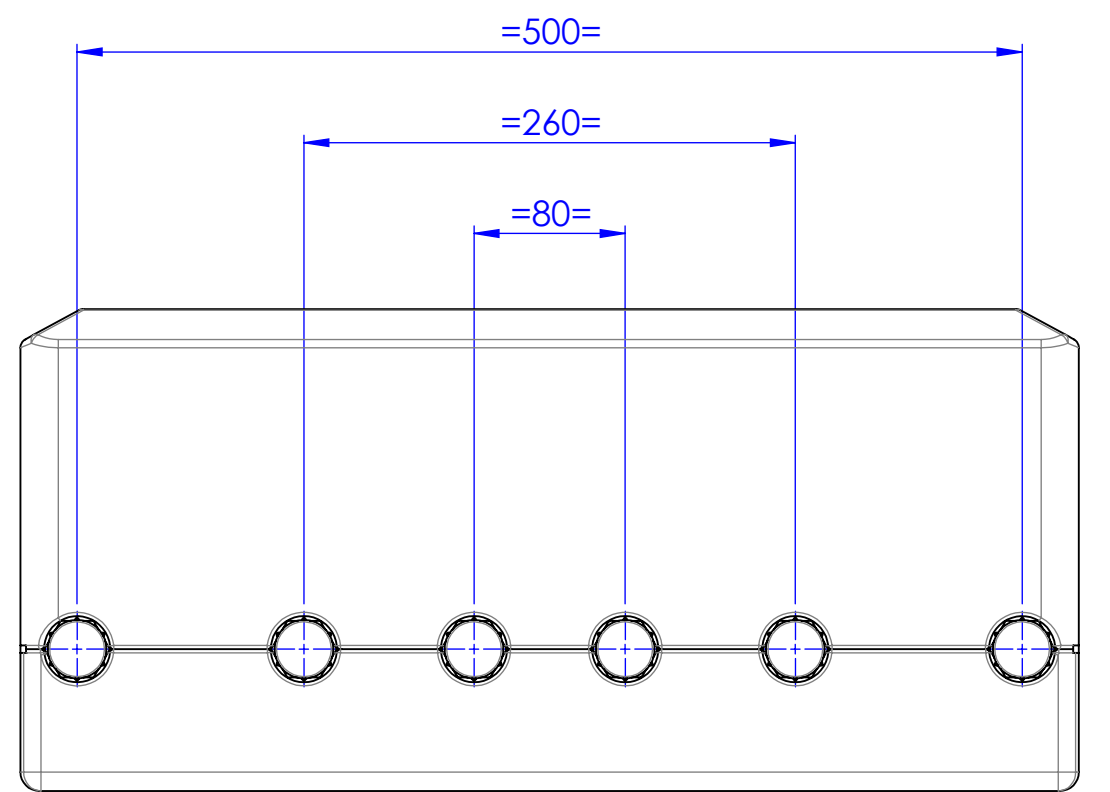
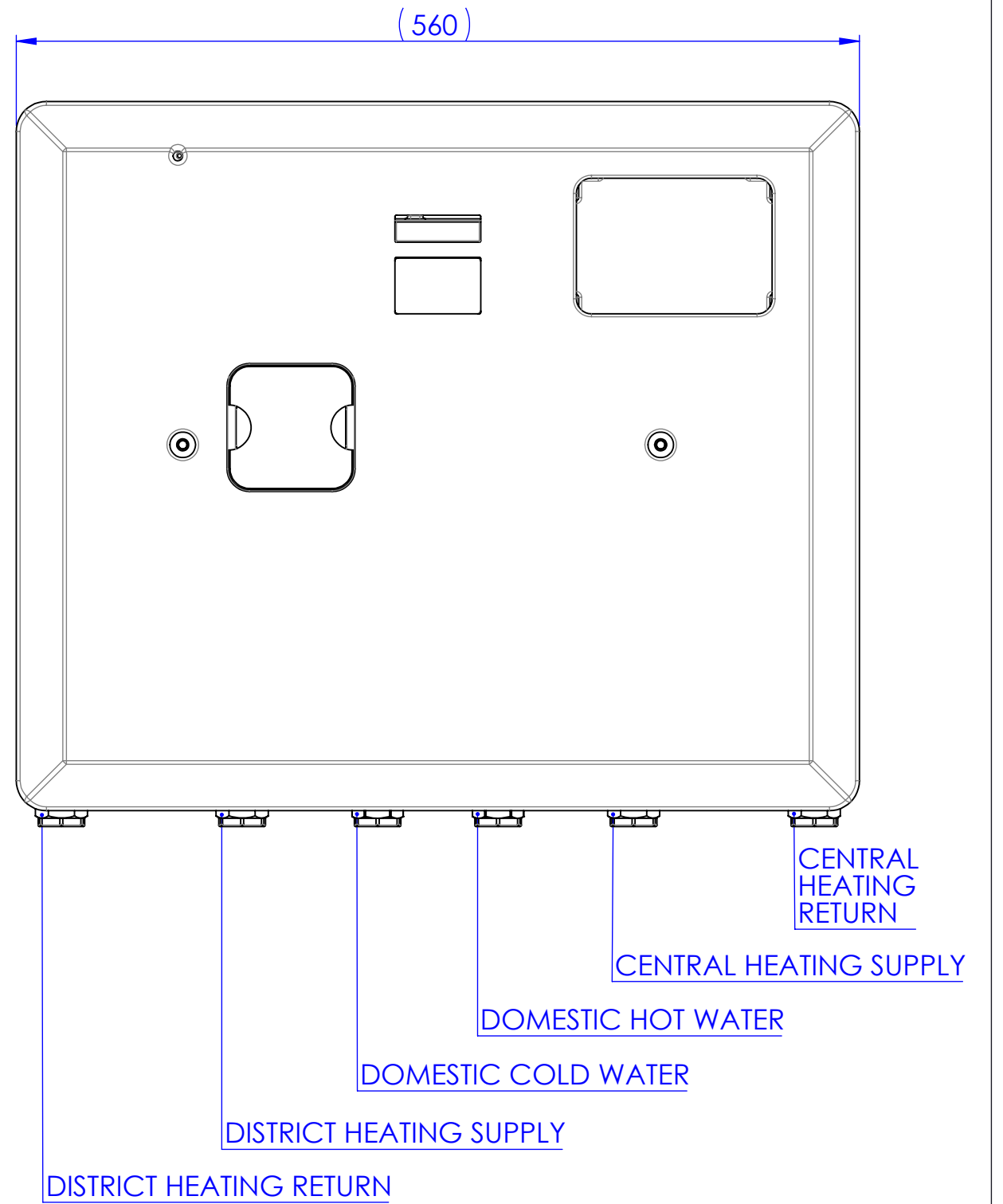
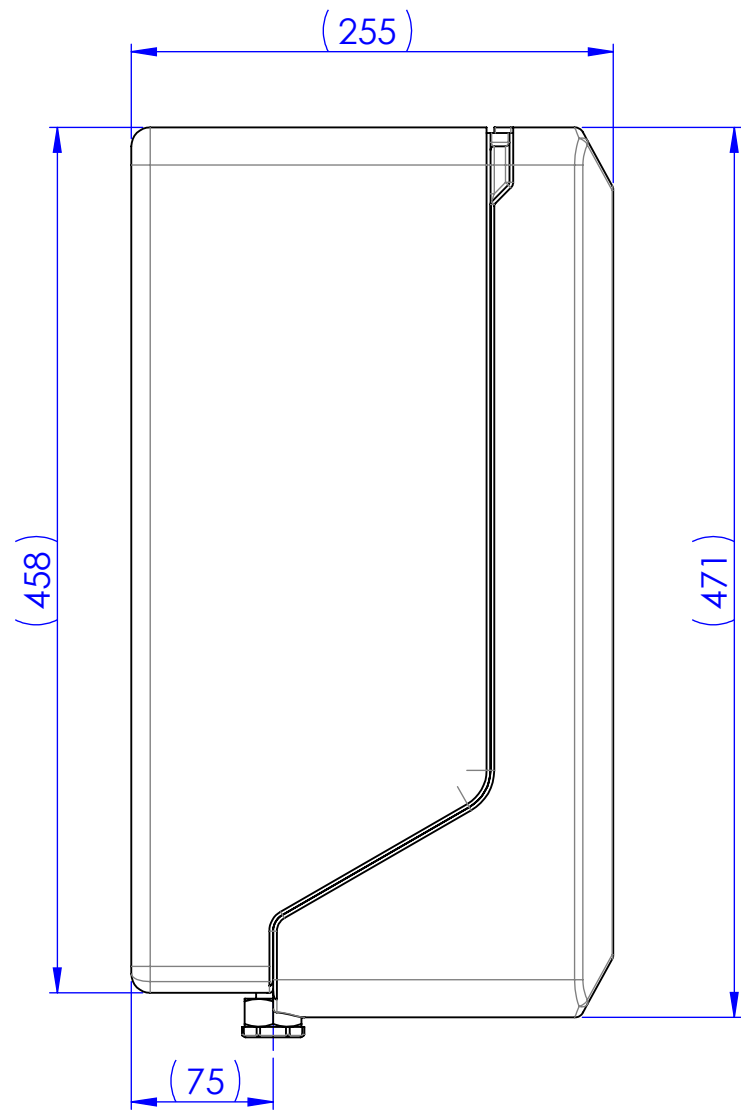
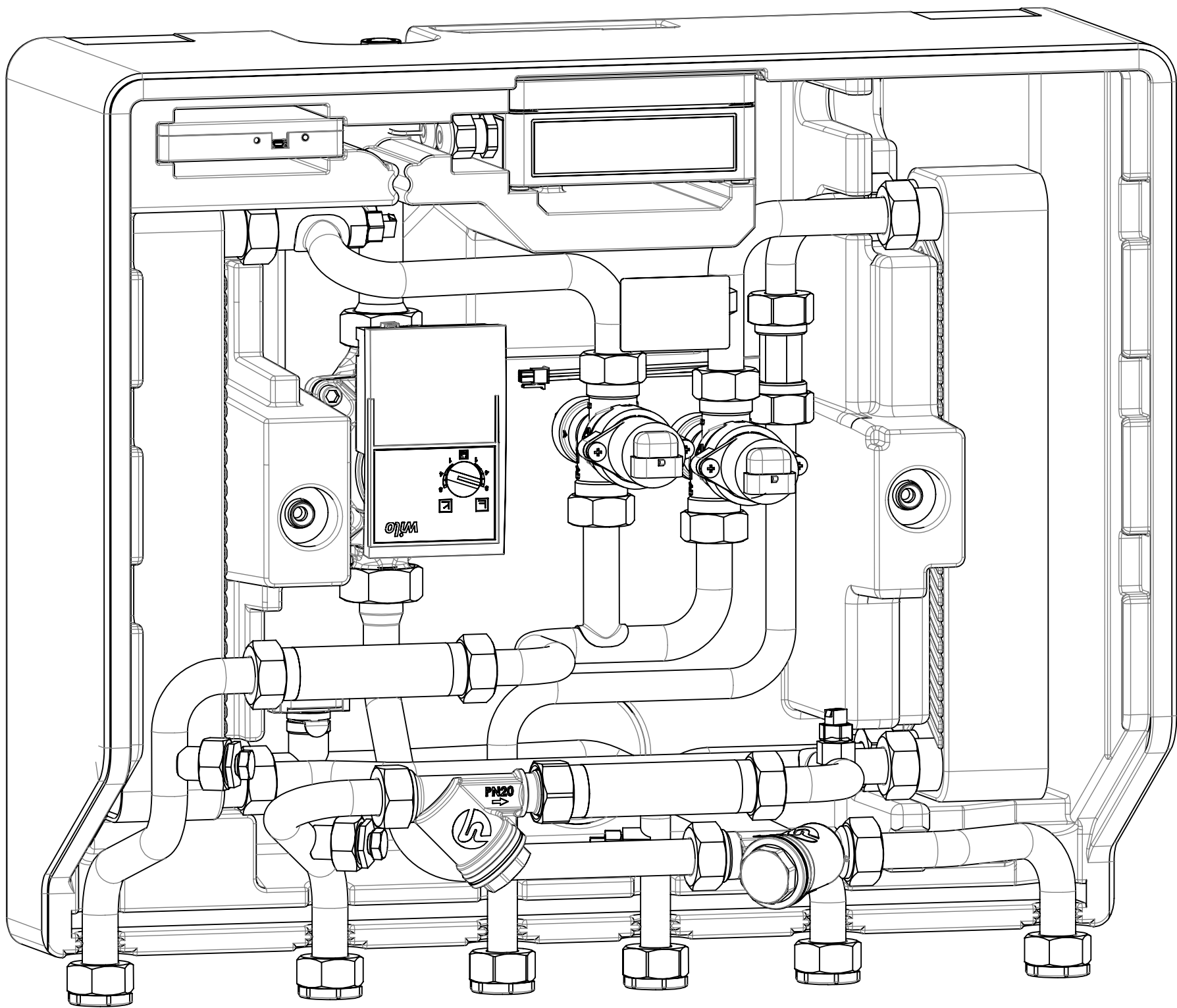
Further Reading

There are a number of articles on our Wiki site which detail the control systems employed in the DATA HIU, which is the same control system as the SPLIT HIU.

http://www.heatweb.com/wiki/index.php?title=The_HIU_Revolution

http://heatweb.com/wiki/index.php?title=HIU_Comparison

http://www.heatweb.com/wiki/index.php?title=The_DATA_HIU

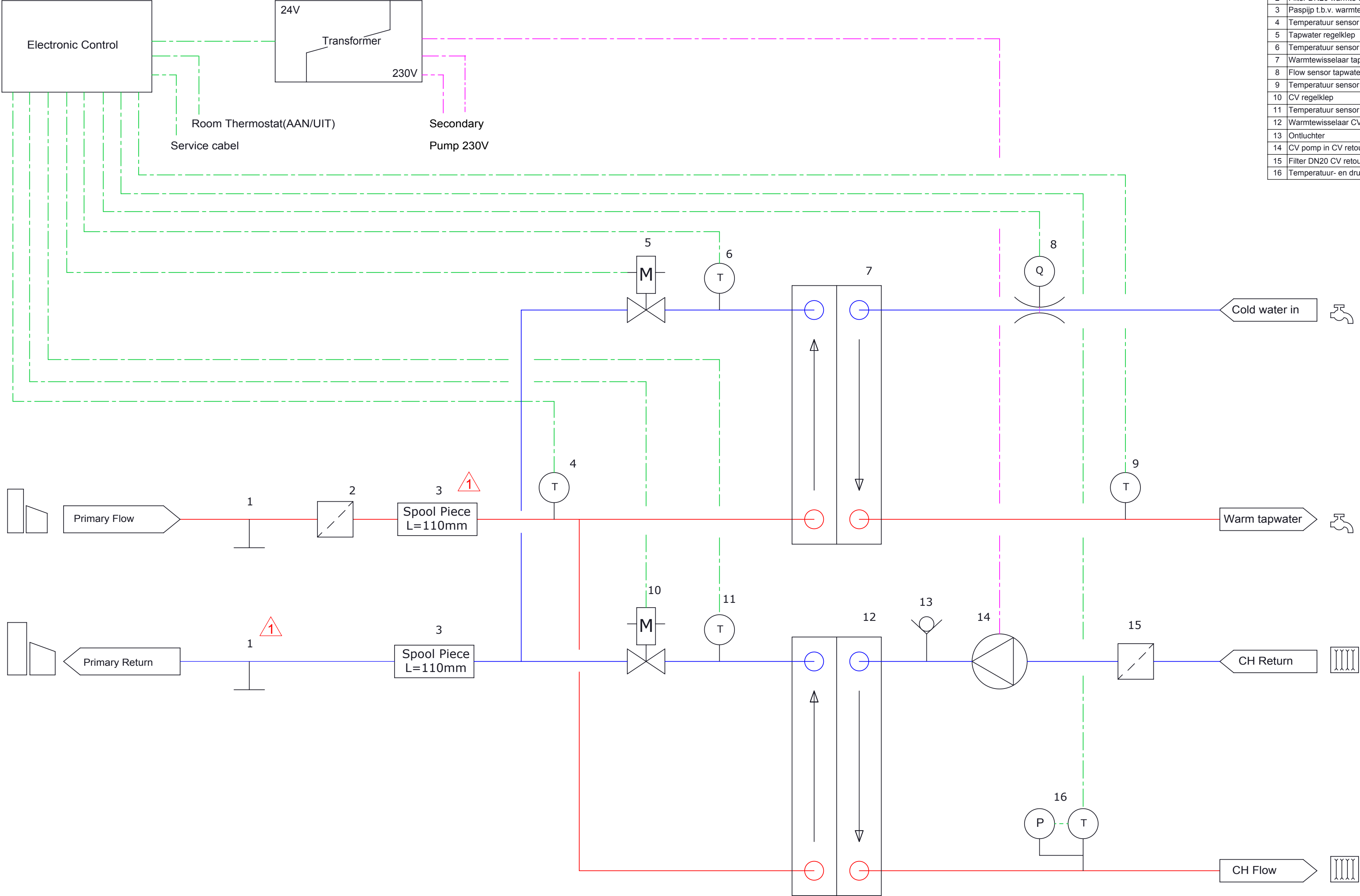


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				Gecontr.:	<CheckedBy>
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				Vervangt:	
Project-nr: P243				Maateenheid: [mm]	
hssf		Am. proj.	Schaal: Form.:	Blad: Tekeningnummer	Rev.
		1:4	A2	2/2 52800	0

The SPLIT - Technical Data

GENERAL						
Countries/Markets		UK				
Brand name		Thermal Integration				
Product name		SPLIT				
Product Description		EcoAdvance Split-II				
TECHNICAL						
Functionality						
CH interface (Direct/Indirect/Mix)		Indirect				
Pump control (n.a./yes/no)		yes				
Heating/Cooling/Combined Heating-Cooling		Heating				
DHW preparation (Instantaneous/Storage)		Instantaneous				
Heat consumption measurement		yes				
Dimensions						
Height (excl. mounting bracket)	mm	470				
Width	mm	560				
Depth	mm	255				
Weight excl. mounting bracket [kg]	kg	+/- 15,5 kg				
Connections						
<i>Order top down, from left to right</i>						
Distribution net supply		3/4" Nut FT				
Distribution net return		3/4" Nut FT				
Cold water inlet		3/4" Nut FT				
Hot water outlet		3/4" Nut FT				
CH supply		3/4" Nut FT				
CH return		3/4" Nut FT				
Drain relief valve		External by others				
Heat meter spool piece supply		110x3/4" Nut FT				
Position of heat meter spool		Supply & Return				
Heat meter temperature sensor pocket		M10x1 or G1/2"				
Thermostat Connector		potential free on/of				
RS485 Data cable		yes				
Power connection type		3-pole cable				
Mains		230VAC-50Hz-0,64A				
Yearly Electrical Consumption	kWh	ca. 45				
District Heating (DH)						
Maximum supply temperature [°C]	°C	95 (peak 100)				
Minimal supply temperature [°C]	°C	65				
Maximum return temperature from CH [°C]	°C	60 (adj. 35-65)				
Maximum differential pressure [kPa]	kPa	250				
Minimal differential pressure @ DH [kPa]	kPa	50				
Pressure class		PN16				
Central Heating (CH)						
Controls		Electronic				
Supply temperature CH	°C	DN Supply temp. - 5				
Maximum CH supply temperature setpoint	°C	80 (adj. 25-80)				
Maximum DN return temperature setpoint	°C	60 (adj. 35-65)				
Output @dT=30° (@750l/h)	kW	26,3				
Output @dT=20° (@750l/h)	kW	17,5				
Output @dT=10° (@750l/h)	kW	8,8				
Maximum pump flow	l/h	750				
Maximum differential pressure pump	kPa	70 (adj. 0-70)				
Pump overrun	min	15 (adj. 0-1440)				
Thermostat Connection (on/off/modulating/n.a.)		on/off (only pot. free)				230V THERMOSTATS REQUIRE RELAY
DHW priority (yes/no/n.a.)		yes				
Expansion vessel (n.a./[ltr])	Ltr.	n.a.				
Pressure relief valve (n.a./[bar])	Bar	n.a.				

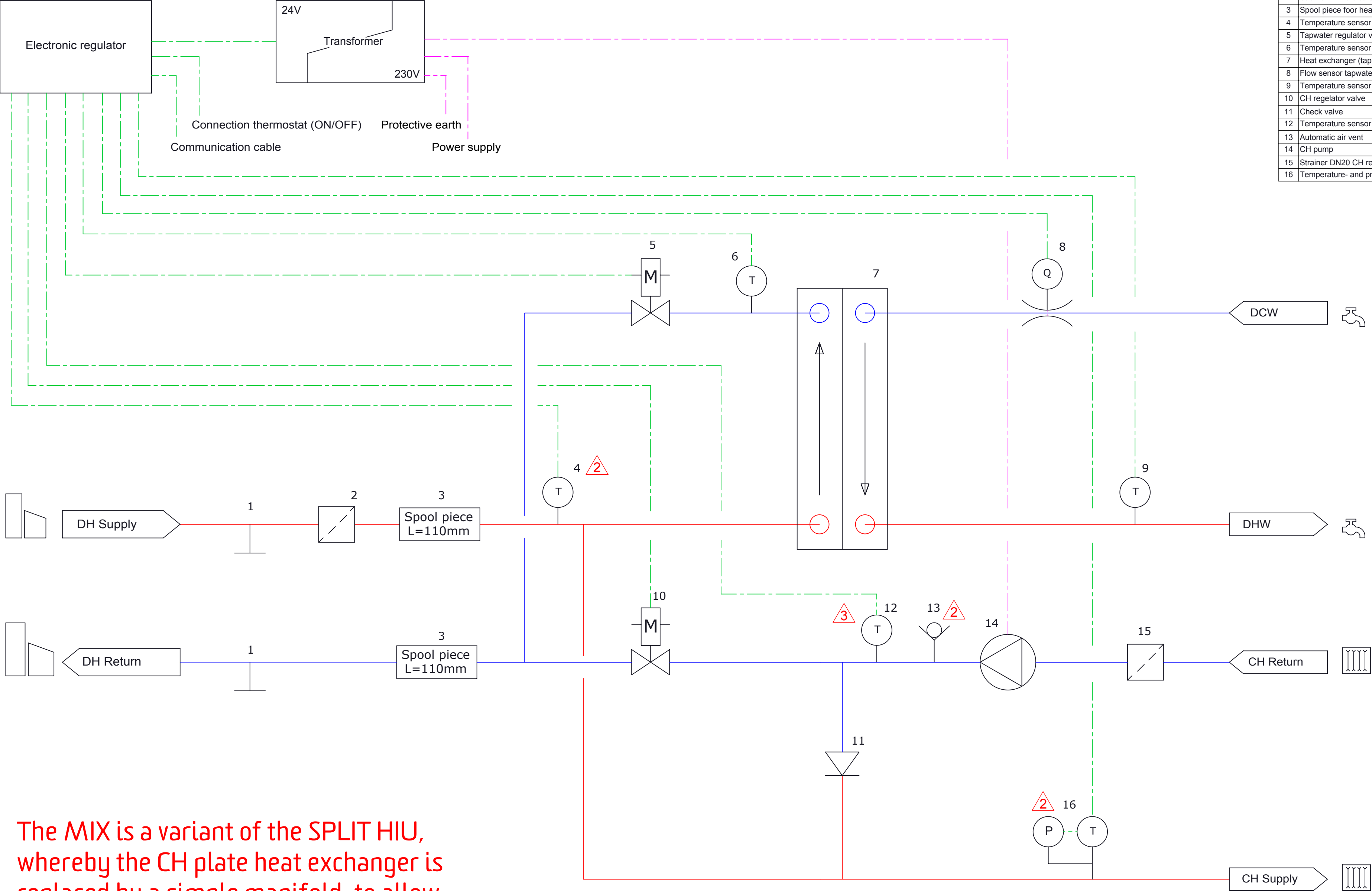
GENERAL						
Countries/Markets		UK				
Brand name		HSF				
Product name		tbd				
Product Description		EcoAdvance Split-II				
Domestic Hot Water (DHW)						
Controls		Electronic				
DHW temperature	°C	50 (adj. 45-60)				
Nominal cold water temperature	°C	10				
DHW comfort class (Gaskeur CWW)		n.a.				
Maximum output	kW	50				
Maximum flow	l/min	18				
DHW Threshold	l/min	1				
Keep hot temperature	°C	40 (adj. 25-60)				
Keep hot time after tapping	min	unlimited (adj. 0-unl)				
Thermal heat loss	W	ca. 20				
Legionella program activated		yes				
Pressure class		PN 10				
Pressure loss at maximum flow	kPa	73				
Components and parts						
Material pipes		Copper				
Plate heat exchanger DHW (double/single wall)		E8LAS				
Plate heat exchanger CH		E8LAS				
Heat meter display visbil from outside		yes				
Indication led visible from outside		yes				
Energy Class A pump		yes; Wilo Yonos Para				
Pump adjustable without removing cover		yes				
Venting (None/Auto/Manual)		Auto (CH)				
Documentation & Labels						
Languages (NL/EN/FR/GE/DK/SE/NO/...)		UK				
Installation Manual		yes				
User Manual		(in IM)				
Failure Code Table		(in IM)				
Guarantee card		yes				
Safety notices		(in IM)				
Spare Parts List		yes				
Training Documentation		yes				
Planning Documentation		-				
CE Label		yes				
Product Label		yes				
Packaging						
Protection demands (Water/Dust/Temp./...)		Normal carton Box				
Product Packaging type (Box/Strap/Seal/Bag/...)		Box				
Branding on packaging (yes/no)		Yes				
Secondary packaging (n.a./Box/Seal/Bag/...)		n.a.				
Product label		yes				
Warning label		yes				Tighten nuts after installation
Box packaging label		yes				
Secondary packaging label		n.a.				
Transportation test						
Accessories						
Installation bracket		yes				
Connections installation bracket fltr:						
Distribution net supply		Valve				
Distribution net return		Valve				
Cold water inlet		Valve (WRAS)				
Hot water outlet		Valve (WRAS)				
CH supply		Valve				
CH return		Valve				
Drain relieve valve (at bottom)		n.a.				
Approvals/Conformities						
Approval on all parts in contact with DW		yes				
CE		yes				
WRAS		yes - TBC				
APPENDIXES						
Appendix 1	Schematic drawing (EcoAdvance Split)					
Appendix 2	Calculations for domestic hot water heat exchanger (output and performance in typical situations)					
Appendix 3	Calculations for central heating heat exchanger (output and performance in typical situations)					
Appendix 4						
Appendix 5						
End of specification						



POS	OMSCHRIJVING
1	Temperatuur sensor aansluiting voor warmtemeter
2	Filter DN20 warmte distributenet aanvoer
3	Paspijp t.b.v. warmtemeter L = 110 mm
4	Temperatuur sensor stadswarmte aanvoer
5	Tapwater regelklep
6	Temperatuur sensor stadswarmte retour tapwaterzijdig
7	Warmtewisselaar tapwaterzijdig
8	Flow sensor tapwater
9	Temperatuur sensor warm tapwater
10	CV regelklep
11	Temperatuur sensor stadswarmte retour CV zijdig
12	Warmtewisselaar CV zijdig
13	Ontluchter
14	CV pomp in CV retour
15	Filter DN20 CV retour
16	Temperatuur- en druksensor (gecombineerd) CV aanvoer

- Legenda:**
- Warm water leiding
 - Koud water / retour leiding
 - Elektronica laag spanning 24 VDC
 - Elektronica hoog spanning 230 VAC

2	P243	TEMPERATUURSENSOR (4) EN ONTLUCHTER (13) TOEGEVOEGD, 16 GEWIJZIGD	10-06-2016	MJ
1	P243	PASPIJP TOEGEVOEGD IN STADSWARMTE AANVOER	26-02-2016	SS
0	P243	CONCEPT SCHEMA ECOSPLIT	09-02-2016	SS
Rev.	Mutatienr.	Omschrijving	Datum	Getekend
Algemene ruwheid		1.6/	Alg. toleranties vlgs.: NEN-ISO 2768- mH	Vorm- en plaats aanduiding: NEN-ISO 1101
Ra in um ISO1302				
Benaming		SPLIT Schematic		
Materiaal: N.V.T.		Project-nr: P243	Maateenheid: [mm]	
hssf		Am. proj.	Schaal: 1:1	Form.: A2
		Blad: 1/1	Tekeningsnummer Split	
				Rev.

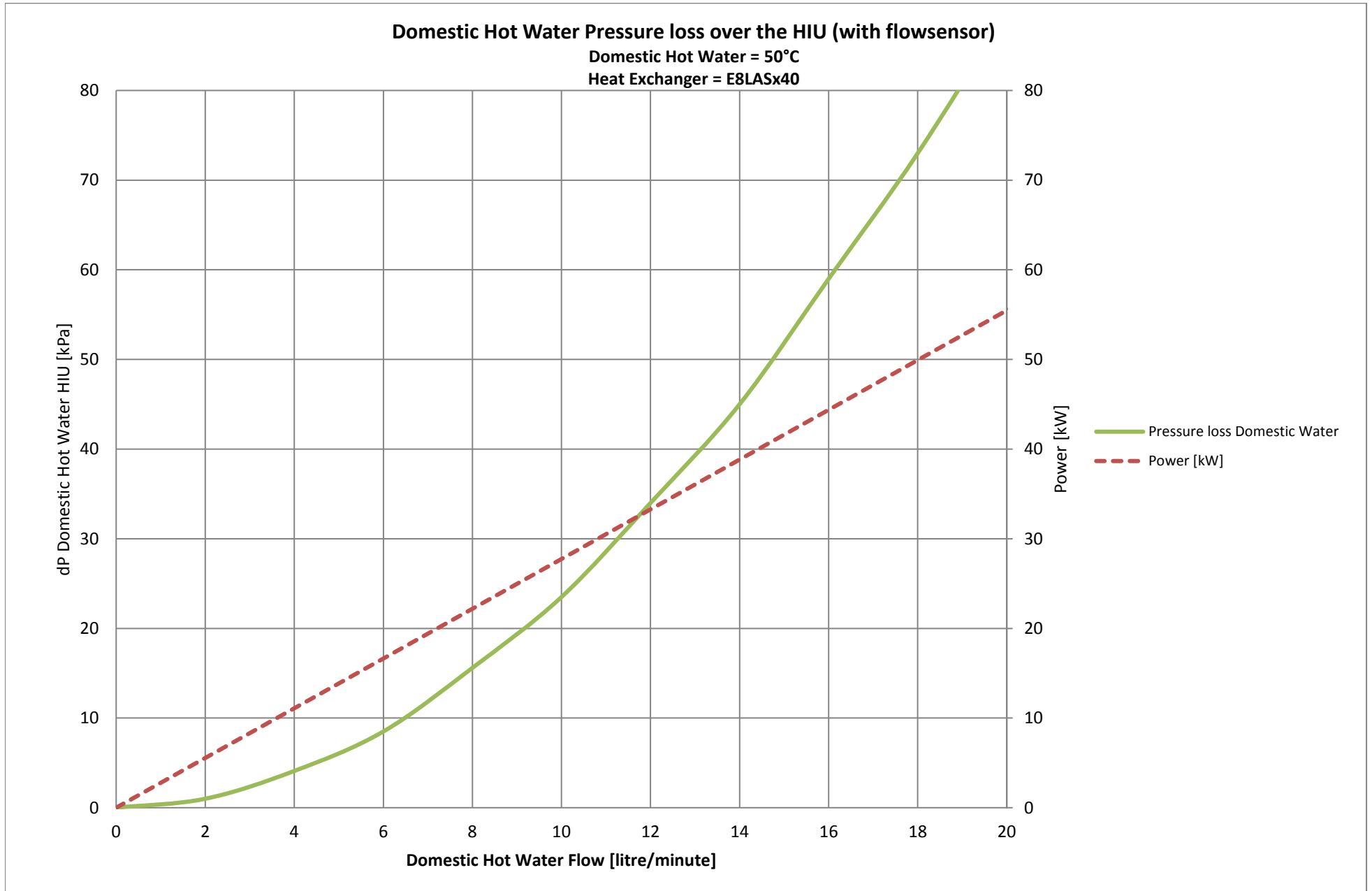


POS	OMSCHRIJVING
1	Temperature sensor pocket for heat meter
2	Strainer DN20 district heating supply
3	Spool piece for heat meter L = 110 mm
4	Temperature sensor district heating supply
5	Tapwater regulator valve
6	Temperature sensor district heating return (tapping side)
7	Heat exchanger (tapping side)
8	Flow sensor tapwater
9	Temperature sensor warm tapwater
10	CH regelator valve
11	Check valve
12	Temperature sensor district heating return (CH side)
13	Automatic air vent
14	CH pump
15	Strainer DN20 CH return
16	Temperature- and pressuressensor (combined) CH supply

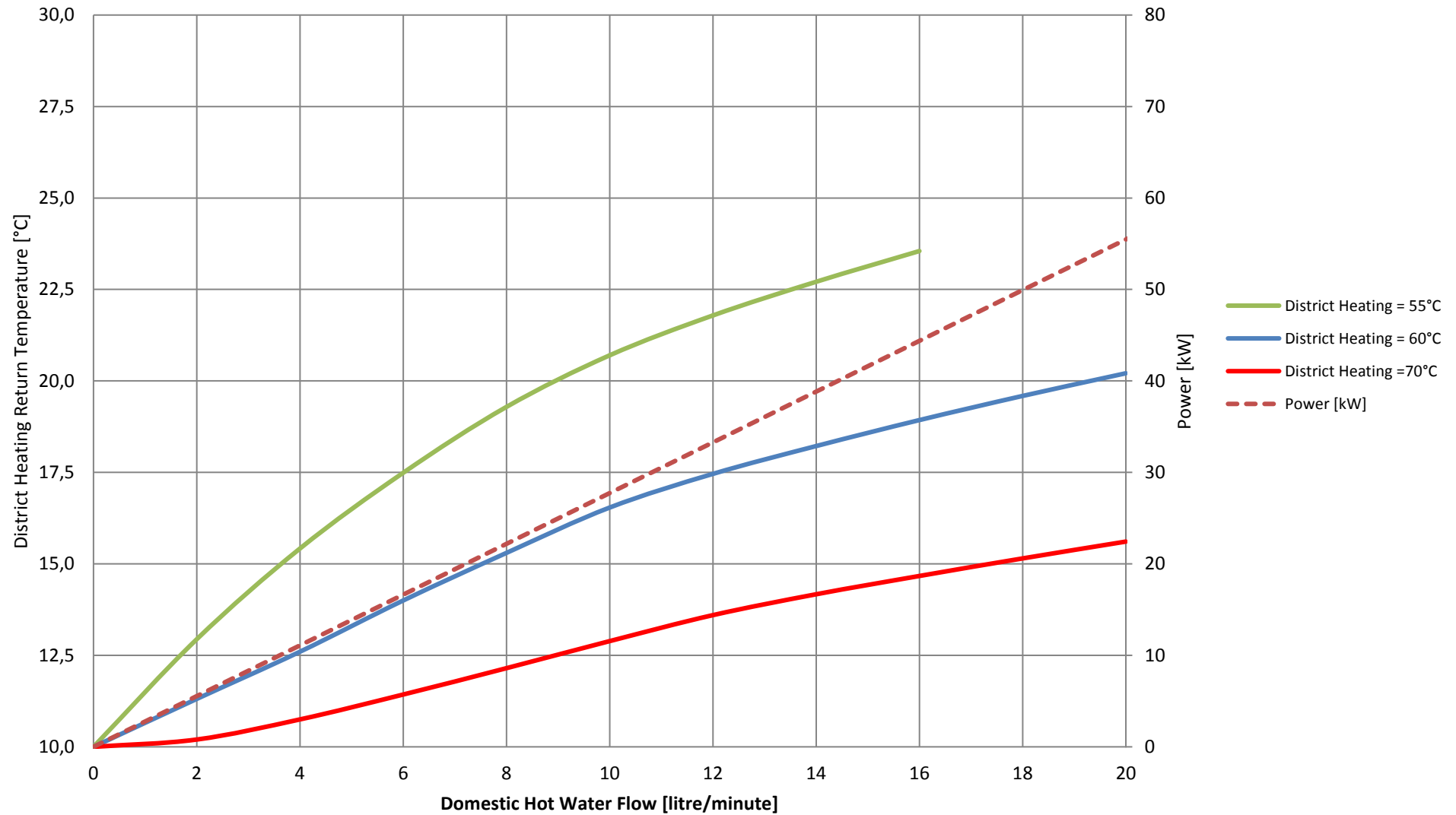
The MIX is a variant of the SPLIT HIU, whereby the CH plate heat exchanger is replaced by a simple manifold, to allow the central heating circuit to connect directly to the district heating circuit.

- Legend:
- Warm water pipe
 - Cold water / return pipe
 - Electronics low voltage 24 VDC
 - Electronics high voltage 230 VAC

3	P243	CHANGED POSITION TEMPERATURE SENSOR (12)			14-10-2016	SS
2	P243	ADDED TEMPERATURE SENSOR (4) AND AIR VENT (13), CHANGED 16			10-06-2016	MJ
1	P243	ADDED SPOOL PIECE IN DISTRICT HEATING SUPPLY			26-02-2016	SS
0	P243	CONCEPT SCHEMATIC ECOMIX			09-02-2016	SS
Rev.	Mutatienr.	Omschrijving			Datum	Getekend
Algemene ruwheid		1.6/	Alg. toleranties vlgs.: NEN-ISO 2768- mH		Vorm- en plaats aanduiding: NEN-ISO 1101	Getekend: SS
Ra in um ISO1302					Datum:	09-02-2016
Benaming					Gecontr.:	RP
The MIX					Datum:	14-10-2016
					Vervangt:	2
Materiaal: N.V.T.			Project-nr: P243		Maateenheid: [mm]	
		Am. proj. 	Schaal: 1:1	Form.: A2	Blad: 1/1	Tekeningnummer MIX
						Rev. 3



District Heating Return Temperature
 Heat Exchanger = E8LASx40
 Domestic Hot Water Temperature = 50°C
 Domestic Cold Water Temperature = 10°C

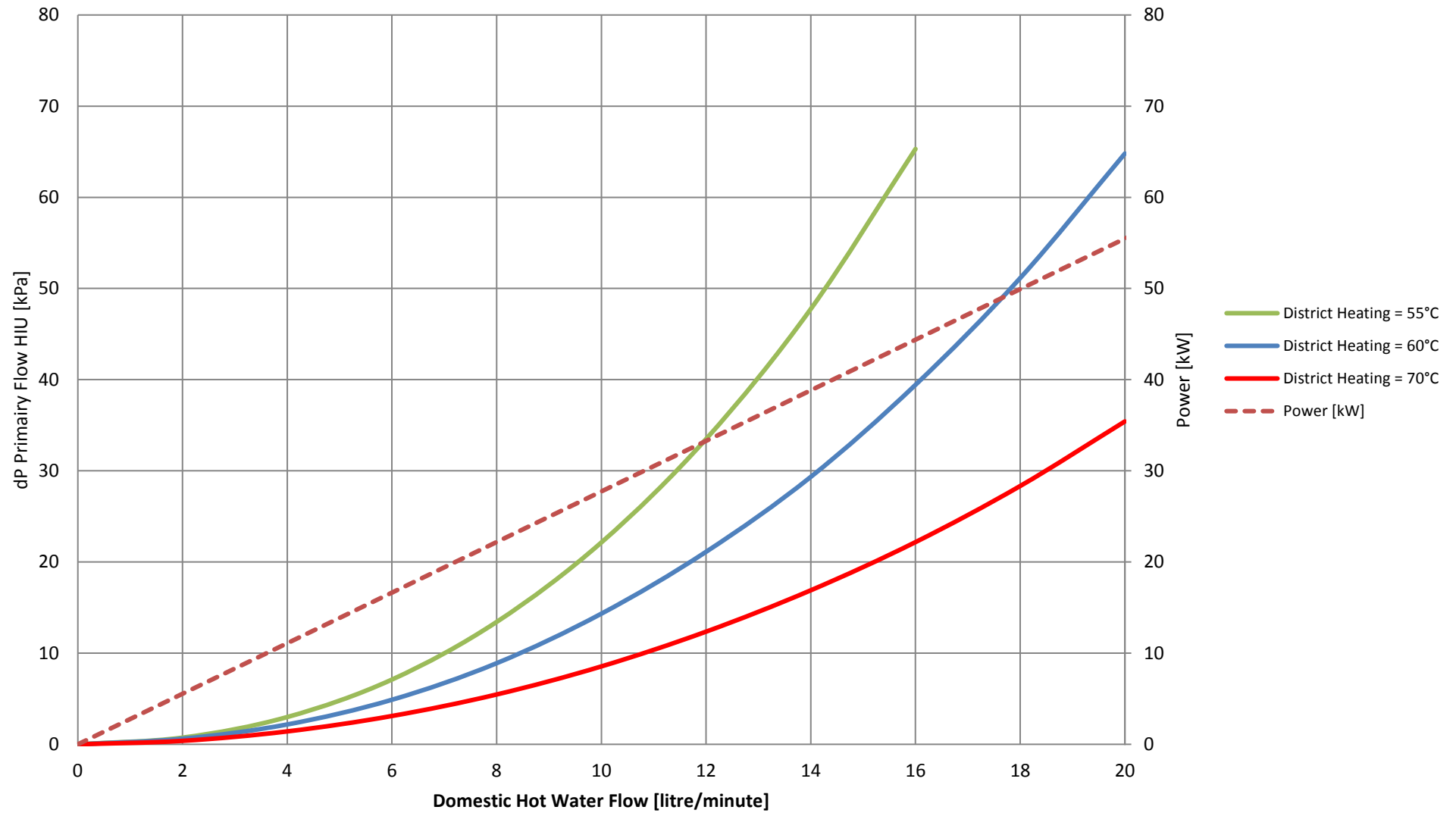


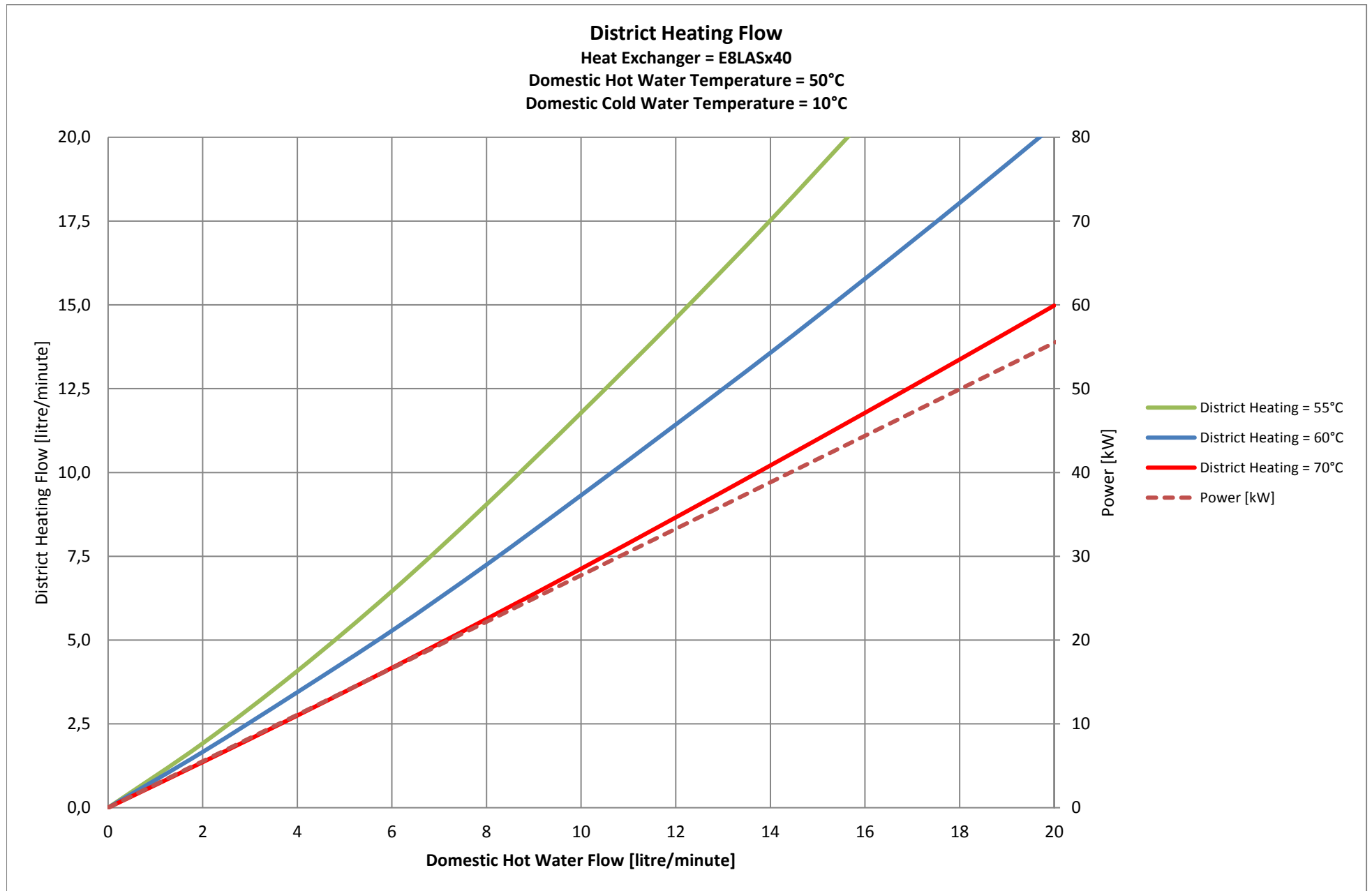
Pressure loss over the HIU (primary flow)

Heat Exchanger = E8LASx40

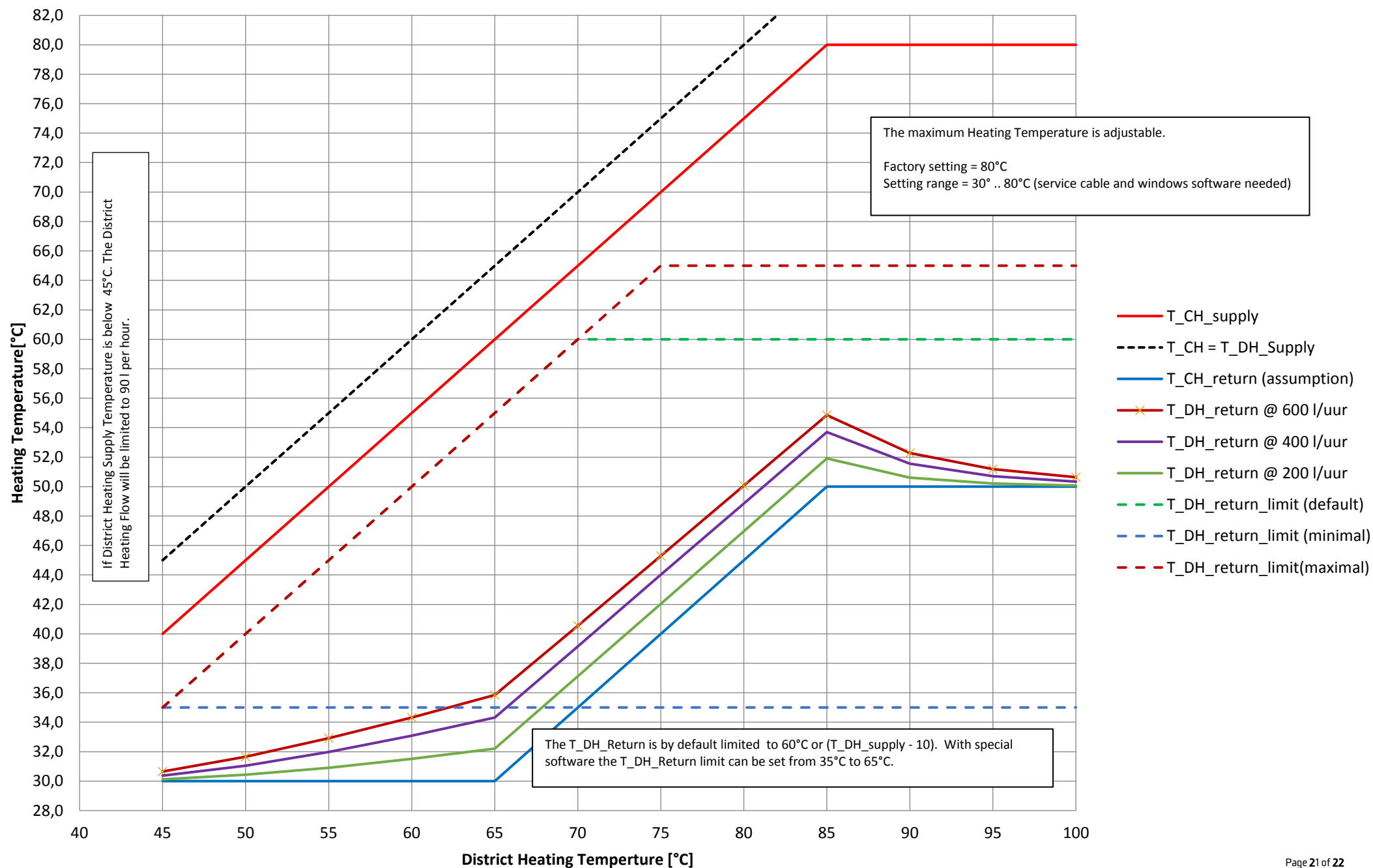
Domestic Hot Water Temperature = 50°C

Domestic Cold Water Temperature = 10°C





Heating Temperature Curves (with SWEP E8LASx40 Heat Exchanger - Narrow on primary side)



Performance of Plate Heat Exchanger - SWEP E8LASNxW40

T_DH_Supply	T_CH_supply	T_DH_return_limit (default)	T_DH_return_limit (minimal)	T_DH_return_limit (maximum)	T_CH = T_DH_Supply	T_CH_return (assumption)	T_DH_return @ 200 l/uur	P [kW]	DH_flow [l/uur]	T_DH_return @ 400 l/uur	P [kW]	DH_flow [l/uur]	T_DH_return @ 600 l/uur	P [kW]	dP district heating [kPa]	dP heating [kPa]	DH_flow [l/uur]
35	30,0	25,0	25,0	25,0	35,0				90			90					90
40	35,0	30,0	30,0	30,0	40,0				90			90					90
45	40,0	35,0	35,0	35,0	45,0	30,0			90			90					90
45	40,0	35,0	35,0	35,0	45,0	30,0	30,1	2,276	133	30,37	4,62	274,5	30,65	6,9	7,05	5,93	419,8
50	45,0	40,0	35,0	40,0	50,0	30,0	30,4	3,414	152,1	31,05	6,923	318,6	31,66	10,38	9,12	5,85	493,7
55	50,0	45,0	35,0	45,0	55,0	30,0	30,9	4,553	165,1	31,98	9,223	350	32,92	13,82	10,9	5,76	546,9
60	55,0	50,0	35,0	50,0	60,0	30,0	31,5	5,691	175	33,08	11,51	374,4	34,32	17,28	12,5	5,7	589,4
65	60,0	55,0	35,0	55,0	65,0	30,0	32,2	6,83	183	34,31	13,81	395,1	35,84	20,69	13,8	5,61	623,1
70	65,0	60,0	35,0	60,0	70,0	35,0	37,1	6,9	182,9	39,14	13,77	392,8	40,55	20,7	13,5	5,49	618,8
75	70,0	60,0	35,0	65,0	75,0	40,0	42,0	6,9	183	44,02	13,78	392,4	45,29	20,62	13,1	5,35	612,2
80	75,0	60,0	35,0	65,0	80,0	45,0	47,0	6,845	183,2	48,85	13,7	388,5	50,06	20,63	12,8	5,31	609,4
85	80,0	60,0	35,0	65,0	85,0	50,0	51,9	6,845	183,4	53,7	13,69	387,8	54,85	20,64	12,6	5,28	607,1
90	80,0	60,0	35,0	65,0	90,0	50,0	50,6	6,8	154,6	51,56	13,69	316,8	52,28	20,53	8,13	5,22	484,2
95	80,0	60,0	35,0	65,0	95,0	50,0	50,2	6,8	136,4	50,71	13,69	275,8	51,18	20,53	6,1	5,22	418,1
100	80,0	60,0	35,0	65,0	100,0	50,0	50,1	6,8	122,8	50,34	13,69	246,8	50,63	20,53	4,86	5,22	372,4