Department of Energy & Climate Change

Metering and Monitoring Service Packages Technical Supplement

Outline of Metering and Monitoring Service Package requirements for the domestic Renewable Heat Incentive

12th July 2013

Department of Energy and Climate Change
3 Whitehall Place
London
SW1A 2AW

Telephone: 0300 068 4000
Website: www.decc.gov.uk

For further information on this document, contact:

Dr. Jennifer Moore
Department of Energy and Climate Change
3 Whitehall Place
London
SW1A 2AW

Chris Wickins
Department of Energy and Climate Change
3 Whitehall Place
London
SW1A 2AW

E-mail: domesticrhi@decc.gsi.gov.uk

This document can be found on DECC's website:

https://www.gov.uk/government/consultations/renewable-heat-incentive-proposals-for-a-domestic-scheme

Published by the Department of Energy and Climate Change

Introduction

As part of the domestic Renewable Heat Incentive (RHI), we intend to financially incentivise consumers to purchase optional Metering and Monitoring Service Packages. These will consist of a range of energy and temperature meters in combination with an online package that pulls together the data and presents it clearly. The aim is to help consumers and industry to understand how well their renewable heating installations are operating and to aid in optimising performance.

We intend to support Metering and Monitoring Service Packages for heat pumps and pellet biomass boilers, but not pellet stoves with back-boilers, any other type of biomass boiler or solar thermal systems. We do not plan to support these other technologies due to the relative cost and complexity of implementing our monitoring criteria for such systems. The payment uplift for a Metering and Monitoring Service Package is intended to be given for as many years as the RHI tariff is received, with total payments per year expected to be as in the table below. Metering and Monitoring Service Packages installed when the renewable heating system is installed and applied for at the same time as the overall RHI tariff would receive this extra annual payment for 7 years. If a package were installed 2 years after the RHI tariff payments have started then they would receive 5 years of payments. In all cases, the Metering and Monitoring Service Package must continue to be functional for the payments to be issued.

Technology	Annual payment
ASHP	**£230**
GSHP	**£230**
Pellet biomass boilers	**£200**

Metering and Monitoring Service Packages are intended to be a voluntary aspect of the RHI scheme and could be adopted by any applicant installing the appropriate technologies as listed above, regardless of whether the applicant is required to install metering for the purposes of payment (as outlined in our policy document[1]).

Those who are required to install metering for payment would also be able to use an eligible package to take meter readings as the metering accuracy and placement is compatible with our specifications for metering for payment (as detailed in the relevant technical supplement[2]). Those applicants who are to receive the deemed RHI tariff payment would continue to receive the deemed payment once the Metering and Monitoring Service Package was installed.

---

[1] https://www.gov.uk/government/consultations/renewable-heat-incentive-proposals-for-a-domestic-scheme

[2] "Metering for Payment Technical Supplement" can be found at the address in footnote 1 above.

This document sets out the prospective eligibility criteria for Metering and Monitoring Service Packages in the domestic RHI policy. The final requirements will be set out in the regulations implementing the Scheme, which will be subject to the necessary approvals (including State Aid and legislative approval), and further detail will be provided in Microgeneration Certification Scheme (MCS) guidance as relevant. This document is intended to provide more information regarding our policy in order to assist those people choosing to design or install systems with appropriate metering arrangements before the domestic RHI scheme launches. In addition, we are working closely with MCS and Ofgem to establish further metering guidance for the RHI before the scheme opens for payments. Once that guidance is in service, this document will have been superseded.

Contents

1. Metering requirements

The tables included in this document set out a summary of our policy regarding the minimum requirements for what should be measured and with what accuracy and resolution. Any package that surpasses these minimum requirements would also be eligible to receive the financial uplift.

To illustrate our requirements, a number of worked examples are presented in this document. We recommend reading all of the examples, even if only certain technologies are relevant to you.

We have calculated the required minimum meter resolution for each case study on a case-by-case basis. Metering resolution is important in order to enable consumers and installers to understand the data that comes from the packages more easily. This is because of the relatively high-frequency data logging that the packages require.

The metering criteria in the tables include measurement of heat outputs, energy inputs and a range of temperature measurements. In each case, a key metering aim is to measure as many energy inputs and heat outputs of the system as possible to help understand how the renewable heating installation is operating. Additionally, each package requires an efficiency measurement to be presented to consumers where:

$$Efficiency = heat\ output/energy\ input$$

It is important that, if the heat output from a component is measured and used in the equation above then so should the energy input to that component.

The document starts with two pages showing tables listing detailed criteria of measurements required for a Metering and Monitoring Service Package to be eligible for payments. The tables specify some items as requirements (for the minimum level of measurement accuracy and resolution) and others as recommendations for what we suggest would be good practice and most benefit to consumers. For example, for temperature sensors, we recognise that there will be a number of possible types of sensors and as such, we have not limited the manner in which this measurement may be undertaken, but have recommended a level of accuracy and resolution that we feel would be helpful in order to understand system performance. Specifications that are recommendations are marked in green, whilst specifications that are requirements are marked in blue.

The first table is for air- and ground-source heat pumps; the second is for biomass boilers. Any provider is encouraged to expand on these criteria to produce a more comprehensive Metering and Monitoring Service Package but they must meet the minimum criteria in the tables to be eligible. The tables refer to several European

standards including the Measuring Instruments Directive (MID)[1] and the relevant IEC standard for temperature measurement[2].

The worked examples will go over each of the points in the tables in more detail.

A larger, full-page version of each figure is provided in Annex 1 at the end of this document.

[1]Directive 2004/22/EC of the European Parliament and of the Council of 31 March 2004 on measuring instruments
http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2004:135:0001:0080:EN:PDF
[2] IEC 60751 Industrial platinum resistance thermometers and platinum temperature sensors

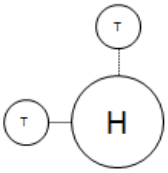
Heat Pump Metering and Monitoring Service Package Requirements and Recommendations

	Sensor type	Minimum resolution	Minimum accuracy	Example number required
1	**Heat metering of all heat output from heat pump and heat metering of any additional fossil fuel boilers**	*[Resolution of heat meter] ≤ 3 % * [min. non-zero heat output in 2 minutes]* (Note that where draw-off from a DHW cylinder is to be metered, then this should always be conducted using at least a 1 pulse per 1 Wh resolution heat meter.) (We recommend using high resolution meters but heat meter resolution need not be finer than 1 pulse per 1 Wh)	Class III of Measuring Instruments Directive	1 x sensor required for heat pump with 2-pipe output 2 x sensors required for heat pump with 4-pipe or 3-pipe output or bivalent system with 2-pipe heat pump 3 x sensors required for bivalent system with 4-pipe or 3-pipe heat pump (Fewer meters may be used if manufacturer has integrated metering to their unit.)
2	**Metering of all electrical supplies to heat pump included in heat measurement plus DHW cylinder where this is supplied by heat pump** **(In addition, we recommend that all internal and external supplementary heaters are metered.)**	*[Resolution of electricity meter] ≤ 3 % * [min. non-zero electricity input in 2 minutes]* (We recommend using high resolution meters but electricity meter resolution need not be finer than 1 pulse per 1 Wh)	Class A of Measuring Instruments Directive	1 x sensor where heat pump is incorporated into single unit 2 x sensors where heat pump is composed of two units. + 1 x sensor for immersion heating where DHW is supplied by heat pump
3	**Gas metering of inputs to heat pump (for hybrid heat pump with integrated gas boiler)** **Note that if it is possible to meter the heat output from fossil fuel source instead (as in Row 1), then heat metering should be conducted as in Row 1 and the gas supply need not be metered.**	10 L per pulse	Class 1.5 of Measuring Instruments Directive	1 x meter to monitor gas input to heat pump only (if a hybrid system has an integrated gas boiler) if not possible to meter heat output from gas boiler as in Row 1.
4	**Measurement of internal temperature, space heating flow temperature and DHW flow temperature, where this is supplied by the heat pump.** **(Note that this may need to be separate to temperature measurements involved in heat metering)**	We recommend 0.1 degrees C	We recommend Class B for Resistance Temperature Detectors (RTDs) (equivalent accuracy for other types of temperature sensor at typical measurement temperature)	3 x temperatures sensors - includes space heating flow metering, DHW flow metering (where DHW supplied by heat pump), internal temperature
5	**For ground-source heat pumps (GSHPs) only, measurement of flow and return temperatures of ground loop.**	We recommend 0.1 degrees C	We recommend Class B for RTDs (equivalent accuracy for other types of temperature sensor at typical measurement temperature)	2 x temperature sensors for ground loop flow and return
6	**For air-source heat pumps only, measurement of external air temperature.** 8 **This sensor should be suitably sited out of direct sunlight and away from other heat sources**	We recommend 0.1 degrees C	We recommend Class B for RTDs (equivalent accuracy for other types of temperature sensor at typical measurement temperature)	1 (air source heat pumps only)

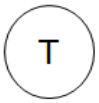
Pellet Biomass Boiler Metering and Monitoring Service Package Requirements and Recommendations

	Sensor type	Minimum resolution	Minimum accuracy	Example number required
1	**Heat metering of heat output from biomass boiler and heat metering of any additional fossil fuel boilers**	*[Resolution of heat meter] ≤ 3 % * [min. non-zero heat output in 2 minutes]* (Note that where draw-off from a DHW cylinder is to be metered, then this should always be conducted using at least a 1 pulse per 1 Wh resolution heat meter.) (We recommend using high resolution meters but heat meter resolution need not be finer than 1 pulse per 1 Wh)	Class III of Measuring Instruments Directive	1 x sensor for single biomass system 2 x sensors where overall system contains a fossil fuel boiler in addition to the above.
2	**Metering of all electrical supplies to heat pump included in heat measurement plus DHW cylinder where this is supplied by heat pump** **(In addition, we recommend that all internal and external supplementary heaters are metered.)**	*[Resolution of electricity meter] ≤ 3 % * [min. non-zero electricity input in 2 minutes]* (We recommend using high resolution meters but electricity meter resolution need not be finer than 1 pulse per 1 Wh)	Class A of Measuring Instruments Directive	1 x sensor for biomass unit + 1 x sensor for immersion heating where appropriate
3	**Gas metering of any gas inputs to biomass boiler** **Note that if it is possible to meter heat output from fossil fuel source instead (as in Row 1), then heat metering should be conducted as in Row 1 and the gas need not be metered.**	10 L per pulse	Class 1.5 of Measuring Instruments Directive	1 x meter to monitor gas input to biomass boiler (if a hybrid system has integrated gas boiler) only if not possible to meter heat output from gas boiler as in Row 1.
4	**Measurement of indoor temperature + flow and return temperatures at location of heat meter**	We recommend 0.1 degrees C	We recommend Class B for Resistance Temperature Detectors (RTDs) (equivalent accuracy for other types of temperature sensor at typical measurement temperature)	3 x temperature sensors
5	**Measurement of external air temperature.** **This sensor should be suitably sited out of direct sunlight and away from other heat sources**	We recommend 0.1 degrees C	We recommend Class B for RTDs (equivalent accuracy for other types of temperature sensor at typical measurement temperature)	1 temperature sensor
6	**Efficiency** **An estimate of efficiency should be provided based on metered fuel input (through measurement of auger revolutions or similar) or flue gas analysis**.	-	This should be done as accurately as possible. We recommend better than 20 %.	-

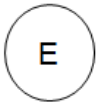
In the following examples, we work through a number of simplified schematics to illustrate the sensor requirements for potential Metering and Monitoring Service Packages. A key for the types of meters and sensors is shown below:



Heat meter



Temperature sensor



Electricity meter

Worked Example 1: An air-source heat pump providing space heating and domestic hot water

The following example works through the required Metering and Monitoring Service Package for a 10 kW air-source heat pump that is capable of modulating its heat output to a minimum of 4 kW. The system is connected to a domestic hot water cylinder with a 2 kW immersion element for the domestic hot water. The heat pump has a design SPF of 2.7:

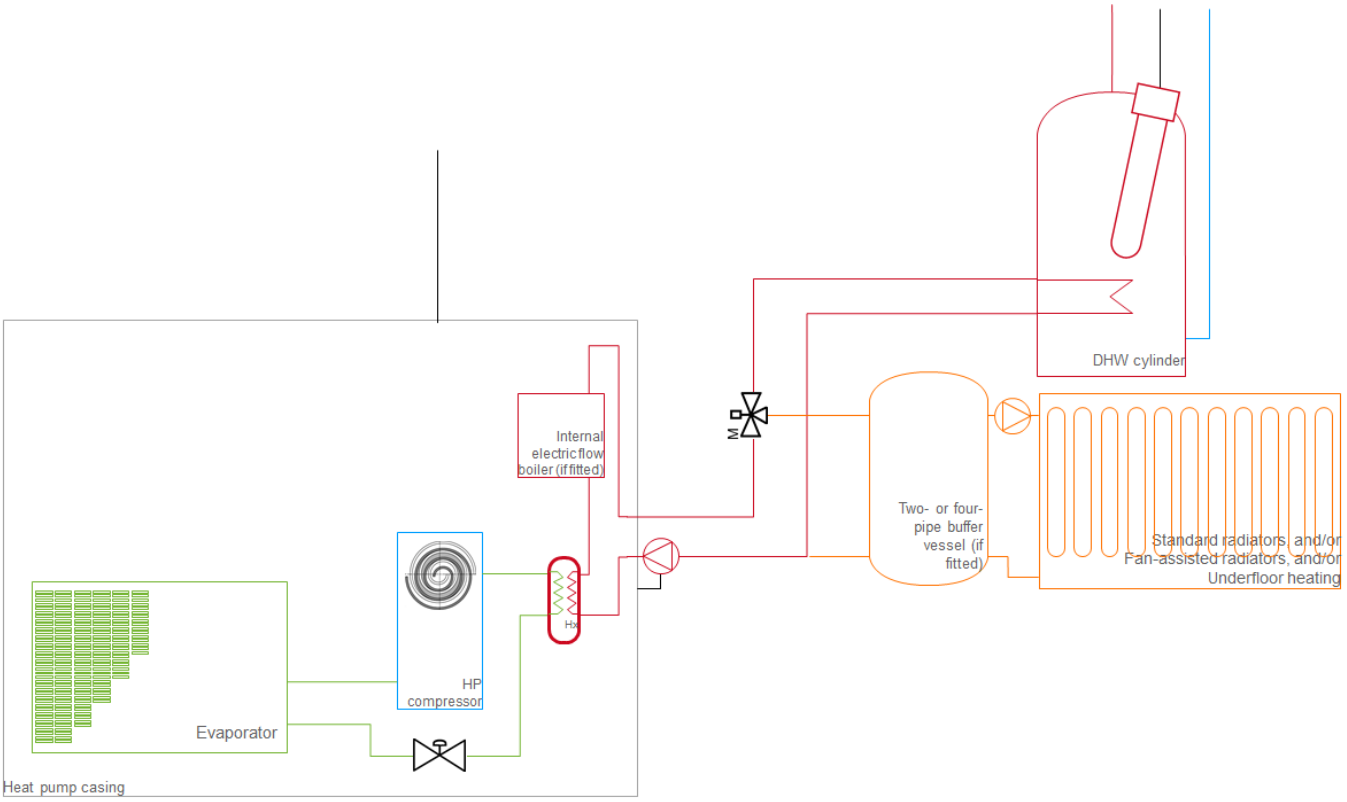


Figure 1: Worked Example 1 - ASHP

One metering arrangement that fulfils our specified criteria is shown in Figure 2.

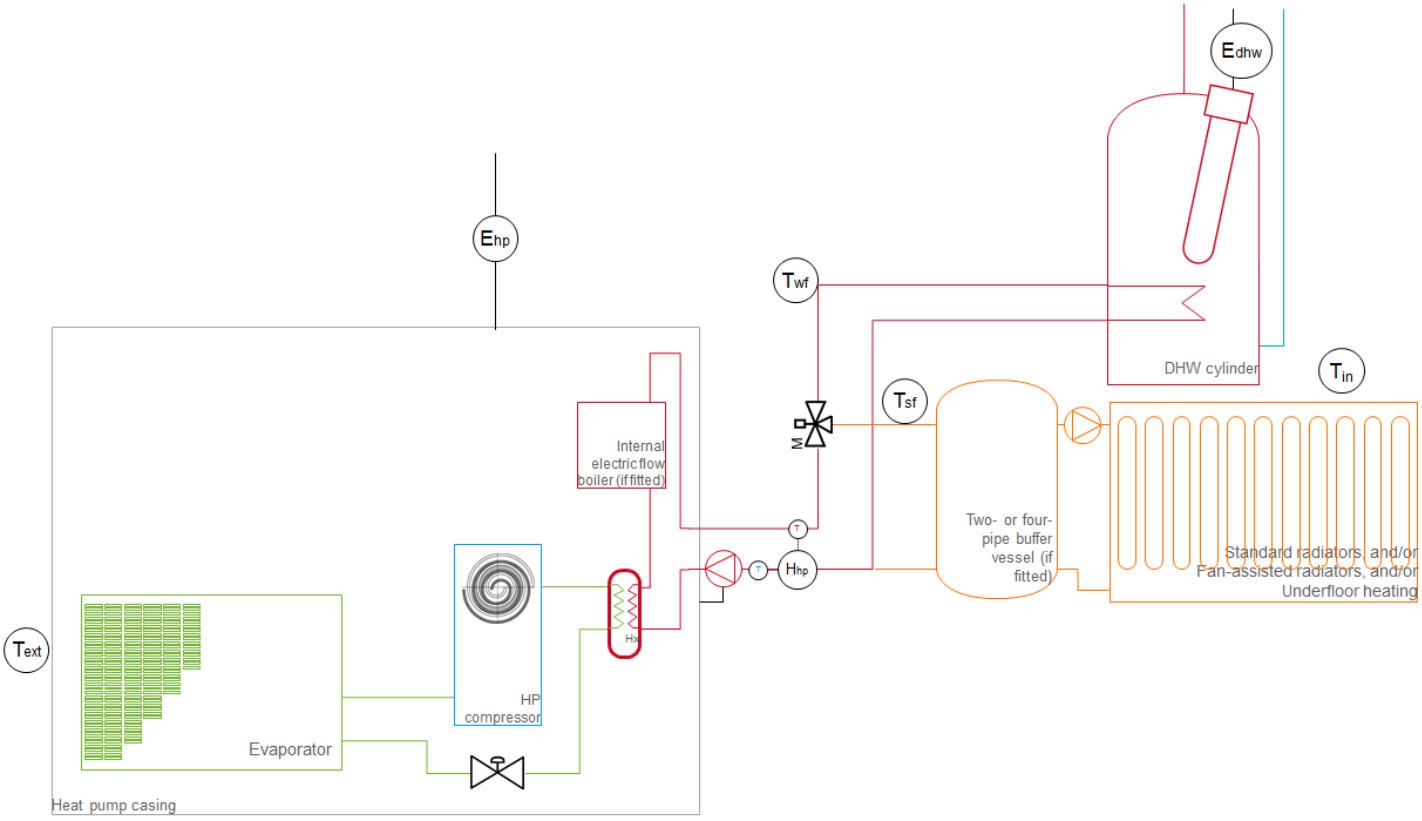


Figure 2: Worked Example 1 - ASHP with metering option 1

Where:

E_{hp} = electrical supply to the heat pump;
E_{dhw} = electrical supply to immersion heating in domestic hot water cylinder;
H_{hp} = heat output from heat pump
T_{sf} = space flow temperature;
T_{wf} = domestic hot water flow temperature;
T_{in} = internal air temperature in at least one location in the dwelling;
T_{ext} = external air temperature.

There is no gas input so no gas metering is required.

<u>All data must be logged on at least a 2-minute time period.</u>

Alternatively, the manufacturer may be able to integrate some of the metering in Figure 2 into their unit, in which case the metering arrangement in Figure 3 may be feasible.

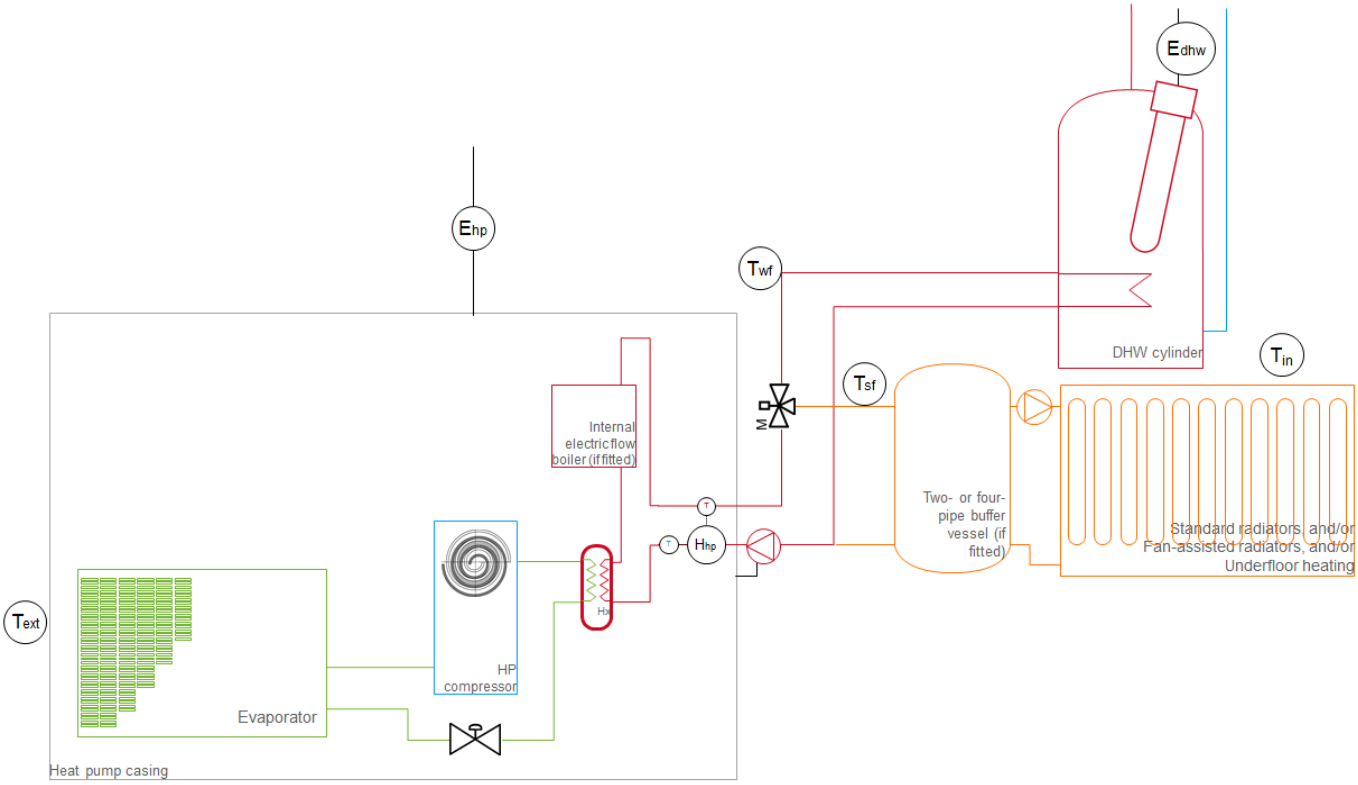


Figure 3: Worked Example 1 - ASHP with metering option 2

In Section 2, we discuss the information that needs to be presented in the online package. This includes a measurement of efficiency, or SPF for heat pumps. In figure 3 the heat metering does not include the heat output from the circulation pump; therefore, when presenting the efficiency of the system:

$$Efficiency = heat\ output / energy\ input$$

the electricity used to power the circulation pump should not be included as an energy input in the equation.

Although the electrical supply to the circulation pump should not be included in the efficiency calculation, it still provides useful information to the householder and Metering and Monitoring Service Package provider. Excessive electricity demand by a circulation pump is a recognised fault which is expensive and wastes energy. Therefore, we recommend that it is still measured and presented separately on the service provider's view of the online platform, as discussed in Section 2. This would be our preferred approach, however it is not expected to be an eligibility requirement at this stage.

We anticipate that this system would satisfy our policy to monitor the energy input and output from the system and combine with temperature data to understand how well the renewable heating installation is performing.

Meter resolution

The minimum resolution of heat meter required for space heating (H_{hp} in the diagram in Figures 2 and 3) would be:

$$[Resolution\ of\ heat\ meter] \leq 3\ \% * [\min non-zero\ heat\ output\ in\ 2\ minutes]$$

Here, the air-source heat pump has a minimum capacity of 4 kW. This means that in 2 minutes, the heat pump can output approximately 133 Wh of heat:

$$[Resolution\ of\ heat\ meter] \leq 3\ \% * [133\ Wh]$$

$$[Resolution\ of\ heat\ meter] \leq 4\ Wh$$

This means that the required resolution of the heat meter is at least 1 pulse per 4 Wh. A meter resolution of 1 pulse per 1 Wh would also fit this specification.

The minimum resolution of the electricity meter can be calculated in a similar manner. Taking the design SPF of 2.7 and a heat output of 133 Wh in 2 minutes, the electrical supply over 2 minutes can be estimated as 49 Wh. Putting this into the equation below:

$$[Resolution\ of\ electricity\ meter] \leq 3\ \% * [\min non-zero\ electrical\ input\ in\ 2\ minutes]$$

the minimum required resolution is 1 pulse per 1.5 Wh. Therefore, a meter resolution of 1 pulse per 1 Wh would fit the criteria.

Similarly, the electricity meter for the immersion heating would need a meter capable of resolving 1 pulse per 2 Wh as a minimum resolution (making a 1 pulse per 1 Wh meter resolution eligible).

Worked Example 2: A ground-source heat pump with integrated domestic hot water cylinder

The following works through our specification for a (fixed-speed) 15 kW ground-source heat pump (design SPF = 4.1) represented by the schematic shown in Figure 4:

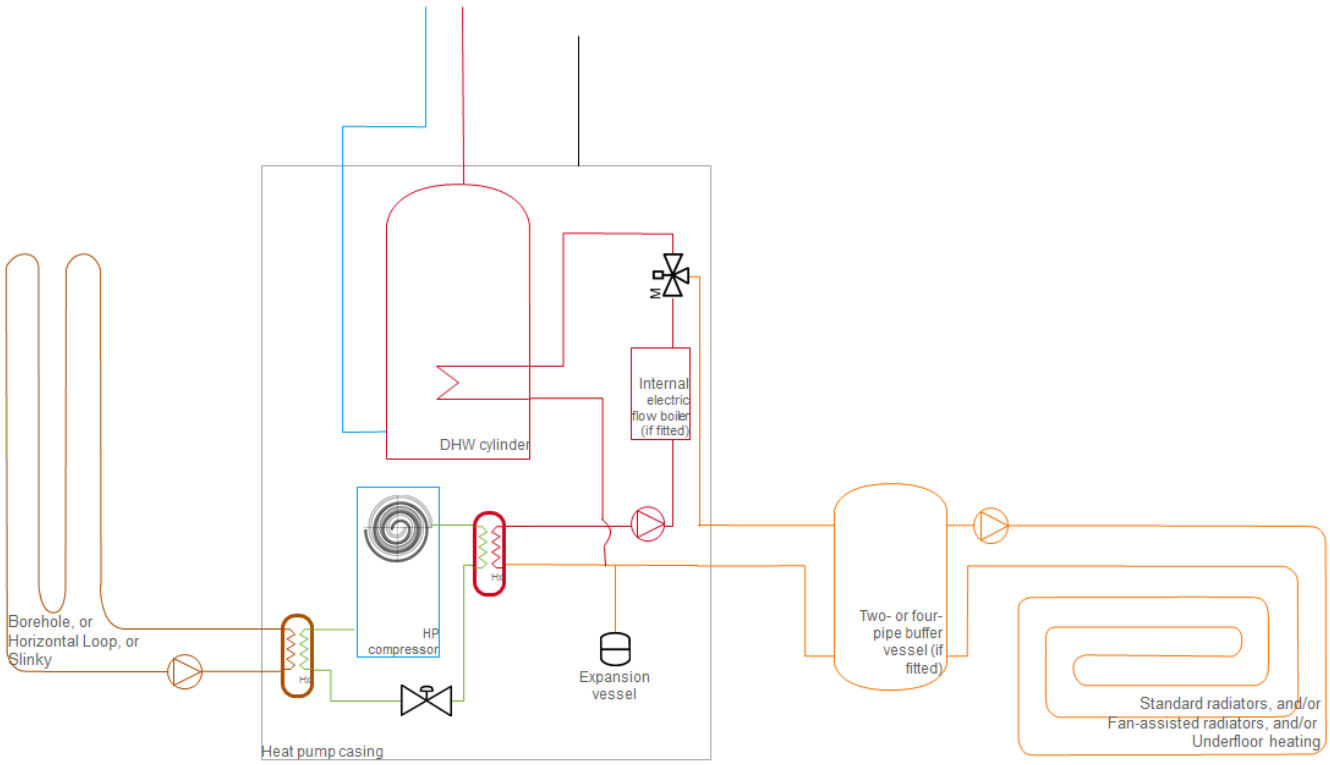


Figure 4: Worked Example 2 - GSHP with integrated cylinder

Using our minimum specification for Metering and Monitoring Service Packages for heat pumps as in the first table at the start of this document, one way to meet our criteria would be through the metering arrangement shown in Figure 5:

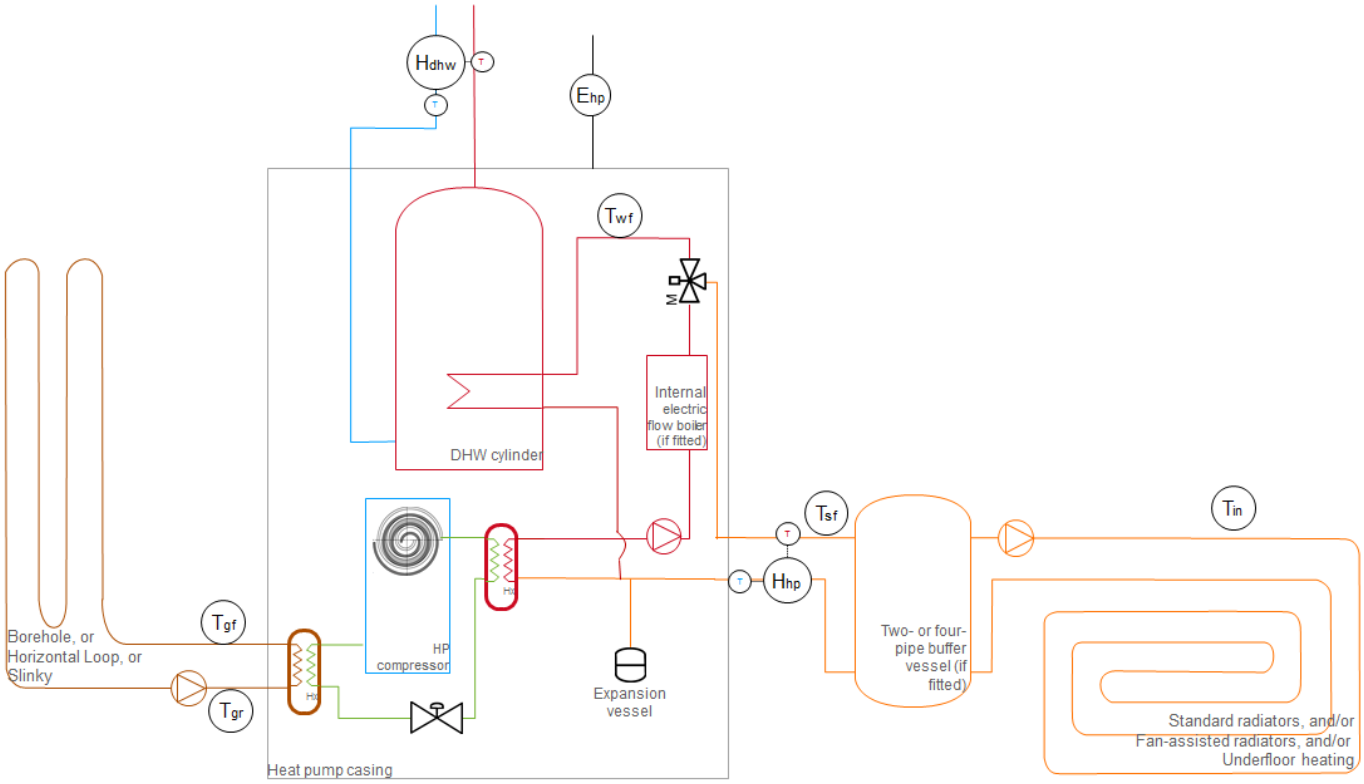


Figure 5: Worked Example 2 - GSHP with integrated cylinder and metering option 1

Where:

E_{hp} = heat pump electrical supply;
H_{dhw} = domestic hot water heat output;
H_{hp} = space heating heat output;
T_{gf} = ground loop flow temperature;
T_{gr} = ground loop return temperature;
T_{wf} = domestic hot water flow temperature;
T_{sf} = space heating flow temperature;
T_{in} = internal temperature in at least one location in the dwelling.

There is no gas input so no gas metering is required.

An alternative arrangement, where the manufacturer has been able to integrate the heat meter into the heat pump unit is shown below:

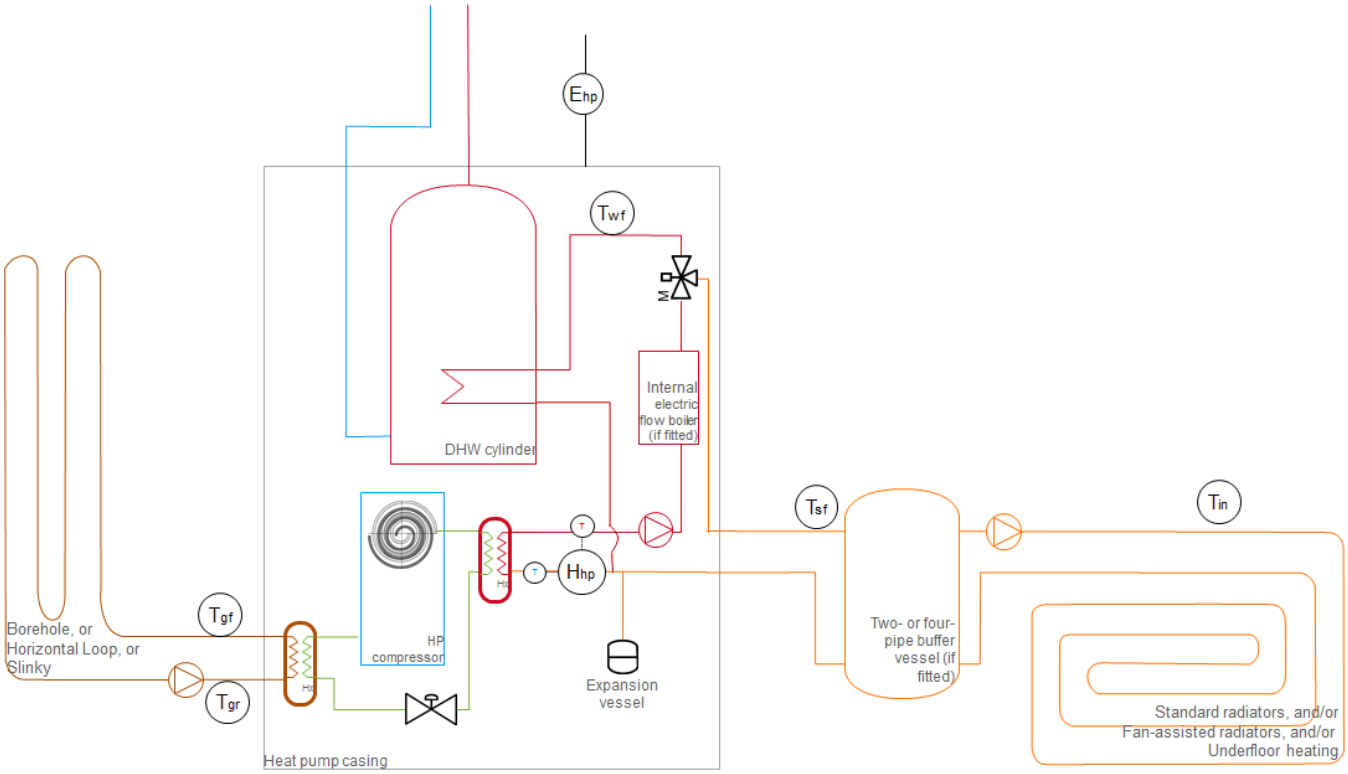


Figure 6: Worked Example 2 - GSHP with integrated cylinder and metering option 2

Note that in Figure 6, the heat output measurement does not include the internal electric flow boiler or circulation pump. Therefore, similarly to the discussion for the previous worked example, a measurement of SPF should not include the electrical supply to the internal electric flow boiler or circulation pump.

In order for the package in Figure 6 to present the most useful information to consumers, we still recommend that the electrical supply to the internal electric flow boiler is measured and presented separately as this provides very useful information to understand how well the heat pump is operating and to explain a customer's bills.

<u>All of the data must be logged on at least a 2-minute time period.</u>

Again, the example fulfils the main criteria of the metering system which is to record energy flows and provide key diagnostic temperature data to understand how well the system is operating.

Meter resolution

The minimum resolution of the space heating heat meter (H_{hp} in Figures 5 and 6) would be:

$$[Resolution\ of\ heat\ meter] \leq 3\ \% * [\min non - zero\ heat\ output\ in\ 2\ minutes]$$

Here, the ground-source heat pump has a (non-modulating) 15 kW capacity. This means that in 2 minutes the heat pump can output approximately 500 Wh of heat:

$$[Resolution\ of\ heat\ meter] \leq 3\ \% * [500\ Wh]$$

$$[Resolution\ of\ heat\ meter] \leq 15\ Wh$$

This means that the required resolution of the heat meter is at least 1 pulse per 15 Wh. A meter resolution of 1 pulse per 10 Wh or 1 pulse per 1 Wh would also fit this specification.

This is a simplified example where the ground-source heat pump is not inverter-driven and therefore is not capable of modulating its output. For a modulating output, the minimum non-zero heat output in 2 minutes should be entered into the equation to determine the required heat meter resolution instead of the heat that would be output at the nominal capacity as shown in Worked Example 1.

The heat meter for the domestic hot water (H_{dhw} in Figure 5) must be capable of generating at least 1 pulse per 1 Wh with the aim of recording short hot water draw-offs.

The minimum resolution of the electricity meter can be calculated in a similar manner. Taking the design SPF of 4.1 and a heat output of 500 Wh in 2 minutes, the electrical supply over 2 minutes can be estimated as 122 Wh. Putting this into the equation below:

$$[Resolution\ of\ electricity\ meter] \leq 3\ \% * [\min non - zero\ electrical\ input\ in\ 2\ minutes]$$

the minimum required resolution is 1 pulse per 3.66 Wh. Therefore, we anticipate that a meter resolution of 1 pulse per 1 Wh would meet our policy requirements.

Worked Example 3: A split-system air-source heat pump with back-up fossil fuel boiler and immersion heating

The following works through an example of our Metering and Monitoring Service Package specification for a (fixed-speed) 4kW split-system air-source heat pump with a design SPF of 2.7. It has a 3kW auxiliary electric heater with its own separate electricity supply. In addition, the system has a 24 kW back-up gas boiler (that is capable of modulating down to 8 kW) and a 2 kW immersion heater for the domestic hot water.

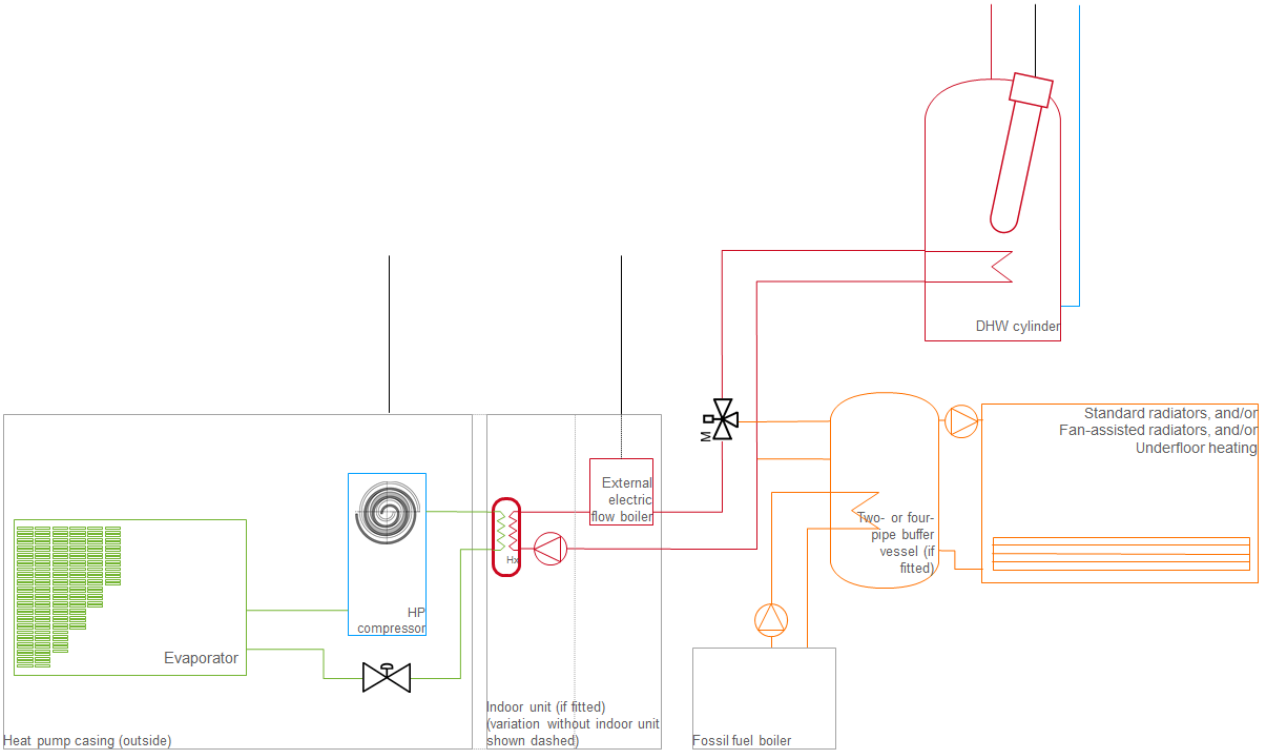


Figure 7: Worked Example 3 – Split-system ASHP with back-up fossil fuel boiler and an immersion element in the domestic hot water cylinder

The minimum intended criteria for this package includes the metering shown on the schematic in Figure 8.

<u>All data needs to be logged on a 2-minute time period.</u>

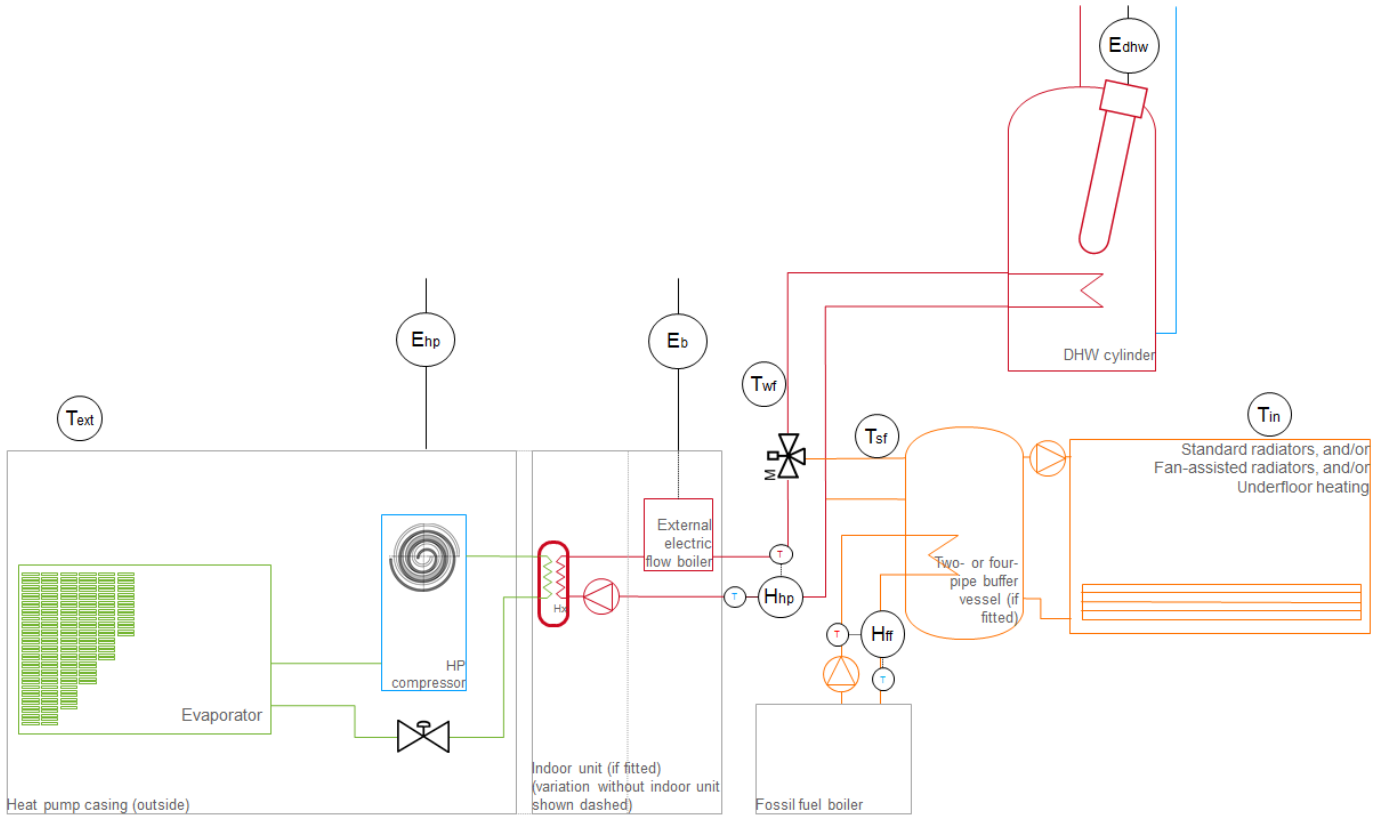


Figure 8: Worked Example 3 – Split-system ASHP with back-up fossil fuel boiler and possible metering

Where

E_{hp} = electrical supply to heat pump;

E_b = electrical supply to auxiliary electric boiler;

E_{dhw} = electrical supply to immersion heating of domestic hot water cylinder;

H_{hp} = heat output from heat pump;

H_{ff} = heat output from fossil fuel system;

T_{sf} = space heating flow temperature;

T_{wf} = domestic hot water flow temperature;

T_{in} = internal temperature at at least one location in the dwelling;

T_{ext} = external temperature.

It would also be possible to combine the electricity measurements in this example so that they are recorded by a single electricity meter. This simplifies the metering arrangements. If the electricity meters are combined, the meter resolution would need to be the better of the two calculations shown below.

Meter resolution

We intend that the minimum resolution of heat meter required for space heating (H_{hp} in Figure 8) would be:

$$[Resolution\ of\ heat\ meter] \leq 3\ \% * [\min non - zero\ heat\ output\ in\ 2\ minutes]$$

Here, the air-source heat pump has a (non-modulating) 4 kW capacity. This means that in 2 minutes the heat pump can output approximately 133 Wh of heat:

$$[Resolution\ of\ heat\ meter] \leq 3\ \% * [133\ Wh]$$

$$[Resolution\ of\ heat\ meter] \leq 4\ Wh$$

This means that the required resolution of the heat meter is at least 1 pulse per 4 Wh. A meter resolution of 1 pulse per 1 Wh would also fit this specification.

The lowest heat power output of the fossil fuel boiler is 8 kW. Therefore, using the equation above, the heat meter resolution required for metering of the fossil fuel system can be calculated to be at least 1 pulse per 8 Wh. A 1 pulse per 1 Wh resolution heat meter would also be suitable for this application.

The minimum resolution of the E_{hp} electricity meter is calculated in a similar manner as in the previous example. Taking the design SPF of 2.7 and a heat output of 133 Wh in 2 minutes, the electrical supply over 2 minutes can be estimated as 49 Wh. Putting this into the equation:

$$[Resolution\ of\ electricity\ meter] \leq 3\ \% * [\min non - zero\ electrical\ input\ in\ 2\ minutes]$$

the minimum required resolution is 1 pulse per 1.47 Wh. Therefore, we anticipate that a meter resolution of 1 pulse per 1 Wh would meet our policy requirements.

The auxiliary electric heater has a capacity of 3 kW and therefore, when operating, uses 100 Wh in 2 minutes. Therefore, using the same equation, the required resolution of electricity meter is 1 pulse per 3 Wh (a 1 pulse per 1 Wh electricity meter would also deliver the right resolution).

Similarly, the electricity meter for the immersion heating would need a meter capable of resolving 1 pulse per 2 Wh as a minimum resolution (making a 1 pulse per 1 Wh meter resolution eligible).

Worked Example 4: A pellet biomass boiler providing space heating and domestic hot water

This example comprises a 24 kW pellet biomass boiler (electrical ignition) providing both space heating and domestic hot water. The system's minimum heat output is 8 kW.

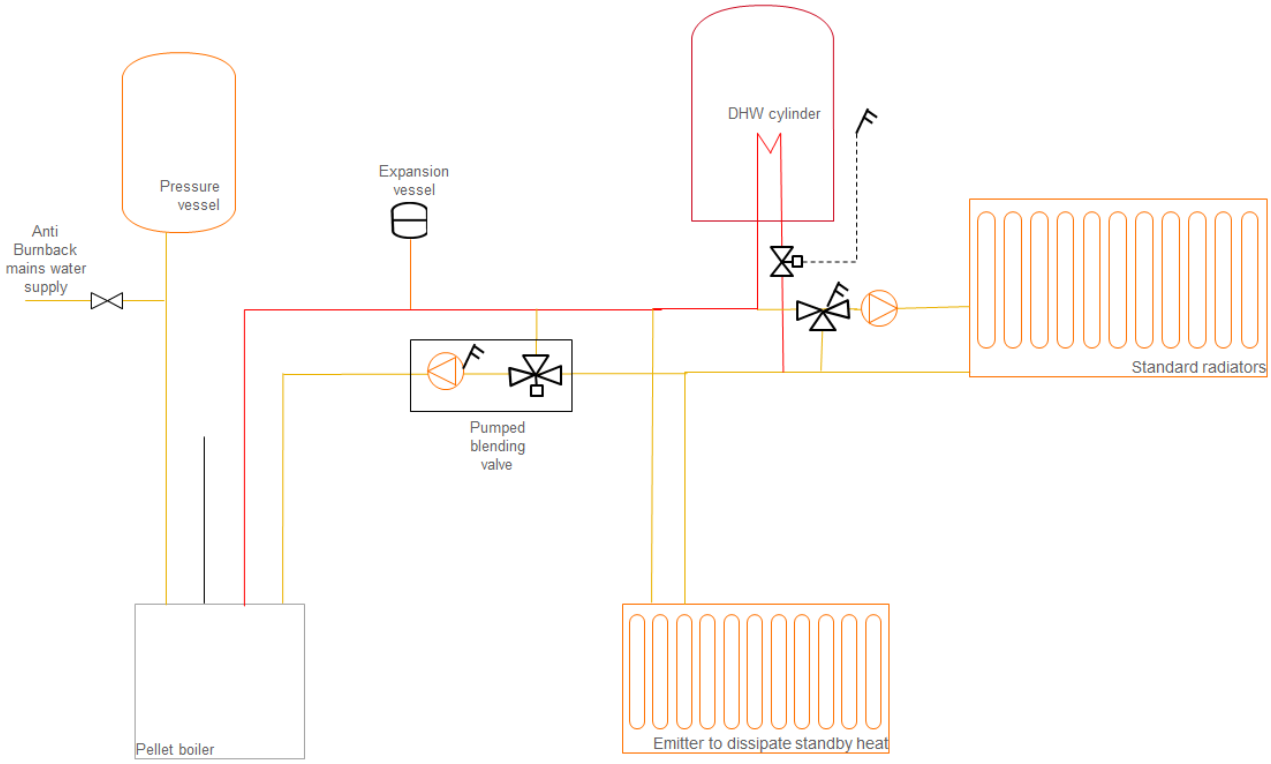


Figure 9: Worked Example 4 - Pellet biomass boiler providing space heating and domestic hot water

Based on our criteria, Figure 10 shows a possible metering schematic for this system:

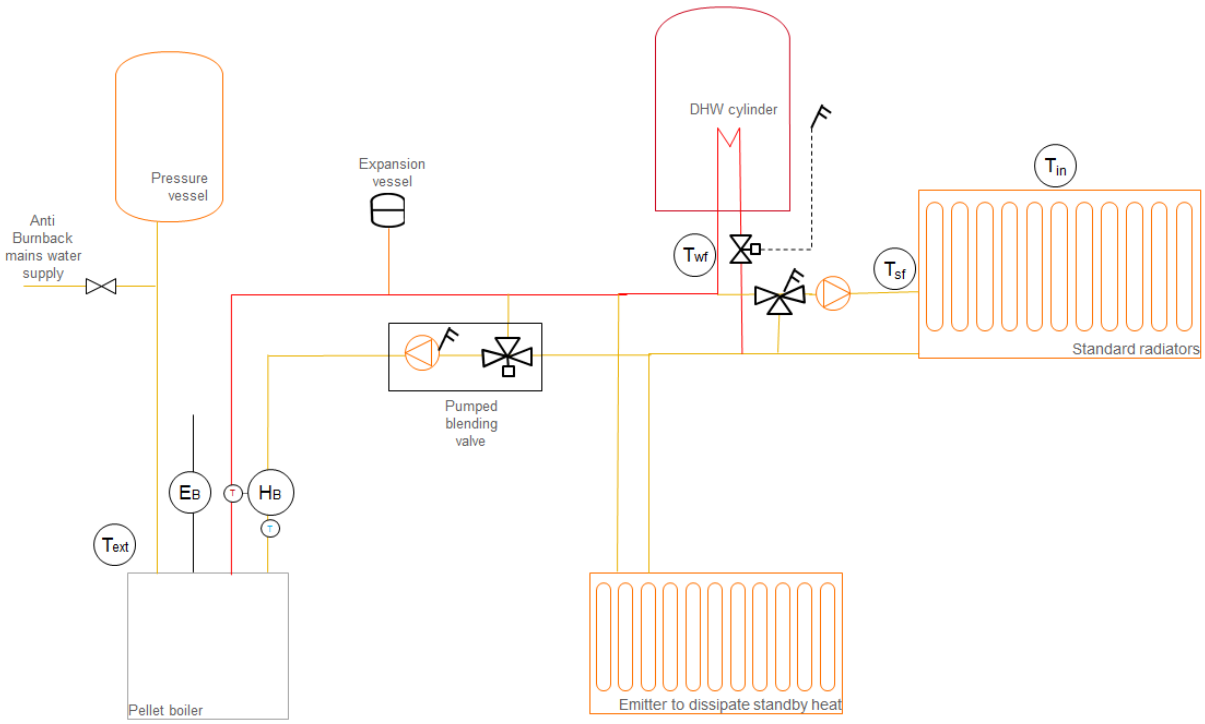


Figure 10: Worked Example 4 - Pellet biomass boilers providing space heating and domestic hot water with possible metering

Where

E_B = electrical supply to boiler;

H_B = heat output from boiler;

T_{sf} = flow temperature of space heating;

T_{wf} = flow temperature of domestic hot water;

T_{in} = internal temperature;

T_{ext} = external temperature.

<u>All data must be logged on at least a 2-minute time period.</u>

There is no gas input to this system so no gas metering is required.

Meter resolution

The minimum resolution of heat meter required for space heating (H_B in figure 10) would be:

$$[Resolution\ of\ heat\ meter] \leq 3\ \% * [\min non - zero\ heat\ output\ in\ 2\ minutes]$$

Here, the biomass boiler has a capacity of 24 kW and the lowest rate of heat output is 8 kW. This means that in 2 minutes, the minimum amount of heat that the boiler can output is approximately 267 Wh:

$$[Resolution\ of\ heat\ meter] \leq 3\ \% * [267\ Wh]$$

$$[Resolution\ of\ heat\ meter] \leq 8\ Wh$$

This means that the required resolution of the heat meter is at least 1 pulse per 8 Wh. A meter resolution of 1 pulse per 1 Wh will also fit this criterion.

The minimum electrical load of this particular biomass boiler at any one time is that required to operate the circulation pumps that are integrated into the body of the boiler. If we assume that the system in Figure 10 has 2 high efficiency circulation pumps, this comes to 80 W power consumption so the energy input to the system in 2 minutes is 2.7 Wh.

$$[Resolution\ of\ electricity\ meter] \leq 7.5\ \% * [\min non - zero\ electrical\ input\ in\ 2\ minutes]$$

Using the formula, the minimum required resolution is 1 pulse per 0.2 Wh. We recognise that it may not be practical to require metering at a resolution that is finer than 1 pulse per 1 Wh and that the most significant electrical energy consumption of the boiler will be when it is operating at substantially higher than this rate. Therefore, in this case our policy is to only require a meter resolution of 1 pulse per 1 Wh as discussed in our specification table. We expect that electricity meters with a resolution of 1 pulse per 1 Wh will usually be required for biomass boilers.

2. Data presentation requirements

Our policy is that each of the Metering and Monitoring Service Packages in the worked examples would need the data that is being recorded by each sensor to be logged on a 2-minute time period and then made visible to both the consumer and the metering service package provider. The minimum criteria for data presented to each of the above recipients are specified separately below:

Our policy is that the Metering and Monitoring Service Package provider view of the data must:

1. Present all of the data over a minimum of 1 year to the metering service package provider in a manner which would allow them to conduct a remote diagnosis of the system and its performance.

2. Allow the package provider to view data down to 2-minute resolution.

3. Make data visible to the package provider after a maximum delay of 1 week.

4. Provide an indication of data completeness and validity as a percentage over a quarterly period (i.e. how much of the data that should be collected is arriving and is valid).

It is a key requirement of the metering and monitoring service packages that the data can be regularly reviewed by an MCS- or equivalent- certified installer and used to remotely monitor system performance in case of poor performance or system failure.

Our policy is that the consumer view of the data must:

1. Present a minimum of 1 year of data with at least monthly resolution, with the exception of the most recent week, for which the data should be presented with at least an hourly resolution.

2. Provide an indication of data completeness and validity as a percentage over a quarterly period to indicate how well the metering equipment is working

3. Present new data on the platform within 1 week of it being measured.

The consumer view should present the following data according to these requirements:

a. energy output
b. energy input
c. internal temperature
d. external temperature

We expect and recommend that all data is presented in a user-friendly and useful way to ensure that the provider and consumer can make maximum use of the service.

For air-source heat pumps and biomass boilers, the external temperature presented should be that measured at the site. For ground-source heat pumps, the ground loop flow and return temperatures should be shown and the external temperature measured at the nearest feasible meteorological reference station to the installation can be taken as an estimate of external temperature at the site. On-site measurements of external air temperature are also allowed for ground-source heat pumps.

The online platform should also include an indication of the efficiency of the biomass boiler or heat pump system over the last week and over the last year with the system boundary (i.e. the components included in the measurement) and uncertainty for the efficiency measurement clearly stated.

In addition, our policy is that the system should be subject to audit by Ofgem as required. This may be done by conducting desktop audits and site visits. We will provide more details about this requirement before the launch of the scheme. This may include a requirement to submit site-specific reports to Ofgem over defined periods to confirm that the Metering and Monitoring Service Package is still functioning correctly. In all cases, the Metering and Monitoring Service Package must continue to be functional for the additional payments to be issued.

Where metering for payment is being met through a Metering and Monitoring Service Package, the RHI payments will be calculated from the appropriate metered data. In this case, any fault identified with the Metering and Monitoring Service Package may be considered by Ofgem to imply that there is also a fault with meter readings being taken by the same system for payment and warrant further investigation. Where a Metering and Monitoring Service Package is to be installed on a deemed RHI heating system then the RHI tariff payment will continue to be based on deeming.

Our policy is that it is also a requirement that DECC is given access to anonymised data from Metering and Monitoring Service Packages as required. We anticipate that this will be necessary to inform our understanding of in-situ performance of heat pumps and biomass boilers. The financial incentive will only be available for packages which comply with this requirement. We will provide more details about this requirement before the launch of the scheme.

Annex 1: Worked example figures

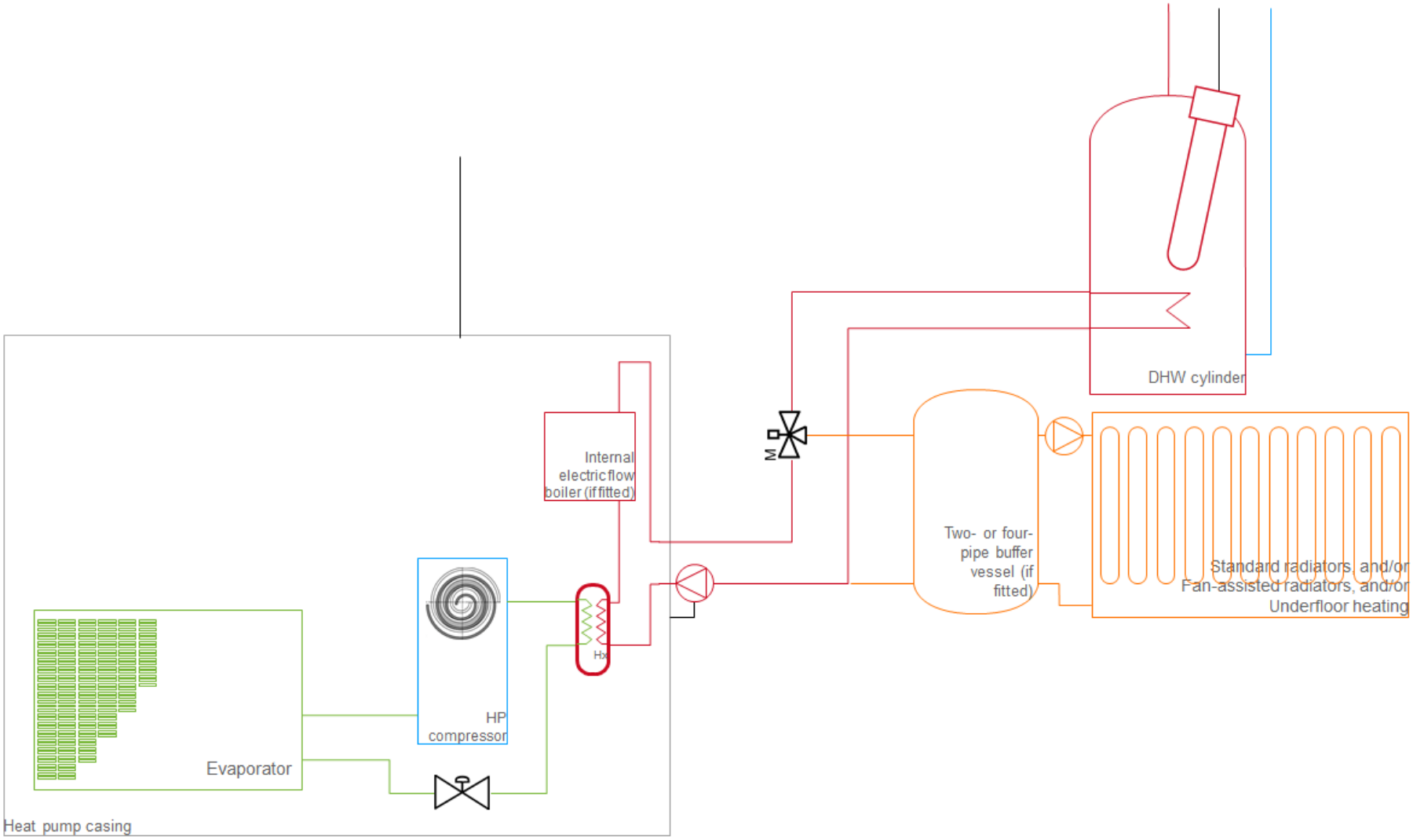


Figure 1: Worked Example 1 - ASHP

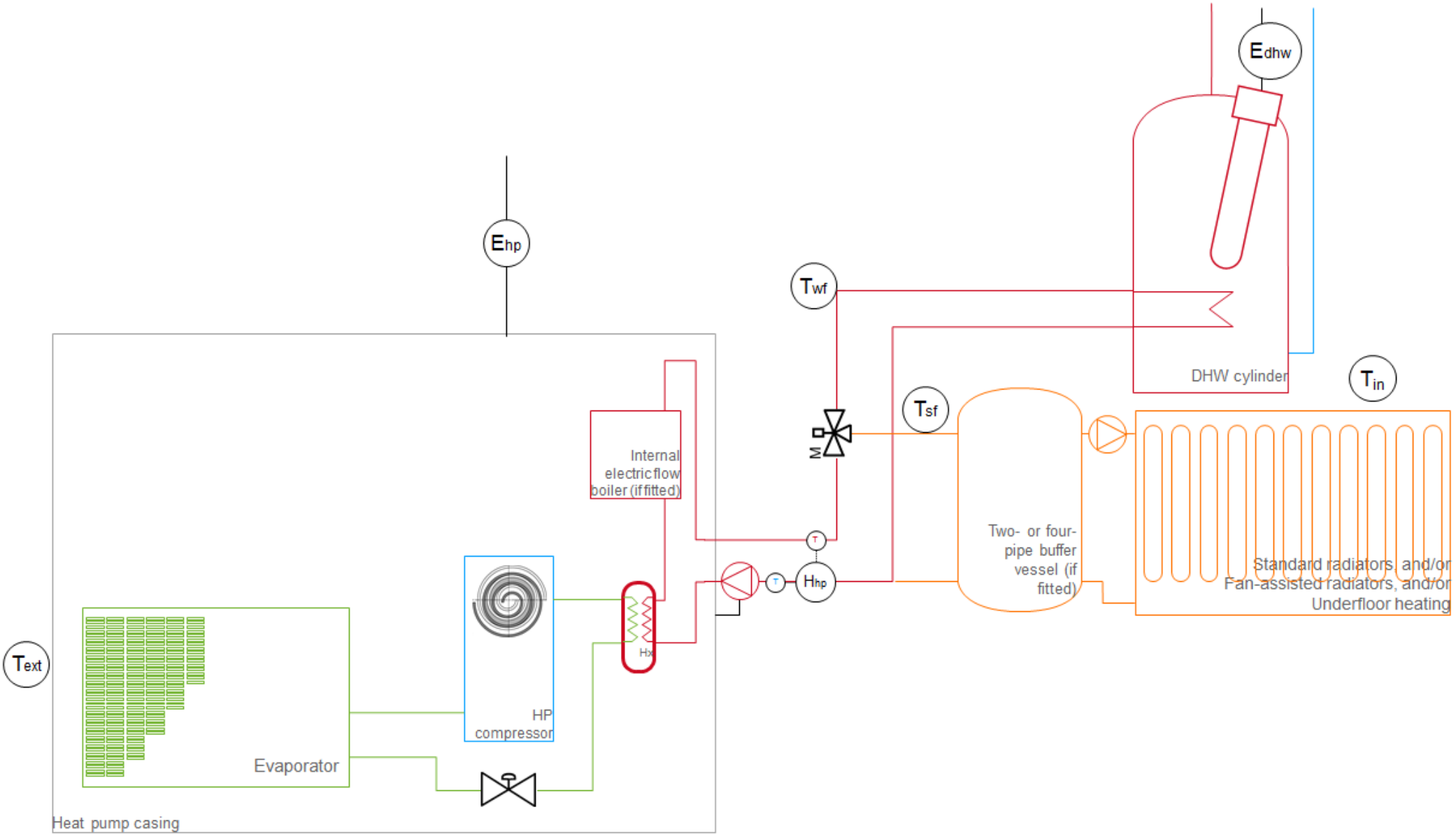


Figure 2: Worked Example 1 - ASHP with metering option 1

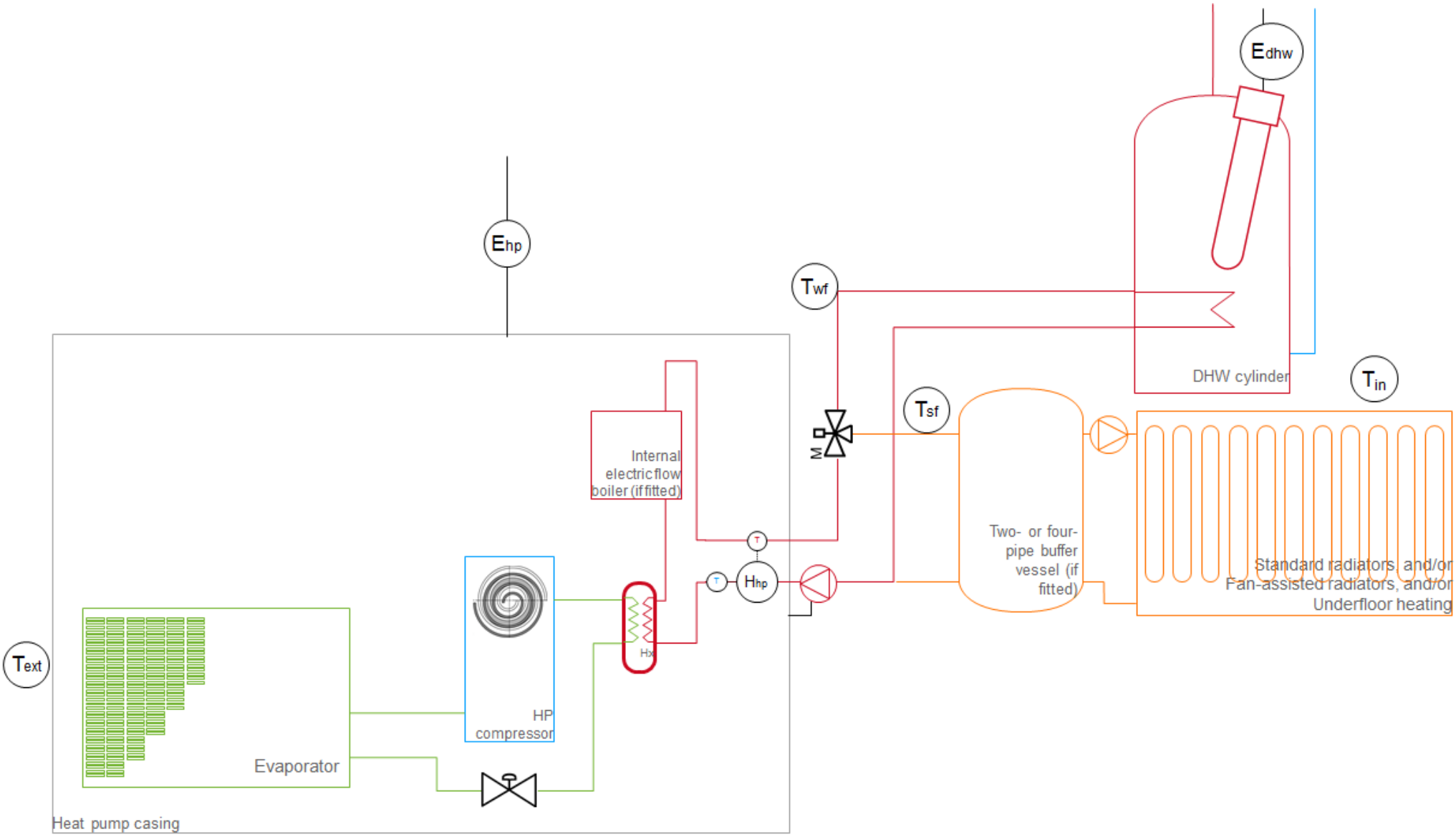

Edhw
Ehp
Twf
DHW cylinder
Tin
Tsf
M
Internal electric flow boiler (if fitted)
Two- or four-pipe buffer vessel (if fitted)
Standard radiators, and/or
Fan-assisted radiators, and/or
Underfloor heating
Hhp
Hx
Text
HP compressor
Evaporator
Heat pump casing

Figure 3: Worked Example 1 - ASHP with metering option 2

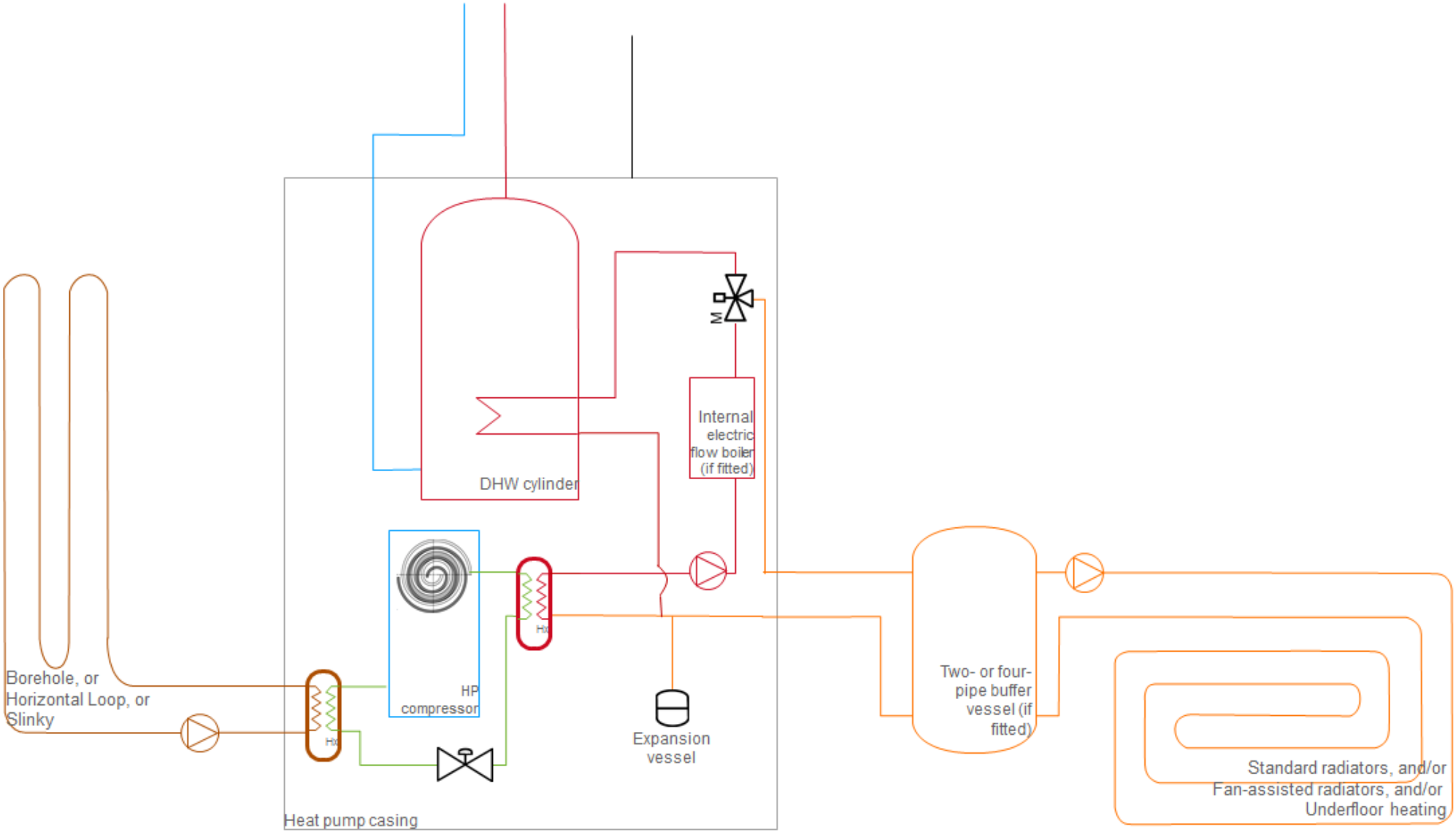


Figure 4: Worked Example 2 - GSHP with integrated cylinder

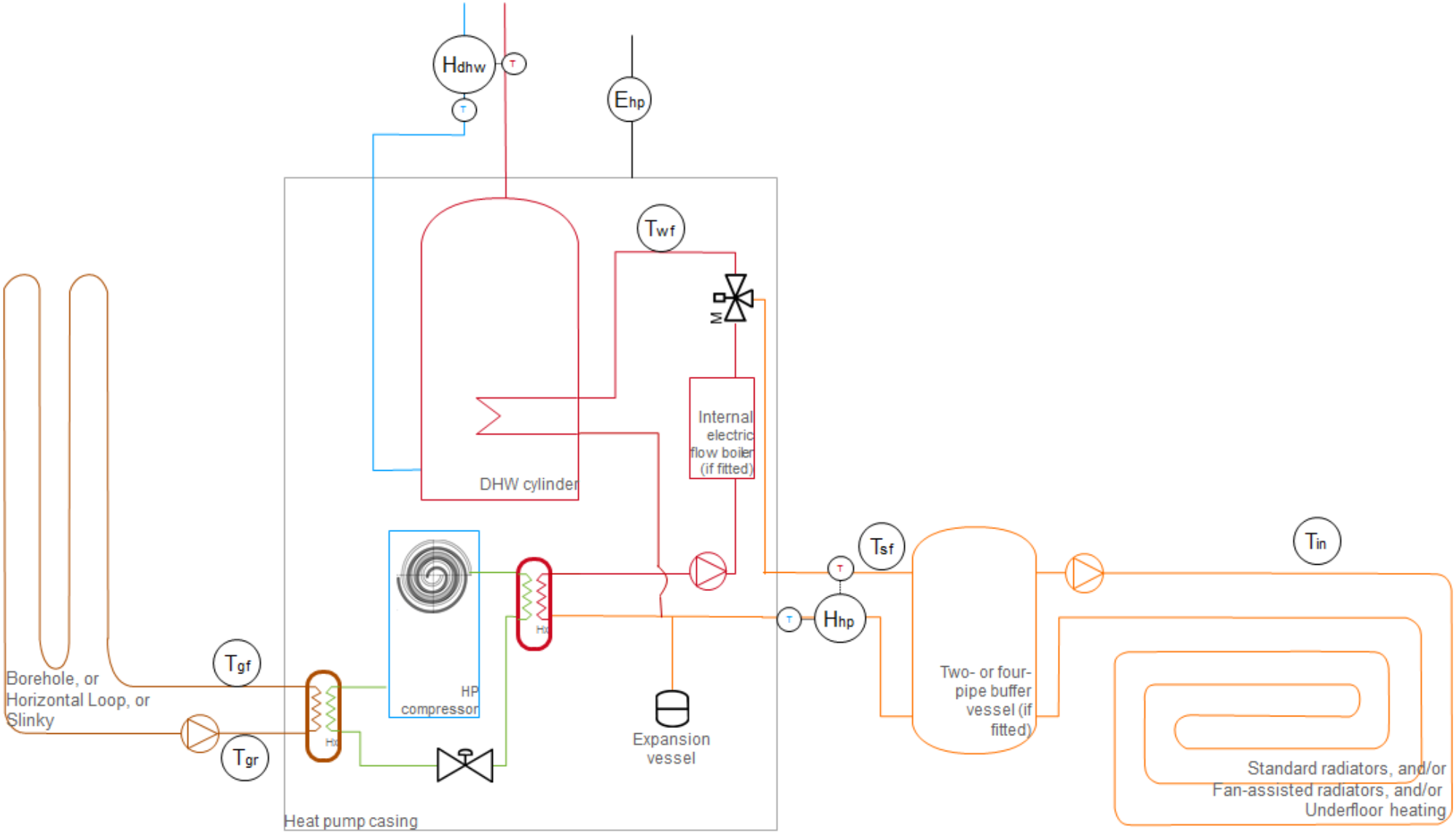


Figure 5: Worked Example 2 - GSHP with integrated cylinder and metering option 1

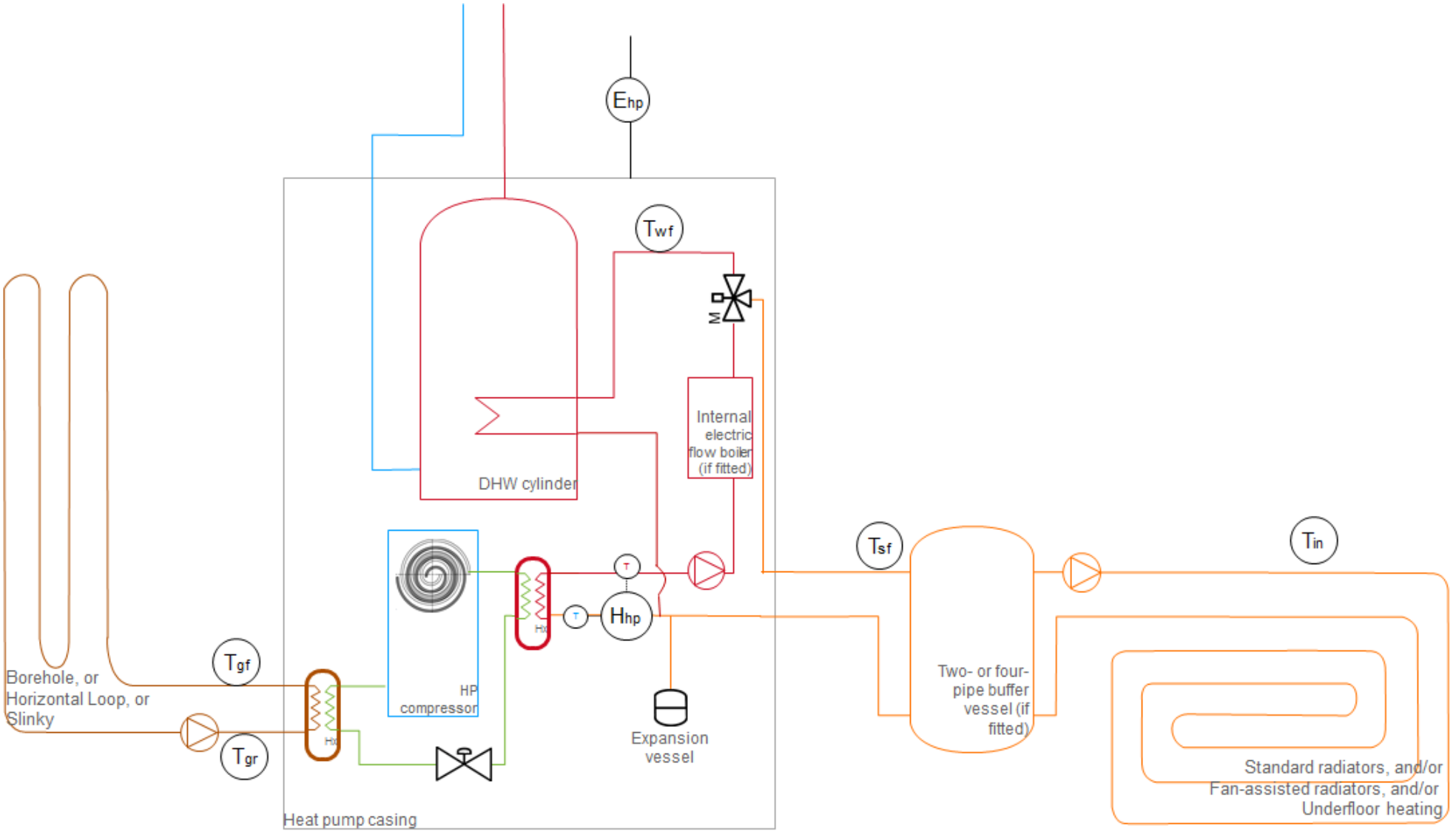


Figure 6: Worked Example 2 - GSHP with integrated cylinder and metering option 2

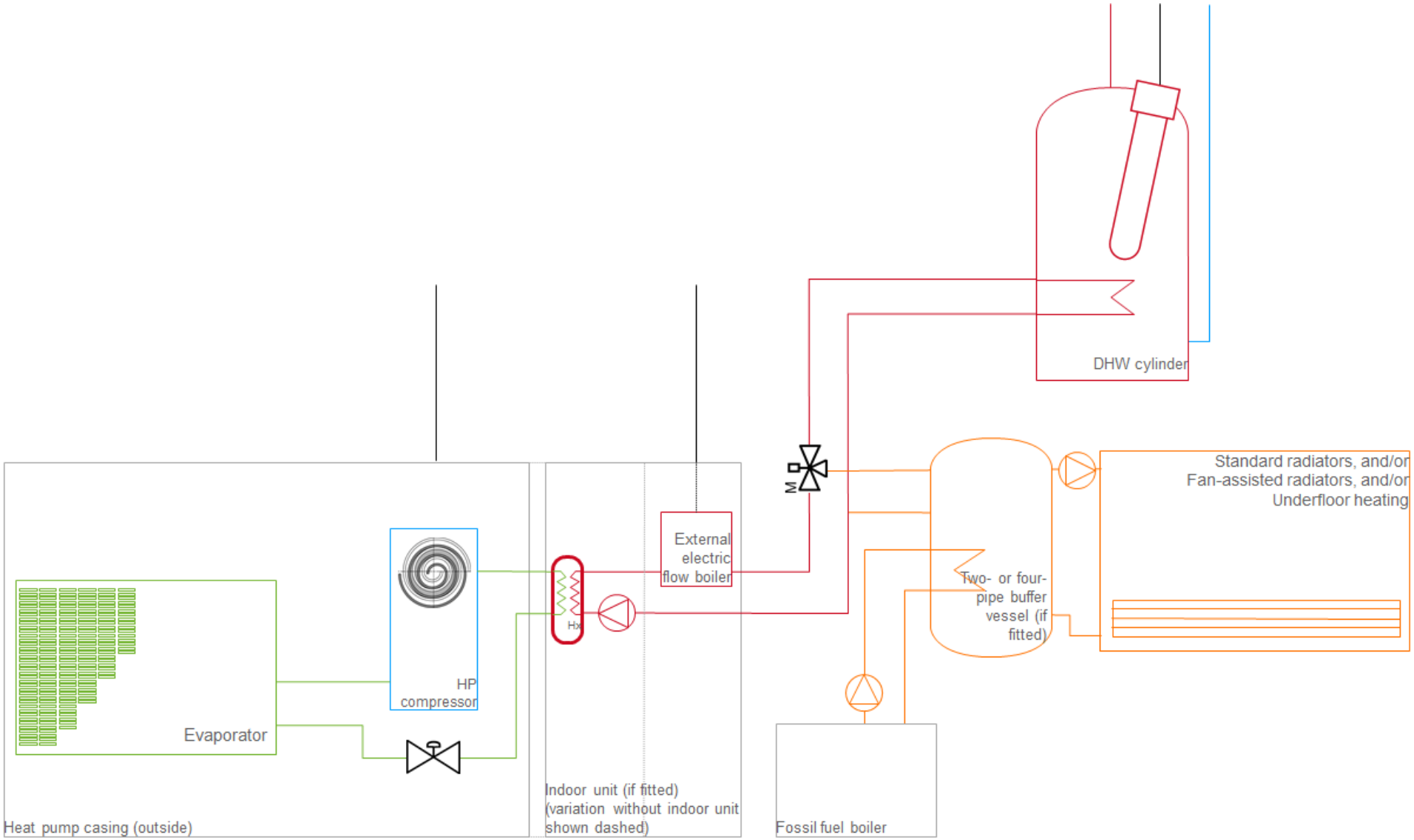


Figure 7: Worked Example 3 - Split-system ASHP with back-up fossil fuel boiler

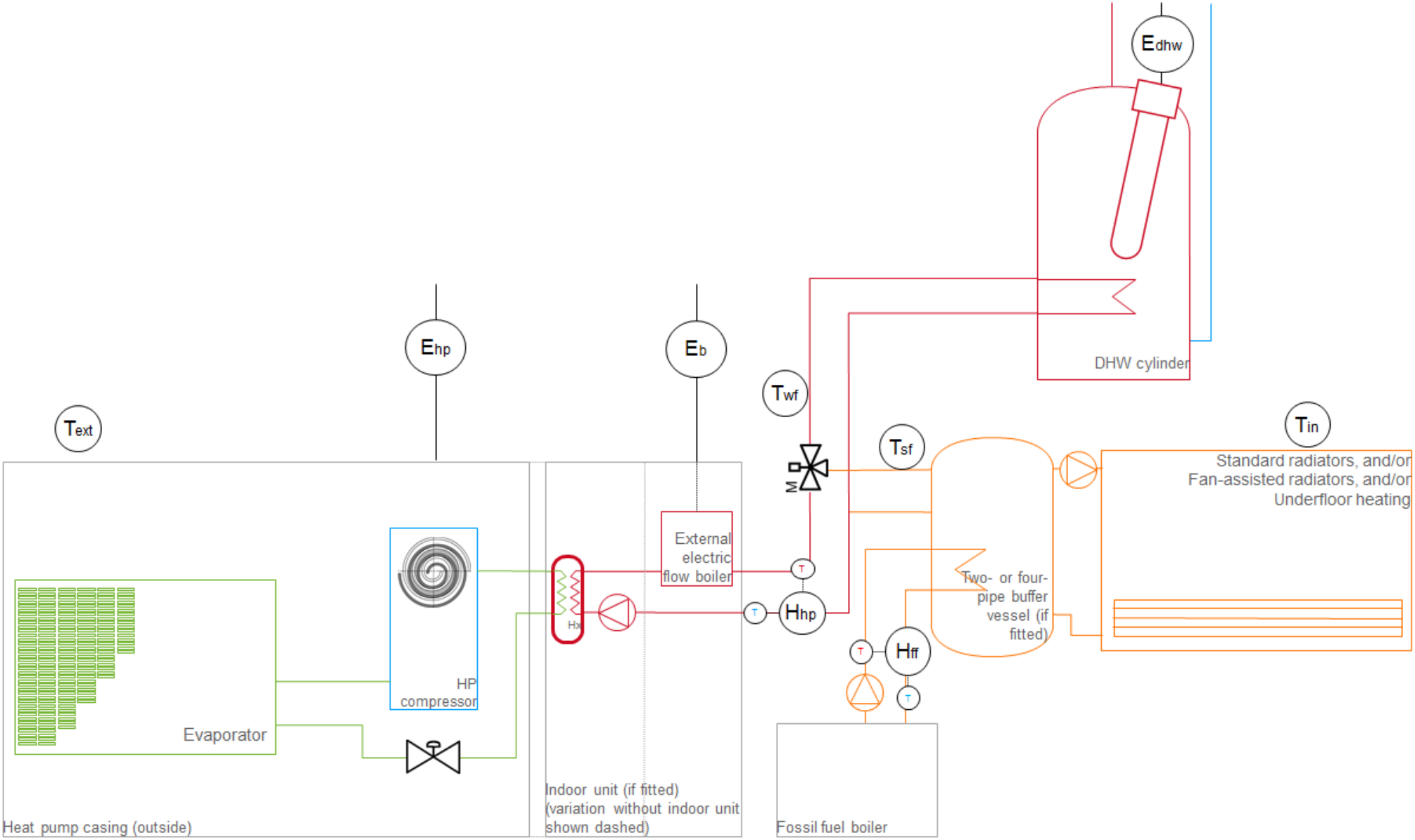


Figure 8: Worked Example 3 - Split-system ASHP with back-up fossil fuel boiler and possible metering

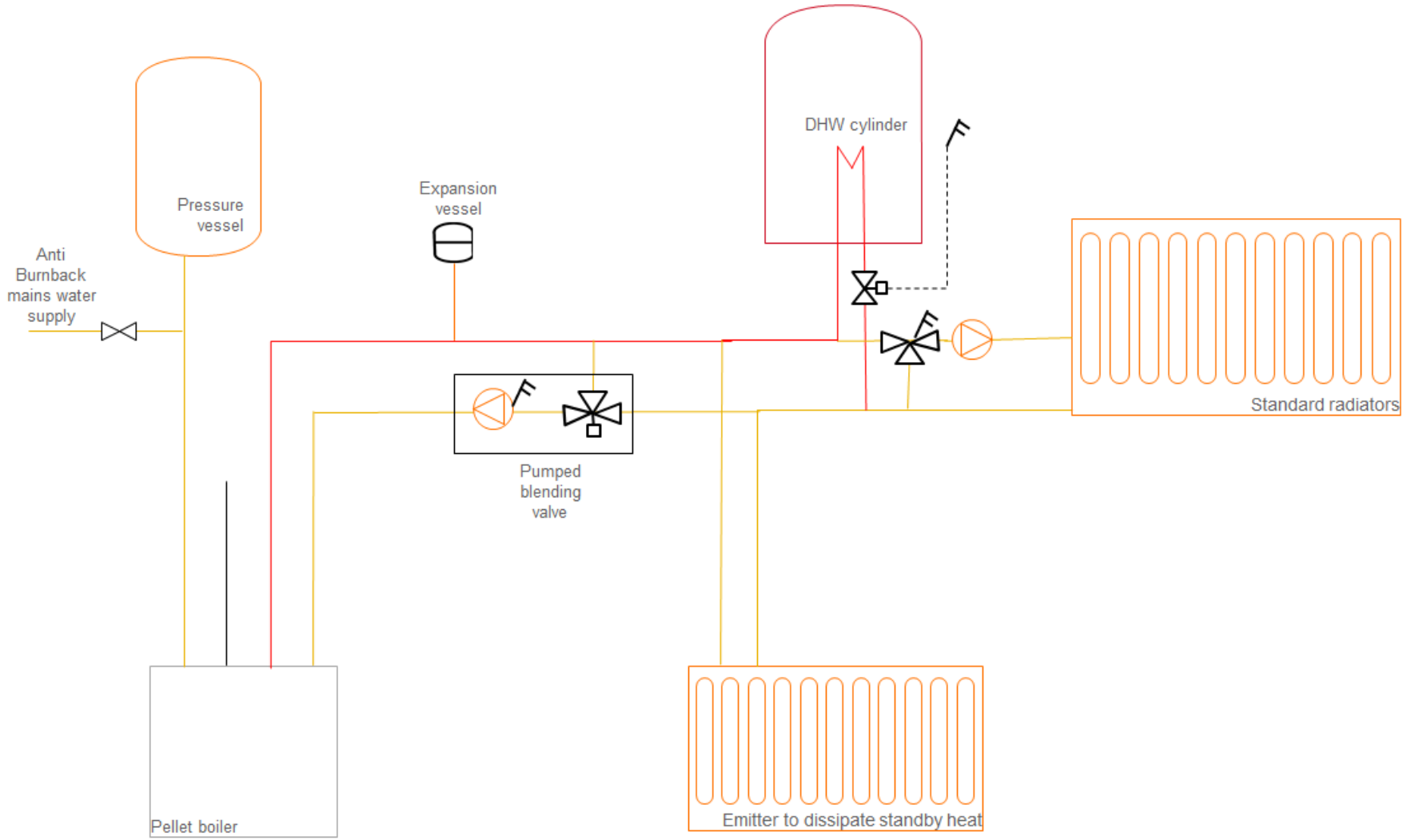


Figure 9: Worked Example 4 - Pellet biomass boiler providing space heating and domestic hot water

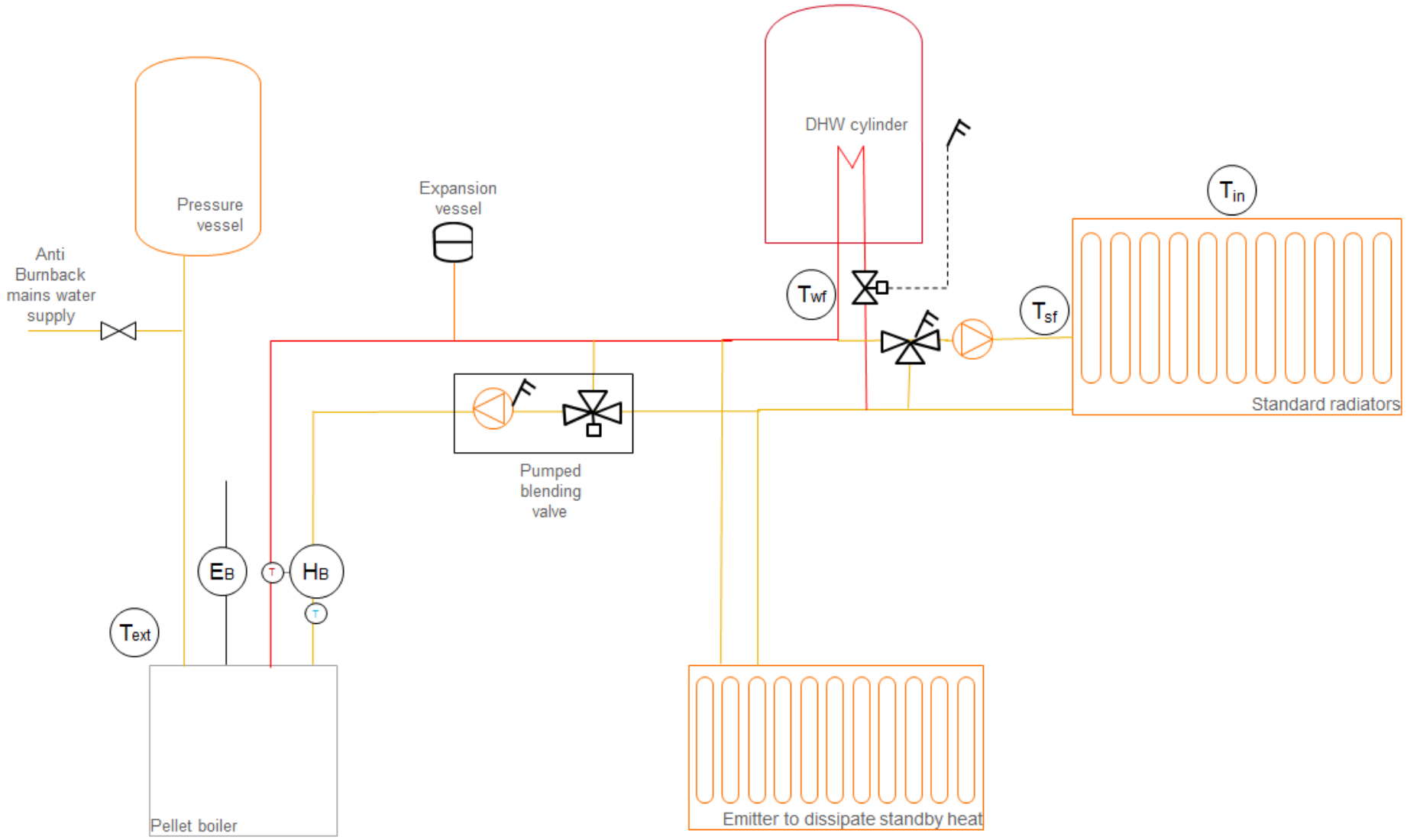


Figure 10: Worked Example 4 - Pellet biomass boiler providing space heating and domestic hot water with possible metering

Department of Energy & Climate Change
3 Whitehall Place
London SW1A 2AW
www.gov.uk/decc

URN 13D/180