Enertek International

International Consultants in Product
Research, Design, Development
& Certification

BESA HIU Test Report

DGI-IND Indirect System (44.05.01.053)

Modules Tested: 2 & 8

Client: YGHP / Kozanlar

Project Number: E5241 Report Issue: 2

17 March 2026

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1 EXECUTIVE SUMMARY

1.1.1 The DGI-IND Indirect System HIU underwent testing to the BESA Technical Standard for UK HIU Test Regime, V3-Rev001 September 2023. Modules 2 & 8 were tested. Summary tables can be seen below, with further technical data shown in each respective test module chapter of this report. VWART calculations can be found within APPENDIX A.

1.1.2 It should be noted that all VWART figures are to within ±2°C tolerance.

Table 1 - Appliance Details and Modules Tested

Manufacturer:	YGHP / Kozanlar
Model:	DGI-IND Indirect System (44.05.01.053)
Modules:	2 & 8

Table 2 - Modules Tested Pass or Fail Summary

Module 2:	Pass
Module 8:	Pass

Table 3 - Modules 2 & 8 VWART Information

	VWART (°C)	Volume (m^3)
DHW	20	55.2
Standby	45	62.8
Space Heating	36	65.9

	VWART (°C)
Summer	33
Winter	34
Overall	33

2 BRIEF

2.1.1 Enertek International Limited (EIL), were contracted to receive, install and commission a production sample of the DGI-IND Indirect System.

2.1.2 To perform the tasks required for assessing the efficiency of Domestic Hot Water (DHW) and Space Heating (SH) as per the BESA Technical Standard for UK HIU Test Regime, V3-Rev001 September 2023, a publicly available online test regime. This is here-on referred to as the Test Regime throughout this document.

2.1.3 To provide a report detailing the tests carried out and generated results in accordance with the Test Regime criteria, including calculations for Volume Weighted Average Return Temperatures (VWART).

3 DEFINITIONS

3.1.1 The following definitions and abbreviations which have been used within this report can be found in Table 4 below.

Table 4 - Definitions and Abbreviations

Symbol	Description
t_{10}	Temperature, primary source
t_{11}	Temperature, primary side flow connection
t_{12}	Temperature, primary side return connection
t_{21}	Temperature, space heating system return connection
t_{22}	Temperature, space heating system flow connection
t_{31}	Temperature, cold water supply
t_{32}	Temperature, domestic hot water flow from HIU
t_{b1}	Temperature, primary side bypass flow (for non-keep warm configuration)
t_{b2}	Temperature, primary side bypass return (for non-keep warm configuration)
q_1	Volume flow, primary side
q_2	Volume flow, space heating system
q_3	Volume flow, domestic hot water
P_{11}	Static pressure, primary side flow connection
P_{12}	Static pressure, primary side return connection
P_{21}	Static pressure, space heating system return connection
P_{22}	Static pressure, space heating system flow connection
P_{31}	Static pressure, cold water supply
P_{32}	Static pressure, domestic hot water flow from HIU
dP_1	Differential pressure, primary system across HIU
dP_2	Differential pressure, space heating system across HIU
dP_3	Differential pressure, domestic hot water across HIU
Q_{DHW}	Estimated annual energy demand per year for hot water
Q_{SH}	Estimated annual energy demand per year for space heating
n_{DHW}	Number of DHW events per year

H_1	Arithmetic mean of primary side power recorded during test
H_2	Arithmetic mean of space heating power recorded during test
H_3	Arithmetic mean of DHW power recorded during test
h_{DHW}	Annual hours that HIU is producing DHW
h_{SH}	Annual hours that HIU is producing space heating
h_{KWM}	Annual hours that HIU is in keep warm mode
h_{NKWM}	Annual hours that HIU is in non-keep warm mode
V_{DHW}	Volume of primary water recorded during and post-DHW test
V_{SH}	Volume of primary water recorded during space heating tests
V_{KWM}	Volume of primary water recorded during keep warm test
V_{NKWM}	Volume of primary water recorded during non-keep warm test
$Prop_{Summer}$	Proportion of year HIU is operating in “summer” mode
$Prop_{Winter}$	Proportion of year HIU is operating in “winter” mode
$VWART_{DHW}$	DHW Volume Weighted Average Return Temperature
$VWART_{SH}$	Space Heating Volume Weighted Average Return Temperature
$VWART_{KWM}$	Keep Warm Volume Weighted Average Return Temperature
$VWART_{NKWM}$	Non-Keep Warm Volume Weighted Average Return Temperature
$VWART_{WINTER}$	Annual Volume Weighted Average Return Temperature for Heating Period
$VWART_{SUMMER}$	Annual Volume Weighted Average Return Temperature for Non-Heating Period
$VWART_{HIU}$	Total Annual Volume Weighted Average Return Temperature
$W_{thermal}$	Thermal energy use
$W_{electrical}$	Electrical energy use
SH_{PROP}	Annual heating period
NSH_{PROP}	Annual non-space heating period
TMV	Thermostatic mixing valve
TRV	Temperature regulating valve
UFH	Underfloor heating
DHW	Domestic hot water
HIU	Heat interface unit

DPCV	Differential pressure control valve
DRV	Double regulating valve
SH	Space heating
UKAS	United Kingdom Accreditation Service
EIL	Enertek International Limited

4 INTRODUCTION

4.1 Installation of Appliance

4.1.1 The appliance was installed and commissioned (as received) and as defined in the product literature provided. Testing was carried out without further adjustment other than disabling the internal space heating pump and adjusting the setting of the SH and DHW set points through the user interface on the HIU controller to suit the conditions of the HIU test rig.

4.1.2 The HIU rig schematic is shown within Figure 1.

The HIU was commissioned in accordance with the technical manual / installation guide provided by YGHP / Kozanlar**.**

4.2 Appliance Details

4.2.1 Details of the DGI-IND Indirect System HIU are given in Table 5. Photographs of the installed appliance are given in Figure 11, Figure 12 and Figure 13.

4.2.2 The UK declaration of conformity (CE or UKCA or equivalent) and water regulation 4 certificate can be found within APPENDIX C.

Table 5 - Appliance Details

Item	Description
Manufacturer	YGHP / Kozanlar
Model	DGI-IND Indirect System (44-05-01-053)
Serial Number	04W2653SMPL0001
Year of Manufacture	2025
DHW Priority	Yes
EUT Number	EUT 0950
Date Test Item Received	29/01/2026

4.3 Appliance Design Pressures and Temperatures

4.3.1 The maximum design pressures and temperatures of the DGI-IND Indirect System HIU for the primary side and the secondary side for both Space Heating and DHW are given in Table 6.

Table 6 - Appliance Design Pressures and Temperatures

Item	Pressure (bar)	Temperature (°C)	Differential Pressure (bar)
Primary Side	10	90	4
Secondary Side Space Heating	3	55	0.7
Secondary Side DHW	10	60	10

5 TEST METHOD

5.1 Test Regime

5.1.1 The testing described in this report was carried out in accordance with the test regime. The test regime outlines a series of static and dynamic tests to determine the performance of a HIU's DHW and SH functions. The test regime outlines the test method including the reporting of the results, the performance requirements and the VWART calculations.

5.1.2 Testing was carried out in accordance with Test Module 2.

5.1.3 Testing was carried out in accordance with Test Module 8.

5.2 Measurement & Uncertainties

5.2.1 All measurements and uncertainties adhere to the requirements stipulated in the BESA Test Regime. All measurements were sampled at a rate of 1 Hz for all tests.

5.2.2 The BESA uncertainties of measurement requirements are as follows:

- Differential Pressure, ± 1.0 kPa
- Temperature, ± 0.1 °C
- Volume Flow (≥ 0.06 l/s) ± 1.5 %
- Volume Flow (< 0.06 l/s), ± 3.0 %

Note: the time constant for the temperature sensors is less than 1.5 s. The time constant for the differential pressure sensors is less than 5s.

5.2.3 EIL's reported uncertainty is based on a standard uncertainty by a coverage factor K=2, providing a level of confidence of approximately 95%. The uncertainty evaluation has been carried out in accordance with UKAS requirements. The EIL equipment list and uncertainties are given in shown within chapter 9.

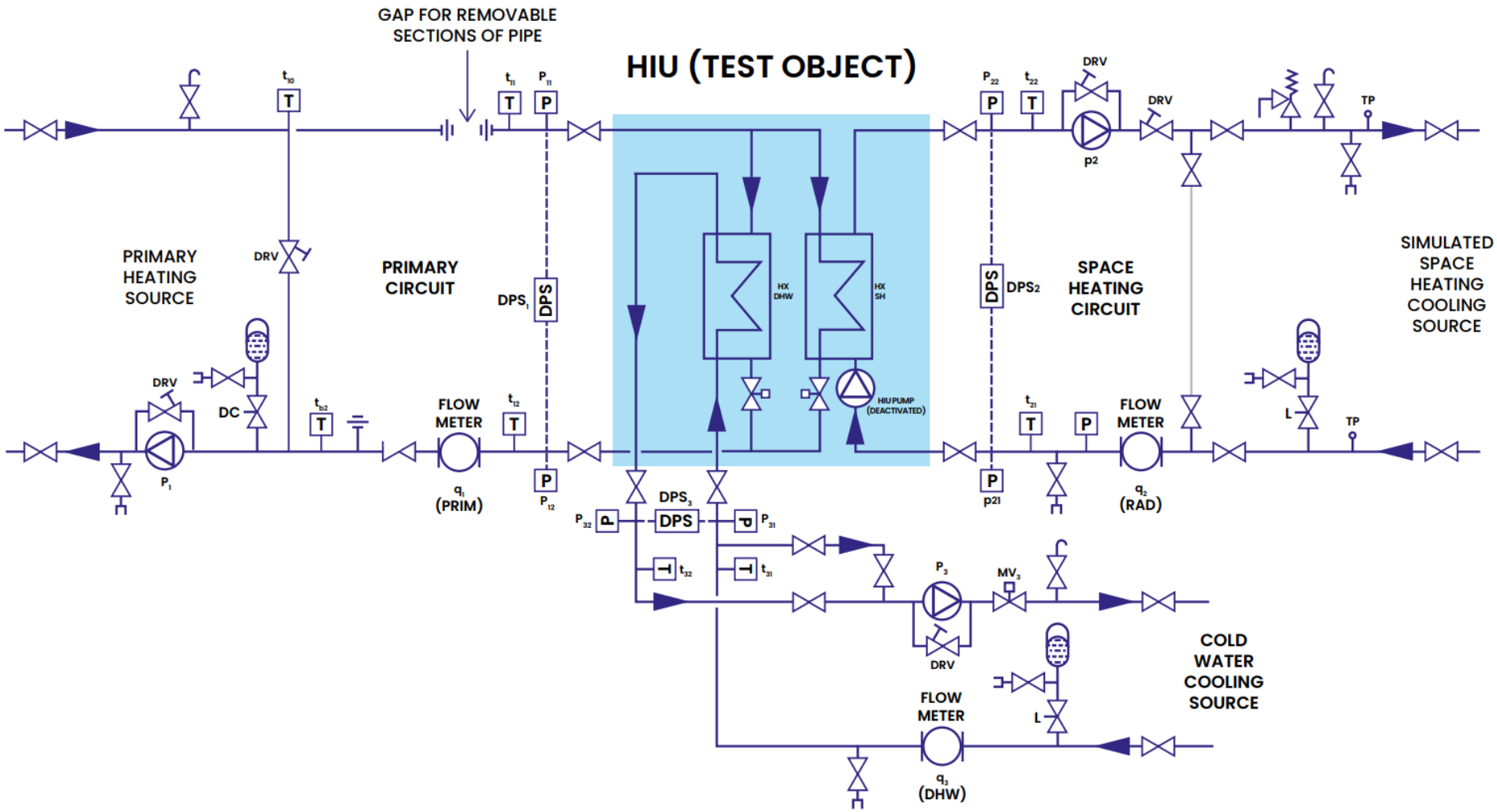


Figure 1 - EIL's HIU Test Rig Schematic which is taken from Appendix B, Figure 4, of Technical Standard for UK HIU Test Regime Version 3: 2023

6 TEST MODULE 2 – SPACE HEATING, LOW TEMPERATURE, DH55 INDIRECT

6.1 Test Module 2 Information

6.1.1 Objective: Perform static testing to investigate the performance characteristics of the HIU when indirectly meeting a space-heating load given a 45°C/35°C tertiary heating circuit and 55°C primary flow temperature.

6.1.2 The following set of tests are from test module 2 - space heating, low temperature, indirect heating module 2-DH55 indirect HM2-DH55C

Table 7 - Module 2 Tests

Module 2 Tests	
01d	DH/55C, Space Heating Indirect 0.5 kW, 45/35°C tertiary, 50 kPa
01e	DH/55C, Space Heating Indirect 1 kW, 45/35°C tertiary, 200 kPa
01f	DH/55C, Space Heating Indirect 4 kW, 45/35°C tertiary, 50 kPa

6.2 Test Module 2 Results

6.2.1 Performance criteria results can be seen in Table 8, test result data can be seen in Table 10 and key metrics can be found in Figure 2, Figure 3 and Figure 4. Best practice criteria can be found in Table 9.

Table 8 - Module 2 Performance Criteria

Module 2 Tests Performance Criteria	
Performance Criteria, Fail if:	**PASS/FAIL**
VWART (fail if the VWART is above 40°C)	PASS

Table 9 - Module 2 Best Practice

Module 2 – Best Practice Criteria	
Best Practice Criteria if:	**Best Practice**
VWART is below 37 °C	Achieved

Table 10 - Module 2 Test Results

Module 2 Test Results				
Parameter	**Symbol**	**01d (0.5kW)**	**01e (1kW)**	**01f (4kW)**
Temperature, primary side flow connection	t_{11} (°C)	54.8	54.8	55.1
Temperature, primary side return connection	t_{12} (°C)	35.3	35.6	35.7
Volume flow, primary side	q_1 (l/s)	0.0063	0.012	0.048
Differential pressure, primary system across HIU	dP_1 (kPa)	52	200	51
Arithmetic mean of primary side power recorded during test	H_1 (W)	515.7	991.4	3875.8
Temperature, space heating system return connection	t_{21} (°C)	35.0	35.4	35.1
Temperature, space heating system flow connection	t_{22} (°C)	45.2	45.2	44.5
Volume flow, space heating system	q_2 (l/s)	0.012	0.023	0.097
Differential pressure, space heating system across HIU	dP_2 (kPa)	13	11	22
Arithmetic mean of Space heating power during test	H_2 (W)	512.6	970.3	3832.8
Volume Weighted Avg. Return Temp	VWART (°C)	35	36	36
Overall VWART (°C)		36		

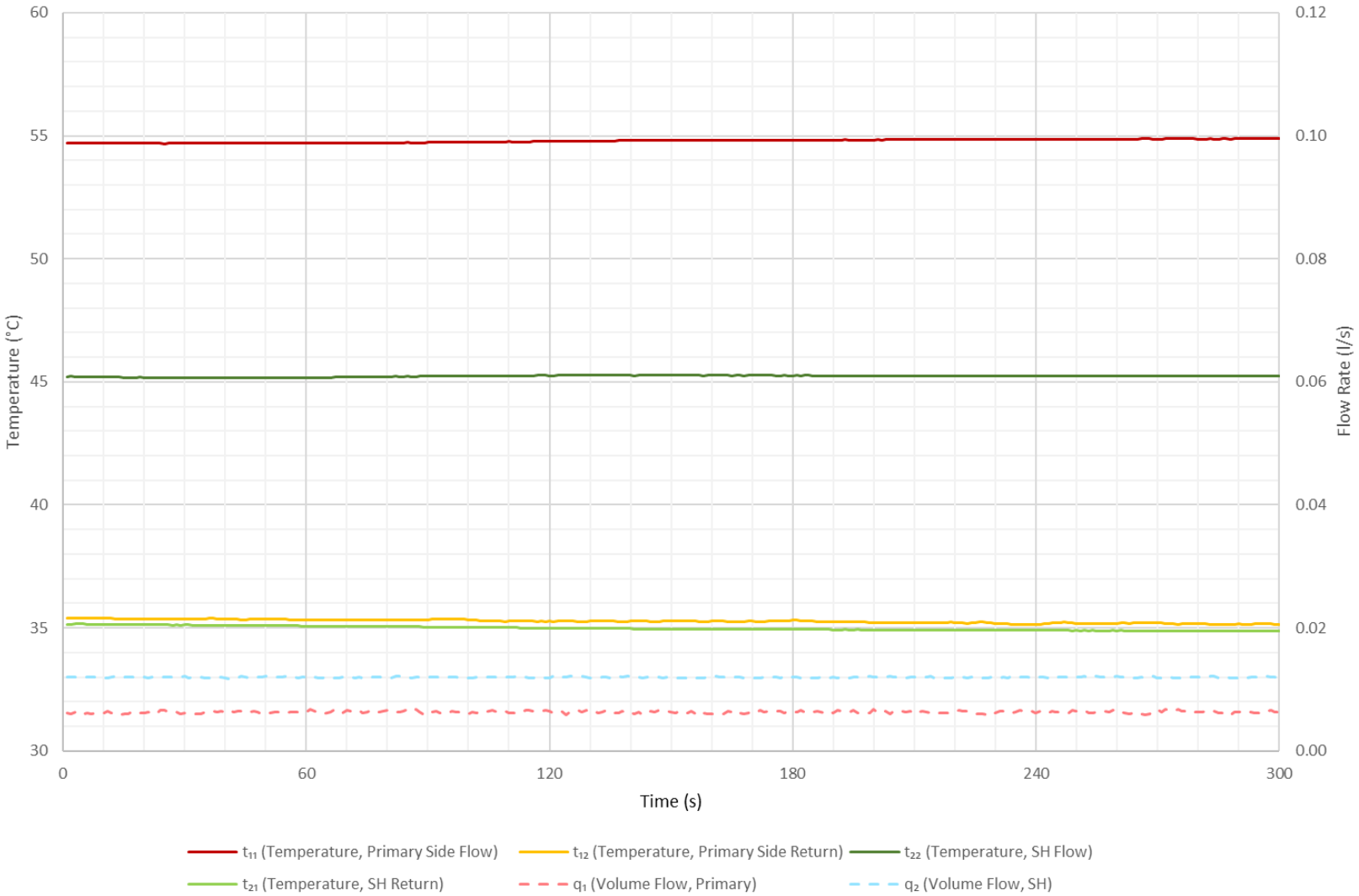


Figure 2 - Test 01d Key Metrics

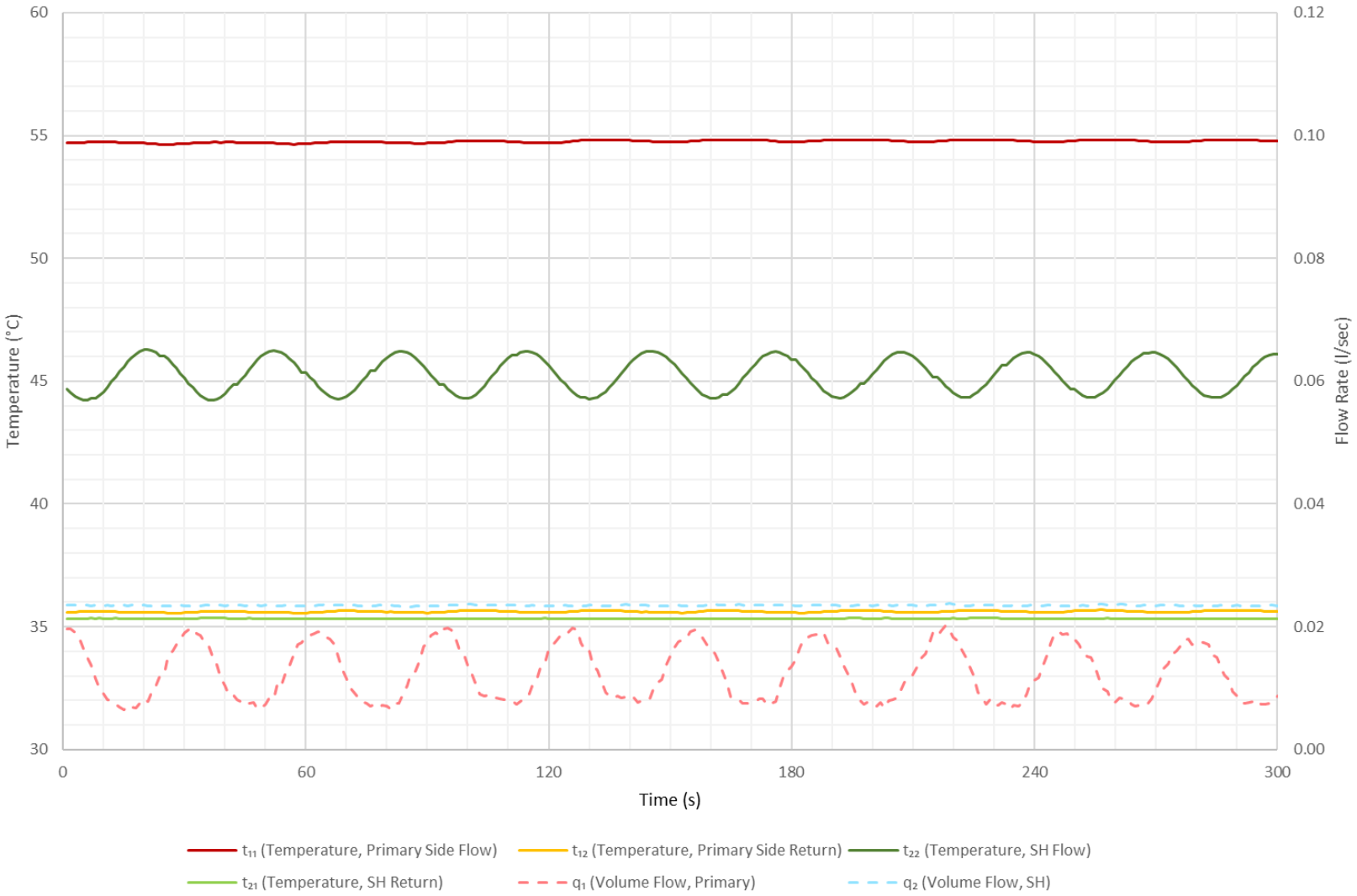


Figure 3 - Test 01e Key Metrics

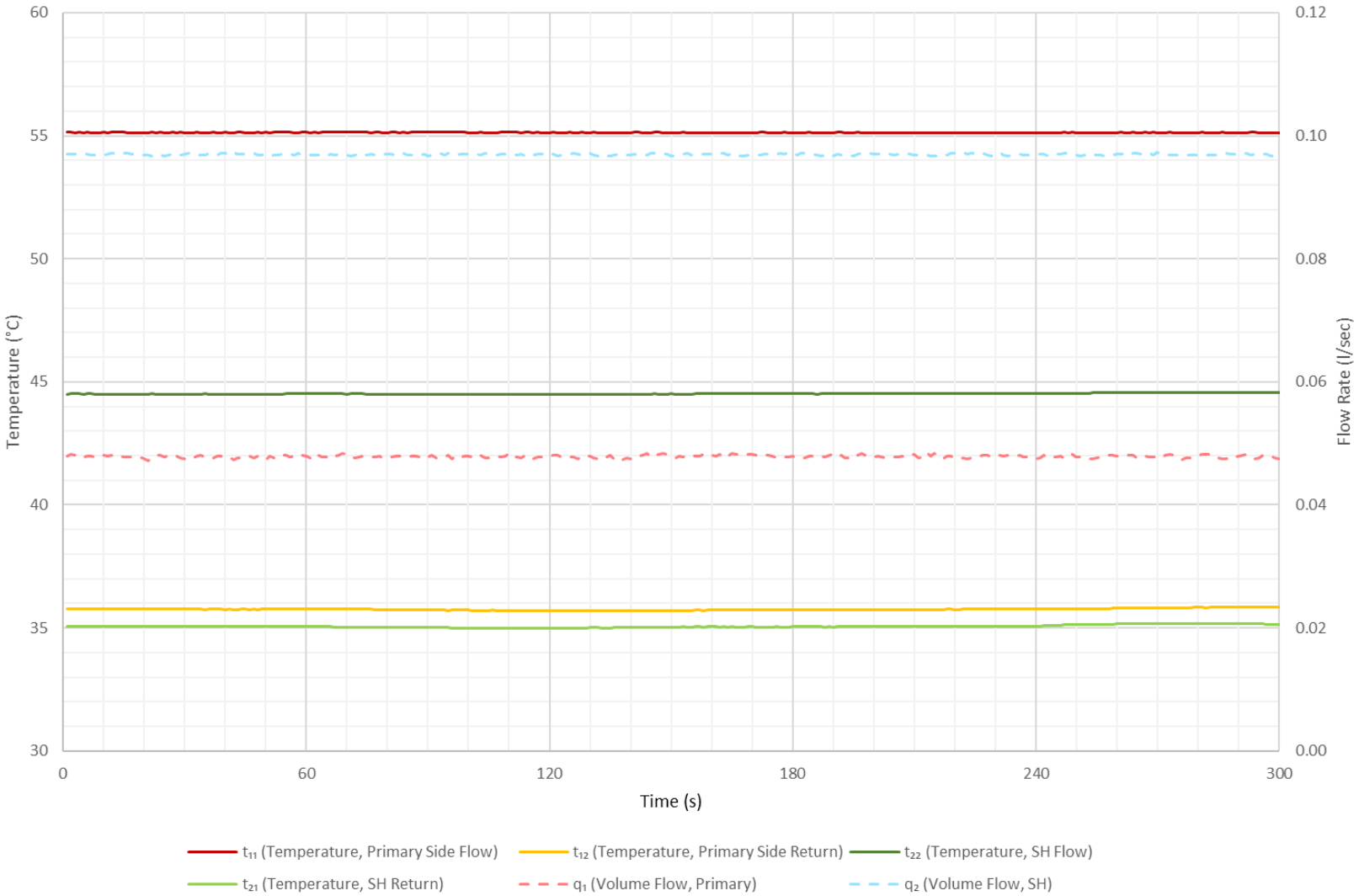


Figure 4 - Test 01f Key Metrics

7 TEST MODULE 8 – DHW, LOW TEMPERATURE, DH55-KWARM

7.1 Test Module 8 Information

7.1.1 Objective: To explore the performance of the HIU under changing loads, as would be the case in practical operation. Key performance criteria are speed and consistency of DHW delivery to the customer; DHW staying at a safe temperature at all times and the volume weighted average return temperature when supplying space heating or DHW.

7.1.2 The following set of tests are from test module 8 – domestic hot water, low temperature, keep warm hot water module 8-DH55-KWarm.

Table 11 - Module 8 Tests

Module 8 Tests	
11b	DH/55C, DHW only, 50°C DHW, variable dP
12b	DH/55C, DHW Low Flow, 50°C DHW, 50kPa
12d	DH/55C, DHW Low Flow, 50°C DHW, 200kPa
13b	DH/55C, DHW Load Test, 50°C DHW
21b	DH/55C, DHW Keep Warm, 50°C DHW
22b	DH/55C, DHW Keep Warm Response Time, 50°C DHW

7.2 Test 11b Information

7.2.1 Objective: To investigate the performance of the HIU when delivering DHW, at a range of flow rates and differential pressures, given a 55°C primary flow temperature. The test investigates HIU operation in terms of DHW delivery and impacts on primary heat network return temperatures.

7.3 Test 11b Results

7.3.1 Performance criteria results can be seen in Table 13, test result data can be seen in Table 12 and key metrics can be found in Figure 5. Best practice criteria can be found in Table 14.

Table 12 - Module 8 Test 11b Results

Module 8 - Test 11b Results			
Parameter	**Symbol**	**Result**	
Maximum and minimum values of t_{32} when there is DHW flow	t_{32} (°C)	52.5	48.6
Number of consecutive seconds where t_{32} > 55°C	(s)	0	
Overall DHW Volume Weighted Avg. Return Temp	VWART (°C)	19	

Table 13 - Module 8 Test 11b Performance Criteria

Module 8 - Test 11b Performance Criteria	
Performance Criteria, Fail if:	**PASS/FAIL**
Fail if DHW temperature (t_{32}) exceeds 60.0°C (to one decimal place) for more than 1 second, as this poses a scalding risk	PASS
Fail if primary return temperature (t_{12}) exceeds 55.0°C (to one decimal place) at any point, as this poses a scaling risk	PASS
Fail if the VWART is above 27°C (to one decimal place)	PASS
Fail if the average DHW temperature (t_{32}) is not 50.0°C ±1°C (to one decimal place) for the final 150 seconds of each of the 180 second DHW flow periods	PASS
Fail if the DHW temperature (t_{32}) is not being maintained at 50.0°C ±3°C (to one decimal place) for >150 seconds of each of the DHW flow periods	PASS
Fail if the DHW temperature (t_{32}) drops below 45.0°C (to one decimal place) for more than 5 consecutive seconds, as this would impact resident comfort	PASS

Table 14 - Module 8 Test 11b Best Practice

Module 8 – Test 11b – Best Practice Criteria	
Best Practice Criteria if:	**Best Practice**
Best practice if the VWART is less than 20°C (to one decimal place)	Achieved
Best practice if the DHW temperature (t32) is being maintained at 50.0°C ±2°C throughout periods of DHW flow	Not achieved
Best practice if the DHW temperature (t32) doesn't drop below 45.0°C (to one decimal place) for more than 2 consecutive seconds	Achieved

Figure 5 - Test 11b Key Metrics

7.4 Test 12b / 12d Information

7.4.1 Objective: To investigate the stability of DHW temperature at low flow rates. During operation, domestic hot water is sometimes drawn off at extremely low flow rates. Test 12 investigates the ability of the system to meet this condition by measuring the temperature at test point t_{32} at a flow rate of 0.02 l/s.

7.5 Test 12b / 12d Results

7.5.1 The HIU was **able** to deliver DHW at low flow rate above 45.0°C at the end of the 180 second period of low flow DHW.

7.5.2 The HIU was **able** to deliver stable DHW flow temperature (at t_{32}), defined as ability to maintain 50.0 ±3.0°C (1 decimal place) during the last 60 seconds of the test.

7.5.3 Performance criteria results can be seen in Table 16, test result data can be seen in Table 15 and key metrics can be found in Figure 6 and Figure 7. Best practice criteria can be found in Table 17.

Table 15 - Module 8 Test 12 Results

Module 8 - Test 12 Results					
Parameter	**Symbol**	**12b Result**		**12d Result**	
Maximum and minimum values of t_{32} when there is low DHW flow	t_{32} (°C)	52.2	47.8	52.4	49.3
Number of consecutive seconds where t_{32} > 55°C	(s)	0		0	

Table 16 - Module 8 Test 12 Performance Criteria

Module 8 - Test 12 Performance Criteria	
Performance Criteria, Fail if:	**PASS/FAIL**
Fail if DHW temperature (t_{32}) exceeds 60.0°C (to one decimal place) for more than 1 second, as this poses a scalding risk	PASS
Fail if primary return temperature (t_{12}) exceeds 55.0°C (to one decimal place) at any point, as this poses a scaling risk	PASS
Fail if DHW temperature (t_{32}) is not maintained at 50°C ±3°C (to one decimal place) for more than 60 seconds	PASS

Table 17 - Module 8 Test 12 Best Practice

Module 8 – Test 12 – Best Practice Criteria	
Best Practice Criteria if:	**Best Practice**
Best practice if DHW temperature (t32) is maintained at 50°C ±2°C (to one decimal place) throughout the test for both test 12b and 12d	Not achieved

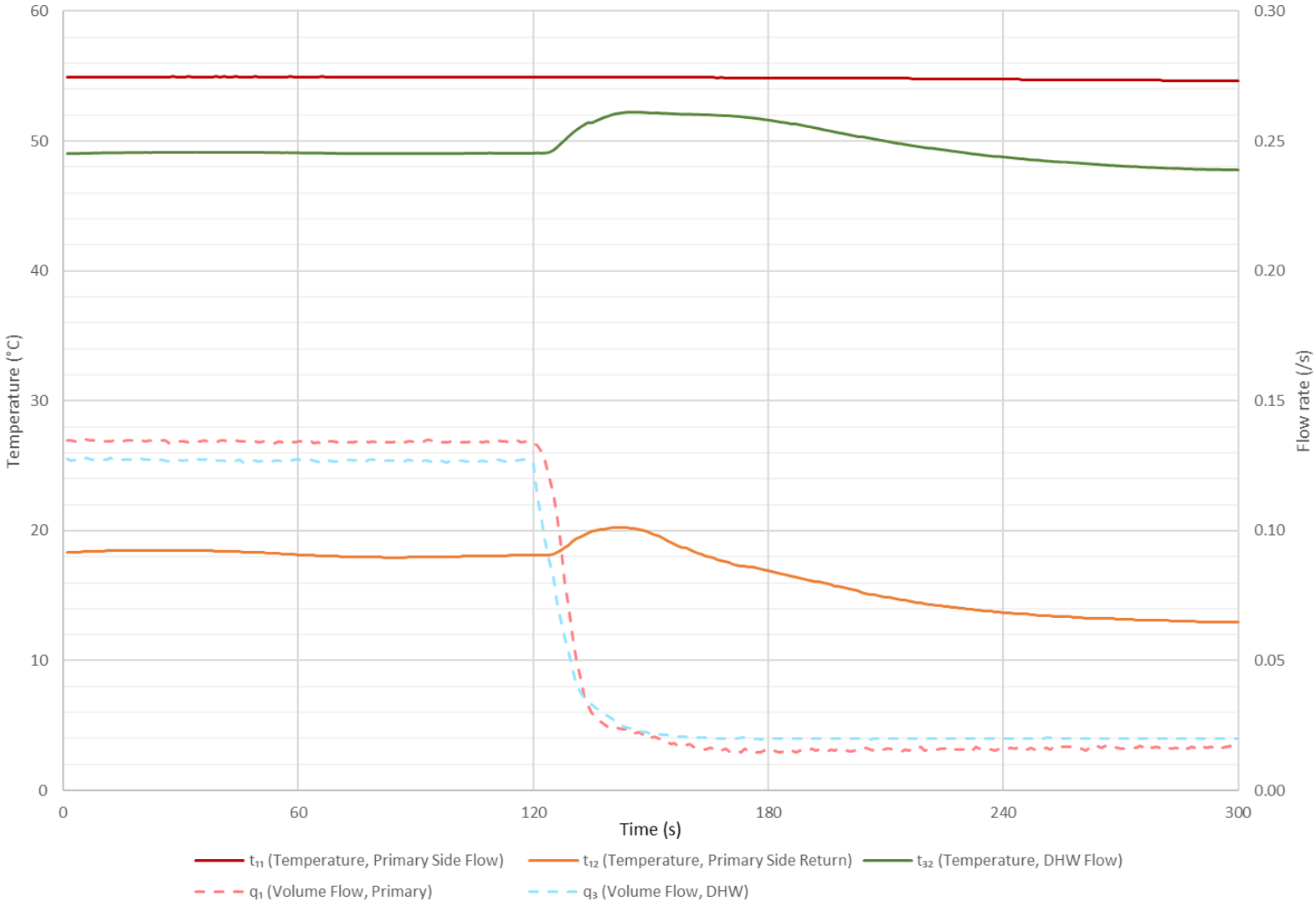


Figure 6 - Test 12b Key Metrics

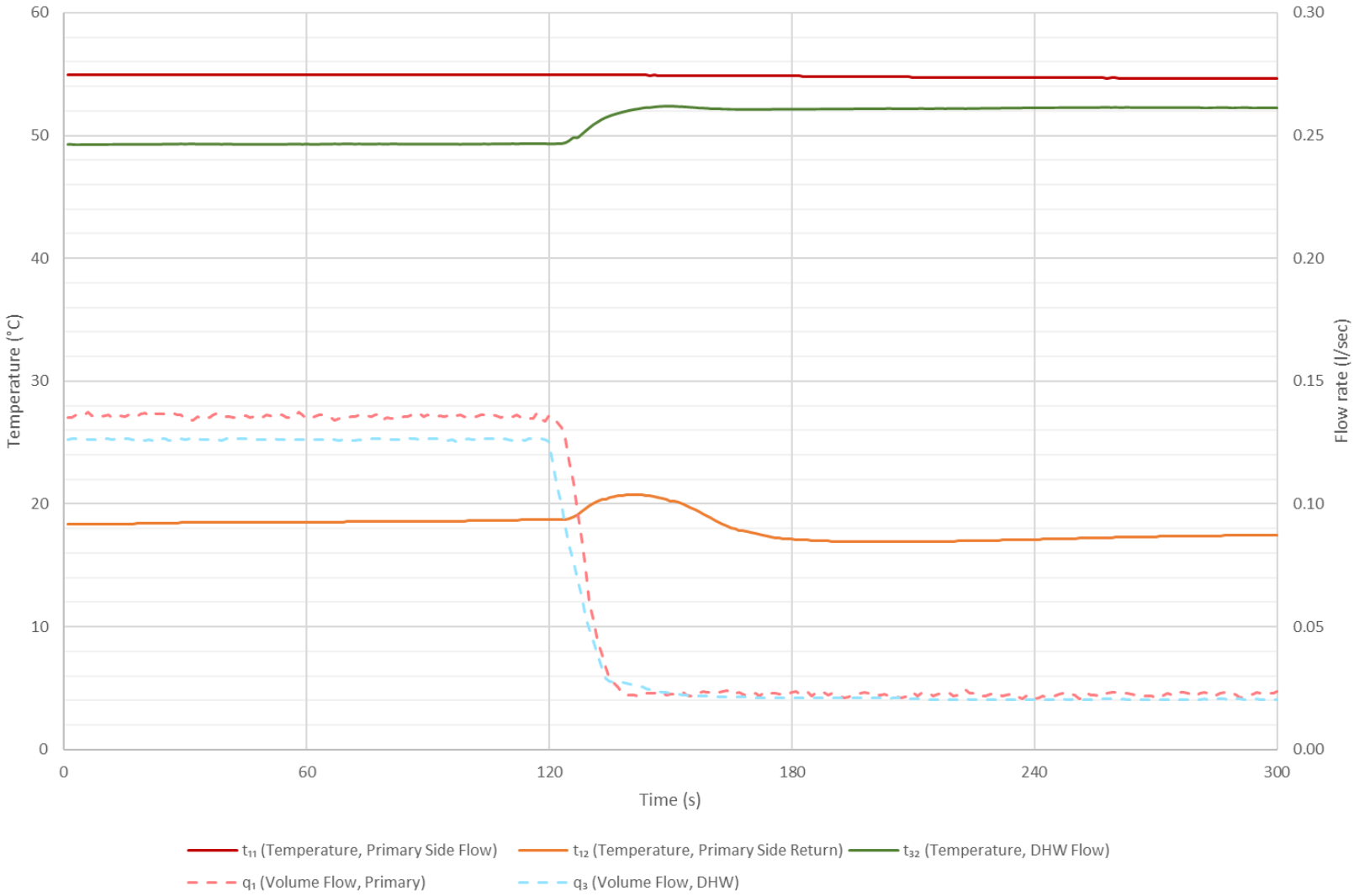


Figure 7 - Test 12d Key Metrics

7.6 Test 13b Information

7.6.1 Objective: To measure the maximum heat output (kW) and flow (l/sec) DHW output that can be delivered from the HIU. The HIU shall be set to deliver 50°C and the maximum DHW power output shall be measured with a flow step change and the peak value recorded when the DHW flow temperature is above 45°C.

7.7 Test 13b Results

7.7.1 The maximum DHW heat output was recorded as 26.0 kW, with a measured flow rate of 0.180 l/s, when producing minimum DHW at 45°C or above (temperature achieved at final step 45.0°C).

7.7.2 The recorded DHW line pressure drop across the HIU was 87 kPa.

7.7.3 The number of consecutive seconds where t_{32} > 55°C was 0 seconds.

7.7.4 Performance criteria results can be seen in Table 18, test result data can be seen in Table 19, key metrics can be found in Figure 8.

Table 18 - Module 8 Test 13b Performance Criteria

Module 8 - Test 13b Performance Criteria	
Performance Criteria, Fail if:	**PASS / FAIL**
Fail if DHW (at t_{32}) is less than 50°C ±1.0°C (to one decimal place) at 0.13 l/s flow rate, as the HIU must be able to produce DHW to the target temperature at a moderate load	PASS
Fail if DHW temperature (t_{32}) exceeds 60.0°C (to one decimal place) for more than 1 second, as this poses a scalding risk	PASS
Fail if primary return temperature (t_{12}) exceeds 55.0°C (to one decimal place) at any point, as this poses a scaling risk	PASS

Table 19 - Module 8 Test 13b Results

Module 8 - Test 13b Results – Mean Average of Last 10 Seconds											
Parameter	**Symbol**	**0.15 l/s (25kW)**	**0.18 l/s (30kW)**	**0.21 l/s (35kW)**	**0.24 l/s (40kW)**	**0.27 l/s (45kW)**	**0.30 l/s (50kW)**	**0.33 l/s (55kW)**	**0.36 l/s (60kW)**	**0.39 l/s (65kW)**	**0.42 l/s (70kW)**
Temperature, primary side flow connection	t_{11} (°C)	54.6	**54.7**	54.7	-	-	-	-	-	-	-
Temperature, primary side return connection	t_{12} (°C)	17.4	**16.1**	14.4	-	-	-	-	-	-	-
Volume flow, primary side	q_1 (l/s)	0.151	**0.161**	0.168	-	-	-	-	-	-	-
Arithmetic mean of primary side power recorded during test	H_1 (kW)	23.4	**26.0**	28.3	-	-	-	-	-	-	-
Temperature, cold water supply	t_{31} (°C)	10.2	**10.4**	9.6	-	-	-	-	-	-	-
Temperature, domestic hot water flow from HIU	t_{32} (°C)	47.4	**45.0**	42.2	-	-	-	-	-	-	-
Volume flow, domestic hot water	q_3 (l/s)	0.150	**0.180**	0.210	-	-	-	-	-	-	-
Differential pressure, domestic hot water across HIU	dP_3 (kPa)	83	**87**	91	-	-	-	-	-	-	-
Arithmetic mean of DHW power recorded during test	H_3 (kW)	23.4	**26.0**	28.6	-	-	-	-	-	-	-

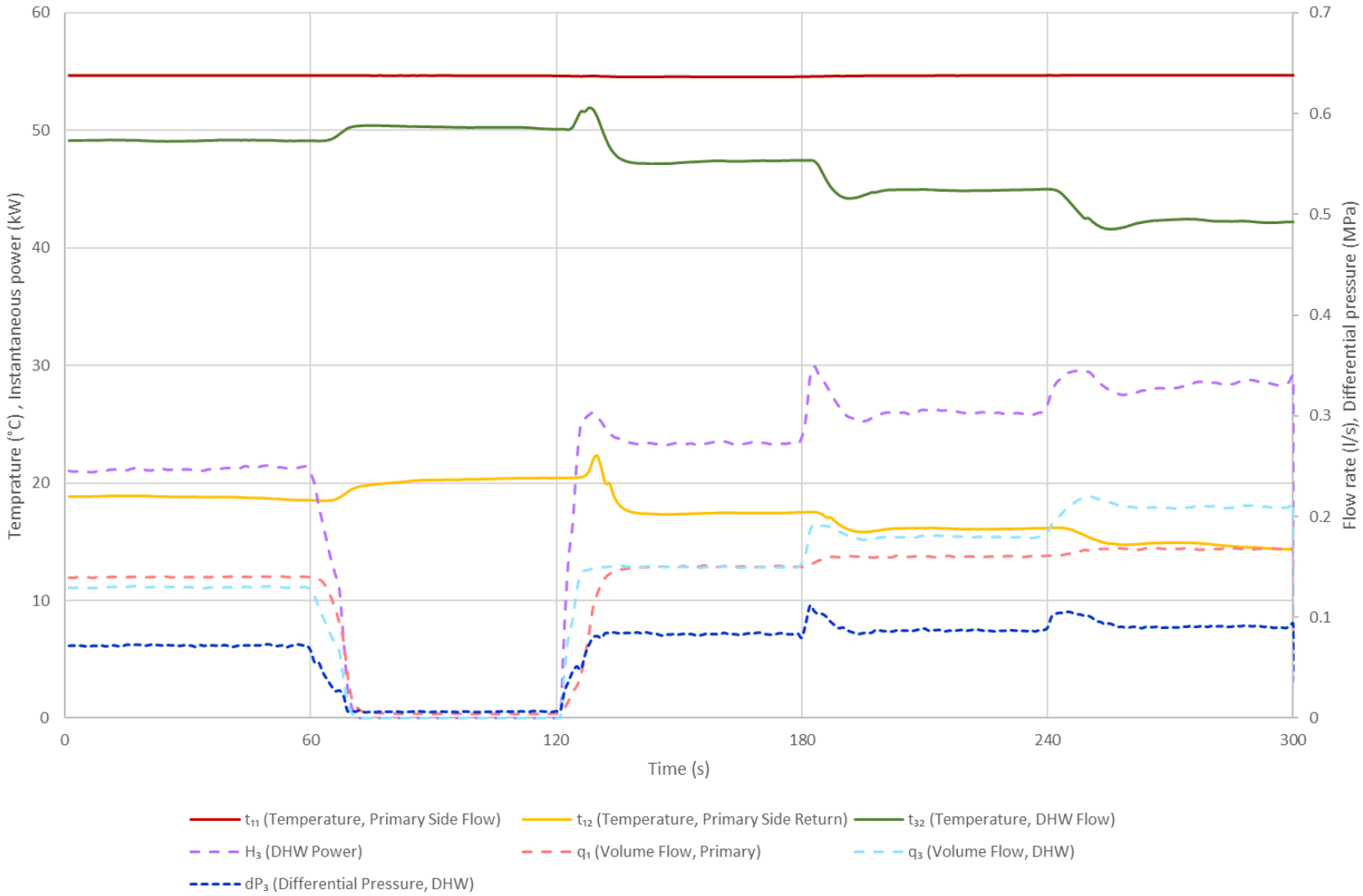


Figure 8 - Test 13b Key Metrics

7.8 Test 21b Information

7.8.1 Objective: To establish HIU performance during periods of no load, when operating in keep warm mode.

7.9 Test 21b Results

7.9.1 The keep warm operation is **valid** (based on Test 22b response time criteria).

7.9.2 The keep warm **undergoes** cycling (i.e. t_{11} varies by more than ±3 °C during the final 3 hours of the test).

7.9.3 Performance criteria results can be seen in Table 21, test result data can be seen in Table 20 and key metrics can be found in Figure 9. Best practice criteria can be found in Table 22.

Table 20 - Module 8 Test 21b Results

Module 8 - Test 21b Results		
Parameter	**Symbol**	**Result**
Mean average volume flow, primary side	q_1 (l/s)	0.0023
Mean average of primary side power recorded during test	H_1 (kW)	0.04
Mean average electrical energy use	$W_{electrical}$ (W)	0.0
Mean average thermal energy use	$W_{thermal}$ (W)	41.5
Overall energy loss per day	(kWh)	0.996
Overall Keep Warm Volume Weighted Avg. Return Temp	VWART (°C)	45

Table 21 - Module 8 Test 21b Performance Criteria

Module 8 - Test 21b Performance Criteria	
Performance Criteria, Fail if:	**PASS/FAIL**
Fail if VWART is above 48°C (to one decimal place)	PASS
Fail if primary return temperature (t_{12}) exceeds 55.0°C (to one decimal place) at any point, as this poses a scaling risk	PASS
Fail if the primary supply temperature to the HIU (t_{11}) drops to below 39°C	PASS
Fail if the HIU overall energy losses are greater than 1.0 kWh/day (to three decimal places)	PASS
Fail if the Test 22b DHW temperature response time test fails (i.e. the HIU Keep Warm operation is not a valid Keep Warm)	PASS

Table 22 - Module 8 Test 21b Best Practice

Module 8 – Test 21b – Best Practice Criteria	
Best Practice Criteria if:	**Best Practice**
Best practice if VWART is below 44°C (to one decimal place)	Not achieved
Best practice if HIU overall energy losses are less than 0.7 kWh/day (to three decimal places)	Not achieved

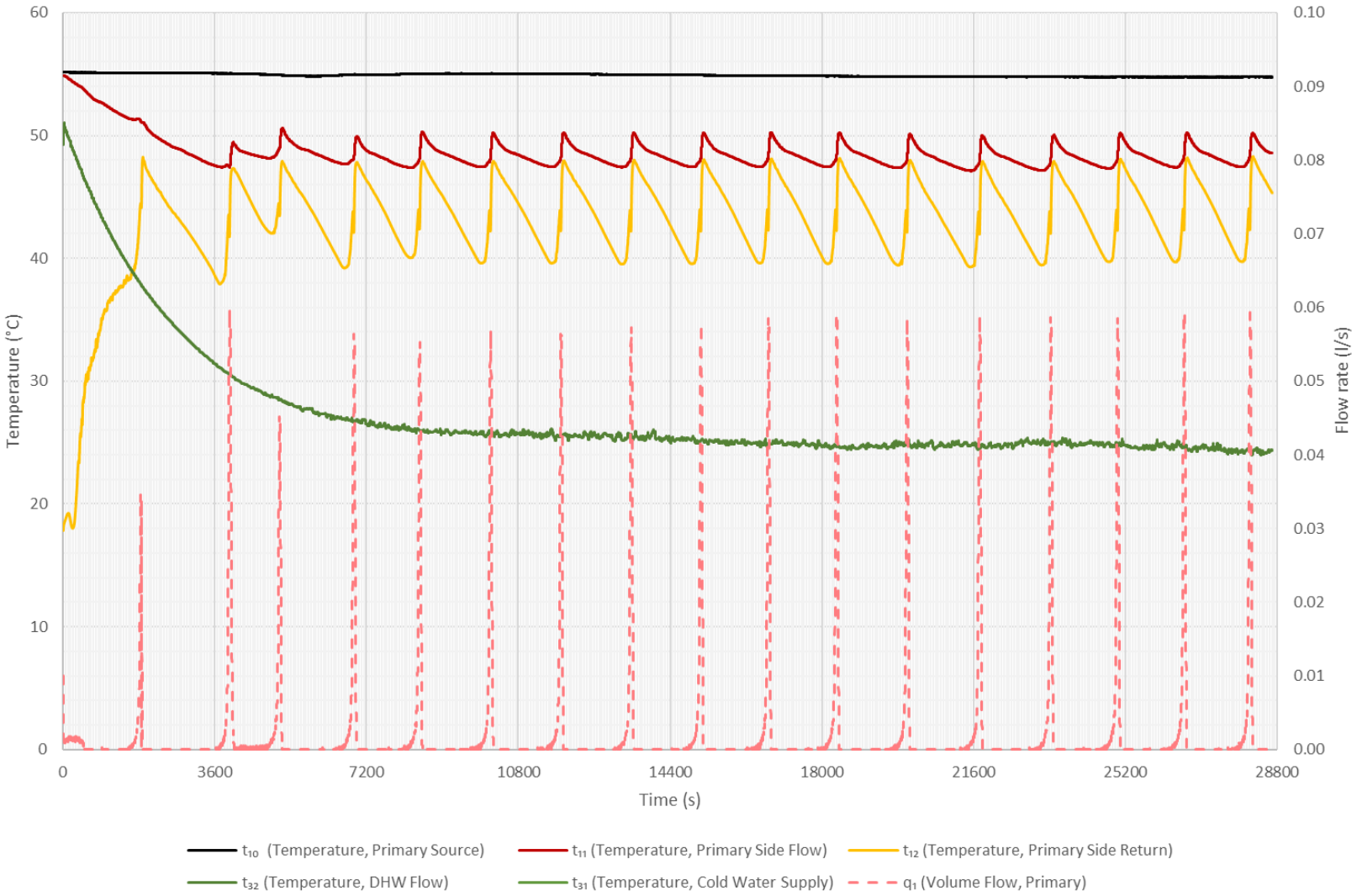


Figure 9 - Test 21b Key Metrics

7.10 Test 22b Information

7.10.1 Objective: To investigate DHW delivery time after a period of at least 8 hours keep warm only operation. This tests if the HIU can supply domestic hot water within an acceptable time of turning on the tap, which is a basic comfort requirement.

7.11 Test 22b Results

7.11.1 The keep warm operation is **valid** (based on response time criteria shown in Test 22 performance criteria).

7.11.2 Performance criteria results can be seen in Table 24, test result data can be seen in Table 23 and key metrics can be found in Figure 10. Best practice criteria can be found in Table 25.

Table 23 - Module 8 Test 22b Results

Module 8 - Test 22b Results		
Parameter	**Symbol**	**Result**
Time taken for t_{32} to reach 45.0°C and not subsequently drop below 42.0°C	(s)	15
Number of consecutive seconds where t_{32} > 55°C	(s)	0
Mean average volume flow, primary side	q_1 (l/s)	0.111

Table 24 - Module 8 Test 22b Performance Criteria

Module 8 - Test 22b Performance Criteria	
Performance Criteria, Fail if:	**PASS/FAIL**
Fail if the DHW response time takes more than 15 seconds to reach 45.0°C (to one decimal place) at t_{32} while not dropping below 42.0°C (to one decimal place) thereafter	PASS
Fail if DHW temperature (t_{32}) exceeds 60.0°C (to one decimal place) for more than 1 second, as this poses a scalding risk	PASS
Fail if primary return temperature (t_{12}) exceeds 55.0°C (to one decimal place) at any point, as this poses a scaling risk	PASS

Table 25 - Module 8 Test 22b Best Practice

Module 8 – Test 22b – Best Practice Criteria	
Best Practice Criteria if:	**Best Practice**
Best practice if DHW response time at t32 is less than 10 seconds	Not achieved

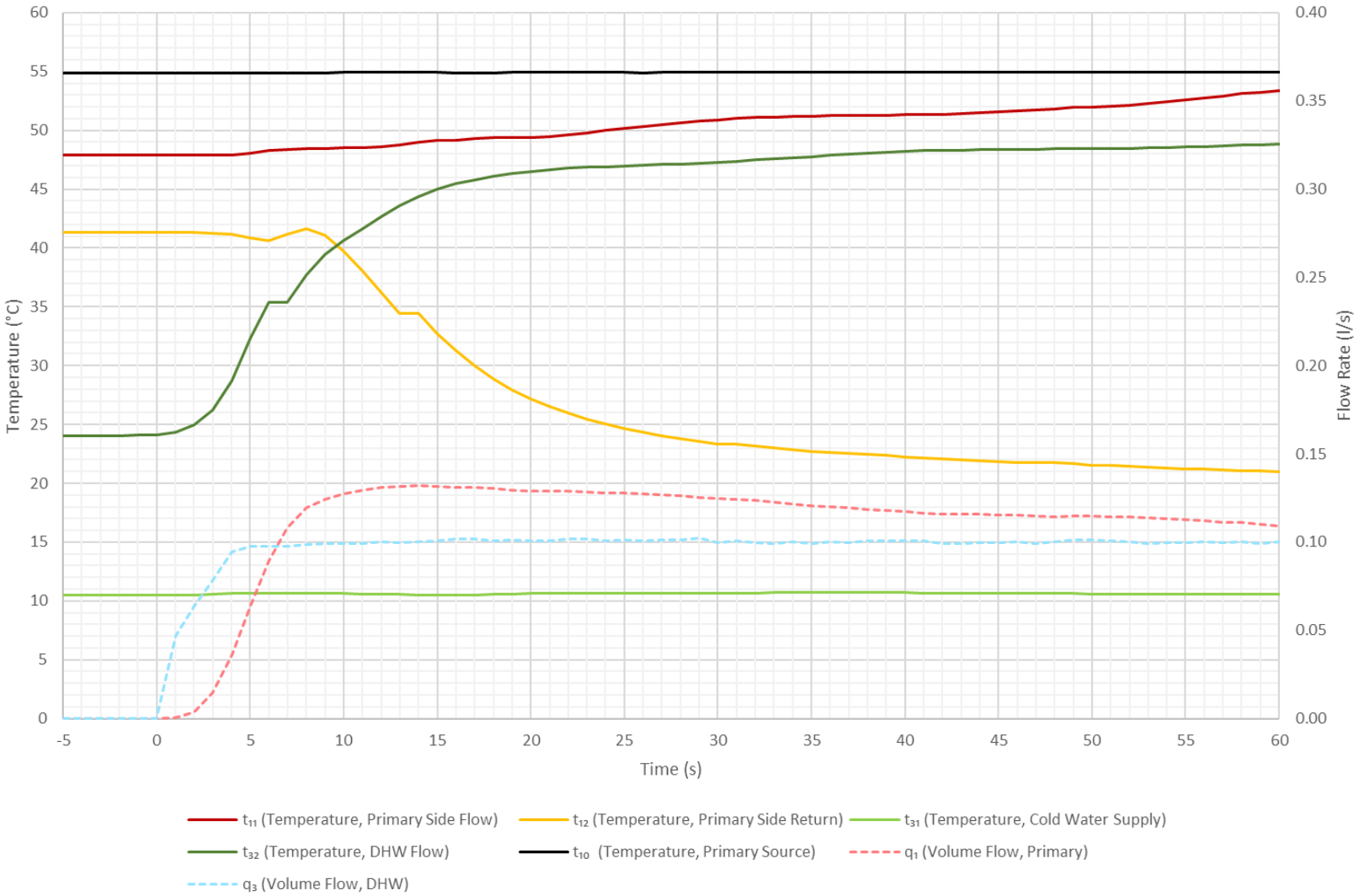


Figure 10 - Test 22b Key Metrics

8 CONCLUSIONS

All conclusions, opinions and interpretations indicated in this report are outside the scope of Enertek's UKAS accreditation.

8.1.1 The HIU **has** passed the requirements of the BESA Technical Standard for UK HIU Test Regime, V3-Rev001 September 2023 – Modules 2 and 8.

9 EQUIPMENT AND INSTRUMENT LIST

EQUIPMENT NAME	ID NUMBER	CERTIFICATE NUMBER	MEASUREMENT UNCERTAINTY K=2	CALIBRATION DATE	CALIBRATION DUE
Cold Water Supply Probe T_{31}	PRT 6035	CAL-001085	± 0.070 °C	25/09/2025	25/09/2026
DHW Outlet Probe T_{32}	PRT 6036	CAL-001086	± 0.070 °C	25/09/2025	25/09/2026
Primary Inlet Probe T_{11}	PRT 6034	CAL-001084	± 0.070 °C	25/09/2025	25/09/2026
Primary Return Probe T_{12}	PRT 6033	CAL-001083	± 0.070 °C	25/09/2025	25/09/2026
SH Flow Probe T_{22}	PRT 6031	CAL-001080	± 0.070 °C	25/09/2025	25/09/2026
SH Return Probe T_{21}	PRT 6032	CAL-001081	± 0.072 °C	25/09/2025	25/09/2026
Primary Flow T_{10}	PRT 6037	CAL-001161	± 0.072 °C	15/01/2026	15/01/2027
Ambient Temperature	PRT 4607	CAL-000873	± 0.136 °C	25/09/2025	25/09/2026
Flow Meter	FM 601	K59426FW	± 0.0112 l/sec	19/09/2025	19/09/2026
Flow Meter	FM 602	K59425FW	± 0.0132 l/sec	22/09/2025	22/09/2026
Flow Meter	FM 603	K59427FW	± 0.0090 l/sec	22/09/2025	22/09/2026
Flow Meter	FM 605	K59428FW	± 0.0040 l/sec	23/09/2025	23/09/2026
Pressure Transducer	PT 083	K59419P	± 2.7 kPa	18/09/2025	18/09/2026
Pressure Transducer	PT 084	K59420P	± 8.1 kPa	18/09/2025	18/09/2026
Pressure Transducer	PT 085	K59421P	± 3.6 kPa	18/09/2025	18/09/2026
Pressure Transducer	PT 086	K59422P	± 4.0 kPa	18/09/2025	18/09/2026
Pressure Transducer	PT 087	K59423P	± 3.8 kPa	18/09/2025	18/09/2026
Pressure Transducer	PT 088	K59424P	± 4.93 kPa	18/09/2025	18/09/2026
Power Meter	PM 1022	TH120471	± 0.09 W	05/09/2025	05/09/2026
Pipe	PIPE 001	-	-	10/2025	10/2026

The reported expanded uncertainty is based on a standard uncertainty by a coverage factor K = 2, providing a level of confidence of approximately 95 %. The uncertainty evaluation has been carried out in accordance with BS EN ISO/IEC 17025:2017 requirements.

10 APPENDIX A

10.1 VWART Calculations for Modules 2 & 8

	VWART (°C)	Volume (m^3)
DHW	20	55.2
Standby	45	62.8
Space Heating	36	65.9

	VWART (°C)
Summer	33
Winter	34
Overall	33

	DHW Draw Test Results			Post DHW Draw (60 seconds)	
	Power (W)	Primary Flow (m^3/hr)	VWART (°C)	Primary Volume (m^3)	VWART (°C)
Low	9825.0	0.2	18	2.03	21
Medium	15257.6	0.4	20	0.30	20
High	19918.8	0.5	20	0.23	19

DHW Draw Volumes pa		
kWh pa	Hours	Volume pa (m^3)
729	74.20	17.0
297	19.47	7.1
444	22.29	10.5

Post DHW Draw Volumes pa	
Events pa	Volume pa (m^3)
10000	20.312
660	0.200
300	0.068

Standby Test Results	
Primary Flow (m^3/hr)	VWART (°C)
0.008	45

Standby Volumes pa	
Hours	Volume pa (m^3)
7496	62.817

	Space Heating					
	Power (W)	Primary Flow (m^3/hr)	VWART (°C)	kWh pa	Hours	Volume pa (m^3)
0.5kW	513	0.023	35	98	191	4.35
1kW	970	0.045	36	787	811	36.17
4kW	3833	0.172	36	565	147	25.40

10.1.1 It should be noted that all VWART figures are to within ±2°C tolerance.

11 APPENDIX B

11.1 Appliance Documentation

11.1.1 The details of the appliance documentation are given in Table 26 below.

Table 26 - Appliance Documentation

#	Component:	Document Submitted (Y/N):	Manufacturer and Type:
1	Space Heating Heat Exchanger	Y	Swep E8LAS – 16 plate
2	Domestic Hot Water Heat Exchanger	Y	Swep E8LAS – 40 plate
3	Controller for Space Heating	Y	GAMPPER _ 1-02-24-062
4	Control Valve and Actuator for Space Heating	Y	GAMPPER _ 1-02-24-054
5	Space Heating Strainer	-	N/A
6	Controller for Domestic Hot Water	Y	GAMPPER _ 1-02-14-007
7	Control Valve and Actuator for Domestic Hot Water	-	N/A
8	Temperature Sensors	-	N/A
9	Domestic Hot Water Isolating Valve	Y	ECA 1-03-14-001
10	Primary Side Strainer	Y	ECA _ 1-03-15-001
11	Drain Valves	Y	ECA _ 1-03-14-010
12	Vent Valves	Y	ECA _ 1-03-19-001
13	Circulation Pump set with AAV & PRV	Y	WILO PARA 15/7 _ 1-09-25-003
14	Heat Meter	Y	BAYLAN US-2
15	Domestic Hot Water Flow Sensor	-	N/A
16	Pipes	Y	ILTA INOX _ 1-16-29-015
17	Connections	Y	ECA
18	Joints	Y	ECA
19	Gaskets	Y	FEROLITE / NAM37 _ 1-04-17-008
20	Expansion Vessel	Y	ONAYSAN _ 1-65-27-002
21	Insulation	Y	ARMACELL/ONEFLEX _ 1-17-31-004
22	Pressure Sensors	-	N/A

23	'O' Ring	Y	EPDM
A1	Commissioning Guide	Y	See document '44-05-01-053 Manual'
A2	Operation guide	Y	See document '44-05-01-053 Manual'
A3	Declaration of Conformity	Y	See section 12.1
A4	Full Parameter List	-	N/A
A5	Maximum Primary Static Operating Differential Pressure	Y	400 kPa
	Software Version	-	N/A
	Model Name and Type Number	Y	DGI-IND Indirect System / 44-05-01-053
	Serial Number	Y	04W2653SMPL0001
	Any other components stated by manufacturer	-	N/A

11.2 Appliance Photographs

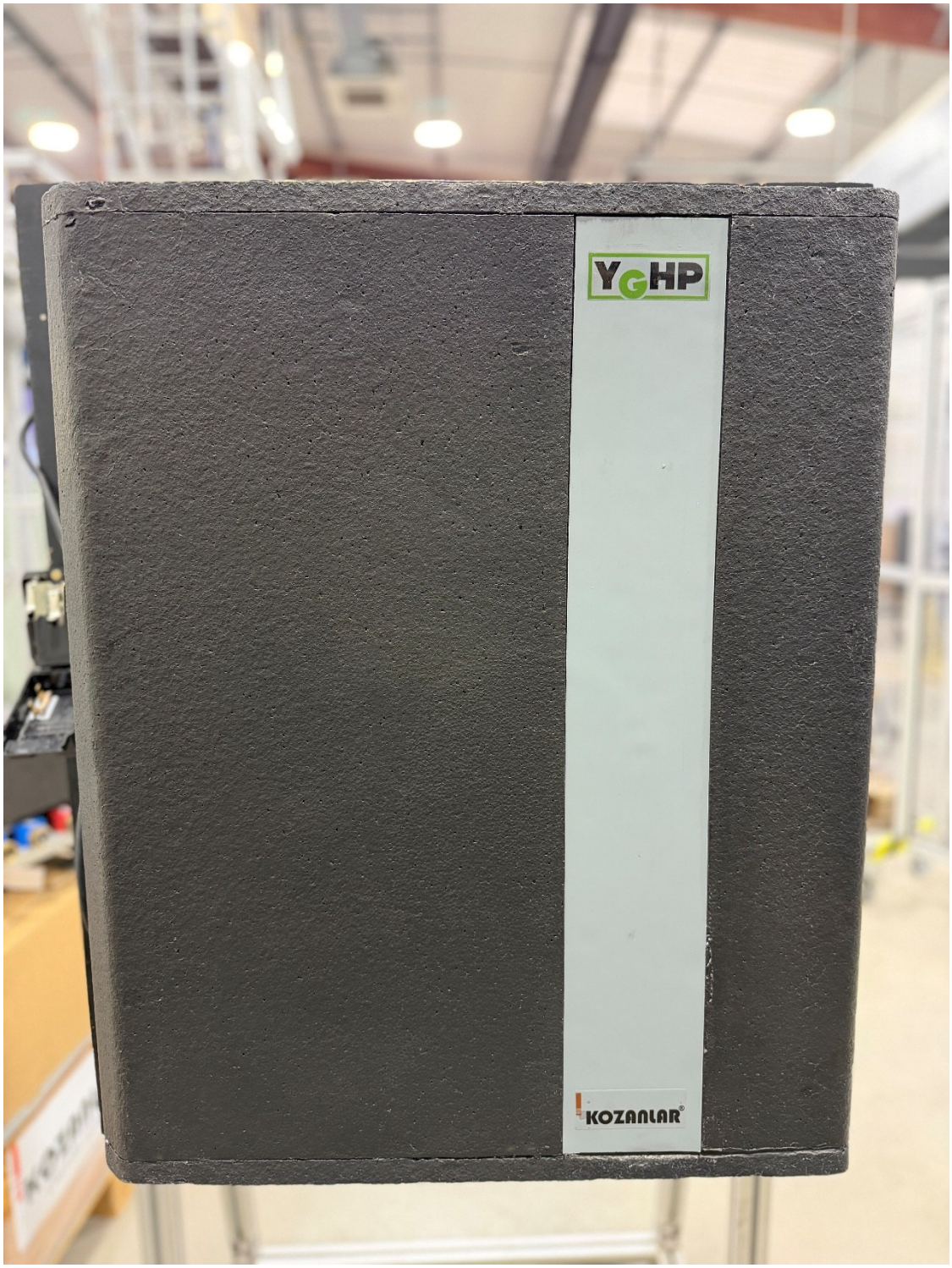


Figure 11 - HIU with Outer Case Fitted

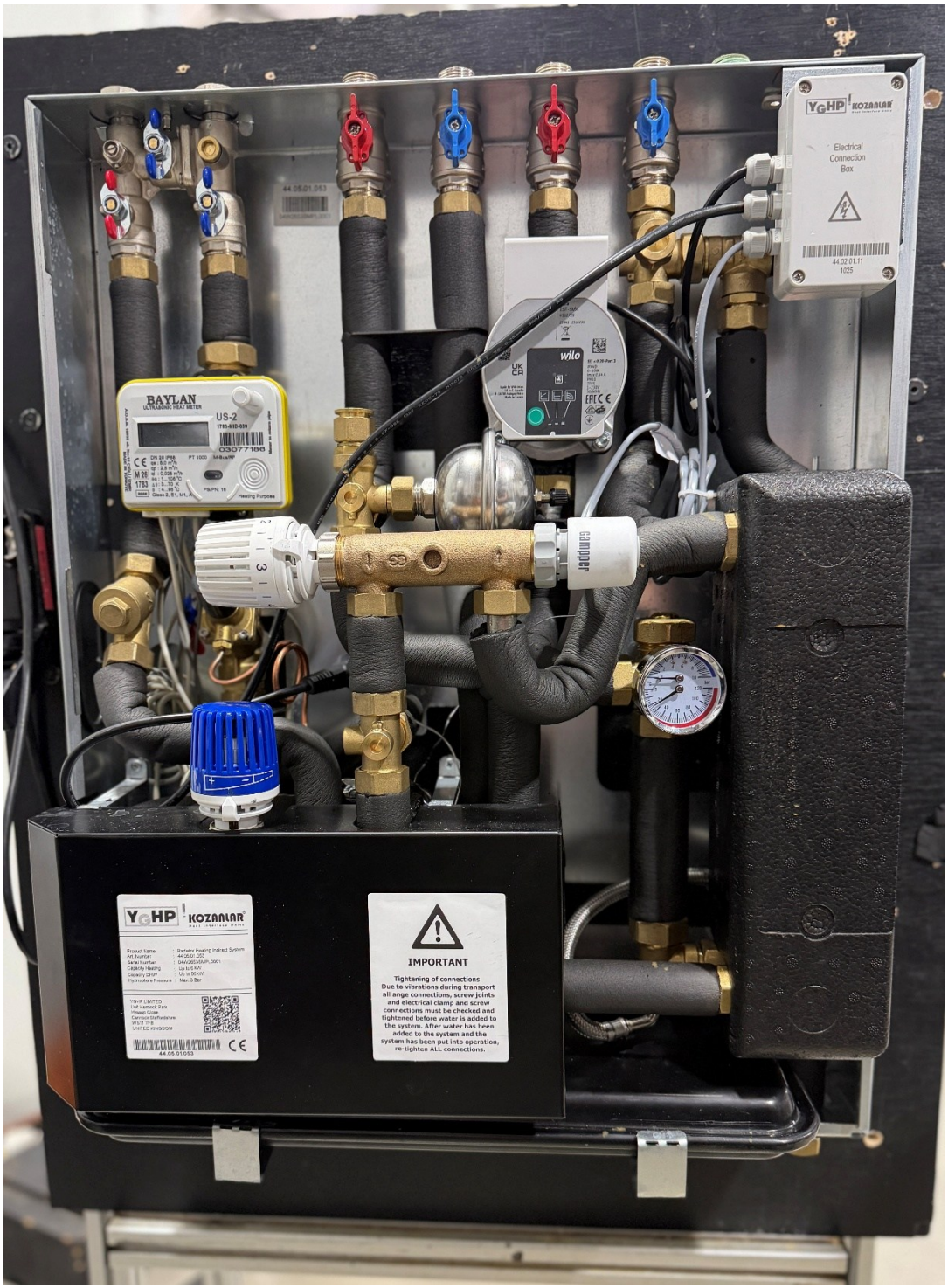
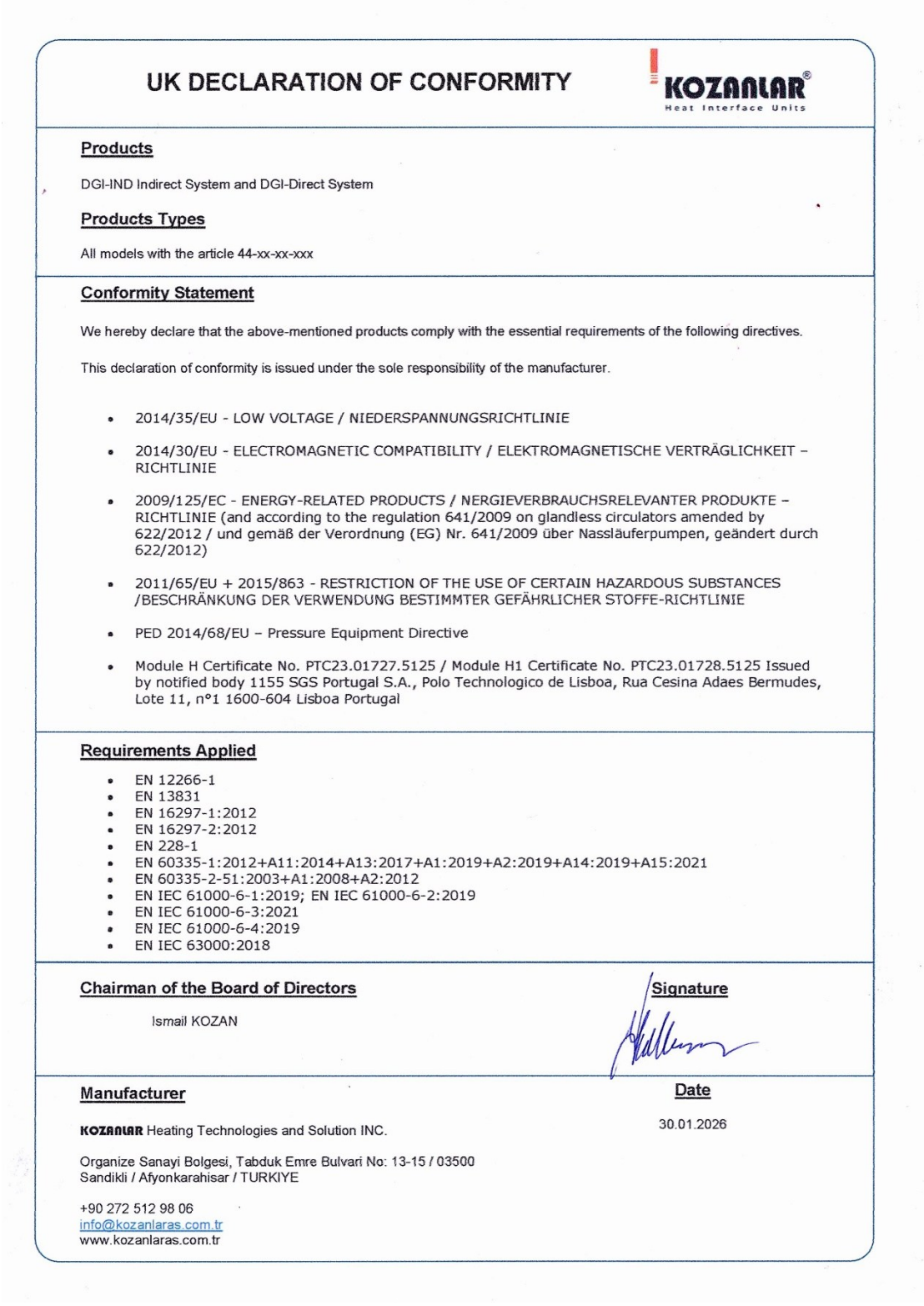


Figure 12 - HIU with Outer Case Removed

Figure 13 - Nameplate with Model Details and Serial Number

12 APPENDIX C

12.1 UK / EU Declaration of Conformity



UK DECLARATION OF CONFORMITY

KOZANLAR® Heat Interface Units

Products

DGI-IND Indirect System and DGI-Direct System

Products Types

All models with the article 44-xx-xx-xxx

Conformity Statement

We hereby declare that the above-mentioned products comply with the essential requirements of the following directives.

This declaration of conformity is issued under the sole responsibility of the manufacturer.

- 2014/35/EU - LOW VOLTAGE / NIEDERSPANNUNGSRICHTLINIE
- 2014/30/EU - ELECTROMAGNETIC COMPATIBILITY / ELEKTROMAGNETISCHE VERTRÄGLICHKEIT – RICHTLINIE
- 2009/125/EC - ENERGY-RELATED PRODUCTS / NERGIEVERBRAUCHSRELEVANTER PRODUKTE – RICHTLINIE (and according to the regulation 641/2009 on glandless circulators amended by 622/2012 / und gemäß der Verordnung (EG) Nr. 641/2009 über Nassläuferpumpen, geändert durch 622/2012)
- 2011/65/EU + 2015/863 - RESTRICTION OF THE USE OF CERTAIN HAZARDOUS SUBSTANCES /BESCHRÄNKUNG DER VERWENDUNG BESTIMMTER GEFÄHRLICHER STOFFE-RICHTLINIE
- PED 2014/68/EU – Pressure Equipment Directive
- Module H Certificate No. PTC23.01727.5125 / Module H1 Certificate No. PTC23.01728.5125 Issued by notified body 1155 SGS Portugal S.A., Polo Technologico de Lisboa, Rua Cesina Adaes Bermudes, Lote 11, nº1 1600-604 Lisboa Portugal

Requirements Applied

- EN 12266-1
- EN 13831
- EN 16297-1:2012
- EN 16297-2:2012
- EN 228-1
- EN 60335-1:2012+A11:2014+A13:2017+A1:2019+A2:2019+A14:2019+A15:2021
- EN 60335-2-51:2003+A1:2008+A2:2012
- EN IEC 61000-6-1:2019; EN IEC 61000-6-2:2019
- EN IEC 61000-6-3:2021
- EN IEC 61000-6-4:2019
- EN IEC 63000:2018

Chairman of the Board of Directors

Ismail KOZAN

Signature

Manufacturer

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Date

30.01.2026

Figure 14 - UK / EU Declaration of Conformity

12.2 Water Regulation 4 Certificate

*In progress – to be supplied when received

Figure 15 - Water Reg 4 Certification

13 BIBLIOGRAPHY

[1] *BESA (Building Engineering Services Association) UK HIU (Heat Interface Unit) Test regime Technical Specification*, V3-Rev001 September 2023

[2] *Technical Standard for UK HIU Test Regime - Space Heating, Low Temperature, Indirect HEATING MODULE 2-DH55 Indirect*, Version 1: 2023

[3] *Technical Standard for UK HIU Test Regime - Domestic Hot Water, Low Temperature, Keep Warm HOT WATER MODULE 8-DH55-KWarm*, Version 1: 2023

Report Issue No	Reason for Report Update
1	Original issue
2	Updates as per BESA review v1

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