INSTALLER QUICK GUIDE

IMPERIUM SYSTEM CONTROLLER

LV338416 I July 2025

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1. Introduction

The purpose of this quick guide is to support the installer in connecting and setting up this Imperium controller. It should be used in conjunction with the supplied installation diagram, as references are made to information on this.

The Imperium controller supports multiple installation diagrams, that can be combined to create a full system. The first part of the installation diagram (indicated by a letter) specifies the heat pump and, if applicable, the central heating setup. The second part of the installation diagram (indicated by a number) specifies the hot water setup, if applicable. Both the letter and number can be found on the supplied installation diagram. To configure the system, enter the letter/number combination as described in paragraph 5.1, Configuration screen.

The imperium controller is designed to control all components to be able to build an efficient hot water system with the Altus heat pump in combination with up to 3 hot water storage tanks (ST0x). In addition, it provides the possibility to heat up one or two central heating buffer tanks (BT0x).

The imperium controller also handles the cascade control in systems with multiple heat pumps. It supports a maximum of 3 heat pumps in a domestic hot water or combi cascade system (CC01), supplying hot water and if applicable central heating. When more power is needed for the central heating system an additional central heating cascade system (CC02) of maximum 7 heat pumps can be added.

2. Safety warnings

Lochinvar cannot be held responsible for damages or injuries leading back to:
- Failure to follow the instructions provided in this installer quick guide.
- Carelessness during the installation, commissioning, use or maintenance of the Imperium System Controller.

This installer quick guide must be available for the user and service engineer at all times.

Warning
If you notice a burning smell:
- Shut off the mains power supply.
- Alert the emergency services.

Warning
The installation must be carried out by an approved installation engineer in compliance with the general and local regulations imposed by the gas, water and power supply companies and the fire brigade.

Warning
Live parts present!
Disconnect the control system completely from the power supply before opening the outside door to access the electrical components.

Warning
External voltage present!
Some terminals are connected to an external voltage and are not isolated by switching the On/Off switch to position 0.

Caution
The installation, commissioning and maintenance may only be carried out by a qualified engineer.

Caution
This controller is not intended for use by persons with reduced physical, sensory or mental capacities, or who lack the necessary experience or knowledge, unless the person responsible for their safety is supervising them or has explained to them how the controller should be used.

Caution
This controller is not intended to be used by children under the age of 16. Always supervise children, and make sure that they do not play with the controller.

Caution
This controller does not fulfill any safety functions. The safety (temperature and pressure) of the installation must be covered in the applied system components such as the heat pump, electrical element and circulating pumps

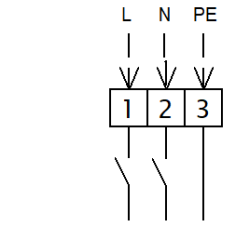
The pressure safety devices must be provided separately and are the responsibility of the installer.

Caution
This controller does not provide frost protection for the installation (including pipes and appendages).
Frost protection is the responsibility of the end user and/or installer.

3. Connection diagram

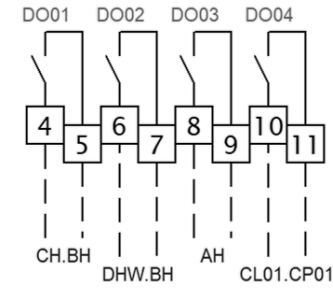
Note*:* For the abbreviations and symbols used, see the accompanying supplied installation diagram.

Power supply voltage (230VAC / 50 Hz / 1.45A)



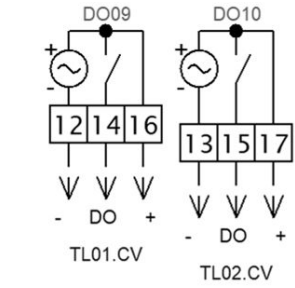
Terminal	ID	Explanation
1	L	Phase
2	N	Neutral
3	PE	Earth

Relay contacts (230VAC / max. 2A)



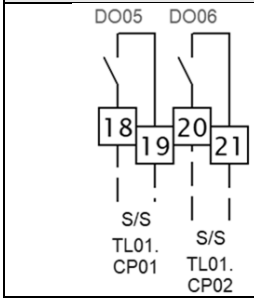
Terminal	ID	Explanation
4	CH.BH	Back-up central heating
5		
6	DHW.BH	Back-up DHW
7		
8	AH	Booster DHW
9		
10	CL01.CP01	Recirculating pump
11		

Changeover valves (24VAC / max. 2A)



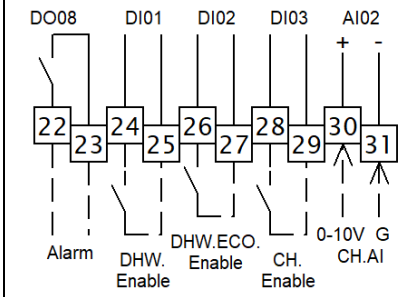
Terminal	ID	Explanation
12	TL01.CV	Changeover valve DHW (DO=1) / central heating (DO=0)
14		
16		
13	TL02.CV	Changeover valve Multi-pass (DO=1) / One-pass operation (DO=0)
15		
17		
A 24VAC power supply (-/+) and 24VAC switched output are available for each valve.		

Start-stop contacts open header circulating pumps (max. 24V / 50mA – SELV)



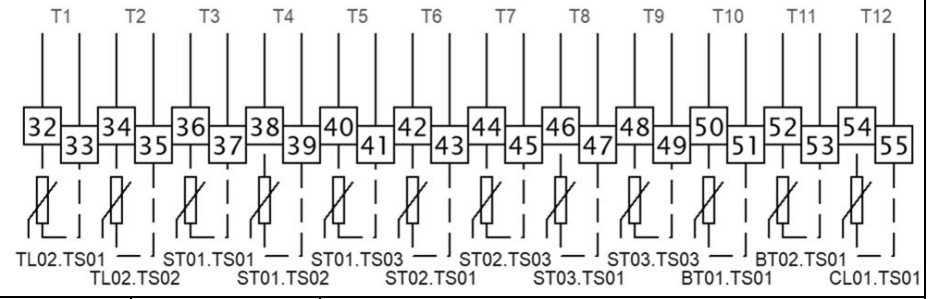
Terminal	ID	Explanation
18	TL01.CP01	Open header circulating pump combi cascade system (CC01)
19		
20	TL01.CP02	Open header circulating pump additional heating cascade system (CC02)
21		

Building management system (BMS) connections (max. 24V / 50mA – SELV)



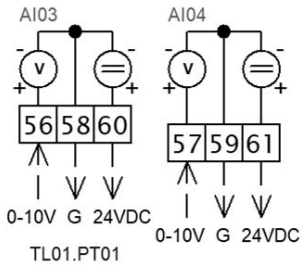
Terminal	ID	Explanation
22	Alarm	Alarm output contact
23		
24	DHW.Enable	DHW enable contact
25		
26	DHW.ECO. Enable	ECO enable contact
27		
28	CH.Enable	Release contact central heating
29		
30	CH.AI	Setpoint central heating based on 0-10VDC signal
31		

Temperature sensors (NTC: 10k at 25°C, β=3435K @ 25/85°C)



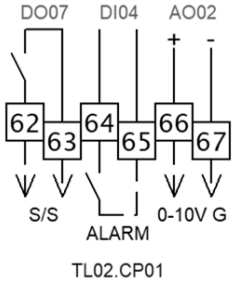
Terminal		ID	Explanation
32	33	TL01.TS01 (T1)	Incoming DHW temperature plate heat exchanger
34	35	TL02.TS02 (T2)	Outgoing DHW temperature plate heat exchanger
36	37	ST01.TS01 (T3)	Bottom temperature DHW storage tank 1
38	39	ST01.TS02 (T4)	Middle temperature DHW storage tank 1
40	41	ST01. TS03 (T5)	Top temperature DHW storage tank 1
42	43	ST02.TS01 (T6)	Bottom temperature DHW storage tank 2
44	45	ST02.TS03 (T7)	Top temperature DHW storage tank 2
46	47	ST03.TS01 (T8)	Bottom temperature DHW storage tank 3
48	49	ST03.TS03 (T9)	Top temperature DHW storage tank 3
50	51	BT01.TS01 (T10)	Temperature central heating buffer tank 1
52	53	BT02.TS01 (T11)	Temperature central heating buffer tank 2
54	55	CL01.TS01 (T12)	DHW outgoing or recirculation temperature

Pressure / flow transmitters (optional) (24VDC / 0-10V – SELV)



Terminal	ID	Explanation
56	TL01.PT01	Pressure transmitter for heat pump hydronic pressure measurement (optional)
58		
60		
57	CW.FT01	DHW flow transmitter (optional)
59		
61		
A 24VDC power supply and a scalable 0-10VDC input with common zero (G) are provided for each sensor.		

DHW circulating pump - TL02.CP01 (max. 24V / 50mA - SELV)

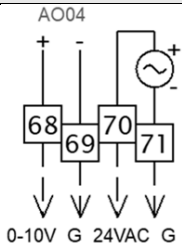


TL02.CP01

Terminal	ID	Explanation
62	S/S	Start-stop contact
63		
64	ALARM	Alarm contact
65		
66	0-10V	0-10VDC control signal
67	G	

Note: for the proper functioning of the Imperium system, the DHW circulating pump prescribed by the manufacturer must be used.

One-pass DHW regulating valve - TL02.RV01 (24VAC / max. 2A)

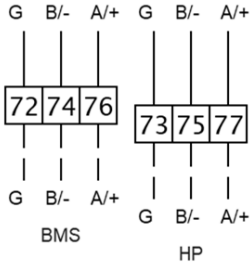


TL02.RV01

Terminal	ID	Explanation
68	0-10V	0-10VDC control signal
69	G	
70	24VAC	24VAC power supply (max. 2A)
71	G	

Note: for the proper functioning of the Imperium system, the DHW regulating valve prescribed by the manufacturer must be used.

Modbus BMS + HP (RS485)



Terminal	ID	Explanation
72	G	Modbus connection Building management system (BMS)* (115.200kbs; 8E1; Adres 1)**
74	B/-	
76	A/+	
73	G	Modbus connection for heat pumps (19.200kbs; 8E1)**
75	B/-	
77	A/+	

Visit www.modbus.org for more information about the modbus protocol.

* Modbus address list is available in the installation manual.

** Baudrate, parity, stop bits and addresses are adjustable.

4. Most used symbols

Indicator buttons, these indicate or allow setting of a parameter

Heat pump installation scheme	DHW installation scheme
CC01 Number of heat pumps in DHW or combi cascade (CC01)	CC02 Number of heat pumps in central heating cascade (CC02)
▶ Start	■ Stop
Temperature	Ambient temperature
Outgoing or recirculation temperature (CL01.TS01)	ECO temperature

Clickable button, pressing these take the user to a new screen

✓ Confirm selection	Alarm
Week program	Components information
Settings	Go back one screen
+ Plus, adds 1 to parameter	- Minus, subtracts 1 from parameter
Clock	Back to home screen
Multi-pass	One-pass

Buttons that exist both as indicator and as clickable button


Heat pump


Legionella program


Central heating


Domestic hot water (DHW)


Auxiliary heating


Back-up heating

Other types of buttons and indicators

Imperium control is off

The component is in alarm

Imperium control is on

The component is in operation

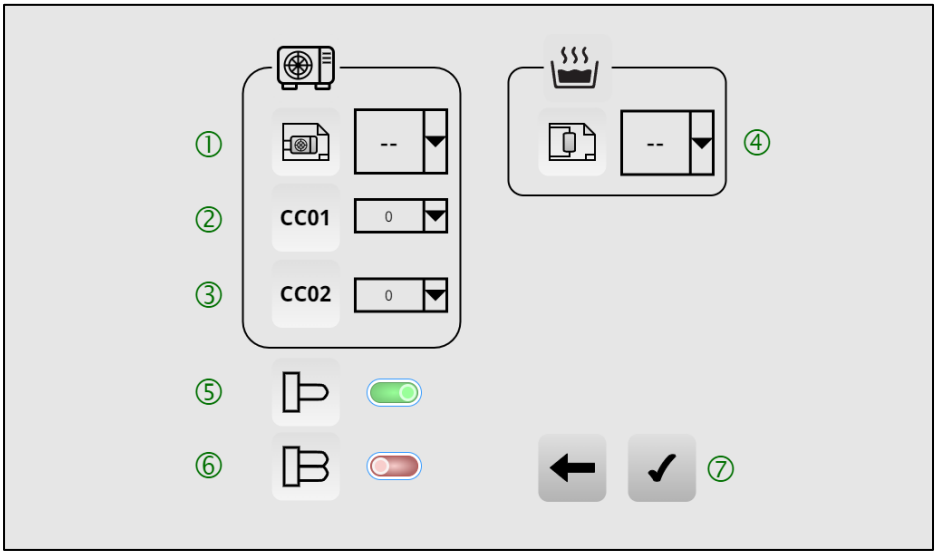
Service mode

The component is in stand-by

An alarm is active

5. Screens

5.1 Configuration screen



When the imperium controller is switched on for the first time, the user will be prompted to enter some details about the installation. The following details must be set to ensure proper functioning of the HP installation:

1 = HP installation schematic (letter)

2 = Number of heat pumps in DHW or combi cascade system (CC01)

3 = Number of heat pumps in additional central heating cascade system (CC02)

4 = DHW installation schematic (number)

5 = Auxiliary immersion heaters installed (AH in schematics)

6 = Back-up immersion heaters installed (BH in schematics)

7 = Confirm choices

By pressing the confirm key (7) the user will be asked to confirm the choices. Once the set-up is confirmed the system will function accordingly and screen-layouts are fixed. To reset the set-up (see: 5.*9 Settings, pos. 7*).

The Imperium System Controller supports the following configurations;

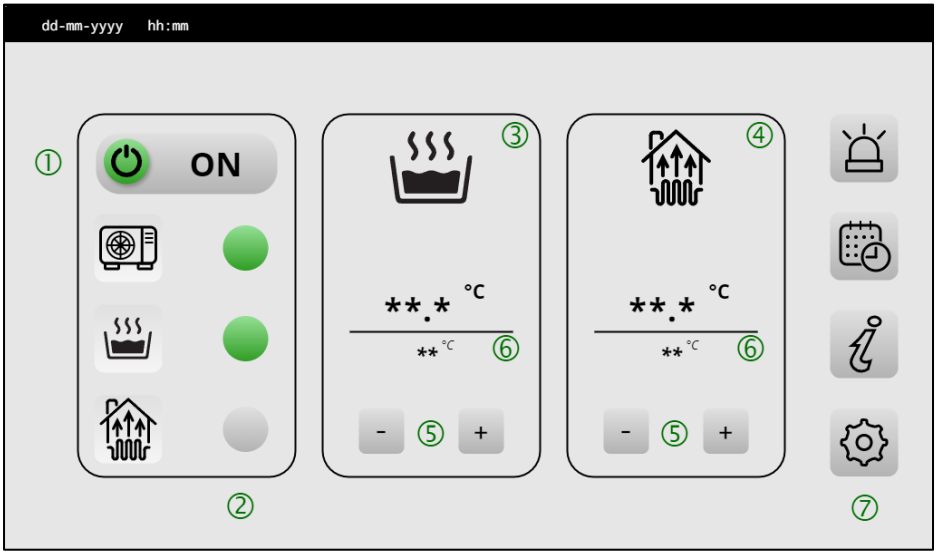
		CC01	CC02	
	HP + CH system	**DHW or Combi cascade [CC01]**	**Additional CH cascade [CC02]**	**No. Buffer tanks [BT0x]**
	A	1-3	-	-
	B	1-3	-	1
	C	1-3	1-7	1
	D	1-3	-	2
	E	1-3	1-7	2
	F	-	1-7	1
	F	-	1-7	2

Table 1 : HP & CH system

	DHW system no.	**No. DHW storage tanks [ST0x]**	**Series (S) / Parallel (P)**	**One-pass (OP) / Multi-pass (MP)**
	1	1	-	MP + OP
	2	1	-	MP
	3	2	S	MP + OP
	4	2	P	MP
	5	2	P	MP
	6	3	P + S	MP + OP
	7	3	P	MP + OP
	8	3	P	MP
	9	1	-	MP
	10	2	P	MP
	11	3	P	MP

Table 2 : DHW system

5.2 Main screen



Once all details have been set, the user will see the main screen.

1 = Indicates the state of the Imperium controller

2 = Status LEDs for installation components

3 = DHW information screen (where applicable)

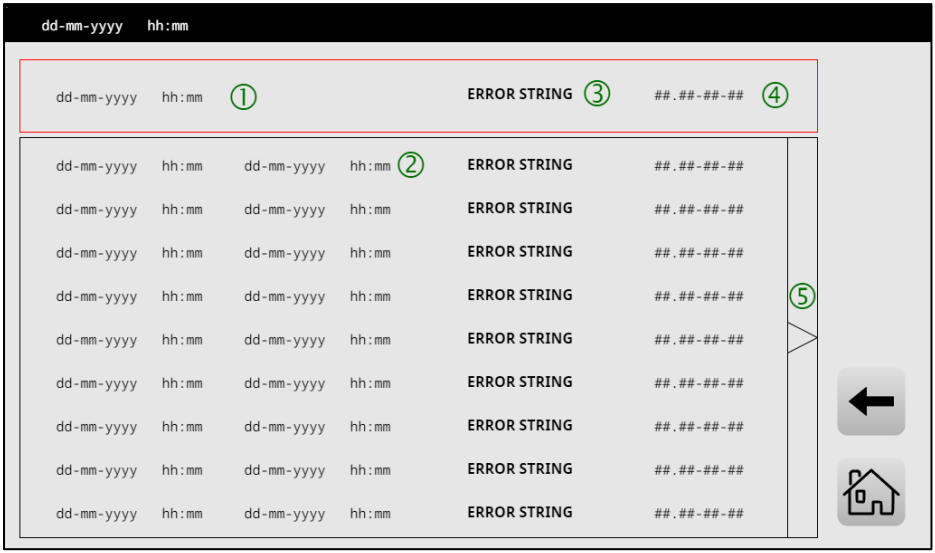
4 = CH information screen (where applicable)

5 = Keys to increase or decrease setpoint temperatures

6 = Actual temperature (upper) and setpoint temperature (lower)

7 = Navigation keys, *see: Most used symbols for more info*

5.3 Alarms



The alarm screen contains the following details.

1 = Date and time of the alarm occurrence

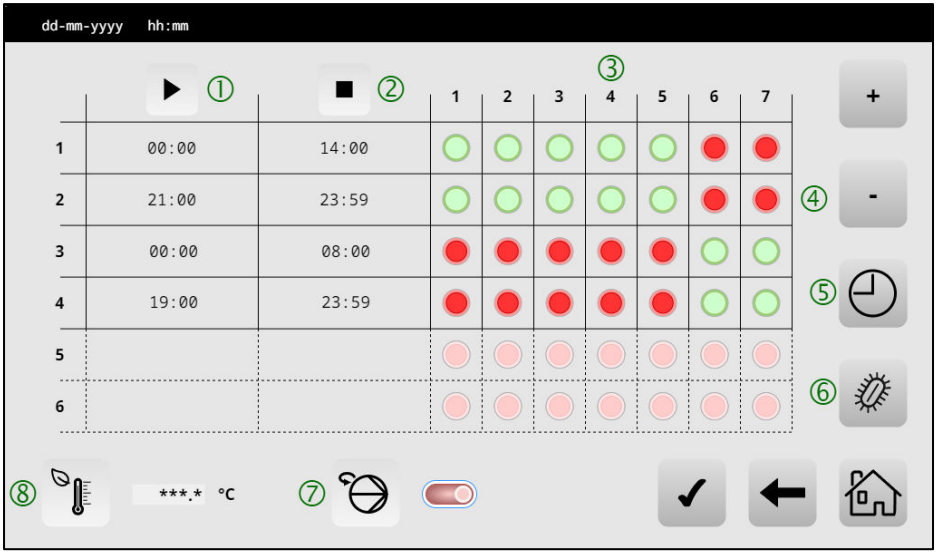
2 = Date and time of the alarm resolution

3 = Information on the alarm

4 = Error code, *see: Error codes* for more info

5 = Next page with error codes

5.4 Week program



An ECO program can be programmed to temporary increase or decrease water temperatures. Up to six blocks of times can be defined.

1 = Start time of the ECO program block

2 = End time of the ECO program block

3 = Days of the week when the ECO program should be active
(1 = Monday, 2 = Tuesday, etc.)

4 = Add or remove a block

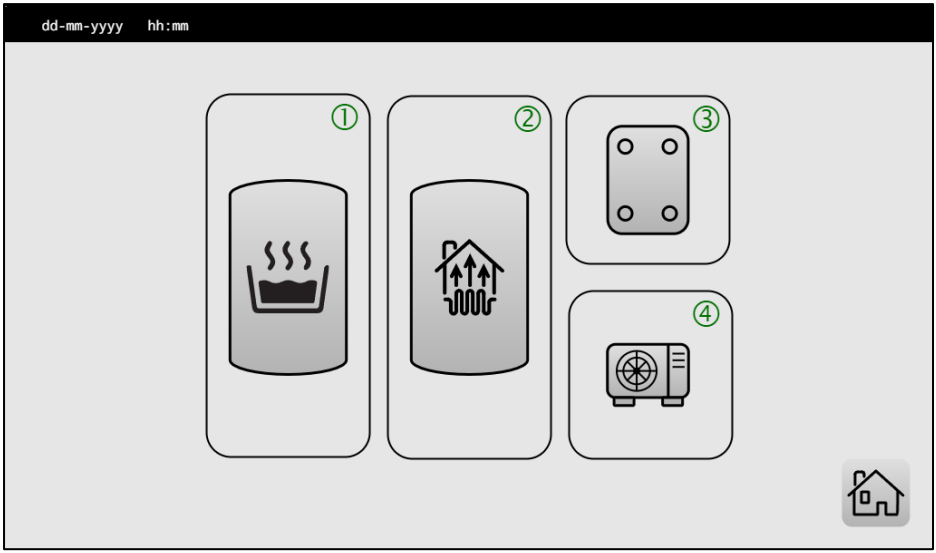
5 = Set actual time of the controller

6 = Set optional legionella program

7 = Set circulating pump on or off during ECO program

8 = Set temperature during ECO program

5.5 Information screen



If the info button on the main screen is clicked, the user will see the set-up screen with the applicable parts of the system.

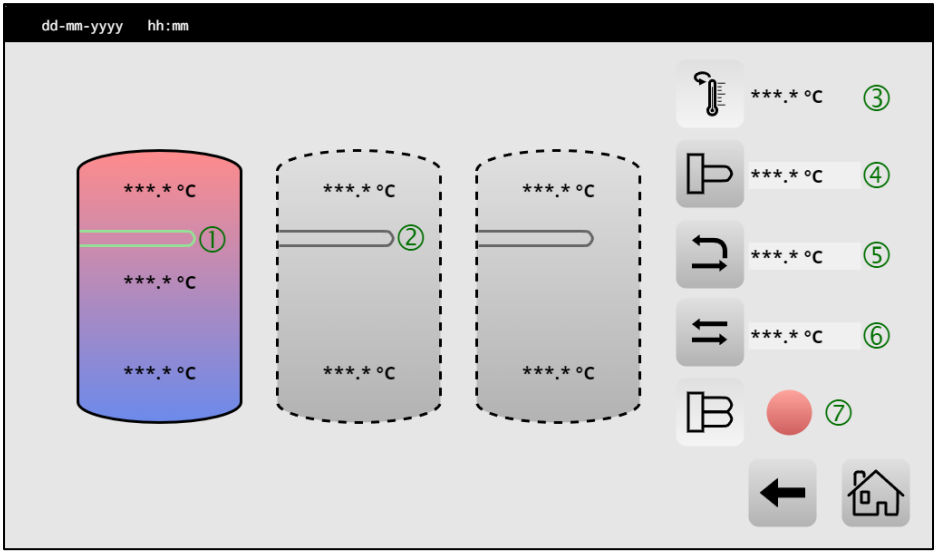
1 = DHW system

2 = CH system

3 = Heat exchanger and transfer loop components

4 = Heat pump details

5.6 Domestic hot water system



In the domestic hot water (DHW) screen several parameters of the DHW system can be seen and set.

1 = State of the tank, the tank being charged is coloured and elements engaged are shown in green. Temperatures are also shown

2 = If the tank is not being charged, or elements are not engaged, these are shown in grey

3 = Outgoing or recirculation temperatures

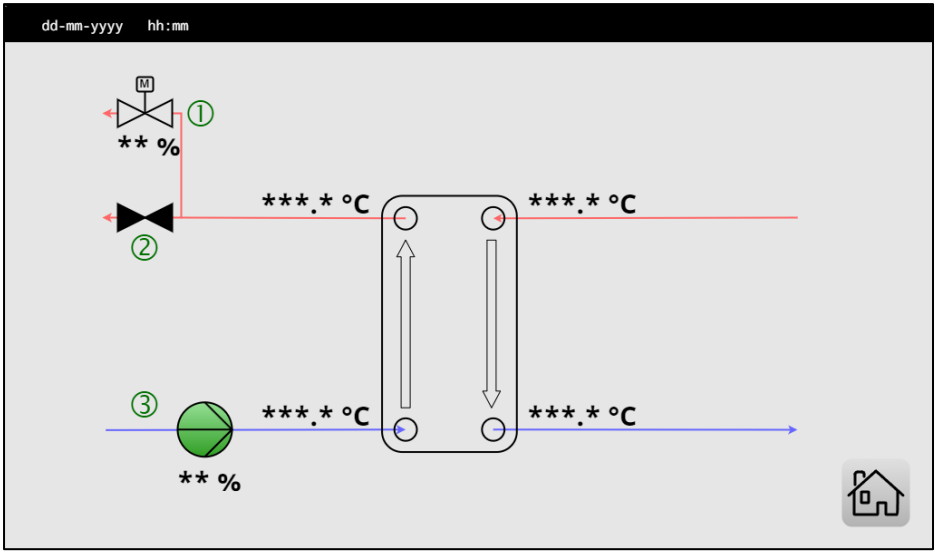
4 = Auxiliary heater information

5 = Multi-pass (MP) information

6 = One-pass (OP) information

7 = State of the back-up heater

5.7 Heat exchanger data



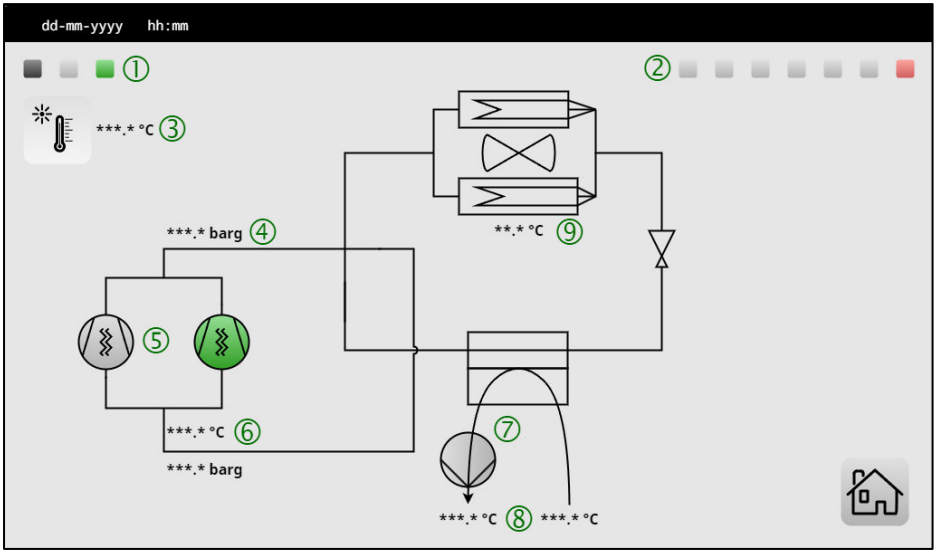
In the heat exchanger screen the user can find information about the heat exchanger temperatures, the transfer loop pump (TL02.CP01) and information about the valve statuses which regulate one-pass (OP) or multi-pass (MP) behaviour (where applicable).

1 = State of the one-pass regulation valve (TL02.RV01) including opening percentage

2 = State of the multi-pass/one-pass changeover valve (TL02.CV01)

3 = State of the transfer loop pump (TL02.CP01) including speed

5.8 Heat pump status screen



The heat pump information screen gives the user info about the heat pump system. The user can switch between heat pumps by clicking on the respective square (1, 2). A green square indicates a running unit, a grey square indicates a stand-by unit and a red square indicates a unit in alarm mode. The status of components is shown in green (in operation) or grey (stand-by)

1 = Number of heat pumps set in DHW or combi cascade (CC01, max. 3)

2 = Number of heat pumps set in additional central heating cascade (CC02, max. 7)

3 = Heat pump ambient temperature indicator

4 = Compressor discharge pressure

5 = Compressor status

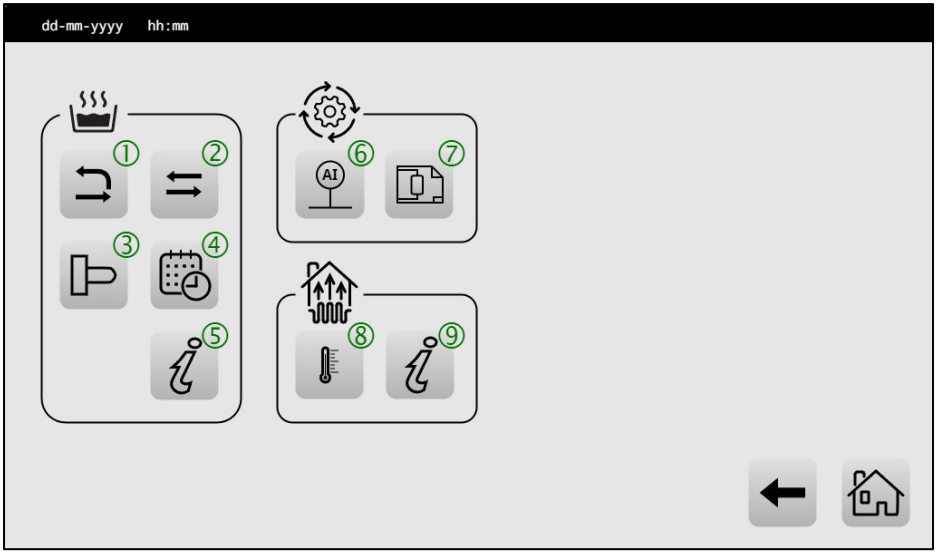
6 = Compressor suction temperature and pressure

7 = Water pump status (CC0x.HP0x.CP01)

8 = Heat pump condenser in- and outlet temperatures (CC0x.HP0x.TS01 and TS02)

9 = Heat pump evaporator temperature

5.9 Settings



In the settings screen several parameters can be set. If the relevant symbol is not explained here, please refer to the icon list elsewhere in this quick guide.

1 = Set the one-pass settings

2 = Set the multi-pass settings

3 = Set the booster heating settings

4 = Set the week program

5 = Go to the domestic hot water (DHW) information screen

6 = Configure the controller's analog inputs

7 = Reset the heat pump system (see: *5.1 Configuration screen*)

8 = Set the temperatures for the central heating section

9 = Go to the central heating information screen

6. Error codes

In the alarm screen the user can find all the information about actual and historical errors. The fault code enables the user to find a quick solution in communication with either installer or manufacturer.

The error code has the common form shown below.

x x . y y - z z - a a

In this:

xx : is the part of the installation

yy : is the number of the affected part

zz : is, if applicable, a subgroup of the part of the installation

aa : is the type of error of the equipment

Below are two examples:

0 1 . 0 2 - 0 - 0 3

The fault code is regarding a temperature sensor (01), on position 2 (02), there is no subgroup defined (0), and is an open sensor (03).

1 0 . 0 1 - 1 - 0 1

This fault code deals with a heat pump fault (10), on position 1 (01), regarding the Modbus connection (1) and is a generic fault (01).

For an extensive description of the fault codes, please refer to the installation manual. This can be found on the website of Lochinvar or by scanning the QR code on the front of this device.

7. Declaration of Conformity

CE

Lochinvar®
HIGH EFFICIENCY BOILERS & WATER HEATERS

Declaration of Conformity

Manufacturer: Lochinvar Limited
8 Lombard Way
The MXL Centre
Banbury - United Kingdom

hereby declares that the following products:

Product description: Control for Heat Pump Systems

Product family name: IMPERIUM

Product models: IMP LAHP

on the assumption that the installation instructions have been followed are complaint to:

Low Voltage Directive (LVD) - 2014/35/EU

Requirements for Restriction of Hazardous Substances (RoHS II/III) Directive - 2011/65/EU en 2015/863/EU

Company: Lochinvar Limited

Date: May 1, 2025

Signature:

T. van der Hamsvoort
Managing Director

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