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T H E L E A D E R I N C O N D E N S I N G T E C H N O L O G Y

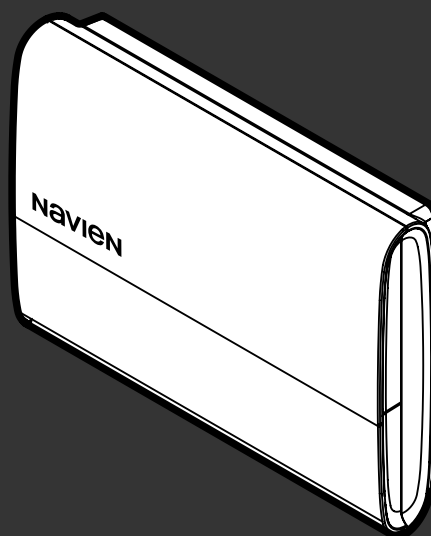
# Installation & Operation Manual

## Wiring Centre

Model

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**VCU-10R**



If your device requires service, you have several options for getting service, contact Technical Support at 0344 332 2323 or on the website: <https://navien.co.uk>  
For warranty service, always contact Technical Support first.

**TEL:** 0344 332 2323

**Add:** Building 2, Guildford Business Park,  
Guildford GU2 8XG

# Safety information

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Read and follow all safety instructions in this manual to avoid unsafe operating conditions, property damage, personal injury, or death.

## Safety messages used in this manual

### **DANGER**

Indicates an imminently hazardous situation which, if not avoided, could result in severe injury or death.

### **WARNING**

Indicates a potentially hazardous situation which, if not avoided, could result in injury or death.

### **CAUTION**

Indicates a potentially hazardous situation that, if not avoided, could result in property damage.

### **DANGER**

- **This device is designed for indoor use. Please install and use this device indoors.**
  - All wiring must be installed in accordance with local regulations of the installation site.
- **Turn off the power supply to the device before wiring to avoid possible electrical hazard.**
  - Failure to do so may cause severe personal injury or death.
- **Before installing the wiring centre, isolate the boiler and system components from the power supply (230 VAC).**
  - Failure to do so may result in an electric shock.
- **Do not disassemble or attempt to repair the device.**
  - You may damage the device and expose yourself to the risk of an electric shock.
  - Any attempt to disassemble or repair the device voids Navien's Limited Warranty. Navien is not responsible for damage or injuries caused by voiding the Navien's Limited Warranty.
- **Do not store flammable materials near the device.**
  - This may cause a fire or electric shock.
  - Keep all flammable products far away from the device and store them in approved containers. Keep the containers closed tightly and out of the reach of children and pets.



## WARNING

- **Avoid interference with other electronic devices.**
  - The device emits radio frequency (RF) signals that may interfere with unshielded or improperly shielded electronic equipment, such as pacemakers, hearing aids, medical devices, and other electronic devices. Consult the manufacturers of your electronic devices to solve any interference problems you experience.
- **When mounting the device on a wall, make sure that the wall is strong enough to support the device.**
  - The device could fall if the wall is not strong enough and this may damage the device or cause injury.
- **Do not handle the device with wet hands.**
  - This may result in an electric shock.
- **Do not clean the device with water or a damp cloth.**
  - You may damage the device and expose yourself to the risk of an electric shock.



## CAUTION

- **Do not expose the device to direct sunlight or high temperatures for an extended period of time.**
  - Prolonged exposure to sunlight or extreme temperature may cause permanent damage to the device's internal components.
- **Do not use unapproved replacement or accessory parts.**
  - Doing so may result in improper or dangerous operation and will void the manufacturer's warranty.
- **Avoid water and wet areas.**
  - This may damage the device's internal components. Always keep the device dry.
- **Do not install the device in very hot or very cold areas. The operating temperature of the device is 0°C–40°C.**
- **Do not use loose or damaged cables.**
  - This may result in a poor connection or cause the device to malfunction.
- **This device has been approved for use in the UK and EU only.**
  - Using the device in any other country will void the manufacturer's warranty.
- **Use suitable tools and appropriate force to install the device.**
  - Using unsuitable tools or excessive force during installation may damage the device.

# Contents

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<b>Overview</b> .....	6	When using a system boiler with Y plan .....	18
Included items .....	7	When using a system boiler with W plan .....	19
Device layout .....	7		
<b>Installing the wiring centre</b> .....	9	<b>Pairing with the wireless communication module</b> .....	20
Mounting the wiring centre to the wall .....	9		
Setting the Navien boilers .....	9	 	
 		<b>Replacing the fuse</b> .....	21
<b>Setting the DIP switches</b> .....	10		
Selecting the plan types .....	10	<b>Commissioning</b> .....	22
Selecting the external pump and sensor settings .....	10		
Setting the domestic hot water cylinder temperature .....	10	<b>Restart and check</b> .....	23
<b>Connecting cables to the wiring centre</b> .....	11	<b>Troubleshooting</b> .....	24
<b>System configuration and wiring diagrams</b> .....	13	<b>Recycling and disposal</b> .....	25
When using a combi boiler with a single zone .....	14	Recycling the package.....	25
When using a combi boiler with multiple zones .....	15	WEEE: Recycling or disposing of the device and its parts .....	25
When using a system boiler with multiple zones .....	16		
When using a system boiler with multiple zones .....	17	<b>Warranty</b> .....	26
		<b>Specifications</b> .....	27

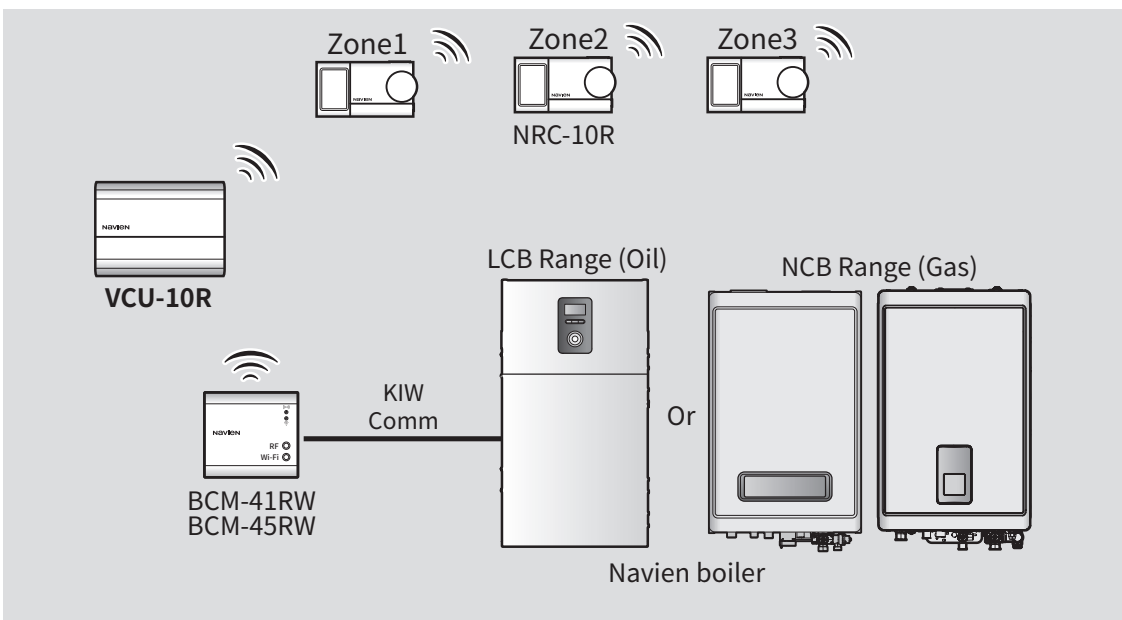
# Overview

Navien Smart Plus uses 2-way communication on an 868 MHz radio frequency (RF) band to control the heating system. The wireless communication module (BCM-41RW or BCM-45RW) operates as the control centre of the system, and the Navien boilers (LCB Range or NCB Range) support 2-wire communication (KIW) technology. It is possible to control it using a 2-wire connection from the BCM-41RW or BCM-45RW terminals.

Navien Smart Plus consists of the wireless thermostat (NRC-10R) and wireless communication module (BCM-41RW or BCM-45RW). The devices are already paired (completed RF pairing procedure). Therefore, when installing them, no additional initial pairing procedure is needed to use the devices.

Navien Smart Plus can be installed in combi/system and regular boilers. With an additional wireless thermostat (NRC-10R) and an additional wireless wiring centre (VCU-10R), multizone control can be implemented in a combi boiler environment via the S/S+ Plan and in a system/regular boiler environment with the S/S+/Y/W Plan.

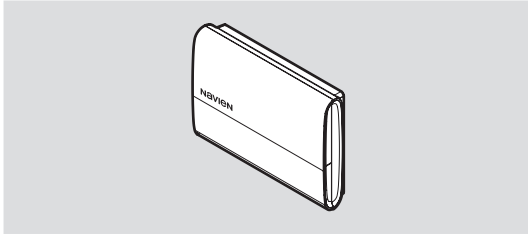
Applicable devices with VCU-10R	Specifications			
	Model name	Power input	Radio frequency (RF)	Wi-Fi
Wireless communication module	BCM-41RW BCM-45RW	Navien boiler (power line along with communication line)	868 MHz	2.4 GHz, IEEE Std. 802.11b/g/n (20 MHz)
Thermostat	NRC-10R	AA batteries x 2	868 MHz	-
Main controller (boilers)	LCB Range (Oil) or NCB Range (Gas)	230 VAC, 50 Hz	-	-



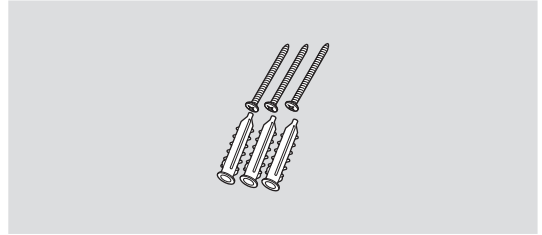
- 🔍 • This device specifications or contents of this manual may be changed without prior notice due to upgrade of device functions.
- The device functions can be limited by the operating environment.

## Included items

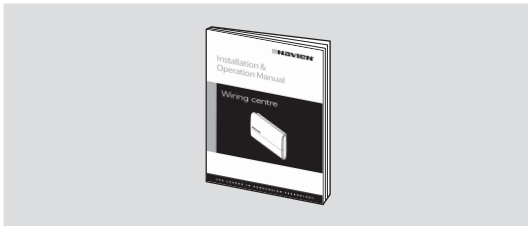
Open the packaging and ensure that the following items are provided.



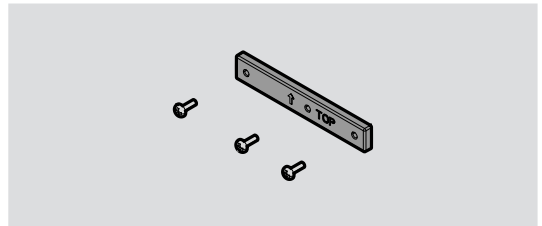
Wiring centre



Screws and anchors



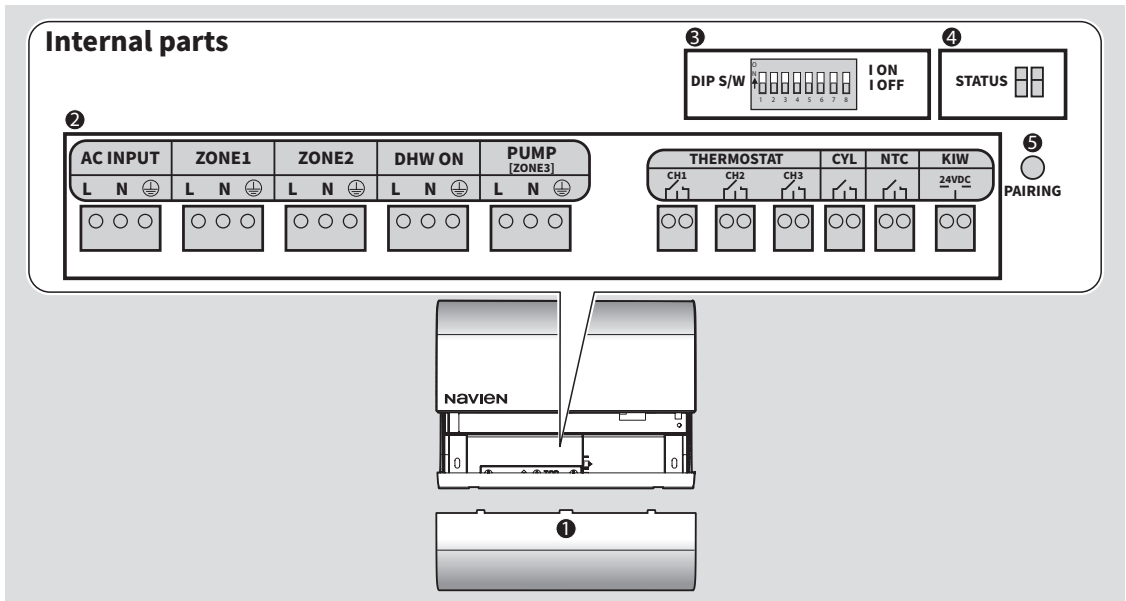
Installation & Operation manual



Strain block and screws

## Device layout

The following table provides the brief information on each part of the wiring centre.





No	Name	Description															
①	<b>Front cover</b>	Covers the internal parts.															
②	<b>Internal terminals</b>	Connect cables for other units (power supply, zone valves, DHW cylinder, cylinder thermostat, non-wireless thermostats).															
③	<b>DIP switches</b>	Select the plan types, external tank settings, sensor types, and cylinder temperature setting types.															
④	<b>LED status</b>	Indicates the wiring centre's operation status.															
		<table border="1"> <thead> <tr> <th>LED Colour</th> <th>Status</th> <th>Description</th> </tr> </thead> <tbody> <tr> <td rowspan="2">RED</td> <td>On</td> <td>A tank sensor error has occurred.</td> </tr> <tr> <td>Blinking</td> <td>A communication error has occurred.</td> </tr> <tr> <td rowspan="3">Blue</td> <td>Blinking (Quick)</td> <td>No devices are paired with the wiring centre.</td> </tr> <tr> <td>Blinking (Slow)</td> <td>The wiring centre is in pairing mode.</td> </tr> <tr> <td>On</td> <td>The wiring centre has a good RF communication connection with the paired devices.</td> </tr> </tbody> </table>	LED Colour	Status	Description	RED	On	A tank sensor error has occurred.	Blinking	A communication error has occurred.	Blue	Blinking (Quick)	No devices are paired with the wiring centre.	Blinking (Slow)	The wiring centre is in pairing mode.	On	The wiring centre has a good RF communication connection with the paired devices.
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	Blinking (Slow)	The wiring centre is in pairing mode.															
	On	The wiring centre has a good RF communication connection with the paired devices.															
⑤	<b>Pairing button</b>	<ul style="list-style-type: none"> <li>• Press to enter pairing mode.</li> <li>• Press and hold to initialise the pairing mode settings.</li> </ul>															

# Installing the wiring centre

Remove the front cover and install the wiring centre on a wall near the boiler or DHW cylinder in a convenient location that is accessible for wiring and servicing.

Also, for the best RF system performance, install the wiring centre in an open area so that it can pair with the wireless communication module.



- Do not install the wiring centre near heat sources, such as radiators, chimney walls, televisions, and direct sunlight. Doing so may damage the device.
- Install the wiring centre at least 30 cm away from any metal objects. Metal objects, such as wall boxes and the boiler housing, may affect RF communication between RF devices.

## Mounting the wiring centre to the wall

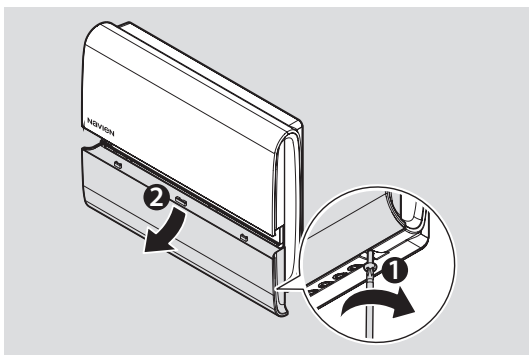
1 Drill holes which fit the keyholes of the mounting plate into the selected wall, and then insert the plastic anchors into the holes.



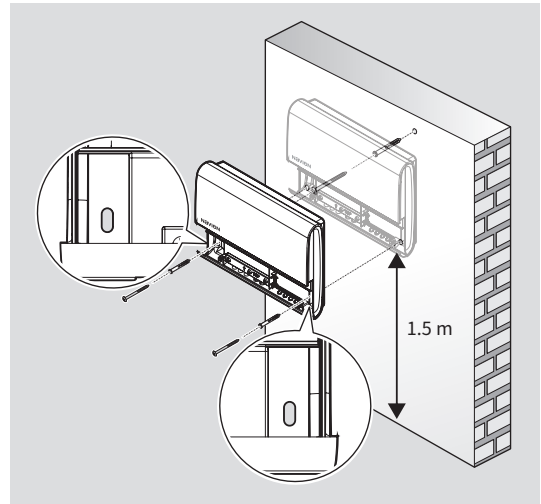
- Maintain a minimum clearance of 1.5 m from the bottom.
- Ensure the plastic anchors are fully inserted into the holes.

2 Mount the back of the wiring centre using the screw (at the top).

3 Unfasten the two screws at the bottom of the wiring centre and remove the front cover.



4 Insert the screws through the two holes of the wiring centre (in the middle) and into the plastic anchors, and screw them in a clockwise direction to attach the wiring centre to the wall.



## Setting the Navien boilers

To use wiring centre, set the NCB-CE, LCB700 and NCB500 boilers as follows.

### • NCB-CE Boiler

#### (Starting from SW Version V11-6)

- When using a combi boiler with the wiring centre: Boiler DIP SW1 8-OFF / Panel DIP SW 4-OFF, 5-OFF
- When using a system boiler with the wiring centre: Boiler DIP SW1 8-ON / Boiler DIP SW2 1-OFF, 2-ON / Panel DIP SW 4-OFF, 5-OFF

### • NCB-CE Boiler

#### (lower than SW Version V11-6)

- When using a combi boiler with the wiring centre: Boiler DIP SW1 8-OFF / Panel DIP SW 4-OFF, 5-OFF
- When using a system boiler with the wiring centre: boiler DIP SW1 8-ON / Boiler DIP SW2 1-OFF / Panel DIP SW 4-OFF, 5-OFF

### • LCB700 System Boiler

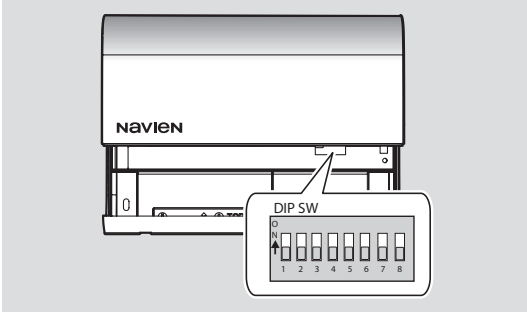
- DIP SW2: 7-ON
- Panel: Press the Menu button, and then select "4. DHW Operation" > "3. DHW Call Signal" > "2. Wiring Centre".

### • NCB500 System Boiler

- DIP SW1: 1-ON, 7-ON
- Panel: Press the menu button, and then select "3. DHW Operation" > "1. Cylinder Controls" > "3. Wiring Centre".

# Setting the DIP switches

Before wiring the device, set the DIP switches to select the plan types, sensor types, and cylinder temperature.



## Selecting the plan types

Refer to the follow table to see how to select plan types.

Switch	Function	Setting	
1&2	Plan types	S/S+ Plan	1-OFF, 2-OFF
		Y Plan	1-ON, 2-OFF
		W Plan	1-OFF, 2-ON
		Reserve	1-ON, 2-ON

## Selecting the external pump and sensor settings

Refer to the follow table to see how to select the external pump and sensor settings.

Switch	Function	Setting	
4&5	External pump settings	Not used (Using Zone 3)	4-OFF, 5-OFF
		Connected with Zone 1	4-ON, 5-OFF
4&5	External pump settings	Connected with Zone 2	4-OFF, 5-ON
		Connected with Zone 1 and 2	4-ON, 5-ON

Switch	Function	Setting	
6	Sensor settings	Tank sensor	6-ON
		Aquastat	6-OFF

- If the external pump is set to be used, the external pump turns on or off depending on zone valve operation.
- Even if you set the external pumps to operate in the Y or W plans for the heating system, the external pumps will not operate.

## Setting the domestic hot water cylinder temperature

Refer to the follow table to see how to set the domestic hot water cylinder temperature.

- Increasing the temperature increases the risk of accidental scalding. The domestic hot water cylinder temperature at or above 55°C can cause instant scalding or severe burns.
- If domestic hot water cylinder temperature is higher than 60 °C, use a mixer device.

Switch	Function	Setting	
7&8	Cylinder temperature settings	35°C	7-OFF, 8-OFF
		45°C	7-ON, 8-OFF
		55°C	7-OFF, 8-ON
		65°C	7-ON, 8-ON

- For more information on the tank sensor temperature and its mean value, refer to “Specifications” on page 27.

# Connecting cables to the wiring centre

Before connecting the cables, turn off the power supply and read the safety information below to properly wire the device.



- Before connecting cables to the wiring centre, electrically isolate the boiler and system components. Secure against unintentional reconnection and ensure that the power supply is disconnected from the wiring centre.
- When connecting the power cable, ensure that the wires of the power cable are correctly connected to the Live, Neutral, and Earth terminals.
- As the power supply is not provided via the electronic circuitry of the heating devices, install a circuit breaker complying with the applicable standards to interrupt all phases of the power supply.
- The wiring centre requires different voltages. Do not connect the low-voltage equipment to 230 V mains or vice versa.

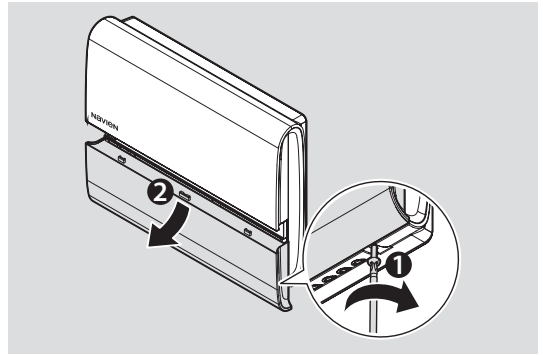


Improperly connecting the electrical supplies can result in electrical shock or electrocution. Follow all applicable electrical codes of the local authority having jurisdiction. Connecting the electrical cables to the terminals should be performed only by a qualified professional.

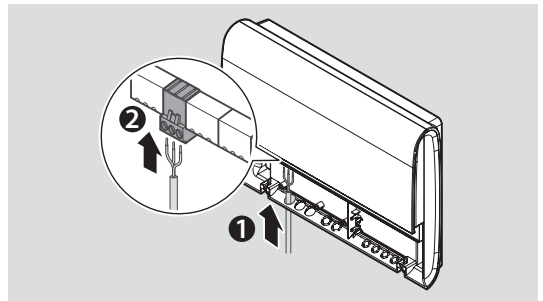


Label all wires before disconnecting them when you work on the controls. Wiring errors can cause abnormal or dangerous operation. Verify proper operation after servicing.

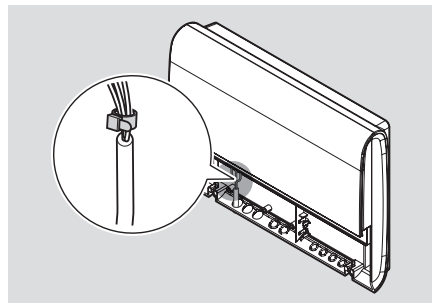
- 1 Unfasten the two screws at the bottom of the wiring centre and remove the front cover.



- 2 Route the valve cable through the wiring hole, and then connect each wire of the valve cable to the right terminals.

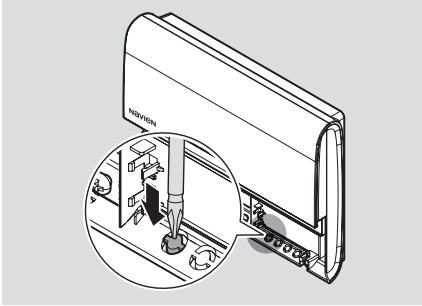


To prevent wire crossing, use a cable tie to secure together the wires of every cable connected close to the terminals after you complete connecting cables to the terminals. Failure to do so may damage the device and expose yourself to the risk of electric shock.

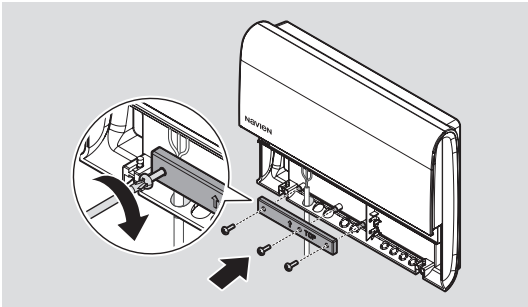




To pass the pump, thermostat, and cylinder/NTC valve cables through the wiring hole, remove the grommet using the screwdriver.



3 After completing connecting the cables to the terminals, fasten the three screws on the strain block to fix it to the wiring centre so that the cables connected to the terminals do not move.



# System configuration and wiring diagrams \_\_\_\_\_

The system configuration and wiring diagrams are only schematic examples and provide examples of possible installation configurations. Install safety equipment in accordance with applicable standards and local regulations. For more information on the devices used in the configuration diagrams, refer to the Installation & Operation Manuals for the Navien boilers, wireless communication module (BCM-41RW or BCM-45RW), wireless thermostat (NRC-10R), or the additional system components (other manufacturers).



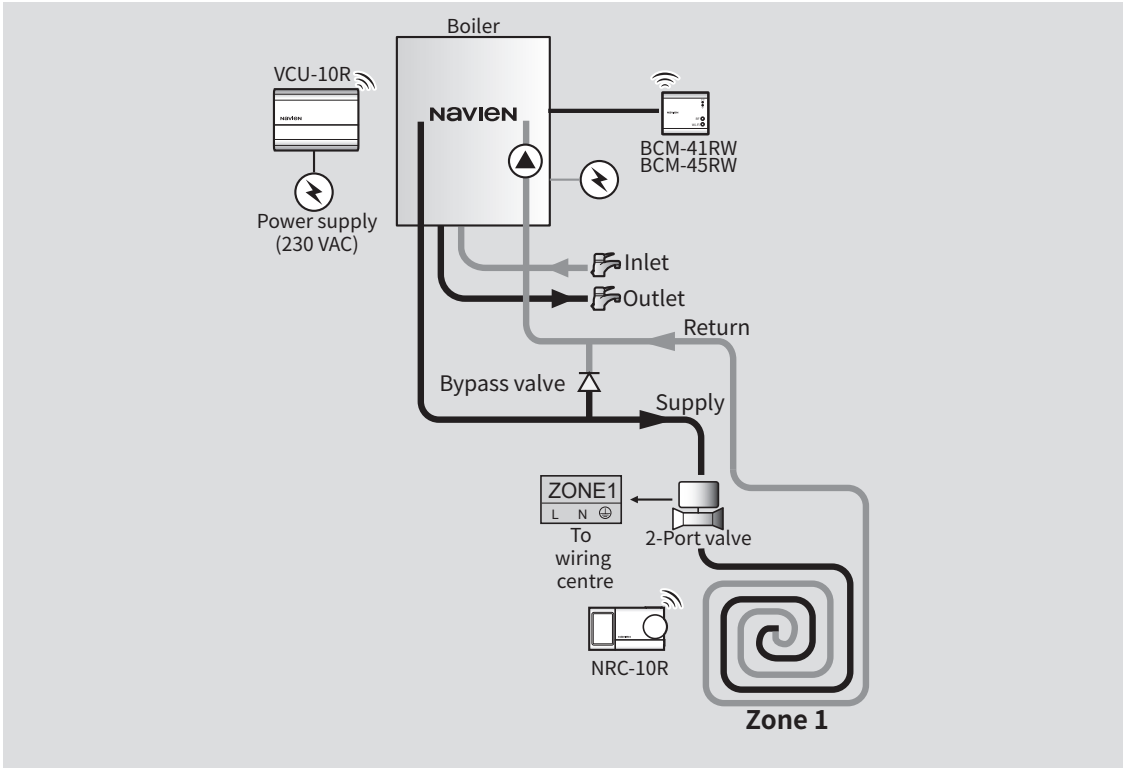
The cables used in the wiring diagrams are explained in the following table.

<b>Label (Description)</b>	<b>Colour (Abbrev.)</b>
L (Live)	Brown (BN)
	Gray (GR)
	White (WT)
	Orange (OR)
N (Neutral)	Blue (BL)
PE (Protective earth)	Green and yellow (GN/YL)

# When using a combi boiler with a single zone

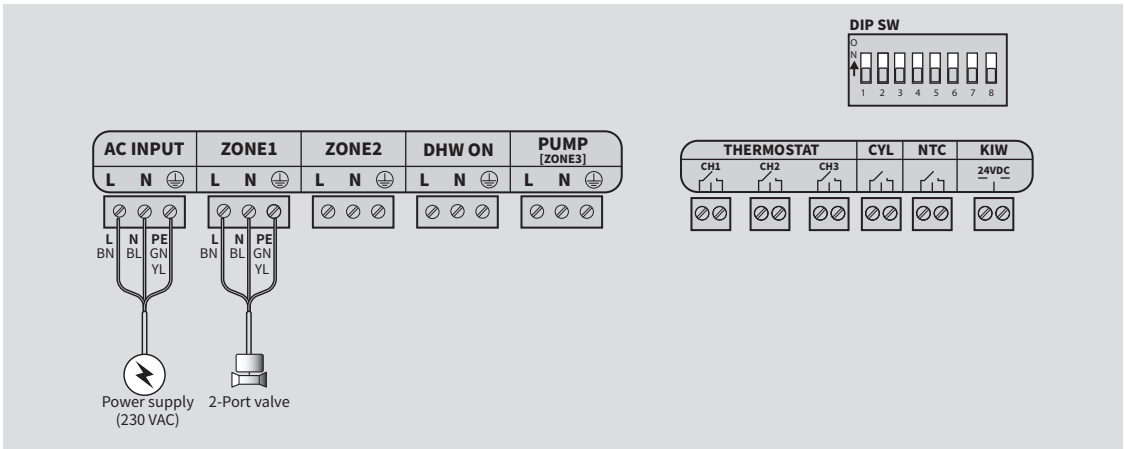
## System configuration diagram

The following diagram shows the example of using a combi boiler with a single zone.



## Wiring diagram

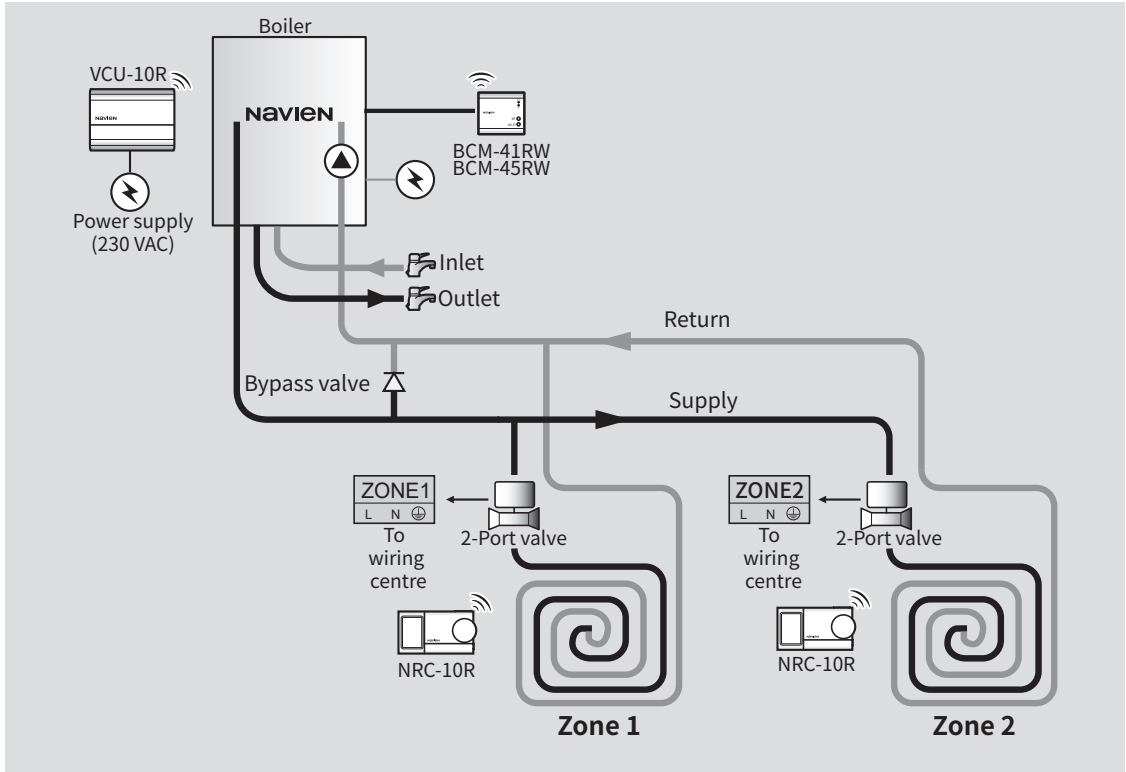
The following diagram shows how to connect the device with other units. Open the front cover and connect the cables as follows.



## When using a combi boiler with multiple zones

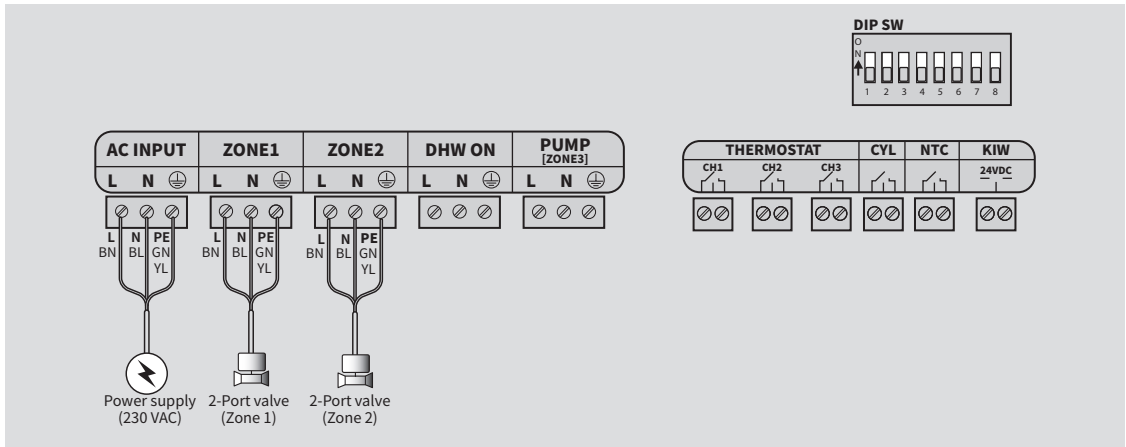
### Configuration diagram

The following diagram shows the example of using a combi boiler with multiple zones.



### Wiring diagram

The following diagram shows how to connect the device with other units. Open the front cover and connect the cables as follows.

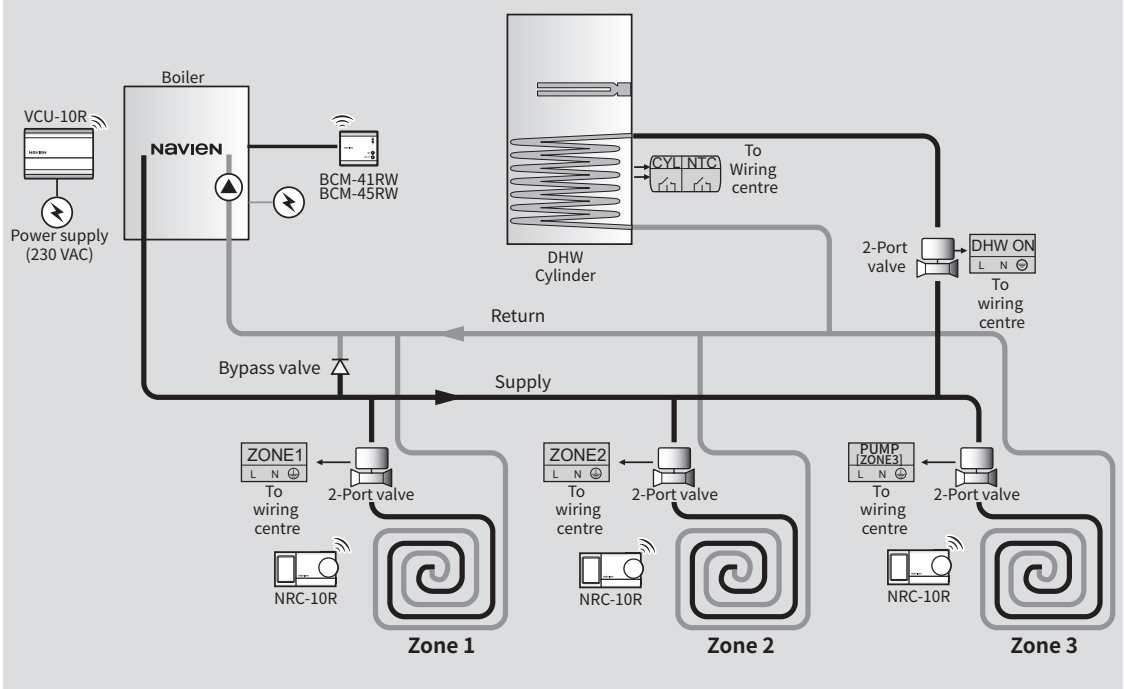




# When using a system boiler with multiple zones


## Configuration diagram

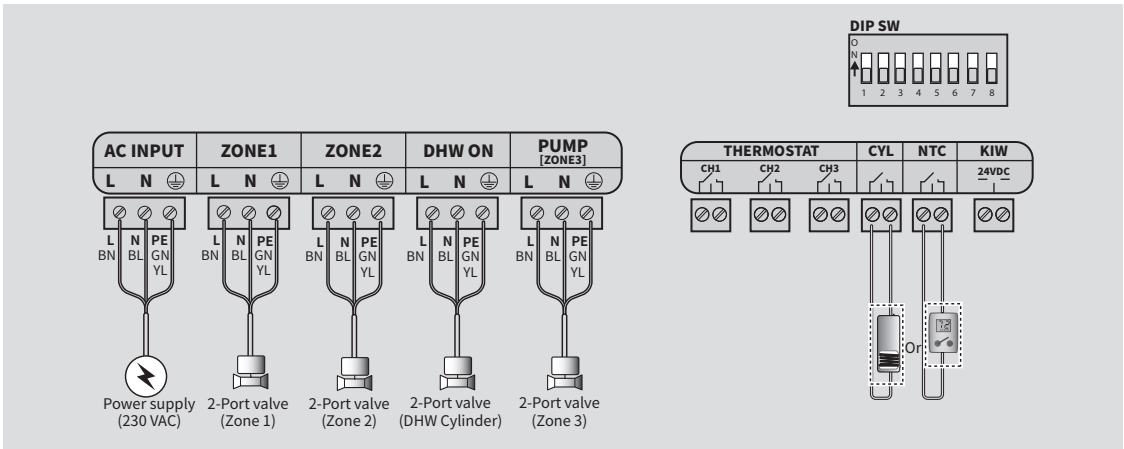
The following diagram shows the example of using a system boiler with multiple zones.



## Wiring diagram

The following diagram shows how to connect the device with other units. Open the front cover and connect the cables as follows.

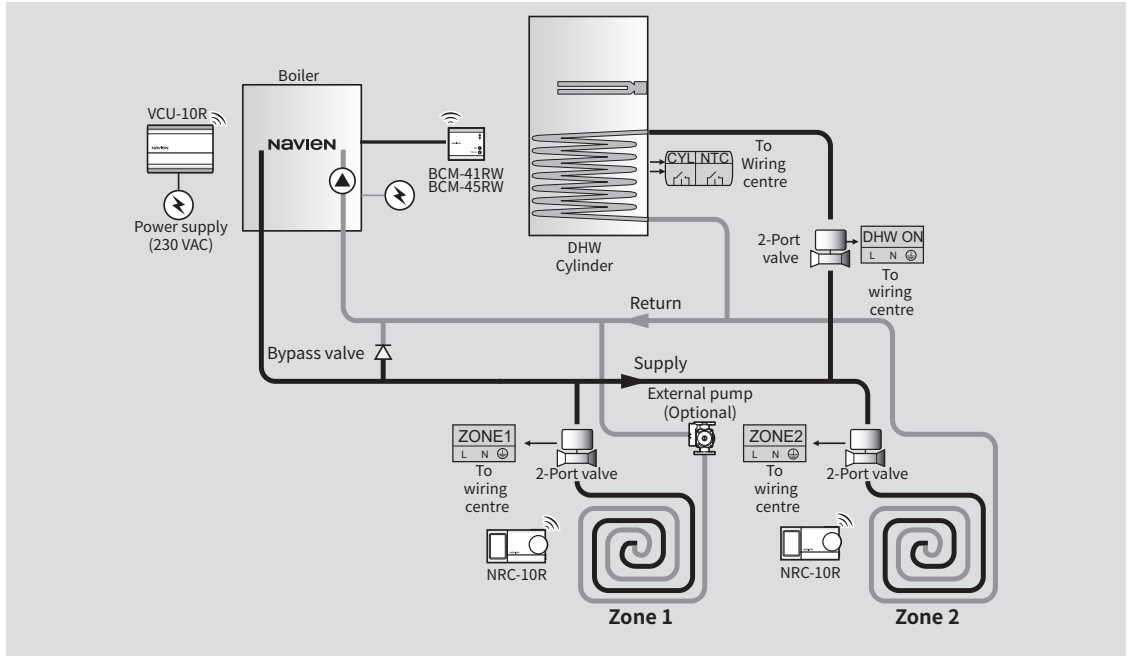
 When using a system boiler, use either a DHW cylinder or a cylinder thermostat. You cannot use both units at the same time.



## When using a system boiler with multiple zones

### Configuration diagram

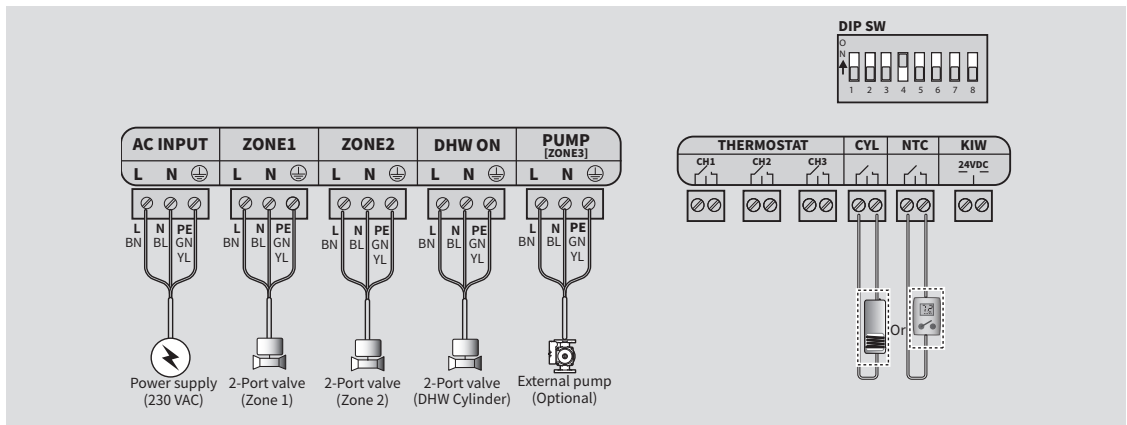
The following diagram shows the example of using a system boiler with multiple zones.



### Wiring diagram

The following diagram shows how to connect the device with other units. Open the front cover and connect the cables as follows.

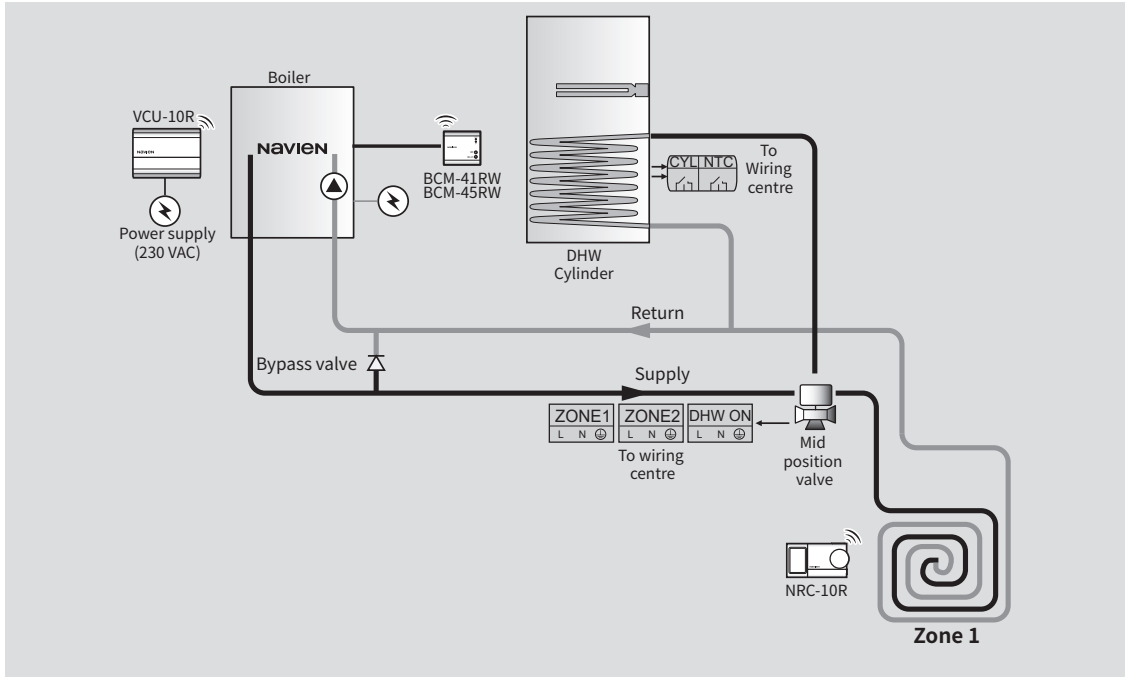
- When using a system boiler, use either a DHW cylinder or a cylinder thermostat. You cannot use both units at the same time.
- If required, an external pump can be optionally installed to Zone 1. To use the external pump at Zone 1, set the DIP switch 4 to on and 5 to off.



## When using a system boiler with Y plan

### Configuration diagram

The following diagram shows the example of using a system boiler with Y plan.

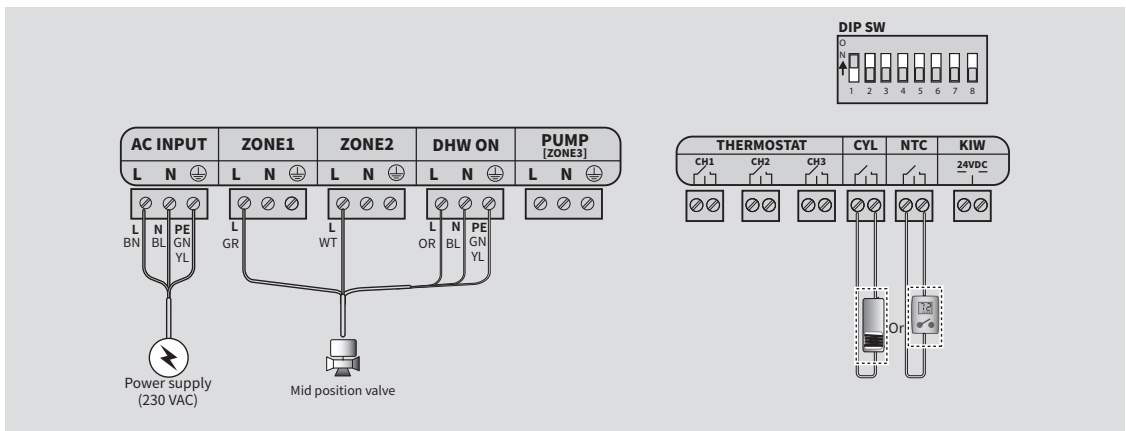


### Wiring diagram

The following diagram shows how to connect the device with other units. Open the front cover and connect the cables as follows.



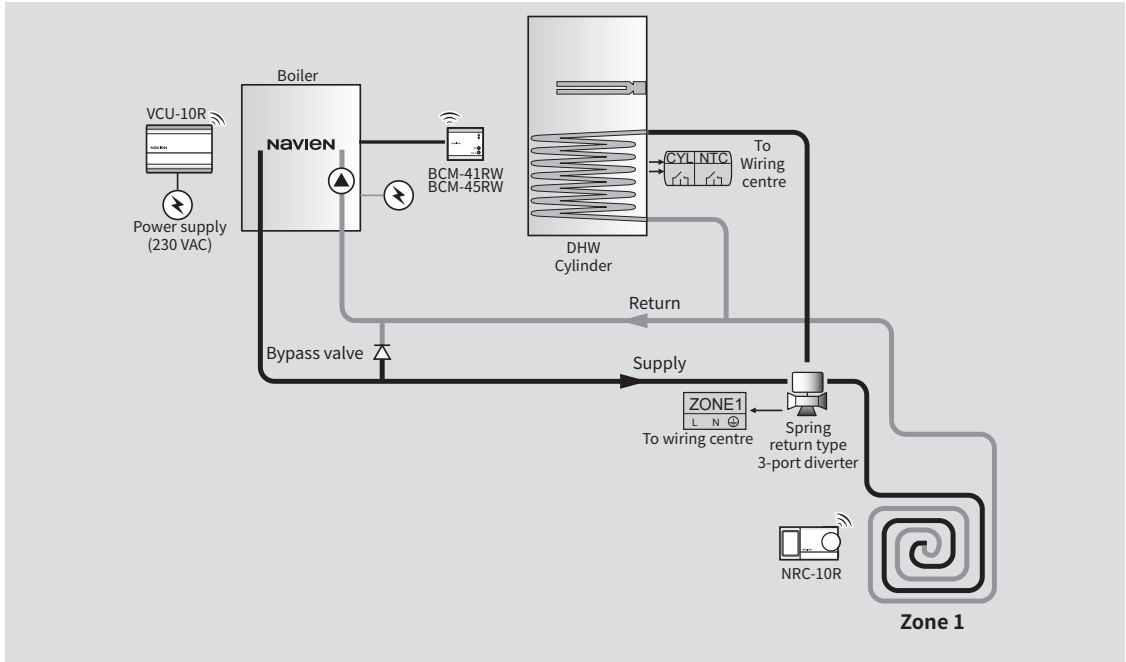
- When using a system boiler, use either a DHW cylinder or a cylinder thermostat. You cannot use both units at the same time.
- To configure a Y plan using the system boiler, set the DIP switch 1 to on and 2 to off.



## When using a system boiler with W plan

### Configuration diagram

The following diagram shows the example of using a system boiler with W plan.

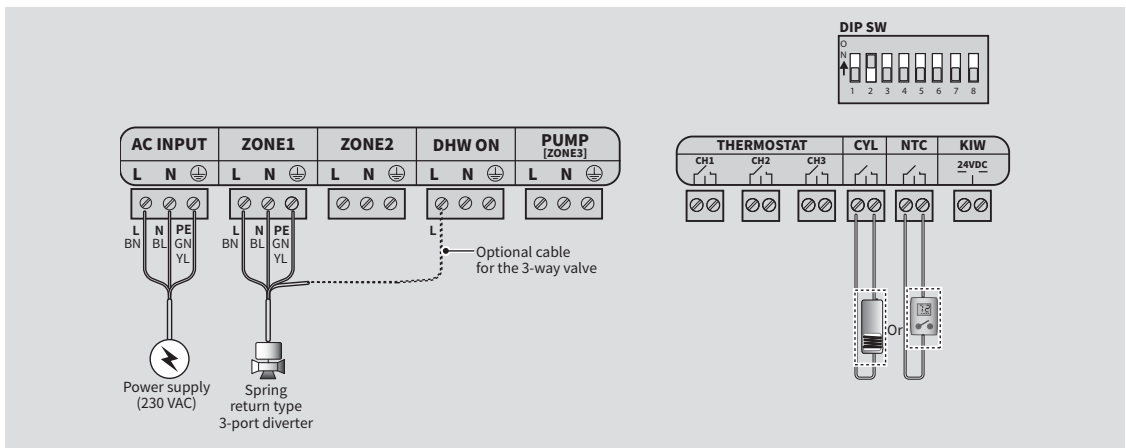


### Wiring diagram

The following diagram shows how to connect the device with other units. Open the front cover and connect the cables as follows.




- When using a system boiler, use either a DHW cylinder or a cylinder thermostat. You cannot use both units at the same time.
- To configure a W plan using the system boiler, set the DIP switch 1 to off and 2 to on.



## Pairing with the wireless communication module \_\_\_\_\_

When pairing the wiring centre with the wireless communication module, the wireless communication module should be in pairing mode. Refer to the wireless communication module Installation & Operation Manual for information on entering pairing mode.

 For the best RF system performance, install the wiring centre in an open area so that it can pair with the wireless communication module.

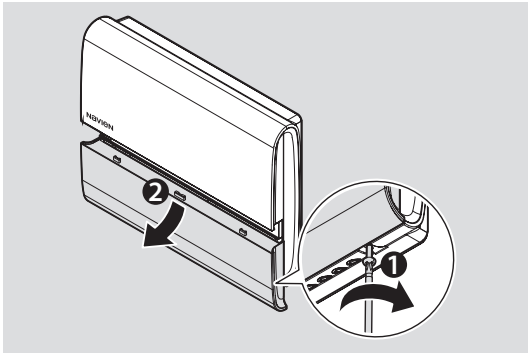
- 1 Turn on the power to the wiring centre after properly wiring the device.
- 2 Open the front cover and press the Pairing button. The LED status will blink blue slowly (in pairing mode).
- 3 On the wireless communication module, enter pairing mode. If the wiring centre is successfully paired with the wireless communication module, the LED status will turn blue.

# Replacing the fuse

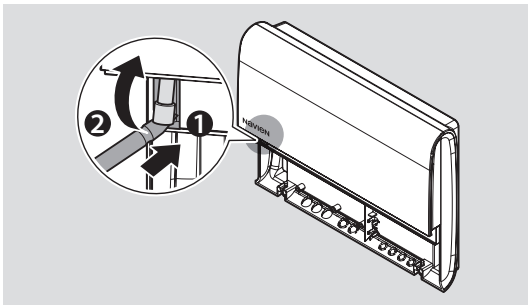
The fuse (250 V 5 A) may become defective if an overcurrent occurs due to wrong wiring connections. If power is supplied to the wiring centre and the LED status is off, it means the fuse is defective. Replace the defective fuse with the spare fuse located under the internal terminals of the wiring centre.

**!** Turn off the power supply to the wiring centre before replacing the fuse to avoid possible electrical hazards. Failure to do so may cause severe personal injury or damage the device.

- 1 Unfasten the two screws at the bottom of the wiring centre and remove the front cover.

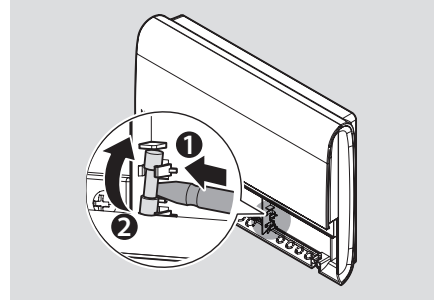


- 2 Insert a flat-head screwdriver between the edge of the fuse and the fuse socket and gently push the fuse upward to remove it.

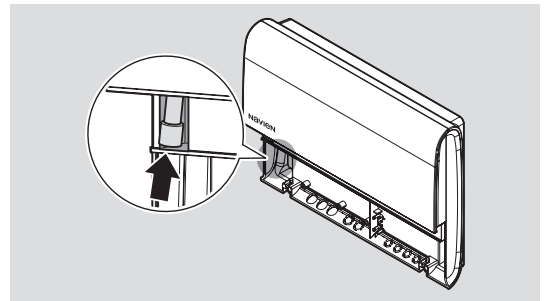


- 3 Use a flat-head screwdriver to remove the spare fuse.

**!** Do not forcefully insert the flat-head screw driver. Doing so may damage the fuse.



- 4 Insert the spare fuse into the fuse socket.



- 5 Turn on the power supply to the wiring centre and then check if the LED status is on.

# Commissioning

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After you complete the installation and wiring, commissioning should be carried out.



Do not turn on the power supply to the wiring centre until other devices and units are set up.



When the wiring centre is turned on, the connected external pump may start operating immediately depending on the DIP switch settings. This is part of the start-up process and does not indicate an error. Ensure that the system is filled before turning on the wiring centre so that the pump does not run dry.

- 1 Set the DIP switches in accordance with the desired system configuration. For detailed information on the DIP switch settings, refer to “Setting the DIP switches” on page 10.
- 2 Turn on the power supply (230 VAC) to the entire system, including the wiring centre.
- 3 Open all the valves in the rooms where the wireless thermostats are installed.
- 4 Commission and set up the boiler and control accessories in accordance with the Installation & Operation manuals supplied with those devices or units.

## Restart and check

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Check if all the settings have been saved by turning the wiring centre off and then on again to ensure that any adjustments operate correctly, and check that the devices or units are operating safely.

Also, check if the wiring centre properly responds to the following demands:

- Central heating demand for the Zone 1
- Central heating demand for the Zone 2 (If multiple zones are required)
- Central heating demand for the Zone 3 (If multiple zones are required)
- Domestic hot water demand (If the DHW cylinder is used)



# Troubleshooting

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Before reporting a malfunctioning device, refer to the following table and see if you can identify and fix the problem.

Fault situation	Suggested Remedies
The LED status is turned red.	A tank sensor error has occurred. <ul style="list-style-type: none"><li>- Check if the tank sensor operates properly.</li></ul>
The LED status blinks red.	A communication error has occurred. <ul style="list-style-type: none"><li>- Check if the devices paired with the wiring centre operate properly.</li><li>- Check if the wiring centre is installed at least 30 cm away from any metal objects. Metal objects, such as wall boxes and the boiler housing, may affect RF communication between RF devices.</li></ul>
The LED status blinks blue quickly.	No devices are paired with the wiring centre. <ul style="list-style-type: none"><li>- Check if the devices to be paired with the wiring centre operate properly.</li><li>- Try to pair devices with the wiring centre again.</li><li>- If the RF connection experiences interference from nearby electrical equipment or buildings, choose a different installation location.</li></ul>
Although power is being supplied to the wiring centre, the LED status is off.	The fuse may be defective. <ul style="list-style-type: none"><li>- Check if the fuse is defective. If the fuse is defective, replace the defective fuse with the spare fuse located under the internal terminals of the wiring centre. For more information on how to replace the fuse, refer to “Replacing the fuse” on page 21.</li></ul> Power is not being supplied to the wiring centre. <ul style="list-style-type: none"><li>- Check if the power supply is turned on and properly connected to the wiring centre.</li></ul>

# Recycling and disposal

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## Recycling the package

Sort out the waste to separate that which can be recycled (cartons, plastics, etc.) from the various wastes that cannot be recycled (straps, etc.). Also recycle the product's packaging in accordance with all relevant local regulations.

## WEEE: Recycling or disposing of the device and its parts



- The device must be recycled in compliance with the WEEE Directive (Waste Electrical and Electronic Equipment), which specifies the:
  - selective collection of waste electrical and electronic equipment.
  - selective systematic treatment of certain components and substances considered to be dangerous,
  - reuse, recycling, and recovery of the collected waste electrical and electronic equipment.
- Do not dispose of the device or any of its accessories with your regular household waste.
- Ensure that the old unit and any of its accessories are appropriately disposed of.
- Deposit the product at an appropriate collection point for evaluating, treating, and recycling waste electrical and electronic equipment.
- Observe all relevant regulations and laws.

## Warranty

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Manufacturer's warranty of 2 years is provided.

# Specifications

The following table lists the specifications for the wiring centre.

Items		Specifications																		
Power supply	Main supply	230 VAC, 50 Hz																		
	Power consumption	450 W																		
AC output rating per output terminal (when using 4 output terminals max.)		Max. 120 W (below 500 W in total)																		
Fuse		250 V 5 A																		
Radio frequency (RF)		865.15 MHz–867.95 MHz																		
Permissible operating temperature		0°C–40°C																		
Tank sensor temperature	<table border="1"> <thead> <tr> <th>Temperature [°C]</th> <th>Mean [kΩ]</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>27.71</td> </tr> <tr> <td>10</td> <td>18.11</td> </tr> <tr> <td>20</td> <td>12.13</td> </tr> <tr> <td>30</td> <td>8.314</td> </tr> <tr> <td>40</td> <td>5.818</td> </tr> <tr> <td>50</td> <td>4.15</td> </tr> <tr> <td>60</td> <td>3.014</td> </tr> <tr> <td>70</td> <td>2.226</td> </tr> </tbody> </table>		Temperature [°C]	Mean [kΩ]	0	27.71	10	18.11	20	12.13	30	8.314	40	5.818	50	4.15	60	3.014	70	2.226
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- Must be supplied from a power source of less than 8 A, 100 VA
- We suggest using only the accessories provided with the product. Using third-party accessories may result in signal interference or improper operation of the product or other nearby devices.
- The product's wireless power supply follows all related RF standards. If the product's voltage and temperature become too low or high or the product is subject to any abnormal operation, the product's power supply may become unstable and impact performance.
- We suggest using only the accessories provided with the product. The product's wireless power supply follows all related RF standards. Using third-party accessories, allowing the product's voltage and temperature to become too low or high, or subjecting the product to any abnormal operation may cause the product's wireless power supply to become unstable and impact performance.
- The product's short range wireless communication function is controlled via software or firmware to meet standards related to data transfer security. If the software or firmware is improperly modified or changed, the product's data transfer security may not function properly.
- This product's wireless communication antenna does not require SAR testing, because the operating distance is more than 20 cm and conforms to EN62311.
- This product's safety/RF/EMC have already been tested by a qualified laboratory and received passing marks, but any abnormal operation method or conditions may make the product stop working or experience a malfunction.

Certification



Manufactured by KDNA (KYUNG DONG NAVIEN CO., Ltd.)  
[www.kdnavien.co.kr](http://www.kdnavien.co.kr)  
 95, Suworam-gil, Seotan-myeon, Pyeongtaek-si, Gyeonggi-do,  
 (17704) Republic of Korea  
 +82) 31-8060-5707