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Product Manual

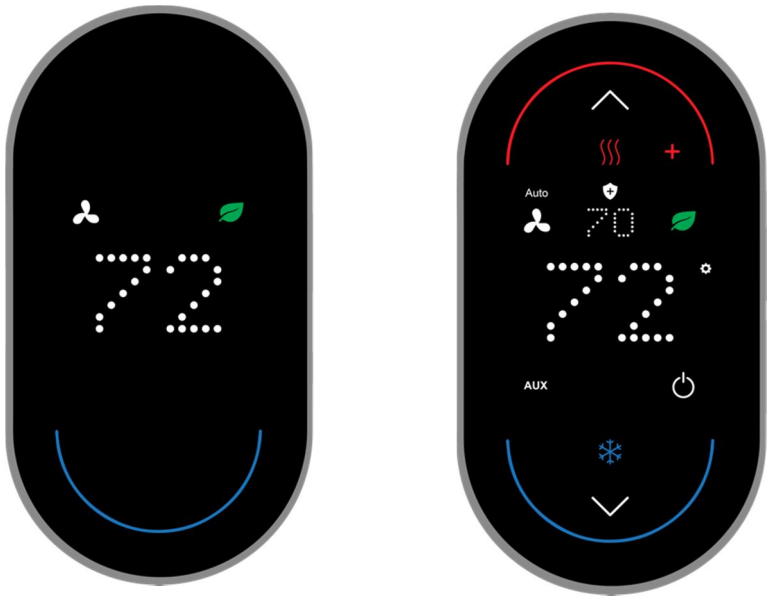
ABB-free@home™

TH-1.1 ABB Thermostat

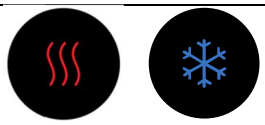
Table of Contents

1 The Device

This section contains a short overview of the display and hardware functions of the device.



1.1 Function Overview

	**Heating & Cooling Indicators** Red and blue semi-circles indicate if device is heating (red), cooling (blue), or idle (both off).
	**Room Temperature** Large number in middle of display shows current home temperature.
	**Setpoint Temperature** Small number above large number is desired temperature. Use arrows to change. Both setpoint and arrows appear when your hand nears device. **Note:** Setpoint can be changed in device settings.
	**Settings** Tap to activate or deactivate function. Switch between “active view” and “settings view”.
	**Heating & Cooling** Tap to enable or disable heating/cooling mode.
	**Fan** Fan can be set to ON or AUTO mode. By default, it is in AUTO mode. Tap to turn ON the fan.

	**Eco** At night or when operator is away, device can be set to save energy. Tap to activate. Setpoint is automatically decreased (for heating) or increased (for cooling).
	**ON/OFF** Tap to turn Thermostat ON/OFF and to turn ON/OFF all appliances connected to it. Only House Protection function remains active.
	**Accessory Appliance** Tap to activate or deactivate an additional function, (i.e. humidifier or de-humidifier).
	**Auxiliary heating / Emergency Heating** Use only if heat pump is controlled. If symbol is ON, auxiliary heating is enabled. Auxiliary heating allows supplemental source (electric or gas heater) to support heat pump if needed. Auxiliary heating can be enabled manually by user or automatically by HVAC control. Press and hold symbol for 3 seconds to activate “Emergency Heating”. Use to heat house but prevent compressor from turning ON. Use when compressor is defective or iced due to extreme winter temperatures. Symbol will blink when Emergency Heating is active.
	**House Protection** Indicates heating/cooling was turned ON automatically to protect HVAC from overload and home from extreme hot or cold temperatures for one of these reasons: 1) To protect house from freezing or overheating; or 2) To protect HVAC equipment from overload or damage. House Protection stays ON, activate in settings.

1.2 Always-ON Functions

Proximity Sensor	As the user’s hand approaches the display, it wakes-up and shows touch controls. Proximity sensor is located near bottom of device.
Self-Adjusting Display Brightness	Display adapts to fit light level of room. Brightness level can be changed in settings.

Tab.1: >>Always-ON Functions<<

2 Adding the Thermostat

STEP 1: Install the Thermostat

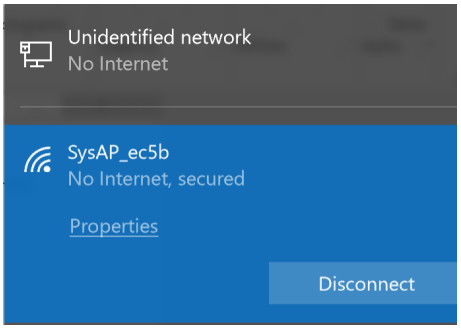
WARNING: Installation must be performed by a licensed HVAC installer or electrical professional. Improper installation can cause property damage, personal injury, or loss of life.

Install the device by following the Operating Instructions and Wiring Guide included in the original packaging. After wiring is complete, take a photo of the connected wires and save for future use.

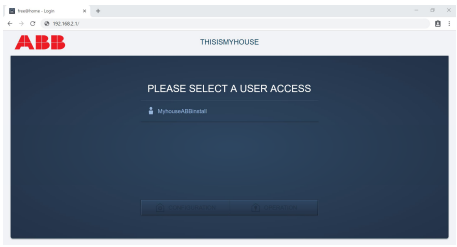
Note: When first powered, the device is in discovery mode for 30 minutes. This time period allows the SysAP to see and connect to the device. During this time, the user can login to the SysAP and add the device to the free@home network. If the Thermostat has been assigned to a different SysAP, it will need to be reset. Please see here for instructions.

STEP 2: Open configuration and search for the Thermostat

Ensure that the SysAP is in Access Point mode by pressing the button on the SysAP. The indicator light will turn solid blue. Connect to the SysAP by selecting it from the list in your wireless network.



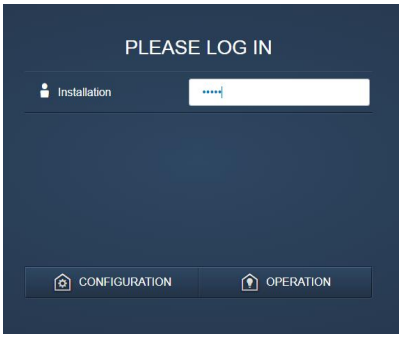
Once connected, open a browser and enter 192.168.2.1 in the address line.



If you have a tablet, use the free@home App.

Note: it is not possible to set up the Thermostat by using a smartphone.

Log in as a user that has configuration rights.



Start Go to Settings > free@home radio > Search for wireless devices

The SysAP will now search for the Thermostat.

Note: The Thermostat can only be found if the search starts within 30 minutes after the Thermostat was connected to power. If the 30 minutes has elapsed, pull the Thermostat from the wall and plug it in again to restart the 30 minutes.

The Thermostat will be found automatically and will be inserted into the configuration software.

Please wait until the Thermostat configuration is read. This may take up to 10 minutes.

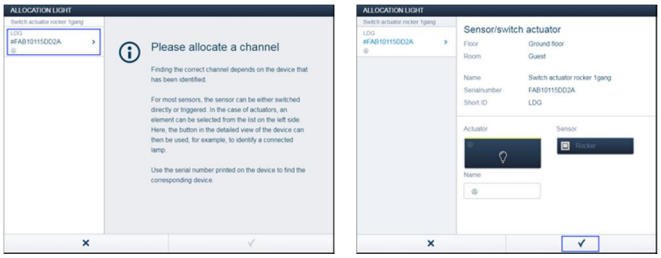
STEP 3: Add the Thermostat to the floor plan

A. Go to “Devices”.

B. Click on “Temperature control”.

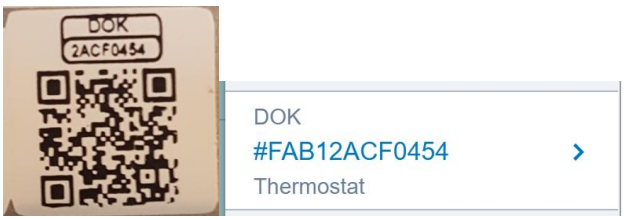
C. Click on “Thermostat”.

D. Drag the Thermostat symbol into the floor plan.

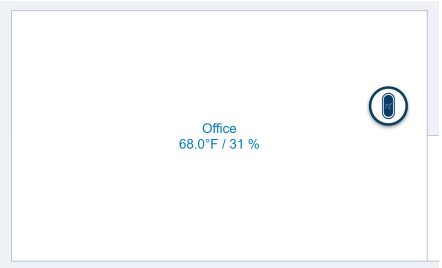


E. Choose the device from the list.

Note: The device can be identified by its serial number or 3-digit code.



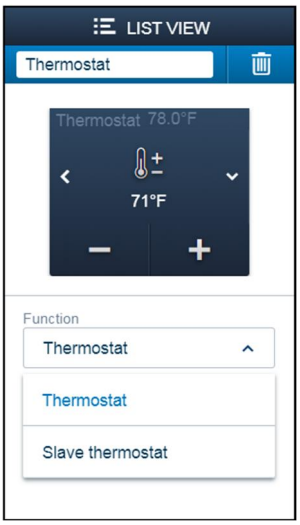
G. A new symbol will appear in the floor plan.



2.1 More than one Thermostat (“Master & Slave“)

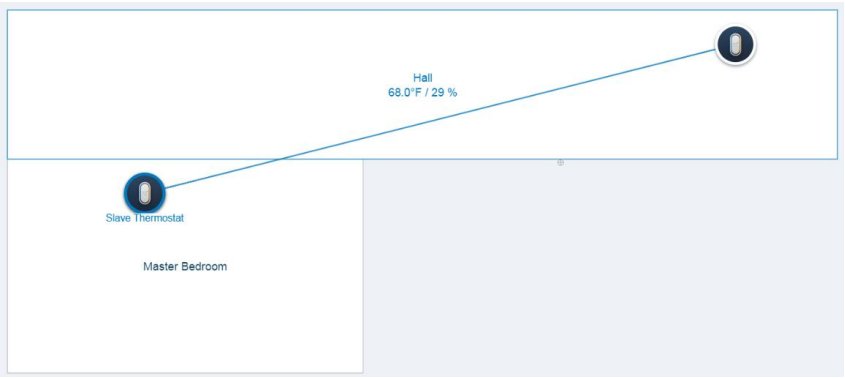
Of course you can have more than one Thermostat. There are two options:

OPTION 1: There are 2 (or more) Thermostats for the same HVAC equipment



If you only have one HVAC equipment but want to have 2 (or more) Thermostats for controlling it, make one Thermostat the “Master” and the other one(s) a “Slave”. This is done during configuration (see next chapter).

Important: The control wires must be connected to the “Master” Thermostat. The Slaves only need 24 V AC connected to the Rc and C terminals. Master and Slave will show the same information on their display.



See the example above: The Thermostat in the Hall is the “Master”. The Thermostat in the Master Bedroom is the “Slave”.

OPTION 2: There are 2 (or more) HVAC equipment in the house

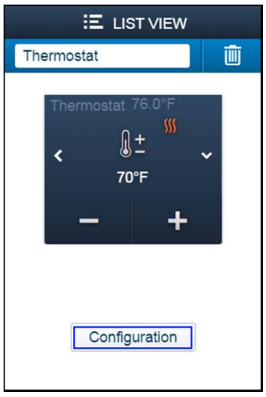
If you have 2 (or more) HVAC equipment (e.g. one for the 1st floor and another one for the 2nd floor) configure both Thermostats as “Thermostat”.

3 Configuring the Thermostat

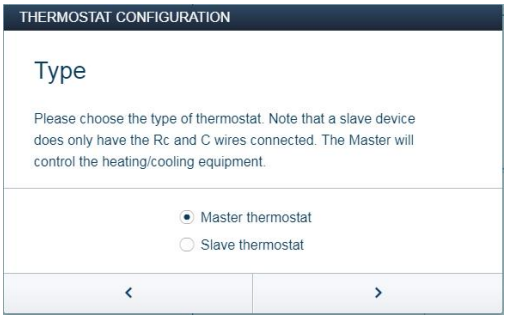
STEP 1: Start the Configuration Wizard

Follow the instructions of the Configuration Wizard. To start the Wizard, click on the Thermostat symbol in the floor plan, then click “Configuration” in the menu that appears on the right.

After the configuration is complete, the Thermostat will appear in the DEVICES List View:



Once you add a second Thermostat you will be asked if it is a Master or a Slave:

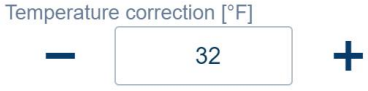
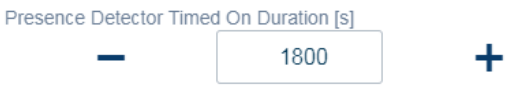


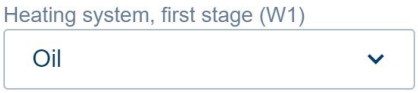
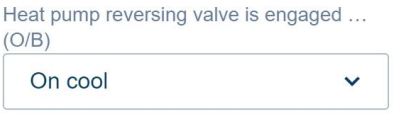
Please refer to section 2.1 for more information on “Master” and “Slave”.

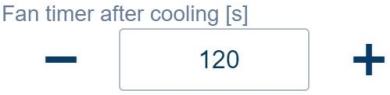
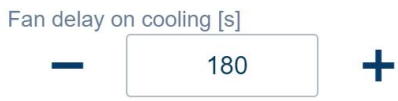
STEP 2: Adapt the Settings, if required

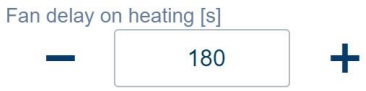
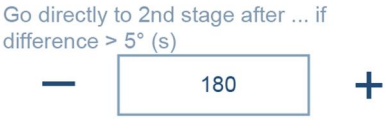
The following table shows the Thermostat settings.

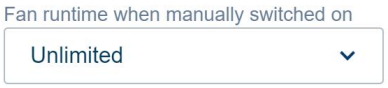
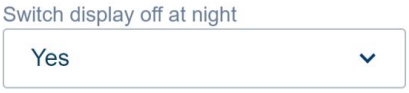
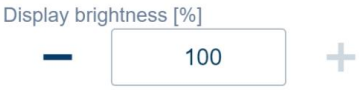
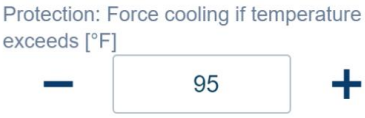
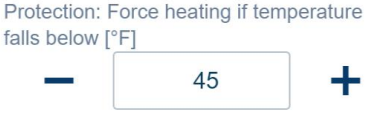
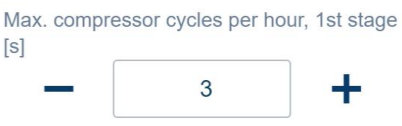
3.1 Thermostat Settings

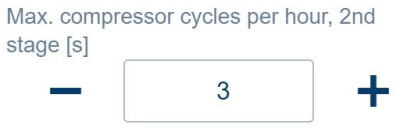
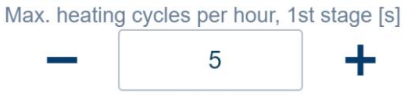
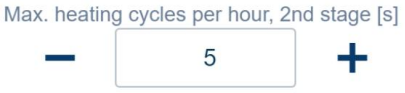
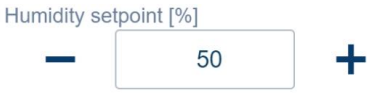
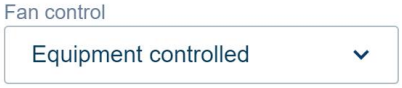
Setting	Description	Options	Image
Temperature correction	Sometimes temperature shown on Thermostat is incorrect, i.e. due to air draft. This setting allows user to correct temperature value.	27 to 38 in increments of 1	
Presence Detector Timed On Duration [s]	For future purposes. Will be hidden in the next software version.		

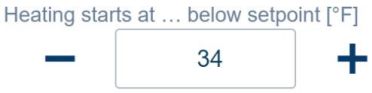
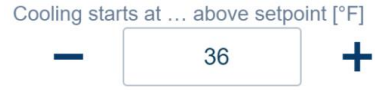
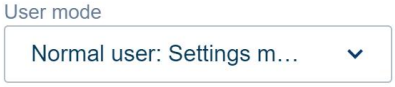
Setting	Description	Options	Image
Heating system, first stage (W1)	Defines type of heater controlled by W1 wire.	· None · Natural Gas · Heat Pump · Propane · Oil · Electric · Hydro underfloor · Hydro radiator	
Heating system, second stage (W2)	Defines type of heater controlled by W2 wire.	· None · Natural Gas · Heat Pump · Propane · Oil · Electric · Emergency Heating	
Cooling system, first stage (Y1)	Defines type of device controlled by Y1 wire.	· None · Air conditioning · Heat pump	
Cooling system, second stage (Y2)	Defines type of device controlled by Y2 wire.	· None · Air conditioning · Heat pump · Heat pump reset (do not use)	
Heat pump reversing valve is engaged … (O/B)	**Note:** For heat pumps only. Reversing valve switches between heating/cooling mode of heat pump. Setting defines polarity of reversing valve.	· On cool · On heat	
Type of accessory (ACC)	Defines type of device controlled by AUX/ACC wire.	· Humidifier (evaporative) · Humidifier (steam) · Dehumidifier (active closed) · Dehumidifier (active open)	

Setting	Description	Options	Image
		· Manual (active open) · Manual (active closed)	
Compressor delay between cycles [s]	**Note:** Only if air-conditioner or heat pump exists. Setting defines minimum time system must wait before air-conditioner or heat pump can run again.	120 to 360 in increments of 10	
Fan timer after heating [s]	**Note:** Not for water-based systems. Defines fan-running time after heating has switched off. During time remaining heat in system is extracted.	60 to 240 in increments of 10	
Fan timer after cooling [s]	**Note:** Not for water-based systems. Defines fan-running time after air conditioning has switched OFF. This allows system to distribute remaining pre-cooled air already present in ducts.	60 to 240 in increments of 10	
Minimum ON time for gas furnace [s]	**Note:** Only for gas furnaces. Setting defines minimum time gas furnace stays ON. Some gas furnaces should not be switched ON/OFF rapidly to prevent damage or premature wear of parts.	0 to 240 in increments of 10	
Fan delay ON cooling [s]	**Note:** Not for water-based systems. Delays time for fan after cooling starts. Prevents warm air coming out of vent while air conditioning is still cooling.	0 to 240 in increments of 10	

Setting	Description	Options	Image
Fan delay ON heating [s]	**Note:** Not for water-based systems. Delays time for fan after heating starts. Prevents cold air coming out of vent while heater is warming up.	0 to 240 in increments of 10	
Go directly to 2nd stage after … if difference > 5°F	Thermostat switches to 2nd stage heating/cooling system after detecting 1st stage is unable to bring temperature to within 5°F of setpoint within certain time. Thermostat activates to 2nd stage after certain elapsed time.	30 to 360 in increments of 10	
Displayed values	Setting defines temperature values displayed on Thermostat after user's hand has approached device.	· Current temperature: big; Setpoint: small · Setpoint temperature only · Current temperature only · Setpoint temperature: big; Current: small · Setpoint prominent, outside temperature small · Actual temperature prominent, outside temperature small	
Show temperature when switched off	When switched off, device shows "OFF" on display. If "Yes" is selected, current temperature will also be displayed.	Yes No	
Eco Temperature Offset [°F]	Setpoint change occurs automatically and is not displayed on Thermostat.	· If ECO (green-leaf symbol) is active: Setpoint is changed by this value · If heating is active: Setpoint is decreased · If cooling is active: Setpoint is increased	

Setting	Description	Options	Image
Shortcut for the … **(multiple settings)**	For future purposes. Will be hidden in the next software version.	(keep unchanged)	
Fan run time when manually switched on	Setting limits time fan is ON when user touches Fan symbol.	· Unlimited · 10 minutes · 20 minutes · 30 minutes · 60 minutes	
Switch Display Off at Night	By default, display brightness dims automatically if room light goes down. If setting is set to "Yes", it will switch OFF when room light goes below certain level.	Yes No	
Display Brightness	Setting defines display brightness on Thermostat.	0 to 100 in increments of 10	
Protection: Force cooling if temperature exceeds [°F]	If temperature rises above this value cooling will switch ON to protect home.	86 to 104 in increments of 1	
Protection: Force heating if temperature falls below [°F]	If temperature drops below this value heating will switch ON to protect home.	34 to 50 in increments of 1	
Compressor lockout [°F]	For future purposes. Will be hidden in the next software version.	(keep unchanged)	
Heat pump aux heat lockout [°F]	For future purposes. Will be hidden in the next software version.	(keep unchanged)	
Max. compressor cycles per hour, 1st stage	Limits how often compressor for stage 1 cooling is switched ON. Limiting compressor cycles saves energy and reduces wear. Stage 1 is controlled by Y1. Compressor is part of air-conditioner or heat pump.	1 to 6 in increments of 1	

Setting	Description	Options	Image
Max. compressor cycles per hour, 2nd stage	Limits how often compressor for stage 2 cooling will be switched ON. Limiting compressor cycles saves energy and reduces wear. Stage 2 is controlled by Y2. Compressor is part of air-conditioning or heat pump.	1 to 6 in increments of 1	
Max. heating cycles per hour, 1st stage	Limits how often compressor for stage 1 heating will switch ON. Limiting compressor cycles saves energy and reduces wear. Stage 1 heat is controlled by Y1. Compressor is part of air-conditioner or heat pump.	1 to 12 in increments of 1	
Max. heating cycles per hour, 2nd stage	Limits how often compressor for stage 2 heating will be switched ON. Limiting compressor cycles saves energy and reduces wear. Stage 2 heat is controlled by Y2. Compressor is part of air-conditioner or heat pump.	1 to 12 in increments of 1	
Humidity setpoint [%]	Defines desired humidity percentage when running a humidifier or dehumidifier.	20 to 80 in increments of 10	
Fan control	**Note:** Setting depends on type of equipment. *Thermostat-controlled* is safest option. Select when HVAC equipment does not control fan or if user is unsure. *Equipment-controlled* is more common. **Note:** User must validate system equipment has control over fan. If not, HVAC may overheat/freeze as it relies on being	· Thermostat-controlled · Equipment-controlled	

Setting	Description	Options	Image
	cooled/warmed by fan.		
Heat pump remains in a stage for a minimum of … [min]	Limits how often Thermostat will switch between 1st and 2nd stage heating or cooling sources.	10 to 25 in increments of 5	
High cool latch temperature [°F]	For future purposes. Will be hidden in the next software version.	(keep unchanged)	
High cool latch temperature [°F]	For future purposes. Will be hidden in the next software version.	(keep unchanged)	
Heating starts at… below setpoint [°F]	Thermostat starts heating if actual temperature falls below setpoint value. Not relevant in ECO mode.	32 to 50 in increments of 1	
Cooling starts at … above setpoint [°F]	Thermostat starts cooling if actual temperature exceeds setpoint value. Not relevant in ECO mode.	32 to 50 in increments of 1	
Switching delay between heating and cooling	If both heating/cooling are enabled, Thermostat can automatically switch between them, i.e. if house cools rapidly at night after hot day. Setting defines how quickly system will switch between heating and cooling modes. Medium is the recommended mode. **Note:** Default mode is “None”.	· None: Stays in original mode setting until user disables it · Low: Changes immediately between heating/cooling, changes can occur frequently · Medium: Changes between heating/cooling after a reasonable time, approx. 30 minutes to one hour · High: Waits several hours before switching between heating/cooling.	
User Mode	Select which icons are accessible from the main screen.	· Normal User: All icons available in settings menu · Power User: All icons displayed	

Setting	Description	Options	Image
		on main screen · Default Setting: Normal User	

4 Technical Data

4.1 Technical Data

Designation	Value
Operating Voltage*	24 V AC, 60 Hz
Wires	AWG18 to AWG22, Stranded Wires are NOT allowed
Wireless Transmission Protocol	free@home, 2.400 - 2.483 GHz, meshed
Ambient Operating Temperature	32°F to 104°F (0°C to 40°C)

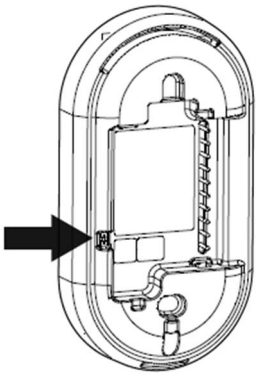
*__WARNING:__ DO NOT connect device to a voltage above 24 V

4.2 Wiring Connection

Terminal	Conventional Setup	Heat Pump Setup
Rc **	Cooling power, 24 V AC	Cooling power, 24 V AC
Rh **	Heating power, 24 V AC	Heating power, 24 V AC
C	Common, 24 V (from Rc)	Common, 24 V (from Rc)
Y1	Y1 Cooling (stage 1)	Heat pump compressor (stage 1)
Y2	Y2 Cooling (stage 2)	Heat pump compressor (stage 2)
G	Fan	Fan
W1	Heating (stage 1)	AUX heating (stage 1)
W2	Heating (stage 2)	AUX heating (stage 2)
ACC	For accessories*, operated by “AUX” symbol on display	For accessories*, operated by “AUX” symbol on display
O/B	Not used	Reversing valve

*Typical accessories: humidifier or de-humidifier

**If heating and cooling systems are 24 V AC separately (“2-transformer system”) please remove jumper on back of ABB Thermostat. See image below.



4.3 Supported Equipment

The ABB Thermostat works with the following equipment:

Equipment	Types
Conventional Heating Systems (Single and Dual-stage)	· Natural Gas · Propane · Oil · Electric
Conventional Air Conditioning	· Single-Stage · Dual-Stage
Heat Pumps – Heating and Cooling	· Air-Based · Geothermal · Electric Auxiliary - User can activate “Emergency Heating” to run heat pump with/without using compressor (auxiliary heating only).
Water-Based Systems	· Radiators · Underfloor Heating
Humidity Control	· Humidifier · De-Humidifier
Combinations	· Different Power Types: Stage 1 - Natural Gas and Stage 2 - Electric · Water-Based Heating and Air-Based Heating

5 Resetting the Device

Reset the Thermostat if it was previously assigned to a different System Access Point (SysAP). The reset will remove any previous connection and enable the device to connect to a new SysAP.

Reset procedure:

Touch and hold power OFF button for at least 15 seconds, until Thermostat starts to reboot.

ABB
Electrification Products
860 Ridge Lake Boulevard
Memphis, TN 38120
abb.com/freeathome

Customer Service:
800-816-7809
7:00 am – 5:30 pm, CST, Mon-Fri
elec_custserv@tnb.com

Technical Support:
888-385-1221, Option 1
7:00 am – 5:00 pm, CST, Mon-Fri
freeathome_techsupport@us.abb.com

For information about the many functions of this device, see the system manual at
abb.com/us/freeathome

NOTICE:
We reserve the right at all times to make technical changes as well as changes to the contents of this document without prior notice. The detailed specifications agreed upon apply for orders. ABB accepts no responsibility for possible errors or incompleteness in this document.

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