



# **Touchscreen Controller WIFI & Building Management System Connectivity Manual**

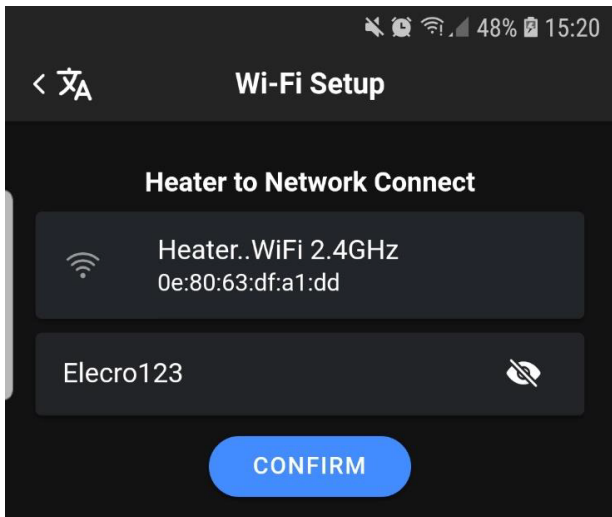


**CONNECTING THE TS CONTROLLER TO A WIFI NETWORK (THIS STEP IS DONE WITH THE PHONE AND THE TS CONTROLLER ONLY)**

1) Connect your mobile phone to the same WiFi network you want to connect the TS Controller to:

Network: Heater.WiFi 2.4GHz  
Password: Elecro123

2) Open the Elecro WiFi app  
Check the correct network is displayed in the network box and then enter the network password in the password field. Do not click 'CONFIRM' yet, please move on to step 3



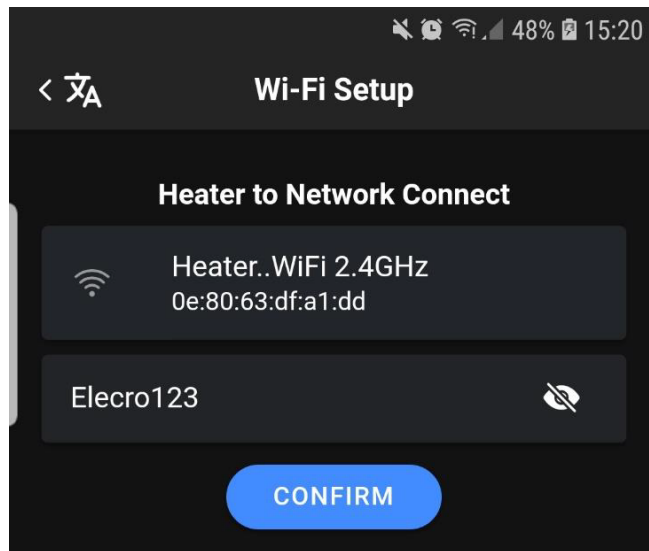
3) On the TS controller, press the “M” button four times, until the word “INSTALLATION” appears at the top of the display and press OK



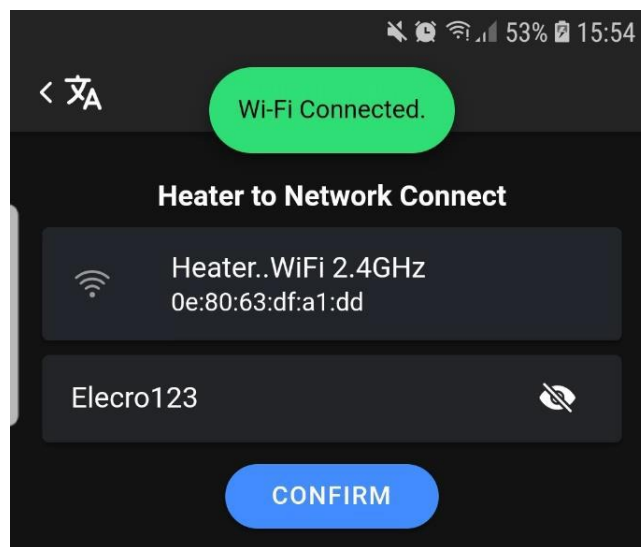
4) Now use the RED/BLUE directional arrows until “WiFi/BMS” appears at the top of the display, press OK

5) Now use the RED/BLUE directional arrows until “SET PORT” appears at the top of the display, press OK. Make a note of the 5-digit port number displayed and press OK.

6) Use the RED/BLUE directional arrows until “CONNECT WIFI” appears at the top of the display, press OK. When the word “CONTINUE?” appears at the top of the display, press OK and then immediately press the **CONFIRM** button on the phone app

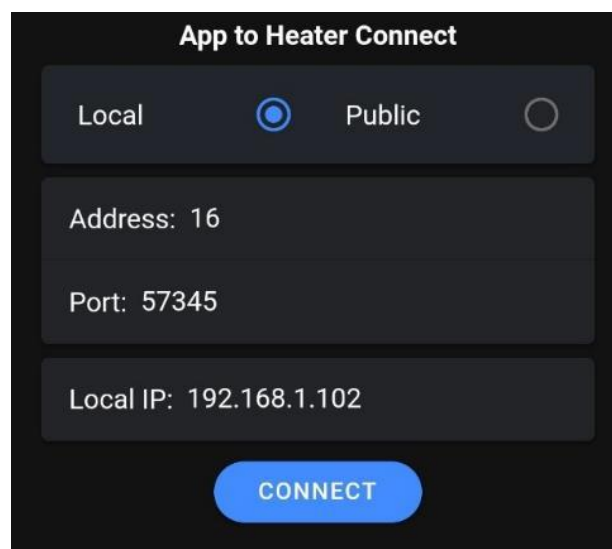


After approximately 30 seconds you should get confirmation on the phone that the connection was successful. If connected successfully the TS Controller will return to 'NORMAL'. If the connection failed, then it will return to the 'CONNECT WiFi' option. Please try to connect again if this happens.



### **CONNECTING THE APP TO THE TS CONTROLLER (THIS STEP IS DONE WITH THE PHONE ONLY)**

- 1) In the app select the 'Local' button. Enter the 'Address' as 16 and insert the 5 digit port number you made a note of earlier. Click 'CONNECT'. You should now see the TS Controller display.



## **NETWORK INSTALLATION PROCEDURE**

### **Step 1 – Phone**

The Heater WiFi works on 2.4GHz frequency and during the network connection process the phone has to connect to the Heater on 2.4GHz so you must make sure your phone is connecting to the wifi network at 2.4GHz or it will not be able to connect.

On Android go to Settings – WiFi and select the network the phone is connected to and the frequency is shown.

It must be 2.4GHz. If it's shown as 5GHz it won't work and must be changed to 2.4GHZ.

Once the Heater is connected to Network the phone can revert to 5GHz wifi as it no longer has to communicate directly with the Heater but communicates to the router and the router then communicates with the Heater.

### **Step 2 – Router Setup**

If remote communication via the internet is required, then you must have a Public IP address which is usually possible to get from your Internet Service Provider (ISP) if you don't already have one.

To check if you already have a Public IP address use <https://www.whatismyip.com/> or <https://whatismyipaddress.com/>. When the setup is completed the mobile phone App will normally have installed two IP addresses to communicate with Heater Controller – the Public IP Address and the Private IP Address - and also the Open Port number which will normally be the same for both addresses.

If internet communication is not required or if a Public IP address is unavailable for some reason the mobile phone can still be connected to the Heater Controller locally using just the Private Network.

Login to the router installation menu using your web browser (often the router address is 192.168.1.1) and enter your routers username and password. If these aren't known refer to the router user manual (commonly available online) and/or contact your ISP.

See <https://www.audioholics.com/home-theater-connection/how-to-login-wireless-router> for more information and common default usernames and passwords and also <http://www.routerpasswords.com/> specifically for passwords.

If your router is using the manufacturers default username and password it is strongly recommend changing both to improve your security.

It is highly recommended that once logged in to your router you create a Guest Network to isolate your Heater internet connection from the rest of your network connected equipment and so improve your overall system security. Look through the router menu options to find 'Guest Network' screen and set up the network. Most routers have online instructions how to do this if it's not intuitive in the router menu screens. Make sure you make a note of the Guest Network name and password as these will be needed later.

Now, with the Heater Controller powered on, look at the router **Network Map** screen and find the **Client** whose name begins "**ESP....**" and make a note of its local network (ie Private) IP address (often this is 192.168.1.xxx where 'xxx' is a number eg '121'). This address is usually allocated dynamically and potentially changes each time the router is powered on and is indicated as 'DHCP'. It's necessary to make the address stays the same so that the Heater Controller has a constant address to 'talk' to so select the ESP.... client in the router screen and then select the 'STATIC' option. This is sometimes shown as a padlock icon – open padlock is DHCP and closed padlock is STATIC.

On the Heater Controller go to the **Installation** menu and step through to the **WiFi/BMS** option and then to the **Set Port** option. The **Port** is selectable between **57000** and **57999** and it is recommended to choose a different port to the default to improve your security. Make a note of the Port number that has been selected.

On the router find the "**Virtual Server/Port Forwarding**" screen or its equivalent (usually it's in the WAN menu) and enable **Port Forwarding** by entering the ESP's Private IP address and the Port number both noted in the above steps.

Enable, Save and Apply as required by your particular router.

The router set up is now complete and should be logged out to prevent unauthorised access to the router setup menus.

### Step 3 - Connect the Heater to the Network

Using the Heater Controllers MODE and OK keys enter the Installation menu and step through to the **WiFi/BMS** menu.

Step through the WiFi/BMS options as follows:

- Check “**Baud**” is set to 115200 and touch OK.
- Check “**Address**” is set to the same Address as the App will be/is set to – default is 016 (decimal) – and touch OK.
- Check the “**Parity**” is set to Even and touch OK.
- Reconfirm the **Port** is set to the same value that was set in the router and touch OK.

The next option is “**Connect WiFi**” – touching OK will bring up “**Continue?**” message which gives the user the possibility of not continuing because if the OK key is not touched the screen will timeout back to “**Connect WiFi**”

*This is necessary as the first action of the Connect procedure is to delete any existing connections so if the user doesn't have their phone ready to do the connection, they will lose the connection they may already have which is potentially annoying.*

Before proceeding the mobile phone, connection app must be started. The mobile phone's WiFi must be connected to the same Private Network (as mentioned ideally this is a Guest Network) as the Heater Controller WiFi.

The mobile phone connection App will show the Private Network name and it should be the same as assigned earlier. If not go to the phone's 'Network' menu to select and connect to the correct WiFi network.

The Private Network password that was also assigned earlier should then be entered into the phone App.

The Heater Controller can now start the connection process by selecting **Connect WiFi** → **OK** → **Continue?** → **OK**. The Heater Controller then displays – “**Start Phone App**” & “**Enter Password**”. Selecting the “**Confirm**” button on the phone App will allow the App to attempt to transfer the network login detail to the Heater Controller.

The connection process takes ~30 secs and if is successful the phone App will indicate success and the Heater Controller will show “**WiFi Connected**” and then return the Heater Controller to the 'Normal' mode and the signal strength indicator will appear.

If unsuccessful both the Heater Controller and the App will show “**Connect Failed**” and then return to “**Connect WiFi**”.

Both cases timeout is automatic, and no user input is possible or required until the timeout has occurred.

### Common Reasons for Failing to Connect:

Phone on Wrong WiFi Network – Wrong Private IP Address – Poor WiFi Signal Strength

### Step 4 - Connect the App to the Heater

On the App 'Connect Heater to App' screen make sure that:

- the auto entered IP address is present and correct,
- the Product Address is present and correct
- the Port number is present and correct

if any of the above are incorrect they must be re-entered.

Touching the **CONNECT** key on the phone App will connect the App to the Heater and the Heater display will be replicated on the phone.

## **BUILDING MANAGEMENT SYSTEM (BMS)**

The Controller implements Building Management System (BMS) control using the standard 2 wire RS485 MODBUS communications in RTU mode.

The Modbus Baud Rate, Address and Parity can all be set in the Controller Installation options and may need to be adjusted to suit the installed BM System Master.

The default factory settings are: Baud =19200 Address = 16 (decimal) Parity = Even

**Note:** The Address is shown as a decimal number in the Installation menu.

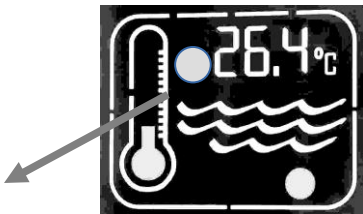
The Controller only recognises and responds to two commands:

**OFF** – puts the Controller into the Standby Mode.

**ON** – puts the Controller out of Standby and into the previously selected operating mode.

If the Controller is already in the requested mode, then there is no action

All other commands or messages received via the Modbus are ignored.



When any Modbus activity is recognised by the Controller the Red icon will flash to indicate that there has been Modbus activity.

Note that the Modbus activity may not be intended for or have the correct values for the Controller, but the icon will still flash to indicate bus activity.

The Controller operates either a 'Single Coil' ON or a 'Single Coil' OFF function as specified in the Modbus Application Protocol Specification.

For example, a Modbus message to turn **ON** might be:

User Adjustable Controller Address	Write to Single Coil	Single Coil Address	Comm and Turn ON	Error Check Calculated Automatically
<b>0x10</b>	0x05	0x00 0x01	0xFF 0x00	0xDE 0xBB

and to turn **OFF** the message would then be:

User Adjustable Controller Address	Write to Single Coil	Single Coil Address	Comm and Turn ON	Error Check Calculated Automatically
<b>0x10</b>	0x05	0x00 0x01	0x00 0x00	0x9F 0x4B

All the values are shown above are in hexadecimal.

**Note:** The only value in the above tables that is adjustable in the Installation Menu is the Controller **Address** (shown in bold). The other values are either fixed or, in the case of the Error Check, calculated by the system.

The BM System Master must be programmed to send the correct **Write to Single Coil, Single Coil Address** and **Command Turn ON/OFF** codes as shown above as well as the correct Controller **Address**.





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