

MCerberus[®] Hardware Installation Guide

MCB-4XX Series

Copyright© by RT Automation

All rights reserved.

Licensed Users of the MCerberus® unit(s) are allowed to make copies of this manual (as required) for their use. Otherwise, no parts of this work may be reproduced without the written permission of RT Automation.

Products that are referred to in this document may be either trademarks and/or registered trademarks of the respective owners. The publisher and the author make no claim to these trademarks.

While every precaution has been taken in the preparation of these documents, the publisher and the author assume no responsibility for errors or omissions, or for damages resulting from the use of information contained in this document or from the use of programs and source code that may accompany it. In no event shall the publisher and the author be liable for any loss of profit or any other commercial damage caused or alleged to have been caused directly or indirectly by this document.

Use of the MCerberus® product is subject to our End Users License Agreement (EULA) which is located on our website at www.mHVACmonitor.com.

CONTACT INFORMATION

RT Automation
14111 Bluff Grove Drive
San Antonio, TX 78216
Phone: 210-380-9890

Email: sales@MCerberus.com
Web: www.mHVACmonitor.com

TABLE OF CONTENTS

I. Introduction 4

II. Safety Summary 5

III. Key Features of the MCerberus® HVAC Monitoring Hardware..... 6

IV. Installation 7

V. MCerberus® Water Detection Hardware 9

VI. Necessary Components 11

VII. Networking Requirements..... 11

VIII. Programming/Configuring 12

IX. Unit Installation 14

X. Thermostat Signal Wire(s) Connections 18

XI. Run Mode 20

XII. Troubleshooting..... 21

XIII. Product Summary 22

XIV. FCC Test Results 23

XV. FCC Part 15 Compliance Test Results 24

XVI. Service Information 25

XVII. Customization 25

XVIII. Warranty 26

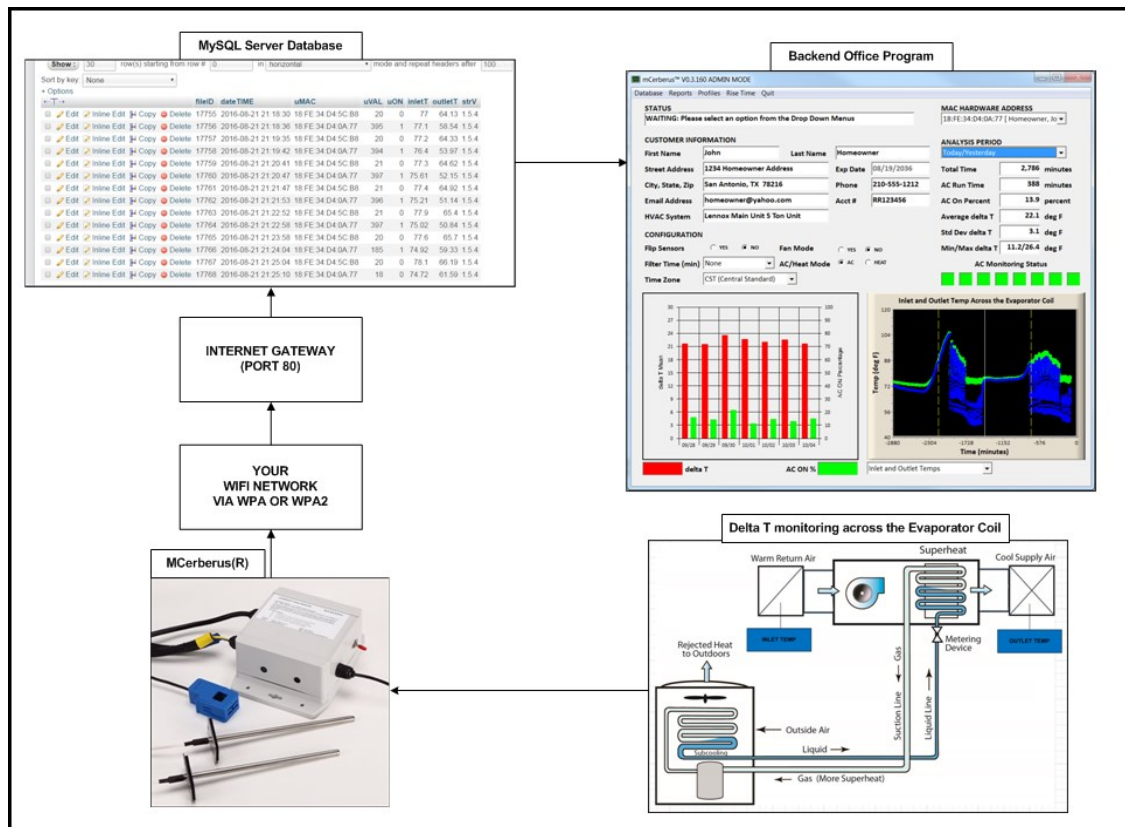
XIX. Enclosure 27

XX. Installation Qualification/Operational Qualification Summary Sheet 28

I. Introduction

Welcome to the MCerberus® Hardware Installation Guide. The following schematic illustrates the overall function of the MCerberus® product. The following are the major process steps of the SYSTEM:

- The SYSTEM includes a SCT-013 current probe is utilized to monitor the air handler blower fan.
- The SYSTEM includes two temperature sensor that are used to measure the Inlet and Outlet Temperatures. Your SYSTEM may include an additional (optional) room temp sensor.
- The SYSTEM includes an optional water detection sensor that is used to detect water in the drain pan. Your SYSTEM may include an optional delta P system for monitoring your HVAC filter.
- Every 60 seconds -- the SYSTEM measures the current draw and the Inlet and Outlet Temperatures. This data is written to a MySQL Database hosted on the Internet via a WiFi System. The WiFi System is provided by the End User.
- A Backend Office Software Application is used to analyze the stored data. We provide separate documentation for the installation and running of this software program.
- Our dedicated BackOffice server will monitor your system for you. We have a dedicated Server that downloads the data for your unit periodically. We will automatically send you an email if there is an issue.



II. Safety Summary

The following safety precautions apply to both operating and maintenance personnel and must be observed during all phases of operation, service, and installation of the SYSTEM. Before applying power, follow the installation instructions and become familiar with the operating instructions for this instrument. If this device is damaged or something is missing, contact US immediately. This manual contains information and warnings that must be followed to ensure safe operation as well as maintain the SYSTEM in a safe condition.

DO NOT OPERATE IN AN EXPLOSIVE ATMOSPHERE

Do not operate the SYSTEM in the presence of flammable gases or fumes. Operation of any electrical instrument in such an environment constitutes a safety hazard.

KEEP AWAY FROM LIVE CIRCUITS

Monitored equipment covers must not be removed by operating personnel. Installation of the MCerberus® unit must be made by qualified maintenance/electrical personnel. Disconnect the power cord before removing the monitored equipment covers and installing the MCerberus® current probe. Under certain conditions, even with the power cable removed, dangerous voltages may exist. To avoid injuries, always disconnect power, and then discharge circuits before touching them.

DO NOT SERVICE OR ADJUST ALONE

Do not attempt any internal service or adjustment unless another person, capable of rendering first aid and resuscitation, is present.

DO NOT SUBSTITUTE PARTS OR MODIFY THE INSTRUMENT

Do not install substitute parts or perform any unauthorized modifications to the MCerberus® product. Return the instrument to RT Automation for service and repair to ensure that safety features are maintained.

WARNINGS AND CAUTIONS

WARNING and CAUTION statements, such as the following examples, denote a hazard and appear throughout this manual. Follow all instructions contained in these statements.

A WARNING statement calls attention to an operating procedure, practice, or condition, which, if not followed correctly, could result in injury or death to personnel.

A CAUTION statement calls attention to an operating procedure, practice, or condition, which, if not followed correctly, could result in damage to or destruction of part or all of the product.

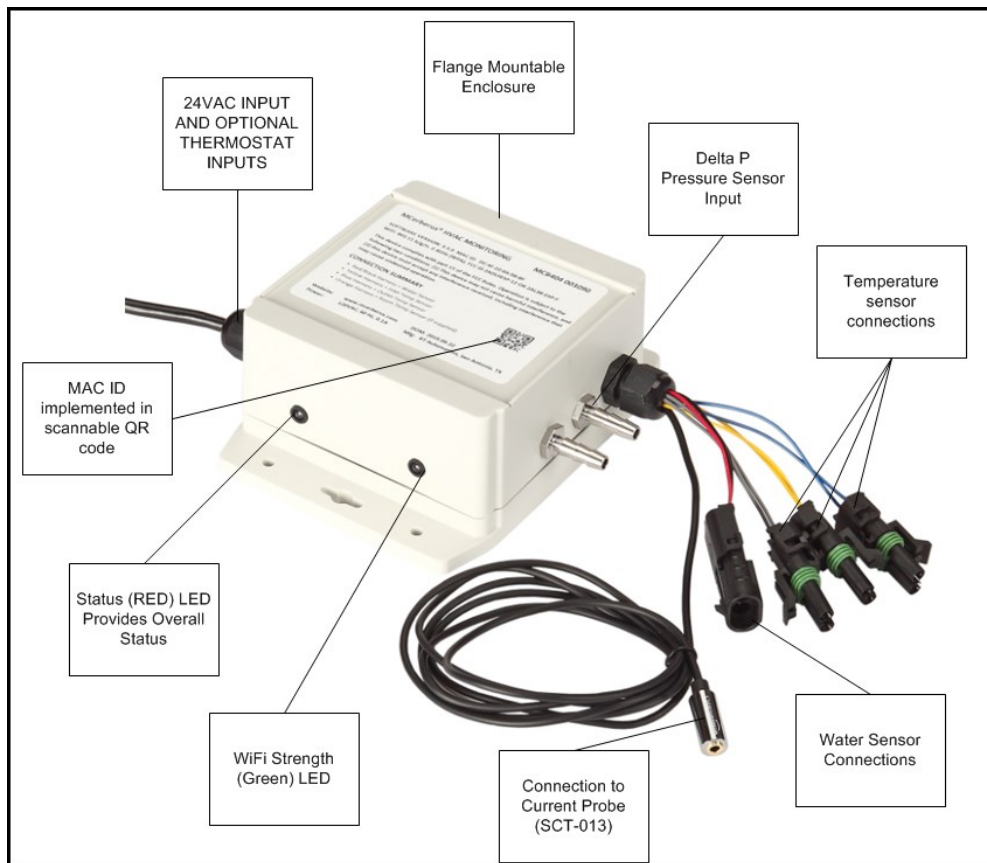
WARNING: Do not alter the ground connection. Without the protective ground connection, all accessible conductive parts (including control knobs) can render an electric shock.

WARNING: To avoid electrical shock hazard, disconnect power cord before removing covers. Refer servicing to qualified personnel.

CAUTION: Before connecting the line cord to the AC mains, check the rear panel AC line voltage indicator. Applying a line voltage other than the indicated voltage can destroy the AC line fuses. For continued fire protection, replace fuses only with those of the specified voltage and current ratings.

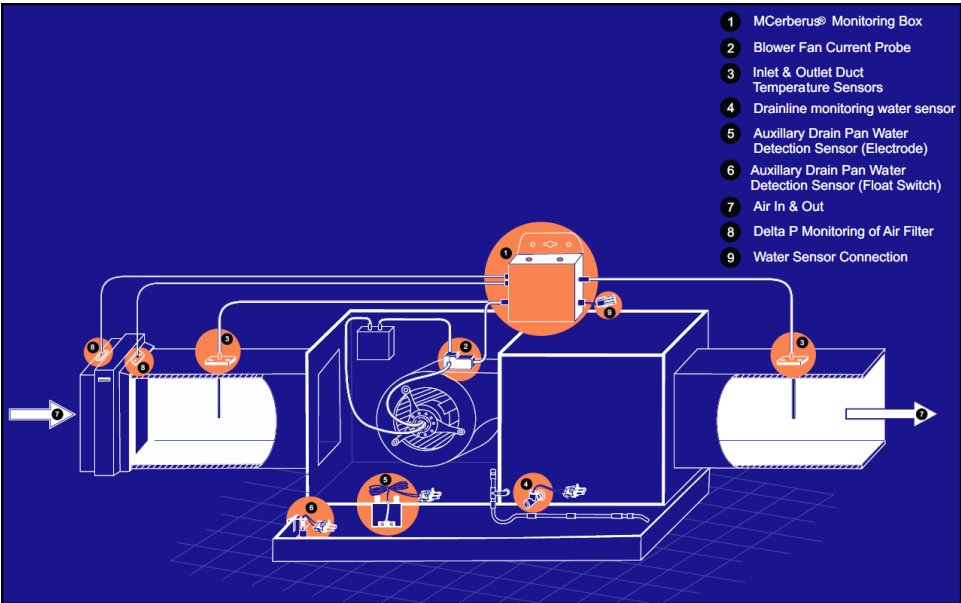
III. Key Features of the MCerberus® HVAC Monitoring Hardware

The following figure provides information with regards to key features of the MCerberus® supplied hardware.

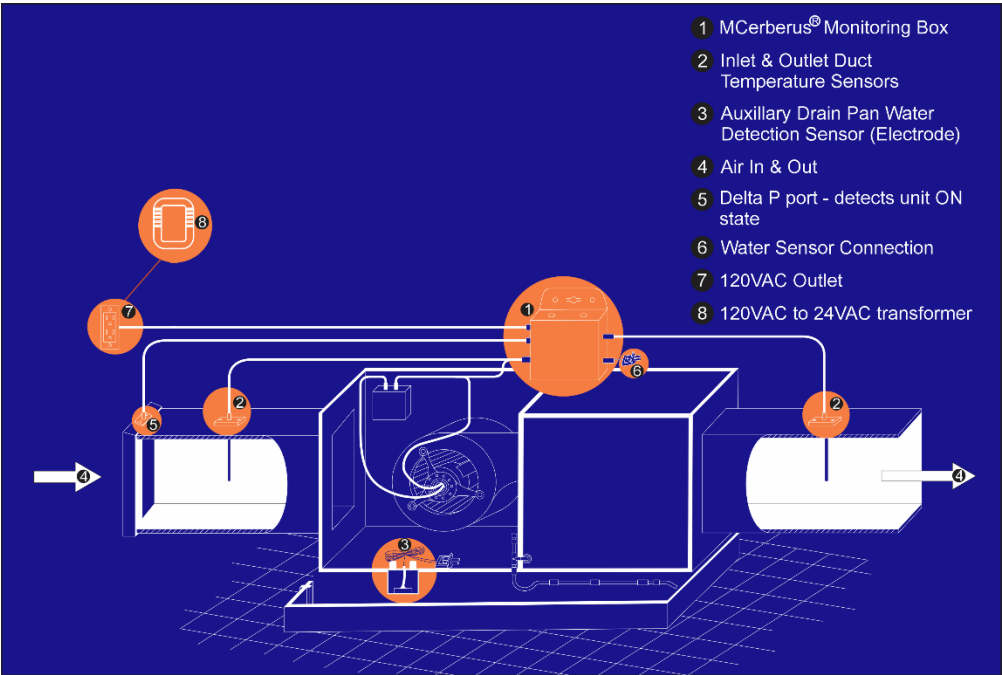


IV. Installation

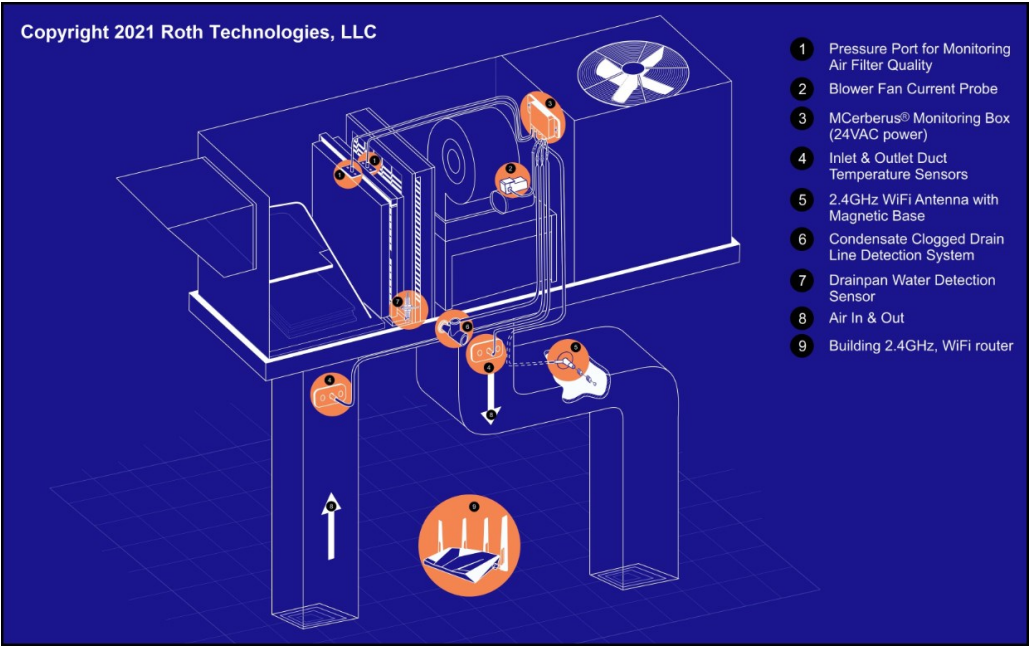
This schematic illustrates the complete installation for a residential unit (horizontal). This installation does not show the connection of the harness to the thermostat controls.



This schematic illustrates a simple installation for a residential air handler. It provides 95 percent of the monitoring capabilities of the complete install. The installer does not need to open up the air handler or make any electrical connections. The disadvantage is that the system will not immediately alert to a catastrophic shutdown event.



This schematic illustrates the typical installation for a Roof Top Unit



If you have any questions with regards to an installation – please email us your proposed schematic (especially if you deviate significantly from these outlines).

V. MCerberus® Water Detection Hardware

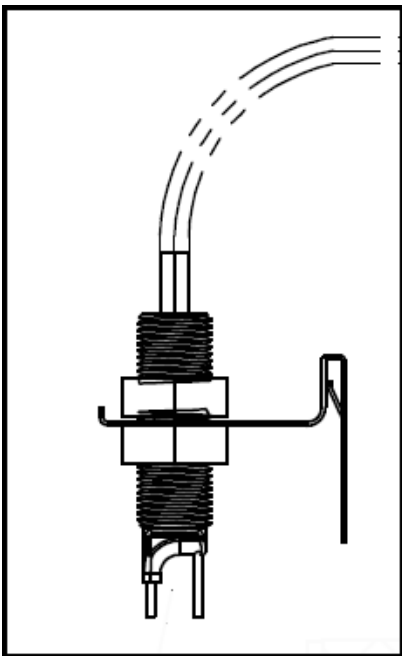
Depending on part number purchased the System may also include an optional Water Detection System. These sensors **ONLY** detect the presence of water but they will **NOT** shut the system OFF if water is detected.

There are three water sensors available:

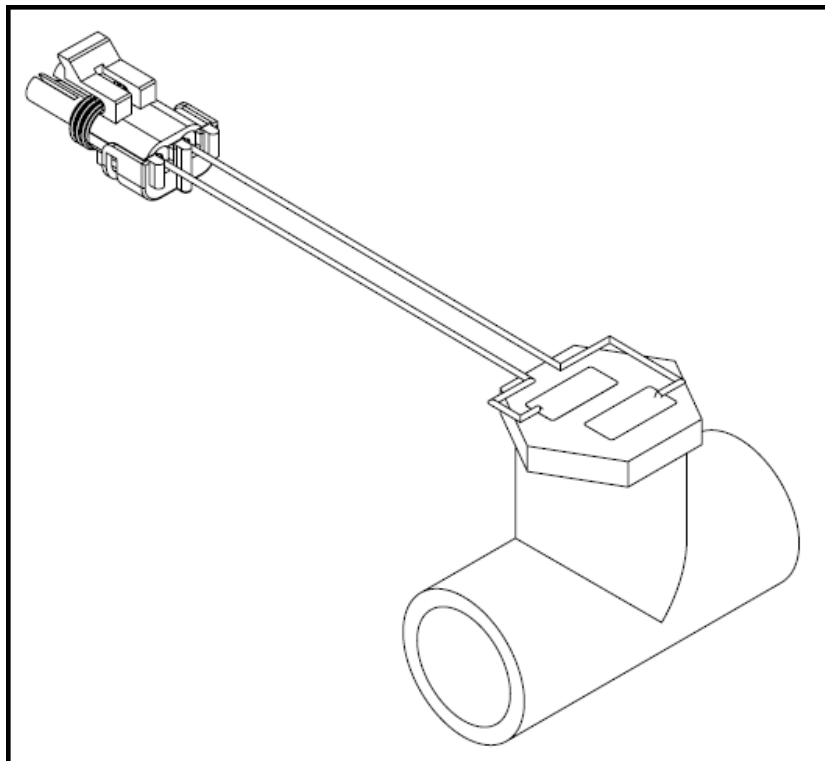
- Drain pan (sits on the tray)



- Drain pan mountable (mounts onto the tray itself)



- Drain line



VI. Necessary Components

The following components are necessary in order to run the SYSTEM:

1. The MCerberus® Hardware unit (MCB-4XX) which includes a current probe and a minimum of two temperature sensors (inlet and outlet). Optional room temperature sensor is provided depending on the part number purchased.

2. Power: The Monitoring Hardware is available in two different power options:

- a. 120VAC, 60Hz power: The AC/DC converter integrated into the device will accept between 80-240VAC power input (single phase)
- b. 24VAC power – typically available via the HVAC unit (120VAC to 24VAC adapter)

3. The SYSTEM requires access to your WiFi. If you do not have access to WiFi coverage where the SYSTEM is to be placed -- the SYSTEM will not operate. We do not provide this service.

4. Equipment or process: You must have access to the Air Handler of the Air Conditioner or Furnace. In order for the SYSTEM to monitor the process, you must be able to place (or clamp) the current probe around one (1) of the Equipment's power lines.

- Note: Working with high voltage electrical service is potential hazardous. The installation of the current probe must be completed by qualified personal (see Section II Safety Summary).
- The current probe (that we provide) must be sized properly to the equipment being monitored. Standard sizes provided at the time this document was written are 5A, 10A, 20A, 30A, and 50A. **Using too small or large of a current probe can lead to the SYSTEM not operating correctly and/or the SYSTEM being permanently damaged.**

VII. Networking Requirements

1. The SYSTEM requires access to your WiFi and also the Internet. We do NOT include these services with the SYSTEM.

- If you do not have access to WiFi coverage where the SYSTEM is to be placed -- the SYSTEM will not operate.
- If there is no WiFi coverage where the SYSTEM is to be placed -- the SYSTEM will not operate.
- If the WiFi signal strength is less than -75 dB, then the SYSTEM reliability and performance in sending text messages may be derated significantly. If your WiFi strength is too low -- we recommend the purchase and implementation of a WiFi Range Extender (not provided).
- SYSTEM supports 802.11 b/g/n, 2.4GHz (no security)

2. Ports 80 and 2525 on your WIFI gateway must be open. These Ports are utilized by the SYSTEM in order to transmit data to our MySQL Server. If you do NOT program the SYSTEM -- the system will not operate.

VIII. Programming/Configuring

The MCerberus® product allows for "in the field" configuration which requires following a very specific "power-on" sequence of steps. This section provides this information so you can setup your MCerberus® for use in your facility.

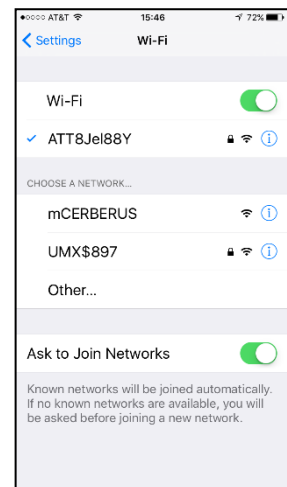
1. **Make sure that the device is OFF** (i.e. power to the unit must be completely removed). The AC current probe does NOT have to be connected to the monitored equipment during programming.

2. **Disconnect ALL of the temperature sensors from the Hardware Box.**

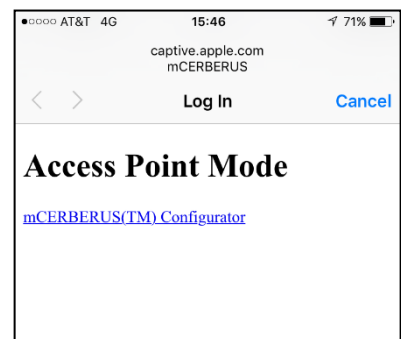
3. **Connect power (as applicable) to the unit and WAIT.** After approximately five (5) seconds -- the LED will flash rapidly (ON/OFF/ON) for two seconds and then remain ON. This LED flashing is the SYSTEM acknowledgement that you are entering program mode.

4. User: Log into the SYSTEM using your Smart Phone. The Network name of the SYSTEM is called **MCerberus** (as illustrated).

- If you are using an iPhone -- simply click on this Network name to gain access to the unit. After you click on this Network name -- your web browser will automatically open up to the Access Point menu
- If you are using something other than an iPhone (like a laptop with WiFi capability) -- configure your laptop to gain access to the MCerberus WiFi Network. Then open a web browser on your laptop and type in "194.168.1.1" into the web browser address bar and press ENTER.



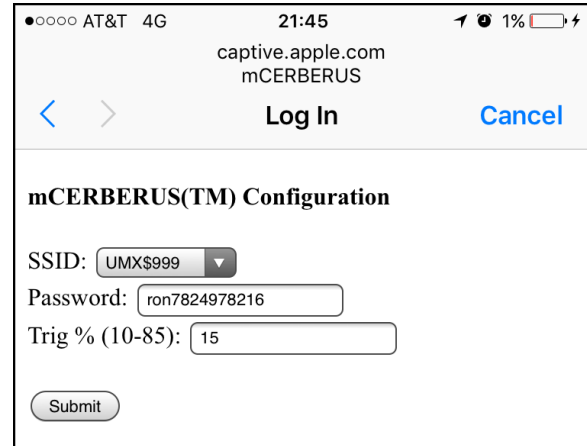
5. User: The following screen should appear on your browser screen. Select the **MCerberus® Configurator** link to enter the SYSTEM configuration screen.



6. User: The **Configuration** screen will appear.

SSID: Select the SSID from the drop down dialog box. The SYSTEM polls and records all current available WiFi Networks in the vicinity. The SYSTEM must be in the area where your designated WiFi Network is operating AND the WiFi Network must be actively broadcasting its name.

Password: Enter the WiFi Network Password. Note: If you enter the WiFi password into the system wrong -- the SYSTEM will NOT function correctly.



The screenshot shows a mobile device screen with a captive portal for mCERBERUS. At the top, the status bar shows AT&T 4G, 21:45, and 1% battery. Below the status bar, the text 'captive.apple.com' and 'mCERBERUS' is displayed. There are navigation arrows on the left and 'Log In' and 'Cancel' buttons on the right. The main section is titled 'mCERBERUS(TM) Configuration'. It contains three input fields: 'SSID:' with a dropdown menu showing 'UMX\$999', 'Password:' with a text box containing 'ron7824978216', and 'Trig % (10-85):' with a text box containing '15'. A 'Submit' button is located at the bottom of the configuration section.

Select the Submit button: When you have configured the system -- select the **SUBMIT** button. Wait approximately ten (10) seconds for the information to be written to EEPROM.

7. User: **Cycle Power to the SYSTEM by unplugging the power cord.** Wait a minimum of five (5) seconds. If you wish to check to see if your unit connects to your WiFi, you will need to connect the inlet/outlet temperature sensors AND then reconnect power to the unit. Use our mobile app to determine that data is properly being written to the back office database.

NOTE: This step is VERY important if you happened or plan to have multiple units in the immediately vicinity. If you do not complete this step, the SYSTEM will/may continue to broadcast the MCerberus® as an available Network Access Point when in fact it is NOT available. The only way to remove this AP Name Broadcast is by completely removing power to the Unit after configuring it.

In addition - if you do NOT cycle power after updating it you leave the SYSTEM in an unstable condition such that the Internal WatchDOG program may or may not operate correctly. If the Unit is in this condition and attempts to reboot itself -- the SYSTEM will "lock up" and will not operate correctly.

IX. Unit Installation

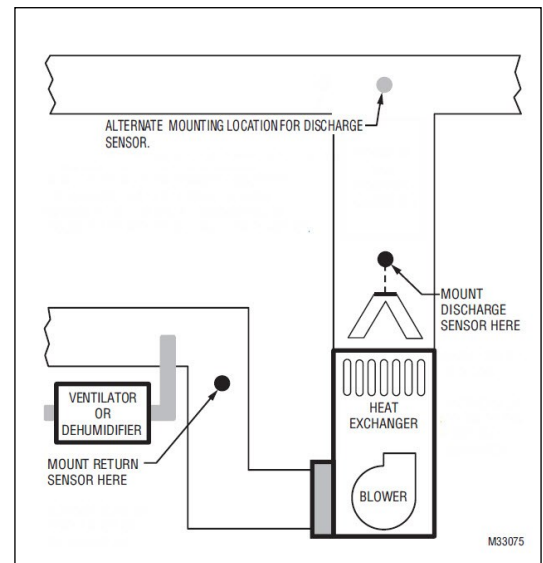
This section provides necessary instructions for proper installation of your MCerberus® unit. This installation should be completed AFTER you have configured the unit.

WARNING: The following steps should be completed by someone experienced with electrical systems. If these steps are not followed -- the installation may not be successful, the installer may be electrically shocked/harmed/killed, and the MCerberus® unit may be damaged.

WARNING: Do NOT clamp the SCT013 current probe onto circuits where voltages exceed 480 VAC. Personal injury or damage to the MCerberus® unit may result.

The following figures provide illustrations of the installation of the temperature sensors as well as the mounting point for the Main Unit.

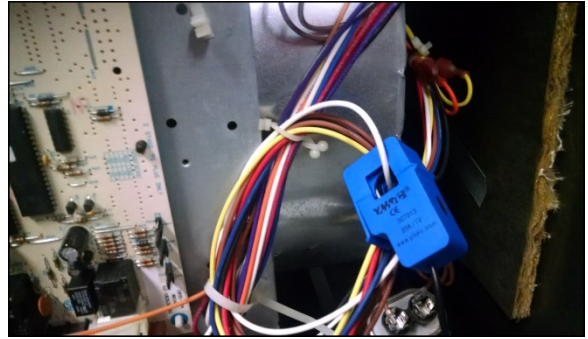
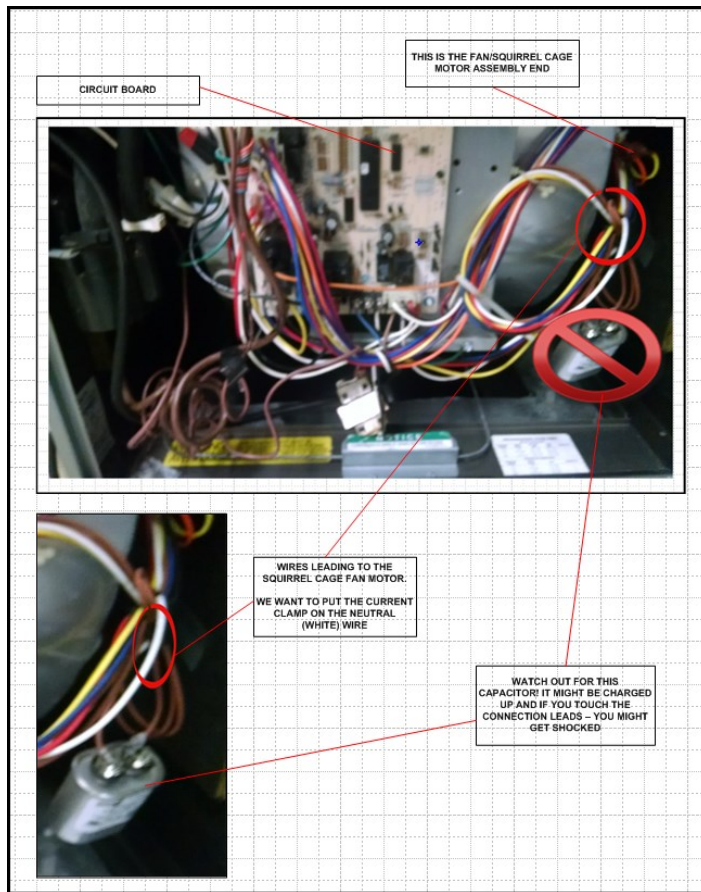
1. Mount the Main Unit. The flange mountable case allows for installation of the SYSTEM to a wall or on top of the air handler. NOTE: The SYSTEM is a sensitive piece of electrical equipment. Do not drop, shake, rattle, or roll it.



2. Turn OFF the power to the air handler that is to be monitored by the MCerberus® system.

NOTE: The MCerberus® system utilizes a SCT013 current probe to determine the machine state. A current clamp or current probe is an electrical device having two jaws which open to allow clamping around an electrical conductor. This allows properties of the electric current in the conductor to be measured, without having to make physical contact with it, or to disconnect it for insertion through the probe. The SYSTEM only works with detecting alternating currents (not DC). This current probe may or may not work with smart (ECM) blower fans.

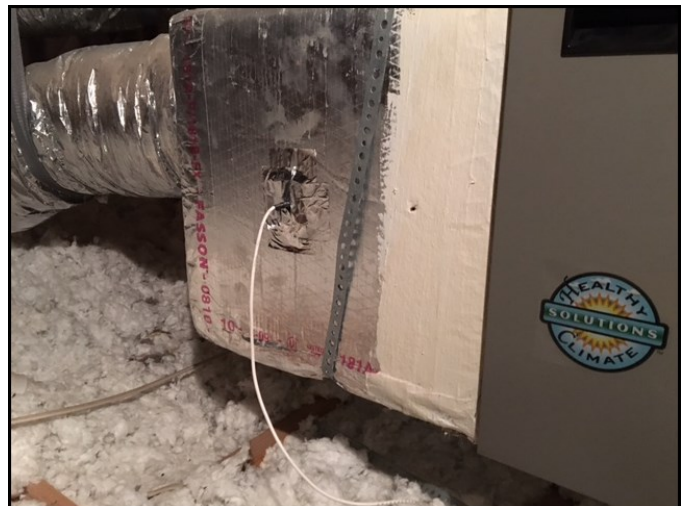
3. Remove the main cover to the air handler and identify the Input Power to the Blower Fan Motor. Place the SCT013 current probe around the WHITE conductor. Ensure that the SCT013 jaws are completely CLOSED.



WARNING: If the SCT013 current probe jaws are not completely closed -- then the current measurement by the SYSTEM will be adversely affected. The SYSTEM will not operator and/or will operate inconsistently. Clamping the SCT013 current probe around both wires WILL give you a zero reading and the MCerberus® unit will not operate correctly.

4. Route the SCT013 cable (as necessary) so that it may be connected to the Main Unit. Then reinstall the main cover to the air handler.

5. Install the Inlet Temperature Sensor. This sensor should be placed approximately 18 to 24 inches before the heat exchanger in the air duct. The sensor may be installed horizontally or vertically BUT it should be centered in the middle of the duct as shown. We typically use metal foil duct tape to secure the sensor in place (not provided).



6. Install the Outlet Temperature Sensor. This sensor should be placed approximately 18 to 24 inches after the heat exchanger. The sensor may be installed horizontally or vertically BUT it should be centered in the middle of the duct as shown. Use metal foil duct tape to secure the sensor in place.

NOTE: In many cases -- there will be a temperature sensor port/opening that already exists in the duct that was used during the HVAC installation.

7. Connect the Inlet Temperature Sensor to the SYSTEM. The sensor connection has Yellow insulated wires. On an AC system -- the Inlet temperature is warm.



8. Connect the Outlet Temperature Sensor to the SYSTEM. The sensor connection has blue insulated wires. On an AC system -- the outlet temperature is cold.

9. Optional depending on part number purchased: Install the optional room temperature to the SYSTEM.

10. Optional depending on part number purchased: Install the dP ports before and after the HVAC filter. Connect the supplied tubing from the dP ports to the ¼" flanged ports on the monitoring box. A simplified install of the delta P monitoring system may be completed by only connecting the dP port that is after the HVAC filter and the dP port before the HVAC filter remains unconnected. The dP sensor utilized will measure up to 2 inches of H₂O.

11. Install the applicable water detection sensor and make the cable connection from the sensor to the monitoring box.

12. For 24VAC systems – connect the provided harness connection points as follows:

- 24VAC common (Black Wire)
- 24VAC Power (Red Wire)
- Thermostat Stage 1 Cooling Command (Yellow Wire)
- Thermostat Stage 2 Heating Command (White Wire)

Additional information w/ regards to the connection of the thermostat monitoring wires (yellow and white) is provided in Section X of this document.

13. Restore power to the piece of equipment to be monitored At this point, the MCerberus® system is active.

14. You should verify proper operation (Installation Qualification/Operational Qualification) of the MCerberus® unit when first installing it.

These steps are summarized here:

- a. Confirm that the SYSTEM has connected to the programmed WiFi network. If the RED LED light is flashing ON/OFF very quickly -- this indicate that the SYSTEM has NOT logged into the WiFi system. See Section VI of this document.
- b. The GREEN LED on your unit will indicate the quality of the WiFi signal to your box.

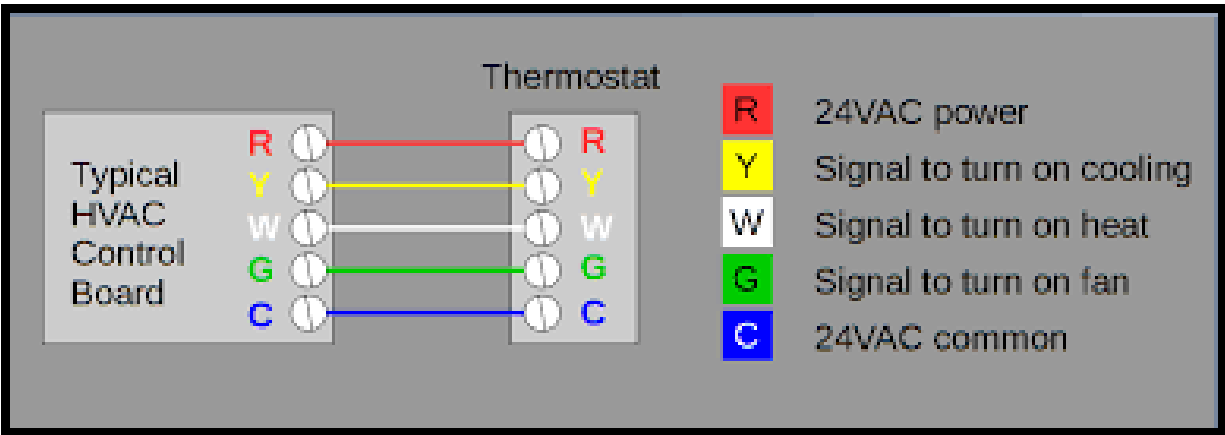
We recommend using the mobile app (iPhone and/or Android) to confirm the following attributes of your system using the [Current Status] menu option.

- Inlet temperature
- Outlet temperature
- Room Temperature (if installed)
- Blower current. Values for this range from 0 to 1000. If you have a 20A current probe installed then a value close to zero = 0 amps. A value close to 1000 = 20 A. A value close to 500 = 10 A. These values are actual current readings and NOT rms so if you are comparing values to a real Fluke current meter you will need to multiple the Fluke values by 1.41.
- dP reading (inches of water) – if installed.
- Water sensor reading
 - A voltage above 3 V = no water detected
 - A voltage below 3 V = water detected. Typical water detection voltage will be on the order of 0.8 to 1.5 VDC.
- Thermostat signals (call for heat or cooling)
- WiFi signal strength:
 - Value should be greater than -75 dBm.
 - The unit will operate if the signal strength is between -75 dBm to -80 dBm.
 - The unit may lose packets of data to the Server if the signal strength is smaller than -80 dBm.
 - The unit will go off line periodically if the signal strength is smaller than -85 dBm.
 - If your WiFi signal strength is too low (i.e. less than -75 dBm) your system is not installed optimally. You will need to install a WiFi signal booster and/or purchase a larger antenna from our company (part number ATN-002).
- If you have installed / connected the thermostat inputs to your system ensure that these inputs are being read properly by the monitoring system.

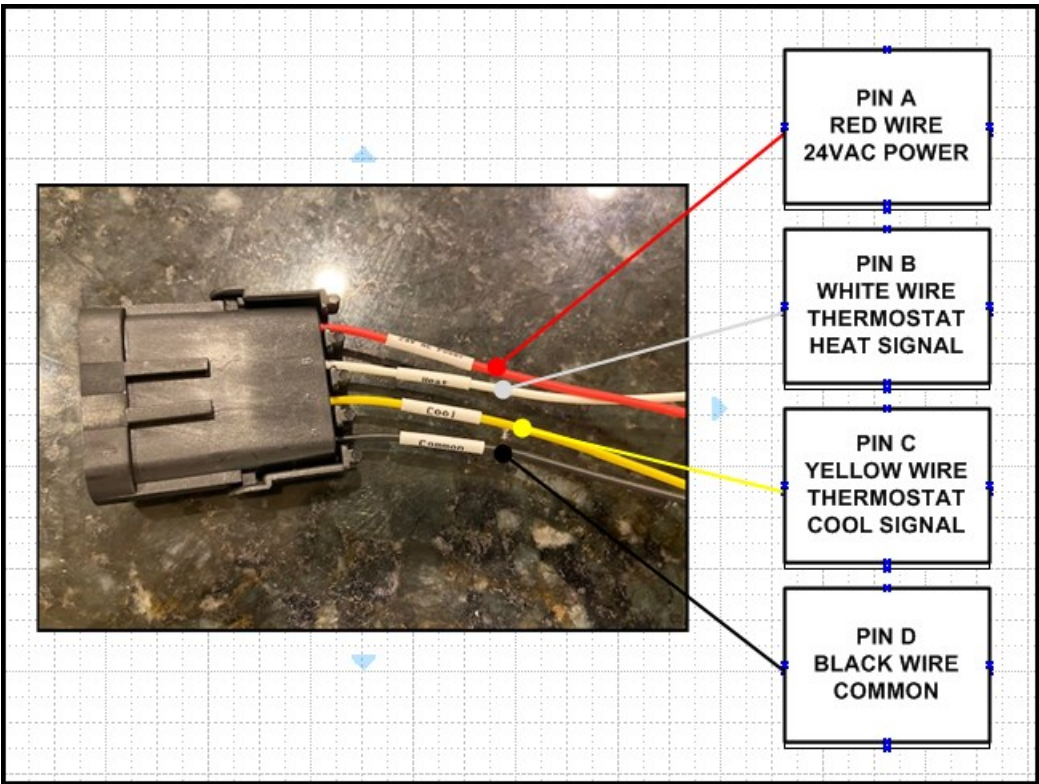
Use the Current Status menu option on the HVAC monitoring mobile application to ensure that all values are being properly read and transmitted to the Server.

X. Thermostat Signal Wire(s) Connections

Our updated products, MCB-410 and MCB-414, allow for the direct monitoring of the thermostat signal (control) wires. The following figure shows the typical wiring between the HVAC control board and the thermostat.



A power and thermostat signal connection is integrated into the MCerberus® monitoring box. Each of the wires is identified by the following schematic.



In some cases a thermostat that is connected to a system (i.e. our monitoring system) that has a high impedance input the control signals from the thermostat may be corrupted. In these cases the thermostat relay allows some leakage current through the relay in the OFF state rather than being rated for infinite resistance. This results in some systems identifying the relay OFF state as being ON (incorrectly).

Our monitoring system includes an insulation unit in the monitoring box. As a result, there is no need to install an external isolation relay.

XI. Run Mode

When the SYSTEM is first powered up (and assuming the User is not attempting to program or configure it via Section VI), the first operational step that the SYSTEM takes is to login to your WiFi system. The SYSTEM will indicate to the User that it is trying to log into the WiFi system by flashing the LED for a few seconds (typically 2 to 6 seconds) during the login process.

- If the LED flashes quickly for more than 25 seconds continuously, that is an indication that the SYSTEM was UNABLE to login to your WiFi system. Failure modes are the following:
 - Incorrect WiFi information entered (typically the password)
 - Your WiFi system does not support WPA or WPA2
 - The WiFi signal strength is too low

After completing the WiFi login process was successful the SYSTEM will enter run mode:

- When the air handler is ON -- the Red LED light will be ON for 1.9 seconds and OFF for 0.1 seconds (i.e. mostly ON) and then repeats itself.

NOTE: When the Red LED light is "mostly" ON indicates that the MCerberus® believes that the piece of equipment is ON

- When the air handler is OFF -- the Red LED light will be ON for 0.1 seconds and OFF for 1.9 seconds and then repeat itself (i.e. mostly OFF).
- NOTE: When the Red LED light is "mostly" OFF indicates that the MCerberus® believes that the piece of equipment is OFF
- The GREEN LED gives an indication of WiFi Signal Strength

Every minute the SYSTEM will communicate with our MySQL server. This takes approximately 3 to 6 seconds. The Red LED will be constantly ON when data is being transmitted.

XII. Troubleshooting


FAULT CONDITION	CORRECTIVE ACTIONS
The LED light just flashes rapidly	<p>Your SYSTEM was unable to connect to the WiFi system.</p> <ul style="list-style-type: none"> . Ensure that the WiFi Network is ON . Ensure that the WiFi Signal Strength is at least -75 dBm <p>If these are proper -- you will then need to make sure that the system was configured properly. See Section VI of the User's Guide</p> <p>If the WiFi strength at the installation point is weak -- you may need to install a WiFi range extender. We require the use of TP-Link AC2600. We do NOT provide this range extender as part of the kit. Cheaper units may or may not work properly.</p>
LED Light is not ON	Ensure AC Power Cord is plugged into Power (120VAC, 60Hz)
The SYSTEM never detects a machine state change (air handler)	<ul style="list-style-type: none"> . Make sure the current clamp is properly installed . Make sure the SYSTEM is ON (engaged). . Make sure the current clamp is connected to the Hardware Box
I am unable to configure the unit	See Section VI of the User's Guide
No information is being written to the MySQL database	<p>Ensure that the System is connected to the WiFi network</p> <p>Ensure that Port 80 is open on your Network</p> <p>Ensure that the ON/OFF switch is set to ON</p> <p>Ensure that the System is powered (LED light is ON)</p>
I installed the temperature sensors backwards and I do not want to go fix it	The back end office software application allows you to "flip" the sensors. Set this parameter and save it for the Installation and the problem is fixed.

XIII. Product Summary

Main Unit Size:	4.7x4.7x2.5" (flange mountable), IP Rating: IP52
Electrical Requirements:	120 VAC 60 Hz, less than 1 Amp current 85 ~ 305VAC input, 47-63 Hz, less than 5 Watts. Comply with EN55032 Class B without any additional components. Optionally: 24VAC powered units are available.
WiFi	802.11 b/g/n, 2.4GHz, supports WPA WiFi systems
WiFi Network Signal Strength:	-80 dBm minimum. If the signal strength is less than this value than data packets may be lost
Network Requirements:	Ports 80 and 2525 must be open on your network
Current Detection	SYSTEM only works with detecting alternating current levels (not DC or direct current)
Operating Temperature:	-20 to 60 degrees C. We have six years of field tests within this operating environment
Humidity:	5 - 95% RH (non-condensing)
Vibration:	Not rated. Item is a sensitive piece of electrical equipment
Temperature Sensors:	10K Type II Thermistors
Current Sensor:	SCT-013 alternating current sensor
Water Sensor:	Low profile water sensor, super-sensitive dual probe trigger alerts quickly. Inspect annually and if there is any corrosion or damage the sensor should be replaced.
State Change Time:	The MCerberus® product takes approximately fifteen (15) seconds to recognize an air handler state change
Modes:	System works with analyzing the delta T across the evaporator coil in air conditioning systems and/or heating systems
Warranty:	24 months from date of shipment. We retain the right to repair or replace failed units. See Section XIII.

XIV. FCC Test Results

The following test reports provides the FCC Test Results Certification for the WiFi Modules used in the SYSTEM. This SYSTEM complies with Part 15 of the FCC rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference and (2) this device must accept any interference received, including interference that may cause undesired operation.



Page 3 of 58

Report No.: NTEK-2017NT04142711F

1 TEST RESULT CERTIFICATION

Applicant's name	ShenZhen Doctors of Intelligence & Technology Co.,Ltd.
Address	4F, Building 2, Science & Technology Industrial Park, Pingshan Xili, Nanshan District, Shenzhen
Manufacturer's Name	ShenZhen Doctors of Intelligence & Technology Co.,Ltd.
Address	4F, Building 2, Science & Technology Industrial Park, Pingshan Xili, Nanshan District, Shenzhen
Product description	
Product name	ESP-F WiFi Module
Model and/or type reference	ESP-F
Serial Model	ESP

Measurement Procedure Used:

APPLICABLE STANDARDS	
APPLICABLE STANDARD/ TEST PROCEDURE	TEST RESULT
FCC 47 CFR Part 2, Subpart J:2016	Complied
FCC 47 CFR Part 15, Subpart C:2016	
KDB 174176 D01 Line Conducted FAQ v01r01	
ANSI C63.10-2013	
FCC KDB 558074 D01 DTS Meas Guidance v03r05	

This device described above has been tested by NTEK Testing Technology Co., Ltd., and the test results show that the equipment under test (EUT) is in compliance with the FCC requirements. And it is applicable only to the tested sample identified in the report.

This report shall not be reproduced except in full, without the written approval of NTEK Testing Technology Co., Ltd., this document may be altered or revised by NTEK Testing Technology Co., Ltd., personnel only, and shall be noted in the revision of the document.

The test results of this report relate only to the tested sample identified in this report.


Date of Test : 14 Apr. 2017 ~ 08 May. 2017

Testing Engineer : Lebron Wang
(Lebron Wang)

Technical Manager : Jason Chen
(Jason Chen)

Authorized Signatory : Sam. Chen
(Sam Chen)

NTEK-11.05.1005 V1.1



Page 2 of 56

Report No.: BCTC-141211251E

TEST RESULT CERTIFICATION

Applicant's name	Shenzhen Anxinke technology co., LTD
Address	5A,B Building,Gushu WanLiHua Industrial,XOXiang Town, BaoAn District,ShenZhen,China
Manufacturer's Name	Shenzhen Anxinke technology co., LTD
Address	5A,B Building,Gushu WanLiHua Industrial,XOXiang Town, BaoAn District,ShenZhen,China
Product description	
Product name	WiFi Module
Model and/or type reference	ESP-12
Serial Model	ESP
Standards	FCC Part15.247
Test procedure	ANSI C63.4-2003

This device described above has been tested by BCTC, and the test results show that the equipment under test (EUT) is in compliance with the FCC requirements. And it is applicable only to the tested sample identified in the report.


This report shall not be reproduced except in full, without the written approval of BCTC, this document may be altered or revised by BCTC, personal only, and shall be noted in the revision of the document.

Test Result.....: **Pass**

Prepared by(Engineer): Eric Yang

Reviewer(Quality Manager): Sophie Lu

Approved & Authorized Signer(Manager): Casey Wang



XV. FCC Part 15 Compliance Test Results

FCC Compliance Our device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation. Changes or modifications not expressly approved by the party responsible for compliance could void the user’s authority to operate the equipment.

FCC Part 15 This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications.



XVI. Service Information

Warranty Service: Please contact us in order to obtain an RMA #. Clearly state on the RMA the performance problem and return any leads, probes, connectors and accessories that you are using with the device.

Non-Warranty Service: Please contact us to obtain an RMA #. Return the product in the original packaging to the address below. Clearly state on the RMA the performance problem and return any leads, probes, connectors and accessories that you are using with the device.

Our Non-Warranty Service does not include return shipping. Return shipping to locations in North America is included for Warranty Service.

RT Automation
14111 Bluff Grove Drive
San Antonio, TX 78216
Phone: 210-380-9890
Web: www.mHVACmonitor.com
Email: sales@MCerberus.com

Include with the returned instrument your complete return shipping address, contact name, phone number and description of problem.

XVII. Customization

We pride ourselves on customer service. If you want your SYSTEM customized -- please contact us. We typically do this at no charge (but we are not making any promises).

The latest version of the software application for this device is available on our website at www.mHVACmonitor.com. As a licensed User of this program -- you have availability to the latest version at no charge (including any and all updates to the application). Please see our End User License Agreement for more details.

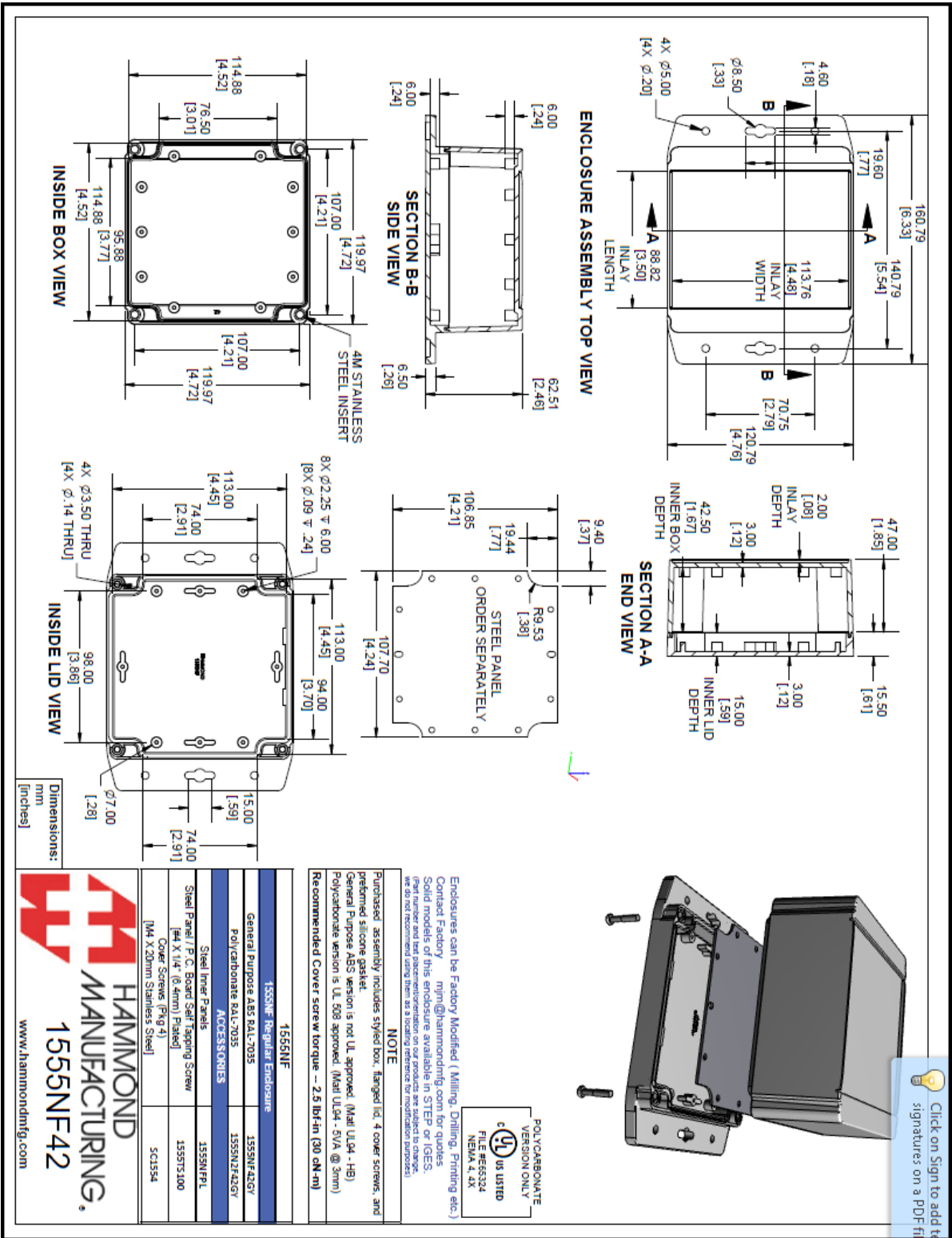
XVIII. Warranty

RT Automation warrants to the original purchaser that its products and the component parts thereof, will be free from defects in workmanship and materials for a period of 24 months from the date of purchase. We will, without charge, repair or replace (at OUR option) defective product or component parts. Returned product must be accompanied by proof of the purchase date in the form of a sales receipt.

Exclusions: This warranty does not apply in the event of misuse or abuse of the product or as a result of unauthorized alterations or repairs. The warranty is void if the serial number is altered, defaced or removed. RT Automation shall not be liable for any consequential damages, including without limitation damages resulting from loss of use. If this exclusion provision is not acceptable then we require that you return the unit to us for a full refund within the first 30 days of purchase.

This warranty gives you specific rights and you may have other rights, which vary from state-to-state.

XIX. Enclosure



XX. Installation Qualification/Operational Qualification Summary Sheet

MCB-400 HVAC Installation Qualification/Operational Qualification Summary			
Item	Requirement	Initials	Date
MAC ID	Record MAC ID or Product SN and identify unit to actual customer installation		
Main Unit Install	Unit is mounted to a wall or to a stable location with minimal vibration. Intallation environmental conditions meets product requirements. Unit may not be exposed to direct sunlight and/or moisture (directly and/or indirectly), Outside installations must		
Power	A stable source of power is provided		
WiFi Connection	At installation confirm that unit is connected to the local WiFi network and that the WiFi signal strength requirement is met (
Current Probe Sizing	Confirm w/ current probe that the current probe utilized (SCT-013) is of the proper rating for the measured current. Current probe may be connected to blower fan power and/or compressor input power lead		
ON cycle confirmation	At installation confirm that unit is able to register ON cycle		
OFF cycle confirmation	At installation confirm that unit is able to register OFF cycle		
Inlet Temp Sensor	Confirm inlet temp sensor is installed in the air handler air inlet and that the routing cables are routed to prevent damage during normal use of HVAC system		
Outlet Temp Sensor	Confirm outlet temp sensor is installed in the air handler air inlet and that the routing cables are routed to prevent damage during normal use of HVAC system		
Current Probe Installation	Ensure current probe cable is routed to ensure that it is not damaged during normal use of the HVAC system		
Back end office data logging	After installation confirm that back office server is registering data and that at least one HVAC ON/OFF cycle has been registered		
Back office customer info	Update applicable customer information (name, address, phone number, email address) on Software/database in order to relate MCB-400 installation (MAC ID/SN) to Customer installation		
WiFi signal strength	Check actual numerical WiFi signal strength from back office application		