



# TTWC Series

Through-The-Wall Condensing Units

## Installation Operation and Maintenance Manual

Listing #4008574  
Complies With UL 1995  
Heating & Cooling  
Equipment



Accepted For Use  
City of New York  
Department of Engineering  
MEA-85-04-E

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***Congratulations*** on selecting a TTWC Unit from AeroSys. With proper installation and maintenance your system will provide you with years of satisfactory operation. This system is sold and intended for use only with blower coil indoor units. To see a list of approved air handlers please go to [www.aerosysinc.com/certified-ratings](http://www.aerosysinc.com/certified-ratings)

## **SHIPPING INSPECTION**

Upon receiving the product, inspect it; notify the shipper or carrier of damage from shipping. Shipping damage and subsequent investigation is the responsibility of the carrier. Verify the model number, specifications, electrical characteristics and accessories are correct prior to installation. Check the blower housing to impeller alignment to ensure that it did not shift during shipment. The distributor or manufacturer cannot accept claims from dealers for transport damage or installation of incorrectly shipped units.

## **CODES AND REGULATIONS**

This product is designed and manufactured to comply with National Codes. Installation in accordance with such codes and/or prevailing local codes/regulations is the responsibility of the installer. The manufacturer assumes no responsibility for equipment installed in violation of any local codes or regulations.

## **PRE-INSTALLATION INSTRUCTIONS**

Before installing the unit, a duct analysis and heat load calculation must be performed. A heat load calculation begins by measuring all external surfaces and openings that conduct heat from the surrounding air and quantifying the resulting heat load. A heat load calculation also includes extra heat load caused by sunlight and humidity removal. ***When choosing an indoor section the minimum internal coil volume is 0.83 cubic feet.***

Carefully read all instructions for the installation prior to installing the product. Make sure each step or procedure is understood and any special considerations are taken into account before starting installation. Assemble all tools, hardware and supplies needed to complete the installation. Make sure everything needed to install the product is on hand before starting.

Before attempting any installation, consider:

- Structural strength of supporting members must be adequate to support the weight of the unit.
- Clearances and provisions for servicing must be sufficient.
- Power supply and wiring must be per NEC and local codes.
- Air duct connections must not exceed 0.3" w.c. and must prohibit recirculation of discharge air.
- Drain facilities and connections must be sufficient and where possible a secondary drain is recommended.

Improper installation or installations not performed in accordance with these instructions can result in unsatisfactory operation and/or dangerous conditions, and can cause the warranty to be revoked.

AeroSys is not responsible for the performance and operation of a mismatched system. Installers are encouraged to match to air handlers that are approved by AeroSys and listed in the CCMS database at <https://www.regulations.doe.gov/ccms>

## **UNIT INSTALLATION / START-UP CHECK LIST**

- \_\_\_\_\_ Install/mount unit, level, plumb and secure
- \_\_\_\_\_ Check for air flow restrictions or blockage (internal & external)
- \_\_\_\_\_ Protect line sets between units from sharp, abrading edges
- \_\_\_\_\_ Install or route piping to ensure proper suction line trapping
- \_\_\_\_\_ Install correct drier/strainer (R-410A applicability)
- \_\_\_\_\_ Install sight glass
- \_\_\_\_\_ Adjust refrigerant charge for correct superheat and sub cooling (Liquid charge ONLY for R-410A units)
- \_\_\_\_\_ Seal all holes/perforations in cabinet
- \_\_\_\_\_ Wire and ground unit properly
- \_\_\_\_\_ Check for detached or hanging insulation (LX option Units)
- \_\_\_\_\_ Check for correct thermostat wiring
- \_\_\_\_\_ Secure cabinet access panel
- \_\_\_\_\_ Turn power on

## **REPLACEMENT PARTS**

When reporting shortages or damage, or ordering parts, give the complete product model and serial numbers as indicated on the product label. Replacement parts for this product are available through your contractor or local distributor.

## **IMPORTANT SAFETY INSTRUCTIONS**

These instructions are intended as an aid to qualified licensed service technicians for proper installation and operation of this unit. Installers have the obligation to know the product better than the end-user. Pay special attention to all safety warnings. Remember, it is the installer's responsibility to install the product safely and then instruct the end-user in its safe operation.

The precautions listed in this installation manual are intended as supplemental to existing practices. However, if there is a direct conflict between existing practices and the content of this manual, the precautions listed here take precedence.

# WARNINGS

**HIGH VOLTAGE:** *To avoid the risk of fire or equipment damage, use only copper conductors. Disconnect ALL power sources. Failure to do so may cause property damage, personal injury or death.*

The unit MUST have an uninterrupted electrical ground to minimize the possibility of personal injury if an electrical fault should occur. The electrical ground circuit may consist of the properly sized electrical wire connecting the ground lug in the unit and control box to the building's electrical service panel. Other methods are permitted if performed in accordance with the National Electric Code (NEC), American National Standards Institute (ANSI), National Fire Protection Association (NFPA) 70, and local/state codes. In Canada, electrical grounding is to be in accordance with the Canadian Electric Code CSA C22.1. Failure to observe this warning can result in electrical shock that can cause personal injury or death.

**QUALIFIED TECHNICIAN:** Installation and repairs of this unit should be performed ONLY by individuals meeting the requirements of an "Entry Level Technician" as specified by the Air Conditioning and Refrigeration Institute (ARI). Attempting to install or repair this unit without such background may result in product damage, personal injury or death.

**APPROVED AIR HANDLERS:** This unit should not be connected to, or used in conjunction with, any devices that are not certified for use with this unit, or have not been tested and approved by AeroSys, Inc. Reduced unit performance and/or hazardous conditions may result from the use of devices that have not been tested, approved or certified by AeroSys.

**EMERGENCY CUTOFF:** Have your HVAC technician identify the location of any and all cutoff switches that power this unit.

**REFRIGERANT RECOVERY:** The US Environmental Protection Agency (EPA) has regulations regarding the introduction and disposal of refrigerants. Failure to follow these regulations may harm the environment and can lead to substantial fines. These regulations may vary by jurisdiction. A certified technician must perform the installation and service of this product. Should you have any questions please contact the local EPA office.



**SITE PREPARATION AND INSTALLATION:** To insure a satisfactory air supply, locate the condensing units in a clean area, away from loose dirt and foreign matter that may clog the coil. The condensing unit's coil/blower side must

not be located near any exhaust of steam, hot air, grease or corrosive fumes. The coil and discharge of the unit must be free from obstruction.

The condensing unit should be located at least 30 inches from a wall, adjacent unit or other obstruction that may restrict accessibility for maintenance. For multiple unit installations, space the units so that the hot exhaust air is **not** directed toward the air inlet of an adjacent unit. We recommend minimum of 18 to 24 inches vertical spacing between units.

The base of the unit is sloped to drain water away from the maintenance access side (inside face) of the equipment. When installing the unit, ensure that the top of the unit is level in order to maintain the drainage angle toward the coil side of the condensing unit (the outside of the building in an exterior thru-the-wall mount).

The metal components of this unit may oxidize and corrode if exposed to a corrosive environment. This oxidation could shorten the equipment's useful life. Corrosive environments include , but are not limited to, salt spray, fog or mist near the coastal areas, sulphur or chlorine from lawn sprinkler systems and various contaminants from industries such as paper mills and petroleum refineries. If it is necessary to install a unit in a corrosive environment special consideration should be given to equipment exposure.

- Avoid having lawn sprinklers spray directly on the unit.
- In coastal areas locate the unit away from the waterfront.
- Frequent washing of the coil with fresh water will remove most of the salt or other contaminants that build up on the unit.
- Coil cleaner can be used if there is still residue after washing with water.

Outdoor louvers provided by others must be approved by AeroSys to ensure unit performance and guarantee warranty coverage.

The unit must be mounted in an area where there is adequate fresh outside air to ensure that the condenser operates properly.

The unit must never be placed on its side or upside down to ensure proper oil recirculation. The unit must always be handled and installed with the compressor upright.

## **REFRIGERANT PIPING CONNECTIONS**

Refrigeration piping should be installed with high temperature brazed joints. When replacing an R-22 system, new line sets are highly recommended. A thermal expansion valve must be used and the indoor coil must be replaced.

ALWAYS keep the line set sealed until ready to use. See Tables 1 & 2 for correct line size(s) and multipliers used to determine capacity for various line diameters and lengths of run.

**ALWAYS use the smallest diameter liquid line permitted to minimize refrigerant charge thereby maximizing compressor reliability.** Use clean, dehydrated type "L" refrigerant grade tubing. Blow out the liquid and suction lines

with dry nitrogen prior to installation. When cutting tubing, debur the cut area. Do not kink or twist tubing.

**ALWAYS use damp rags wrapped around the valve body to protect the valve from heat damage.**

Two refrigerant lines, an insulated copper suction line and a copper liquid line, are required between the evaporator and the condenser. **A refrigerant drier must be installed in the liquid line.**

When brazing to the unit's refrigerant service valves:

- Low pressure dry nitrogen should always be supplied inside the heated tubing. Maintain the nitrogen flow until tubes have cooled.
- Prior to brazing at the service valves, remove the schraeder cores and caps. Wrap the valves with a wet rag to prevent damage to the cabinet or valve. Suction lines should be insulated with minimum 1/2" wall insulation from the indoor coil to the compressor suction inlet.
- Piping connections to the unit are mounted on the right side wall of the cabinet. The valve may be temporarily loosened from the wall to facilitate brazing.

**Maximum recommended refrigerant line length is 50' Refer to Tables 1 & 2 if longer line-sets are required**

<b>Table 1 Suction Line Sizing</b>							
<b>Capacity Tons</b>		<b>1.5</b>	<b>2</b>	<b>2.5</b>	<b>3</b>	<b>4</b>	
<b>25'</b>	Line Size	3/4"	3/4"	3/4"	3/4"	7/8"	
<b>50'</b>	Line Size	3/4"	7/8"	7/8"	1-1/8"	1-1/8"	
<b>100'</b>	Line Size	7/8"	7/8"	1-1/8"	1-1/8"	1-1/8"	

*Using a suction line larger than indicated in Table 1 will result in poor oil return, and premature compressor failure.*

**Table 2 Liquid Line Sizing to TXV (5 psi Max Press Drop)**

Capacity Tons		1.5	2	2.5	3	4	
25'	Line Size	3/8"	3/8"	3/8"	3/8"	3/8"	
50'	Line Size	3/8"	3/8"	3/8"	3/8"	1/2"	
100'	Line Size	3/8"	1/2"	1/2"	1/2"	1/2"	

**Note on refrigerant Traps:** *When installing remote condensing units above the indoor air handler, the suction gas line should be trapped at the indoor unit. This trap will retain refrigerant oil in the off cycle. When the unit starts, oil in the trap is carried UP the vertical riser and returns to the compressor.*

*When installing remote condensing units below the indoor air handler, the suction gas line should be trapped with an inverted trap the height of the indoor air handler. This prevents refrigerant migration to the compressor during off cycles.*

**Leak Check and Evacuation:** Field pressure testing, evacuation, and refrigerant charging may be done through the side ports on the suction and liquid line service valves. These ports are open to the line set side of the piping. Replace the schraeder inserts that were removed for brazing.

Connect a dry nitrogen tank to the service port on the liquid line. Pressurize the line set and indoor section to 350 PSIG. Check for leaks using a liquid soap solution. If leaks are detected, release the nitrogen, repair the leak and repeat this operation.

Connect a vacuum pump to the gauge set with both the liquid and suction valves on the gauge set open and connected to the unit. On a new install, the service valves should remain closed until after evacuation and leak back tests. On a system where charge has been lost, the service valves should be open until after evacuation and leak back tests. A vacuum of at least 250 microns should be pulled on the system. Allow the vacuum pump to run an additional 15 minutes after achieving 250 microns. Isolate the vacuum pump from the system and micron gauge and verify that the pressure does not rise above 500 microns within 10 minutes. If the pressure rises above the 500 microns it is indicating a leak or moisture in the compressor oil due to the system piping being left open during installation. Identify the leak and repair it. Repeat the process.

On a new installation, open both service valves (back valve stem out) all the way for proper system operation.

On a system where charge has been lost break the vacuum with refrigerant by opening suction line gauge set valve.

Vibration isolating supports should be used to isolate the refrigeration piping from the building. Pack a soft flexible material around tubing to prevent damage when sealing openings in walls and to reduce vibration transmission.

### **Charging the System**

TTWC systems are factory shipped with an R-410A refrigerant charge suitable for a 5 foot line set. For different line set lengths use the following guideline:  $\frac{3}{8}$ " diameter  $\pm$  0.6 oz. per foot;  $\frac{1}{2}$ " diameter  $\pm$  1.2 oz. per foot,  $\frac{5}{8}$ " diameter  $\pm$  1.7 oz. To add charge to the system, attach the gauge set to the discharge and suction access ports making sure there is no air in the refrigerant hoses. After the pressure is sufficient to activate the low pressure switch, (On LX Units Only) the compressor will turn on. Continue to charge the system, observing the refrigerant in the sight glass, for system pressures, and super heat and subcooling. Compare to the ranges in Table 4.

### **Condenser Air Ducting (if used)**

The total static pressure for any inlet and outlet ducting, including louvers, must not exceed 0.3 inches of water.

If the condensing unit draws ducted air from the outside of the building, rain hoods must be installed. In addition, install screens over the rain hood openings to eliminate the possibility of birds, insects, water or debris entering the unit.

Normal operating sound may be objectionable if the condensing unit is placed directly over quiet work areas. Use flexible ductwork or nonflammable cloth collars to attach ductwork to the unit to control vibration transmission to the building.

Locate the unit and ductwork so that the discharge air does not short circuit to the condenser air inlet. Avoid directing the hot exhaust air toward adjacent doors, sills or windows.

### **Refrigerant Pressures**

Suction and discharge pressures will vary with load and ambient conditions. Normal pressures in the COOLING start-up mode are displayed in Table 3.

Thermocouples should be placed within 6 inches of compressor suction and liquid service ports in order to get a proper measurement of superheat and subcooling respectively.

### **Long Line Sets**

On installations with line sets longer than 50 feet, it may be necessary to add a crankcase heater and a suction line accumulator. While scroll compressors do not usually require crankcase heaters, there are instances when a heater is needed. Refrigerant migration in the off cycle can cause a noisy startup and bearing "wash out" on systems with long line sets. Employ a crankcase heater and suction line accumulator to avoid these problems.

TABLE 3 TTWC LIQUID/SUCTION PRESSURES (PSIG)																														
Ambient	R18H21		R18P21		R18R21		R18S21		R18T21		R24H21		R24P21		R24R21		R24S21		R24T21		R30H21		R30P21		R30R21		R30S21		R30T21	
Temperature	Pressure (PSIG)																													
	Deg F	L	S	L	S	L	S	L	S	L	S	L	S	L	S	L	S	L	S	L	S	L	S	L	S	L	S	L	S	
115	555	146	546	149	550	147	516	147	515	147	521	146	590	144	561	153	550	145	544	146	506	146	569	143	590	149	577	146	570	146
105	479	143	473	146	477	144	445	144	444	144	449	143	511	141	486	150	477	142	520	143	437	143	489	140	511	146	500	143	495	143
95	414	143	410	145	413	143	385	144	392	143	389	140	443	140	421	147	413	141	404	142	378	143	429	137	443	145	433	142	433	142
82	345	140	347	143	345	140	323	141	320	140	326	139	374	137	353	146	346	139	340	140	317	142	364	135	366	133	367	140	365	140
75	318	135	319	139	317	136	298	136	293	136	301	134	344	133	324	142	318	135	312	136	292	139	339	130	336	129	338	136	338	136
55	245	129	245	133	244	130	229	130	222	130	231	128	265	127	250	136	245	129	238	130	225	133	270	124	259	124	261	130	262	130

TTWC SUBCOOLING (DEG f)																
AMBIENT																
TEMPERATURE																
DEG F	R18H21	R18P21	R18R21	R18S21	R18T21	R24H21	R24P21	R24R21	R24S21	R24T21	R30H21	R30P21	R30R21	R30S21	R30T21	
115	14	14	18	10	11	11	18	17	14.5	12.5	12	13	8	14	14	
105	14	14	18	10	11	11	18	17	14.5	12.5	12	13	8	14	14	
95	15	15	20	12	11	13	20	19	16.5	14.5	14	14	10	16	16	
82	15	15	20	12	11.5	13	20	19	16.5	14.5	14	14	10	16	16	
75	15	15	20	12	11.5	13	20	19	16.5	14.5	14	14	10	16	16	
55	16	17	22	14	13.5	15	22	21	18.5	16.5	16	14	12	18	18	

# ELECTRICAL SUPPLY AND CONNECTIONS

## Power Supply Connections

Each unit ships from the factory with all internal wiring completed. Refer to the electrical schematic when making connections.

This unit is designed for a specific electrical supply. Measure the power supply to the unit. The supply voltage must be in agreement with the unit nameplate power requirement and within the range shown in Table 6. Every installation must include an NEC (USA) or CEC (Canada) approved over current protection device. Also check with local or state codes for any special regional requirements.

Protection can be in the form of using fusing or HACR style circuit breakers. The unit nameplate can be used as a guide for selecting the Maximum Overcurrent Protection (MOP) device.

**NOTE: Fuses or circuit breakers are to be sized larger than the equipment MCA but not to exceed the MOP.**

A knockout is provided on the back of the unit to allow for the entry of the supply voltage conductors. If the knockout is used for electrical conduit, an adapter ring must be used in order to meet UL 1995 safety requirements. An NEC or CEC approved strain relief is to be used at this entry point. The wire is to be sized in accordance with the Wire Sizing section of this manual. Some areas require the supply wire to be enclosed in conduit. Consult your local codes for applicability. Attach supply wire to unit's power distribution block or available power leads (depending on option). Route the supply power to a field supplied disconnect switch so the unit can be isolated from supply power maintenance activities.

Connect an earth ground to the lug provided in electric junction box.

**Table 6**

<b>Nominal Input</b>	<b>Minimum Voltage</b>	<b>Maximum Voltage</b>
208/230	187	253
460	414	506

***REMEMBER: THE LINE SIDE OF DISCONNECT REMAINS ENERGIZED WHEN DISCONNECT IS "OFF"***

## Wire Sizing

Wire sizing is important to the operation of the unit. Use the following check list when selecting the appropriate wire size for your unit.

- Wire size must carry Minimum Circuit Ampacity (MCA)
- Wire sized for no more than 2% voltage drop from the building breaker/fuse panel to the unit.

Refer to the latest edition of the National Electric Code or in Canada, the Canadian Electric Code when determining the correct wire size. The following table shows the current carrying capabilities of copper conductors rated at 75°C with a 2% voltage drop. Use Table 7 to determine the voltage drop per foot of various conductors.

**Table 7**

Maximum allowable length in feet to Limit Voltage Drop to 2%								
Wire Size (AWG)	Minimum Circuit Ampacity (MCA)							
	10	15	20	25	30	35	40	45
14	75	50	37	NR	NR	NR	NR	NR
12	118	79	59	47	NR	NR	NR	NR
10	188	125	95	75	63	54	NR	NR
8	301	201	150	120	100	86	75	68
6	471	314	235	188	157	134	118	110

\* Reference NEC 1996

### **Control Connections**

A field-installed, 2-wire control connection (24VAC) is required between the thermostat and the unit. Control wiring must be installed in accordance with the National Electrical Code (NEC), Class II circuit.

Control wiring between the thermostat and the unit must not allow a voltage drop in the line of more than 1 volt (16 gauge minimum for 75 feet). The thermostat should be located in the airflow path of the room.

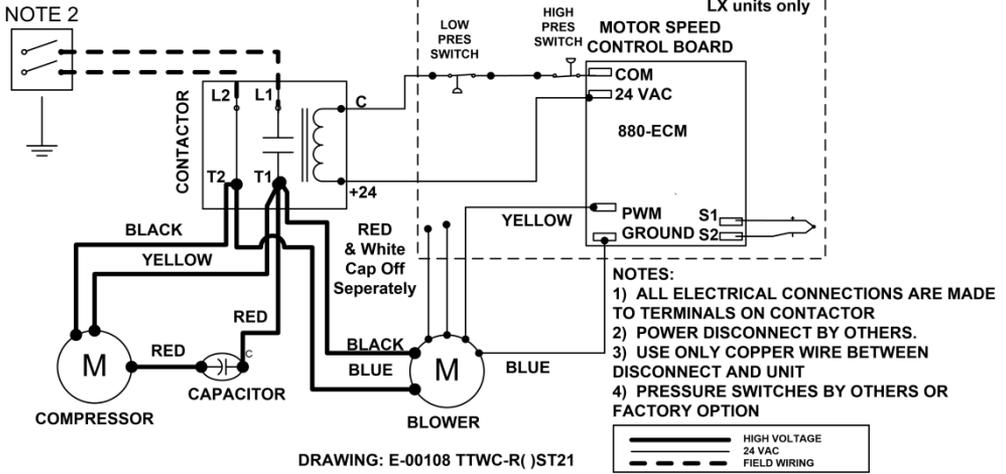
### **Air Distribution**

Unusual air flow restrictions must be avoided. Restricted airflow through the indoor coil will reduce the operating capacity of the unit. Restricted airflow through the outdoor coil will reduce the operating efficiency of the unit. Additionally, it can result in high compressor head pressure and loss of cooling. Using compressed air or a commercial coil cleaner; clean the condenser coil of all debris that will inhibit airflow. Check for bent or damaged coil fins and repair as necessary.

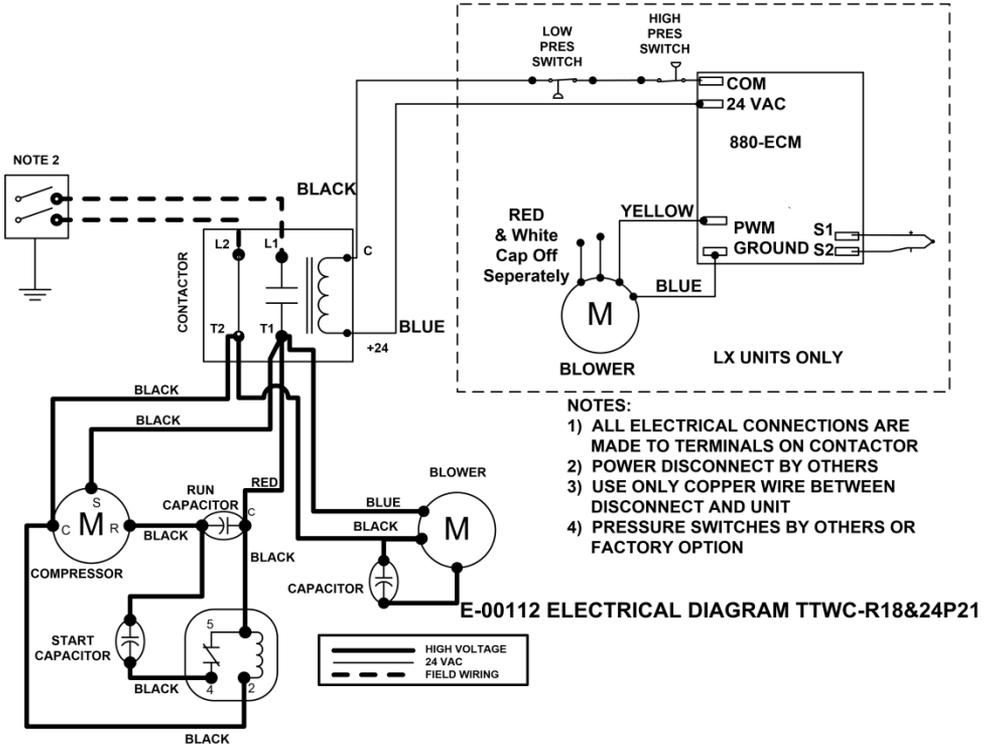
### **Refrigerant System**

Inspect all refrigerant lines and capillaries for vibration and support as necessary. Carefully inspect all refrigerant lines for signs of oil leaks.

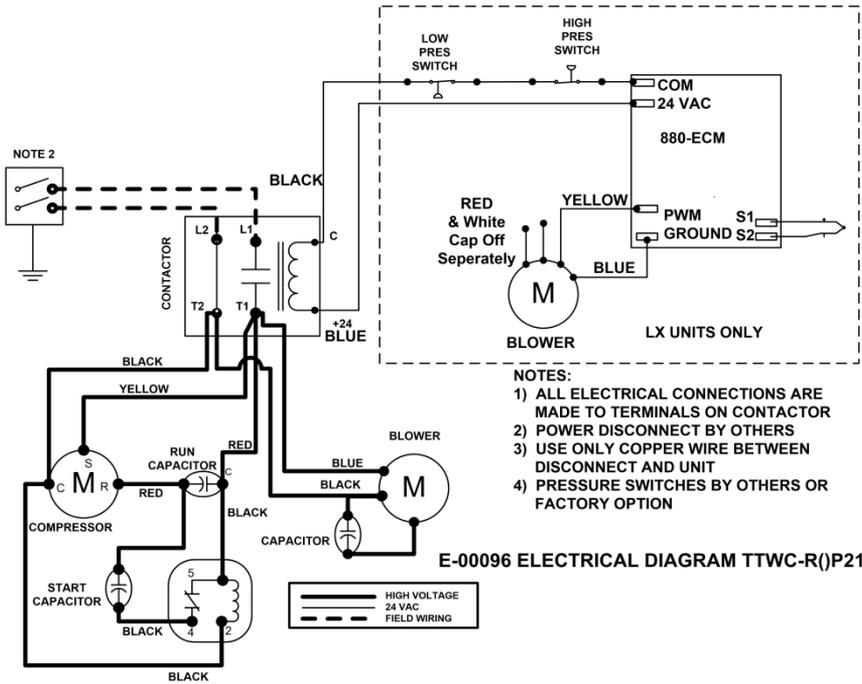
## TTWC-R()(S&T)21 STD & LX Wiring Diagram



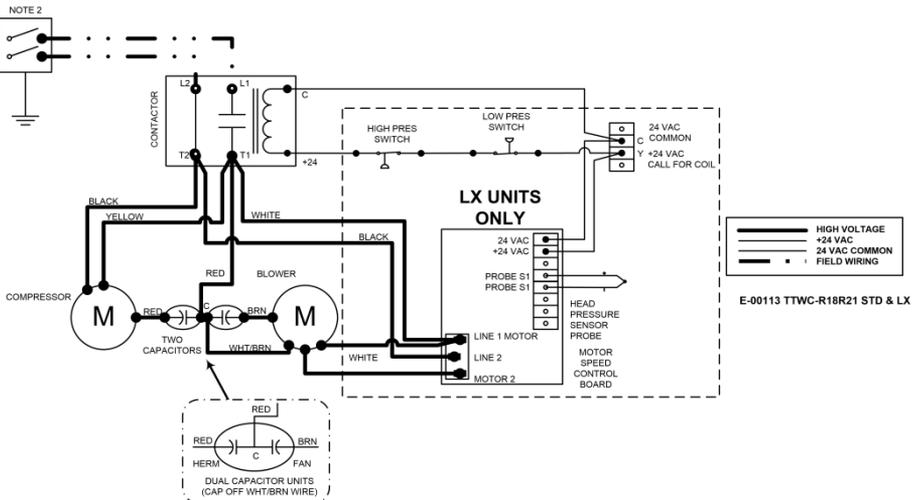
## TTWC-R(18 & 24)P21 STD & LX Wiring Diagram



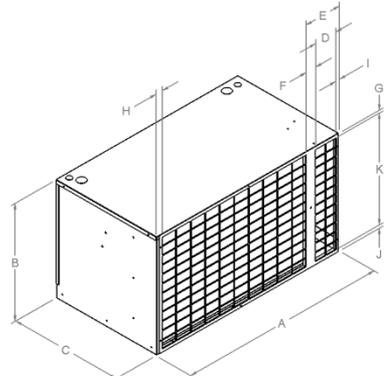
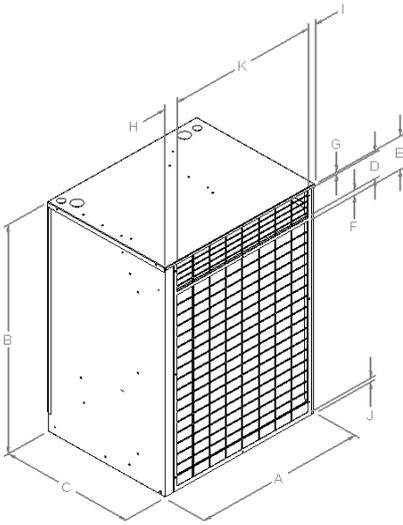
## TTWC-R30P21 STD & LX Wiring Diagram



## TTWC-R18R21 STD & LX Wiring Diagram







**Dimensional Data (in.)**

MODEL	A	B	C	D	E	F	G	H	I	J	K
TTWC-R(H)	27	44	41.3	42.4	1.6	5.3	9.3	13.5	23	21.6	19.6
TTWC-R(P)	33 ¾	19	18 ½	3 ⅝	6 ⅞	1 ¾	½	1	⅝	½	18
TTWC-R(R)	29 ½	23	18 ½	3 ⅝	4 ⅝	⅝	⅜	1	1 ⅞	½	22
TTWC-R(S)	26	28 ⅝	18 ½	3 ⅝	4 ⅝	⅝	⅜	1 ⅞	1	½	23 ⅞
TTWC-R(T)	23 ¾	32	18 ½	3 ⅝	4 ⅝	⅝	⅜	1 ⅞	1	½	20 ⅞

## **RECOMMENDED MAINTENANCE SCHEDULE**

This unit is designed to provide many years of dependable, trouble free comfort when properly maintained. Proper maintenance will consist of annual checkups and cleaning of the internal electrical and heat transfer components by a qualified service technician. Failure to provide periodic checkup and cleaning can result in excessive operating cost and/or equipment malfunction.

- The electric panel should be cleaned and inspected annually for loose electrical connections
- Blower impellers should be thoroughly inspected and any debris removed.
- Check to see if they are tightly mounted on the fan shaft and do not rub against the fan housing during rotation.
- Where applicable, once every year add 3 drops of SAE 20 weight non-detergent oil to each of the two oil ports on the blower motor if your system is supplied with oil ports.

<b>Maintenance Item</b>	<b>Monthly</b>	<b>Quarterly Seasonally</b>	<b>Semi Annually</b>	<b>Annually</b>
Check filter	<b>X</b>			
Inspect unit mounting & line connections			<b>X</b>	
Tighten wire connections				<b>X</b>
Inspect wires for wear				<b>X</b>
Check refrigerant charge			<b>X</b>	
<b>Inspect &amp; Clean:</b>				
COILS			<b>X</b>	
CONDENSING UNIT		<b>X</b>		
MOTOR			<b>X</b>	
CONDENSATE PUMP			<b>X</b>	
BLOWERS			<b>X</b>	
CONDENSATE PAN/DRAIN		<b>X</b>		

X = Heating Cycle Only (Heat Pump)

ORIGIN or BASIS of FAILURE	Pressure	No Cooling	Cooling/Heating Issue(s)	TEST and REPAIR or REPLACE			
					Power Failure	Blown Fuse	Unbalanced Power, 3phase
Unit will not defrost				Test Voltage			
Unit will not terminate defrost				Inspect Fuse Size & Type			
System runs - blows cold air in heating				Test Voltage			
Compressor is noisy				Inspect Connection - Tighten			
Certain areas too cool, others too warm				Test Circuits With OhmMeter			
Not cool enough on warm days				Test Continuity of Overload			
Too cool and then too warm			•	Test Continuity of Thermostat & Wiring			
System runs continuously - little cooling/htg				Check Control Circuit with Voltmeter			
Compressor cycles on overload	•	•	•				
Compressor runs - goes off on overload	•	•	•				
Condenser fan will not start		•	•				
Evaporator fan will not start		•	•				
Comp. and Cond. Fan will not start		•	•				
Compressor will not start - fan runs		•	•				
System will not start	•	•	•				
High head pressure							
High suction pressure							
Low head pressure							
Low suction pressure							

• = Cooling Or Heating Cycle (Heat Pump)



X = Heating Cycle Only (Heat Pump)

	Inspect Coil - Clean	Check Blower Speed, Duct Static Press., Filter	Reduce Blower Speed	Recover Part of Charge	Inspect Coil - Clean	Recover Charge, Evacuate, Recharge	Remove Obstruction to Air Flow	Check Windows, Doors, Vent Fans Etc.
Unit will not defrost								
Unit will not terminate defrost								
System runs - blows cold air in heating				X		X		
Compressor is noisy				•				
Certain areas too cool, others too warm	•	•						•
Not cool enough on warm days	•	•			•	•	•	•
Too cool and then too warm								
System runs continuously - little cooling/htg	•	•						•
Compressor cycles on overload				•	•	•	•	
Compressor runs - goes off on overload				•	•			
Condenser fan will not start								
Evaporator fan will not start								
Comp. and Cond. Fan will not start								
Compressor will not start - fan runs								
System will not start								
High head pressure	X	X		•	•	•	•	
High suction pressure			•	•				
Low head pressure			X					
Low suction pressure	•	•			X			
• = Cooling Or Heating Cycle (Heat Pump)	Dirty Indoor Coil	Not enough air across Indoor Coil	Too much air across Indoor Coil	Overcharge of Refrigerant	Dirty Outdoor Coil	Noncondensibles	Recirculation of Condensing Air	Infiltration of Outdoor Air



## ECM Motor

The TTWC LX model units employ an ECM motor on all models. On all standard models series the motor is wired to energize with the call for cooling. On the LX models the motor is controlled by a head pressure controller which outputs a pulse width modulated signal. If the motor is not operating correctly the following checks can be performed:

### **ECM Motor Trouble Shooting Guide**

<b>Motor will not run</b>	<b>Solution</b>
<ol style="list-style-type: none"> <li>1. Improper installation, motor not wired correctly.</li> <li>2. 24 VAC not present.</li> <li>3. Sensor below 50°F up to 70°F as set by "Range Adjust" pot.</li> <li>4. Motor "OFF" on internal overload.</li> <li>5. Sensor opened, verify ohms vs. temp per Table 6.</li> </ol>	<ol style="list-style-type: none"> <li>1. Check wiring, review instructions.</li> <li>2. Verify 24 VAC supply.</li> <li>3. Normal operation.</li> <li>4. Determine cause of overheated motor and correct it.</li> <li>5. Replace sensor.</li> </ol>
<b>Motor runs at full speed only</b>	<b>Solution</b>
<ol style="list-style-type: none"> <li>1. Sensor shorted verify ohms vs. temp per Table 6.</li> <li>2. Control damaged.</li> <li>3. Low refrigerant. (Hot gas in the liquid line)</li> <li>4. Sensor above 80°F up to 100°F, as set by the "Range Adjustment" pot.</li> </ol>	<ol style="list-style-type: none"> <li>1. Replace sensor.</li> <li>2. Replace control.</li> <li>3. Add charge</li> <li>4. Normal operation.</li> </ol>
<b>Motor will not modulate properly</b>	<b>Solution</b>
<ol style="list-style-type: none"> <li>1. Sensor not properly located or attached to liquid line.</li> <li>2. Sensor ohms vs. temperature measured not in accordance with Table 6.</li> <li>3. System not charged properly.</li> <li>4. Expansion valve not metering properly, cap tube or orifice sized improperly for low ambient operation.</li> <li>5. Low evaporator temperature and/or head pressure.</li> </ol>	<ol style="list-style-type: none"> <li>1. Relocate per instructions.</li> <li>2. Replace sensor.</li> <li>3. Correct the charge.</li> <li>4. Adjust or replace expansion valve, cap tube or orifice to provide proper control of the low side.</li> <li>5. Adjust "Range Adjustment" pot to assure that the evaporator is above 32°F.</li> </ol>

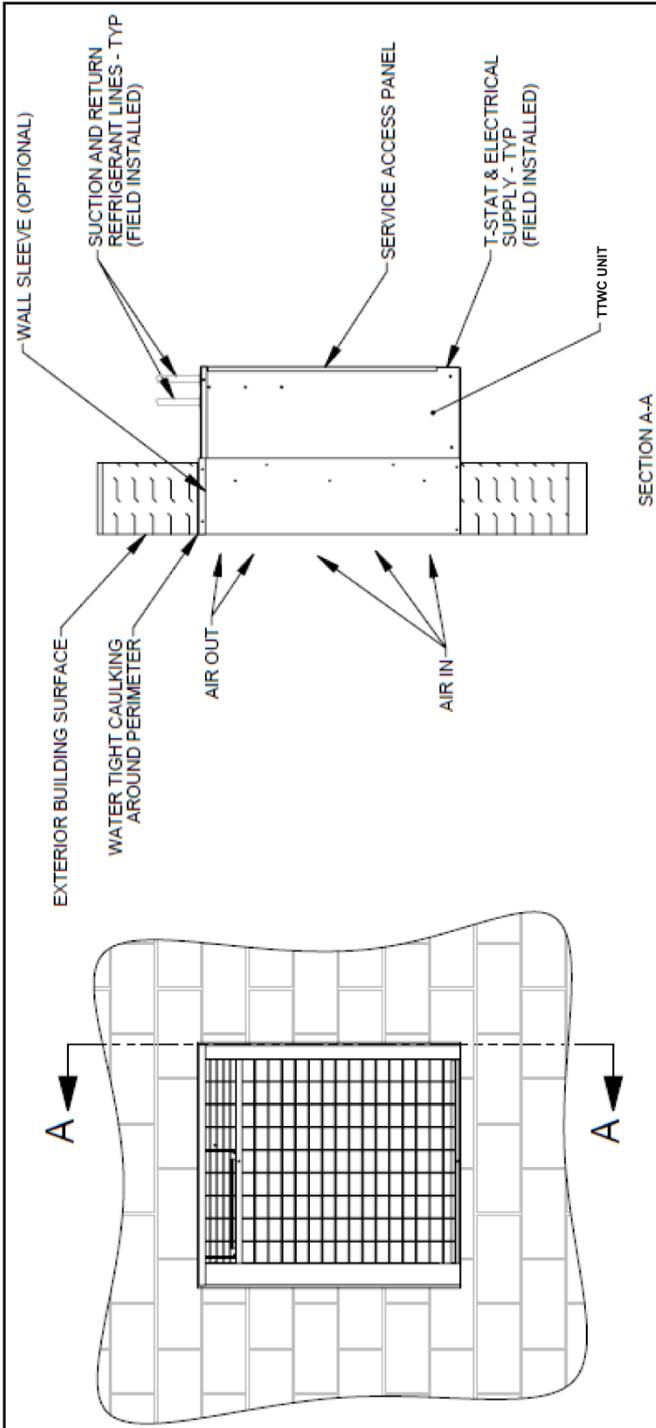
If the steps above do not solve the problem, disconnect the head pressure control board and place an RMS multimeter in DCV mode across the PWM terminals. You should see a DC voltage varying from about 2 VDC @ 53°F to about 13.5 VDC @ 80°F. Measure the input resistance of the motor by placing a multimeter in resistance mode across the blue and yellow wire to ensure that it is not shorted.

**Table 8**

<b>Sensor Temperature vs. Resistance Chart</b>					
<b>Temp °F</b>	<b>Sensor (ohms)</b>	<b>Temp °F</b>	<b>Sensor (ohms)</b>	<b>Temp °F</b>	<b>Sensor (ohms)</b>
28	36,627	56	16,990	84	8,433
30	34,582	58	16,128	86	8,056
32	32,660	60	15,315	88	7,685
34	30,869	62	14,547	90	7,332
36	29,180	64	13,823	92	6,997
38	27,600	66	13,139	94	6,679
40	26,109	68	12,492	96	6,378
42	24,712	70	11,881	98	6,092
44	23,398	72	11,303	100	5,820
46	22,160	74	10,851	102	5,561
48	20,996	76	10,210	104	5,316
50	19,899	78	9,750	106	5,094
52	18,872	80	9,287	108	4,873
54	17,903	82	8,848	110	4,662

**NOTE: SPECIFICATIONS AND PERFORMANCE DATA LISTED HEREIN ARE SUBJECT TO CHANGE WITHOUT NOTICE**

# INSTALLATION DATA





# AeroSys LIMITED WARRANTY

## *To Our Valued Customer*

***Please remember that all units must be registered. If a unit is not registered within 30 days of installation, warranty coverage begins based on the unit's Serial Number (manufacture date) instead of the installation date.***

AeroSys split system unit is a component part of a cooling and heating application. When two products are installed together, it may become confusing when trying to diagnose an operational problem. Our goal is that you experience the highest level of performance, with minimal amount of service and attention. In order to do this, our technicians will require on-site performance data, the indoor AHU model in the system and specific installation information. The lack of this data, may limit our ability to properly solve the problem and affect your warranty coverage.

**Service technicians may view our trouble shooting guide or report a failure to the factory via the factory Tel: 301.620.0002 for technical assistance; and then contact your local AeroSys wholesaler for the replacement part.**

### **ONE YEAR WARRANTY:**

AeroSys Inc. products are warranted to be free from all manufacturing defects, material or workmanship, for a period of one year from installation (registration required), whether or not actual use begins on this date; **or** one year from the date of manufacture if product has not been registered.

A new or remanufactured part for any defective component will be supplied, providing the defective part is processed through our distributor or service department following the return instructions below. The replacement part assumes the unused portion of the warranty.

### **EXTENDED COMPRESSOR WARRANTY FOR YEARS 3 THROUGH 5:**

If, under normal operation, proper installation, maintenance/service as specified in the Installation, Operation and Maintenance manual a compressor fails due to a manufacturing defect, AeroSys, Inc. will provide a replacement new or remanufactured compressor.

**A RETURN MATERIAL AUTHORIZATION (RMA)** will be issued only if a replacement part needs to be installed. Most defective parts covered under warranty must be returned to the wholesaler for shipment back to AeroSys for inspection and credit. Note: All warranty parts, returns and paperwork must be submitted no later than 60 days after the failure. All RMA's are closed at 61 days.

### **Parts Warranty Procedure**

1. Call AeroSys with model number, serial number and description of the failure to have an RMA# issued.
2. The use of parts from finished inventory must be authorized by AeroSys in writing (Additional information may be needed)
3. Fax / E-mail the PO with the above information and RMA# clearly listed on the document.
4. AeroSys will ship out the parts needed for the repair with;
  - a. A copy of the return procedure in the box
  - b. A copy of the return procedure attached to the packing slip on the outside of the box.
  - c. A copy will also be send to the wholesaler when the order is acknowledged.
5. The contractor must take care in removing the parts so they can be returned, **tested and inspected** upon receipt at AeroSys.
6. If the part is returned, in a condition that AeroSys is not able to test and inspect, the warranty will be denied.
7. Field scrap of parts must be pre-approved by AeroSys before action is taken.
8. All warranty parts must be sent back to AeroSys in **60 days** from the time of shipping for disposition.
9. AeroSys will issue a disposition either granting or denying credit within 30 days.

## Unit Replacement

Unit replacement is only to be done under the following conditions and must be pre-approved by AeroSys before action is taken;

- A unit is DOA on start up.
- Coil Leak within 90 days of online registration.

### **((NOTE))**

The AeroSys warranty is a "parts only" replacement warranty and does not include any labor. ONLY in extreme cases and ONLY with pre-approval from AeroSys, a chassis, heater box or a complete unit (of any AeroSys product lines) will be accepted as a warranty solution. Any labor requests must be presented up front before shipping out the warranty part. ANY labor charges that are not pre-approved will be denied (No Exceptions) If the warranty procedure is not followed the warranty will be denied (No Exceptions).

## AEROSYS WILL NOT BE RESPONSIBLE FOR:

- Cost incurred for replacing, removing, ship-back to factory, servicing, installing, or handling of either defective parts or replacement parts.
- Damage or repairs required due to installations that do not adhere to approved application spec's as listed in the unit's Installation, Operations and Maintenance manual or found on our website.
- Start failures due to voltage conditions, blown fuses, open circuit breakers, or other damage due to the inadequacy; surge or interruption of electrical service.
- Damage as a result of floods, winds, fires, lightning, accidents, corrosive atmosphere, or other conditions beyond the control of AeroSys Inc.
- Parts not supplied or designated by AeroSys Inc.
- AeroSys Inc. products installed outside the United States and Canada.
- Damage or repairs needed as a consequence of any misapplication, abuse, improper servicing, unauthorized alteration, or improper operation.
- Any special, indirect, consequential, property, or commercial damage of any nature whatsoever.
- All material is inspected at the factory and is only released for transport in perfect condition unless otherwise noted. When received, visual inspection must be made immediately. All deliveries must be inspected in the presence of the carrier's representative and any shipping damage (even "potential" issue) noted on the delivery receipt before the driver leaves. If damage is found, a freight claim must be filed with the carrier immediately. Original packaging should remain intact for Carrier Inspection. Shipping/Freight damage is not covered under this warranty policy, but AeroSys will assist with damage assessment and any rework required and approved by the freight company.

**AeroSys Limited Warranty C40**

## **LIMITATION OF WARRANTIES**

THIS WARRANTY IS EXCLUSIVE AND IN LIEU OF ALL OTHER WARRANTIES EXPRESS OR IMPLIED. THE REMEDIES PROVIDED FOR THIS WARRANTY ARE EXCLUSIVE AND SHALL CONSTITUTE THE ONLY LIABILITIES ON THE PART OF AEROSYS INC.

## Steps to Register Your AeroSys Product Maximize Your AeroSys Warranty Coverage

### To Our Valued Customers

Please remember that all units must be registered to qualify for the maximum warranty coverage. If a unit is not registered within 30 days of installation, warranty coverage begins based on the unit's Serial Number (manufacturer date) instead of install date.

**Units can be registered by mailing/faxing this form or on-line  
[www.aerosysinc.com](http://www.aerosysinc.com)**

1. Serial Number \_\_\_\_\_
2. Model \_\_\_\_\_
3. Install Date \_\_\_\_\_
4. Installer / Service Technical Info

Installer /Company \_\_\_\_\_

Preferred Contact:

E-Mail \_\_\_\_\_

Phone \_\_\_\_\_

Address \_\_\_\_\_

Address \_\_\_\_\_

*-line set length in feet -*

*- connection piping sizes -*

Vertical _____ Horiz. _____ <i>enter zero if applicable</i>
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Liquid: $\frac{1}{4}$ " $\frac{3}{8}$ " $\frac{1}{2}$ " $\frac{5}{8}$ " $\frac{3}{4}$ " Suction: $\frac{5}{8}$ " $\frac{3}{4}$ " $\frac{7}{8}$ " $1\frac{1}{8}$ " $1\frac{3}{8}$ "
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5. Air Handler Match-Up:

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*manufacturer*

--

*model no.*

6. Owner Contact Information:

Preferred Contact

E-Mail \_\_\_\_\_

Phone \_\_\_\_\_

Install Location/Address \_\_\_\_\_

If you cannot access the internet  
register by mail:

AeroSys Inc.  
Attn: Product Registration  
929 Eldridge Drive  
Hagerstown, MD 21740

(Cut Here To Mail In Registration)

