





CyberOneEC CW

Installation, Operation and Maintenance Manual

Perimeter Precision Air Conditioners

12-35 kW / 60 Hz

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Nomenclature COS-XXX-CW-X-EC				
System	Capacity in 1,000s BTU/H	Model	Air Flow Pattern	Fan Cooling
COS = CyberOne	042 060 096 120	CW = Chilled Water	D = Downflow Air U = Upflow Air	EC = Direct Driven, single inlet, two-fold, backward curved radial fan with electronically commutated (EC) motor

Call Product Support at 888 529 1266 for additional details.

Example: CyberOne EC CW, 42,000 BTU, Up Flow Air - COS-042-CW-U-EC

1.0 INTRODUCTION

1.1 General

The CyberOne EC CW floor mounted precision air conditioning system covered by this manual is designed and manufactured by STULZ Air Technology Systems, Inc. (STULZ) and uses the latest, state-of-the-art control technology. Recognized as a world leader, STULZ provides air conditioning systems with the highest quality craftsmanship using the finest materials available in the industry. The system will provide years of trouble free service if installed and maintained in accordance with this manual. Damage to the unit from improper installation, operation or maintenance is not covered by the warranty.

Study the instructions contained in this manual. They must be followed to avoid difficulties. Spare parts are available from STULZ to insure continuous operation. Using substitute parts or bypassing electrical or refrigeration components in order to continue operation is not recommended and will void the warranty. Due to technological advancements, components are subject to change without notice.

CyberOne EC CW systems are designed to be installed indoors unless otherwise noted on the equipment.

1.2 Safety

NOTE, CAUTION and WARNING statements are used in this manual to draw attention to important operational and safety information.

- □ A bold text NOTE marks an important detail.
- □ A bold text CAUTION marks information important to protecting your equipment and its performance. Be especially careful to read and follow all cautions that apply to your application.
- Abold text WARNING marks safety information important to protecting you and others from harm. Pay very close attention to all warnings that apply to your application.

An exclamation - \land - symbol in a WARNING or CAUTION indicates a general safety alert. A lightning bolt - \checkmark symbol in a WARNING indicates an electrical shock hazard.

1.2.1 Safety Summary Priortoperforming any installation, operation, maintenance or troubleshooting procedure, read and understand all relevant instructions, recommendations and guidelines contained within this manual.

Certain maintenance or cleaning procedures may call for the use and handling of chemicals, solvents, or cleansers. Always refer to the manufacturer's Safety Data Sheet (SDS) prior to using these materials. Clean parts in a well-ventilated area. Avoid inhaling solvent fumes and prolonged exposure of skin to cleaning solvents. Wash exposed skin thoroughly after contact with solvents.

The following warnings and cautions are applicable to the equipment and operations documented in this manual.



All personnel working on or near equipment should be familiar with hazards associated with electrical maintenance. Safety placards/stickers have been placed on the unit to call attention to all personal and equipment damage hazard areas. Never work on electrical equipment unless another person who is familiar with the operation and hazards of the equipment and competent in administering first aid is nearby.

This equipment should be serviced and repaired by a journeyman refrigeration technician only.

To prevent personal injury stay clear of rotating components, as automatic controls may start them unexpectedly. Turn off power to the unit unless you are performing tests that require power. With power and controls energized, the unit could begin operating at any time.

When working on electrical equipment, remove all jewelry, watches, rings, etc.

Hazardous voltage will still be present inside the electric box at the motor start protectors and circuit breakers, even with the unit turned off at the microprocessor controller. To isolate the unit for maintenance, turn off power at the main power disconnect switch.



After the return and supply piping is connected to the unit, the entire system must be flushed prior to beginning operation.

Once in service, the CyberOne CW EC unit should not be drained and taken out of service for an extended period of time. Formicary corrosion can occur.

Do not use chloride based water conditioning additives in the condensate drain pans. They will cause corrosion to occur on the coil fins.





E2 Terminal – Large Bezel

E² Terminal Small Bezel (Remote Only)



E2 Terminal - Touch Screen

1.3 Product Description

The CyberOne EC CW system comes in two cabinet sizes: A compact 30.6 inches wide by 30.6 inches deep cabinet for units ranging from 12 - 17.5 kW (42 - 60 MBH) and a 48 inches wide by 34 inches deep cabinet for units ranging from 28 - 35 kW (96 - 120 MBH).

The system is available in two airflow patterns: Upflow and downflow. Cabinet height is determined by these airflow patterns. See the STULZ CyberOne EC Chilled Water Engineering Manual for cabinet dimensions, with and without the optional discharge plenum box assembly.

<u>NOTE</u>

The CyberOne ECCW system is designed to supply air to only one room.

The system's functional modes of operation, in addition to cooling, are heating, humidification and dehumidification, which provide complete environmental control of a conditioned space.

An advanced E^2 series microprocessor controller is mounted inside the CyberOne EC CW electric box. This controller provides superior features for comprehensive control of the unit. These features include: a full alarm system; input/output monitoring status; full integrated control of heating, cooling, humidification, and dehumidification; multi-A/C unit control; and remote communication with building management systems.

The E² user interface terminal is typically factory mounted on the front access door of the unit. As an option, the small bezel terminal may be shipped loose for remote mounting to a wall or control panel.

An operating manual for the system controller is provided under separate cover. Refer to that manual for detailed instructions on operating the system controller provided with your unit.

1.4 General Design

The CyberOne EC CW is housed in a steel frame type cabinet and is rated for indoor use. The exterior of the cabinet is coated with a powder coat finish to protect against corrosion. A hinged door is located in the front of the cabinet for easy access to all components. Operator controls are conveniently located on the front of the cabinet.

NOTE

Customer specified non-standard features or design variations may not be described in this manual. Refer to the installation and/or electrical drawings supplied with your unit for details on additional feature(s). In some cases, an addendum to this manual may also be included to further describe the feature(s).

Figure 1 depicts the internal layout of a typical CyberOne EC CW downflow unit and identifies the major components. The location of major components vary depending on the model number and options purchased.

Figure 2 depicts a typical internal layout of a typical CyberOne EC CW upflow unit and identifies the major components. The location of major components vary depending on model number and options purchased.

1.4.1 Electric Box

The unit's electrical components are mounted in the electric box behind a front hinged access door. The access door is safety interlocked with the main power service disconnect switch (See Figure 1 and Figure 2), preventing the door from opening when the switch is in the On position. The switch must be set to Off to gain access to the electric box.



Figure 1. Typical CW Internal Layout- Downflow Configuration



Figure 2. Typical CW Internal Layout- Upflow Configuration

The service disconnect switch may be used to turn the unit off for emergency shutdown or when routine maintenance is performed. The handle of the switch may be tagged/locked in the Off position to prevent unintended operation.

NOTE

Electric box components are labeled with reference designators. See the unit electrical drawing provided in the data package to identify the components.

1.4.2 Circuit Breakers/Motor Start Protectors

CyberOne EC CW systems incorporate state of the art component protection with the use of motor start protectors and circuit breakers located in the electric box. If an overload occurs, the switches must be manually re-set after the overload condition is cleared.

1.4.3 Coil(s)

Cooling and optional hot water re-heating coils are aluminum finned/copper tube construction. The coils are leak tested and cleaned before installation by the factory.

1.4.4 EC Fan

The unit is equipped with a high efficiency, electronically commutated (EC) fan. EC fans have a brushless motor equipped with permanent magnets and permanently lubricated ball bearings. The fan impellers are backward curved and attached to the rotor casing. The fan is balanced and aerodynamically optimized to minimizevibration.

The fan does not use drive belts. Fan speed is variable, controlled by a 0 to 10 VDC signal from the system controller. The fan motor is equipped with integral electronics and does not require the addition of secondary electronics such as thermal protection, inverters or filters. The fan will not produce AC inverter whine.

EC fans feature an integrated monitoring function to protect the motor and electronics against damage from jamming, phase loss or overheating. If any of the following failure conditions occur, the motor automatically stops and an alarm is signaled:

- a. Locked rotor¹
- b. Loss of a phase¹
- c. Low main supply voltage²
- d. Over-heating of electronics²
- e. Over-heating of motor²

¹ Upon correction of these failure conditions, the motor will automatically reset.

² Upon correction of these failure conditions, the motor must be manually reset by turning off power for 20 seconds.

1.4.5 Temperature/Humidity Sensor

As a standard for room air control, a temperature/humidity (T/H) sensor is factory mounted in the return air stream. The T/H sensor monitors the return air conditions and provides input signal(s) to the system controller to manage the operation of the A/C unit consistent with the set points entered in the system controller. As an option, sensor(s) may be shipped loose for field installation. Refer to the electrical drawing supplied with your unit for details specific to your system.

1.5 Optional Equipment

1.5.1 Heater

An optional electric or hot water heater may be mounted in the supply air stream after the cooling coils to reheat supply air, as may be required to offset the sensible cooling of the system during the dehumidification cycle, and for the automatic heating mode.

1.5.1.1 Electric Reheat

For this option, electric resistance heating elements are factory installed.

1.5.1.2 Hot Water Re-heat

For this option, hot water heating coil(s) are factory installed. A 2-way or 3-way modulating valve is provided to control the flow of hot water through the coils to maintain the correct re-heat temperature.

1.5.2 Humidifier

CyberOne EC systems are offered with an optional electrode steam humidifier. The humidifier is factory installed inside the air conditioner and includes fill and drain valves and associated piping. Operation of the humidifier's fill and drain cycles is based on water conductivity and is maintained by the humidifier controller. An operating manual for the humidifier is provided under separate cover. Refer to that manual for detailed information on operation of the humidifier.

1.5.3 Condensate Pump

An optional factory-installed condensate pump may be provided. The pump automatically eliminates condensate and humidifier flush water (if applicable) from the drain pan. Should an overflow occur, an internal overflow safety switch will signal the E^2 system controller of the alarm condition.

1.5.4 Water Detector

1.5.5 As an option, STULZ offers spot type or strip/cable type water detectors. Upon sensing a water leak, the water detector control circuit will signal the A/C system controller of the alarm condition.

1.5.6 Smoke Detector

Optionally mounted in the return air stream, a photo-electric smoke detector is used to sense the presence of smoke and signal the controller when a smoke alarm condition exists. The controller responds by shutting down the system.

1.5.7 Firestat

Optionally mounted in the return air stream, a fire detector senses high return air temperature and signals the controller when afire alarm condition exists. The controller responds by shutting down the system.

1.5.8 Remote Temperature/Humidity (T/H) Sensor

A T/H sensor may be selected as an option for use with the COS EC CW unit. The sensor will be shipped loose for field installation somewhere in the conditioned space away from the unit.

1.5.9 Remote-mounted Graphic Terminal for the E² Controller

A "small-bezel" E^2 graphic terminal may be selected for remote mounting to remotely control the E^2 controller. An optional 30 ft, 75 ft or 150 ft cable for connecting the graphic terminal to the E^2 controller may also be selected.

1.5.10 Floor stands

Seismic and non-seismic, open or enclosed, floor stands are available for downflow units in both COS EC CW footprints (042/060 and 090/120). Floor stands are available with or without a turning vane to direct the process air exiting a downflow unit.

1.5.11 Plenums and Plenum Extensions

2- and 3-way 18.5" discharge plenum boxes are available for upflow units, and 24", and 36" plenum extensions are available for downflow and upflow units.

2.0 INSTALLATION

2.1 Receiving the Equipment

Your CyberOne EC CW precision A/C system has been tested and inspected prior to shipment. To ensure your equipment is received in excellent condition, visually inspect the equipment immediately upon delivery. Carefully remove the shipping container and all protective packaging. Remove the access panels and thoroughly inspect the unit interior for any signs of transit-incurred damage. If there is shipping damage, it must be noted on the freight carrier's delivery forms before signing for the equipment. Any freight claims must be done through the freight carrier; STULZ can assist in the claim filing process with the freight carrier. STULZ ships all equipment FOB. Should any damage be present, notify STULZ Product Support prior to attempting any repairs. Refer to "5.0 Product Support" on page 19 of this manual for instructions.

A unit data package was sent with your unit. It contains this manual, a supplemental microprocessor controller manual, system drawings, applicable SDS's, warranty registration, other component manuals and applicable instructions based on the configuration and options of your unit. The data package has been placed in your unit in a clear plastic bag. These documents need to be retained for future reference.

NOTE

Items that have been shipped loose, such as controller terminal, temperature/humidity sensors, water detectors, etc., are shipped inside the air conditioner unless specified otherwise by the customer. A plenum box (if applicable) is shipped separately. Unpack and store these items in a safe place unless you are using them immediately.

2.2 Moving the Equipment

CyberOne EC CW systems are designed to be kept in a vertical position. The unit is shipped on a skid to facilitate moving prior to installation. Move the unit with a suitable device such as a forklift, pallet jack or roller bar and dollies capable of handling the weight of the unit. The unit should always be stored indoors in a dry location prior to installation.

When moving the unit it must be lifted vertically and kept in a level position to prevent damage.

2.3 Site Preparation

CyberOne EC CW systems are designed with easy service access in mind. A hinged access door is provided on the front of the unit and removable access panels are located on each side. In order to have full service access to internal components, no permanent obstructions should be placed in front of the unit. See Figure 3 for the minimum recommended front installation clearance.

NOTE

Working clearance requirements need to be established prior to mounting the unit. Refer to local and national electrical codes.



Figure 3. Recommended Installation Clearance

When determining the installation location consider how you will route the piping and wiring into the cabinet and ensure access is available (see "2.7 Piping Connections" on page 11). Pilot holes for piping and wiring are located on the CyberOne EC CW unit based on the configuration. On an upflow configuration, the pilot holes are located in the top of the cabinet. On a downflow configuration, they are located in the floor of the cabinet. See the installation drawing provided with your unit for pilot hole locations.

2.3.1 Conditioned Space

Certain steps should be taken to minimize the effects of the environment surrounding the conditioned space. This is especially important for critical/precision room preparation (computer rooms/labs) requiring close tolerance control of temperature and humidity. The conditioned space should be well insulated and include a vapor barrier. The installer should ensure that the proper insulation rating is used based on the design of the space, which was the basis for the system selected. The following table is a recommended minimum R-value (thermal resistance) to ensure optimum equipment operation.

Structure	R-Value
Ceiling	R-38
Wall	R-21
Floor	R-19
Door	R-5

The vapor barrier is the single most important requirement for maintaining environmental control in the conditioned space. The vapor barrier in the ceiling and walls can be a polyethylene film. Concrete walls and floors should be painted with a rubber- or plastic-based paint. Doors and windows should be properly sealed and a door sweep used to minimize leakage. Outside or fresh air should be kept to a minimum (as it adds to the cooling, heating, dehumidification and humidifying loads), while maintaining the requirement of the Indoor Air Quality (IAQ) standard. Ignoring the above can cause erratic operation, unstable room control and excessive maintenance costs.

2.4 Mounting/Placement

CyberOne EC CW systems that are not ducted are designed to be located in the conditioned space. Ducted units may be located either inside or outside the space to be conditioned but are designed to supply air to only one room. They have a compact footprint which allows the units to be placed in a corner or between cabinetry. It is recommended to position the unit to obtain optimum air circulation.

NOTE

These units use welded frame construction for unit rigidity. The system is designed to be installed on a roof curb, which is provided by others and ducted into a singular space to be conditioned. Ensure the curb is sealed to prevent air leakage. See the detail drawing provided with the unit for interface dimensions. These units are designed to be ducted to a space to be conditioned and are intended to condition only one room.

NOTE

Placement of the floor or ceiling registers is important. If they are too close to the unit, the supply air will be recirculated back to the unit before it has circulated throughout the space.

The unit is designed to be located directly on top of the floor (typically upflow) or on a raised floor (typically downflow).

Ensure the mounting surface is capable of supporting the equipment. Before mounting the unit, refer to the weight table provided on the installation drawing. On some raised floor installations, a floor stand is required, depending on the load capacity of the existing raised floor.

2.4.1 Floor Mounting

The CyberOne EC CW unit uses a frame and panel construction for unit rigidity and full service accessibility while the unit is mounted in place.

If a floor stand is selected (see Figure 6), refer to the installation drawing provided and cut out the raised floor to match the unit's overall base dimension. If a floor stand is not selected, use the installation drawing and cut out the raised floor to match the blower discharge opening(s) and cut out the holes required for piping and wiring through the raised floor.

<u>NOTE</u>

The equipment must be level to operate properly.



Figure 4. Downflow Configuration Typical Air Patterns

2.5 Air Distribution Connection

2.5.1 Downflow Configuration Air Patterns

In a downflow unit, the conditioned supply air discharges through the bottom of the unit, typically into a raised floor. There are two basic return air patterns: top free return and top ducted return (see Figure 4).

If ductwork is to be installed, always consult your local and state codes to determine ducting requirements. The duct system should be designed to allow the air to move with as little resistance as possible.

The return inlet is provided with flanges for connecting ductwork. Refer to the installation drawing provided with the unit. Ductwork may be connected with either pop rivets or self-tapping screws.

2.5.2 Upflow Configuration Air Patterns

In a configured unit, the conditioned supply air has two methods of discharge: Ducted or through a 2- or 3-way grilled discharge plenum box (see Figure 5). There are two basic air patterns: front free return and rear ducted return. Consult your local or state codes to determine ducting requirements before ducting the unit. The duct system should be designed to allow the air to move with as little resistance as possible.

Supply air outlets and the rear ducted return are provided with flanges for connection of the ducting. Refer to the installation drawing provided with the unit. Ductwork may be connected with either pop rivets or self-tapping screws.



TOP DISCHARGE- 2 OR 3-WAY PLENUM BOX

Figure 5. Upflow Configuration Typical Air Patterns

2.6 Optional Equipment (Field Installed)

<u>NOTE</u>

Do not mount any optional equipment on the unit access doors.

2.6.1 Floor Stand

Install the floor stand (see Figure 6) directly on the sub-floor on the isolation pads supplied, ensuring the side with the FRONT label is facing the same direction as the front of the precision A/C unit. Refer to the floor stand assembly drawing for the dimensions required to cut the raised floor. The optional floor stand is designed with adjustable feet on all the legs allowing for leveling and overall height adjustment. Refer to the floor stand assembly drawing for minimum and maximum height adjustability of your floor stand. To adjust the height, first loosen the middle hex nuts on each leg. Next, turn the top hex nuts to raise or lower the floor stand. Once the floor stand is level and even with the raised floor, lock all feet in place by tightening the middle hex nuts against the top hex nuts.

2.6.2 Remote Controller Terminal

As an option, the E² controller terminal may be remotely mounted. Refer to the system drawings and supplemental controller manual sent in the data package with your unit for mounting and wiring instructions.



Figure 6. Optional Floor Stand Installation

2.6.3 Remote Temperature/Humidity Sensor

The remote temperature/humidity (T/H) sensor must be located so that it will properly sense the temperature/ humidity conditions to be controlled. The T/H sensor should not be mounted near a doorway or an area where it would be exposed to direct sunlight. When locating the sensor, consider the length of wire to be used. As an option, a 75 foot or 150 foot long cable may be provided by. Follow the steps below to mount the sensor.



Temperature /Humidity Sensor

1. Remove the cover from the base of the sensor by squeezing it at the top and bottom.

Take care not to damage the exposed temperature/ humidity sensors on the PC board when the cover is removed. The sensors can be damaged if handled improperly.

- 2 Temporarily place the base against the mounting surface.
- 3. Level the base. Mark and drill mounting holes through at least two of the available slotted holes.
- 4. Run a 3-conductor shielded cable through the opening in the base, then secure the base with screws ensuring the word TOP on the PC board is oriented upward.
- 5. Make the wiring connections. Refer to "2.8 Utility Connections" on page 12 and the wiring diagram supplied with your unit.
- 6. Seal the hole in the wall behind the sensor.
- 7. Replace the cover plate on the base.

2.6.4 Remote Water Detector

The remote water detector is normally placed on the sub-floor or in a field-supplied auxiliary drain pan located beneath the unit. provides two types of water detectors, installed as follows:

Spot type water detector

Remove the protective cover and connect two control wires

to the terminals on the base (terminal lugs are provided). Replace the cover and place the water detector(s) on the floor with the metal electrodes facing down. When water is present, current will flow between the electrodes. The base is provided with a mounting hole in the center which may be used to secure the water detector in place.



NOTE

Do not place the spot type water detector on an electrically conductive surface.

Cable type water detector

Lay the cable water detector flat across the sub-floor where

water could collect. When water is present, current will flow between the two wires. A two conductor wire harness is provided with a quick connect



fitting on the end. The harness mates to the fitting on the water detector cable and connects it to the terminal block inside the electric box.

2.6.5 Plenum Box Assembly

If an optional plenum box (plenum extension box or 1-, 2- or 3-way discharge plenum box) is purchased it is typically shipped loose. To install a plenum box, first apply a strip of sealing foam around the top flange of the A/C unit or, run a bead of silicone sealant. Place the plenum assembly on top of the unit as shown in Figure 5 on page 9. Attach the plenum with the self-tapping screws provided. Holes are pre-drilled in the unit and the plenum box. If mounting an air distribution plenum box, the grilles may be removed for access to the mounting holes.

2.7 Piping Connections

For downflow models, piping is routed through the bottom of the cabinet. For upflow models, the piping is routed through the top of the cabinet. If an optional plenum box is installed, drill holes in the top or in the side of the box, as preferred, to route the piping out.

2.7.1 Condensate Drain

2.7.1.1 Gravity Drain

A 7/8 inch O.D. copper (sweat type) line is provided to drain the condensate pan. An S-trap is internally-installed in the condensate drain piping. An installer should connect a 7/8 inch I.D. drain line to remove water from the cabinet. If an optional humidifier is used, the drain line from the humidifier is typically connected to the condensate drain line.

NOTE

During normal operation, the humidifier drain line discharges (hot) water into the condensate drain line.

The drain line must be located so it will not be exposed to freezing temperatures. The diameter of the drain line should be the full size of the connection.

NOTE

Pour some water into the condensate drain pan(s) prior to start-up. This fills the trap and prevents air from being drawn up the drain lines.

2.7.1.2 Condensate Pump

An optional condensate pump is normally factory installed. The drain connection line is typically 1/2" I.D. vinyl tubing or a 1/2" O.D. copper (sweat connection) maybe used.



Figure 7. Condensate Pump

2.7.2 Humidifier

CyberOne EC CW systems optionally include an electrode steam humidifier. The humidifier empties into the condensate drain line during the flush/drain cycle. A water supply line must be connected to the 1/4" O.D. copper tubing connection supplied by the factory. Refer to the installation drawing supplied with your unit for the location of the water supply connection. The humidifier requires normal tap water for the water supply. If the supply water is high in particulates an external filter may be needed.



Do not use demineralized water in the humidifier.

Refer to the humidifier operator's manual, supplied with the equipment, for complete manufacturer's information on the humidifier and the supply water recommendations.

2.8 Utility Connections

2.8.1 Main Power

The CyberOne EC CW uses three phase power in a range of voltages. The operating voltage, frequency and phase provided to the unit must match the specifications on the unit nameplate (See Figure 8). The nameplate also provides the full load amps (FLA), the current the unit will draw under full design load, the minimum circuit ampacity (MCA) for wire sizing, and the maximum fuse or HACR (Heating, Air Conditioning, Refrigeration) breaker size (MAX FUSE/CKT BKR) for circuit protection. The unit's nameplate is located inside the electrical box.

The unit is equipped with terminals for all required field-wiring. Refer to the electrical drawing supplied with the unit for all power and control field-wiring. It is important to identify the options that were purchased with the unit in order to confirm which field connections are required.

<u>NOTE</u>

If the nameplate states MAX FUSE/CKT BKR, fuses or an HACR-type circuit breaker must be used to protect the system. Other protection devices are not allowed based upon the product listing.

The unit is provided with main power and control pilot holes for connecting field-wiring conduits. These pilot holes are located on the CyberOne EC CW unit based on the configuration. On an upflow unit, the pilot holes are located in the top of the cabinet. On a downflow unit, they are located in the floor of the cabinet. A label stating "MAIN POWER INPUT" is placed in close proximity. See the installation drawing provided with your unit for pilot hole locations. Terminate the main power wires at the line side of the main power service disconnect switch located in the electric box. A separate equipment ground lug is provided in the electrical box for connecting an earth ground wire.

NOTE

Use only copper conductors in wiring connections. Wiring terminations may become loose during transit of the equipment; therefore, verify that all wiring terminations are secure.



Verify power is turned off before making connections to the equipment.

A main distribution panel must be provided with a manual fused disconnect switch or HACR-type circuit breaker for service to the equipment, per local and national electrical codes. Do not mount a customer supplied manual fused disconnect switch or HACR-type circuit breaker to the surface of the unit.

Manufactu	red By
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Item Number:	
Serial Number:	
Electrical Data:	
SCCR: kA RMS Sym	metrical
Voltage: Phase:	Hz:
No. Wires: (Includin	ng Ground)
MAX EncalCity Birs (HACE	toma ner NECh: A
Hester: kW (N	ominal)
Humidifier: kW (N	ominal)
Evaporator Motor (1): HP:	FLA:
Evaporator Motor (2): HP:	FLA:
Condenser Motor (1): HP:	FLA:
Condenser Motor (2): HP:	FLA:
Condensate Pump: HP: Compressor (1): FLA:	FLA:
Compressor (2): RLA:	LRA:
Refrigerant Type: R407C	
Charge: Circuit #1: I	b oz
Charge: Circuit #2: 1	b oz
High Side Design Pressure: Low Side Design Pressure:	278 psig 144 psig
Max. Output Air Temperatu Blower/Fan Ext. Static Pres	are: "F s.: in.w.g.
Max. Inlet Hot Water Temp	. 7
Hot Water or Steam Pressu	re: psig
Minimum Installation Clear	rance: 0.0 in.
Remote Condenser Type:	
Suitable for Indoor:	Outdoor: 📗 Use
Date of Manufacture:	
Q.A. Acceptance: 1	

Figure 8. Sample Nameplate

An adequate earth ground must be connected to the unit before operating the unit.

<u>NOTE</u>

All wiring must be provided in accordance with local and national electrical code requirements.

Verify the main power supply matches the voltage, phase and frequency specified on the system nameplate. The supply voltage measured at the unit must be within $\pm 10\%$ of the voltage specified on the system nameplate.

Do not connect any additional loads to the system control transformers. Connecting additional loads to the factory supplied control transformer(s) may overload the transformer(s).

2.8.1.1 Three-Phase Wiring Connections

CyberOne EC CW units are designed to have the L1, L2 and L3 supply wires connected to corresponding L1, L2 and L3 line terminals on the non-fused service switch. The unit will operate correctly if the supply wires are connected in this manner.

2.8.2 Controls

STULZ offers a wide range of control features to meet your air conditioning control/alarm requirements. If the system controller is mounted on the unit (standard), no utility connection is required. As an option, the E² controller terminal may be remotely mounted. A six-conductor cable is provided for interconnect wiring. Refer to the electrical drawing supplied with your unit for details on interconnecting the field wiring.

2.8.3 Optional Equipment

<u>NOTE</u>

All wiring must meet local and national electrical code requirements.

2.8.3.1 Remote Temperature/Humidity Sensor

The remote temperature/humidity sensor requires a shielded cable with the shield terminated at the unit electric box. Three control conductors are required. Both the electric box and the sensor include a terminal strip with box-type lugs for wire connections. Refer to the electrical drawing supplied with your unit for the appropriate wire terminations.

2.8.3.2 Remote Water Detector

Each remote water detector used will require two conductors to be wired to the control terminal board in the unit electric box. The wire insulation must be rated at 600V. Refer to "2.6.4 Remote Water Detector" on page 10 and see the electrical drawing supplied with your unit for proper wire terminations.

2.8.4 Humidifier Adjustment

The humidifier has an adjustable capacity potentiometer on the humidifier control circuit board. The potentiometer may need to be field adjusted if the humidifier is not supplying enough capacity for the current room conditions.

It is recommended that if the humidifier capacity potentiometer requires adjustment, the adjustment is made in small increments and verified. Refer to the humidifier manual sent with your unit for the capacity potentiometer location.

Adjusting the capacity potentiometer too high may result in the formation of condensate within the system.

2.9 EC Fan

The speed of the EC fan is controlled via a 0 to 10 VDC signal from the system controller. The controller is set by the factory and should not require adjustment. If it is determined that the air flow needs adjustment, this may be done using the controller's programming menu selections. Refer to the operator's manual provided under separate cover for the system controller. It is recommended that STULZ Product Support be contacted before making adjustments to the controller.

3.0 START-UP/COMMISSIONING AND UNIT SHUTDOWN

3.1 Operation

For new installations, ensure the unit is ready to operate by completing the Start-Up Checklist contained in the data package that accompanied your unit.

<u>NOTE</u>

A Warranty Registration and Start-Up Checklist is provided in the unit data package. It should be completed during start-up and sent to STULZ. This checklist should be used as a guideline for items that need to be confirmed during start-up.

Start-up must be performed by a journeyman, refrigeration mechanic or an air conditioning technician.

3.2 Step by Step Start-Up Instructions

- 1. Replace all equipment removed prior to performing the start-up checks.
- 2. Apply power to the CyberOne ECCW system at the main power disconnect switch.
- 3. Ensure that all blowers and fans are rotating correctly and freely without any unusual noise.
- 4. Test cooling operation by setting the temperature set point below the actual room temperature to create a demand for cooling. The discharge air should feel cooler than the return air.
- 5. Test optional heating operation by adjusting the temperature set point above the actual room temperature. The source of heat should be energized to increase discharge air temperature.

For Electric Reheat, use an amp meter on the heater circuit to verify the heater is operational. For Hot Water Reheat, ensure the control signal has energized the control valve and the temperature of the water has decreased as it passes through the unit.

6. If a humidifier is present, test humidification operation by creating a demand for humidification. Use an amp meter to determine current draw of the humidifier. Visually check for vapor leaving the steam head or feel if the cylinder is warm to verify the humidifier is operational. In all cases, one to six hours might be required to see a desired level or rise in humidity in the conditioned space. Once room conditions have been programmed or set, a repeat visit to the conditioned space may be required to ensure the humidifier is meeting the room's requirements. An Operation and Maintenance manual for the humidifier is provided with your unit under separate cover. Refer to that manual for detailed information on humidifier operation.

3.3 Microprocessor Controller Programming

The E^2 microprocessor controller is factory programmed based on the model of the A/C system and optional features selected. Most applications require no field start-up or program adjustment beyond setting the current date and time. Separate operating instructions for the controller have been sent with your unit, including each feature's factory "default" setting and the available adjustment range, if applicable.

3.4 Unit Shutdown

To shut down the unit, command the shutdown from the BMS managing the unit or use the user interface terminal connected to the unit controller to power down the unit, as described in the controller operator manual.

To perform an emergency shutdown, set the main power disconnect switch to the Off position.

4.0 MAINTENANCE

4.1 Periodic General Maintenance

Systematic, periodic general maintenance of the CyberOne EC CW unit is required for optimal system performance. General maintenance should include, but not be limited to, the following: Replacing filters and humidifier cylinders, tightening electrical connections, checking the condensate drain line to ensure it is free of debris, cleaning the interior of the unit, visually inspecting the unit's components.

Use copies of the Periodic General Maintenance Checklist located in the back of this manual to record periodic general maintenance inspections. For assistance, contact STULZ Product Support. Follow all safety statements while performing any type of maintenance.



This equipment should be serviced and repaired by a journeyman refrigeration technician only. This unit employs high voltage equipment with rotating components. Exercise extreme care to avoid accidents and ensure proper operation.

Hazardous voltage will still be present inside the electric box at the motor start protectors and circuit breakers, even with the unit turned off at the microprocessor controller. To isolate the unit for maintenance, turn off power at the main power disconnect switch. Always disconnect main power prior performing any service or repairs.

Turn off power to the unit unless you are performing tests that require power. With power and controls energized, the unit could begin operating automatically at any time. To prevent personal injury, stay clear of rotating components as automatic controls may start them unexpectedly.

4.2 Maintenance Procedures

4.2.1 Air Filter

The air filter is usually the most neglected item in an air conditioning system. Tomaintain efficient operation, the filter should be checked at least monthly and replaced as required.

NOTE

Air quality in conditioned spaces varies. A schedule for checking air filters should be based on those conditions.

4.2.2 EC Fan

Periodically check the EC fan system wiring, motor mounts, housing and impeller wheel. Ensure all electrical connections are tight. Verify all mounts are secure and the impeller wheel is tightly mounted. Impeller blades should be kept free of debris.

4.2.3 Drain Pan

Inspect the drain pan on a monthly basis to ensure proper drainage. Ensure the drain pan outlet is always free of debris and the drain pan does not leak.

4.2.4 Coils

Coil(s) should be inspected semi-annually and cleaned as required, following standard coil cleaning practices. Using a brush, clean the coil fins of all debris that will inhibit airflow. This can also be done with compressed air or with a commercial coil cleaner. Check for bent or damaged coil fins and repair as necessary. Check all lines and capillaries for vibration isolation and support as necessary. Check all piping for signs of leaks.

4.2.5 Heat/Reheat

The heat/reheat equipment should be inspected semiannually to ensure it is operational. If you have electric heat/ reheat, inspect the heating elements to ensure they are free of debris.

4.2.6 Humidifier

The steam cylinder has a limited lifetime and must be replaced periodically. Because water conditions and humidifier usage rates vary greatly, it is difficult to establish intervals for changing the cylinder. Individual maintenance schedules must be determined for each location, based upon periodic examination of the humidifier. A yellow LED on the humidifier cabinet will flash four times in a repeating pattern when the cylinder requires replacement.

<u>NOTE</u>

The yellow LED may illuminate during initial startup but it doesn't necessarily mean the cylinder needs to be replaced.

Refer to 4.4.2 Humidifier Cylinder Replacement and the humidifier operator's manual supplied in the unit data package for detailed instructions on changing the cylinder.

4.2.7 Condensate Pump

The condensate pump should be inspected semi-annually and cleaned. Ensure that the float works freely. Wipe the float with a wet cloth and detergent to remove dirt. Clean the tank bottom. Check that the discharge line is open and water can pass through it freely.

4.3 Troubleshooting

Turn off all power to the unit before conducting any troubleshooting procedures, unless the procedure specifically requires the system to operate. For troubleshooting purposes the system may be operated with the doors open by using a pair of channel lock pliers to turn the shaft of the main power disconnect switch to the "On" position. When the switch is turned on, high voltage will be present inside the cabinet. Exercise caution to prevent injury. Keep hands, clothing and tools clear of the electrical terminals and rotating components. Ensure that your footing is stable at all times.

Symptom	Probable Cause	Recommendation		
Chilled Water Valve Fails to Open	Temperature setpoint too high or low	Adjust to correct temperature setting.		
	No control power to the chilled water valve	Valve actuator is wired incorrectly. Check wiring schematic and rewire if required.		
	Actuator failed	Replace actuator.		
	Power failure.	Check main power source voltage. Check power Input cable.		
EC Fan(s) Fail to Start	Motor starter protector (MSP) tripped.	Reset motor starter protector and check amperage of motor. Compare to setting on the motor starter protector and adjust the MSP to the correct FLA if necessary.		
	Control transformer circuit breaker tripped.	Check for short circuit or ground fault. If none, reset circuit breaker.		
	No Modbus control signal to fan(s).	Check for a Modbus control signal at each fan. Refer to the electric drawing to determine the correct terminals to check.		
		Determine the cause of the interruption and correct. Possible causes are:		
	EC fan's internal overheat protection interrupted fan motor operation	1. Blocked rotor.		
		2. Low supply voltage > 5 seconds.		
		3. Loss of phase > 5 seconds.		
		After causes 1, 2, and 3 are corrected, the motor		

Troubleshooting

Symptom	Probable Cause	Recommendation		
		will automatically reset.		
		4. Over-temperature of electronics.		
		5. Over-temperature of motor. After causes 4		
		and 5 are corrected, the fan(s) must be manually		
		reset by turning off power for 20 seconds.		
	Defective fan.	Repair or replace.		
Control is Erratic	Wiring improperly connected or broken.	Check wiring against schematic diagram.		
	Low chilled water flow	Locate leak and repair. Recharge system.		
System Short of Capacity	Supply water temperature too high	Remove and clean or replace valve.		
	Clogged drier/strainer (feels cold).	Replace with new drier/strainer.		
	Reduced airflow	Check filters and dampers.		
	Dirty coil	Clear coil fins of debris.		
	Circuit breaker tripped	Check for short circuit; reset circuit breaker.		
Electric Heater	Temperature setpoint too low	Increase temperature setpoint.		
	Overheat switch open	Insufficient air flow across heater elements. Check for dirty filters or obstructions that may reduce air flow. Correct or replace as needed.		
Inoperable	Manual reset overheat safety switch tripped	Reset manual overheat safety switch (see item immediately above).		
	Heater element burned out	Check continuity with an ohmmeter Replace heater element.		
	Defective contactor	Repair or replace.		
Hot Water	Low hot water flow	Check hot water flow at supply source. Inspect piping for leaks or obstructions.		
Heater	Hot water supply temperature too low	Check hot water supply.		
	Temperature setpoint too	Increase temperature setpoint.		

Symptom	Probable Cause	Recommendation
	low	
	Control power interrupted	Check for loose or broken wires.
	Water supply has been turned off or is not connected	Connect and/or turn on water supply.
	Humidifier switch is in Off position	Turn switch to Auto/On position.
	Electrical connections are loose.	Tighten electrical connections.
Humidifier Inoperable NOTE : See Humidifier Manual for Additional Help.	Humidifier circuit breaker tripped.	Check for excess current draw by the humidifier electrodes.
		Drain water from tank and refill.
		Reset circuit breaker.
	Defective contactor	Repair or replace.
	Relative humidity is above setpoint.	Adjust humidity setpoint.
	Electrode canister change cylinder light is on.	Consult humidifier manual. Water conductivity is too low and water is at the top of the cylinder (see next item).
	Water conductivity is too low.	Add a teaspoon of table salt to the water through the top of the cylinder. Typically, this is only required on initial start-up.

4.4 Field Service

NOTE

Do not attempt to make repairs without the proper tools.

4.4.1 CW Leaks

A leak in a chilled water cooling system will usually form an obvious puddle of fluid beneath the unit. To locate the point of leakage, visually trace the leak up from the puddle to the area on the unit where fluid is seen dripping.

4.4.1.1 CW Leak Repair

When a leak is detected, properly reclaim the remaining CW coolant before attempting repairs. Adjacent piping must be thoroughly cleaned by removing all paint, dirt and oily film. Use a wire brush, sandcloth or sandpaper and wipe the area with clean, dry cloths. Protect nearby parts from heat damage by wrapping with water-soaked cloths.

For copper-to-copper (piping) repairs use SILFOS Alloy. No flux is required with Silfos Alloy. Silver solder (Stay Silv #45) and flux should be used on copper-to-brass or copper-to-steel repairs.

When repairs are completed, remove all traces of flux. After any repair, check for leaks prior to recharging the system.

4.4.2 Humidifier Cylinder Replacement

After an extended period of operation, the yellow LED on the humidifier cabinet will repeatedly flash four times indicating that the cylinder is completely used and a replacement cylinder must be installed. The cylinder is disposable and cylinder life is dependent on water supply conditions and humidifier usage. Use the following procedure to replace the cylinder.

Failure to replace the cylinder at the end of cylinder life may result in humidifier damage.

<u>NOTE</u>

Decrease the humidity set point below actual conditioned space humidity to allow the cylinder to cool down prior to removal.

- 1. Turn the unit off, preferably in a manner that uses the controller, such as via BMS or the controller terminal.
- 2. Turn off the water supply to the humidifier using the small manual ball valve (in the unit skid, under the compartment where the humidifier is located) that tees off the main water supply.

- 3. Enter the cabinet section that houses the humidifier and drain the humidifier cylinder by toggling the ON/OFF/ DRAIN switch on the humidifier to DRAIN.
- 4. Allow the cylinder to completely drain then turn the humidifier off by toggling the ON/OFF/DRAIN switch on the humidifier to OFF.
- 5. Exit the cabinet and turn off main power using the through-door disconnect switch on the door of the Unit Control Box.
- 6. Follow the steps of the cylinder removal, drain valve cleaning and cylinder installation procedures in the humidifier installation and operation manual, which was provided under separate cover with your unit.
- 7. Close up the cabinet and turn main power on using the through-door disconnect switch on the door of the Unit control box.
- 8. Open the manual ball valve that was closed in Step 2.
- 9. Turn the unit on and readjust the humidity set point.

If the humidifier is to be shut down for an extended period, follow the steps of the Extended Shutdown procedure in the Nortec MES2 Installation and Operation Manual.



Failure to perform the recommended Extended Shutdown procedure before a prolonged shutdown period will drastically shorten cylinder life.

4.4.3 Air Filter Replacement

To change the air filters, open the front doors of the cabinet. The air filters are accessed from inside the cabinet (except for upflow units with rear return). For upflow units, the filters are located behind the air intake grilles. For downflow units, the filters are located at the top where the label "FILTER ACCESS" appears. Remove the old filters from the trays. Insert the new filter(s) ensuring the directional airflow arrows on the filters are correct, then close the front doors.

5.0 PRODUCT SUPPORT

STULZ Product Support provides aftermarket technical and field support, warranty authorization and part sales to contractors and end users. Factory authorized services are available by request and include:

- □ FactoryAuthorizedStart-up/WarrantyInspection
- □ Commissioning Assistance
- Break Fix Repair
- □ Preventive Maintenance Contracts
- □ Performance Evaluations
- □ Technician and Owner Training

5.1 Technical Support

The STULZ Technical Support Department is dedicated to the prompt reply and resolution of issues experienced with supplied equipment. Please contact (888) 529-1266 Monday through Friday from 8:00 a.m. to 5:00 p.m. EST. After hours support is also available. Please provide your name and contact information and a support technician will return your call.

When calling to obtain support, it is important to have the following information readily available, (information is found on the unit's nameplate):

- Unit Model Number
- □ STULZ Sales Order Number
- □ STULZ Item Number
- □ Unit Serial Number
- □ Description of Problem

5.2 Obtaining Warranty Parts

All Warranty Parts Authorizations are validated and processed through the Technical Support Department at (888)529-

1266 Monday through Friday from 8:00 a.m. to 5:00 p.m. EST. A support technician at STULZ will provide troubleshooting assistance over the telephone. If it can be determined that a part may be defective, a warranty authorization for a replacement part will be processed by STULZ Technical Support. The replacement part will then be shipped via UPS ground. If the customer requests that warranty part(s) be sent by any other method than UPS ground, the customer is responsible for the shipping charges. If you do not have established credit with STULZ you must provide a freight carrier account number.

A written (or faxed) purchase order is required on warranty parts and must be received prior to 12:00 p.m. for same day shipment. The purchase order must contain the following items:

- Purchase Order Number
- Date of Order
- □ STULZ Stated Part Price
- □ Customer Billing Address
- □ Shipping Address
- □ Customer's Telephone and Fax Numbers
- Contact Name
- □ Unit Model Number
- □ Serial Number

The customer is responsible for the shipping cost incurred for returning the defective part(s) back to STULZ. Return of defective part(s) must be within 30 days, at which time an evaluation of the part(s) is conducted and if the part is found to have a manufacturing defect a credit will be issued.

When returning defective part(s), complete the Return Material Authorization Tag and the address label provided with the replacement part. For prompt processing, please affix the RMA in a prominent place on the external packaging of the returned part.

5.3 Obtaining Spare/Replacement Parts

Maintaining a recommended spare parts inventory is an industry best practice for critical facilities. On-site spares kits reduce downtime and can eliminate the cost of expedited freight charges. Recommended spares and replacement parts sales are available through Product Support at (888) 529-1266.

STULZ accepts Visa and MasterCard. STULZ may extend credit to its customers; a credit application must be prepared and approved (this process could take oneweek).

A 25% minimum restocking charge will be applied on returned stocked parts that were sold as spare/replacement parts. If the returned part is not a stocked item, a 50% restocking charge may be applied. Additionally a Return Material Authorization Number is required when returning parts. Repair/replacement parts may be returned for credit up to 30 days after purchase.

Maintenance Checklist

Prepared by	Model Number	
Title	Item Number	
Date	Serial Number	

Monthly

Filters	Y/N	Y/N Fans Y/N Condensate Drain		Y/N	
Cleanliness		Fan(s) rotate		Drain is open	
No obstructions				Condensate pan safety switch operates freely	
Additional					
Check chilled water/hot water circuits for air (bleed as required)					
Coils clean and clear of obstructions					
Humidifier cylinder and controls operate properly					

Semi-Monthly

Tasks	Y/N	Tasks	Y/N
Tighten electrical connections		Clean coils	
Check contacts on contactors for pitting		Clean condensate pump	
Heat/reheat operational		Inspect and clean CW screen	
Clean unit			

Annually

Tasks	
Inspect chilled water unit for leaks and corrosion	
Conduct a complete check of all services listed above	
Clean unit interior	

Comments

Identify below all unit concerns for follow up actions below.

If you need technical support, call 888 529 1266 or email stulztechnicalsupport@stulzats.com. Support is available 24/7/365. Provide the model number, serial number, and STULZ item number from the unit nameplate. This will speed up the process and ensure accuracy.

Signature:_____

Glossary

Term	Definition	Term	Definition	
ASHRAE	American Society of Heating, Refrigerating, and Air-Conditioning Engineers	ІТ	Information Technology	
BTUH/Hr	British Thermal Units Per Hour	ЮМ	Installation, Operation, and Maintenance Manual	
CFM	Cubic Feet Per Minute	Kw	kilowatt	
CNDCT	Conductor	kVA	Kilo Volt Amps	
COS	CyberOne	LWT	Leaving Water Temperature	
CRAC	Computer Room Air Conditioner	MAX CKT BKR	Maximum Circuit Breaker	
CRAH	Computer Room Air Handler	MAX FUSE	Maximum Fuse	
CW	Chilled Water	MCA	Minimum Circuit Ampacity	
DB	Dry Bulb	NEC	National Electric Code	
DF	Downflow	NFPA	National Fire Protection Agency	
CFM	Cubic Feet Per Minute	PH	Phase	
EC	Electronically Commutated	PSI	Pounds Per Square Inch	
DP	Dewpoint	PSIG	Pounds Per Square Inch Gauge	
DX	Direct Expansion	RLA	Run Load Amps	
ESD	Electrostatic Discharge	RMA	Return Material Authorization	
EST	Eastern Standard Time	R-Value	Thermal Resistance	
°F	Degrees Fahrenheit	SDS	Safety Data Sheet	
FLA	Full Load Amps	SPDT	Single Pole, Double Throw	
FOB	Freight on Board	UF	Upflow	
HGBP	Hot Gas Bypass	UL	Underwriters Laboratories	
HACR	Heating, Air Conditioning, Refrigeration	UPS	Uninterruptible Power Supply	
HP	Horsepower	V	Volt	
HVAC	Heating, Ventilation and Air Conditioning	VA	Volt-Amperes	
НХ	Heat Exchanger	VAC	Volt, Alternating Current	
Hz	Hertz	VFD	Variable Frequency Drive	
IAQ	Indoor Air Quality	W	Watt(s)	
in. w.g.	Inches of Water Gauge			



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